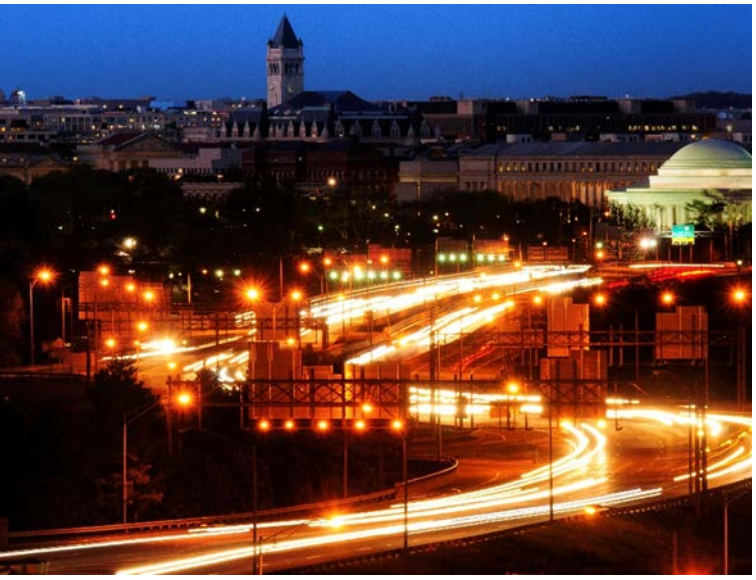

Multi-Sector Approach to Reducing Greenhouse Gas Emissions in the Metropolitan Washington Region

March 6, 2015

RFP No. 15-010

Submitted to:
Metropolitan Washington Council of Governments
777 North Capitol Street, NE, Suite 300
Washington, DC 20002
ATTN: George Hohmann
Contracts and Purchasing Manager

Submitted by:
ICF International
1725 Eye Street, NW
Suite 1000
Washington, DC 20006

Contact: Lauren Pederson
202-862-1258
Lauren.Pederson@icfi.com

March 5, 2015

Mr. George Hohmann
Contract and Purchasing Manager
Metropolitan Washington Council of Governments
777 North Capitol Street, NE, Suite 300
Washington, DC 20002

Dear Mr. Hohmann:

ICF Resources, LLC (and ICF International company hereinafter ICF) is pleased to provide our proposal for the *Multi-Sector Approach to Reducing Greenhouse Gas (GHG) Emissions in the Metropolitan Washington Region*. ICF's proposal is valid for 60 days from its submittal, at which time ICF reserves the right to revise the contents or extend the validity date, if needed. ICF has teamed with Renaissance Planning, Mondre Energy Inc., and Sharp & Company to provide a uniquely qualified consulting team that will enable the regions success in its GHG reduction initiatives.

The ICF team is the most qualified firm to support the Metropolitan Washington Council of Governments (COG) for this effort due to the following advantages:

- **Deep expertise in multi-sector regional climate action planning.** ICF offers an unparalleled breadth and depth of experience in climate action planning, including knowledge of GHG reduction strategies across all sectors. ICF has deep experience in supporting state and local agencies on climate change policies, including emissions quantification, analysis of mitigation strategies, program measurement, and training state and local officials. ICF has supported communities across the country in understanding the effectiveness and benefits of GHG reduction measures through EPA's State and Local Climate Change Program. In addition, we have developed multi-sector GHG inventories and projections for regions including the Delaware Valley Regional Planning Commission (DVRPC) in the Philadelphia metro area, the Chicago region, and 88 cities in Los Angeles County. ICF has also led regional GHG reduction plans for several regions and counties in California, and a multi-sector comprehensive sustainability plan with a target similar to COG's for a group of eight counties in the Southern Tier of New York State, to name a few.
- **Extensive experience using sketch planning tools and methodologies for effectively analyzing strategies and synergies among strategies.** Through our work in climate action planning, as well as sustainability and energy efficiency planning, the ICF team brings deep experience in developing and using sketch planning tools to effectively analyze GHG strategies across all sectors. Specifically, for EPA, ICF developed its Transportation Efficiency Analysis Method (TEAM), a sketch planning approach that relies upon local data inputs, the TRIMMS tool, and EPA's MOVES model to efficiently analyze the emissions impacts of transportation and land use strategies for long-range policy analysis. ICF team member, Renaissance Planning, has developed a new set of methods for estimating pedestrian and bicycle travel that have been applied and tested in various locations in the COG region. These new tools, developed from MWCOG data, should prove of special value for synergies among strategies identified in the land use and land use/transportation assessments featured in the MSWG study. In the energy field, ICF's Energy Efficiency Potential Model is widely used in utility energy efficiency planning studies. ICF has conducted energy efficiency program modeling for a wide array of energy providers and states and counties.

- **Unique understanding of the local context and issues in the Washington, DC metro region.** ICF brings experience not only nationally but regionally working on energy reduction, vehicle travel reduction, and GHG mitigation strategies in Maryland, Virginia, and the District of Columbia. For Montgomery County, ICF modeled technical potential and conducted a series of policy and program scenario analyses for helping the County reach its 25% energy savings goal for commercial buildings. ICF also supported Montgomery County under an EPA Smart Growth technical assistance support contract to analyze tools for assessing the GHG reduction potential of strategies in sector plans. ICF team member, Renaissance Planning, has past and ongoing involvement in key planning studies for the Virginia and Maryland Departments of Transportation, MWCOG's TLC program, and most if not all of COG's member jurisdictions.

Being a locally based firm (but with the depth of a global company), we are personally and professionally invested in Washington DC's national leadership in the areas of climate and clean energy. We also have put our commitment to sustainability and carbon reduction into practice in our own business practices. Our approach to this project will balance the desire for continued leadership and novel strategies with the practical realities facing the region, and will ensure the rapid completion of work in accordance with COG's aggressive schedule.

ICF's proposal remains valid for a period of 90 days from the due date of March 6, 2015. ICF accepts the terms and conditions of the RFP. For technical questions, please contact Lauren Pederson at (202) 862-1258 or Lauren.Pederson@icfi.com. For contractual questions, please contact me at (707) 992-0768 or Jodi.Young@icfi.com.

Sincerely,

Jodi Young

Jodi Young
Contracts Manager

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1. QUALIFICATIONS OF THE OFFEROR AND PERSONNEL

1.1. INTRODUCTION TO THE ICF TEAM

Over the past several years, the members of the Metropolitan Washington Council of Governments (COG) have collaboratively worked together to adopt an ambitious vision for the future that is accessible, sustainable, prosperous, and livable. With the adoption of the National Capital Region Climate Change Report, the Greater Washington 2050 Coalition Report and Voluntary Regional Compact, and *Region Forward,* the National Capital Region member governments have laid out voluntary and ambitious goals for greenhouse gas (GHG) reductions, initiated a range of program efforts, and conducted important analyses of potential GHG reduction strategies.

Now as COG moves forward to the next step of convening a multi-sector multi-disciplinary effort to identify implementable actions across key sectors and to consider measures and targets for sectors, COG needs a consultant that is **well-versed in multi-sector climate action planning**, and also **understands the unique factors that will affect the costs and benefits of potential actions in the Washington, DC region**. In addition to deep technical analysis expertise and experience applying sketch planning GHG analysis tools across sectors, COG needs **expertise facilitating consensus on priorities** across representatives of diverse agencies, and an **ability to complete this work rapidly, efficiently, and accurately**, given the very compressed time-frame for this effort.

ICF International (ICF) brings these key skills and attributes, and more to COG. ICF is internationally recognized for its leadership in climate change policy, research, and technical analysis, and brings in-house specialists in transportation, building energy efficiency, renewable fuels, carbon sequestration, and more. These experts bring a deep understanding of the effectiveness of strategies across sectors, data and tools used for analysis, and best practices from across the nation and beyond. ICF works with public- and private-sector clients, including national, state, and local government agencies, to understand and inventory GHG emissions; identify, develop, and prioritize emissions reduction strategies; and conduct long-term sustainability planning. ICF has led work for the U.S. Environmental Protection Agency (EPA) to support communities around the country in developing GHG inventory and action plans. With our headquarters in Fairfax, Virginia, and key offices in Washington, DC, and Rockville, Maryland, ICF staff have been engaged in transportation, energy, and sustainability planning efforts across the National Capital region and across the world. We bring strong capabilities in quick, responsive, analysis and a proven record of managing complex multi-sector engagements for State, regional, and local governments.

ICF RECOGNIZED AS BEST CARBON ADVISORY FIRM FOR SEVENTH STRAIGHT YEAR

ICF International has been honored by companies participating in *Environmental Finance* magazine's Voluntary Carbon Market Survey 2014 – the most closely watched survey of sentiment across carbon, renewable energy, weather risk, and U.S. emissions markets – for our outstanding work.

ICF is supplemented by the unique skills of three specialty firms:

- **Renaissance Planning**, a firm that specializes in coordinated land use and transportation planning employing the latest advancements in GIS and visualization technology. Specifically, Renaissance Planning specializes in the integration of transportation, land use, urban design, and technology for communities to create thoughtful, lasting plans and policies. ICF has brought them on board because of their unique experience with land use data and analysis in the National Capital Region.

- **Mondre Energy, Inc. (MEI)**, a DBE certified firm, brings expertise in energy efficiency, engineering and sustainability; and alternative and renewable energy development and procurement. MEI has extensive experience developing and employing methods to estimate the impact that planned energy efficiency programs and projects would have on use of electricity, natural gas and heating oil in residential, commercial and industrial facilities.
- **Sharp & Company**, a DBE certified firm that brings expertise in providing project communications and public relations services for urban projects with multiple stakeholders. From its roots in advertising and graphic design, the 32-year-old firm has built a significant practice in transportation communications. They will provide support in developing a visually appealing, user-friendly final report and presentations.

Together, the ICF team brings unique capabilities and value to MWCOG:

Deep expertise in multi-sector regional climate action planning

ICF offers an unparalleled breadth and depth of experience in climate action planning, including knowledge of GHG reduction strategies across all sectors. ICF has deep experience in supporting state and local agencies on climate change policies, including emissions quantification, analysis of mitigation strategies, program measurement, and training state and local officials. Through support to EPA's State and Local Climate Change Program, ICF has provided guidance to more than 40 states and support to local governments nationwide in developing climate action strategies. ICF was the first firm engaged in a multi-jurisdictional GHG reduction plan effort in California, through our work on the San Bernardino Regional GHG Reduction Plan, prepared for the San Bernardino Associated Governments and 21 partnership cities. ICF also has completed regional GHG reduction analyses for a multi-jurisdictional partnership in Sacramento, as well as multi-jurisdictional GHG inventories for 88 cities in Los Angeles County and for the entire Chicago metropolitan area. For the Delaware Valley Regional Planning Commission (DVRPC), in the Philadelphia region, we developed a multi-sector GHG inventory and scenario projections, and have supported additional planning support for advancing electric vehicle (EV) deployment. For a group of eight counties in the Southern Tier of New York State, ICF supported the development of a multi-sector comprehensive sustainability plan with a target similar to COG's, to reduce GHG emissions in the region by 80% by 2050. At the state-level, ICF staff led the technical analysis of emissions reduction strategies for the transportation and land use components of Climate Action Plans in Washington, Colorado, North Carolina, Vermont, Minnesota, Maryland, and South Carolina, and we have assisted with Climate Action Plans in New Mexico, Arizona, and Montana.

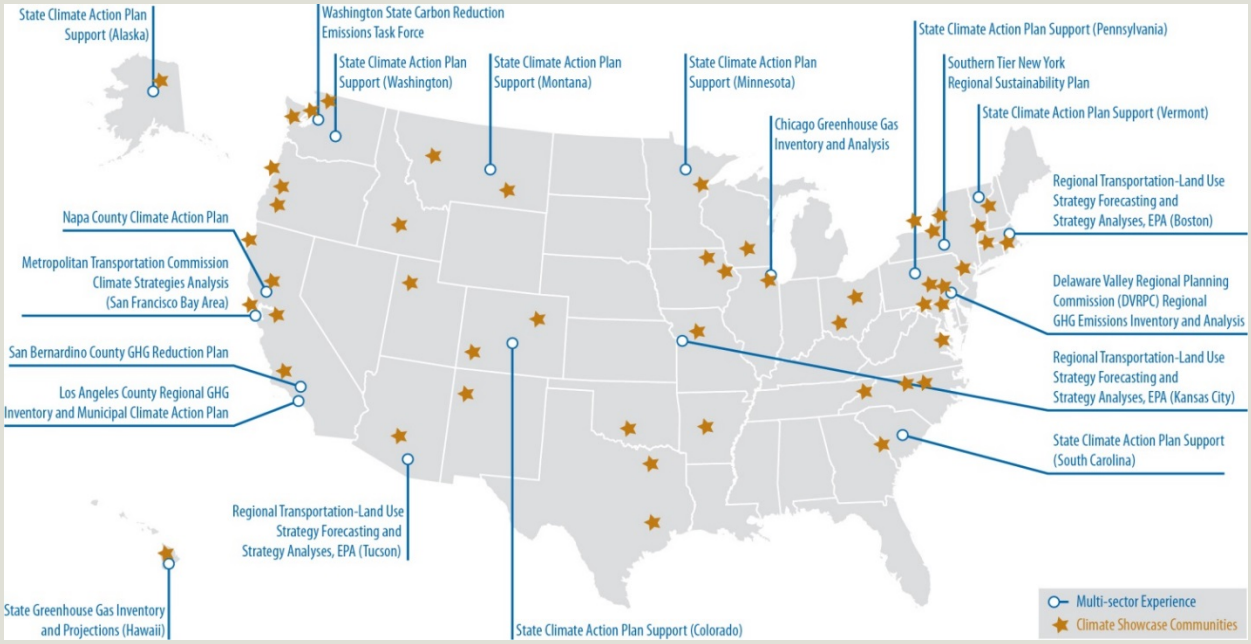
Extensive experience using sketch planning tools and methodologies for effectively analyzing strategies and synergies among strategies

Through our work in climate action planning, as well as sustainability and energy efficiency planning, the ICF team brings deep experience in developing and using sketch-planning tools to analyze GHG strategies across all sectors effectively. Specifically, for EPA, ICF developed its Transportation Efficiency Analysis Method (TEAM), a sketch planning approach that relies upon local data inputs, the TRIMMS tool, and EPA's MOVES model to efficiently analyze the emissions impacts of transportation and land use strategies for long-range policy analysis. One of the key values of this approach is the ability to address multiple transportation strategies and the synergies of strategies. We have tested and applied these methods successfully with the Mid-America Regional Council (MPO for the Kansas City, Missouri region), the Pima Association of Governments (MPO for the Tucson, Arizona region), and Massachusetts DOT (for the Boston region). ICF also has led development of methods for analyzing the emissions effects of transportation control measures, including development of a national guidebook for the Federal

Highway Administration on *Multipollutant Emissions Benefits of Transportation Strategies,* and support in reviewing and developing methods for analyzing a wide range of traffic flow improvements, transit projects, demand management, and alternative fuel strategies, among others, as part of national studies on the Congestion Mitigation and Air Quality Improvement (CMAQ) Program.

ICF BRINGS UNPARALLELED EXPERIENCE IN MULTI-SECTOR GHG STRATEGY ANALYSIS

ICF has supporting GHG inventories and climate action planning nationally through our support to EPA's State and Local Climate Change program. Through this program, ICF has worked directly with Climate Showcase Communities across the nation, assisting these communities with implementing cost-effective, successful greenhouse gas reduction projects with creative approaches. In addition, ICF has worked directly with States, MPOs, and counties throughout the country to develop GHG inventories, facilitate development of Climate Action Plans and sustainability plans, and assess GHG reduction strategies across transportation, land use, energy, and built environment sectors.



The ICF team has also supported coordinated land use and transportation planning employing the latest advancements in GIS and visualization technology, including the integration of transportation, land use, urban design, and technology for communities to create thoughtful, lasting plans and policies. ICF subcontractor, Renaissance Planning, has developed unique tools, including a new set of methods for estimating pedestrian and bicycle travel developed under a National Cooperative Highway Research Program (NCHRP) project that have been applied and tested in various locations in the COG region. These new tools, developed from MWCOG data, should prove of special value for synergies among strategies identified in the land use and land use/transportation assessments featured in the MSWG study. Renaissance Planning staff developed models for the Baltimore Metropolitan Council (BMC), and Southern California Association of Governments (SCAG) to estimate household auto ownership, vehicle miles traveled (VMT), and trips by mode based on socio-demographic factors, local accessibility, and regional transit and auto accessibility. Renaissance staff also supported development of the FHWA TDM

Model and EPA COMMUTER Model to analyze demand management strategies, and was part of a team that developed the SmartGAP model to analyze the effect of smart growth policies on travel demand.

In the energy field, ICF developed a range of technically complex and sketch planning tools. ICF's Energy Efficiency Potential Model is widely used in utility energy efficiency planning studies. ICF has conducted energy efficiency program modeling for a wide array of energy providers and states and counties.

Unique understanding of the local context and issues in the Washington, DC metro region

ICF brings experience not only nationally but regionally working on energy reduction, vehicle travel reduction, and GHG mitigation strategies in Maryland, Virginia, and the District of Columbia.

- *Energy and Built Environment*: For Montgomery County, ICF modeled technical potential and conducted a series of policy and program scenario analyses for helping the County reach its 25% energy savings goal for commercial buildings. ICF has conducted energy efficiency analysis for Pepco, and brings analytic data on energy efficiency potential in DC and the Maryland suburban counties. ICF also has conducted energy efficiency program modeling for Dominion Virginia Power.
- *Transportation/Land Use*: ICF supported Montgomery County under an EPA Smart Growth technical assistance support contract to analyze tools for assessing the GHG reduction potential of strategies in sector plans. ICF has conducted analyses of the effectiveness of the Commuter Connections program, and has supported Fairfax County in developing performance metrics reporting mechanisms for its travel demand management programs and is currently completing a 6-year Transportation Demand Management Plan. ICF subcontractor, Renaissance Planning, has past and ongoing involvement in key planning studies for the Virginia and Maryland Departments of Transportation, MWCOG's TLC program, and most if not all of COG's member jurisdictions.

Our core staff are all located in the Washington, DC region – out of ICF's offices in Washington, DC (primary office for multi-sector GHG experts and transportation-land use analysis staff proposed on this project) and Fairfax, Virginia (headquarters, and primary office for energy analysis staff) and Renaissance Planning's Arlington, Virginia office. In addition, our graphics and communications support will come from Sharp & Company, out of its Rockville, Maryland office.

Being a locally based firm (but with the depth of a global company), we are personally and professionally invested in Washington DC's national leadership in the areas of climate and clean energy. Our approach to this project will balance the desire for continued leadership and novel strategies with the practical realities facing the region. While we are recognized nationally and internationally for leadership in GHG mitigation, energy, transportation, and land-use planning, we bring a local perspective and understanding. We also have put our commitment to sustainability and carbon reduction into practice in our own business practices.

ICF – MAKING A SUSTAINABLE COMMITMENT

ICF specializes in developing sustainable solutions for our clients, so ensuring that we minimize the environmental impact of our own operations is critically important to us.

ICF began tracking and offsetting our carbon emissions in 2006. ***We were the first professional services firm to become carbon neutral***. And we've been carbon neutral each year since. But that's just the beginning.

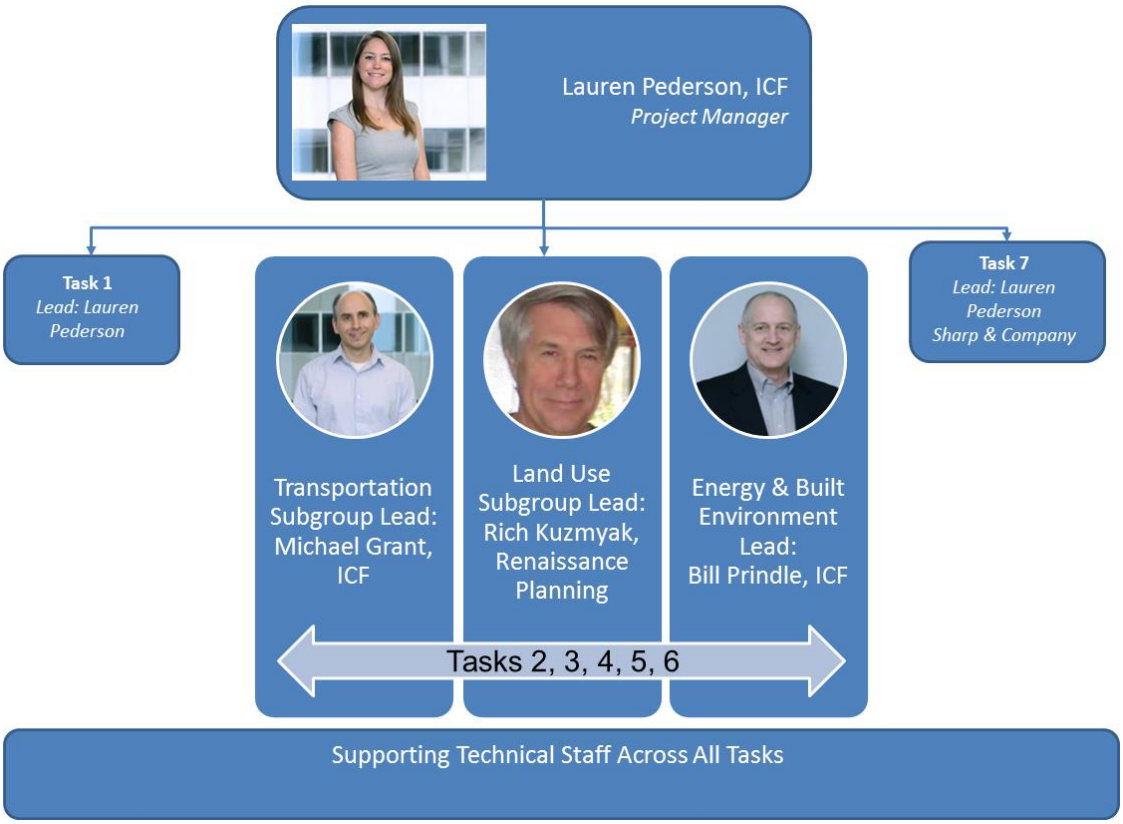
- Transportation emissions avoidance - To reduce the number of cars our employees use for commuting, ICF invests in subsidies for those who use mass transit and bike to work.
- Green building leases – In 2010, we revised our leasing procurement documents to include criteria for sustainability. In 2012, we consolidated three offices to move into a LEED Gold certified commercial space with a LEED Platinum certified interior in Rockville, Maryland
- Energy reduction / Green IT – ICF has replaced vending machines, water heaters, and office electronics with energy-efficient mechanisms. ICF requires all new laptops to be EPEAT Gold certified, and all IT equipment is ENERGY START qualified.
- Waste minimization – We initiated default duplex printing in most U.S. offices, decreasing use of paper by an estimated 25 percent, and have composting programs at several offices.
- Water conservation – ICF installed high-efficiency toilets and upgraded faucet aerator in some of our largest offices; estimated to reduce water usage by up to 50 percent in these locations.

1.2. STAFF CAPABILITIES AND ROLES

The ICF team's proposed staff brings multi-sector GHG planning expertise, combined with deep subject matter experts in transportation, land use, energy efficiency, and renewable fuels. Our team is composed of:

- A project manager, Lauren Pederson, with deep experience in multi-sector GHG emissions inventory and strategy development, including work with communities across the country through EPA's State and Local Climate and Clean Energy Program.
- Three sector leads, Michael Grant (Transportation), Rich Kuzmyak (Land Use), and William Prindle (Energy/Environment), who bring deep subject-matter experience in conducting analyses of GHG reduction strategies, their costs and benefits, and implementation issues, in each of these sectors; they will be responsible for facilitating the Subgroup meetings and moving the groups to consensus on strategies for analysis and analytical approaches.
- Supporting analytic teams for the Transportation/Land Use sectors (combined) and Energy/Environment sectors; these supporting teams bring deep analytical experience in sketch planning tools, models, and research associated with strategies in each sector, and include experts in specific strategies that may be addressed, such as electric vehicle deployment, travel demand management strategies, renewable fuels, and building energy efficiency.
- Supporting technical staff for multi-sector analysis, integrating results, and preparing presentation material, as well as communications/graphic design support.

The following organizational chart presents the team of dedicated professionals with experience in leading and conducting analyses on the impact of reduction strategies across sectors. Key staff will be available to fill the roles identified and are committed to success of this project.



Key Staff

Our proposed key staff bring a strong blend of experience in all aspects of required capabilities. Our proposed technical leads as well as supporting technical staff mirror the structure of MSWG subgroups, with additional staff well versed in multi-sector analysis. The resumes for key staff and select technical staff are provided in Appendix A.

Lauren Pederson, Project Manager, is a Manager at ICF with over 10 years of experience in analytical work ***supporting state and local efforts to reduce GHG emission across all sectors***. She serves as deputy program manager under ICF's contract with the EPA State and Local Climate and Energy program, and brings experience collecting and analyzing data, writing technical documents, and developing Excel-based tools aimed toward creating inventories of GHG emissions. For over 7 years, she has supported EPA's State and Local Branch including technical assistance to the Local Climate and Energy program by responding to public inquiries and developing analyses based on these inquiries; conducting analyses or reports on local government climate mitigation issues; ***developing and refining the methodology for multi-jurisdictional local government agencies to analyze GHG emissions***; maintaining State and Local Clean Energy Listserv; providing support to the Urban Heat Island and Local Climate and Energy Webcast Series; analyzing, categorizing, and recording contents of state climate change action plans and related documents; and developing content for EPA's State and Local website. Ms. Pederson oversaw the

development of the Energy Efficiency and Renewable Energy strategy documents as part of the Branch's Local Government Climate and Energy Strategy Series[1]. Lauren has also led support for the Climate Showcase Communities Program, providing technical assistance to communities on their GHG reduction efforts and logistical support for the annual Climate Showcase Communities workshop.

Lauren has extensive experience with EPA's U.S. National Inventory of Greenhouse Gas Emissions and has been involved with estimating U.S. CO_2 emissions from fossil fuel combustion, non-CO_2 emissions from stationary sources, GHG emissions from international bunker fuels, U.S. CO_2 emissions from non-energy uses, and non-CO_2 emissions from enteric fermentation. This experience at the national level has provided context for her work for GHG inventories and analysis at the local and regional level. At the local level, she has supported the City of Raleigh in estimating GHG emissions for local government operations. She has also supported the Environmental Protection Agency's State and Local Branch in development of a Regional Greenhouse Gas Inventory Guidance document, and worked with Central New York to develop a GHG inventory and projections in order to fulfill their reporting requirements to NYSERDA's Cleaner, Greener Communities Program. She graduated from Johns Hopkins University with an M.S. in Environmental Science and Policy.

Michael Grant, Transportation Sector Subgroup Lead, brings over 20 years of experience in

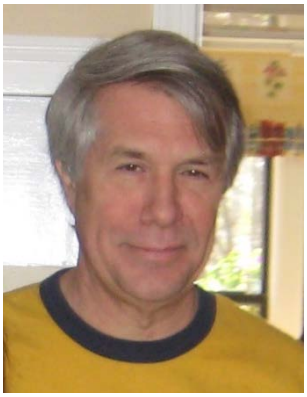
transportation, land use, and environmental planning and policy, with expertise in GHG inventory development and mitigation analysis. For U.S. EPA, he led a national assessment of the GHG implications of transportation and land use strategies, conducting ***modeling and analyses of strategies in over a dozen large, medium, and small metropolitan areas***, extrapolated to the nation. Following this work, he provided input to the refinement of these methods into the Transportation Efficiency Analysis Method (TEAM) approach. He led development of a key EPA study on *Our Built and Natural Environment,* addressing the impacts of transportation, land use, and buildings on GHG emissions, air quality, and natural resources. Michael brings experience ***analyzing the emissions benefits of transportation and land use strategies for MPOs***, including Baltimore, Birmingham, Denver, and Los Angeles, as well as MPOs across New York State. He also led transportation and land use strategy analysis as part of a multi-sector emissions analysis strategy study for the Southern Appalachian Mountains Initiative, and for the Canada Climate Change Process, he supported analyses of a range of GHG reduction strategies for urbanized areas, including travel demand management, land use, transit, and economic strategies.

Michael brings both broad national expertise and local understanding of the metro Washington, DC area, and is an effective facilitator. For FHWA, he facilitated a series of climate change peer exchange workshops for MPOs across the country. He also has led the development of national guides and workshops on GHG planning and emissions analysis methods, including FHWA guidebooks on *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning* and *Handbook for Estimating Transportation Greenhouse Gases for Integration into the Planning Process.* Michael has led regional planning work in the Washington, DC region, including support to Montgomery County in identifying tools to support GHG analysis of sector land use and transportation strategies (as part of EPA Smart Growth technical assistance), support to the Maryland DOT Transportation Solutions Group on strategies to reduce vehicle travel in suburban Maryland, and

[1] http://www.epa.gov/statelocalclimate/resources/strategy-guides.html#energyeff

support to Fairfax County in developing a 6-year TDM Plan. Prior to consulting, he worked at the U.S. Department of Transportation and the Maryland State Highway Administration.

Richard Kuzmyak, Land Use Sector Subgroup Lead, is a Principal with Renaissance Planning, based in their Arlington, VA office. Rich has more than 30 years of experience as a transportation planner and analyst, focused heavily on research and ***development of new tools*** and information to support improved decision-making on complex transportation and land use issues. His expertise includes transportation and land use interaction, travel behavior analysis, multimodal performance-based planning, and emissions analysis. He has been a resident of the Washington DC area since 1980, and while he has pursued a national practice, has intimate familiarity with the transportation and growth management issues in the region.



Rich served as an expert consultant with the Maryland Departments of Transportation and Statewide Planning, as well as in the Governors' Office of Smart Growth in the early 2000s and worked extensively on ways to ***quantify the nature and benefits of Smart Growth***. Since leaving the State, Rich served the Baltimore Metropolitan Council as an in-house consultant 2003 to 2005, helping them develop new ways of incorporating land use considerations into their regional plan, transportation model, and project prioritization. He developed a set of transportation and land use models while at BMC which incorporated density, diversity and design, including a new measure of local walk accessibility that quantified walk opportunities through a relationship between the built environment and the transportation network (similar to but pre-dating "Walk Score"). Rich subsequently adapted the general approach to a nationally recognized study of the relationship between Land Use and Traffic Congestion for the Arizona Department of Transportation, and several studies for the Southern California Association of Governments (***estimating the transportation and land use benefits*** of the Compass Blueprint regional vision, and for assistance in implementing SB 375 to reduce GHG emissions through better land use and reduced VMT). Most recently, he has led the development of new tools for estimating the demand for pedestrian and bicycle travel under NCHRP 8-78/Report 770, making strategic use of GIS data, enabling a much sharper association between land use context and travel choice. One of the key new NCHRP tools is a ***GIS-accessibility model*** developed for Arlington, using activity, network and travel survey data provided by MWCOG. Rich led a major pilot test of the GIS-Accessibility approach in the Rockville Pike/I-270 corridor, with sufficient success that MDOT has tasked Renaissance with extending coverage of the tool to the entire MWCOG/BMC central Maryland region.

William Prindle, Energy and Built Environment Sector Subgroup Lead, has over 37 years of experience in the energy field, working in consulting, nonprofit organizations, and trade associations. Following his first job as an air quality planner for the Delaware Valley Regional Planning Commission, he went on to become a nationally-recognized expert in energy efficiency technology and policy, working on federal and state energy efficiency policies and programs, utility-sector efficiency policies and programs, and building codes and appliance rating, labeling, and standards. From 2010 to 2013, he led a study for Montgomery County, Maryland, of technical potential and policy options for meeting the County's 25% energy savings goal as stated in its 2009 Climate Action Plan. This project involved extensive ***efficiency potential modeling, using ICF's EEPM planning model***, as well as background research on baseline conditions, policy options, and an extensive stakeholder engagement process. He also supported state policy development in Maryland

related to electricity and climate, including support that led to development of the EmPOWER Maryland and Strategic Energy Investment Fund bills in the legislature. These bills set energy savings targets for utilities, and create a fund for administering the RGGI allowance auction funds for a combination of energy efficiency and electric rate relief. He has subsequently provided consulting services to the Maryland Energy Administration in its efforts to develop its emerging energy and climate policies and programs.

In 30-plus years of living in the Washington, DC area, William has served as a member of the Montgomery County Energy and Air Quality Advisory Committee and on the Fairfax County Executive's Private Sector Energy Task Force, and has participated in numerous MWCOG events. He is currently Board Chair of the Local Energy Alliance Program (LEAP), which is active in the home energy retrofit and Solarize initiatives in Northern Virginia. William is also a trained facilitator and leadership coach, enabling him to provide leadership support to stakeholder processes other aspects of ICF's projects.

Supporting Technical Staff – Land Use and Transportation Analysis

Frank Gallivan is a transportation planner and policy analyst with ten years of experience, who will provide key analytic support on TDM, transit, and bicycle-pedestrian strategies. His work focuses on the development and analysis of policies and plans to reduce GHG emissions from transportation. He is an expert at distilling complex research questions into manageable quantitative methods to predict the impact of transportation strategies. Frank has served as a policy analyst to numerous state and local government agencies ***developing climate action plans***. He helps agencies understand the greenhouse gas emissions and cost impacts of both internal and external transportation policy developments. He developed Excel calculator tools for Caltrans that regional transportation agencies can use to estimate the impacts of strategies to reduce transportation GHG emissions and criteria pollutants, including efficient vehicle fuels and technologies, transit-oriented development, and more conventionally-assessed strategies such as shifting travel from cars to transit or active transportation. Frank served as analytic lead on application of the EPA TEAM methodology in three regions (Boston, Kansas City, and Tucson), including development of travel demand management scenarios, and modeling of scenarios using the TRIMMS tool. He supported the Metropolitan Transportation Commission in developing GHG reduction policies for inclusion in the Regional Transportation Plan/Sustainable Communities Strategy, and led analysis of strategies including a regional commuter benefits ordinance, improvements to bicycle infrastructure, and a regionwide Safe Routes to School program. Frank served on the Transportation Technical Advisory Committee of ICLEI's community GHG protocol development initiative**.**

Alex Bell is a Senior Planner with Renaissance Planning, who will support ***land use analysis***. He brings six years of experience in integrated planning and applied research. His work focuses on developing systems and mechanisms to analyze the complex interactions that occur in ***urban spaces*** and distill essential relationships that underpin the science of cities. His work covers transportation, land use, environmental, and economic topics, often supported by ***custom tools development***. He has played a leading role in several groundbreaking studies and data development initiatives to promote multidisciplinary planning, including NCHRP Report 770 ("Estimating Walking and Biking for Planning and Project Development"), the Tampa Bay Regional Goods Movement Study, and EPA's Smart Location

Database v2.0. Alex is currently working with the states of Virginia and Maryland to understand and apply ***multimodal accessibility analyses*** to transportation needs evaluation, land use and economic development suitability assessments, and project evaluation/prioritization processes. The approach under development will assess ***land use and transportation interventions*** in light of their impacts on local and regional accessibility, which in turn support models addressing travel behavior choices, levels of active transportation, VMT-related greenhouse gas emissions, impervious surface area change, and more.

Brenda Dix is an environmental engineer at ICF with expertise in assisting transportation agencies and local government to mitigate their contributions to climate change and prepare for the impacts of climate change. She will support specific analyses of strategies. Brenda has experience writing and preparing both technical and policy based documents for a wide variety of audiences; conducting literature reviews and gap assessments; developing climate change vulnerability and adaptation reports; preparing presentations and facilitating outreach/stakeholder engagement meetings; preparing long-range integrated land use and transportation planning documents; and familiarity with ***land use and transportation modeling***. She has created and analyzed new approaches to achieving California state mandated regional transportation and land use GHG emissions reduction targets (SB 375), and consulted with California Air Resources Board on methods development. Brenda also assisted in identifying and evaluating livability and sustainability performance metrics for TIGER grants.

Alanna McKeeman is a transportation planner in ICF's Washington, DC office who will play a lead role in the transportation strategy analysis. She has contributed to ***regional sustainability planning efforts*** aimed at achieving long-term greenhouse gas reduction targets. For the Metropolitan Transportation Commission (MTC) in the San Francisco Bay Area, she estimated GHG and pollutant emissions reductions attributable to MTC's Climate Initiatives program. For the Cleaner Greener Southern Tier initiative, she drafted a ***multi-sectoral baseline assessment***, actions and strategies for achieving goals in an implementation plan, and a best practices report on land use strategies. This initiative covers an eight-county region in New York State, designed to enable the region to reduce greenhouse gas emissions by 80 percent by 2050. She has extensive project management, research, and writing experience producing deliverables such as guidebooks, case studies, memoranda, data analyses, presentations, and reports.

Kathleen Rooney is a Project Manager with Renaissance Planning, based in their Arlington, VA office, who will provide support in TDM and land use strategy analysis. Kathleen brings more than 12 years of integrated transportation planning experience, especially in multidisciplinary, outcomes-based collaborations. Kathleen's work has focused on innovative and implementable solutions to multimodal transportation planning challenges, notably at the federal and state levels. Her specialties include transportation demand management (TDM), public health and active transportation, smart growth/livability, sustainability and climate change, and applied transportation technologies. She currently is leading a study for EPA estimating the environmental benefits of brownfield redevelopment on several transportation and environmental criteria – such as VMT, mode shift, and

GHG emissions. She also helped lead the Cleaner Greener Southern Tier project, which focused on creating a ***multi-sector GHG implementation plan*** – across 8 counties and 9 sectors, ultimately leading to a more targeted implementation plan along with 20 key GHG reducing projects that included significant co-benefits.

Supporting Technical Staff – Energy and Built Environment

Charles Haack is a Senior Associate on ICF International's Energy Efficiency Analytics & Policy team where he supports ***energy efficiency policy analysis***, including policy development, stakeholder outreach, and program evaluation. Mr. Haack serves as the technical lead in supporting the U.S. EPA's ENERGY STAR Certified Homes program and through this work, directs a team of engineers in performing the policy analysis as well as energy and emissions analyses behind the program requirements. This ranges from maintaining and updating the ENERGY STAR Certified Homes program documents to frequently delivering webinars to program stakeholders. Prior to joining ICF, Charlie served as the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) public policy intern in Washington, DC where he met with policy makers, reviewed proposed energy policy and standards, and published his own paper on energy efficiency labeling programs in the United States. Mr. Haack also brings design experience from his internships at multiple design firms. He is a LEED accredited professional.

Steve Miller, a registered professional engineer at Mondre Energy Inc., who will play a key role in analysis of renewable energy strategies. He has experience in the technical and financial evaluation of ***residential, commercial and industrial energy production and energy use systems***. He has expertise in the design of combined heat and power (CHP), heat pumps, HVAC systems, and photovoltaic (PVC) arrays. Mr. Miller has evaluated numerous renewable energy projects involving solar, wind, geothermal and biomass resources for technical and financial feasibility. Mr. Miller designs and manages energy audits and energy conservation programs, identifying for clients cost-effective energy and demand reduction and conservation opportunities. Mr. Miller serves as an Expert Reviewer for the Opportunity Research Fund (ORF), which provides grants to support research, development, demonstration and deployment of energy efficiency technologies, policies, business models, and training programs.

Michael Freeman, an energy analyst at Mondre Energy Inc., has over 30 years of experience in energy and environmental management. Mr. Freeman has been responsible for identifying project sites for both utility and commercially-sized renewable energy developments, conducting environmental and financial site reviews, qualitative and quantitative site analysis, managing and directing site control activities, developing and negotiating host community economic development agreements, power sales contracts, and monetizing GHG credits for biomass fueled power plants in several states. He has successfully pursued large-scale DOE grants for the development of off-shore wind power projects. In addition, he has managed environmental permitting programs for ***renewable energy and waste-to-energy projects***. His work at Mondre Energy has included the preparation of residential and commercial baseline studies supporting the implementation of incentive programs for the installation of energy efficient lighting and HVAC projects, an investigation of the feasibility of on-bill

financing programs, and preliminary screening of the financial feasibility for a municipally owned multi-building solar energy project.

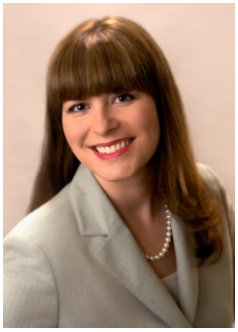
Craig Schultz is a Principal with ICF International with 19 years of energy industry experience, who will advise on renewable energy issues. He specializes in a range of energy supply issues and has led or helped manage over two dozen ***renewable energy projects*** for Federal, state, and local government, utility, and corporate clients in the last two years. His Federal agency renewable energy work includes assignments for the U.S. Departments of Defense, Energy, Interior, Homeland Security, and Veterans Affairs, as well as the Environmental Protection Agency, U.S. Agency for International Development, U.S. Trade and Development Agency, and the Armed Forces Retirement Home. He has supported state and local agencies throughout the U.S. Mr. Schultz has overseen technical and economic feasibility studies and other planning work for solar PV, solar thermal, wind, geothermal, ground source heat pump, waste heat recovery, and bioenergy technologies. He has also been active in managing client procurement and project negotiation processes that flowed from feasibility reviews.

Parker Crowe is an associate with four years of experience in policy and data analysis related to ***renewable energy, fossil fuel use and energy efficiency***. He has worked on-site at the Department of Energy for nearly two years providing insight to program managers by analyzing grantee-reported data. He has also contributed to projects involving web content management, training and outreach on proprietary computer systems, and policy development. Parker's academic background is specialized in business and economic issues related to clean energy systems.

Supporting Technical Staff – Multi-Sector Analysis

Cory Jemison has over 7 years of experience in the ***energy efficiency, renewable energy, and carbon accounting*** fields. As an Associate at ICF International, Mr. Jemison works with a variety of clients on ***multi-sector climate action plans, energy efficiency and renewable energy policy, and greenhouse gas inventories***. He works directly with Ms. Pederson on behalf of EPA's State and Local Climate and Clean Energy Branch on a range of GHG, energy, and co-benefits analyses. Prior to working at ICF International, Cory was the data manager for the Solar Cities program at the Moreland Energy Foundation (MEFL). In this role, Mr. Jemison was the technical lead for MEFL's accounting of the energy, cost, and greenhouse gas savings from energy efficiency measures throughout the Municipality of Moreland. Accounting for these actions covered smaller behavioral measures such as households adjusting their thermostats or taking more public transportation, to larger measures such as installing solar panels. Mr. Jemison built ***multi-sectoral calculation tools incorporating around 70 different greenhouse gas reduction actions for households and businesses*** to ensure consistency in the assumptions applied behind these savings across programs. These tools also ensured the flexibility to calculate the most accurate savings based on the level of details known about the action taken. Mr. Jemison dealt directly with the program's Federal funders to provide them the data required for the program and an evaluation of the overall program savings across all actions. In an earlier posting with

ICF, just out of college, Mr. Jemison was responsible for modeling and analysis using ICF's Integrated Planning Model, the premier model supporting EPA's Clean Air Act assessments for more than 20 yrs.



Erika Myers has over 12 years of experience in the ***renewable energy, clean transportation, and environmental fields***, who will be available to advise on strategy analyses. As a Senior Associate at ICF International, she provides support to clients on program and project management, policy development, strategic planning, and analysis on a variety of clean energy projects. Her subject matter expertise includes ***plug-in electric vehicles, biofuels, renewable energy technologies, and other clean fuels***. In her previous work as an independent consultant, Erika helped a range of clients in the clean energy industry, including project management support for one of the largest rooftop solar photovoltaic projects in the country. Prior to consulting, she was the Manager of Renewable Energy Programs at the South Carolina Energy Office. Her duties included oversight of the state's wind, biomass, solar, geothermal, and alternative fuel programs. She effectively worked with a broad range of stakeholders to develop clean energy policies, including the state's first renewable energy grant program, net metering and interconnection policy, seven renewable energy tax credits and two incentive payment programs.

Jessica Klion is a Research Assistant who will provide support in developing presentations, note-taking, and summarizing meeting results. She has experience in geography and urban studies, with a focus in urban sustainability and transportation. Her writing and research experience at ICF includes aiding with the development of final reports and presentations, analyzing surveys, and doing research on a broad range of transportation, alternative fuel, and environmental topics.

Supporting Staff – Graphics and Communications Support

Mary Arzt, Partner and Creative Director at Sharp & Company, will oversee development of the graphics and layout of the final report. She brings over 30 years of experience, leading teams to develop campaigns and materials that deliver on clients' needs and earning her a reputation for exceptional print and electronic creative work and management skills. Her ability to strategize, conceptualize, and develop comprehensive campaigns has garnered numerous national and international awards. Mary has demonstrated expertise in all areas of creative direction, including communication strategy and project implementation. She provides leadership for the Sharp & Company team, including overall scheduling, assignment of resources, quality control, and day-to-day coordination of staff activities and resources.

Mary will be supported by **Deborah Eckbreth**, graphic designer. Deborah Eckbreth's organizational skills and impeccable attention to detail allow her to produce quality work while meeting tight deadlines. She uses PC and Mac platforms and the latest software, including Adobe Creative Suites: InDesign, Photoshop, Illustrator, Acrobat, along with QuarkXpress and Microsoft Office.

1.3. DEMONSTRATED SUCCESSFUL EXPERIENCE AND QUALIFICATIONS

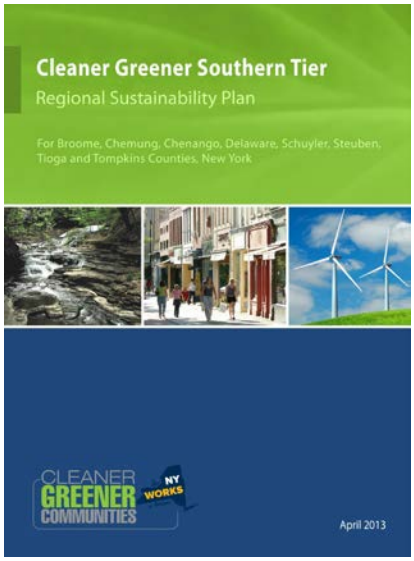
The ICF team brings a proven track record of effectiveness in multi-sector GHG emissions analysis, climate action planning, and sustainability efforts that are directly relevant to COG's work on this project. Our qualifications are based on experience accumulated over the course of hundreds of projects related to climate change action planning, with clients ranging from local and state governments to federal agencies to multilateral organizations. With decades of experience in climate change science, transportation and land use analysis, energy, policy, strategic planning, and evaluation, ICF has unparalleled expertise in developing multi-sector strategies for addressing climate change and sustainability. In addition, our team brings deep experience in analyses of strategies in each of the three sectors to be analyzed: energy/built environment, land use, and transportation. Illustrative projects for the ICF team are highlighted in the following table, followed by project descriptions.

Project Title	Relevant Knowledge & Expertise			
	Multi-Sector	Energy/Built Environment	Land Use	Transportation
Southern Tier New York Regional Sustainability Plan	●	●	●	●
Delaware Valley Regional Planning Commission GHG Inventory	●	●	●	●
Municipal Climate Action Plan, Los Angeles County	●	●	●	●
Chicago Metropolitan Area GHG Inventories	●	●		●
Napa County Climate Action Plan	●	●	●	●
Climate Change Technical Support, Philadelphia Mayor's Office of Sustainability	●	●		●
San Bernardino County, GHG Inventories and Reduction Plans	●	●	●	●
Greenhouse Gas Forecast and Reduction Measure Analysis, Sacramento Municipal Utilities District	●	●	●	●
Carbon Emissions Reduction Task Force Support, Washington State Office of Financial Management	●			●
State Climate Change Action Plan Support, Center for Climate Strategies	●		●	●
EPA, State and Local Climate Programs Support	●	●	●	●
Estimating Emissions Reductions from Transportation-Land Use Strategies: Three Metropolitan Area Analyses			●	●
Estimating Changes in Travel and Emissions from Transportation and Land Use Strategies			●	●
Quantifying Transit's Impact on GHG Emissions and Energy Use: The Land Use Component			●	●
Evaluation of Public Transit Projects Eligible for State Cap and Trade Funds				●
Transportation Strategies GHG Analysis/ Climate Initiatives Program Evaluation				●
Washington State Climate Action Team: Transportation Implementation Working Groups				●
Transportation GHG Emissions Sketch Analysis				●
Onondaga County Sustainable Development Plan, Syracuse- Onondaga County Planning Agency			●	●

Project Title	Relevant Knowledge & Expertise			
	Multi-Sector	Energy/Built Environment	Land Use	Transportation
Transit Oriented Development Housing Needs Analysis, Metropolitan Washington Council of Governments			●	●
Countywide Transit Network Study, Fairfax County Department of Transportation			●	●
Land Use and Transportation Impacts on VMT and GHG Emissions, Southern California Association of Governments			●	●
Smart Growth Technical Assistance Program Review, U.S. Environmental Protection Agency			●	
Commercial Buildings Energy Efficiency Study—Montgomery County, Maryland		●		
Hawaii GHG Emissions Reductions, Hawaii DBEDT	●	●		●
Energy Efficiency Programs to Achieve GHG Reductions, Baltimore Gas & Electric		●		
Energy Efficiency Program Modeling, Dominion Virginia Power		●		
Green Communities Planning Assistance, Massachusetts Department of Energy Resources		●		
Renewable Energy Policy Analysis, NYSERDA		●		
Energy Efficiency Program Planning and Delivery, Pepco Holdings		●		
EPA ENERGY STAR Program Support		●		
Energy Efficiency Codes Coalition Support		●		
Regional Greenhouse Gas Initiative (RGGI) Analytics Support		●		
EPA Clean Power Plan Program and Analytical Support		●		
Power Plant Research Program, Maryland Department of Natural Resources		●		

Multi-Sector GHG Analysis – Facilitating Consensus, Conducting Analysis

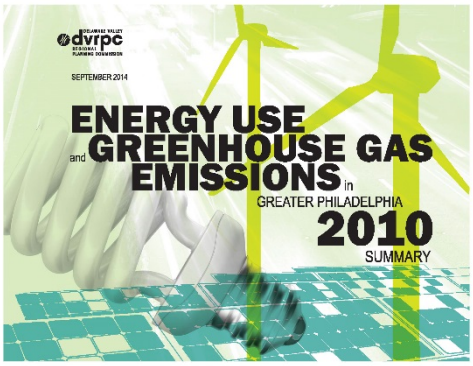
Southern Tier New York Regional Sustainability Plan, NYSERDA Cleaner Greener Communities Program, 2012-2013. For a group of eight counties in the Southern Tier of New York State, ICF supported the development of a comprehensive sustainability plan to lower greenhouse gas emissions in the region by 80% by 2050. This planning effort involved extensive research; establishment of baseline data and key indicators; outreach throughout the region; integrated energy, environmental, transportation, and economic development planning; case studies; and implementation plans for the highest potential mitigation and investment opportunities. Implementation plans included thorough analysis of expected GHG reductions from each strategy. The planning was funded by the New York State Energy Research and Development Authority (NYSERDA), as part of its Cleaner, Greener Communities program.



- The renewable energy component included consideration of solar PV, solar water heating, wind, and biomass options. The plan also included detailed discussion of options for expanding combined heat-and-power (CHP) in the region.
- The transportation component included strategies for reducing VMT, increasing efficiency, improving system operations, and transitioning to less carbon intensive fuels.
- The land use component included strategies to support development of housing that is energy and location efficient.
- The plan also addressed water management, open space, and climate adaptation.

Delaware Valley Regional Planning Commission GHG Inventory, 2008-2013. The Delaware Valley Regional Planning Commission (DVRPC) developed a GHG inventory and forecast to assist the region, as well as the counties and municipalities it contains, in benchmarking and ultimately reducing GHG emissions. This effort represented a foundational step toward developing a comprehensive regional climate change strategy for DVRPC. ICF provided the following services:

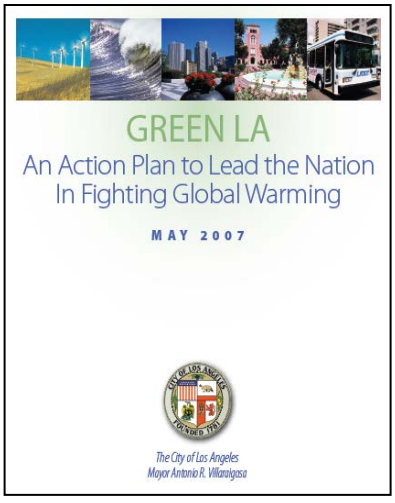
- Development of a protocol for conducting the regional GHG inventory consistent with emerging standards for regional GHG inventories. This work was performed in conjunction with ICF's support to the EPA in the development of regional GHG inventory methods.
- Development of a GHG inventory for the nine-county DVRPC region, which was then disaggregated into a sub-regional GHG emissions baseline for the region's 364 minor civil divisions.



- Development of inventory projections for three 2035 scenarios corresponding with the three scenarios being considered under DVRPC long-range planning exercises. To develop the projections, ICF drew from the GHG inventory; DVRPC's existing demographic, economic, and transportation network projects; national projections; and observed national, state, and regional trends.

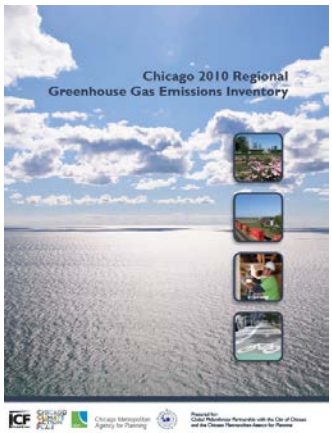
Municipal Climate Action Plan, Los Angeles County, 2006. ICF prepared a Municipal Climate Action Plan (MCAP) for Los Angeles County. ICF worked with multiple County departments to develop a range of GHG reduction options for the County and evaluate the effect of California state initiatives on municipal emissions. ICF's work included:

- Evaluating options to reduce building energy-related emissions from the County's 4000+ buildings including energy efficiency and renewable energy options.
- Evaluating the GHG effectiveness of decommissioning electricity generation from several aging County-owned power plants.
- Evaluating water conservation, fleet management and fuels, refrigerant management, and waste minimization/recycling measures.

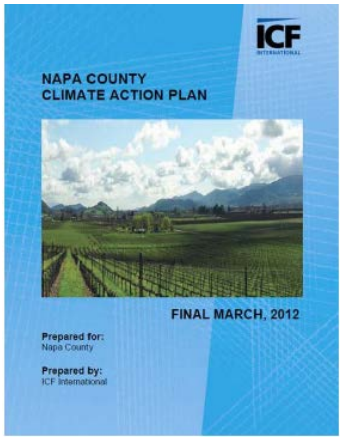


- Developing an implementation plan.
- Writing a public-friendly document clearly explaining sources of emissions and all activities, policies and programs on-going that are reducing current and future County emissions.
- Developing an abbreviated summary of the document for web publication only that was heavily graphics focused.

Chicago Metropolitan Area GHG Inventories, 2012. ICF prepared the 2010 GHG emissions inventory for the City of Chicago and the 7 counties in the Chicago Metropolitan Area. ICF employed several new methodologies for the inventory to improve its usefulness in helping to implement the Chicago Climate Action Plan. ICF also conducted an in-depth benchmarking and trends analysis to identify likely causes of changes in Chicago's emissions over time. ICF also completed an offsetting analysis to look at the contribution of urban forestry efforts in promoting carbon sequestration that can offset a portion of local emissions.



Napa County Climate Action Plan—Napa County, 2011-2012. ICF prepared a countywide Climate Action Plan (CAP) for Napa County. ICF updated the County's prior GHG inventory with revised traffic methodology to use an origin-destination based mode and expanded upon the County's prior GHG inventory to include carbon stock and carbon sequestration changes due to land use changes over time. The multi-sectoral CAP examined options for reducing GHG emissions to 15 percent below 2005 levels by 2020. In its analysis, ICF considered the likely impacts of new development projects and identified approaches to development to offset emissions related to conversion of oak woodlands and other land covers. ICF facilitated the process of obtaining input from environmental and agricultural stakeholders to ensure the final CAP reflected all identified concerns.



Climate Change Technical Support, Philadelphia Mayor's Office of Sustainability, 2009–2013. ICF has supported the City's climate change initiatives in a variety of ways since 2009. We first supported MOS in researching and developing quantitative estimates of the benefits of achieving key sustainability goals, measured in energy consumption, greenhouse gas (GHG) emissions, vehicle miles traveled, and other metrics. ICF then worked with MOS to prioritize nearly 200 proposed actions to meet these goals based on potential benefits. After selecting the most promising actions, we estimated the cost, benefit, and return on investment of specific actions. Results from this work were included in the MOS' *Greenworks Philadelphia Sustainability Plan*. In 2011–2012, ICF assisted the City with updates to its GHG inventory and the *Greenworks Philadelphia* plan. ICF helped the City harmonize government and community inventory estimates for 1990, 2006, and 2010; developed GHG estimates for several key sectors; and reviewed work completed by the City. ICF is beginning a contract in 2015 to develop a climate adaptation plan that includes strategic adaptation actions for each of the departments.

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San Bernardino County, GHG Inventories and Reduction Plans, 2007-2011. ICF prepared a GHG emissions inventory for municipal operations ("internal" inventory) and county land use jurisdiction ("external inventory"). ICF also completed both an internal and external reduction plan to reduce GHG emissions to a county proposed target level by 2020. The county's jurisdictional area included an estimated 2006 population of 307,000. The county government operations include an extensive set of facilities spread over a large geographic region and employs over 17,000 people.

Greenhouse Gas Forecast and Reduction Measure Analysis, Sacramento Municipal Utilities District, 2009. This purpose of this project was to analyze and catalyze feasible and financially sound climate action plans (CAPs) in Sacramento County. To ensure regional preferences were prioritized, the study was closely coordinated with the Sacramento Area Green Partnership (SAGP), which is comprised of Sacramento area cities, Sacramento County, and various organizations, including the Sacramento Metropolitan Air Quality Management District (SMAQMD), Sacramento Area Council of Governments (SACOG), and Sacramento Regional County Sanitation District (SRCSD). ICF provided contract support for this study, including measures identification, estimation of quantitative results, coordination of participants, and production of the final report/presentation. ICF developed an accurate GHG baseline inventory and business-as-usual (BAU) emissions forecast for Sacramento County. To obtain an understanding of existing GHG emissions and sources, ICF reviewed Sacramento County's existing 2005 GHG inventory. Minor technical revisions were made to ensure that the inventory reflected the most recent published guidance. ICF developed a BAU emissions forecast for the incorporated cities and unincorporated county. ICF identified a list of potential candidate measures for reducing GHG emissions in the Sacramento Region. A total of 43 candidate measures were identified in nine sectors. ICF also explored methods for optimizing GHG reductions, costs, and job creation through creative combinations of candidate measures. Each scenario was based on a unique set of parameter values for individual candidate measures within a theoretical range of minimum and maximum values. GHG reductions, costs, savings, and potential jobs created were estimated for each scenario.

Quantifying Benefits, Costs, Co-Benefits, Implementation Approaches, and Timeframes

Carbon Emissions Reduction Task Force (CERT) Support, Washington State Office of Financial Management, 2014. The CERT Taskforce is a group of stakeholders charged by Governor Inslee to provide recommendations on how Washington State can meet its GHG limits through market mechanisms, such as trading, taxes, and incentives. ICF provided technical support to the taskforce by developing briefing materials and memos on the environmental and economic costs and benefits of various carbon pricing policies. ICF also performed research and analytics to estimate the impact of carbon reduction policies on transportation fuel costs in Washington State and quantified the monetized value of the associated petroleum displacement and CO_2 reductions.

State Climate Change Action Plan Support, Center for Climate Strategies, 2007-2009. ICF led the transportation and land use portions of the climate action plan processes for various states including Washington, Pennsylvania, Montana, Colorado, Vermont, South Carolina, Minnesota, and Alaska. ICF assisted with the evaluation of emissions strategies including measures to increase the use of alternative fuels, promote biking, walking, and transit use, and improve vehicle fuel economy.

EPA, State and Local Climate Programs Support, **2008-present.** ICF supports EPA in its efforts to help state and local governments develop and implement clean energy and climate change policies by providing a wide range of technical, outreach, communications, and programmatic support. ICF provides broad program and technical support to EPA including tracking national, state, and local government policies and actions and conducting analyses to identify state, local, and tribal technical assistance

needs. ICF developed the Energy Efficiency and Renewable Energy strategy documents as part of the Branch's Local Government Climate and Energy Strategy Series.[2] ICF also provides direct technical assistance to state and local governments; conducts analyses, studies, and evaluations of clean energy technologies on air quality, climate change, and human health; provides analytical support using ICF's Integrated Planning Model (IPM®) to assist states in promoting clean energy through the implementation of energy efficiency and renewable energy policies and programs in State Implementation Plans (SIPs); develops guidance & tools, including Web-based calculators and State Inventory Tools to assist states in quantifying their GHG emissions; and provides meeting, partner workshop, and other communications support. We have hosted webinars on technical topics for state partners, drafted background documents on technical topics; drafted and disseminated listservs, hosted workshops and conferences, facilitated and responded to peer review comments, facilitated in-person and virtual discussions among stakeholders, drafted Web pages, and tracked state and local climate policies. We are currently providing research assistance, implementation support, and tool development assistance to support the Clean Power Plan under Section 111(d) of the Clean Air Act.

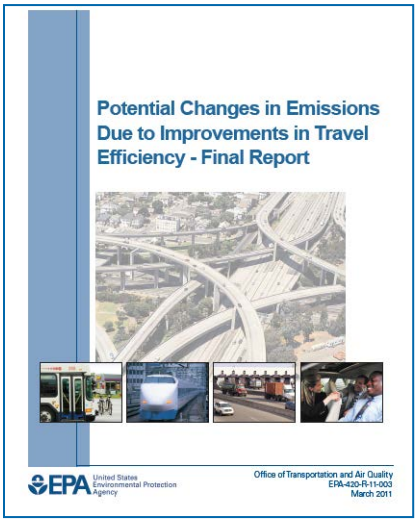
Land Use and Transportation Analysis

Estimating Emissions Reductions from Transportation-Land Use Strategies: Three Metropolitan Area Analyses, U.S. Environmental Protection Agency, 2012-13. ICF developed an approach to quantify the emissions effect of strategies that change travel activity, which became identified as the Travel Efficiency Assessment Method (TEAM). TEAM integrates the use of a transportation/land-use sketch planning model (TRIMMS) with EPA's MOVES model. ICF applied TEAM using case studies with three metropolitan areas:

- Kansas City, Missouri (Mid-America Regional Council),
- Tucson, Arizona (Pima Association of Governments), and
- Boston, Massachusetts (Massachusetts DOT)

Each area is unique in terms of their current transportation systems, their long range plans, the alternative strategies they are considering, and the availability of data to support the analysis. For more information, see: http://www.epa.gov/otaq/stateresources/policy/420r14003a.pdf.

Estimating Changes in Travel and Emissions from Transportation and Land Use Strategies, U.S. Environmental Protection Agency, 2009. ICF developed a methodology and toolkit for transport practitioners at the state and regional levels outlining approaches to estimate statewide and regional reduction in trips, vehicle travel, and emissions from transportation strategies. The strategies covered include travel demand management, transit improvements, road and parking pricing, smart growth, speed limit controls, non-motorized transportation improvements, and use of ITS. The manual provides guidance to practitioners regarding the appropriate data sources, assumptions, and tools to use in estimating changes in travel activity and emissions. In the first phase of the project, ICF designed an innovative methodology for the analysis and obtained baseline data from 15 metropolitan



[2] http://www.epa.gov/statelocalclimate/resources/strategy-guides.html#energyeff

areas representing a variety of city sizes, transportation profiles, and geographical regions of the country. The data were used as inputs to model the travel activity impacts of multiple packages of strategies, followed by an analysis of emissions impacts forecast out to the year 2050. For more information, see: http://www.epa.gov/otaq/stateresources/policy/420r11025.pdf.

Quantifying Transit's Impact on GHG Emissions and Energy Use: The Land Use Component, Transit Cooperative Research Program. ICF managed this significant research effort to examine the indirect benefits that transit provides to reduce energy use and GHG emissions by fostering efficient land use patterns, and developed tools for local and regional governments to better estimate these emissions. Deliverables from the project included a spreadsheet-based calculator tool, and guidebook for transit agencies, and an addendum to an APTA protocol quantifying the GHG benefits of transit.

Evaluation of Public Transit Projects Eligible for State Cap and Trade Funds, California Transit Association, 2014-present. ICF is recommending methodologies for quantifying the GHG reductions due to new or improved transit service when allocating cap and trade funds to transit agencies for emissions-reducing projects. ICF reviewed research and existing tools to identify a straightforward methodology for assessing the GHG impacts of projects related to new and increased transit capacity, outreach and transportation demand management programs, transit oriented development and other improvements to station areas, and energy-efficient transit vehicles and fuels.

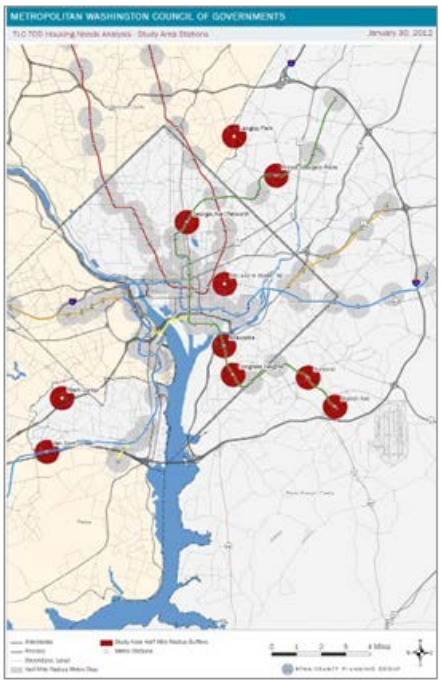
Transportation Strategies GHG Analysis/ Climate Initiatives Program Evaluation, Metropolitan Transportation Commission (MTC), 2010-present. ICF is the lead consultant on this four year contract to evaluate the outcomes of MTC's Climate Initiatives Program, a two-year $85 million grant program for local governments in the Bay Area. ICF is evaluating each program and project for cost and GHG emissions impacts and co-benefits. ICF's analysis has included assessments of outreach programs to encourage transit and active transportation use among youth.

Washington State Climate Action Team: Transportation Implementation Working Groups, Washington State Department of Ecology, 2008. ICF supported the Transportation Implementation Working Group (IWG) in recommending tools and best practices to achieve the vehicle miles traveled (VMT) reduction goals in HB 2815. This was a focused, bounded effort designed to result in the successful development of policy proposals which are specific and complete enough to be seriously considered by the Governor and Legislature in the 2009 Legislative Session. ICF analyzed the emission reduction potential and costs of various transit expansion packages.

Transportation GHG Emissions Sketch Analysis, MTC, 2011. ICF analyzed potential emissions reduction opportunities of bicycle and electric vehicle transportation alternatives for the 9-county San Francisco Bay Area. The project entailed identifying potential GHG emission reduction strategies for inclusion in the Regional Transportation Plan (RTP)/Sustainable Communities Strategy (SCS) and providing quantified GHG and criteria pollutant emission reduction potentials of the identified strategies using off-model sketch analysis.

Onondaga County Sustainable Development Plan, Syracuse- Onondaga County Planning Agency, 2011-present. Renaissance worked on a team of consultants to support the Syracuse-Onondaga County Planning Agency in creating scenarios for the Onondaga County Sustainable Development Plan. With a direct focus on land use and development patterns, the Sustainable Development Plan establishes a growth strategy for the long term future and informs local government policy makers, stakeholders, and residents about the benefits and tradeoffs of smart growth in the City of Syracuse and the towns and villages in Onondaga County. The scenario planning analysis evaluated the County across 9 sustainability topic areas, which included inter-municipal planning, infrastructure and land use, tax and fiscal policy, farmland and open space, economic development, housing, livability, energy, and water resources.

These elements were analyzed across the development scenarios and Renaissance generated indicators that measure the differences between the two growth patterns.



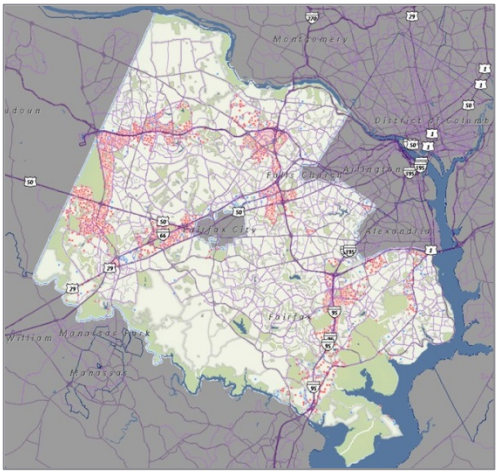
Transit Oriented Development Housing Needs Analysis, Metropolitan Washington Council of Governments, 2011-2012. Renaissance Planning conducted the Transit Oriented Development Housing Needs Analysis in coordination with the planning departments of Prince George's County, Washington, DC, and the City of Alexandria. The intent of the project was to create an analytical methodology and strategic framework for addressing the housing needs near transit stations in a variety of different contexts. A central element of the analysis was developing a rigorous approach that delivered both useful findings for the selected stations and a template for applying the methodology to other stations across the region. The results identify those stations where strong housing demand is most likely to increase housing costs substantially within the next five years. Detailed case studies for a subset of three stations dug deeper into the station-level housing dynamics and how those interact with the accessibility and connectivity opportunities that form the basis of good TOD planning. Renaissance synthesized these findings with jurisdiction-level long-term housing demand forecasts to develop the platform of knowledge needed to make strategic recommendations for addressing TOD housing needs at the selected stations.

Countywide Transit Network Study, Fairfax County Department of Transportation, 2011-2013. Renaissance Planning developed system recommendations for potential Metrorail extensions and appropriate locations for light rail systems and bus rapid transit. Renaissance used CommunityViz to develop cost estimates for several future high-quality transit networks. Each network represented a potential long-term vision for transit service comprised of a variety of service alignments, transit technologies, and station locations. Renaissance used CommunityViz to facilitate a multi-tier analysis of transit supportive development patterns in the US 1 corridor. Local land use plans at the "land unit" level were nested within station areas, activity centers, and TAZs. Long term forecasts for residential and employment growth was summarized at each scale of analysis. As a bottom-up process, FAR and jobs-housing balance values altered at the land unit scale would be reflected in activity levels at the core, activity center, and TAZ scales. As a top-down process, activity volume-to-trip production/attraction targets to support major transit investments were gleaned from a sketch regional travel demand model. These approaches were blended to gauge the amount of growth required in core areas to support premium transit service and quickly report the resulting amounts of residential and employment activity levels at the activity center and TAZ levels, feeding directly into the regional travel demand model.

Land Use and Transportation Impacts on VMT and GHG Emissions, Southern California Association of Governments (SCAG), 2008-2011. Land Use Sector Subgroup lead leader Rich Kuzmyak provided support to the Southern California Association of Governments (SCAG) with improved methods and tools to address key regional vision and GHG goals. He developed a new system of land use/transportation (TR/LU) models to complement MPOs regional TAZ model in quantifying the benefits of its Compass Blueprint vision, a revolutionary plan to manage the expected increase of 8 million new residents by directing growth around transit and into supporting communities. He then led work to develop a special Local Sustainability Tool (LST) motivated by SB 375, to help both the MPO and

individual jurisdictions test and adopt changes to their land use and transportation plans to reduce VMT and GHG emissions. As part of this same process, he developed a new travel demand management (TDM) model to be used in tandem with the LST model by local jurisdctions. Both the LST and TDM tools were designed for interactive use with local study groups and provide instant feedback.

Smart Growth Technical Assistance Program Review, U.S. Environmental Protection Agency, 2011-present. Renaissance used CommunityViz to evaluate the impacts of EPA's Smart Growth Technical Assistance (TA) efforts in nine case study communities. The TA efforts resulted in plans or programs that funnel regional growth and development to smart growth locations such as urban infill or transit oriented development areas. Using CommunityViz, we compared the prospective environmental impacts of the smart growth plans with an alternative "conventional development" scenario in which growth was allocated the region's fastest growing neighborhoods and employment centers. A land use/land cover analysis was conducted to introduce capacity constraints on new development in high growth areas, and assumptions about general floor to area ratio, residential density, redevelopment rates, and density increases in infill areas allowed the user to customize the conventional development allocation to reflect prevailing development patterns. Additional assumptions and indicators were used to compare the smart growth and conventional development scenarios across several environmental topic areas including: changes in impervious area; forest, cropland, grassland, and wetlands lost to development; residential and non- residential energy consumption; vehicle miles of travel, fuel consumption, and transportation- related greenhouse gas emissions; and walk trips.



Energy and Built Environment Sector Analysis

Commercial Buildings Energy Efficiency Study—Montgomery County, Maryland, 2010-2013. ICF conducted a study of technical potential and policy options for meeting the County's 25% energy savings goal as stated in its 2009 Climate Action Plan. This project involved extensive efficiency potential modeling, using ICF's EEPM planning model, as well as background research on baseline conditions, policy options, and an extensive stakeholder engagement process. The project included a detailed efficiency potential study, adapting ICF's Energy Efficiency Potential Model, widely used in utility energy efficiency planning studies, for this purpose. It also included developing detailed market characteristics, using the County's property tax database supplemented by other public and commercial sources. The study developed a detailed set of briefs on specific County policy options, and reviewed them through an in-depth stakeholder outreach and engagement process, including an online survey with some 80 respondents. Policies reviewed include energy performance benchmarking and disclosure, mandatory energy audits and retro-commissioning, building code requirements, community planning practices, and a range of financing and incentive options. The project produced a final report in November 2012.

Hawaii GHG Emissions Reductions, Hawaii Department of Business, Economic Development, and Tourism, 2008-2009. ICF supported Hawaii's Department of Business, Economic Development, and Tourism (DBEDT) in implementing Hawaii's GHG Emissions Reduction Act (Act 234). This work included support in (a) developing an updated Inventory of GHG Emissions for 1990 and 2007 and (b) analyzing the economic and non-economic benefits of alternative emissions reduction policies. Many of these policies focused on the benefits of implementing energy sector policies.

Energy Efficiency Programs to Achieve GHG Reductions, Baltimore Gas & Electric, 2008. ICF assisted with the BGE re-filing of 10 DSM energy efficiency programs designed to meet EmPower MD legislation mandating a 15% energy reduction by 2015. ICF assisted with program redesign and new program development for residential and commercial/industrial markets. ICF provided the re-filing and testimony support.

Energy Efficiency Program Modeling, Dominion Virginia Power (DVP), 2008-present. Since 2008, ICF has conducted all of DVP's energy efficiency program modeling, including measure and program impact analyses, load shape development. ICF also provides regulatory support to DVP including expert witness testimony. In 2008, ICF estimated achievable demand side management (DSM) savings potential over a ten year planning horizon for Dominion and surrounding service territories in the DC metropolitan region. The analysis encompassed both the residential and commercial sectors, including ten sub-sectors, and both new and existing construction. The steps included characterizing dozens of residential and commercial technologies for their cost, energy, and demand impacts; screening the measures for cost effectiveness; bundling the passing measures into utility-level programs; and estimating achievable annual market penetration over the planning horizon. Characterization of the measures included extensive use of DOE-2, building energy simulation software that provides results for every hour of the year.

Green Communities Planning Assistance, Massachusetts Department of Energy Resources (DOER), 2009 –Present. ICF provides planning assistance services to 53 municipalities for the Massachusetts DOER Green Communities Program. This initiative encourages the adoption of green policies and practices at the municipal level. By meeting five rigorous qualification criteria, a municipality can become designated as a Green Community, and therefore eligible for grant funding to support local sustainability goals. For each municipality, ICF develops an Action Plan to meet the five qualification criteria and coordinates a kickoff meeting with the key stakeholders from each municipality including town managers, mayors, selectmen, planners, building inspectors, facilities staff, and energy committee members. ICF then provides customized assistance to each community, which may take the form of educational webinars, small technical working sessions, review of proposed bylaws or policies, or presentations at public meetings. Following the first year of planning assistance, 19 of the initial 25 communities served by ICF have gone on to be designated as Green Communities. This success rate is higher by a wide margin than any other consultant that provided support to communities during the first round of Green Communities planning assistance. Based on our success, DOER has assigned ICF an additional 28 communities, to be served in the second year of planning assistance.

Renewable Energy Policy Analysis, NYSERDA, 2010 – 2011. Under a series of task orders, ICF assisted NYSERDA in a range of policy and market analysis tasks related to renewable energy. The project began with parallel efforts to identify and analyze renewable energy policies adopted by several other states/localities that might be adopted in New York to accelerate the deployment of renewable energy. For each state/locality, ICF prepared a report that summarized relevant renewable energy policies, analyzed their impacts and effectiveness, and identified potential improvements. As a second phase of work, ICF prepared a report on several key generic policies, which reviewed how various states and localities had used the policies and offered recommendations for how New York might best deploy them. In a third phase of work, ICF assisted NYSERDA in forecasting the cost and performance of PV technology over the 2010-30 time period for residential and small commercial customers. This analysis compared several reference forecasts (including ICF's own solar technology forecasting work for DOE/EIA), and derived installed cost figures for hardware and labor, as well as a levelized cost of energy value, across the analysis horizon. The fourth phase of work reviewed analyses of the impacts of the

proposed Solar Jobs Act of 2011 on solar market penetration, customer bill impacts, aggregate economic impacts, and job creation.

Energy Efficiency Program Planning and Delivery, Pepco Holdings, Inc. (PHI), 2010-present. Similar to its work for Dominion Virginia Power, ICF has provided both analytical and program delivery support to Pepco and its parent company. As with DVP, our potential analysis and program planning support involves developing detailed baseline and energy savings estimates for all major building types. We also currently deliver Pepco's residential energy efficiency programs, which gives us additional insight into market characteristics, achievable potential, and program design options. As with the DVP data, ICF's experience with Pepco provides an extensive, robust dataset that allows us to estimate GHG reduction impacts from any number of policy and program scenarios aimed at the built environment.

EPA ENERGY STAR program support, 1990s-present. ICF provides a wide range of support for EPA in the ENERGY STAR program suite, including labeled products specification development, and residential and commercial building benchmarking, rating, and labeling. This experience informs our utility DSM work as well as other ICF practice areas because it gives us both hard data and deep market knowledge of the energy and GHG savings associated with individual labeled products as well as whole-building strategies. While the ENERGY STAR programs are national in scope, we are experienced in using our utility-service-area analytics to efficiently apportion impacts at the state and local levels.

Energy Efficiency Codes Coalition support, 2007-present. ICF has conducted all of the building analytics behind this advocacy coalition's success in driving stringency increases from the 2006 to the 2015 versions of the International Energy Conservation Code (IECC). This work has also engaged us in estimating CO_2 and criteria air pollutant emissions impacts from adoption and enforcement of IECC code versions. We can easily apply VA, DC, and MD impact estimates from this work for purposes of the proposed MWCOG project.

Regional Greenhouse Gas Initiative (RGGI) Analytics support, 2005-present. ICF conducted all of RGGI's power system modeling analytics, for both the initial rule, the first compliance period, and the current compliance period. This involved assessing the impacts of various related policies in the RGGI states, which include Maryland. These included assessing the impacts of various levels of energy efficiency and renewable energy deployment on total emissions, wholesale power prices, and related variables. ICF also conducted similar modeling analyses for the Midwest Governors Greenhouse Gas Accords, and the Western Climate Initiative.

EPA Clean Power Plan Program and Analytical Support, 2013-present. ICF conducts a range of program support and analysis work for EPA, state governments, and private companies on the potential impacts of the proposed Clean Power Plan (CPP), whose final rule is expected in September 2015 with the compliance period running from 2020 through 2030. We are not only intimately familiar with the CPP's design and background analysis; we have also conducted independent analysis of CPP's potential impact by state as well as nationally. We apply ICF's IPM power sector modeling tools in tandem with our energy efficiency analytics tools to develop robust, granular assessments of various compliance scenarios. We will be able to adapt our existing analyses to estimate CPP impacts for the MWCOG region, both on a standalone basis and in combination with other strategies.

Power Plant Research Program, Maryland Department of Natural Resources, 2011 – 2014. ICF team member, Mondre Energy Inc. (MEI), provided support to the Maryland Department of Natural Resources (DNR), Power Plant Research Program. As part of this effort, MEI participated in the research and

analysis for, and drafting of portions of, the program's Cumulative Environmental Impact Report (CEIR). The research and analysis focused on electric utility economics; power plant design, siting and operation; load forecasting; alternative generation technologies; and the economics of carbon trading. MEI analyzed the potential, aggregate energy consumption savings and avoided carbon dioxide, sulfur dioxide, and nitrogen oxide emissions resulting from large-scale implementation of light-emitting diode (LED) street lights in Maryland's counties and municipalities. Lastly, under this project, MEI completed a survey of a survey of published research and analyses regarding the causes of recent declines in the projected rate of growth in electricity use in the U.S. The report identified the impact of electricity growth factors over the forecast period from 2010 through 2040.

2. SCOPE OF WORK

2.1. UNDERSTANDING

The members of the Metropolitan Washington Council of Governments (COG), representing 22 local governments, have collaboratively adopted voluntary goals to reduce greenhouse gas (GHG) emissions in pursuit of "a more accessible, sustainable, prosperous, and livable National Capital Region." These goals are ambitious – reducing GHGs by 20 percent below 2005 levels by 2020 and by 80 percent below 2005 levels by 2050 – and will likely require significant reductions in emissions across all sectors. The challenge is further put in perspective by recognizing that the region is expected to add 1.6 million people by 2030 (Climate Change Report[3]) and 2 million people by 2050 (Region Forward[4]). Against a current base of 5.8 million people, these increases in population represent 27.5 percent and 34.5 percent, respectively.

Why choose the ICF Team?

- Deep multi-sector expertise in developing climate action plans brings understanding of synergies across strategies and issues associated with target setting.
- Unique understanding of tools and technical approaches for analyzing strategies. ICF's work on the EPA Transportation Efficiency Analysis Method (TEAM) and application for strategy analysis in several regions, ICF's Energy Efficiency Potential Model (EEP), and Renaissance Planning's GIS Accessibility model (applied using MWCOG data) provide unique value.
- A broad perspective on strategy effectiveness, benefits, and costs, based on experience working with local governments on climate policy throughout the United States across the domains of energy, transportation, land use, and the built environment.
- Past and ongoing involvement in key planning studies related to transportation, land use, and energy in Virginia, Maryland, and the District.

Over the past several years, COG has made progress in understanding the nature of regional emissions through development of a 2005 (and 2012) baseline GHG inventory and forecasts, and in identifying opportunities for reductions in various sectors. Many local governments in the Washington region have become national leaders in adopting programs to reduce GHG emissions, including promoting building energy efficiency and transit-oriented development, and many communities have also signed agreements such as Cities for Climate Protection and Cool Counties. In its 2010 and 2013 Climate and Energy Action Plans, COG has identified a range of actions and is tracking progress toward these actions. COG also conducted focused analyses of transportation GHG reduction strategies through its "What Would It Take?" Scenario Study, and has explored various scenarios for land use development.

This effort represents a focused attempt to look across sectors to maximize reduction potential most cost-effectively, to generate co-benefits, and to understand what targets might be appropriate for

[3] MWCOG, 2008. National Capital Region Climate Change Report. Prepared by the Climate Change Steering Committee for the Metropolitan Washington Council of Governments (MWCOG) Board of Directors.

[4] MWCOG, 2010. Region Forward: A Comprehensive Guide for Regional Planning and Measuring Progress in the 21st Century. Prepared by the Greater Washington 2050 Coalition for the Metropolitan Washington Council of Governments (MWCOG).

various sectors to meet the aggressive overall emission reduction goals. In particular, this project represents an opportunity to accomplish the following:

1. Identify viable, implementable local, regional, and state strategies for reducing GHG reductions in each of the four sectors (Energy, Transportation, Land Use, and the Built Environment).
2. Analyze and quantify the benefits, costs, co-benefits, and implementation timeframes of these GHG reductions strategies.
3. Explore specific GHG emission reduction goals, measures and/or targets by sector or major source category.
4. Jointly develop an action plan for the region by January 2016.

In order to successfully carry out these tasks, COG will need a contractor to prioritize strategies for analysis, conduct effective sketch planning analysis of these strategies within a tightly constrained time frame. Moreover, the short-time frame for this analysis will benefit from lessons learned in other regions where municipal, regional, and state strategies have been identified, tested, and implemented. The ICF Team's work with local governments in California, New York, Pennsylvania, Illinois, among others, provides our team with unique perspectives and insights from the perspective of metropolitan planning organizations (MPOs), Mayor's Office staff, regional planning commission staff, and local jurisdictions regarding barriers to implementation, practical barriers of evaluating baselines against which mitigation benefits can be estimated, and accuracy of co-benefit calculations.

In addition to these perspectives from working with communities on climate action plans, ICF brings the knowledge of best practices for state and local government officials implementing climate and clean energy projects by virtue of our work for more than 20 years providing primary contractor support to EPA's Climate Change and Clean Energy Branch, including support to the Climate Showcase Communities and the local guides to GHG mitigation. Understanding the realities from the perspective of local governments and having literally written the guide for best practices in these areas, we feel uniquely qualified to help in this ambitious, stakeholder-rich endeavor. Our facilitation approach for in-person meetings will be rooted in our deep technical understanding, utilize enhanced stakeholder engagement techniques and approaches, and will be fostered by the involvement and participation of sectoral experts.

2.2. TECHNICAL APPROACH

Task 1 – Finalize Contractor Work Plan and Schedule

Upon contract award, the ICF Project Manager will arrange a kickoff meeting with the MWCOG Project Director to review the technical approach and schedule identified in this proposal. The purpose of this meeting will be to ensure a common understanding and agreement on the overall work plan and schedule. We anticipate that the kickoff meeting will be held within one week of contract award (estimated March 20), or by no later than March 25. The content of this proposal will be used as the basis for the work plan but may be adjusted slightly, based on MWCOG comments and needs.

We will discuss our approach to interacting with the three Sector Subgroups and the roles of our Sector Subgroup leads and overall Project Manager. We also will discuss our proposed task approaches, team organizational structure, and deliverable formats. Specifically, we recommend that while the Land Use and Transportation Sector Subgroups can meet separately, it would be beneficial for these groups to meet jointly since both sectors largely affect GHG emissions from on-road motor vehicles. Moreover, there are many synergies associated with land use policies and some types of transportation investments and policies (particularly, transit and travel demand focused strategies).

Given the short time-frame for this study and the need to rapidly complete deliverables for each of the three Subgroups, while ensuring coordination across Sector Subgroup efforts, effective on-going communication will be critical to the success of this effort. During the kickoff meeting, we will discuss communications protocols, including setting up regularly scheduled conference calls and progress report updates with the MWCOG Project Director. In addition, we propose to set up a Share Point project web site in order to efficiently and effectively share deliverables, as well as interim products, resources, and presentations, with MWCOG staff (and Sector Subgroup members, if desired). We will discuss the use of this Share Point site, and gather input on any preferred mechanisms for communication with the three Sector Subgroups, during the kickoff meeting.

Based on feedback from this meeting, ICF will submit a detailed work plan and schedule to MWCOG within one week of the kickoff meeting, by March 30.

PRODUCT: Detailed Work Plan and Schedule – to be finalized by March 30, 2015.

Task 2 – Meet with Sector Subgroups and Review Proposed Strategies

The purpose of this task will be to identify a set of viable short-term and long-term GHG reduction strategies for the metropolitan Washington, DC region, and to work with each of the three Sector Subgroups to develop consensus on the list of strategies to be analyzed.

It is our understanding that each of the three Sector Subgroups - Land Use, Transportation, and Energy/Environmental Sector –met in February 2015 and has identified an initial set of GHG reduction strategies that they consider viable and implementable in the short-term and the longer term. In addition, each of the Sector Subgroups will also identify "stretch" GHG reduction strategies that currently may not be considered viable and implementable given current laws or other restrictions, but could be viable in the future.

Not a "Cookie-Cutter" Approach

Many state climate action planning efforts have started off with a standard "catalog" of 40-50 potential strategies in each sector, and then have involved working with Sector groups to select 8-10 strategies for evaluation. However, starting from a long laundry list of strategies is not efficient, given where the region already is in thinking about and implementing strategies. Consequently, we plan to build upon the priorities identified in *Region Forward* and related plans. We will work with the subgroups to identify promising strategies that leverage all the past work so that we can quickly get to a shortlist of strategies worthy of consideration and analysis.

The ICF team will meet with each Sector Subgroup twice to discuss the list of potential strategies identified, analysis methods to be used, potential synergies among methods, and to develop agreement on the sets of strategies to be analyzed and approaches. Because of the work performed by the MSWG to date, starting from a laundry list of strategies would not be efficient. ICF recommends that given where the region is right now, we leverage all the past work to date so that we can quickly develop a shortlist of strategies worthy of consideration and analysis. It is assumed that MWCOG will schedule these meetings at MWCOG's offices and provide any initial lists of strategies identified to the ICF team.

As noted earlier, we suggest having the Land Use and Transportation Sector Subgroups meet jointly, given the synergies and common target of reducing motor vehicle emissions among both sectors. Most climate action planning efforts conducted at the state level have jointly addressed land use and transportation, and some of the analytic tools and approaches associated with travel demand can

address both land use and transportation investment. Our proposal assumes joint meetings of Land Use and Transportation, but this approach can be adjusted in consultation with MWCOG if preferred.

First Meeting with Sector Subgroups

At the first meeting of the Sector Subgroups, ICF will facilitate a discussion about promising strategies for consideration, along with recommended analysis approaches. The ICF team will also recommend potential strategies that may not have been identified by the Sector Subgroups.

The initial sets of GHG reduction strategies identified by the Subgroups will serve as the starting point for the identification of strategies, along with those strategies identified as promising or recommended based on relevant forerunner studies developed through COG's regional planning process. These studies in particular include the National Capital Region Climate Change Report (2008, and subsequent updates), and *Region Forward*, the overarching long-term vision plan for the region.

For each of the initial subgroup meetings, ICF will work with COG staff to organize the sessions as follows:

1. A ***brief overview of the current GHG inventory and baseline forecast***, to provide context of the importance of GHG emissions sources, to be presented by COG staff (if not already addressed in the previous Subgroup meetings). For instance, understanding the share of regional transportation GHG emissions associated with light-duty vehicles, heavy-duty vehicles, and other sources is important context for considering strategies that address the different sources.
2. A ***brief synthesis of results of recent studies on the costs and effectiveness of GHG reduction strategies***, based on relevant past analyses by COG, as well as studies conducted in Maryland, Virginia, and the District of Columbia, and nationally. For instance, the study, "Preliminary Analysis of Potential Transportation-related Greenhouse Gas Reduction Strategies for the Washington, DC Region" and the "What Would it Take?" analysis of transportation strategies both completed in 2010 identified and analyzed a wide range of transportation GHG mitigation strategies and their cost-effectiveness.
3. A ***facilitated discussion of potential strategies*** identified by the Subgroup, as well as other potential options for consideration. One item to consider is how the strategies should be framed for analysis. For instance, the strategies identified as illustrative examples (triple renewable energy production by 2020; increase proportion of electric vehicles in fleet to 15% by 2030; increase proportion of new housing in Activity Centers to 75% by 2040; increase daily transit mode share from 7% to 14% by 2050) demonstrate potential avenues for GHG reduction, but there remains the question of <u>*how*</u> would these outcomes be achieved. For instance, what types of investments or policies would be needed to increase transit mode share significantly? While this study cannot address every specific type of investment, the costs and benefits/co-benefits of different types of strategies could be very different. For instance, extending Metrorail, increasing neighborhood circulator buses, enhancing commuter bus services, reducing transit fares, enhancing real-time bus information, increasing employer-paid transit, and implementing road pricing are all strategies that can increase transit ridership, with different costs

Clearly Defining Strategies

A key point of discussion with the sector subgroups will be how to define strategies specifically enough for analyses of their GHG emissions benefits, costs, and co-benefits. Rather than defining broad strategies like "increase transit mode share", we anticipate defining a set of specific strategies and policies that could be implemented at the local, regional, or state levels for evaluation.

and benefits. A key issue for discussion with each work group will be how to define specific strategies for analysis purposes.

4. A ***brief presentation and discussion of proposed analysis methods*** – One issue that looms as a challenge at the outset of this exercise is the inescapable overlap and synergy of many of the strategies across sectors. It is important to recognize that the implications of individual strategies may not be additive but can be either synergistic or antagonistic when implemented in combination. This synergy is particularly true in the pursuit of VMT reduction strategies that involve both land use and transportation sector elements. However, some overlap also occurs in relation to land use and building energy use, since clustering development – residential or commercial – in higher-density, transit-served activity centers, results in multi-occupant/multi-use building designs that should be more energy efficient per resident than more dispersed stand-alone units. In anticipation of these issues, it will be important to consider analysis methods that address these issues of synergy.

The result of these working sessions will be an understanding of the interests of the Work Groups in specific strategies, and feedback on proposed analysis approaches. A brief description of potential strategies for analysis and issues to be addressed by the subgroups is provided below.

Land Use and Transportation Sectors

Land use and transportation actions both largely affect motor vehicle emissions, and so it is useful to consider these strategies in tandem. In particular, concentrating development in activity centers, combined with investments in transit, bicycling, and walking infrastructure work together to support reductions in vehicle travel that can reduce GHG emissions. As a result, we anticipate defining a set of strategies for analysis and plan to layer them. Strategies that ICF anticipates considering are noted in the table below.

LAND USE AND TRANSPORTATION SECTOR STRATEGIES

The Land Use and Transportation Sectors both largely affect motor vehicle emissions. While strategies can be grouped in different ways, an effective way to group strategies is to use three primary categories:

VEHICLE TRAVEL REDUCTION These strategies generally aim to reduce VMT, by encouraging shifts from driving alone to higher occupancy modes (i.e., transit, ridesharing) or non-motorized options (i.e., bicycling, walking, telecommuting) and/or by reducing trip lengths. Sample categories of strategies include:	
▪ Concentrate development in activity centers and around high-capacity transit (involves a wide range of options, which are often conducted in concert with transportation investments) ▪ Improve/increase transit services	▪ Improve/increase bicycle and pedestrian infrastructure and services ▪ Travel demand management and strategies to increase HOV use (employer outreach, ridematching, carpool/vanpool incentives, expanded telework) ▪ Increase vehicle registration fees, road pricing
IMPROVED OPERATIONAL EFFICIENCY These strategies generally aim to reduce the emissions per mile traveled, and include strategies:	
▪ Eco-driving incentives and promotion	▪ Improve traffic signal coordination

▪ Idling reduction	▪ Improve regional coordination of incident management
VEHICLE TECHNOLOGY AND FUELS These strategies generally aim to improve the fuel efficiency of a fleet:	
▪ Increasing electric vehicles	▪ Provide tax incentives for fuel efficient vehicle purchases or alternative fuel vehicles

While land use is listed as just one of many strategies listed above, we recognize the critical role of land use and specific attention that should be placed upon it. A thoughtful and advanced vision for dealing with the growth in regional population is to try to steer as much new growth (as well as infill and rehabilitation) into regional activity centers, which number 144 at latest count (2013). A prominent goal is to try to locate 75% of new housing in these activity centers by 2040. Whether this goal is achievable, which centers and in what form (mix of uses, density, urban design) it takes will directly affect the levels of future auto dependency, VMT and transportation-based GHG in the Region. In addition, goals like increasing transit ridership, the share of trips made by walking, bilking or short auto trips, will depend critically on how this growth is planned and executed – hence, the success of the land use or transportation strategies depend sharply on one another.

In the first session with the Land Use and Transportation subsectors, information will be presented on what is known about the relationship between transportation and land use, for which we will be able to draw upon recent work in Montgomery County for Maryland DOT to inform group members on what is known. In particular, we will discuss through what dimensions land use impacts travel behavior, in sufficient detail to equip the group with a starting sense of what matters and to what extent. We have numerous examples to share from our work nationally, as well as from the region, that will clearly make these point and thereby allow the group to move forward with identifying strategies, rather than engaging in protracted discussions about whether land use matters or not.

One significant task for the Land Use Sector Subgroup is to try to identify more directly how much of what of future activity should be allocated to alternative land use situations (i.e., the activity centers), which centers, with what density thresholds and mix proportions, and what transportation system elements or investments will be necessary to support it. The product of the group's work under Task 2 is expected to be a template with suggested growth allocation assumptions for different horizon years (2020, 2040 and 2050).

Energy and Built Environment Sectors

For the Energy and Built Environment sector, ICF will focus primarily on GHG emissions associated with the built environment. These come in two main forms: (1) direct emissions from on-site fuel combustion and (2) indirect emissions from power plants associated with on-site electricity usage. The strategies ICF anticipates for consideration as priorities for Subgroup review are highlighted in the table below.

ENERGY AND BUILT ENVIRONMENT SECTOR STRATEGIES

MWCOG members can affect the Energy and Built Environment Sectors most directly through local jurisdiction authorities and markets, but can also affect regional energy supply systems. Based on MWCOG's 2/27/15 Energy Environment Straw Proposal Strategy List, we have grouped these strategies in six primary categories:

New Buildings (and major renovations)—a mix of mandatory building codes and voluntary initiatives can drive new building energy needs toward a Net Zero goal	
• Adopt stretch goals for new building performance such as Architecture 2030 • Adopt best available model energy codes: IgCC, IECC, etc.	• Create incentives for beyond-code design and performance--utility incentives, property tax incentives
Existing Buildings—a mixture of regulatory and incentive approaches can drive down existing building energy use and emissions	
• Implement commercial building benchmarking/disclosure requirements • Encourage financing initiatives (PACE, green bank, revolving funds, credit enhancement) • Extend building code enforcement to cover more permitted projects • Encourage on-site renewable generation—Solarize initiatives, tax abatements	• Encourage renewable credit purchases – promote Green Power Partnerships • Develop voluntary challenges (e.g., Better Buildings Challenge, Green Games, Envision Charlotte) • Convert heating systems to lower-emission technology (oil>gas, electric>gas, electric>geothermal)
Utility programs—Pepco, Dominion Virginia Power, and the DC Sustainable Energy Utility offer a range of programs that MWCOG members can leverage	
• New construction design and commissioning incentives • Building retro-commissioning • Incentives for energy efficient appliances, HVAC systems, lighting	• Custom incentives for whole-building upgrades • Behavior change via smart grid/AMI technology, feedback and controls programs
Local Government Lead by Example	
• Set local government building energy savings goals (link to voluntary challenges) • Expand on-site renewable generation	• Grow green Power renewables purchases • Pursue green leasing/green purchasing • Energy education in schools
Other Public Infrastructure—regional and other authorities that span local jurisdictions, such as water and sewer, transit, and airport authorities operate major energy-using infrastructure	
• Convert streetlights, parking and security lighting to LED • Urban heat island reduction – tree planting, cool roofs, cool pavements, green streets	• Transportation authorities—lighting upgrades, onsite renewable generation, CHP/microgrids • Water & waste water utilities—renewable energy generation (solar, biogas/CHP, hydro turbines), waste heat recovery, reduce

	leakage rates
Energy Supply, including transmission/distribution (T&D) and Microgrids/CHP—MWCOG members can influence state and regional policies and other initiatives in energy supply systems	
• Leverage the federal Clean Power Plan by influencing state compliance plans (improve plant heat rates, increase gas generation, increase renewable and nuclear generation, increase customer energy efficiency) • Expand natural gas supply infrastructure to new and existing plants • Add units at existing nuclear plants near the region	• Increase the efficiency of the T&D system (recabling existing lines, high-EE transformers, distribution automation, PMUs, digital switching, other smart grid) • Increase RE through RPS, utility green power rate plans • Microgrid/CHP

Based on the results of the first set of Subgroup meetings, ICF will prepare a Technical Memorandum for each Sector Subgroup (Land Use and Transportation, and Energy and Built Environment Sector) recommending a prioritized list of the strategies to be analyzed for each sector based on a qualitative assessment of these strategies.

Second Meeting with Sector Subgroups

Using the above universe of potential strategies, and those strategies discussed during the initial meeting with sector Subgroups, ICF will apply a set of criteria developed with MWCOG staff and the Subgroup to narrow the focus to a preferred list for further analysis. On a preliminary basis, we anticipate that such criteria may include:

- Total GHG impact potential,
- Cost per ton of CO_2e,
- Incremental impact of regional strategies,
- Practicality of regional implementation, and
- Co-benefits such as other air pollutant emission reductions, and local economic benefits, among others.

The ICF team will facilitate discussion among the Subgroups in order to identify the most promising strategies to be analyzed in greater detail, and will discuss proposed methodologies for analysis. The ICF team will leverage our in-depth experience evaluating a wide range of GHG reduction strategies across the Land Use, Transportation, Energy, and Built Environment sectors, as demonstrated by our experience profiled in Section 1 of this proposal.

In addition to reaching consensus on the set of strategies to be analyzed, we will also use the second Sector Subgroup meeting to discuss how each strategy should be defined. The strategy "definition" includes the assumptions for parameters such as penetration rate and implementation timing – assumptions that will be needed to analyze the strategy GHG impacts. We will also use the second meeting to address the baseline against future reductions will be measured, and evaluate any disconnects between mitigation strategies and existing baseline estimates. Strategies can be defined based in a variety of ways, such as:

- Policy or regulatory decision (e.g., complete streets policy, Zero Emission Vehicle (ZEV) Mandate),
- Funding levels (e.g., level of investment in residential energy efficiency),
- Operational improvements (e.g., decrease transit headways in X corridor from 15 minute to 10 minutes),
- Infrastructure improvements (e.g., double miles of bikeways in the region by 2030), and
- Desired outcome or end state (e.g., increase bicycle mode share to 5% by 2025).

We will provide a recommended definition for each strategy included on the preferred list, and solicit Sector Subgroup feedback on these parameters. Final suggestions for strategy definition will be discussed as part of the May 8, 2015 meeting with all MSWG members.

PRODUCT: Meetings with each MSWG Sector Subgroup Technical Memoranda on Proposed Subgroup Strategies

Task 3 – Presentation of GHG Reduction Strategies for Analysis to MSWG

Develop Draft Technical Memorandum

Following the meetings with the Sector Subgroups in Task 2, the ICF team will develop a draft Technical Memorandum on the combined list of strategies proposed for analysis, along with a description of the methodologies to be used to analyze these strategies.

Our proposed methodologies will rely on applicable sketch planning tools, including several that the ICF team has developed. Specifically, in our work on Climate Action Plans for several states, regions, and municipalities, ICF has developed simple spreadsheet analysis tools to assess the implications of GHG reduction strategies, based on local inputs. In addition, ICF team members have developed some unique methods and tools that we anticipate using for the analysis. These are briefly described below, along with our prior experience in developing analytical tools.

Transportation Strategies. For strategies designed to reduce vehicle travel, ICF will apply a simplified version of the Transportation Efficiency Analysis Method (TEAM) approach, which we have developed in concert with EPA to analyze scenarios related to strategies such as transit investments, demand management strategies, and pricing. This approach utilizes the Trip Reduction Impacts of Mobility Management Strategies (TRIMMS) transportation/land use sketch planning model and emissions factors from EPA's Motor Vehicle Emissions Simulator (MOVES) emissions model. TRIMMS is a useful tool since it allows use of regional data as inputs, and accounts for synergistic effects of multiple strategies implemented in tandem. Moreover, the ICF team can adjust the figures to reflect results from regional and local studies. For instance, the ICF team can use data from the regional Transportation Emissions Reduction Measures (TERMs) analyses associated with outreach programs, commuter stores, and other strategies to extrapolate the effectiveness associated with further implementation. We plan to use emissions factors for GHGs and criteria pollutants from COG, based on MOVES analyses conducted for regional conformity analyses, and work with COG to extrapolate these factors through 2050. Some strategy analyses will have adjustments to account for changes in vehicle fleet.

In addition, the ICF team will apply sketch-planning methods to analyze a range of other strategies related to transportation operations and vehicle technologies, using inputs associated with vehicle population, trip lengths, average speeds, and results of analyses of these strategies nationally, supplement with local data and study results. For instance, ICF can apply the FHWA Tool for Operations Benefit Cost Analysis (TOPS-BC) to estimate the impacts of a wide range of operations strategies, such as ramp metering and traffic signal coordination. ICF has utilized TOPS-BC in work for FHWA to assess ways to integrate the travel benefits and costs of increased ramp metering in FHWA's Highway Economic Requirements System (HERS) benefit-cost analysis tool. ICF also has developed calculations of the implications of various strategies, and developed guidance on calculation procedures for 35 different types of transportation strategies in our work on the *Multipollutant Emissions Benefits of Transportation Strategies* for FHWA (http://www.fhwa.dot.gov/environment/air_quality/conformity/research/mpeb.pdf).

ICF TEAM EXPERIENCE DEVELOPING AND USING ANALYTICAL TOOLS TO ANALYZE GHG REDUCTION STRATEGIES

NCHRP 770 tools for bicycle and pedestrian planning: Guidebook contains a menu of ***sketch planning*** and more formal tools from existing soruces plus entirely new methods developed by the project team, in particular the Arlington VA-based GIS Accessiility model

Transportation Strategies: Rich Kuzmyak and Michael Grant conducted several national analyses of the CMAQ program (TRB Speical Report 264, SAFETEA-LU Assessment Report), which involved developing and reviewing simple methodologies for analyzing the VMT, speed, and ***emissions impacts of strategies***

Transportation/Land Use Ds's models developed by Rich Kuzmyak for Baltimore (BMC), Phoneix (Arizona DOT), Los Angeles (SCAG): Estimated household auto ownership, VMT, trips by mode based on sociodemographic factors, local accessiblity (densities, mix of use/entropy, design [e.g., intersection types & density]), and regional transit and auto accessibility

TDM: Rich Kuzmyak developed the ***FHWA TDM model*** in early 90's; assisted in developing EPA's COMMUTER Model in 2001; developed entirely new TDM model for SCAG for use in SB 375 compliance in 2009. ICF applied ***COMMUTER model*** and ***TRIMMS model*** for regional analyses

Sketch planning tools: Utilized for MTC and other MPOs on a ***range of strategies***

EPA Smart Location Database: ***Demographic***, ***land use*** and ***transportation*** characteristics for every CBG in the US for use in scenario planning

Scenario Planning Tools: Community VIZ, Envision Tomorrow

IMPACTS 2050 model for NCHRP (project 20-83-06/Report 750): Contributed to development and testing of model to analyze effects of ***demographic trends*** (along with ***land use***, ***transportation*** and ***economic interactions***) on future ***travel demand*** across diverse growth scenarios

SmartGAP model under SHRP2 C-16: Contributed to development of this model to analyze the effect of Smart Growth policies on travel demand

Energy: Beacon, EEPM, and Integrated Planning Model (IPM)

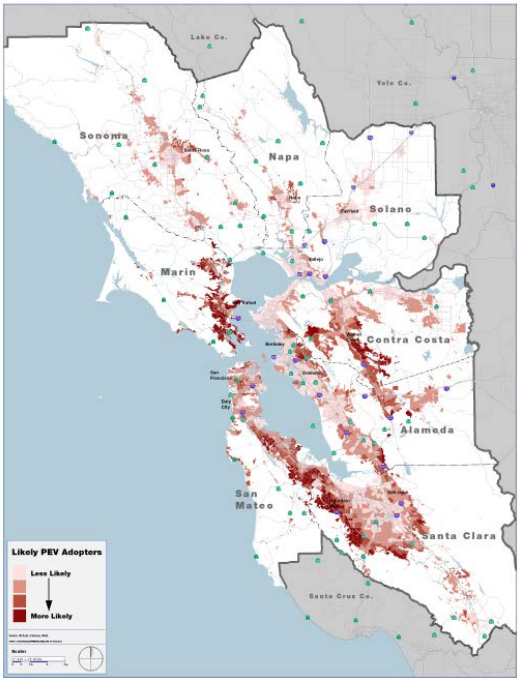
Multi-sectoral Tools: State Inventory Tool (EPA), State Projection Tool (EPA), Waste Reduction Model (WARM) (EPA), Climate Leadership in Parks Tool (NPS), Energy 2020 (Western Governors Initiative), Clean Energy GHG Calculator (USAID)

However, in conducting analyses through 2050, it will be important to not simply apply factors of today to the world of the future. Connected vehicles, new forms of shared mobility, and further enhancements in vehicles and communications (including fully autonomous vehicles) are likely to be in place in 2050. Consequently, it will be important to analyze some scenarios or conduct sensitivity analysis to assume potentially significant changes in vehicle technologies and mobility options.

Vehicle/Fuels Strategies. Our analysis of vehicle technology and alternative fuel strategies will involve first developing a baseline (BAU) projection of the vehicle fleet operating in the COG region, then analyzing the impacts of strategies to increase penetration rates of "clean vehicles" above this baseline. The COG region has significant potential to increase clean vehicle deployment, given the high levels of interest in electric vehicles and Maryland's participation in the recent 8-state pact to encourage deployment of 300,000 zero emission vehicles (ZEVs). ZEVs can include battery electric vehicles (BEVs), plug-in hybrid electric vehicles (PHEVs), and fuel cell vehicles (FCVs). If desired by the Sector Subgroup, we can also analyze increased use of biofuels (biodiesel, ethanol) and natural gas, which generally offer more modest reductions in GHG emissions compared to conventional gasoline and diesel.

To develop the baseline (BAU) vehicle fleet projection, we will start with COG's 2014 vehicle population data and any vehicle population forecasts available from long range transportation planning and climate change planning efforts. We can also make use of forecasts from the Energy Information Administration, which include baseline projections of vehicle sales and adoption rates for BEVs (of 100- and 200-mile range) and PHEVs (of 10- and 40-mile range).

Working with the Sector Subgroup, we will define one or more strategy scenarios that increase clean vehicle deployment beyond baseline levels. If monetary incentives are envisioned, these scenarios can be directly linked to a target level of funding, which can help offset the higher purchase price of electric vehicles. Alternatively, the scenarios can be developed as reasonable penetration targets/goals, reflecting expected deployment of electric vehicle supply equipment (EVSE) and other state and local support.



Example of PEV Penetration Analysis in the San Francisco Bay Area – geographic analysis will not be conducted for this study but will consider one or more scenarios for clean vehicle deployment

We will also discuss with the Sector Subgroup the potential for a more granular forecast of ZEVs in the COG region, using demographic forecasts to project likely adopters of electric vehicles at the TAZ-level. While our proposed budget does not assume this level of analysis, we could explore this this approach as part of scope of work revisions. ICF has performed this type of analysis for several other regions, including the Philadelphia metro area (DVRPC) and San Francisco Bar Area (MTC) (see example above).

Land Use Strategies. While the simple sketch planning assumptions used in TRIMMs, extrapolation of data from COG's own CLRP Aspirations Scenario study, and other land use and transportation analysis tools can be used to assess the implications of alternative land use patterns on travel patterns, the ICF team proposes to employ a relatively new methodology, called the multimodal accessibility (MMA) model, developed by our team member Renaissance Planning. This model was initially developed as one

of a suite of tools in NCHRP project 08-78 for use in estimating the demand for bicycle and pedestrian travel, and is prominently featured in the NCHRP Report 770 guidebook. It makes intensive use of GIS tools and data to calculate measures of accessibility (to jobs, goods, services) for all modes at a given point of reference. The initial model was developed using data and support from MWCOG, in particular:

1. InfoUSA data on employment establishments (by specific address, size, and 4-digit NAICs activity code)
2. Transportation network data, gained from use of COG's NAVTEQ license, as well as travel time skims from COG's regional model.
3. Individual trip data from COG's regional travel surveys.

Using GIS-overlay methods and a tool called Network Analyst, each travel survey trip end was identified and a set of accessibility scores calculated for each mode. These score were then analyzed concurrently in relation to the person's actual mode choice, and a set of models were produced that explain choice of mode accurately from the respective accessibility scores. The calibrated models (for HBW and HBO currently) may then be applied back at a higher level of geography, although to ensure adequate resolution for non-motorized travel and transit (walk access) the current tool operates at the level of census blocks. Accessibility scores are calculated for the blocks, and then the models applied to those scores to estimate mode choice, which can then be transformed to modal trip productions or attractions.

We propose to utilize this unique model to conduct more detailed analyses of alternative land use and transportation scenarios, and to assess the implications on travel, and corresponding GHG emissions. Additional information on the model and three example applications are included in the box below. Based on application of the tool, MDOT has since tasked Renaissance Planning with existing the MMA score coverage to all of Central Maryland. MWCOG transportation staff have been kept abreast of this development and discussion has been held about expanding the platform through the remainder of the COG region. Based on data and experience in hand, we estimate having the pieces of this platform in place before they are needed by the analysis activity of Task 4 beginning in May. With this tool, it will be possible to make land use assumptions and allocations – as well as transportation system improvements – at the various time horizons and compute change in major travel indicators.

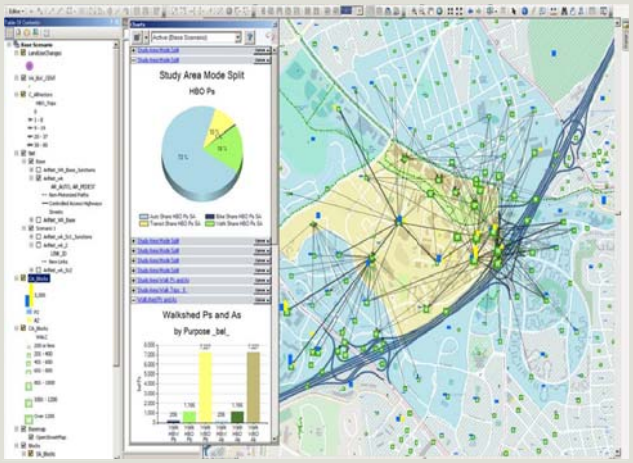
Energy and Built Environment Strategies. In the Built Environment sector, ICF will apply our experience and capabilities for various types of strategies as summarized below.

- **Building codes**—ICF will apply the state-by-state CO_2 emissions impacts it has developed for the Energy Efficient Codes Coalition to project the impacts of various levels of code stringency for the MWCOG region.
- **Efficient products**—Using our knowledge of DOE appliance standards, EPA ENERGY STAR labeling, and their market deployment dimensions, we will develop a set of deployment strategies assuming a baseline established by standards with additional impacts from voluntary product labeling deployment.
- **Whole-building retrofits**—Based on our Montgomery County modeling project, and on ICF whole-house retrofit program experience in Maryland and other states, we will estimate the potential for whole-building retrofits.

MULTIMODAL ACCESSIBILITY (MMA) MODEL EXAMPLES

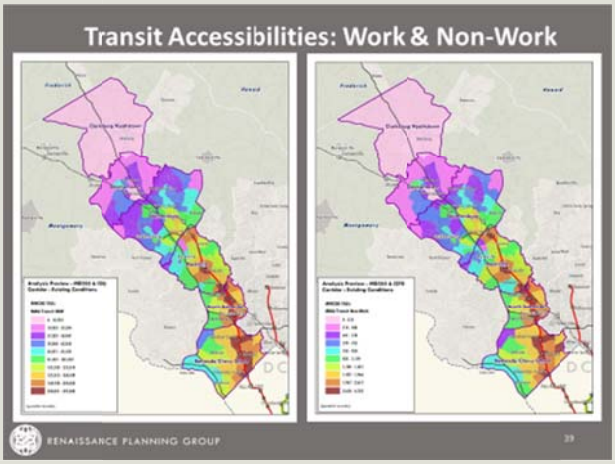
Estimating Walk Trips for Shirlington

The MMA Model was test applied to locations in Arlington, including an example for the town of Shirlington. The figure to the right shows how walk trip productions and attractions were calculated at the block level, and then joined to create a network of block to block flows, which if desired could be assigned to the walk network to gauge facility use. This framework can readily be used for scenario planning analyses. The planner can either alter assumptions about the land use totals or mix in any block, or change the links in the underlying network, recompute accessibilities and ascertain the changes that result.



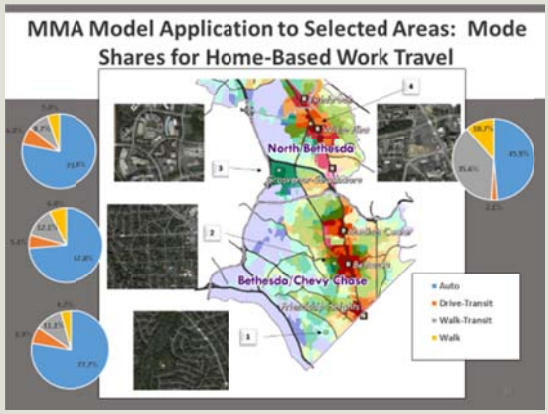
Calculated Transit Accessibility Scores in Rockville Pike/I-270 Corridor

Since the NCHRP research, Renaissance Planning has been working with the Maryland Department of Transportation to help it improve the capability of its analytic tools for multimodal planning and project evaluation. The existing state and MPO models were seen as too coarse for important land use, transit and non-motorized assessments, and MDOT directed Renaissance to test expanded application of the Arlington approach to a major corridor – in this case the entire Rockville Pike/I-270 corridor. Using the same general approach, modal accessibility (MMA) scores were calculated for the defined corridor area, providing highly informative accessibility maps throughout the corridor, seen in the figure to the right.



Mode Choice Prediction at Census Block Level

These features of the MMA model allow us to target any given block and predict its mode share, given the respective MMA scores. The figure to the right illustrates this capability in estimating mode splits for several randomly selected individual blocks in the lower corridor. The aerials serve to show how well the layout of the area corresponds to the travel patterns predicted. Again the mode choice models were estimated using MWCOG travel survey data, and estimate auto, walk-transit, drive-transit and walk for HBW trips and auto driver, passenger, transit and walk for non-work trips



- **Distributed generation**—From combined heat and power to renewables installed directly or purchased via Renewable Energy Certificates, we will develop strategies designed to reduce emissions and increase efficiencies in the current regional electricity grid, and to develop microgrid applications. ICF will use its extensive state-by-state database of existing CHP site potential and Mondre Energy's renewable expertise to develop these strategies.
- **Utility DSM strategies**—Using a mixture of code compliance, product incentives, and whole-building retrofit programs, we will develop DSM strategies as an overlay to assess the portion of the above underlying strategies.
- **State and local government strategies**—While utilities may serve as effective delivery agents for energy efficiency and renewable energy, ICF will also examine state and local agency strategies that can complement or supplant utility strategies. These can include the Sustainable Energy Utility concept, currently implemented in the District of Columbia, agency procurement policies and construction standards, green power purchasing strategies, voluntary community challenges such as the Arlington Green Games, and Lead By Example strategies in which governments commit to benchmark and improve energy performance.
- **Leveraging federal policies**. Various federal policies could be leveraged to help MWCOG members drive GHG reduction strategies. We will focus on those most likely to support state and local leveraging, especially EPA's Clean Power Plan. Based on our ongoing work in this area, we will be able to show MWCOG how to use energy efficiency, renewable energy, and distributed generation resources, within the context of CPP compliance, to increase regional impacts and benefits from clean energy strategies.

These methods have been proven in several Washington-region projects as described below. We will use data developed in these efforts to sketch-modeling of any number of measure combinations as part of various policy and program scenarios.

- **Developing energy efficiency potential assessment for electric utilities (Dominion Virginia Power and Pepco).** ICF uses its proprietary Beacon building simulation modeling platform to develop robust, detailed estimates of individual energy efficiency measure impacts. Beacon uses the DOE-2 and EnergyPlus simulation engines, enabling it to develop accurate energy usage calculations on hourly and annual bases. We then populate our Energy Efficiency Planning Model (EEPM) with measure impacts and costs, plus regional market characterization and building stock date, to conduct market penetration and total market impact analyses. Beacon and EEPM are also designed to automate parametric analyses, so that policymakers can asked detailed "what-if" questions for a range of scenarios and variants.
- **Calculating whole-building energy construction and energy retrofit impacts.** ICF uses our Beacon modeling platform for this type of work, including projecting impacts from building energy codes scenarios or whole-building scenarios. We used Beacon to develop measure impacts for several measures used in our Montgomery County project, and then used the EEPM model to project total market impacts for a range of scenarios.
- **Assessing market impacts of various strategies**. ICF's EEPM modeling tool is designed to permit both very granular and aggregate impact estimates of a range of policy and program scenarios. Once the individual technology measures have been loaded into the model, various measure bundles and participation rates can be used to simulate a variety of scenarios. We used this approach in the Montgomery County project described above.

- **Assessing impacts of federal, state and regional climate policies**. ICF's IPM power sector model was used to develop the Regional Greenhouse Gas Initiative (RGGI), of which Maryland is a member. This experience can be translated into potential impacts for various scenarios the Subgroup wants to explore.

MSWG Meeting

ICF will present and discuss the recommended strategies for detailed analysis with the full MSWG on May 8, 2015, consisting of members from all Subgroup Sectors. In advance of the meeting, ICF will circulate the list of recommended strategies to allow participants time to review them before the meeting. During the meeting, ICF will gather feedback on the list of strategies by polling the participants with a series of questions. This might include:

- Do you feel we have the right number of strategies? Too few? Or too many?
- Do we have the right balance of strategies among sectors? Or should we add/remove strategies from certain sectors?
- Are there opportunities to consolidate the sector-specific strategies into cross-sector strategies?

Then, ICF will solicit recommendations for additions and modifications to the list of recommended strategies. This might include:

- Brainstorming additional strategies not yet considered by the sector subgroups
- Identifying strategies that should not be included in the list for detailed analysis
- Identifying cross-sector strategies that combine elements of multiple sector strategies

Voting on any strategies that should be added to the list of strategies for detailed analysis—this could be done using a show of hands, sticky note voting, or electronic polling

ICF will document the proceedings of the meeting, and will document comments made on the recommended strategies for analysis. ICF will also document any suggested additions or modifications to the recommended list of strategies; identifying synergies among the strategies recommended in different Sectors. ICF will deliver the documentation of the proceedings and comments received on the recommended list of strategies at an agreed upon timeframe with the Subgroup Sectors (no later than 1 week following the meeting).

Develop Final Technical Memorandum

ICF will respond to the various comments and suggested modifications to the recommended strategies and advise how these comments and suggested modifications could be addressed. Where there are disagreements on some of the recommend strategies or modifications, ICF will facilitate achieving consensus on the final list of strategies to be analyzed. ICF will then document in a Technical Memorandum the final list of strategies to be analyzed and the methodology to be used to analyze these strategies.

PRODUCT: May 8th Meeting with full MSWG Draft and Final Technical Memorandum on Recommended Strategies for Detailed Analysis

Task 4 – Analyze Selected Strategies

Analyze Strategies, Synergies, Costs, and Benefits

In this task, ICF will analyze the selected strategies from Task 3. This analysis will include first, identification of the implementation approaches and time frames for each selected strategy and quantification of the GHG reductions. The ICF team will also analyze costs (both public and private sector) and co-benefits (including reductions in air quality criteria pollutants, as feasible) attributable to each strategy. The GHG reductions will be analyzed for specific milestone points: 2020, 2040, and 2050, along with estimates of the cumulative GHG reductions over three periods: 2012 to 2020, 2020 to 2040, and 2040 to 2050, primarily using straight-line reduction assumptions across these periods. We recognize this is a simplified approach, given changes in vehicle fleet and other factors, but given the wide range of factors and uncertainties with strategy effects, this approach should provide useful information for comparative purposes. .

Across all sectors, a first step for the analysis will be to build off of the baseline GHG inventory and forecast to identify baseline GHG emissions estimates by major source for each of the milestone years. We will coordinate with COG to gather baseline forecasts of VMT and vehicle fleet characteristics. When exploring the results of strategies, we will conduct a limited analysis of combinations of several strategies. The TEAM analysis approach already allows for exploration of a combination of VMT-reduction types of strategies. However, beyond these sets of strategies, it is important to recognize that other strategies will have implications on each other and GHG reductions are not fully additive. For instance, increasing the deployment of EVs will erode the effectiveness of VMT reduction strategies. More renewables will erode the effectiveness of energy efficiency strategies.

In estimating costs, we will focus primarily on public sector costs for infrastructure investments (e.g., transit, bicycle pedestrian) but will also include estimates of private sector costs (e.g., associated with building energy efficiency and other strategies with notable impacts on private entities). It will also be important to note that many strategies that reduce fuel use in transportation and utility costs will generate corresponding energy cost savings to the public.

Transportation and Land Use Strategies. Using a simplified version of the TEAM Approach, along with sketch planning spreadsheet-based calculations, the ICF team will calculate GHG emissions reductions, as well as criteria pollutant emissions reductions associated with various transportation strategies. Using the multimodal accessibility tool introduced in Task 3, Renaissance Planning will take the lead in preparing the identified land use and corresponding transportation strategy inputs and calculating the respective impacts. The primary model outputs include mode choice (for auto, transit and walk), for work and non-work travel if desired, and VMT. Using these outputs, Renaissance will derive GHG and other benefits of identified land use strategies.

There are a number of co-benefits that can be linked to the land use and transportation calculations, including:

- Changes in other criteria pollutants
- Preservation/enhancement of existing neighborhoods
- Preservation of open space and farmland
- Storm water runoff from roads and parking lots, rooftops
- Improved accessibility to jobs, health care, services, education Greater variety of housing types, price points, affordability
- Balanced growth across the region, reducing need for long commutes, auto dependency
- Safe communities (research is showing

- Broader range of travel choices for more people

that TODs have better crime statistics because of design and activity levels)

Some sense of how each of these can be impacted by the land use and transportation scenarios can be determined for many of these with quantitative indicators.

ICF and Renaissance will work with various study groups and the MSWG on estimating costs. For the land use strategies, the major costs are transportation related, specifically for additional transit service plus walk and bike facilities. In addition, local communities may also experience costs for providing a finer-grained local street network and relocating utilities. However, nearly all of these costs could be covered through improvement districts or impact fees. Perhaps more important are the potential cost savings of implementing certain actions, including:

- Fewer dollars to road expansion and upkeep/maintenance
- Fewer travelers losing time due to congestion (more so due to different destination/mode alternatives than reduced highway congestion levels)
- Reduced costs of public services for municipal and state governments in sustainable communities

Energy/Environment Strategies. For the Energy/Environment Subgroup effort, ICF will use the building, program, and policy analysis tools, including Beacon, EEPM, and IPM, that are described above. Because we have already applied these tools in various capacities for entities in the MWCOG region, ICF is confident that we have robust data available from previous projects that can be readily adapted and extrapolated for the purposes of this project.

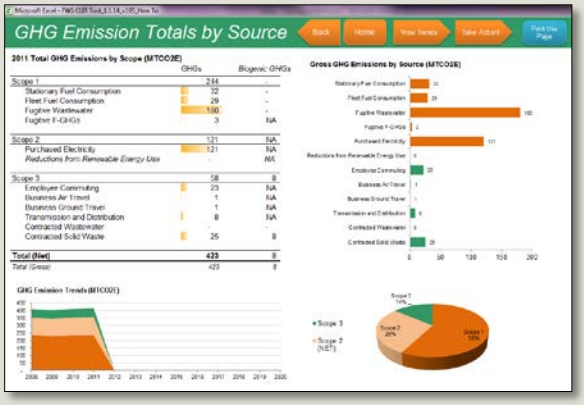
For this effort, we propose to use a simplified or "sketch" version of EEPM, in which various policy and program scenarios are tested by modifying certain assumptions and parameters from previous EEPM applications in the region. This will preclude the need to build a model from scratch, while leveraging the robust and granular results from previous ICF projects.

SAMPLE ANALYTIC TOOLS TO ANALYZE COSTS AND BENEFITS OF GHG REDUCTION STRATEGIES

ICF has developed a range of simple Excel tools to support calculation of the GHG emissions benefits, as well as corresponding effects, of strategies. For this effort, we do not plan to develop a formal tool for COG, but will rely upon the approaches we have used in previous tools to support the analysis of specific strategies selected. Two examples of tools ICF designed are highlighted below:

Climate Leadership in Refuges, U.S. Fish and Wildlife Service

ICF developed a Microsoft Excel-based GHG emission calculation and mitigation tool (known as the CLIR Tool) for use by U.S. wildlife refuges. The CLIR Tool estimates GHG emissions for all GHG sources required by the Federal GHG Accounting and Reporting Guidance as well as emissions from visitor travel to and within refuges. The CLIR Tool also presents calculators to help refuge staff calculate the cost and GHG benefit of taking action to improve sustainability within their refuge. The emission inventory and prioritized actions are presented in an annual "Performance Brief" that can be exported.



County-level GHG Planning and Cost/Benefit Analysis Tools

ICF has developed and utilized spreadsheet calculation tools to support analyses of GHG reduction strategies for several local governments. By leveraging these tools, ICF will be able to build on existing research and spreadsheets already developed to help evaluate costs and savings of GHG reduction measures at the local level. These tools will enable us to develop credible cost analyses in a cost-effective manner.

Develop Technical Memorandum

ICF will document the results of the Task 4 analysis in a Technical Memorandum and provide COG with all data, models, and other analytical tools used to perform the analysis of each strategy.

Present Findings, and Respond to Comments

The CONTRACTOR will present the Technical Memorandum documenting analysis of each strategy to each of the Sector Subgroups and respond to the comments received from each Subgroup and address the comments in the draft Interim Technical Report in Task 5.

PRODUCT: Technical Memorandum on Strategies Analyzed Data, Models and Documentation

Task 5 – Prepare and Present Interim Technical Report

The Technical Report will be a major outcome of this project and will summarize the actions identified and analyzed by the Sector Subgroups and ICF. The report will communicate important findings and guidance to City departments and as such, it will need to provide enough technical detail and substance to be useful to departmental planning and decision making. The ICF team will present a draft Interim Technical Report to the full MSWG at their July 31, 2015 meeting. This draft Interim Technical Report will address the comments on the results of the strategy analysis received from each Subgroup in Task 4. Where there are disagreements on the results of the strategy analysis, the ICF will attempt to facilitate consensus on revisions to the Interim Technical Report. If a complete consensus cannot be reached, the ICF will incorporate the discussion of these areas of disagreements into draft final Interim Technical Report.

ICF's general approach to producing technical reports is to begin by developing a "creative brief" that identifies the target audience(s), key messages, objectives of the report, an outline, guidance on look and feel, and a production schedule that sets target dates for each step of the process from initial writing through final layout and design. The creative brief (which can be vetted with both MWAQC and CEEPC, as desired) establishes agreement between ICF and the client on key characteristics of the report, and ICF uses the brief to guide its work throughout the writing, editing, and design phases. This will be important given the tight timeframe and range of stakeholders/perspectives involved.

Another feature of our approach that relates to the relatively short duration of the project period is our plan to draft sections of the report in tandem with earlier tasks. ICF's author and editor will communicate regularly with the task leads to determine when enough information becomes available to allow individual sections to be drafted, and will work with MSWG to develop supporting graphics for those sections. ICF will also work with MSWG to develop design options for the report, including up to two sample covers and inside spreads for review by MSWG. We typically develop design options early in the process so decisions on look and feel can be made without the pressure of impending deadlines. Once a cover and inside spread design are approved, MSWG will develop a layout template and work with ICF to develop any supporting graphics in a style that fits with the overall approved design. Because diagrams and other graphics can take time to develop and refine, we begin developing them as early as possible in the process. We also focus early on identifying photographs that will be used in the report, since tracking down high-resolution images and obtaining permissions can take time.

Two rounds of review are anticipated for the draft report. As sections of the draft report are completed, ICF will send Microsoft Word versions to MSWG for initial review and comment, incorporating edits and addressing revisions in second drafts that will be compiled into a full draft of the report. ICF will then send the full draft Word version to MSWG for a second round review, incorporating any edits and revisions before developing a layout. Once edits are incorporated, the final version will be delivered to MSWG.

ICF will work with MSWG to address any potential requested revisions to the layout version. In addition, ICF will provide graphics from the report as separate high-resolution files suitable for use in Microsoft PowerPoint presentations or posters; exceptions may need to be made for proprietary graphics such as photographs with permissions restrictions.

ICF's criteria for satisfactory completion and delivery of the product are that MSWG is satisfied with the writing, organization, content, and design of the report and that the final PDF is free of errors and meets all requirements for posting on the WASHCOG website.

ICF will also work with MSWG to develop presentations on the results of the GHG reduction strategy analysis. ICF will assist COG staff in the development of the PowerPoint presentation, and can accompany COG staff to the September 2015 meeting and participate as requested/needed.

PRODUCT: Interim Technical Report Presentations to TPB, MWAQC, CEEPC and COG Board

Task 6 – Explore GHG Goals and Targets in each Sector

Assess Achievable and Stretch Goals and Targets for Each Sector

Ultimately, key issues stemming from the analysis of strategies include:

- How much GHG reduction can we achieve from different strategies in each of the sectors?
- What are the potential additive effects of these strategies (accounting for synergies or antagonistic effects)?
- What would be appropriate GHG emissions reduction targets for different sectors or GHG emissions source categories?

The "What Would it Take?" analysis, for instance, acknowledged that GHG reductions from transportation are likely more challenging than from electricity, and so achieving the 80% reduction by 2050 might reasonably entail different targets for transportation versus other sectors.

As a first step in considering targets by sector, it will be important to connect strategies to GHG reduction mechanisms, and ultimately to emission source categories corresponding to components of the regional GHG inventory. Generally, goals or targets should correspond to a primary source category, such as transportation-related (on-road motor vehicle) emissions, rather than setting targets for each of the four sectors identified by COG for analysis, given the overlapping GHG sources that are addressed through different sectors. As noted earlier, land use and transportation sector strategies will largely affect transportation (on-road motor vehicle) emissions, and built environment and energy strategies will largely affect electricity consumption and residential-commercial-industrial (RCI) non-electricity fuel consumption. The following table connects several possible strategies with their corresponding GHG emissions source.

To develop an understanding of a reasonable range of GHG goals and targets, ICF will look to other regions, states, and relevant international reports. ICF has prepared GHG emissions analysis and/or reduction plans for several major metropolitan cities around the country, including three of the five largest cities in the country (Philadelphia, Los Angeles, and Chicago). We will draw on our experience and policy knowledge to identify a set of possible targets by sector.

Example Strategies	GHG Reduction Mechanism	GHG Emissions Source Category
Fleet mpg improvements	Vehicle Technology and Fuels	Transportation
ZEV deployment		
Increase biofuels use		
Incident management	Transportation System Efficiency	
Idle reduction		
Signal timing		
Transit investments	VMT Reduction	
Bike/pedestrian investments		
Rideshare programs		

Example Strategies	GHG Reduction Mechanism	GHG Emissions Source Category
Land use – TOD		
Land use – mixed use		
Residential demand side mgmt – new buildings	Building Energy Efficiency	Electricity
Energy efficiency – building operations		
Commercial/industrial demand side mgmt		
Landscaping strategies	Water Use Reduction	
Water-saving fixtures		
Distributed renewable energy	Renewable Energy	
Grid-based renewable energy		
Combined heat and power	Other Energy Supply Investments	
Smart grid		
Residential demand side mgmt – new buildings	Building Energy Efficiency	RCI Fuel
Energy efficiency – building operations		
Commercial/industrial demand side mgmt		
Various	Other	
Various	Waste Management	Other
Various	High GWP Gas Reduction	

We will consider targets within the COG region, neighboring regions and states, and other regions of similar size to COG, with a focus on targets by sector or emissions source. While we will rely largely on the results of the GHG strategy analysis in the Washington region, ICF recently completed a national assessment of GHG performance measures and targets in the transportation sector for FHWA, and as a result can draw upon examples from around the country for context (see: A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning, available at: http://www.fhwa.dot.gov/environment/climate_change/mitigation/publications_and_tools/ghg_planning/index.cfm). Several other regions that have transportation sector GHG reduction targets used metrics such as light-duty vehicle carbon dioxide (CO2) emissions per capita (notably, MPOs in California, as well as Portland Metro). In part, this metric was designed to focus the regional analysis on passenger transportation, removing the effects of state policies that affect vehicles and freight.

In the case of COG, we assume that the metric desired would be in terms of total on-road CO2 emissions, for consistency with the region's overall GHG reduction goal. Consequently, we will explore analyses conducted by MPOs, such as the Puget Sound Regional Council (PSRC), in the Seattle region, which analyzed GHGs associated with different plan scenarios for its Transportation 2040 Plan, and the Atlanta region, which also conducted a similar analysis, to compare their estimated reductions.

ICF will compile a summary table of these organizations short term, medium-term, and long-term targets. Supporting the table, ICF will provide information on the context under which the goals have been established. Frequently, targets are set to help achieve a greater goal. Common methods for expressing these targets include:

- A percent reduction below business as usual,
- A percent reduction below a baseline year,
- Efficiency-based (emissions per capita, per job, per kwh, etc.), and
- Consistency with state, federal, or international targets.

Following the review of external targets and goals, ICF will begin crafting a range of potential targets for MWCOG. ICF will provide recommendations for 2020, 2040, and 2050 targets by primary GHG emissions source category – based on both 1) achievable goals based on currently viable, implementable strategies, and 2) stretch goals that could become viable in the future.

ICF will evaluate the strategies evaluated under Task 4 to qualitatively determine their feasibility. Potential criteria for evaluation could include the following:

- Financial feasibility,
- Political will,
- Regulatory or legal barriers,
- Community support, and
- Consistency with local priorities and plans.

ICF will then assign each of the strategies an overall "score" to inform the ease of implementation, and to sort the strategies into those that fall into two tiers:

Tier 1: Currently viable, implementable strategies; and

Tier 2: Strategies that could become viable in the future if certain changes were made in existing state and local regulations and future investments were made in them

Assess Potential Targets with New Federal Actions

Even with implementation of these "stretch" strategies, it is likely that there will still be significant gaps in achieving an 80 percent reduction in GHG emissions by 2050. ICF will explore what effects could be achieved through some highly effective national-level GHG strategies, such as increasing the federal CAFE standards to 65 mpg in 2035 or national regulations for carbon sequestration of fossil fueled power plants, and how those strategies might fit within a more ambitious target-setting approach by major source category. ICF will work with COG to identify one significant federal policy change per major source category or sector, and conduct analysis of the effects of these strategies.

Calculating the effects of a higher CAFE standard is not simple, given a wide array of factors that affect real world vehicle fuel economy. These include vehicle fleet turnover, mileage accumulation rates by vehicle age, and differences between CAFE-rated fuel economy and actual fuel economy in real world driving conditions. ICF is well prepared to conduct this analysis, based on our experience leading the development of the light-duty and medium-and-heavy duty truck CAFE environmental impact statements (EISs). We will conduct a simplified analysis to assess implications of these federal policies on potential targets by sector. COG can use the knowledge of how these strategies can contribute to an overall emission reduction strategy to better advocate for changes in federal or state policies.

Once the strategies have been identified, described, and categorized and the additional analyses of federal and state level policies has been completed, ICF will sum up the potential ranges of emissions reductions within each of the tiers for the 2020, 2040, and 2050 time periods. In estimating potential reductions, ICF will assess synergies in the implementation of a full suite of strategies. When implemented as a package, the emission reduction benefits may be greater than their individual contributions, or may be less for certain types of combinations of strategies.

ICF will provide the results of this exploration in a Technical Memorandum which will be presented to the MWCOG on September 25, 2015. The memo will include information on the differences between the three tiers and a summary of the regulations and policies that would need to change or be put in

place in order to accomplish each tier. Upon receipt of comments, ICF will revise and finalize the memorandum, and incorporate the edits in the Final Technical Report.

PRODUCT: Technical Memorandum on Exploration of GHG Goals and Targets

Task 7 – Prepare and Present Final Technical Report

Following the analysis activities of all the strategies for Land Use, Transportation, and Energy and Built Environment in Tasks 2 through 7, ICF will prepare a Final Technical Report that incorporates the information developed from the exploration of GHG goals and targets in each sector with the analysis of the strategies analyzed and documented in the Interim Technical Report. This Final Technical Report will address any comments received at the September 25, 2015 MSWG meeting.

The ICF team will assist with presentations made by COG staff to TPB, MWAQC, and CEEPC on the Final Technical Report in December 2015 and to the COG Board in January 2016. ICF will assist COG staff in preparing these presentations, and will accompany COG staff to the presentations and participate as requested.

PRODUCT: Final Technical Report Presentations to TPB, MWAQC, CEEPC and COG Board

3. SERVICES, PRICING, AND SCHEDULE

3.1. PRICE PROPOSAL- FIRM FIXED PRICE PAYMENT SCHEDULE

ICF proposes the below firm fixed price/lump sum payment schedule. ICF will invoice COG the prices listed above upon completion of each task.

Deliverable / Milestone	Payment
Task 1. Finalize Contractor Work Plan and Schedule	$5,046
Task 2. Meet with Sector Subgroups and Review Proposed Strategies	$46,818
Task 3. Presentation of GHG Reduction Strategies for Analysis to MSWG	$18,683
Task 4. Analyze Selected Strategies	$120,367
Task 5. Prepare and Present Interim Technical Report	$28,827
Task 6. Explore GHG Goals and Targets in each Sector	$22,631
Task 7. Prepare and Present Final Technical Report	$34,053
Total	**$276,425**

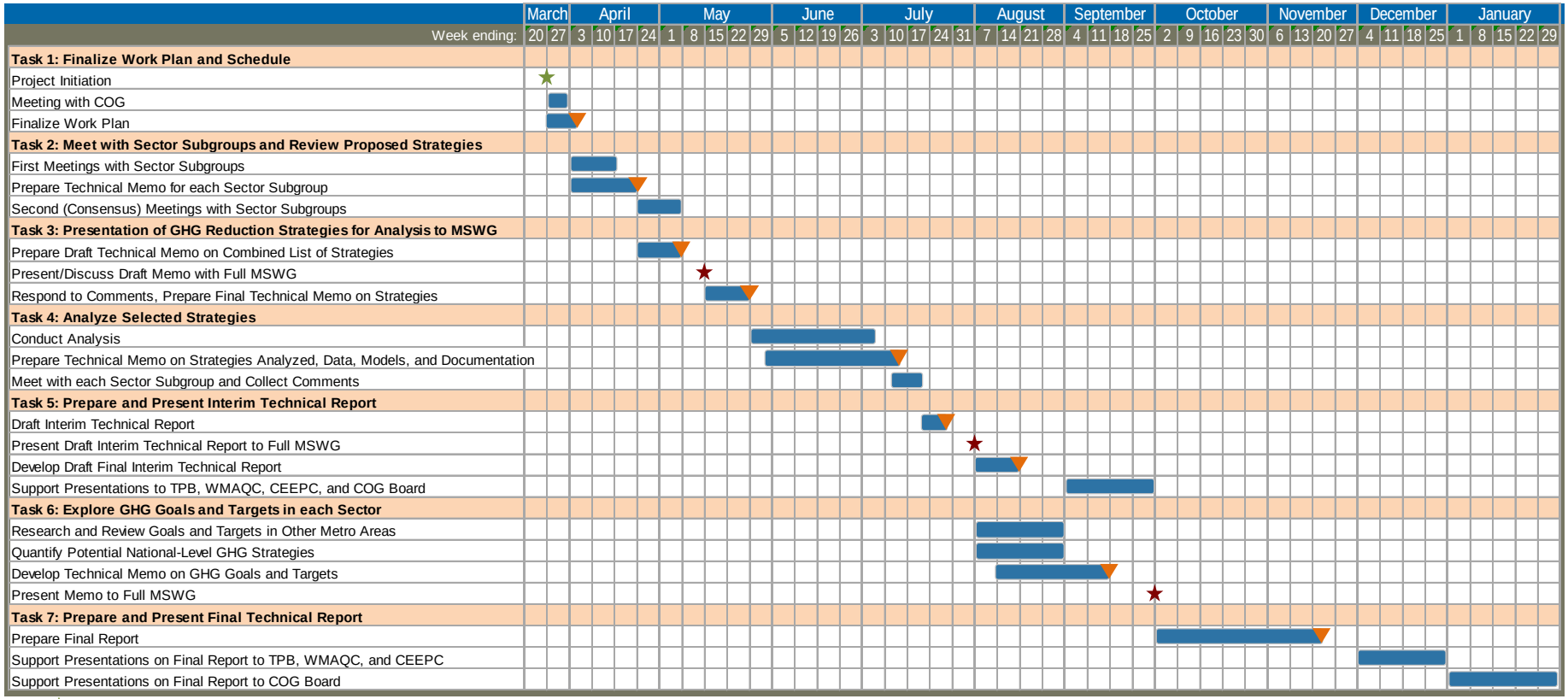
Assumptions

ICF's cost proposal is based upon the following assumptions:

- All milestones will occur within the stated time-frames of the RFP, with only slight modifications by COG if scheduling problems should arise for specific planned meeting dates. Additional research, analysis, or revisions to products will not be requested outside of the time-frames called for within the individual tasks.
- Aside from the possibility of holding the first meetings of the Transportation and Land Use Sector Subgroups separately, ICF assumes that all remaining meetings with these two Subgroups will be held jointly.
- When draft and final products are called for in the RFP, ICF assumes that all comments will be provided on draft products during the appropriate Sector Subgroup meetings or full MSWG meetings, so that a single revision will be made by ICF, given the short time-frame for response and revisions. The Technical Memoranda on Proposed Subgroup Strategies under Task 2, the Technical Memorandum on Strategies Analyzed, Data, Models, and Documentation under Task 4, and the Technical Memorandum on Exploration of GHG Goals and Targets under Task 6 will be provided without revisions, as these are interim products. These documents will be discussed in the specified Sector Subgroup or MSWG meetings, and comments on these documents will be incorporated in deliverables under other tasks.

3.2. SCHEDULE

The project timetable below presents our proposed schedule for completing the tasks and deliverables for this project. ICF will be ready to start work within one day after authorization to proceed. Within one week of the kickoff meeting with MWCOG, ICF will finalize the work plan and schedule. The timeline below assumes project completion by January 29, 2016.



4. REFERENCES

References who can speak to ICF's experience performing similar work are provided in the following table. A letter of reference from Mr. Robert Graff, the director of DVRPC's Climate and Energy Program, is provided. We believe our experience working closely with an MPO on regional GHG issues is directly applicable to COG and can speak well to not only our technical competence but also responsiveness.

Project Name	Reference Phone/Email
DVRPC Greenhouse Gas Inventory and Analysis	Robert Graff, Manager, Delaware Valley Regional Planning Commission (DVRPC) 190 North Independence Mall West Philadelphia, PA 19106 rgraff@dvrpc.org (215) 238-2826
MTC Climate Initiatives Program Evaluation and RTP/SCS Support	Ursula Vogler, Manager, Metropolitan Transportation Commission (MTC) 101 Eighth Street Oakland, CA 94607 uvogler@mtc.ca.gov (510) 817-5785,
U.S. Environmental Protection Agency, State and Local Climate and Energy Program	Julia Miller, Project Officer, U.S. Environmental Protection Agency (EPA), State and Local Branch 1200 Pennsylvania Avenue, NW Washington, DC 20460 Miller.Julia@epa.gov (202) 343-9341
EPA Regional Analysis of Transportation/Land Use Strategies – TEAM Analysis and Pilot Regions	Mark Simons, Transportation and Air Quality Specialist, U.S. Environmental Protection Agency 2565 Plymouth Road Ann Arbor, MI 48105 simons.mark@epa.gov (734) 214-4420

DELAWARE VALLEY dvrpc REGIONAL PLANNING COMMISSION

190 N INDEPENDENCE MALL WEST
8TH FLOOR
PHILADELPHIA, PA 19106-1520
Phone: 215-592-1800
Fax: 215-592-9125
www.dvrpc.org

March 4, 2015

Dear Sir or Madam,

The purpose of this letter is to commend ICF International on their work at the local and regional level to support climate and clean energy analyses. This commendation is based on a series of projects ICF has conducted in the Philadelphia region.

The Delaware Valley Regional Planning Commission (DVRPC) is the federally-designated metropolitan planning organization (MPO) for Greater Philadelphia. I manage DVRPC's Office of Energy and Climate Change Initiatives. DVRPC has been a leader among MPOs in climate change mitigation and adaptation planning. ICF has served as a key consultant in both our mitigation and adaptation work, and their staff at all levels have consistently been very easy to work with, highly responsive, and appropriately proactive in helping DVRPC sharpen its thinking on how to carry out projects.

ICF has worked closely with DVRPC since 2008, when they assisted us in developing our baseline greenhouse gas inventory for Greater Philadelphia. DVRPC's inventory methodology, developed in concert with ICF, served as the basis for U.S. EPA's *Draft Regional Greenhouse Gas Inventory Guidance*, released in 2010, and DVRPC is regularly consulted by other organizations wishing to carry out energy use and GHG emissions inventory work.

In 2012 and 2013, ICF was instrumental in helping Southeastern Pennsylvania Transportation Authority (SEPTA) and DVRPC conduct a risk and vulnerability assessment of SEPTA's Manayunk/Norristown regional rail line. This $144,000 project was a pilot project under the Federal Transit Agency (FTA)'s Transit Climate Change Adaptation Assessment Pilot Program. SEPTA credits this assessment as instrumental in strengthening their successful application for funding from FTA's recent Public Transportation Emergency Relief Program, which resulted in an award of over $86 million. ICF has also worked closely with the City of Philadelphia's Greenworks Program, with the Mayor's Office of Sustainability since 2009, supporting their work on both mitigation analyses and more recently, adaptation strategies. This work has been well received, and has served as a model DVRPC's work in these areas within the region at large. In particular, DVRPC participated in a scientific review of ICF-developed climate science information presented in a manner that would facilitate local and regional decisions.

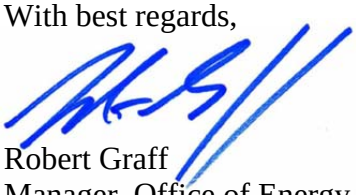
ICF also served as DVRPC's consultant on developing a comprehensive electric vehicle (EV) readiness plan for southeastern Pennsylvania. This work entailed developing a model of EV uptake in the region, based on an analysis of existing vehicle deployment, as well as analyzing and documenting a wide range of policy issues ranging from public charging to permitting and codes.

Throughout these projects, ICF has consistently demonstrated a commitment to excellence, both in products of the highest quality and a deep commitment to DVRPC as a client. ICF worked well with all members of the project teams, has always been responsive to requests, and excellent in communicating clear information in a timely manner. ICF focuses on schedule and budget

requirements and coordinates all issues with the appropriate management. ICF is technically savvy, proficient in all relevant regulations, and produces complete, professional, high quality work on projects simple to complex.

We consider ICF a trusted collaborator and recommend their services. Please do not hesitate to contact me if you would like additional information

With best regards,



Robert Graff
Manager, Office of Energy and Climate Change Initiatives
☏ 215-238-2826
rgraff@dvrpc.org

APPENDIX A: RESUMES

Resumes for key staff and select technical support staff are provided in this section. The section is organized by key staff, followed by land use and transportation staff, energy and built environment staff, staff involved in multi-sector analyses, and graphics and communications support.

Key Staff

Lauren Pederson, Project Manager

Michael Grant, Transportation Sector Subgroup Lead

Richard Kuzmyak, Land Use Sector Subgroup Lead

William Prindle, Energy and Built Environment Sector Subgroup Lead

Supporting Technical Staff – Land Use and Transportation Analysis

Brenda Dix

Frank Gallivan

Alex Bell

Supporting Technical Staff – Energy and Built Environment

Charles Haack

Craig Schultz

Steve Miller

Supporting Technical Staff – Multi-Sector Analysis

Cory Jemison

Erika Myers

Supporting Staff – Graphics and Communications Support

Mary Arzt

Lauren Pederson — ICF International

Project Manager

EXPERIENCE OVERVIEW

Years of Experience

- Professional start date: 2003
- ICF start date: 2003

Education

- M.S. Environmental Science and Policy, Johns Hopkins University, Washington, DC, 2009
- B.S. Integrated Science and Technology, James Madison University, Harrisonburg, VA, 2003

Ms. Pederson joined ICF International in June 2004 with the Climate Change Strategies Practice. She has since worked on projects ranging from estimating greenhouse gas (GHG) emissions from fossil fuel combustion, to serving as deputy manager and managing task orders under ICF's contract with the EPA State and Local Climate and Energy program. She has experience collecting and analyzing data, writing technical documents, and developing Excel-based tools aimed toward creating an inventory of greenhouse gas emissions. Ms. Pederson has extensive experience with EPA's U.S National Inventory of Greenhouse Gas Emissions and has been involved with estimating U.S. CO_2 emissions from fossil fuel combustion, non-CO_2 emissions from stationary sources, all GHG emissions from international bunker fuels, U.S. CO_2 emissions from non-energy uses, and non-CO_2 emissions from enteric fermentation. She has worked on building capacity for GHG inventories in developing countries, contributed to work in Thailand, Nepal, Philippines, Malaysia, Colombia, and Bangladesh. She has supported the City of Raleigh and Central New York in estimating greenhouse gas emissions for local government operations. She has also supported the Environmental Protection Agency's State and Local Branch on state and local communications and outreach, development and maintenance of the State Inventory Tools, developing state-level CO_2 estimates, state and local clean energy and climate change news and policy tracking, and the development of a Regional Greenhouse Gas Inventory Guidance document.

PROJECT EXPERIENCE

State and Local Branch Support, U.S. EPA, 2008-present. Ms. Pederson is the deputy manager for the U.S. EPA State and Local Branch contract and manages a variety of task orders providing support to the Branch. As deputy manager, Ms. Pederson tracks budgets for all task orders, approves and edits monthly progress reports, and participates in quarterly check-in calls with the State and Local Branch. Provides technical assistance to the Local Climate and Energy program by responding to public inquiries directed to the State and Local Branch and developing analyses based on these inquiries; conducting analyses or reports on local government climate mitigation issues; developing and refining the methodology for multi-jurisdictional local government agencies to analyze GHG emissions; maintaining State and Local Clean Energy Listserv; supporting the Urban Heat Island and Local Climate and Energy Webcast Series; analyzing, categorizing, and recording contents of state climate change action plans and related documents; tracking and summarizing weekly news articles related to clean energy and climate change policy areas; and developing content for EPA's State and Local website. Ms. Pederson has also led support for the Climate Showcase Communities Program, providing technical assistance to communities and logistical support for the annual Climate Showcase Communities workshop.

State and Local Development, State Inventory Tools, U.S. EPA, 2004-present. Ms. Pederson helped develop a set of tools designed to assist states in developing state-level greenhouse gas emissions inventories. Specifically, Ms. Pederson participated in updating data, updating and creating Excel-based

code, researching state consumption projections for various sectors, developing projection methodology for various sectors, and created User's Guides to accompany each module. She also assisted in the development and updating of the Projection Tool, and the development of the Electricity Consumption module. The Projection Tool is used by states, in conjunction with the Inventory tools, to project GHG emissions. The Electricity Consumption module estimates indirect greenhouse gas emissions associated with the consumption of electricity in a variety of end-use sectors. Ms. Pederson also presented a tool demonstration of the State Inventory Tools at EPA's Emission Inventory Improvement conference, coordinated logistics for Live Meeting webcasts on greenhouse gas inventories with over 200 registered participants, and is currently developing a regional greenhouse gas methodology.

Development of a Regional Greenhouse Gas Inventory and Projections, Central New York, 2012-2013. Ms. Pederson managed a project to develop a greenhouse gas inventory and projections for the Central New York region. The inventory included an allocation to sub-regional levels (i.e., county and municipal) in order to provide the community with a baseline to facilitate mitigation and sustainability projects. For this work, Ms. Pederson led a team to analyze and calculate greenhouse gas emissions, develop projections, and produce a final report describing the methodology used to develop estimates.

Inventory of U.S. Greenhouse Gas Emissions and Sinks, U.S. EPA, 2004-present. Since 2004, Ms. Pederson has been responsible for generating estimates of GHG emissions from CO_2 from fossil fuel combustion, stationary combustion, and international bunker fuel sources in the U.S. for EPA's annual Inventory of U.S. Greenhouse Gas Emissions and Sinks. Her responsibilities include gathering and analyzing activity data, developing text sections and narratives of the results, developing trends for the document, and developing and implementing a QA/QC plan. She is also responsible for reviewing and revising the estimation methodology to improve the quality of the estimates. She compiles the Energy source chapter in the inventory publication, and performing a thorough QC of the Energy chapter.

Common Reporting Format (CRF) Submission to the UNFCCC Secretariat, 2004-present. For the annual National Inventory submission to the United Nations, Ms. Pederson has completed the common reporting format (CRF) files for all energy sectors and provided support to compile the CRF files for all sectors. She has used the CRF reporter software to enter current year data into the CRF reporter tool, and responded to comments from the UN after review.

Emission Factor Improvement Analysis, Low Emissions Asian Development (LEAD) Program 2012-present. For USAID's Regional Development Mission/Asia, Ms. Pederson is leading the development of a study improve GHG inventories and GHG accounting systems and practices. This study culminates in a report that summarizes an analysis of emission factors used in LEAD program country GHG inventories and recommends six emission factors for further research and development, as well as identifying other emission factors for which research and development could be supported by other development partners. To conduct the emission factor improvement analysis, a selection framework was developed and in-country consultations were conducted with 10 LEAD program countries as well as consultations with experts from regional and international organizations. The input from these activities provides the basis of the recommendations included in the report.

Capacity Building for National GHG Inventory Systems in Developing Countries. 2010-present. For the U.S. EPA, Ms. Pederson is leading updates to the national inventory systems templates used by developing countries to implement a national GHG inventory system. Ms. Pederson also developed an energy questionnaire to aide developing countries in collecting and documenting energy-sector activity data and emission factors. Ms. Pederson is leading a team to develop a project website (using SharePoint) that will include a database of experts attending GHG inventory workshops in developing countries, presentations at past workshops, and tools/resources that will be used by developing countries to establish a national inventory system. Ms. Pederson attended, presented, and facilitated

working sessions at developing country workshops in Colombia, Thailand, Malaysia, Bangladesh, Nepal, and the Philippines to further the goals and mission of this project.

Catalyzing Clean Energy in Bangladesh (CCEB), USAID, 2012-present. Bangladesh is a partner country in the United States' Enhancing Capacity for Low Emission Development Strategies (EC-LEDS) program, a whole-of-government program that supports partner countries' efforts to pursue low-emission, climate-resilient economic development. USAID is investing $3.5 million in the Catalyzing Clean Energy in Bangladesh (CCEB) program. CCEB is providing technical assistance and training to the Bangladesh Energy Regulatory Commission (BERC) and other government ministries and agencies to build capacity to implement the 2009 National Climate Change Strategy and Action Plan and Low Emission Development Strategy. Under this project, Ms. Pederson is supporting work to build capacity in country for GHG emissions and data analysis and modeling for the electric power sector.

Accounting Framework for GHG Emissions from Bioenergy and Other Biogenic Sources. 2011-present. Ms. Pederson is leading a team to summarize comments received from a "Call for Information" by the U.S. EPA to defer regulations of biogenic sources of CO_2 emissions for 3 years. For this work, Ms. Pederson is leading the synthesis of comments report by developing the outline, categorizing comments according to the outline, and summarizing alternative approaches and recommendations included in the comments. This document will be used by the Scientific Advisory Board during their review of the technical approach selected by the U.S. EPA.

Developing Biofuels Scenarios to 2050. 2011-present. Ms. Pederson is managing a project for the U.S. EPA's National Center for Environmental Assessment to develop a set of consistent scenarios that describe potential biofuel feedstock mixes, technologies, and pathways that go beyond the Renewable Fuel Standard (RFS2) regulatory horizon of 2022 out to 2050. This work involves identifying models and analyses that contain biofuel projections, collecting background information and eliciting biofuel expert's opinions, facilitating a biofuels workshop to determine scenarios to 2050, developing post-workshop recommendations, and drafting a report of the biofuel scenarios identified through the workshop. This work will build a foundation for more quantitative analyses, models, and lifecycle assessments related to biofuels.

Liquid Crystal Display (LCD) Reporting Tool for Fluorinated Greenhouse Gas Emissions. 2011. For EPA, Ms. Pederson developed the LCD Reporting Tool to estimate fluorinated greenhouse gas emissions from LCD manufacturing. The tool provides a standardized reporting template for LCD manufacturing facilities/companies to estimate and report process F-GHG emissions consistently and allows users to input information on manufacturing processes.

Capacity Building for National GHG Inventory Systems in Developing Countries. 2010-present. For EPA, Ms. Pederson is leading updates to the national inventory system templates developing countries use to implement a national GHG inventory system. Ms. Pederson also developed an energy questionnaire to aide developing countries in collecting and documenting energy-sector activity data and emission factors. Also under this project, Ms. Pederson is leading a team to develop a project website (using SharePoint) that will include a database of experts attending GHG inventory workshops in developing countries, presentations at past workshops, and tools/resources that will be used by developing countries to establish a national inventory system. Ms. Pederson attended, presented, and facilitated at a developing country workshop in Malaysia.

SELECTED PUBLICATIONS AND PRESENTATIONS

USAID. 2013. Lead Author, Current Challenges and Priorities for Greenhouse Gas Emission Factor Improvement in Select Asian Countries. Prepared by ICF for USAID. November 12, 2013.

EPA. 2014. Contributing Author, Energy Source Lead (since 2004). Inventory of U.S. Greenhouse Gas Emissions and Sinks. Prepared by ICF International for EPA Office of Air and Radiation. EPA430-R-14-003.

City of Raleigh. 2010. Lead Author. City of Raleigh Greenhouse Gas Inventory: Municipal Operations. Prepared by ICF International for the City of Raleigh, NC. July 12, 2010.

Choate, A., Denny, A., Diem, A., Pederson, L. 2010. Electricity Consumption Greenhouse Gas Inventory Tool for States. Presented September 28, 2010, at the Emission Inventory Conference, San Antonio, TX.

Michael Grant — ICF International

Transportation Sector Subgroup Lead

Michael Grant is an experienced manager with expertise in transportation policy, economics, planning, environmental analysis, and land use. Mr. Grant has experience managing multi-dimensional projects for the U.S. Department of Transportation (DOT), the U.S. Environmental Protection Agency (EPA), state and local transportation and environmental agencies, and international agencies and organizations. His work focuses broadly on advancing sustainable transportation decision making, with emphasis on transportation demand management (TDM) and other strategies to improve air quality, reduce greenhouse gas emissions, and support community livability. He has provided training and technical assistance to State DOTs, metropolitan planning organizations, and other agencies on GHG mitigation strategies, emissions analysis, and sustainability practices.

Years of Experience

- Professional start date: 1995
- ICF start date: 2000

Education

- M.S., Public Policy and Management, Carnegie Mellon University, Pittsburgh, Pennsylvania, 1995
- B.A., Economics and Government & Politics, Summa Cum Laude, University of Maryland, College Park, Maryland, 1993

PROJECT EXPERIENCE

Transportation-Land Use GHG Reduction Strategies

A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning, FHWA, 2012-2013. Led development of a handbook on integrating GHG performance measures within State DOTs' and MPOs' performance-based planning and programming processes. This study involved a review of GHG performance measures from regions across the country, and examining data on GHG performance and factors affecting performance from a sample of states and metro areas.

Handbook for Estimating Greenhouse Gases Emissions for Integration in the Planning Process, FHWA, 2011-2013. Led development of a handbook that describes analytical methods for estimating GHG emissions in transportation planning. The handbook provides information on approaches, tools, and systematic procedures for estimating GHG emissions using fuel-based methods, VMT-based methods, and other tools.

Implications of Performance Standards, Conformity-Style Approaches, and Other Mechanisms for Integrating GHG Objectives into Transportation Decision Making, National Cooperative Highway Research Program, 2009-2010. Co-led this study exploring alternative policy mechanisms for addressing GHG emissions in transportation planning, programming, and project development.

Transportation and Climate Change Technical and Outreach Support, FHWA, 2009-2010. Managed wide ranging technical and outreach support to FHWA related to climate change issues. This work included analyses of state climate action plans, reauthorization support, and communications and outreach support, including facilitating peer exchanges.

Climate Change Symposium, AASHTO, 2010. Organized a national climate change symposium for AASHTO, and facilitated breakout sessions to identify key challenges and actions.

Development of Transportation Component of U.S. Greenhouse Gas Emissions Inventory, U.S. Environmental Protection Agency, 2003 – 2009. Managed development of the transportation and mobile sources component of the national *Inventory of Greenhouse Gas Emissions and Sinks*. In this role,

was responsible for developing estimates of carbon dioxide, methane, and nitrous oxide for all modes of transportation and other mobile sources, including construction and agricultural equipment.

Briefing Paper on Transportation Strategies to Reduce Greenhouse Gas Emissions, National Transportation Policy and Revenue Commission, 2006-2007. Under contract to FHWA, co-authored a briefing paper synthesizing literature on the potential impacts of different types of transportation strategies on reducing GHG emissions.

Methodologies for Assessing the Greenhouse Gas Impacts of Transportation Projects, National Cooperative Highway Research Program, 2005-2006. Developed a guidebook, describing 17 tools that can be used for transportation GHG assessment, including GHG emissions calculation tools, strategy analysis tools, and energy analysis models and tools. The guidebook describes appropriate methodologies for state-level GHG inventory development, state-level GHG projections, regional (plan/TIP) emissions analysis, and project-level/strategy analysis.

Implications of New York State Energy Plan on Transportation, FHWA, and New York State Department of Transportation, 2003. This work involved three components: 1) Developing a transportation GHG inventory at a statewide-level and for each MPO; 2) Interviews with MPO staff in several MPOs to identify challenges and implications of the New York State Energy Plan's recommendations for each MPO to conduct a regional energy and GHG emissions analysis; and 3) Analysis of the potential impacts of specific transportation GHG reduction strategies within New York State.

Assessment of GHG Reductions Strategies for Personal Transportation in Metropolitan Areas, U.S. Environmental Protection Agency, 2000–2001. Assessed the national impacts of strategies to reduce GHG emissions from personal motor vehicle travel, including analysis of transportation demand management strategies, infrastructure investment, and land use strategies. The analysis involved sketch planning analysis and models to assess the implications of GHG reduction strategies in a variety of small, medium, and large metro areas, and extrapolating these results to the nation. The results of this analysis were peer reviewed by an advisory group and used by EPA in its submission as part of the National Communication Report.

Our Built and Natural Environment, U.S. Environmental Protection Agency, 1997-2000. Managed a research effort to provide evidence that the way land use and transportation are developed have important implications for environmental quality. Prepared a technical paper that identified how the built environment has direct environmental implications to habitat and water quality, and indirect effects to air pollutant emissions, GHG emissions, fossil fuel consumption, and water quality through changes in travel behavior. It provided evidence from case studies, modeling scenarios, and various analytical analyses that transportation investment and land use patterns matter to the environment.

Analysis of GHG Policy Options for Urbanized Canada. Canada Climate Change Process. 1999. Analyzed the potential of over a dozen strategies to reduce greenhouse gas emissions from transportation in the urbanized portions of Canada. This work involved an extensive literature review of strategies including transit investment, bicycle and pedestrian facilities, carsharing programs, road pricing and other market-based options, and ridesharing. The FHWA's Transportation Demand Management (TDM) model was used in coordination with data from three urbanized areas to model the potential impacts of these strategies in different types of regions.

Fuel Tax and Price Elasticity Analysis for Canada. Canada Climate Change Process. 1999. Examined the potential for fuel taxes to reduce energy consumption and GHG emissions in Canada.

Literature Review on the Travel and Emissions Implications of Land Use. U.S. Environmental Protection Agency, 1996-1998. Performed a detailed literature review on the linkages between land use strategies, land use patterns, travel, and emissions. The document highlighted relevant research on the nexus between land use and transportation, and includes discussion of methods to model these effects, and recent improvement to travel models to incorporate land use considerations. The report synthesized literature on the effects of land use factors on trip generation, trip length, and mode choice.

Transportation Strategy Evaluation Reports, U.S. Environmental Protection Agency, 1995-1999. Provided analytic support to the development of annual evaluation reports for EPA's Transportation Partners Program. This report involved efforts to quantify the GHG reduction efforts associated with local actions, and descriptions of the other benefits of GHG reduction programs, such as improved air quality, reduced traffic congestion, and improved quality of life.

Regional Transportation Strategy Analysis in the Washington Metro Area and Other Regions

Transportation Demand Management Plan, Fairfax County Department of Transportation, 2014-present. Leading development of a 6-year TDM plan, outlining key strategies, factors affecting programs, and financial plan for program to reduce vehicle travel.

Ft. Meade Ridesharing and Commuter Clearinghouse Planning. Anne Arundel County, MD. 2008-2009. Led analysis and development of recommendations for commuter services in the Ft. Meade areas to support carpooling, vanpooling, and other options to reduce traffic demand associated with Base Closure and Reallignment (BRAC).

TDM Proffer Reviews, Fairfax County (Virginia) Department of Transportation. 2007. Conducted reviews of TDM proffers submitted by developers to determine their adequacy and make recommendations for enhancements to reduce vehicle travel.

TDM Task Force Technical Support, Southern California Association of Governments, 2002–2003. Mr. Grant is supporting the SCAG TDM Task Force in developing recommendations for TDM measures to be included in the update to the Regional Transportation Plan. Mr. Grant is conducting analyses of the effectiveness of a range of TDM strategies across various criteria.

Multi-sector Emissions Reduction Strategy, Southern Appalachian Mountains Initiative, 2000. Supported development of a demand management strategy to reduce emissions from motor vehicles, focusing on incentive-oriented policies. Developed a baseline emissions inventory for the transportation sector and analyzed potential incentive-oriented policies to reduce motor vehicle emissions. A stakeholder process developed consensus on promising strategies for the multi-state region.

Mobility Action Plan, Montgomery County, Maryland, 2000. Supported development of a short-range, strategic Mobility Action Plan for Montgomery County, MD. This work included an analysis of traffic data, development of multimodal performance measures to identify existing deficiencies, and application of these criteria to prioritize strategies/projects.

Maryland Transportation Solutions Group Technical Support, Maryland Department of Transportation, 1998-1999. Provided analytical support to a commission to examine solutions to transportation problems in suburban Maryland. This work involved identifying goals for the transportation system and analyzing alternative strategies, such as transit investment, parking policy, highway investments, and land use policies, to reduce vehicle travel and/or reduce traffic congestion.

J. Richard Kuzmyak — Renaissance Planning

Land Use Sector Subgroup Lead

Rich Kuzmyak is a transportation planner and policy analyst with extensive experience in the areas of travel demand analysis, the integration of transportation and land use, smart growth, performance based planning, travel demand management and air quality. He has done leading research on many of these issues, created special tools to bring the findings into planning practice, and worked with federal, state, and local governments and public/private organizations in their application.

Education

- Master of Science, Public Management and Public Policy, Carnegie-Mellon University
- Bachelor of Science, Civil Engineering, University of Pittsburgh

PROJECT EXPERIENCE

NCHRP 08-78: Estimating Walking and Bicycling Demand for Planning and Project Development. Rich led a multi-disciplinary research team in creating a practitioner guidebook (NCHRP Report 770) on methods to estimate bicycling and pedestrian demand. The project addressed a major gap in availability of robust and responsive analytic tools to quantify the demand for non-motorized travel in relation to land use and transportation infrastructure. A comprehensive review of existing practice led to development of several new methods using data from the Seattle and Washington DC regions. These methods found success through a reliance on measures of accessibility, derived from innovative use of GIS tools and data to quantify opportunities exclusive to each mode at the respective levels of spatial relevance. The tools provide strong new capabilities for bike/pedestrian facilities design, land use, and transit.

Maryland Department of Transportation Planning Support. Rich has been leading Renaissance's efforts to assist Maryland DOT's Office of Planning and Capital Programming in defining its needs and options for improved analytic tools to address increasingly complex multimodal transportation polices and projects. In a major step toward realizing such a capability, Renaissance recently completed a pilot application of the GIS-accessibility approach it developed under NCHRP project 8-78 for Arlington VA in a major corridor (MD-355/I-270). The pilot study successfully demonstrated the applicability of the approach, which uses modal accessibility scores calculated at the census block level to depict patterns in accessibility by mode and purpose throughout the corridor. These scores were joined with travel survey trip data from MWCOG and used to estimate a set of models that predict mode choice by purpose at the block level. MDOT has subsequently tasked Renaissance with expanding the coverage of the accessibility score mapping to the entire central Maryland (MWCOG and BMC) region.

Models to Support Compass Blueprint and SB 375 Implementation, Southern California Association of Governments (SCAG). For the Southern California Association of Governments (SCAG), Mr. Kuzmyak first led a team that developed a set of transportation/land use models to allow SCAG to quantify the transportation and emissions impacts of its smart-growth oriented Compass Blueprint regional vision. In a subsequent project, he led another team in developing a customized version of that approach into a specialized web-based program to support compliance with SB 375, the trend setting state law that attempts to achieve GHG reduction targets through better land use and VMT reductions. The resulting Local Sustainability Model allows local jurisdictions to profile their existing land use and transportation activity levels through an enhanced version of Envision Tomorrow and then test alternative scenarios to reduce future VMT demand, leading to revisions in the corresponding comprehensive plans.

Arizona Land Use and Traffic Congestion Study, Arizona Department of Transportation. Rich led this study for the Arizona DOT's Transportation Research Center investigating the link between land use and traffic congestion. The objective was to ascertain whether higher density land use alleviated or contributed to traffic congestion. An extensive literature review and survey of regional officials was followed by detailed analysis of travel behavior and congestion characteristics in a sample of intensely developed areas in the Phoenix area. The study found that traffic levels in areas with high density but also good mix of uses, pedestrian friendly design, good transit accessibility and compact street grids had much less congestion than outlying suburban areas with much less density, but also lacking the other critical urban design factors. A set of transportation/land use models was also developed and used to examine VMT rates across the region, and estimate changes that might occur under different land use and transportation assumptions.

Transportation-Related Greenhouse Gas Modeling Assistance, Baltimore Metropolitan Council (BMC). Served as land use specialist on a team to assist the Baltimore Metropolitan Council (BMC) in developing methods to quantify greenhouse gas (GHG) emissions from on-road mobile sources. Mr. Kuzmyak was responsible for addressing the role of land use in VMT and GHG reduction. He performed a cross-sectional analysis of VMT trends and their relationship to land use in the Baltimore region, and subsequently developed a detailed tutorial on land use and transportation interrelationships for use in educating and shaping the work of BMC's Board and key technical committees.

OTHER RELEVANT EXPERIENCE

- Lincoln Institute Study to Quantify the Importance of Land Use at Trip Destinations
- NCHRP Report 750: Effects of Socio-Demographic Trends on Travel Demand
- SHRP2 Project C-16: Effects of Smart Growth Policies on Travel Demand
- TCRP Report 95 – Traveler Response to Transportation System Changes: lead author of volumes on Land Use and Site Design (15), Transportation Demand Management (19), Parking Pricing and Fees (18), and Parking Supply Management (13).
- In-house transportation, land use and emissions consultant on smart growth for Maryland Department of Transportation, Governor's Office of Smart Growth, MD Department of Planning (1999-2003)
- In-house consultant specialist on transportation and land use for Baltimore Metropolitan Council (2003-2005).
- Extensive transportation/air quality experience: Ozone attainment plans for MWCOG, DVRPC, Central Connecticut; Emissions trading for Western Governors' Association; EPA Pricing guidance manual.
- TDM specialist: research, tools, guidebooks, and training for FHWA, FTA, ITE, and TCRP. Assessment of TDM strategies for Tysons Corner in advance of Silver Line extension.
- Selected as analyst by TRB to perform first comprehensive evaluation of CMAQ program under request from US Congress (Report 264).
- NCHRP Synthesis Report 384: Metropolitan Freight and Commercial Vehicle Forecasting.

William R. Prindle — ICF International

Energy and Built Environment Sector Subgroup Lead

William Prindle has over 37 years of experience in the energy field, working in consulting, nonprofit organizations, and trade associations. Specializing in energy efficiency technology and policy, he has worked on federal and state energy efficiency policies and programs, utility-sector efficiency policies and programs, and building codes and appliance rating, labeling, and standards. He has testified in Congress, state legislatures, and state utility commissions, and has appeared as an energy expert on national television, radio, and in print media. As a board member of national energy efficiency organizations, Mr. Prindle is deeply engaged in the development of the energy efficiency industry. William is also a trained facilitator and leadership coach, which enables him to provide leadership support to stakeholder processes, project managers, and other human-capital aspects of ICF's projects.

Years of Experience

- Professional start date: 12/1975
- ICF start date: 03/2008

Education

- MS, Energy Management and Policy, University of Pennsylvania, 1975
- BA, Psychology, Swarthmore College, 1972

Professional Memberships

- International Code Council
- Residential Energy Services Network
- Association of Energy Services Professionals

Certifications

- Certificate in Professional Coaching, Coaches Training Institute, Alexandria, Virginia, 2006
- Certificate in Transformational Leadership, Georgetown University School of Continuing Professional Education, 2003

PROJECT EXPERIENCE

Federal Energy Efficiency Policy and Programs

SEE Action Network Support—U.S. DOE, Washington, DC. Leads ICF's support team for the State and Local Energy Efficiency Action (SEE Action) Network. Working primarily with the Commercial Buildings Working Group, ICF has authored a number of fact sheets and papers, conducted background research, and supported working group operations. Ongoing.

SEED Platform Development—U.S. DOE, Washington, DC. Led ICF's work to develop the Standard Energy Efficiency Database (SEED) platform, a public-domain, open-source software platform design to help state and local governments as well as large building portfolio owners. ICF developed a working Beta version of SEED and a detailed work scope for SEED versions 1.0 and 1.1. 2012–2013.

Clean Energy Program Administrator Support—U.S. EPA. Helped lead ICF's support to EPA in providing outreach and technical assistance to energy efficiency and other clean energy program administrators across the U.S. This work involved helping. 2008–2010.

International

Provides lead strategy and project development support under various ICF contracts with U.S. AID and other funders. Helped develop and deliver ICF energy efficiency projects in Europe, Russia, India, Kazakhstan, Bangladesh, and Tanzania.

U.S. Energy and Climate Policy

Energy Policy Acts of 1992 and 2005, Energy Independence and Security Act of 2007—Energy Foundation, Washington, DC. With foundation funding while employed at the Alliance to Save Energy

and the American Council for an Energy-Efficient Economy (ACEEE), helped shape efficiency provisions in these major energy bills. Primary areas of focus were appliance standards, building codes, and tax incentives provisions. Also worked on energy efficiency resource standards for utilities. Work included quantitative analysis of the energy, environmental, and economic benefits and costs of various efficiency provisions

America's Climate Security Act 2007—Energy Foundation, Washington, DC. With foundation funding while employed at ACEEE, helped shape energy efficiency-related provisions in this comprehensive climate change bill. Focused on provisions that direct federal allowance auction proceeds to energy-efficient technologies, and that allocate allowances to states and distribution utilities for funding energy efficient technologies. Developed fact sheets that drew on quantitative research documenting the benefits of efficiency for cost containment in climate policy.

Regional Greenhouse Gas Initiative (RGGI)—Energy Foundation, Washington, DC. In addition to his role as an official stakeholder, with foundation funding while employed at ACEEE, coordinated ACEEE's analytical efforts in characterizing efficiency resources in the RGGI modeling process. ACEEE developed quantitative data in a format compatible with ICF International's IPM model, which allowed IPM to include efficiency as a resource option in its power sector resource selection module. This allowed staff and stakeholders to understand the contribution efficiency could make to cost containment in the RGGI policy regime. Authored an ACEEE report based on this analysis. 2004–2007.

State and Utility Programs and Policies

Commercial Buildings Energy Efficiency Study—Montgomery County, Maryland. From 2010 to 2013, led a study of technical potential and policy options for meeting the County's 25% energy savings goal as stated in its 2009 Climate Action Plan. This project involved extensive efficiency potential modeling, using ICF's EEPM planning model, as well as background research on baseline conditions, policy options, and an extensive stakeholder engagement process.

Building Codes Development—Energy-Efficient Codes Coalition (EECC), Washington, DC. Serving as expert consultant to the EECC, building on 20 years of building code experience. EECC support roles include developing code change strategies and providing expert testimony. 2008–Present.

Building Codes Policy Guidance—National Action Plan for Energy Efficiency (NAPEE), EPA, Washington, DC. Served as expert consultant. Requested by EPA staff as a special consultant on the development of NAPEE's fact sheet on building codes as a state and local policy tool. 2009–2010.

Maryland Electricity and Climate Policy—Campbell Foundation, Maryland. Authored a white paper in 2007 on the role of energy efficiency in the state's electricity future. This was part of a larger state policy development effort that included a speaking role in Governor O'Malley's Energy Summit in July 2007. In early 2008, helped develop the EmPOWER Maryland and Strategic Energy Investment Fund bills in the legislature. These bills set energy savings targets for utilities, and create a fund for administering the RGGI allowance auction funds for a combination of energy efficiency and electric rate relief. ICF has provided consulting services to the Maryland Energy Administration in its efforts to develop its emerging energy and climate policies and programs. 2007–2008.

Iowa Energy and Climate Policy—Energy Foundation, Iowa. Invited to participate in a select Policy Academy with Governor Culver and his senior staff on energy and climate issues. Also invited to testify before the legislature's joint committee on energy efficiency in the utility sector. 2007.

Save a Watt Program—Duke Energy, Washington, DC. While with ACEEE, with foundation funding, reviewed and commented on Duke's innovative cost recovery and incentive proposal. Met with senior Duke staff and other stakeholders, developed suggested modifications to the Save a Watt proposal, and

helped negotiate an agreement among Duke and nonprofit organizations providing support for the Save a Watt concept in exchange for Duke's agreement to achieve specific efficiency savings targets. 2007.

Residential Program Design—BGE, Baltimore, Maryland. While with ACEEE, led a project to develop residential programs for BGE customers. This project entailed reviewing best-practice program designs from around the U.S., developing BGE service area and customer information, designing program features, estimating program impacts and costs, and conducting benefit-cost analyses of the programs. Programs focused on appliances and lighting, heating and cooling equipment, new homes, home retrofits, low-income, and windows. The report was filed with the Maryland Public Service Commission, and provided the basis for many of the programs BGE implemented in 2008-2011. 2003–2006.

Best Practice Efficiency Programs—Various foundations, Washington, DC. While with ACEEE, with foundation funding, oversaw projects that screened nominations from across the U.S. for exemplary programs in all customer market segments. These projects included publications of detailed program summaries as well as awards for leading programs. 2003–2007.

State Energy Efficiency Scorecard—Various foundations, Washington, DC. While with ACEEE, with EPA grant funding, led project to score all 50 states on their energy efficiency policies, from utility efficiency programs to building codes and transportation policies. Helped design the scoring methodology, identify data sources for state ranking, write the report, and host webcast release of the report. 2007.

Building Energy Codes Development—Energy Foundation, Washington, DC. Working in concert with the Energy Efficient Codes Coalition while employed at ACEEE, helped develop a set of technical proposals that would increase the stringency of the International Energy Conservation Code (IECC) by about 30%. ICF International provided computer simulation modeling, economic analysis, and expert witness support to the Coalition. Along with ICF's project manager, consulted closely on witness testimony at the IECC code development hearings in 2008. 2007.

SELECTED PUBLICATIONS AND PRESENTATIONS

Prindle, William. Final Report of the Montgomery County, Maryland Commercial Building Energy Efficiency Policy Study. Montgomery County Department of Environmental Protection, under contract to M.C. Furman Associates. 2013.

Prindle, William. From Shop Floor to Top Floor: Best Business Practices in Energy Efficiency. Pew Center on Global Climate Change. 2010.

Prindle, William. Customer Incentives for Energy Efficiency Through Program Offerings. National Action Plan for Energy Efficiency. Prepared by ICF International, Inc., 2010. www.epa.gov/eeactionplan

Prindle, William. Energy Efficiency as a Low-Cost Resource for Achieving Carbon Emissions Reductions. National Action Plan for Energy Efficiency. Prepared by, ICF International, Inc., 2009. www.epa.gov/eeactionplan

CONGRESSIONAL AND REGULATORY TESTIMONY

Testimony before the Maryland General Assembly, House Committee on Economic Matters and Senate Finance Committee, on SB 205, SB 268, HB 368, and HB 374, on energy efficiency savings goals for electric utilities and use of allowance auction funds from the Regional Greenhouse Gas Initiative. February 2008.

Testimony before the U.S. Congress House Transportation and Infrastructure Committee on energy independence and climate change. May 2007.

Testimony before the U.S. Congress Senate Committee on Energy and Natural Resources, on SB 1115. April 2007.

Brenda Dix — ICF International

Technical Staff: Land Use and Transportation

Brenda Dix is a Senior Associate at ICF International. Her expertise focuses on assisting transportation agencies and local government to mitigate their contributions to climate change and prepare for the impacts of climate change that are already in evidence. While developing climate change adaptation strategies, Ms. Dix ensures that they are complimentary to existing practices, and that they are cost effective investments. Ms. Dix has experience writing and preparing both technical and policy based documents for a wide variety of audiences; conducting literature reviews and gap assessments; developing climate change vulnerability and adaptation reports; preparing presentations and facilitating outreach/stakeholder engagement meetings; preparing long-range integrated land use and transportation planning documents; and familiarity with land use and transportation modeling.

Years of Experience

- Professional start date: 2008
- ICF start date: 2014

Education

- M.S., Civil Systems Engineering, University of California, Berkeley (UC Berkeley), 2010
- B.S., Civil and Environmental Engineering, University of California, Berkeley (UC Berkeley), 2009

PROJECT EXPERIENCE

Adapting to Rising Tides: Transportation Vulnerability and Risk Assessment Pilot Project, Metropolitan Transportation Commission (MTC), 2010-2012. While employed at MTC, Ms. Dix co-managed an assessment of the vulnerability and risk of San Francisco Bay transportation assets--both existing and planned--to forecasts of future sea level rise. While working hand-in-hand with the California Department of Transportation (Caltrans) and the Bay Conservation and Development Commission (BCDC) Ms. Dix evaluated when an asset would be inundated and the severity of that inundation, collected a suite of information on the current conditions of critical assets, and contributed to a report on potential hard and soft adaptation solution. Ms. Dix solicited the input of expert stakeholders throughout the process and presented the results of the work to Bay Area elected officials as well as at several conferences.

Climate Initiatives Program, MTC, 2010-2013. While employed at MTC, Ms. Dix managed the $33 million Climate Initiatives Innovative and Creative Grant Program; focused on exploring and implementing ways to reduce GHG emissions from the transportation sector. Grants focused on electric vehicles, safe routes to school, transportation demand management, parking pricing, and showcase projects. Many of the grants utilized strong public private partnerships to stretch the public investment in strategies such as electric vehicle charging stations. She analyzed the GHG emission reduction potential of grant proposals while also assessing their ability to achieve other program objectives. Ms. Dix oversaw project implementation and increased public awareness for the program through press releases, a web presence, and public events. Ms. Dix also managed an ICF International contract for a non-biased and analytically sound evaluation of program cost, effectiveness, and capacity to reduce emissions, improve public health and safety, and reduce family transportation costs. Additional information on the program can be found here: http://onebayarea.org/regional-initiatives/climate-initiatives-program.html

Sustainable Communities Strategy, MTC, 2012-2013. While employed at MTC, Ms. Dix created and analyzed new approaches to achieving California state mandated regional transportation and land use GHG emissions reduction targets (SB 375), and consulted with California Air Resources Board on

methods development. As a result, $700 million is being invested in the following programs, without which the Bay Area would not have met the California state mandates**:** Electric Vehicle Acceleration through an EV Charging Network; Car Sharing; Vanpools/Employer Shuttles; Smart Driving; Clean Vehicle Fee-Rebate Program; and Commuter Benefit Ordinance.

Sustainable Communities Strategy Emission Reduction Development, MTC, 2014-Present. Since joining ICF, Ms. Dix has continued her involvement in the development and analysis of innovative greenhouse gas reduction strategies for inclusion in MTC's regional transportation plan. Ms. Dix is currently conducting a literature review to determine appropriate revisions to the original set of emissions reductions strategies (based on advances in the academic literature and changing market forces), proposing new strategies, and assessing the feasibility of expanding the climate initiatives program grants to full regional strategies.

Smart Driving Pilot, MTC, 2012-2013. While employed at MTC, Ms. Dix provided analytical support for MTC's Smart Driving Pilot to maximize emission reduction potential. Smart driving is defined as a series of in-vehicle and vehicle maintenance actions that a driver can take to improve their fuel efficiency. The pilot consisted of installing smart driving feedback devices in vehicles to provide real-time feedback to drivers as well as providing them with marketing materials in the form of a series of lessons and educational tips on smart driving and a Facebook discussion page. The results of this pilot will inform future investment levels in smart driving.

Southeast Region Climate Change Transportation Tool Overview, Federal Land Management Agency (FLMA), 2014. ICF created a set of climate change and transportation vulnerability assessment tools for the National Park Service and Fish and Wildlife Service. Upon completion of this work, Ms. Dix organized a series of visioning interviews with a diverse range of stakeholders to ascertain thoughts on improvements to and expansion of the tools. She used the information from these interviews as well as discussions held throughout the project with the core project team, the multiagency working group, the pilot unit staff, and their partners who attended the project workshops to draft a report on the options for future improvements and expansion of the tools.

Transportation Engineering Approaches to Address Adaptation and Resiliency, Federal Highway Administration (FHWA), 2014-Present. Ms. Dix is the lead for several tasks in this project. Thus far, she has led the development of a literature review and initial assessment of key gaps that are preventing widespread adoption and integration of climate change adaptation into transportation engineering design. She scheduled and conducted a series of interviews with the FHWA Climate Resiliency Pilots to document problems they have encountered while conducting their work. She drafted several key sections of the report, synthesizing information from technical literature, the pilot interviews, and professional experience and compiled sections written by other authors into a single document.

Chapter Lead, Phase 2 Standards for Medium Duty/Heavy Duty Greenhouse Gas and Fuel Efficiency Environmental Impact Report, NHTSA/EPA, 2014-Present. Ms. Dix reviewed and summarized the Intergovernmental Panel on Climate Change 5th Assessment Report, the 3rd National Climate Assessment, and all recently published literature on anticipated climate changes and the risk they post on urban and rural societies (including energy, transportation, and food security). Ms. Dix also summarized potential adaptation strategies that could be taken at a national level to minimize the risks and increase resilience.

Frank Gallivan — ICF International

Technical Staff: Land Use and Transportation

Years of Experience

- Professional start date: 2005
- ICF start date: 2008

Education

- Master of City Planning, University of California, Berkeley, 2006
- Bachelor of Arts, Economics / Classical Archaeology, Dartmouth College, Hanover, NH, 2001

Mr. Gallivan is a transportation planner and policy analyst with ten years of experience. His clients include the Federal Highway Administration, Caltrans, the Transportation Research Board, U.S. EPA, non-profit groups, transit agencies, and local governments. His work focuses on the development and analysis of policies and plans to reduce greenhouse gas emissions from transportation. He is an expert at distilling complex research questions into manageable quantitative methods to predict the impact of transportation strategies. Mr. Gallivan has served as a policy analyst to numerous state and local government agencies developing climate action plans. He helps agencies understand the greenhouse gas emissions and cost impacts of both internal and external transportation policy developments. Mr. Gallivan's expertise extends to all types of GHG reduction strategies, including promotion of transit and other alternative modes, improved fuel economy of vehicles, alternative fuels and vehicle technologies, and non-road strategies. Mr. Gallivan served on the Transportation Technical Advisory Committee of ICLEI's community GHG protocol development initiative.

PROJECT EXPERIENCE

Travel Efficiency Assessment Methodology Case Studies, U.S. EPA, 2013. Mr. Gallivan served as the lead analyst of regional travel patterns for this project, which applied the Travel Efficiency Assessment Methodology (TEAM) that ICF previously developed for EPA. The methodology estimates GHG emission reductions from the application of various transit and travel demand management (TDM) strategies. Case studies were conducted in three regions: Boston, Kansas City, and Tucson. Mr. Gallivan oversaw the development of travel demand management scenarios, design of data collection tools, and modeling of scenarios using the TRIMMS tool.

GHG Reduction Policies for the Bay Area's Regional Transportation Plan, Metropolitan Transportation Commission, 2010-2011. ICF is supporting MTC in scoping and developing GHG reduction policies that can be analyzed outside of the region's travel demand model for inclusion in the Regional Transportation Plan/Sustainable Communities Strategy. Mr. Gallivan lead the development and analysis of a regional Commuter Benefits Ordinance to encourage or require employer-based TDM programs, improvements to bicycle infrastructure, and a regionwide Safe Routes to School program. These efforts involved collecting detailed travel data from MTC's travel demand model, and developing custom calculator tools in Microsoft Excel.

Climate Initiatives Evaluation, Metropolitan Transportation Commission, 2010-present. ICF is the lead consultant on this four-year contract to evaluate the outcomes of MTC's Climate Initiatives Program, a two-year $85 million grant program for local governments in the Bay Area. ICF and its team of subconsultants will provide continual support and guidance to MTC and grant recipients during implementation of a public outreach program, Safe Routes to School grants, and a number of innovative GHG reduction projects. ICF will ultimately evaluate each program and project for cost and GHG

emissions impacts and co-benefits. Mr. Gallivan serves as the Deputy Project Manager. He is leading the evaluation of three innovative grants: a Cold in Place Recycling (CIR) program in Napa County, a transportation demand management program in San Francisco, and an automatic vehicle locator (AVL) technology program for buses in Santa Rosa.

Cost Effectiveness of Transportation Strategies to Reduce GHG Emissions, San Francisco County Transportation Authority, 2010-2011. Mr. Gallivan served as GHG reduction analyst for San Francisco's first comprehensive analysis of transportation GHG reduction strategies. Options include expanding transit service and ridership, expanding facilities for bicyclists, a bike-sharing program, parking pricing, ridesharing and business outreach, transit pass programs, marketing and education campaigns, local serving retail, improved goods distribution, and technology options. Estimating both cost and GHG emissions impacts of these strategies, ICF helped city and county agencies determine how they can achieve the greatest reduction in GHG emissions on limited budgets. Though the ways to reduce GHG emissions from transportation are well known, individual cities and counties have little information about which strategies are most effective for them. The results of ICF's work with this project will provide cities and counties with clear guidance about the expected return from individual investments. The analyses informed climate action plans for San Francisco city agencies and the SFCTA's Countywide Transportation Plan.

Quantifying Transit's Impact on GHG Emissions and Energy Use: The Land Use Component, Transit Cooperative Research Program, 2011-2014. This project analytically examined the complex interrelationships between transit and land use patterns to better understand their contribution to compact development and the resulting greenhouse gas (GHG) reduction benefits. The report is accompanied by an Excel-based sketch-modeling tool ("calculator tool") that applies the research findings. The calculator estimates the land use benefits of existing or planned transit projects with a minimum amount of input data required. This research will be useful to transit agencies, planners, modelers, and researchers seeking to better understand and to quantify the impacts of transit service on compact development, energy use, and air quality in urbanized areas. Frank Gallivan led the research team and design and testing of the tool, as well as the overall project.

The Influence of Transit on Land Use Patterns in Los Angeles County, Los Angeles Metro, 2010-2012. Transit has the ability to catalyze denser development patterns in Los Angeles County that contribute to higher rates of walking and biking and lower rates of driving. This study tested two approaches for quantifying the impact the total impact that transit has had on travel and land use patterns in Los Angeles County since 1990. The first method used was a time series regression analysis. The second method used was a comparison of travel patterns in Los Angeles County to surrounding areas. Mr. Gallivan served as the project manager and lead analyst for this study.

Support to NYSERDA on State Transportation and Climate Change Policies, 2010. Mr. Gallivan served as the Project Manager on this effort in support of the New York State Climate Action Plan. ICF provided research and analysis of transportation policy options being considered for inclusion in the Climate Action Plan. Mr. Gallivan managed a team of research staff and subject matter experts.

Washington State Climate Action Team: Transportation Implementation Working Groups, Washington State Department of Ecology, 2008. Mr. Gallivan supported the Transportation Implementation Working Group (IWG) in recommending tools and best practices to achieve the vehicle miles traveled (VMT) reduction goals in HB 2815. This was a focused, bounded effort designed to result in the successful development of policy proposals that are specific and complete enough to be seriously considered by the Governor and Legislature in the 2009 Legislative Session. Mr. Gallivan analyzed the emission reduction potential and costs of various transit expansion packages.

Alex Bell, AICP — Renaissance Planning

Technical Staff: Land Use and Transportation

Mr. Bell focuses on plans, projects, tools, and data products that support a systematic and comprehensive approach to community and regional planning. His work deals primarily with interactions between the built environment, economic and demographic trends, travel behavior, transportation system performance, and environmental impacts of urban development. His project involvement covers database construction and management, GIS analysis and tools creation, and model development and application. He has contributed to a variety of transportation and land use studies at the local, regional, state, and federal levels.

Education

- Master of Science in Planning, Florida State University
- Bachelor of Arts in Art History, University of South Florida

PROJECT EXPERIENCE

Updating EPA's Smart Location Database, U.S. Environmental Protection Agency. The smart location database (SLD) is nationwide assessment of the five "D's" variables that describe the built environment and influence travel choices. The database combines numerous national datasets that describe protected areas, residential and employment activity, detailed street networks, and transit availability and accessibility. The SLD update builds upon previous versions by elaborating on network design and intersection density variables, calculating true network and schedule based travel times between census block groups for auto and transit/walk, and refining the measures of defining land use diversity. Mr. Bell developed the structural design and analytical approach for the update in addition to processing and assembling the database, which includes all census block groups in the United States and Puerto Rico.

Reviewing EPA's Smart Growth Program's Technical Assistance Efforts, U.S. Environmental Protection Agency. The EPA Smart Growth Program offers technical assistance to diverse applicants to incorporate smart growth principles in their respective plans, programs, and projects. Renaissance conducted a quantitative and qualitative evaluation of the Technical Assistance outcomes. Mr. Bell developed a sketch scenario-planning platform in CommunityViz to model the environmental benefits of the smart growth planning outcomes as compared to prevailing development trends in a given region. The evaluation examines nine case studies from around the country and measures stormwater, air quality, energy consumption, public health, and environmental justice benefits achieved by the technical assistance program.

NCHRP 08-78: Estimating Walking and Biking for Planning and Project Development – Transportation Research Board. Renaissance led a team of researchers in an exploration of the key factors and relationships that influence non-motorized travel demand. The study yielded a comprehensive guidebook of best practices in bike/ped demand estimation. Mr. Bell utilized travel survey data from Arlington, VA, disaggregated employment data, and detailed street networks with embellishments representing bicycle and pedestrian facilities to support a GIS-based analysis of multimodal accessibility and non-motorized trip making. The GIS tools and techniques developed fall in the middle range of the guidebook's hierarchical outline of approaches, requiring a moderate level of effort and having broad application in planning practice.

Assessment of Analytical Needs and Tools, Maryland Department of Transportation. Renaissance developed a sample application of its multimodal accessibility analysis framework for an urban corridor in Montgomery County, MD. The work focused on measuring accessibility from all points within the

corridor to destination opportunities defined by the transportation modes serving the corridor. Accessibility evaluations were conducted for the auto, transit, and walking modes and applied to model the mode choices of residents, workers, and employees throughout the corridor. The findings were translated into an analytical framework in which land use and/or transportation decisions are assessed in tandem to evaluate their impacts to accessibility and influence on mode selection. An example application for BRT service on MD-355 was developed to demonstrate the utility of the approach in transit and station area planning assessments. Mr. Bell served as the technical lead, defining the analytical process and supervising the collection/development of supporting data to support the model development and test application phases of the work.

East of the Riverway Transportation Network Plan, City of Asheville, North Carolina. Renaissance led a multimodal transportation planning process to identify short-term improvements needed in the area of the River Arts District and its adjacent, economically diverse neighborhoods. The study includes an integrated land use, development scenario and network analysis. The project addresses elements of economic, community and workforce development; access to goods and services; and access to employment. Mr. Bell completed the land use modeling and accessibility analysis, which was used to identify and prioritize projects for the study.

Healthy By Design Guidelines, Metropolitan Washington Council of Governments. Renaissance helped the District of Columbia frame a set of guidelines and considerations for developing affordable housing locations that support healthy lifestyles. Mr. Bell designed and implemented a suitability assessment that highlighted places that promoted walking, have strong access to/via transit, are well served by health, human services, and community facilities, minimize exposure to environmental hazards, and more. The suitability assessment was used to evaluate current affordable housing locations and to aid the development of design and location guidelines that support healthy living.

Greenprint and Comprehensive Plan, City of Clearwater, Florida. The City of Clearwater adopted strategies and actions to enhance mobility, increase energy efficiency and conservation, and reduce greenhouse gas emissions. Renaissance led a team of planners, engineers, and environmental scientists to produce metrics for a greenhouse gas (GHG) inventory and integrated land use and transportation analysis, which accompanied tools and information the City will use to monitor its progress toward GHG reduction targets. Mr. Bell provided basic technical and graphical support to measure and communicate the impacts of the transportation sector on GHG, develop inputs for an air quality assessment using EPA's MOVES model, and articulate strategies for mitigating the transportation sector's impact on air quality.

Onondaga County Sustainable Development Plan, Syracuse-Onondaga County Planning Agency. Renaissance prepared future growth scenarios and build-out analyses to inform policies and programs that promote long-term livability in the Syracuse region. The plan evaluated economic development and revitalization, land use and transportation dynamics, farmland and open space preservation, housing, and public infrastructure and services. Mr. Bell developed a sketch-planning tool to project future travel behavior and estimate future vehicle miles of travel in the study area based on the various future growth scenarios.

Charles J Haack, LEED AP — ICF International

Technical Staff: Energy and Built Environment

Mr. Haack is a Senior Associate on ICF International's Energy Efficiency Analytics & Policy team where he supports energy efficiency policy analysis, including policy development, stakeholder outreach, and program evaluation. His primary role on the team is serving as the technical lead in supporting the U.S. EPA's ENERGY STAR Certified Homes program. Mr. Haack directs a team of engineers in performing the policy analysis as well as energy and emissions analyses behind the program requirements. This ranges from maintaining and updating the ENERGY STAR Certified Homes program documents to frequently delivering webinars to program stakeholders.

Prior to joining ICF, Mr. Haack served as the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) public policy intern in Washington, DC where he met with policy makers, reviewed proposed energy policy and standards, and published his own paper on energy efficiency labeling programs in the United States. Mr. Haack also brings design experience from his internships at multiple design firms. Mr. Haack is a LEED accredited professional.

Years of Experience

- Professional start date: 2009
- ICF start date: 2010

Education

- M.A.E., Architectural Engineering, The Pennsylvania State University, University Park, Pennsylvania, 2009
- B.A.E., Architectural Engineering, The Pennsylvania State University, University Park, Pennsylvania, 2009

Certifications

- Building Performance Institute Building Analyst Certification, 2011
- LEED Accredited Professional by the USGBC/GBCI, 2008
- ASHRAE E-learning Fundamentals of HVAC Systems – IP, 2008
- ASHRAE E-learning Fundamentals of HVAC Control Systems, 2008

Professional Affiliations

- American Society of Heating, Refrigerating & Air Conditioning Engineers (ASHRAE)
- American Society of Mechanical Engineers (ASME)
- American Society for Testing and Materials (ASTM) International

PROJECT EXPERIENCE

Energy Efficiency Policy Analysis

Technical Support to the ENERGY STAR New Homes Program, U.S. Environmental Protection Agency, 2010-Present. Mr. Haack provides ongoing technical support for the EPA's ENERGY STAR guidelines for new homes. He is the lead contractor and oversees the team of engineers that work on the development and modifications to the new ENERGY STAR for Certified Homes guidelines.

These program development services include market research, strategic planning for program implementation, evaluation industry building specifications and residential technology assessments using computer simulations. This has also included analyzing market best practices to recommend cost-effective energy efficiency upgrades and provide verification of energy savings. Applications of these analyses include determining policy for the ENERGY STAR New Homes specifications for specific regions across the United States, including California, Florida, Hawaii, Massachusetts, the Pacific Northwest, and Puerto Rico. The technical team led by Mr. Haack is currently in the process of conducting a program emissions analysis and program cost effectiveness analysis using the U.S. DOE's Methodology for Evaluating Cost-Effectiveness of Residential Code Changes.

Account Management Support to the ENERGY STAR New Homes Program, U.S. Environmental Protection Agency, 2010-Present. Mr. Haack provides Account Management to EPA's ENERGY STAR for Homes program. His responsibilities include a range of marketing and program development support to EPA. He assists ENERGY STAR partners and stakeholders such as home energy raters, and HVAC contractors through activities such as resource development along with web-based and live training.

Code Improvement Development, Energy Efficiency Codes Coalition (EECC), 2012-2013. Mr. Haack assisted in the development of code proposals for consideration by the International Code Council (ICC) on behalf of the Energy Efficiency Codes Coalition, the American Council for an Energy Efficient Economy, the Alliance to Save Energy and Edison Electric Institute. Proposals were developed to improve the IECC beyond the 2012 IECC and to improve the simplicity and enforceability of the overall code language. Analysis was conducted using both empirical market research and advanced energy simulation software (The U.S. Department of Energy's DOE-2 and EnergyPlus) to determine the impact of proposed code changes on the energy use among new commercial buildings and homes in the United States. Rapid, market-wide modeling was used to guide the task force's decisions. Project goals required extensive use of the Energy Information Administration's Commercial Building Energy Consumption (CBECS) database. The EECC is a coalition of industry organizations that support cost-effective improvements to the efficiency of homes and buildings.

End Use Electrification Analysis and Tool Development, SMUD, 2011-2012. Mr. Haack assisted in the residential building analysis and tool development to assist SMUD in evaluating the potential of electric technologies to replace fuel technologies used in residential, commercial, and industrial buildings, and plug-in electric vehicles (PEVs). The resulting tool allows SMUD staff to estimate energy impacts of replacement technologies through 2050 with annual hourly electricity loadshapes by sector.

Comparison of Green Building Codes, U.S. Green Building Council, 2011-2012. Mr. Haack provided technical expertise in assessing notable green building programs and codes. The USGBC is interested in assisting jurisdictions in determining which code vehicle would be the best suited for their needs as the USGBC is interested in keeping LEED an above code program. The policy analysis also included modeling in EnergyPlus using ICF's Beacon Commercial and the creation of an Excel-based tool that has dynamic visuals to compare codes based upon selected inputs. The purpose of the tool is to have a single platform in which green building metrics could be compared in a fair and simple manner. Additionally, Mr. Haack authored paper with the U.S. Green Building Council client for the 2012 ACEEE summer study for energy efficiency in buildings.

Energy Efficiency Analysis and Reports, North American Insulation Manufacturing Association, 2011. Provided technical support in assessing the energy savings potential for various levels of insulation in residential buildings, commercial buildings, and industrial applications as a part of a larger lifecycle energy analysis of insulation products. Analysis was conducted using ICF's Beacon Platform of tools.

Energy Benefits of Compact Development, SMUD, 2010-2011. Mr. Haack assisted in an innovative project that shows the energy effects of land use planning on the energy use of residential and commercial buildings. The study was based on energy simulations of various building scenarios in the Sacramento market. The results may be used to assist SMUD in considering more active involvement in land use decision making through the planning process.

National Energy Model, Saudi Aramco, 2010-2011. Mr. Haack supported the development of building energy data that has been calculated with DOE-2 and EnergyPlus for use in developing an energy model that is representative of the energy consumed and the energy savings potential for the Kingdom of Saudi Arabia. The resulting data included many building types, vintages, and locations in addition to energy savings potential from upgrade measures.

Existing Home Asset Rating Policy Support, U.S. DOE, 2010. Provided policy development support associated with having asset ratings conducted broadly across the country. Support includes sensitivity analysis of software tool inputs to assist in optimizing the accuracy of the asset rating for the level of effort associated with a home audit. Support also includes examining and developing methods for using operational information to assist understanding the impact that the building has on the energy use of a home.

Energy Efficiency Policy Analysis

Tool Development, IBEDROLA: NYSEG and Rochester Gas & Electric (RG&E), 2010-2012. Mr. Haack developed excel based tools for use in evaluating deemed kW, kWh, and therm savings, as well as incentives for commercial building energy efficiency upgrades. Mr. Haack developed energy efficiency tools in under 4 weeks for six commercial sector upgrades, including variable frequency drive, chiller, high efficiency motor, unitary HVAC, boiler and boiler controls, and lighting.

KW and kWh Energy Savings Tool Development, Georgia Power, 2011-2012. Mr. Haack assisted in the development of measures for excel based tools to assess the kW and kWh energy savings and incentives for prescriptive and performance based commercial building lighting upgrades.

Demand Side Management Potential Study, Dominion, 2010. Mr. Haack provided technical analysis in determining achievable demand side management savings potential in both the VA and NC markets. Calculations performed included evaluating residential and commercial technologies and their associated costs and energy savings.

Ontario Power Authority Measures Review & Update, 2010. Mr. Haack provided technical analysis to assist in creating a "bottom-up" analysis of potential Demand Side Management (DSM) program savings for numerous energy efficiency measures for the residential and industrial building sectors. Support included conducting DOE-2 building energy analysis simulations, conducting research, and developing energy efficiency measure technical data sheets. Technologies evaluated included: Air-source heat pumps, ground-source heat pumps, heat recovery ventilators, ductless mini-split heat pumps, variable speed drives, and ductless air-conditioners.

Multi-Family and Commercial Retrofit Energy Savings, Con Edison, 2010-2011. Developed measures and excel-based tools for assessing potential energy savings for various upgrade and retrofit measures. These included a number of measures, including lighting, lighting control system, refrigerator LED, boiler, VFD motor, high efficiency motor, efficient window, increased insulation, infiltration, and weatherstripping, and steam trap upgrades. The calculated energy savings resulted in the determination of incentives for local New York state housing authorities. Projects evaluated throughout the New York City region and included the Empire State Building.

SELECTED PUBLICATIONS

Jochum, Michael; Haack, Charles; Khan, Haider. *The Next Step in Energy Efficiency for the New Homes Market.* Energy & Environmental Building Alliance Conference. ICF September 2012.

Burt, Lane; Sigmon, Jeremy; Dean, Brian; Haack, Charles. *'Green' Codes and Rating Systems: A Framework for Evaluating the Tools and the Measuring Sticks to Create Better Buildings.* ACEEE 2012 Summer Study. USGBC/ICF International August 2012.

Haack, Charles *Implementing a United States Building Labeling Program for Energy Efficiency*. Journal of Engineering and Public Policy, vol. 13, (2009) available at http://www.wise-intern.org.

Craig Schultz — ICF International

Technical Staff: Energy and Built Environment

Mr. Schultz is a leader for ICF's Renewable Energy and End-User Energy Supply work and manages energy projects ranging from market assessments and feasibility analyses to project selection, policy formulation, negotiation, and implementation. Mr. Schultz has spent 19 years in the energy industry, working with solar, wind, and other renewable electricity projects, as well as conventional energy supply, pricing, and risk management. His professional focus has been on helping retail and wholesale energy market participants manage the costs and volatility of their energy transactions and helping them optimize their conventional and renewable energy assets. Prior to his consulting work, Mr. Schultz managed a wide range of departments and projects for two of the largest and most innovative energy sellers in the U.S.

Years of Experience

- Professional start date: June 1989
- ICF start date: July 2003

Education

- MBA, Booth School of Business, The University of Chicago, Chicago, Illinois, 1993, *Beta Gamma Sigma honors*
- Bachelor of Arts, Economics, Wesleyan University, Middletown, Connecticut, 1989, *Phi Beta Kappa honors*

Community

- Board Member, Community Engagement Committee, Arena Stage, 2007-2014.
- Board of Directors, Compass DC Strategic Pro-Bono Consulting, 2006-2008. Advisory Board, Compass DC Strategic Pro-Bono Consulting, 2012-2014.

PROJECT EXPERIENCE

Southern Tier New York Regional Sustainability Plan, NYSERDA Cleaner Greener Communities Program. Oversight of renewable energy component. For a group of eight counties in the Southern Tier of New York State, ICF supported the development of a comprehensive sustainability plan to lower greenhouse gas emissions in the region by 80% by 2050. This planning effort involved extensive research; establishment of baseline data and key indicators; outreach throughout the region; integrated energy, environmental, transportation, and economic development planning; case studies; and implementation plans for the highest potential mitigation and investment opportunities. The planning was funded by the New York State Energy Research and Development Authority (NYSERDA), as part of its Cleaner, Greener Communities program. The renewable energy component of the project included consideration of solar photovoltaic (PV), solar water heating, wind, and biomass options.

Guidance for Municipalities on Solar Financing and Services — U.S. Department of Energy Technical Assistance Program, Washington, DC. Subject Matter Expert. Mr. Schultz assisted two California municipalities, one Virginia municipality, one Florida municipality, and one Delaware government agency with questions related to solar power purchase agreements (PPAs) and other solar financing mechanisms the government agencies are considering. For the Delaware agency, that work also involved refinement of a draft services/feasibility RFP to support a planned solar installation. Mr. Schultz also co-led a national webinar for government agencies on solar procurement and implementation, and was an expert presenter on two regional webinars. This work was done as part of ICF's support of the U.S. Department of Energy's Technical Assistance Program that provides technical guidance to American Recovery and Reinvestment Act grantees.

Educational and Outreach Program on Solar PV Projects for Local Financial Institutions — Massachusetts Department of Energy Resources, Boston, Massachusetts. Project Oversight and Editor of Survey and Final Report. In order to help educate local financial institutions on the opportunities and

barriers for viable solar PV projects, ICF performed a multi-stage engagement for the Massachusetts Department of Energy Resources (MassDOER). The work began with research into the knowledge and practices of Massachusetts financial institutions (banks, credit unions, etc.) with respect to residential and small commercial solar PV projects. ICF managed detailed interviews with almost two dozen officials at Massachusetts financial institutions and produced educational materials, workshops throughout the Commonwealth, a webinar, and a final report based on this research and complementary work from MassDOER, the Massachusetts Clean Energy Center, and others. ICF received the 2013 Solar Power project merit award from *Climate Change Business Journal* for work on this engagement.

Energy Action Plan Support, U.S. Department of Veterans Affairs (VA), Washington, DC. Renewable energy and overall energy procurement subject matter expert. As part of ICF's assistance with the VA's Strategic Sustainability Performance Plan (SSPP), ICF is supporting the revision of the agency-wide Energy Action Plan. The Energy Action Plan covers energy efficiency (EE), energy procurement, and self-generation efforts at the VA and details challenges and actions to integrate energy management, collect and report data, improve EE, generate more renewable energy, and optimize energy use in new VA construction and major renovation. ICF experts are working with over a half-dozen senior VA staff covering a range of energy and environment disciplines on this revision.

Evaluation of Alternative Energy Opportunities — Armed Forces Retirement Home, Washington, DC and Gulfport, Mississippi. Project Oversight. ICF is reviewing the suitability of a range of alternative energy technologies, including solar PV, solar hot water, wind, ground-source heat pumps, fuels cells, and micro-turbines for the Armed Forces Retirement Home's (AFRH's) campuses in Washington, DC and Gulfport, Mississippi. This work combines preliminary technical and economic reviews of the technologies with designation of the campus locations on which they may be most viable. The alternative energy project for AFRH is part of ICF's larger support of sustainability programs at AFRH that includes an investment-grade audit of energy efficiency opportunities, a resident engagement and education program, and support for LEED certification of campus buildings.

Alternative Energy Technology Assessment — U.S. Postal Service, Washington, DC. Subject Matter Expert. ICF completed a study on the applicability of alternative energy technologies to the United States Postal Service's over 30,000 facilities. This study focused on solar photovoltaic, geothermal electric, geothermal heat pumps for heating and cooling, and fuel cell based combined heat and power technologies. It included a preliminary evaluation of all Postal Service facilities for their suitability for each technology, ranking of states within the U.S. for economic and technical suitability of each technology, and ranking of top facilities for a possible future pilot implementation program. Mr. Schultz led the project ownership and implementation strategy portions of this project.

STEVEN F. MILLER, PE, CEM, MFBA, CMVP

Mondre Energy, Inc.

Technical Staff: Energy and Built Environment

Years of Experience

- Professional start date: 1979

Education

- MS, Finance, Drexel University, 1988
- BS in Mechanical Engineering and Applied Mechanics, University of Pennsylvania, 1979

EXPERIENCE OVERVIEW

Steve Miller is a registered professional engineer experienced in the technical and financial evaluation of residential, commercial, and industrial energy production and energy use systems. He has expertise in the design of combined heat and power (CHP), heat pumps, HVAC systems, photovoltaic (PVC) arrays, gasification plants for petroleum coke, and advanced fluidized bed technology projects. Mr. Miller has evaluated numerous renewable energy projects involving solar, wind, geothermal and biomass resources for technical and financial feasibility.

Mr. Miller designs and manages energy audits and energy conservation programs, identifying for clients cost-effective energy and demand reduction and conservation opportunities. He has either managed or performed thousands of energy audits involving, collectively, tens of millions of square feet of facilities used for industrial, commercial, administrative, and residential purposes, and including specialized facilities such as sports arenas, refrigerated warehouses, health care and nursing facilities, and correctional facilities. He is expert in developing innovative strategies for improving energy efficiency, implementing sustainability programs and practices, reducing the client's carbon footprint, and managing overall energy usage. He also is expert in the evaluation, measurement and verification of energy savings and demand reductions achieved by utility incentive programs, and has provided recommendations regarding improvements to, and best practices for, such programs.

Mr. Miller serves as an Expert Reviewer for the Opportunity Research Fund, which provides grants to support research, development, demonstration, and deployment of energy efficiency technologies, policies, business models, and training programs. The fund is part of the Greater Philadelphia Innovation Cluster for Energy Efficient Buildings, a nationally recognized program based in the Philadelphia Navy Yard.

PROJECT EXPERIENCE

Pennsylvania Public Utility Commission (PUC) – Act 129 of 2008. Mr. Miller was a key member of the Statewide Evaluator (SWE) Team providing services to the PUC in the administration and implementation of Pennsylvania Act 129 of 2008, Phase I. He managed Mondre Energy's responsibilities in the on-site and desktop audit and evaluation of utility claimed savings in connection with commercial, industrial, and low-income energy savings incentives programs. Responsibilities also included reviewing and updating quantitative energy savings and demand reduction protocols contained in the Pennsylvania Technical Reference Manual (TRM) related to implementing energy efficient residential, commercial, and industrial energy equipment. He led the Mondre Energy team in the preparation of baseline studies for assessing the market penetration of energy efficient equipment, and research studies on best practices for incentive programs in applying net-to-gross ratios and in the implementing demand response programs.

Philadelphia Housing Authority. For the fourth largest housing authority in the United States, Mr. Miller has performed numerous energy audits in accordance with Housing and Urban Development (HUD) program requirements. Specific projects in which Mr. Miller has participated include a natural gas and electric utility allowance analysis for several PHA housing developments, and an energy audit sampling residences in 31 PHA conventional properties with over 6,700 dwelling units.

Local Government Energy Efficiency Planning Projects. Mr. Miller has performed facility audits and related work for local government, including projects funded by the federal Energy Efficiency and Conservation Block Grant (EECBG) program. Clients have included Chester County, Pennsylvania; Upper Darby Township, Pennsylvania; and the City of Meriden, Connecticut. Facilities audited included prisons, residential and senior centers, administration buildings, libraries, police and fire stations, water treatment plant, airport, health facilities and street lighting. The projects involved establishing baseline usage, identifying cost-effective energy conservation measures, identifying potential funding sources, implementing community outreach, advising on on-site power generation solutions, evaluating sustainability and projects and opportunities for reducing carbon footprint, and assisting, where applicable, in EECBG reporting. Additionally, for Chester County, Mr. Miller prepared specifications for boiler replacements for two County courthouses and a 200-bed nursing home.

Philadelphia Industrial Development Corporation (PIDC)/Philadelphia Navy Yard (PNY). Mr. Miller has provided diverse consulting services to the PIDC including utility master plan development, tenant energy efficiency surveys, distributed generation metering protocols and energy technology evaluation. Through this work, he has provided critical support in energy engineering economics and commodities procurement, CHP and HVAC systems conceptual design, electrical grid/substation interconnection and sub-metering protocols (include smart grid technology), tenant billing rate design and system cost recovery, tenant outreach and input to master plan development, demand response programs, and the measurement and verification protocols for evaluating energy efficiency.

Philadelphia Phillies. Mr. Miller conducted a comprehensive energy audit of Citizens Bank Park, home of the Philadelphia Phillies Major League Baseball team. The audit entailed a thorough evaluation of the entire 43,000-seat stadium, located in South Philadelphia, as well as the stadium's associated 21,000 space parking lots, and all food preparation facilities and administrative offices. Mr. Miller identified opportunities for a geothermal space heating and cooling system, food service refrigeration system upgrades, lighting controls, and modifying the existing peak shaving generators for combined heat and power operation.

Cory Jemison — ICF International

Technical Staff: Multi-Sector Analysis

Cory Jemison is an Associate at ICF with seven years of experience in climate change and sustainability, specializing in greenhouse gas accounting, mitigation, and carbon markets. Having worked with clients at all levels of government and the private sector on these issues, Mr. Jemison has honed his expertise at tool building and model development, creating tools and models for a wide variety of uses from examining savings from switching out light bulbs at residential homes and small businesses all the way to modeling and forecasting the financial carbon liabilities of all companies involved in Australia's Carbon Pricing Mechanism. At ICF, Mr. Jemison supports several projects including the U.S. GHG Inventory, U.S. GHG Reporting Program, and Federal Initiatives in Reducing Emissions of HFCs.

Years of Experience

- Professional start date: 2006
- ICF start date: 2014

Education

- M.A., Environment, University of Melbourne, 2012
- B.A., Mathematics, Hamilton College, 2006

PROJECT EXPERIENCE

Inventory of U.S. Greenhouse Gas Emissions and Sinks, U.S. EPA, 2014 to Present. Mr. Jemison currently supports various aspects of quality assurance and quality control in the development of the US GHG Inventory. Mr. Jemison also supports the US GHG Inventory submission to UNFCCC as the National Inventory Compiler for Common Reporting Format tool.

U.S. Greenhouse Gas Reporting Protocol, U.S. EPA, 2014 to Present. Mr. Jemison currently supports a project taking lessons learned from EPA's U.S. GHG Reporting Program in order to provide a guide for developing countries in implementing similar programs of their own. Previously in 2007, Mr. Jemison conducted an analysis on the economic burden on the EPA and companies for administering and reporting to the prospective U.S. GHG Reporting Program.

U.S. Energy Star Industrial Program, U.S. EPA, 2006 to 2009. Mr. Jemison supported this program at ICF by analyzing the amount of CO2 that the program can take credit for preventing through supporting the actions of the program participants. Mr. Jemison also created an energy and GHG emissions tracking tool geared towards helping SME industrial firms. This tool allows companies to track energy and emissions from multiple facilities over time on a monthly or annual basis, allowing the user to specify and track progress towards meeting energy and GHG targets, and giving the user the ability to look at the effects of carbon pricing on their facilities.

Environmental Modeling for the Power Sector, U.S. EPA, 2006 to 2008. Mr. Jemison provided research and analytical support for inputs to ICF's Integrated Planning Model (IPM®). This involved writing technical reports on topics such as the costs of carbon capture and storage as well as the costs of co-firing biomass with coal in power plants. In addition, Mr. Jemison worked to keep ICF's database of power plants up to date, researching technical specifications for current and planned power plants.

Statistical Analysis for the Environmental Protection Authority (EPA) of Victoria (Australia) Annual Stakeholder Survey, 2012. Mr. Jemison provided statistical analyses to examine whether different EPA stakeholder groups showed significant differences in how they responded to questions on the survey, such as EPA's performance, perceived levels of pollution in their area, and relative importance of different environmental issues.

Analyzing EPA Victoria's Relationship with Each Local Government within the State, 2012-2013. For this project, Mr. Jemison built tools and reports to analyze the relationship EPA has with each state municipality. In order to do so, Mr. Jemison collected data on all relevant contact points EPA has had with each local government branch as well as various demographic and pollution data collected on each municipality. This project has now allowed EPA to bring together data from different parts of the organization for the first time to see how EPA is interacting with different municipalities and how these relationships can be improved.

Modeling the Impact of the Australian Carbon Pricing Mechanism, 2011-2012. While employed at RepuTex, Mr. Jemison developed a facility-level bottom-up model of Australia's GHG emissions in the industrial and energy production sectors. He then integrated RepuTex's existing power sector model into this model to extend coverage across all liable entities to Australia's carbon price. This forecasting model is able to output data such as liable emissions by scope, financial liabilities, and free carbon permits with the flexibility to aggregate data by company, sector, or state and toggle between company liabilities on an operational or equity control level. Mr. Jemison then lead a project for a state government client to examine the opportunities and risks of Australia's newly formed carbon market for companies within the state, comparing positions of these companies to companies in other states.

Accounting for Savings from Energy Efficiency Measures, 2009-2011. While employed at MEFL, Mr. Jemison was the technical lead for the organization's accounting for the energy, cost, and greenhouse gas savings from energy efficiency measures. Accounting for these actions covered smaller behavioral measures such as households adjusting their thermostats to larger measures such as installing solar panels. Mr. Jemison built calculation tools incorporating around 70 different energy efficiency actions for households and small businesses to ensure consistency in the assumptions applied behind these savings across programs. These tools also ensured the flexibility to calculate the most accurate savings based on the level of details known about the action taken. For instance, knowing what model refrigerator a household is upgrading from and to allowed the tool to calculate a more accurate savings projection than simply knowing a household had upgraded to a four-star energy efficient refrigerator.

Program Evaluation of Greenhouse Gas Reduction Programs, 2009-2011. While employed at MEFL, Mr. Jemison provided timely evaluations on the effectiveness of various energy and greenhouse gas reduction initiatives lead by MEFL. These initiatives included overall energy, cost, and greenhouse gas savings from programs such as solar PV community bulk buys, solar hot water community bulk buys, green power initiatives, and initiatives targeting draught-proofing homes. These initiatives all fell under the Moreland Solar Cities program, for which Mr. Jemison evaluated all actions undertaken by individuals and businesses signed up to the program to analyze the greenhouse gas emissions reduction attributable to the overall program.

Erika H. Myers — ICF International

Technical Staff: Multi-Sector Analysis

Ms. Myers has over 12 years of experience in the renewable energy, clean transportation, and environmental fields. As a Senior Associate at ICF International, she provides support to clients on program and project management, policy development, strategic planning, and analysis on a variety of clean energy projects. Her subject matter expertise includes plug-in electric vehicles, biofuels, renewable energy technologies, and other clean fuels. In her previous work as an independent consultant, Ms. Myers helped a range of clients in the clean energy industry, including project management support for one of the largest rooftop solar photovoltaic projects in the country. Prior to consulting, Ms. Myers was the Manager of Renewable Energy Programs at the South Carolina Energy Office. Her duties included oversight of the state's wind, biomass, solar, geothermal, and alternative fuel programs. She effectively worked with a broad range of stakeholders to develop clean energy policies, including the state's first renewable energy grant program, net metering and interconnection policy, seven renewable energy tax credits and two incentive payment programs. Ms. Meyers has experience in alternative transportation fuel and advanced vehicle technology policy development, market analysis, and technology in fuels and clean vehicles. She also is an expert in renewable energy policy development, market analysis, voluntary renewable energy credit policy, and technology in a wide range of renewable energy applications. She is skilled in leading complex, multiparty projects on tight budgets and schedules.

Years of Experience

- Professional start date: 2003
- ICF start date: 2011

Education

- MA, Earth and Environmental Resources Management, University of South Carolina, Columbia, 2009
- BA, Biological Sciences, Clemson University, 2003

Professional Memberships

- Transportation Committee Member, National Association of State Energy Officials (NASEO)
- South Carolina Biomass Council (Founder & Board Member)
- South Carolina Clean Energy Business Alliance (Founder)
- South Carolina Solar Council (Former Chair, Board Member, and 2011 Solar Volunteer of the Year)

PROJECT EXPERIENCE

Clean Transportation

Plug-in Electric Vehicle Forecasting and Demand Modeling—Orlando Utilities Commission (OUC), Orlando, FL. Served as project manager. As part of a strategic plan to increase the deployment of plug-in electric vehicles (PEVs), OUC developed a residential and commercial service offering to incentive customers to purchase or lease electric vehicle supply equipment (EVSE) from the utility. To support the plan, ICF prepared a ten-year forecast of PEV penetration within the OUC territory and a 60-mile radius from downtown Orlando. ICF also reviewed the commercial service offering, prepared recommendations, and developed a corresponding five-year forecast of projected EVSE demand. Myers coordinated the research team, prepared written recommendations, assisted with forecast analysis, and served as the liaison with the client. 2015.

Renewable Natural Gas (RNG) Technical Support—Southern California Gas Company, Los Angeles, CA. Served as analyst. RNG as a transportation fuel has grown dramatically in California because of the Low Carbon Fuel Standard (LCFS). ICF provided technical support to help the company understand procurement opportunities for RNG at retail and fleet fueling natural gas stations and to understand the potential implications of a California Renewable Gas Standard. Myers provided support on the viability

and feasibility of a Renewable Natural Gas Standard, including an independent assessment of potential RNG supply from in-state and out-of-state resources, assessment of RNG costs, and an evaluation of incentives to increase RNG deployment. 2015-present.

New England Alternative Transportation Fuel Study—Massachusetts Department of Energy Resources. Served as analyst. As part of a larger project with the Massachusetts Clean Cities Coalition and four other clean cities coalition groups, ICF prepared materials as part of a project entitled 'Removing Barriers, Implementing Policies, and Advancing Alternative Fuels Markets in New England.' ICF identified technical, regulatory, and economic barriers to alternative transportation fuel use in the New England region. ICF also identified recent alternative fuel supply constraints, estimated the annual consumption of alternative transportation fuels by state, reviewed options for alternative fuel use in emergencies, and provided recommendations to overcome barriers in the region. Myers served as one of the primary researchers and authors of the report. 2014-2015.

Biofuel Infrastructure Review—U.S. Department of Energy, Office of Electricity Delivery and Energy Reliability, Washington, DC. Served as technical expert. ICF prepares an annual Year-in-Review summary of significant energy disruptions, major energy events, and infrastructure changes that occur in the United States based on information reported through the year in the Energy Assurance Daily. Myers prepared an overview of supply disruptions, major infrastructure updates, and policy review of all stories related to biofuels. 2014-2015.

State and Federal Alternative Fuels Laws and Incentives Database Update—National Renewable Energy Laboratory (NREL), Golden, CO. Serve as project manager. Along with a team of clean-transportation experts provide monthly updates for NREL's existing online database of state and federal alternative fuel laws and incentives and identify new laws and incentives. This project requires extensive research that spans government legislative, state energy office, and private utility websites. Additionally Myers is responsible for editing existing text and writing new descriptions of the legislation and incentives in plain English to facilitate easy comprehension. 2011–present.

Support for Southeast Alternative Fuels Conference and Expo—North Carolina Solar Center, Raleigh, NC. Served as deputy project manager. ICF assisted with the event management activities of the first Southeast Alternative Fuels Conference held in Raleigh, North Carolina in September 2014. Myers provided assistance with agenda development, speaker identification, exhibitor and sponsor management and communication, and assisted with event logistics. 2013-2014.

Alternative Fuel Analysis, Assessment of Hawaii Refinery Closure— State of Hawaii, Hawaii. Served as analyst. ICF served as the lead consultant to the Hawaii Refinery Task Force under Governor Abercrombie to assess the impact on Hawaiian energy markets following the potential closure of one of the State's two oil refineries. The refinery's subsequent sale altered the scope of work to focus on the economic viability of the refining assets in Hawaii. ICF investigated the major implications for continued refining operations, the impact of a complete closure in refining capacity, the ability of supply infrastructure to import product, the development of alternative sources of power generation and fuel supply, and recommendations to help ensure future energy stability. Ms. Myers provided analysis on the availability of alternative fuels, such as biodiesel and ethanol, and the opportunity for advanced vehicle technologies, such as plug-in electric vehicles, to reduce oil demand. 2013-2014.

Renewable Energy

Utility-Scale Solar System Policy Analysis—Hudson Energy Development, LLC, Albany, NY. Served as project manager. ICF provided policy and technical support to Hudson through strategic discussions, research activities, meeting preparation, and general inquiries and activities to identify solar energy opportunities in South Carolina. Myers assisted the client with policy analysis, engaged with large in-

state end-users, obtained information from in-state utilities, and identified potential site locations for utility-scale solar installations. 2014.

Green Power Partnership Support—U.S. Environmental Protection Agency, Washington, DC. Served as project manager. Ms. Myers worked to support EPA's Green Power Partnership through policy research and writing to promote the purchase and environmental value of voluntary Renewable Energy Certificate's (RECs). Ms. Myers provided policy research and writing assistance to the Green Power Partnership through participation in programs such as the World Resources Institute's initiative to create an international greenhouse gas emissions accounting standard for voluntary REC markets. 2013-2014.

External Renewable Energy Guidelines—National Park Service, Washington, DC. Served as project manager. Provided assistance to the Sustainable Operations Plans and Program Division and the Energy Systems Working Group of the National Park Service on the development of an external renewable energy guidance document for staff and stakeholders as proposed renewable energy projects adjacent to park lands are considered. The *Guidance for Addressing External Renewable Energy Projects and Related Infrastructure* included and overview of renewable energy technologies, regulatory considerations, potential impacts of utility-scale projects, authorization for engagement, and mitigation options and actions. 2013-2014.

Grant Administration and Policy Development

Grant Development and Administration—South Carolina Energy Office, SC. Served as coordinator and manager of renewable energy programs over this period. Developed and administered two state renewable energy grants, including the Renewable Energy and Advanced Vehicle Technology Program, a $3,300,000 grant program that deployed 12 renewable energy projects and the South Carolina Renewable Energy Grant and Loan program, facilitating the award of 23 grants totaling $2,650,000 for research and demonstration projects.

Policy Development and Implementation—EHM Energy Consulting/South Carolina Energy Office, SC. Served as manager of renewable energy programs. Approved over $15 million in state tax credits and issued $2.6 million in state grants in a three-year period for clean energy legislation she helped to develop. Among the more notable policies was South Carolina bill H.3649, The Energy Freedom and Rural Development Act. Myers also managed the creation of the South Carolina Clean Energy Business Alliance, a 501(c)(3) organization representing the clean energy sector and advocating for progressive policies on clean energy. 2006–2011.

PUBLICATIONS

Myers, EH; Noblet, S. 2015. Five U.S. Alternative Fuel and Advanced Vehicle Trends to Watch. ICF International White Paper. Washington, D.C.

Myers, EH; Sheehy, P. 2015. Study of the Transportation of Alternative Fuels in and around Massachusetts. Prepared for the Massachusetts Department of Energy Resources. Boston, MA.

Myers, EH; Bernazzani, P; Jamis, A; Lam, J; Steuer, C. 2014. Guidance for Addressing External Renewable Energy Projects and Related Infrastructure. Prepared for the U.S. Department of the Interior, National Park Service. Washington, D.C.

Myers, EH; Forni, S; Mehta, T; Mulligan, J; O'Conner, T. 2014. Biomass-Based Diesel and Heating Fuel Substitute Opportunities in New York City. Prepared for the New York City Mayor's Office of Long-term Planning and Sustainability. New York.

Mary Arzt — Sharp & Company, Inc.

Graphics and Communications Support

As winner of numerous national and international awards including ADDYs, Tellys, the International TV and Radio Gold Award, and the Best of Baltimore, Ms. Arzt has demonstrated expertise in all areas of creative direction including communication strategy and project implementation. She is a partner at Sharp & Company and has worked professionally for over 35 years, earning a reputation for exceptional creative work and management skills. Ms. Arzt's communication and creative expertise is broad, ranging from development of communication strategies to the design and production of outreach materials that convey clients' messages clearly and build support. She is an expert in conveying technical information clearly to widely varying constituencies. She is an effective supervisor and manager of creative teams, has excellent budget and schedule management skills, and is proficient in developing and implementing quality assurance protocols for creative and production processes. Ms. Arzt is deft at directing the development of creative materials, including both print and electronic media, such as factsheets, graphics (tables, charts, and photographic images), documents, videos, and Web content.

Years of Experience

- Professional start date: 1979

Education

- BFA, Graphic Design, University of Florida, Gainesville

AREAS OF EXPERTISE

- Communication strategy
- Design and production of outreach materials that convey clients' messages clearly and build support
- Creative supervision and management
- Conveying technical information clearly to a wide constituency
- Creative direction for print and electronic media
- Excellent budget and schedule management skills
- Developing and ensuring quality assurance protocols for creative and production processes

WORK EXPERIENCE

Montgomery County/MWCOG Street Smart Pedestrian Safety Marketing Campaign. To increase pedestrian safety awareness, Ms. Arzt is leading a highly successful pedestrian safety public outreach campaign that included the creation and development of special curb markings along the segment of Piney Branch Road, an area with the highest number of pedestrian collisions in the County. The markers indicate where it is safe and not safe for pedestrians to cross the street. County Executive Ike Legget joined State, local, and regional leaders in commemorating the installation of the curb markers. After their installation, pedestrian collisions decreased by 50%.

BWI Thurgood Marshall International Airport Long-Range Needs Assessment. Sharp & Company provided public outreach and communication services for the airport's long range planning, environmental planning, and terminal and intermodal planning process. This engagement, which lays the groundwork for future airport growth, comprised of the development of public information dissemination strategies, creative direction and production of public outreach and stakeholder materials

and activities. Working with hundreds of planning and research documents, Ms. Arzt devised a set of public materials that examine critical planning areas. This hybrid document – more comprehensive than a standard executive summary – provided solid information without overwhelming the audience with too much background material. Each planning area has a separate document that is self-standing but can also be read as part of the complete set. BWI considers this one of its best public documents and a model to be used for future public outreach.

DC Department of Transportation (DDOT) DC Circulator Transit Development Plan. Ms. Arzt oversaw all aspects of design and production for numerous presentation materials produced, including the redesign of technical documents for general and public elected officials. To ensure continuous public awareness and involvement in the study, Ms. Arzt created a web presence for the plan. Among the creative outreach approaches utilized was the development of a dynamic video to encourage public participation.

Virginia Department of Rail and Public Transportation (DRPT) Statewide Rail Plan. Ms. Arzt provided all creative direction for this project, including managing art direction, supervising illustrators, and managing workflow to ensure timely delivery and consistent messaging. Ms. Arzt determined the visual design for the Plan based on the copy developed, assuring that it reflected DRPT's image. Numerous graphics were re-conceived to eliminate extraneous information and focus on clearly making the point. This was especially true in the section devoted to outlining specific projects. Ms. Arzt devised a graphic iconography that was used to quickly encapsulate the specific benefits of a project, enabling easier comparison of them. AASHTO cited this work as a best practice for communicating to stakeholders in statewide rail plans.

DRPT Statewide Public Transportation Plan. For the second statewide plan developed by DRPT, Ms. Arzt directed design, layout, and production, making sure that the graphic integrity was maintained. The product was visually and creatively interesting as well as being user friendly.

DRPT Try Transit Week. Six years ago, DRPT determined that it needed to draw more attention to its efforts to reduce single occupancy vehicle (SOV) use. Try Transit Week was launched as a weeklong event that encouraged the public to try alternatives to their SOV. Ms. Arzt developed the brand identity so that is stood on its own but could also be co-branded with regional transportation providers who participate in the program. For five years, Ms. Arzt managed the development of all creative materials including website design and development, print and internet advertising, all writing and visitor tracking.

VDOT I-66 Multimodal Study. Ms. Arzt led the design and creation of a consensus building study identifier and website, creating a resource for citizens to find important study information and provide their feedback. The website has given the community a place where their ideas and opinions have been documented by VDOT. All of the suggestions will be considered and many will be incorporated into the final recommendations. Ms. Arzt has also been vital in the creation the factsheets, designing the layout, and developing all the graphics such as tables, charts, and photographic images.

APPENDIX B: DBE PARTICIPATION PLAN AND CERTIFICATES

ICF has proposed DBE subcontractor involvement that exceeds the COG established goal of 19% for this project. Our project plan involves DBE subcontractors for **over 20% of the total value of the contract**, as demonstrated below.

DBE SUBCONTRACTOR		PERCENTAGE OF CONTRACT
Subcontractor: Mondre Energy, Inc.		**15.16%**
Address: 1800 John F. Kennedy Blvd., Suite 1504, Philadelphia, PA 19103		
Certifying State: Maryland	DBE Certification #: 01-163	
Subcontractor: Sharp & Company, Inc.		**4.87%**
Address: 794 Nelson Street, Rockville, MD 20850		
Certifying State: Maryland	DBE Certification #: 08-142	

The DBE certificates for the firms follow.

Maryland Department of Transportation
The Secretary's Office

Martin O'Malley
Governor

Anthony G. Brown
Lt. Governor

James T. Smith, Jr.
Secretary

July 17, 2014

JUDITH MONDRE
MONDRE ENERGY, INC.
1800 JOHN F. KENNEDY BLVD., SUITE 1504
PHILADELPHIA, PA 19103

Certification No. 01-163

Dear JUDITH MONDRE:

We are pleased to inform you that your company has been found eligible to continue its certification as a Minority Business Enterprise (MBE), Disadvantaged Business Enterprise (DBE), Small Business Enterprise (SBE), and/or Airport Concessions Disadvantaged Business Enterprise (ACDBE) effective July 17, 2014.

Your firm remains certified for the services for which you have been approved and officially notified in writing. Your current certification status can be found in the Maryland Department of Transportation's (MDOT) Directory of Certified MBE/DBE/SBE/ACDBE Firms available online at http://mbe.mdot.state.md.us/directory. MDOT's online directory is the official record of your firm's certification status. It is important that you carefully review the accuracy of your listing in the Directory. If you have any questions about your firm's certification status, contact MDOT's Office of Minority Business Enterprise (OMBE) immediately at 410-865-1269 or 1-800-544-6056.

If you wish to expand the area(s) of work for which your firm is currently certified, you may request an **Expansion of Services**. The application for expansion of services can be found at http://www.mdot.maryland.gov/Office of Minority Business Enterprise/ExpansionCover.html Please submit your application request to:

Maryland Department of Transportation
Office of Minority Business Enterprise
7201 Corporate Center Drive
Hanover, MD 21076
410-865-1309 (fax) or mbe@mdot.state.md.us

Your firm must be recertified annually in order to maintain its certification. We will contact you when it is time to begin the next recertification process.

Sincerely,

Randy Reynolds
Director, Minority Business Enterprise

Maryland Department of Transportation
The Secretary's Office

Martin O'Malley
Governor

Anthony G. Brown
Lt. Governor

James T. Smith, Jr.
Secretary

December 29, 2014

MARY ARZT
SHARP & COMPANY, INC.
794 NELSON STREET
ROCKVILLE, MD 20850

Dear MARY ARZT (cert # 08-142):

We are pleased to inform you that your company has been found eligible to continue its certification as a Minority Business Enterprise (MBE), Disadvantaged Business Enterprise (DBE), Small Business Enterprise (SBE), and/or Airport Concessions Disadvantaged Business Enterprise (ACDBE) effective December 29, 2014.

Your firm remains certified for the services for which you have been approved and officially notified in writing. Your current certification status can be found in the Maryland Department of Transportation's (MDOT) Directory of Certified MBE/DBE/SBE/ACDBE Firms available online at http://mbe.mdot.state.md.us/directory. MDOT's online directory is the official record of your firm's certification status. It is important that you carefully review the accuracy of your listing in the Directory. If you have any questions about your firm's certification status, contact MDOT's Office of Minority Business Enterprise (OMBE) immediately at 410-865-1269 or 1-800-544-6056.

If you wish to expand the area(s) of work for which your firm is currently certified, you may request an Expansion of Services. The application for expansion of services can be found at http://www.mdot.maryland.gov/Office of Minority Business Enterprise/ExpansionCover.html Please submit your application request to:

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410-865-1309 (fax) or mbe@mdot.state.md.us

Your firm must be recertified annually in order to maintain its certification. We will contact you when it is time to begin the next recertification process.

Sincerely,

Randy Reynolds
Director, Minority Business Enterprise

ATTACHMENT B
CERTIFICATION REGARDING
DEBARMENT, SUSPENSION, AND OTHER
RESPONSIBILITY MATTERS

The prospective vendor certifies to the best of its knowledge and belief that it and its principals:

- Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
- Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any department or agency of the District of Columbia, State of Maryland or the Commonwealth of Virginia or any of the 22 jurisdictions comprising the membership of the Metropolitan Washington Council of Governments (COG);
- Have not within a three year period preceding this date been convicted of or had a civil judgment rendered against them for commission of fraud or criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
- Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State or local) with commission of any of the offenses enumerated above of this certification; and
- Have not within a three-year period preceding this date had one or more public transactions (Federal, State or local) terminated for cause or default.

Vendor understands that a false statement on this certification may be grounds for rejection of any submitted proposal or quotation or termination of any award. In addition, under 18 USC Sec. 1001, a false statement may result in a fine of up to $10,000 or imprisonment for up to 5 years, or both if federal funds are being used to support the procurement.

ICF Resources, LLC

Typed Name of Vendor

Jodi Young, Contract Manager

Typed Name & Title of Authorized Representative

Jodi Young 02-26-2015

Signature of Authorized Representative Date

ATTACHMENT C
CONTACT INFORMATION SHEET

(THIS PAGE MUST BE COMPLETED AND SUBMITTED WITH THE PROPOSAL)

RFP/RFQ No.: 15-010 Federal Tax ID No.: 54-1500263

Name of Offeror: ICF Resources, LLC

Address of Offeror: Farragut Center, 1725 I Street, N.W., 10th Floor, Washington, DC 20006

Telephone No: 202-862-1200 Fax No.: 202-862-1144 Website: www.icfi.com

Name of Authorized Representative: Jodi Young, Contract Manager

Mailing Address (If different from Above): PO BOX 654 (regular mail) or 1742 Alice Drive (for delivery), Penngrove CA 94951

Telephone No.: 707-992-0768 Mobile No.: _____ Other: _____

Email Address: Jodi.Young@icfi.com

Name of Contact Person for this RFP/RFQ: Michael Grant

Title of Contact Person: Vice President

Telephone No.: 202-862-1211 Mobile No.: _____ Other: _____

Email Address: Michael.Grant@icfi.com