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

REQUEST FOR PROPOSAL
RFP No. 15-010

March 6, 2015

Submitted to:
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Reference: Multi-Sector Approach to Reducing Greenhouse Gas Emissions in the Metropolitan Washington Region, RFP No. 15-010

Mr. Hohmann:

CNA is pleased to present the attached proposal in response to the Metropolitan Washington Council of Governments (COG) Request for Proposal (RFP) Number 15-010, for a Multi-Sector Approach to Reducing Greenhouse Gas Emissions in the Metropolitan Washington Region.

CNA is a not-for-profit research and analysis organization and a nationally recognized expert in energy, water, and climate issues. We are based in the metropolitan Washington area, and we have substantial relevant experience in the National Capital Region (NCR). For example, we are working with COG to conduct exercises focused on the resilience of the power sector in the National Capital Region. In addition, we have supported four National Capital Region Emergency Preparedness Council Senior Leader Seminars (SLSs). Importantly, CNA designed, conducted, and evaluated the 2009 NCR workshop and SLSs that explored issues around a heat wave and associated power disruption.

CNA has teamed with RSG, a premier firm known for its greenhouse gas reduction transportation modeling, climate, energy, and environment work; Temoss, a disadvantaged business enterprise (DBE) and a firm that has expertise in land use planning in the NCR; and IME, another DBE, will provide COG with the support needed to facilitate consensus with COG and its committees. Our team brings more than 70 years of experience providing comprehensive climate change, transportation, and energy support to local, state, regional, and federal government agencies, as well as the private sector. Our team will be led by Prasad Nerikar, who has more than 25 years of professional experience and a strong background in environmental policy issues. He is supported by a team of qualified and respected subject matter experts in transportation modeling, energy and environment, and land use planning related to greenhouse gas reduction strategies. Our team has the expertise and experience to meet all of COG's requirements identified in the RFP.

We accept all terms and conditions in the RFP. Please contact Nicholas Hunter, Director of Contracts and Procurement, at 703-824-2082, or via e-mail at huntern@cna.org, with any questions or if we can provide additional information. We are fully committed to supporting the objectives of this important contract. Thank you for considering our proposal.

Sincerely,

Timothy L. Beres
President, Institute for Public Research
CNA

Table of Contents

Chapter 1: Qualifications of the Offeror and Personnel

The Metropolitan Washington Council of Governments (COG) and the jurisdictions in the National Capital Region (NCR) have supported numerous planning efforts, conducted many analyses, and recommended a variety of approaches to address climate, energy, transportation, and environmental issues. To build upon this work and support further analyses and recommendations to COG's Multi-Sector Working Group (MSWG) to address reductions of greenhouse gas (GHG) emissions, CNA has assembled a team of regionally- and nationally-recognized experts in the energy, environment, transportation, and land-use arenas from the region's leading contractors in these fields to support a comprehensive approach that will meet the key challenges of COG's MSWG needs. Our approach is straightforward: assemble an industry-leading team of companies and proven professionals that have the ability to: 1) coordinate multijurisdictional analyses in the each of the MSWG Sector Subgroups, 2) engage COG leaders, and 3) recommend proven methodologies for addressing the GHG emission reduction challenges that COG faces over the next 40 years. The CNA Team is the right partner to support COG and its NCR partners in this effort because:

- We bring substantive knowledge of energy priorities and initiatives in the NCR from current experience supporting COG and its NCR partners.
- We have a proven track record of managing similar multijurisdictional assessments and recommendations for regional urban areas and urban jurisdictions.
- We have selected a team of highly qualified and reputable professionals with proven experience successfuly supporting projects in the NCR, and supporting other multijurisdictional efforts of similar scope and nature nationally.

The CNA Advantage

With our experience developing similar GHG reduction action plans for other regions in the country, we know the challenges that developing such a plan entails, and we have found ways to overcome them.

In the section that follows, we discuss CNA's professional credentials and expertise, our teammates' qualifications, and the experience and expertise of our proposed key personnel.

Qualifications of the CNA Team

The CNA Team includes four organizations: CNA; RSG, Inc.; Temoss, LLC; and IME, Inc. Our team members have complementary capabilities and through the depth and breadth of skills and experience held by our team members, we will be easily able to meet the requirements of this SOW.

In building our team, we looked for three primary capabilities: expertise in energy, environmental, transportation, and land-use issues related to GHG emission reduction strategies; applying that expertise in

CNA Team Members

- **CNA**, a not-for-profit, 501(c)(3) research and analysis organization with a dynamic energy, water, and climate practice
- **RSG, Inc.,** a multidisciplinary air modeling firm with specialization in air and GHG assessments and dispersion modeling
- **Temoss, LLC.,** a DBE firm with expertise in land-use and transportation modeling and scenario development
- **IME, Inc.,** a DBE firm with COG and NCR expertise with facilitators skilled and trained in consensus building

multi-jurisdictional overlapping scenarios, and; experience in analyzing and quantifying benefits, costs, co-benefits, and implementation timeframes for the GHG reduction strategies.

Professional Credentials and Expertise of the CNA Team

The CNA Team was brought together specifically based on our understanding of the Scope of Work and based on the positive and long-term relationships of the individual team members with COG and/or the NCR. We understand the unique regional characteristics of the NCR, including the environmental challenges and opportunities it faces.

This section highlights each firm's credentials and qualifications. The section that follows highlights the key personnel from each firm who are proposed for this Multi-Sector Greenhouse Gas Emission Reduction Strategies effort.

CNA will provide contract oversight and technical expertise in the energy/environment and land use sector subgroups.

Founded in 1942 and headquartered in Arlington, Virginia, CNA is a not-for-profit, 501(c)(3) research and analysis organization with strong, wide-ranging experience providing objective, evidence-based analysis to inform policy, planning, and operations at every level of government. CNA takes a multidisciplinary, field-based "real-world" approach to our work, providing policymakers and other stakeholders the tools and information they need to tackle today's complex challenges. Our research staff—the vast majority of whom have advanced degrees—includes a diverse mix of mathematicians, engineers, physicists, economists, and subject matter experts in energy, water, climate, healthcare, public health, emergency management, and homeland security.

CNA's Energy, Water, and Climate division will manage this contract. A core emphasis of the division's work is examining the complex linkages between energy, water, and climate, as well as their implications for a secure, climate-friendly energy future. A core competency of the division is analysis of the energy-water nexus, including gaining greater insight into the comprehensive impacts of hydraulic fracturing (or "fracking"), and examination of how climate impacts will drive conventional and renewable energy production in the United States.

The division's other environmentally-focused work includes, most significantly, analysis of energy and national security, which is conducted by our Military Advisory Board (comprised of 14 3- and 4-star retired admirals and generals); climate change and its implications for the operations of the Navy and Marine Corps; the impact of naval operations on marine mammals; strategies to reduce energy and water use at Department of Defense installations; and the impact of climate change on water security and conflict in Asia. The divison's other competencies include emergency preparedness planning, assessment, and analysis for emergency management, public health, healthcare, and law enforcement institutions across the country.

RSG will provide transportation modeling expertise for this project.

Since its founding by Dartmouth professors in 1986, **RSG** has provided actionable insights through the skilled application of advanced, creative, and customized techniques and tools to serve a broad portfolio of public- and private-sector clients locally, regionally, nationally, and internationally. RSG is a 100% employee-owned company, and has been honored with several national workplace excellence awards. RSG is headquartered in White River Junction, Vermont, and has additional offices in Arlington, Virginia and elsewhere across the U.S. RSG has creatively applied state-of-the-art modeling and analytics to transportation planning, environmental management, and custom software development, enabling organizations to better make critical decisions with confidence.

RSG's Air Quality and Greenhouse Gas Assessments Experience - RSG's air quality analysts help clients evaluate greenhouse gas emissions from both mobile and stationary sources to understand and achieve compliance with complex air pollution control regulations. At a macroeconomic level, RSG creates tools that allow policymakers to evaluate the impact of certain policy changes (for example, land-use and road improvements) on air quality. At the microeconomic level, RSG works on specific projects that include mobile (that is, vehicles) and stationary (for example, smokestacks) sources. RSG is a national leader in the use of the EPA's MOVES model for analyzing the impact of mobile emissions—an ability that enables us to provide excellent supporting analysis for Congestion Mitigation Air Quality (CMAQ) grant applications. In addition, RSG's work includes permitting and calculating avoided emissions, or lifecycle emissions, reductions due to the use of renewable energy sources.

RSG's Dispersion Modeling Experience - RSG's customized dispersion models simulate how air pollutant emissions from mobile and stationary sources are dispersed in the atmosphere and how they concentrate near adjacent activity centers, reflecting topography, land-use, buildings, roads, weather, etc. RSG excels at integrating these models into other analyses to help clients design and operate projects compliant with air quality standards. RSG often integrates air dispersion models with traffic activity models and mobile emissions models for transportation applications.

RSG's extensive experience with traffic modeling, from the regional to microsimulation levels, enables us to integrate the appropriate level of traffic activity data into mobile emissions models, such as EPA's MOVES model for conducting a regional- or project-level conformity analysis, or for supporting air quality analysis for the National Environmental Policy Act (NEPA). For conformity analyses, emission rates from MOVES are input into air dispersion models, such as AERMOD or CALQ3HC. These modeling techniques inform the planning and design process on the likely local air quality impacts of proposed transportation changes, such as a new connector road or a change in intersection control.

Temoss, LLC provides land-use, transportation, urban, and transit planning, traffic engineering and impact studies, and transportation management

consultancy services to clients throughout the Washington, D.C. and Baltimore metropolitan areas. Temoss is certified by the Maryland Department of Transportation (DOT) as a Disadvantaged Business Enterprise (DBE), Small Business Enterprise (SBE), and Minority Business Enterprise (MBE), and is also a participant in the Small Business Reserve (SBR) program.

Temoss will provide land use planning expertise for this project.

Temoss has reviewed area master plans, and Metro Purple Line station area sector plans and functional plans. Temoss possesses deep knowledge of and experience in conducting Travel Demand Management (TDM)/Transportation Management Plan (TMP) coordination and implementation, multi-modal transportation accessibility planning (including transit and bikeshare/carshare), long-range countywide transportation policy, and long-range regional facility planning studies.

IME is a professional management consulting firm that provides expertise in the energy sector, public safety, personnel/asset/infrastructure protection, and emergency management solutions for state, local, and federal government agencies, as well as commercial entities. IME brings extensive experience working with the COG and NCR member jurisdictions and has recently supported preparedness projects for the District; Fairfax County, Virginia; COG; Prince George's County, Maryland; and the Commonwealth of Virginia. Over the past five years, CNA and IME have collaborated on preparedness training and exercises for the NCR, having supported the development and execution of the 2009, 2010, and 2013 NCR Emergency Preparedness Council Senior Leaders Seminars. IME is currently supporting the COG's Energy Exercise project. IME also possesses extensive experience supporting emergency preparedness initiatives across the NCR, including the Regional HIRA.

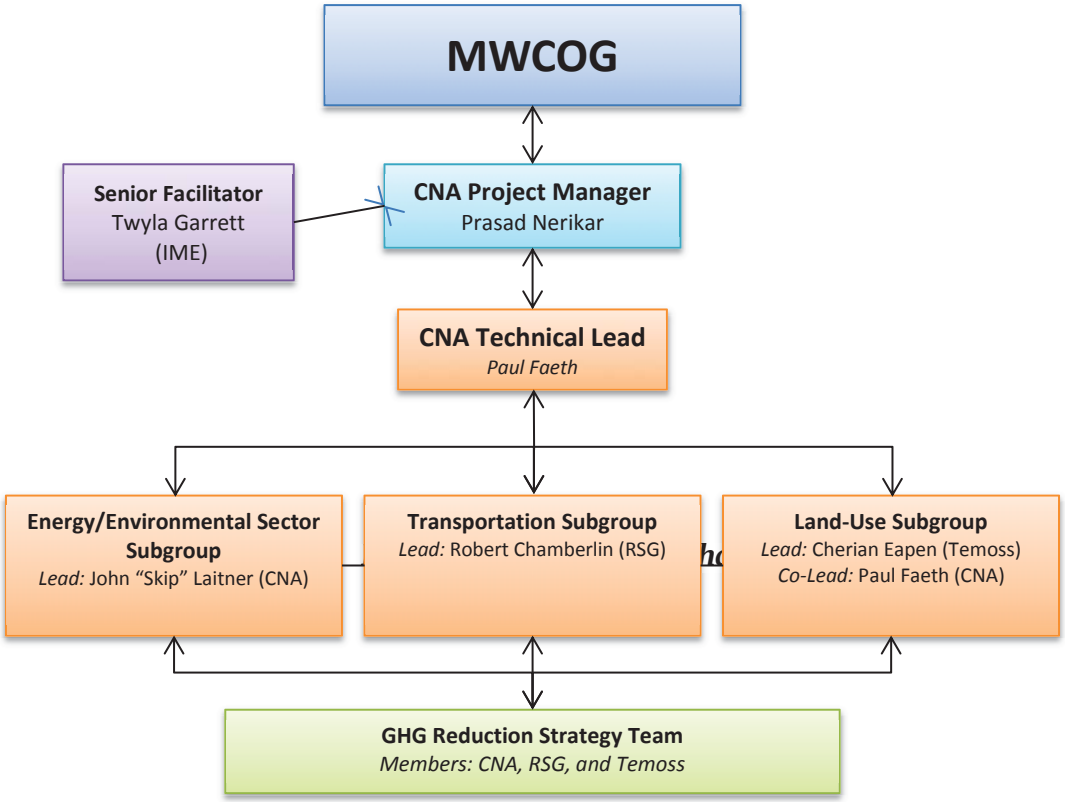
IME will provide consensus building and facilitation expertise for this project.

Key Personnel: Qualifications, Credentials, and Availability

In this section, we describe our proposed key personnel, who we selected because of their experience and expertise with multi-jurisdictional energy, environment, transportation, and land-use issues.

The CNA Team's proposed Project Manager, **Prasad Nerikar**, will direct all program activities and seamlessly integrate the activities and input of all team members. Mr. Nerikar will coordinate the work of the other key personnel identified in the organization chart (*Figure 1*) below.

Figure 1: Organization Chart



Supporting Mr. Nerikar are key personnel who will provide the expertise required for GHG Reduction Strategy Project. In *Table 1*, we describe the roles and qualifications of our proposed key personnel, including availability and their directly relevant experience. Full resumes of key personnel are found in (Attachment D).

Table 1: CNA Team Key Personnel Roles, Availability, and their Directly Relevant Experience

Prasad Nerikar (CNA), Project Manager	
Primary Role: Mr. Nerikar's primary role under this contract will be to manage the implementation and successful completion of the Multi-Sector GHG Reduction Strategy project. He will ensure that the project addresses the requirements identified in the SOW.	
Availability to the Project: 30%	
Value to This Project ✓ Environmental policy experience having supported federal, state, and local entities ✓ Project management experience environmental policy contracts and projects	**Directly Relevant Experience** ✓ Over 20 years of robust, proven project management expertise ✓ Over 25 years of environmental policy and rulemaking experience, having supported EPA's chemical emergency and oil programs, Superfund policy, water and air issues
Summary of Experience: Prasad Nerikar has over 20 years of project management	

experience with emphasis in environmental and emergency management arenas. He has managed over 10 small and large scale contracts with complex technical analyses and shortened time schedules for local, state, and federal entities. These contracts required committed staff ranging from 5 to over 50 professionals. Mr. Nerikar has managed delivery of over 12,000 deliverables. Each of these types of contracts and their associated projects were completed on time and within budget.

Paul Faeth (CNA), Senior Engineer and Greenhouse Gas Reduction and Co-benefits Subject Matter Expert

- ✓ **Primary Role:** Mr. Faeth's primary role on this project will be to provide greenhouse gas reduction and co-benefits subject matter expertise and serve as a co-lead for the land use sector subgroup.
- ✓ **Availability to the Project:** 25%

Value to This Project	Directly Relevant Experience
✓ Strong knowledge of modeling policies and how they affect GHG mitigation, costs, air quality, and water use in the electric power sector ✓ Significant experience evaluating land-use change and its impacts on multiple effects, including nutrient loading and water quality, air quality, forest fragmentation, and health risks	✓ 30 years of experience working on and managing policy analysis concerning economics and the environment ✓ Developed innovative power sector modeling to conduct case studies in China, India, France, and Texas. The results showed that there are positive synergies among water use for cooling, conventional air pollutants, and greenhouse gas mitigation.

Summary of Experience: Paul Faeth is Director, Energy, Water and Climate for CNA's Institute for Public Research, where he manages a program of work exploring the policy synergies between these themes. He has 30 years of experience working on and managing policy analysis concerning economics and the environment. His current work focuses on the impacts of EPA's Clean Power Plan on carbon dioxide reduction, air quality gains, and water use; the energy-water nexus in the power sectors of Texas, China, France, and India; the environmental impacts of fracking; the co-benefits of land-use change and conservation; and the impact of climate change on water security in Asia. Prior to joining CNA, Faeth was the President of Global Water Challenge, a coalition of 24 corporations, NGOs, foundations, universities, and health agencies, working together to promote and invest in safe drinking water and sanitation for the poor in developing countries.

John 'Skip' Laitner (CNA): Senior Economist

Primary Role: Mr. Laitner will lead the energy/environmental sector subgroup and provide subject matter expertise in GHG reduction strategies and associated co-benefits.

Availability to the Project: 40%

Value to This Project	Directly Relevant Experience
✓ More than 40 years in the environmental, energy and economic policy arenas. ✓ Expertise includes: benefit-cost assessments, behavioral assessments,	✓ Served as Director of Economic and Social Analysis for the American Council for an Energy-Efficient Economy (ACEEE) from June 2006 to August 2012

resource costs and constraints, and the net employment and macroeconomic impacts of energy.	✓ Served as the Chief of the Research Division for the Nebraska Energy Office from1983 to 1986.

Summary of Experience: Mr. Laitner currently serves as a Senior Fellow for CNA and the American Council for an Energy-Efficient Economy (ACEEE), where he was formerly Director of Economic and Social Analysis. Mr. Laitner has more than 40 years of involvement in the environmental, energy, and economic policy arenas. His expertise includes benefit-cost assessments, behavioral assessments, resource costs and constraints, and the net employment and macroeconomic impacts of energy and climate policy scenarios. His most immediate research, building on the work of Robert U. Ayres and Benjamin Warr, is to examine the links between energy inefficiency and a productive economy. In a new book chapter, Laitner provides a time series dataset that suggests the United States may be only 14-percent energy efficient, and that it is this level of inefficiency that may constrain the future development of a more robust economy.

Robert Chamberlin (RSG): Senior Engineer

✓ **Primary Role:** Mr. Chamberlin's role is to lead the Transportation Sector Subgroup and provide subject matter expertise in GHG reduction strategies and co-benefits.

✓ **Availability to the Project:** 50%

Value to This Project	Directly Relevant Experience
✓ Well-versed in applying the Federal Highway Administration's Energy and Emissions Reduction Policy Analysis Tool (EERPAT) ✓ Expertise applying mobile emissions models for project evaluation, air quality conformity, and greenhouse gas policy development	✓ 25 years of experience in developing software and hardware solutions to traffic-flow problems related to mobile environmental impacts ✓ Strong transportation air quality and monitoring expertise

Summary of Experience: Robert Chamberlin, Senior Director of Resource Systems Group, Inc.'s transportation air quality practice, is an expert on land-use and multimodal mitigation of mobile-source air quality problems. He is an early innovator in the use of the Environmental Protection Agency's (EPA) Mobile Vehicle Emission Simulator (MOVES) model for regional-and project-level conformity analysis. He recently completed pilot projects with State Departments of Transportation to develop policies for reducing transportation-generated greenhouse gas emissions and to implement the Federal Highway Administration's Energy and Emissions Reduction Policy Analysis Tool (EERPAT).

Cherian Eapen (Temoss): Land-use Subject Matter Expert

Primary Role: Mr. Eapen's primary role on this contract is to provide land use subject matter expertise.

Availability to the Project: 30%

Value to This Project	Directly Relevant Experience
✓ Proven land-use planning and analysis subject matter expertise ✓ Has provided comprehensive	✓ Over 22 years of experience in transportation, urban, transit, regional, land use, and multi-modal accessibility

transportation planning support of area master plans and sector plans, functional plans, and multi-modal transportation planning	planning, and traffic engineering – in both the private and public sectors ✓ Former Senior Transportation Engineer in Massachusetts and Senior Transportation Planner in Maryland

Summary of Experience: Mr. Cherian Eapen is a Professional Transportation Planner (PTP) with over 22 years of experience in transportation, urban, transit, regional, land-use, and multi-modal accessibility planning, and traffic engineering – in both the private and public sectors. Most recently, Mr. Eapen was with the Maryland-National Capital Park and Planning Commission (M-NCPPC) and provided comprehensive transportation planning support to the Montgomery County Planning Board on area master plans and sector plans, functional plans, reviews of subdivision, and multi-modal transportation planning including bringing Bikeshare to Montgomery County, long-range countywide transportation policy, and long-term regional facility planning studies.

Twyla Garrett (IME): Senior Facilitator	
✓ **Primary Role:** Ms. Garrett will facilitate meetings to help build consensus on specific GHG reduction strategies.	
✓ **Availability to the Project:** 20%	
Value to This Project ✓ Skilled facilitator with first-hand experience working with COG and other NCR clients.	**Directly Relevant Experience** ✓ Substantial experience providing facilitation support to COG and numerous other clients, both in the NCR and across the country

Summary of Experience: Since starting IME in 2000, Garrett has facilitated more than 25 tabletop and field exercises conducted in every Federal Region in the US. She also has facilitated COOP exercises for DC Government, and Hampton Roads, Virginia. Other clients include FEMA; DHS; the Government of the District of Columbia; the Maryland Governor's Office of Homeland Security; and the Metropolitan Washington Council of Governments.

Chapter 2: Scope of Work

Understanding the Problem

In response to growing concerns about the risks of climate change, the Metropolitan Washington Council of Governments (COG) called for the voluntary adoption of a greenhouse gas (GHG) reduction goal to cut emissions by 80 percent, relative to 2005, by 2050. This regional compact seeks to do more than just cut emissions, by also creating "a more accessible, sustainable, prosperous, and livable National Capital Region."

The CNA Team understands that the purpose of this project is to support MSWG in developing a GHG action plan for the region that achieves the reduction goal cost-effectively, maximizes potential economic and environmental benefits, and is implementable.

Due to our experience developing similar GHG reduction action plans for other regions in the country, we know the challenges that developing such a plan entails, and we have found ways to overcome them. We also know that substantial co-benefits can be realized from an aggressive plan in sometimes surprising ways. Our recent work in Texas, for example, shows that actions taken to cut carbon dioxide emissions would also substantially reduce the dependence of the power sector on water for cooling. For a state facing blackouts because of the worst drought in decades, this is welcome news.

The CNA Team Difference:

- Proprietary energy model for estimating economic growth from GHG reduction
- Comprehensive examination of a broad category of co-benefits
- Diversity and depth of subject matter expertise
- Strong DBE representation and participation

Our proposed approach will enable us – and, by extension, COG – to quantify potential economic growth benefits in the NCR as well as quality of life and environmental improvements associated with various GHG reduction strategies.

Of substantial benefit to COG, we propose to apply a proprietary energy model that can estimate the regional benefits to economic growth and employment from the adoption of energy conservation, renewable energy investments, and other GHG reducing options. We will adapt the model for the NCR to generate accurate projections of economic growth and employment based on individual GHG reduction strategies and for portfolios of strategies.

We also propose to estimate the co-benefits of sectoral GHG reduction strategies, providing a comprehensive examination of a broad category of benefits including air quality, congestion, water quality, water use, and energy resilience. We will estimate these co-benefits by accessing information already provided by the energy and transportation models we will apply, by adapting the models to generate additional information, and by undertaking ancillary analysis using information extracted from the models.

The analysis we will deliver in support of MSWG's charge to develop a regional GHG action plan will provide a basis to identify a portfolio of strategies that:

1. Collectively meet the goal of cutting GHG emissions by 80 percent by 2050;
2. Do so cost-effectively;
3. Specify targets for the transportation, land-use, energy, and built environment sectors;
4. Provide the greatest economic growth and employment benefits for the region, thereby enhancing prosperity;
5. Create a broad set of co-benefits that improve regional accessibility and sustainability, and also garner public support;
6. Identify actions that COG members can take to directly reduce GHGs; and
7. Identify the gaps where COG can encourage federal investments and policy changes.

Project Tasks

Task 1: Finalize Contractor Work Plan and Schedule

Under this task, the CNA Team's Project Manager, Prasad Nerikar, within five business days of contract award, or as directed, will meet with the COG Project Director to discuss and finalize CNA's work plan and schedule for this project.

The CNA Team possesses extensive experience managing projects of similar nature to this effort and that require expert analyses on a tight schedule. Since 2008, we have supported COG in many areas, including exercise planning, after-action reports, senior-leader workshops, and our current energy services project. Each project required extensive planning and presentations to committees. CNA's approach to project management has been successful at completing projects on time and within budget.

Mr. Nerikar will work with COG and the MSWG to ensure that the project is properly managed and is meeting the goals outlined in the SOW, understanding that final direction comes from the COG Project Director. Mr. Nerikar will be the main point of contact for all project direction and issues. He will ensure that the rest of the CNA Team remains focused on their respective objectives, tasks, and deliverables.

As per the RFP and its SOW, and as described in *Table 2* below, the CNA Team envisions the following actions/deliverables and due dates/work periods for each task and product:

Table 2: Deliverables Table

SOW Task	Action/Deliverable	Due Date/Work Period	CNA Team Key Staff
Task 1: Finalize Work Plan and Schedule	Meet with COG Project Director	Within 5 business days of contract award, or as directed	Prasad Nerikar Paul Faeth
	Finalize work plan and schedule	Within 10 business days of contract award, or as directed	Prasad Nerikar

SOW Task	Action/Deliverable	Due Date/Work Period	CNA Team Key Staff
Task 2: Meet with Sector Subgroups and Review Proposed Strategies	Meet with each MSWG Sector Subgroup	March 2015	Twyla Garrett Paul Faeth Skip Laitner Robert Chamberlin Cherian Eapen
	Prepare technical memoranda on strategic priorities (one for each Sector Subgroup)	By mid-April 2015	Paul Faeth Skip Laitner Robert Chamberlin Cherian Eapen
Task 3: Presentation of GHG Strategies for Analysis to MSWG	Draft technical memorandum on recommended strategies for detailed analysis	May 5, 2015	Paul Faeth Skip Laitner Robert Chamberlin Cherian Eapen
	Deliver Wedge Model	May 5, 2015	Paul Faeth Skip Laitner
	Present GHG reduction strategies	May 8, 2015 (MSWG Meeting #2)	Prasad Nerikar Paul Faeth Skip Laitner Robert Chamberlin Cherian Eapen Twyla Garrett
	Deliver final technical memorandum on recommended strategies for detailed analysis	By May 31, 2015	Paul Faeth Skip Laitner Robert Chamberlin Cherian Eapen
Task 4: Analyze Selected Strategies	Draft technical memorandum on strategies analyzed, data, models, and documentation	May 2015	Paul Faeth Skip Laitner Robert Chamberlin Cherian Eapen
	Meet with each MSMG Sector Subgroup to discuss technical memorandum	May 2015–June 2015	Paul Faeth Skip Laitner Robert Chamberlin Cherian Eapen
Task 5: Prepare and Present Interim Technical Report	Present draft interim technical report documenting analysis of each strategy	July 31, 2015 (MSWG Meeting #3)	Prasad Nerikar Paul Faeth Skip Laitner Robert Chamberlin Cherian Eapen Twyla Garrett

SOW Task	Action/Deliverable	Due Date/Work Period	CNA Team Key Staff
	Assist COG staff to present draft interim technical report documenting analysis of each strategy (to TBP, MWAQC, CEEPC, and COG Board)	September 2015	Prasad Nerikar Paul Faeth Skip Laitner Robert Chamberlin Cherian Eapen Twyla Garrett
Task 6: Explore GHG Goals and Targets in Each Sector	Draft technical memorandum on exploration of GHG reduction goals and targets	August 2015–September 2015	Paul Faeth Skip Laitner Robert Chamberlin Cherian Eapen
	Present technical memorandum on exploration of GHG reduction goals and targets	September 25, 2015 (MSWG Meeting #4)	Prasad Nerikar Paul Faeth Skip Laitner Robert Chamberlin Cherian Eapen Twyla Garrett
Task 7: Prepare and Present Final Technical Report	Prepare final technical report on exploration of GHG reduction goals and targets	September 2015–October 2015	Paul Faeth Skip Laitner Robert Chamberlin Cherian Eapen
	Assist COG staff to present final technical report on exploration of GHG reduction goals and targets (to TPB, MWAQC, and CEEPC)	November 2015–December 2015	Prasad Nerikar Paul Faeth Skip Laitner Robert Chamberlin Cherian Eapen Twyla Garrett
	Assist COG staff to present final technical report on exploration of GHG reduction goals and targets (to COG Board)	January 2016	Prasad Nerikar Paul Faeth Skip Laitner Robert Chamberlin Cherian Eapen Twyla Garrett

Task 2. Meet with Sector Subgroups and Review Proposed Strategies

The COG already has extensively explored a wide range of GHG reduction strategies. An essential report that documents these options and their potential benefits and costs is the National Capital Region (NCR) *Climate Change Report (CCR)*, adopted and published in 2008. However, the catalog of ideas in the *CCR* is vast and needs to be prioritized so that an action plan can be developed, approved, and implemented.

The initial set of two meetings with each subgroup begins this process of prioritization. A key aspect of the first meeting will be for Subgroup members to understand and agree upon the criteria by which GHG reduction strategies are to be evaluated, so that we can develop an appropriate framework to apply. We will elicit criteria from each Subgroup, come prepared to

suggest additional ones for consideration, and will obtain feedback from each Subgroup on our proposed criteria. These criteria could include:

- cost per ton of carbon dioxide equivalent avoided;
- extent of reductions over time and technological certainty;
- degree to which the reductions are within the control of COG members;
- contribution to regional growth and employment;
- potential to advance regional quality of life through improvements to lung and heart damaging emissions, congestion, and accessibility;
- potential to advance regional sustainability through improvements to water quality, water conservation, visibility, mercury contamination, and environmental acidification.

The second part of the first meeting with each Sector Subgroup will focus on compiling options that the members deem to be most viable and suitable for implementation in the short- and long-term, including stretch goals that could be viable given policy changes.

Between the two Sector Subgroup meetings we will apply the framework, and will evaluate and rank each proposed strategy against it. Where possible, we will quantitatively identify potential gains. For example, if a strategy calls for or results in reduced use of coal-fired generation, and increased use of natural gas and renewable energy, the per unit changes in emissions of CO_2, nitrogen oxides, sulfur dioxide, and particulates are known, as well as the relative costs, jobs generated, and water use demands.

At the second round of meetings with each Sector Subgroup, we will present the results of the framework analysis and organize a discussion of the GHG reduction strategies. In order to achieve consensus, the meeting will be professionally facilitated by CNA Team member Twyla Garrett, who is highly skilled and experienced in facilitating COG – and other – meetings.

The CNA Team will include the following key personnel:

- Our proposed Project Manager, Prasad Nerikar, who has more than 20 years of project management experience, with an emphasis in environmental and emergency management arenas. He has managed more than 10 small- and large-scale contracts requiring complex technical analyses, short schedules, and more than 12,000 deliverables for local, state, and federal entities. These contracts required committed staff ranging from 5 to 50+ professionals. Each contract and its associated projects were completed on time and within budget.
- CNA Senior Economist John "Skip" Laitner, who has worked on these issues for nearly four decades and has been widely recognized for his work on energy and climate mitigation. He was awarded EPA's Gold Medal for his work with a team of economists to evaluate the impact of different strategies that might assist in the implementation of smart and more productive climate policies. He has conducted assessments of energy and climate change strategies in more than 15 states and a range of municipalities and

metropolitan areas. He has published more than 320 reports, journal articles, and book chapters on this topic and testified about energy-related economic development opportunities and job creation potential in every U.S. state.

- CNA's Energy, Climate, and Water Division Director and proposed Senior Engineer, Paul Faeth, who has also worked extensively on climate reduction strategies, particularly with regard to co-benefits. Faeth's recent work has focused on the development and application of models to evaluate the synergies between cutting GHGs, reducing air pollution, and conserving water. Faeth's other work has involved developing methods to evaluate water quality improvements and GHG mitigation benefits of options in the agricultural sector that cut nitrogen fertilizer use and sequester carbon in the soil. Faeth also has evaluated the benefits of land-use changes and conservation.
- From our proposed project partner Resource Systems Group (RSG), proposed key Senior Engineer Robert Chamberlin, who has extensive experience with transportation analysis, including more than 10 years' experience with the development and application of travel demand models. Chamberlin has led transportation projects requiring the application of sophisticated traffic simulation tools for developing consensus among oppositional stakeholder groups. RSG brings considerable experience with state departments of transportation on GHG reduction strategies through its experience pilot testing the Energy and Emissions Reduction Policy Analysis Tool (EERPAT) for the U.S. Department of Transportation. RSG consulted extensively with state transportation department staff, including Maryland's, on developing input data sets and output reports and on devising policy approaches for achieving GHG reduction targets.
- Senior Engineer, Cherian Eapen from our partner Temoss, who has extensive land use and transportation planning experience in the NCR and actively involved with COG issues and concerns in these areas.
- Facilitator Twyla Garrett, CEO and Principal of the management consulting firm IME, Inc. Garrett has provided key consensus-building support to COG and other NCR efforts such as exercises and workshops since 2009. Garrett is a trained facilitator and understands the complexities of reaching viable recommendations in multi-sector and multi-jurisdictional efforts.

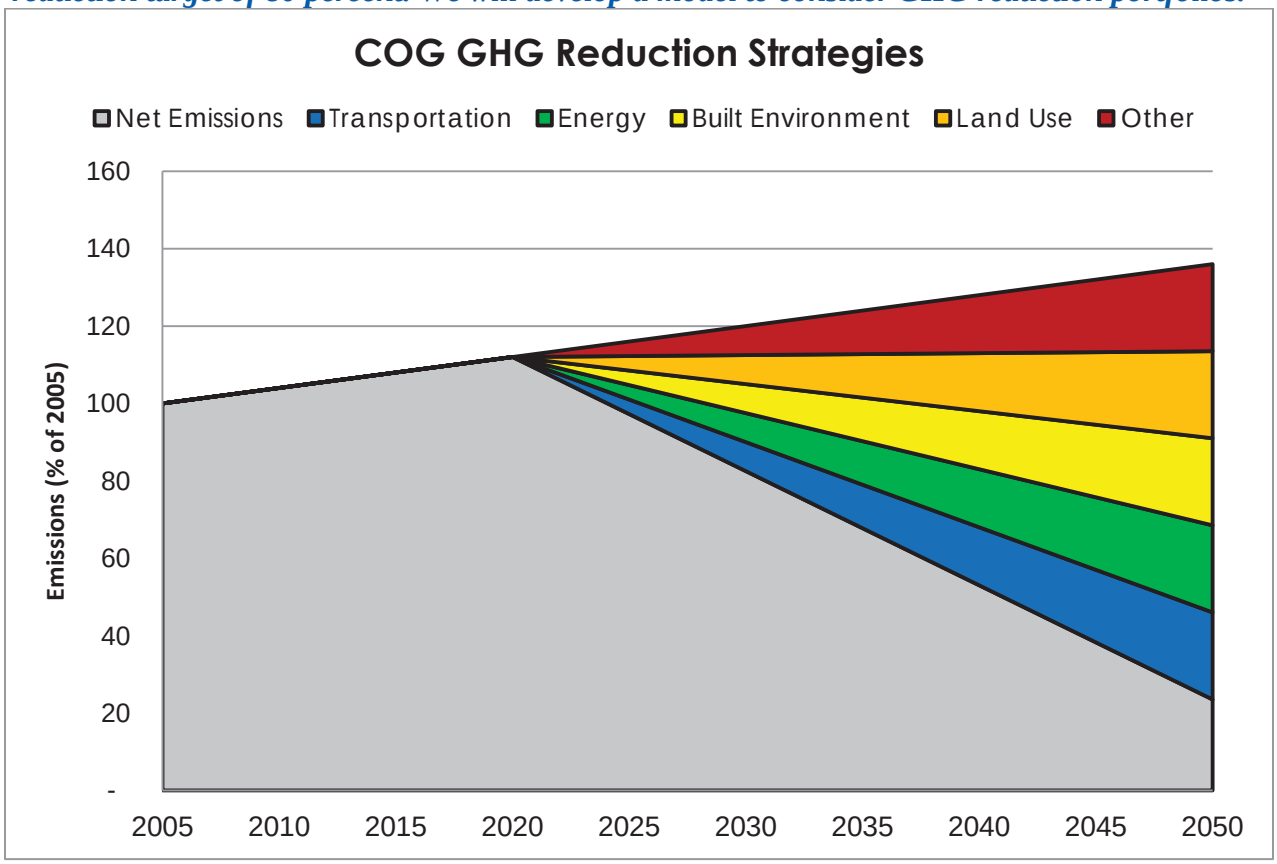
Task 3 – Presentation of GHG Reduction Strategies for Analysis to MSWG

As part of the development of the draft Technical Memorandum for the MSWG, the CNA Team will combine, synthesize, and rank all of the GHG reduction strategies that the Subgroups laid out, based on the criteria framework. We will present the strategies and criteria results for group discussion so as to identify the priority set of strategies for further analysis in Task 4. A particular focus of the task will be the identification of synergies across the sectors and a preliminary assessment of how these strategies could be combined to create a portfolio of activities that achieve the regional goal of 80 percent reduction in GHG emissions by 2050.

We propose to develop a relatively streamlined model for this task and for task 6 that combines the potential GHG reductions of each strategy over time, summed to develop a pathway to 2050. *Figure 1* below illustrates the "wedge" approach to GHG reduction strategies, a well-accepted method developed by Socolow and Pacala. Although their method was originally designed to identify stabilization strategies, it is also suitable for reductions. The sum of the strategies in each sector must achieve the overall target.

The "wedge" model will allow the CNA Team to develop a first approximation for reduction potentials by sector and by strategy, within each sector. This will help MSWG decide on the set of GHG reduction strategies to be analyzed so that at the end of our analysis we don't fall short of the overall GHG reduction goal. Reduction potentials will depend upon assumptions derived from the literature, from other applications of our models, and from our professional judgment. The model could also be a useful tool to support the group discussion of strategies. If the MSWG struggles to reach consensus on certain strategies, we could run the model during the meeting with different assumption suggested by the group to test the viability of a given strategy.

Figure 2: A combination of sectoral strategies will be required to achieve MWCOG's GHG reduction target of 80 percent. We will develop a model to consider GHG reduction portfolios.



The presentation and discussion of synergies between strategies will be central to helping the MSWG decide which one are likely to have the overall greatest benefit for the regional action plan. The best strategies will be ones that have substantial ability to deliver reductions cost-

effectively and contribute benefits broadly across sectors. Discussed below are co-benefits we propose to explore. We will evaluate each GHG reduction strategy for its ability to support these.

- *Air quality*—Less coal-fired power generation and less oil use for transportation will would reduce emissions that cause smog, acid rain, and lung and heart disease. The models we propose to apply are able to make projections of changes in emissions of nitrous oxides, sulfur dioxide, and particulates.
- *Energy resilience*—Distributed energy systems, smart meters, and energy conservation would enable the regional power grid operator (PJM Interconnection) to better manage power disruptions and also would allow people to shelter in place for longer periods during emergencies.
- *Employment*—Renewable energy and green building standards cut the need for CO_2-emitting coal and natural gas use and create more jobs than does traditional electricity generation. The model we propose to apply for regional evaluation of GHG strategies is able to estimate changes in the number of jobs provided by different strategies.
- *Congestion*—Public transit, smart planning and incentives for telework can reduce vehicle miles traveled.
- *Water quality*—Emissions from power plants and cars cause one-third of the nitrogen loading that leads to eutrophication of the Chesapeake Bay and coal-fired generation is the dominant source of mercury contamination in the Bay.
- *Water quantity*—Coal- and natural gas–fired power generation require water for thermal cooling, while wind and solar photovoltaic generation use very little; energy efficiency avoids water use altogether.

CNA's Energy Resilience Work with COG

CNA is currently working with COG to support exercises on the resilience of the power sector in the NCR. The work involves discussing and exercising regional responses to a severe and prolonged energy emergency in the electricity sector and the cascading effects such an emergency would have. Mr. Laitner and Mr. Faeth have contributed to that project.

The CNA Team has considerable experience and capability in developing and applying strong methodologies to analyze GHG reduction strategies and identify synergies. Our experience shows that diversifying energy portfolios with higher levels of renewables and energy efficiency will increase energy security, reduce health and environmental costs, and strengthen economic resilience.

CNA's Paul Faeth is an expert in the development of analytical tools that combine economics and the environment. He has used methods including statistics, systems analysis, linear and non-linear programming, and GIS to look at a wide range of topics including climate and energy policy, water quality and quantity, land-use practices and land-use change, agricultural policy, and international trade policy. He is also an expert on the development of markets for GHG and water quality credits. A web-based platform that he originally developed is being used to implement a nutrient trading program for the Chesapeake Bay. His work in this area has shown that activities to trim nitrogen loads to the Bay also cut N_2O, a greenhouse gas that has more than 300 times the impact on climate change than CO_2. These emission cuts are not considered in COG's current GHG reduction plan. Similarly, GHG reduction strategies that cut fossil fuels also cut nutrient loads to the Bay.

Task 4 – Analyze Selected Strategies

CNA has brought together a team that can bring to bear state-of-the-art analytical tools to analyze the GHG reduction strategies selected by the MSWG. We have the ability to quantify GHG reductions from individual strategies as well as their cumulative effect. We also have the capability to estimate costs and various co-benefits.

We will apply two models, the EERPAT model for the transportation sector, and the DEEPER model for the energy and built environment sectors. Other tools will be developed and applied as needed. Here we explain the benefits of these models.

EERPAT

EERPAT is a sketch planning model for the transportation sector that was developed to enable comprehensive policy analysis of the surface transportation sector for analyzing the effects of GHG reduction policies. ***CNA's partner, RSG, has extensive experience modifying and applying the EERPAT***. The model enables a comprehensive policy analysis of the surface transportation sector for analyzing the effects of GHG reduction policies. EERPAT estimates the amount of travel (in terms of vehicle miles traveled) and the resulting GHG emissions, including fuel use (and electricity use for battery charging) by autos, light trucks, transit vehicles, and heavy trucks. EERPAT's GHG estimates reflect "pump to wheels" GHG emissions, including GHG emissions associated with electric vehicle charging.

In generating CO_2-equivalent emissions and fuel consumption, EERPAT also provides key inputs for estimating the generation of emissions for criteria pollutants such as PM2.5, PM10, VOCs (ozone precursors), and CO. RSG can apply emission factors from the EPA MOVES2014 model to estimate changes in the generation of these criteria pollutants associated with GHG reduction policy scenarios. The model also provides indicators for congestion. RSG also brings considerable reach-back capability to its air quality professionals, who help clients evaluate GHG emissions from both mobile and stationary sources to understand and achieve compliance with complex air pollution control regulations at the macro- and micro-economic levels. The company also has extensive capabilities in the development of quantitative models and software engineering.

EERPAT can address the following factors and policies:

- Changes in population demographics (age structure).
- Changes in personal income.
- Relative amounts of development occurring in metropolitan, other urban, and rural areas.
- Metropolitan, other urban, and rural area densities.
- Urban form (proportion of population living in mixed-use areas with a well interconnected street and walkway system).
- Transportation supply - freeway and arterial capacity; transit service; non-motorized facilities.
- Vehicle fleet characteristics - auto and light truck proportions, average vehicle fuel economy by vehicle type and year; vehicle age distribution by vehicle type.

- Vehicle Technologies - Internal Combustion Engine vehicles (ICEV), Hybrid electric vehicles (HEV), plug-in hybrid electric vehicles (PHEV), and full electric vehicles (EV) by vehicle type and year.
- Alternative Fuels, including electricity, CNG, bio-diesel.
- Carbon intensity of fuels, including carbon from the electric power used to charge electric vehicles.
- Pricing – fuel, vehicle miles traveled (VMT) charge, parking, and pricing of carbon emissions and social/environmental costs.
- Travel demand management – employer-based and individual marketing programs; car-sharing.
- Traffic operations/ITS – impacts of signal coordination, ramp metering, access management, and incident management on fuel economy;
- Vehicle operation and maintenance – eco-driving, low rolling resistance tires.

Several of these policies are illustrated in *Figure 2* below, which demonstrates the policy testing conducted for the Maryland EERPAT project.

The EERPAT tool is well-suited for addressing transportation-sector GHG emissions in this project. In coordination with the Baltimore Metropolitan Council, RSG tested EERPAT for use in the BMC's "How Far Can We Get" initiative. The EERPAT tool has shown itself to be sufficiently flexible to address metropolitan applications. The input data sets, processing, and reporting are all adaptable to the metropolitan level.

We propose to use the EERPAT model to test the prioritized strategies. While a broad range of policies can be tested, it is important to acknowledge the potential that the subgroup will recommend policies that will require additional analysis outside of the EERPAT model. ***A good option that the CNA Team can bring to this project is our ability to run the regional travel model***. This capability will enable us to address and examine additional policies, and to provide additional validation of results from the EERPAT model.

***Figure 3**: The EERPAT model allows testing of GHG reduction strategies independently or in combination. This example is from an EERPAT application in Maryland.*

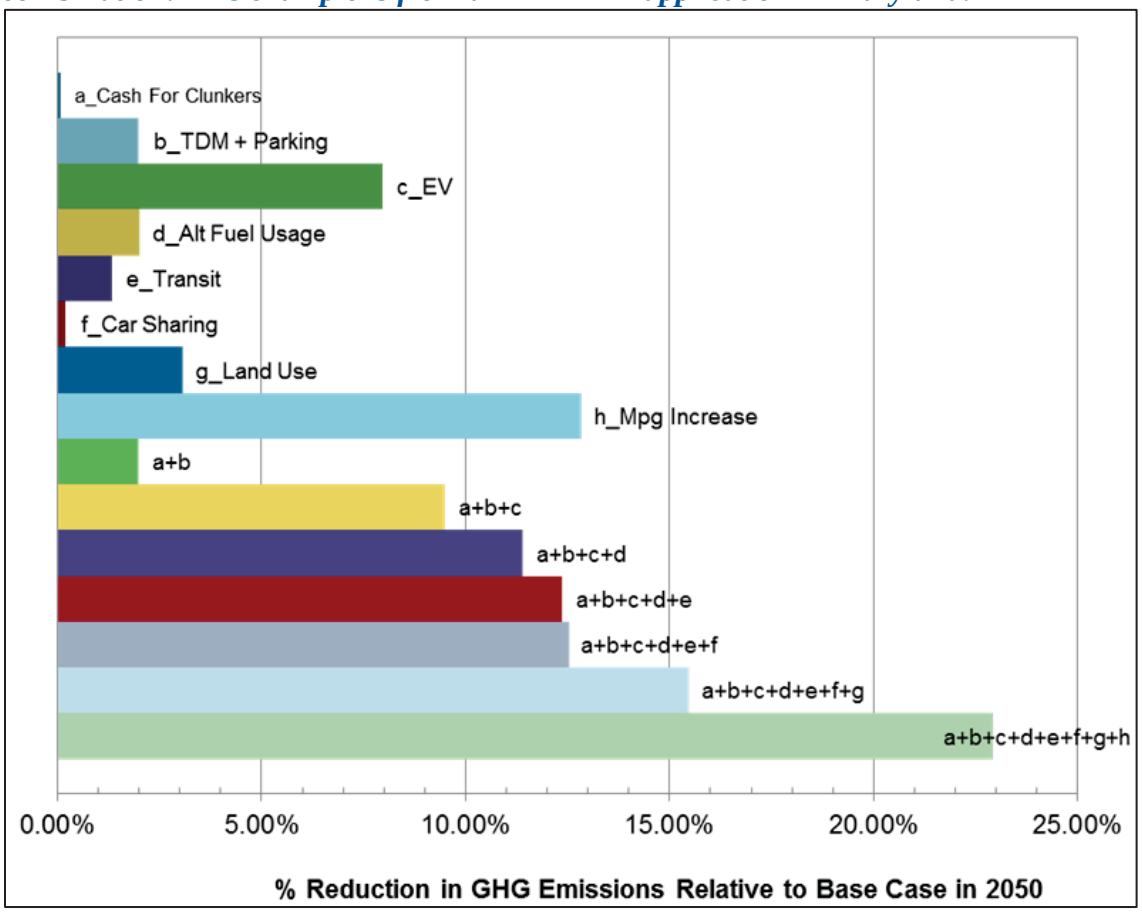


Table 3 below provides an array of the policies that can be discussed for addressing transportation GHG emissions, and also quantitatively tested using EERPAT.

Table 3. EERPAT is able to evaluate a wide variety of strategies to reduce GHGs from the transportation sector.

Technology	Alternative Fuels	Land-use	Pricing	Transportation Supply
Battery Electric Vehicles	Low Sulfur Diesel	Smart growth initiatives	Gasoline Price and Taxes	Expansion of Arterial and Freeway Capacity
Hybrid, Plug-In Hybrid Vehicles	Bio-Diesel	Mixed use development	Road User Fee, VMT Charge	Expansion of Transit Capacity
EV, PHEV Vehicle Range	E80, E85 (ethanol)	Urban population density	Congestion Charges	Expansion of Non-Motorized Facilities
CAFÉ Standards	CNG/LNG		Pay As You Drive Insurance	Travel Demand Management
Phase I and II Heavy Duty Vehicle Standards			Carbon Taxes	Transportation Supply Management

Technology	Alternative Fuels	Land-use	Pricing	Transportation Supply
			Parking Pricing	Carsharing

DEEPER

Mr. Laitner will apply his proprietary economic model called DEEPER (Dynamic Energy Efficiency Policy Evaluation Routine), a 15-sector quasi-dynamic input-output model of the U.S. economy with a 20-year history of development and application. The model is used to evaluate the impacts of a variety of GHG reduction strategies on environmental and economic indicators at the municipal, state, and national levels. ***A key feature of the model is that it can estimate changes in economic growth and employment***.

DEEPER builds from a 400-sector model of the U.S. economy that will be adapted to a 15-sector representation of the Washington metropolitan region. The DEEPER Model includes a representation of energy-related CO_2 emissions, but it focuses, in particular, on the use of energy in all sectors of the economy as well as the prices, policies, and programs or best practices necessary to achieve desired GHG reductions and economic impacts. The DEEPER Model is an Excel-based analytical tool that contains about two dozen independent worksheets. The primary analytic modules include: (i) the Energy Module, (ii) the Electricity Production Module, and (iii) the Macroeconomic Module. The block diagram of the DEEPER Modeling System lays out the analytical framework of the model.

The model outcomes are driven primarily by the demands for energy services and alternative investment patterns as they are shaped by changes in policies and prices. Although the DEEPER Model is not a general equilibrium model, it does provide sufficient accounting detail to match import-adjusted changes in investments and expenditures within one sector of the economy and balance them against changes in other sectors.

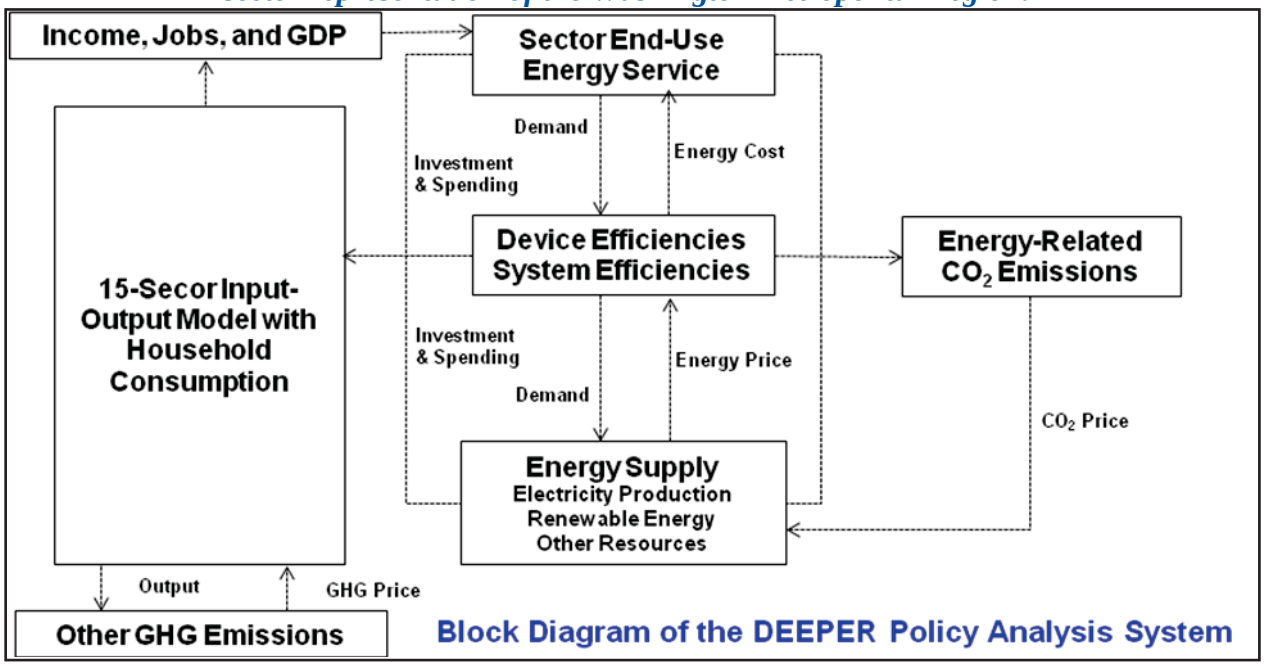
As shown in the *Figure 4* below, the demand for energy-related services is the starting point for policy-induced changes. Both price and non-price policies—including energy efficiency or renewable energy portfolio standards, technical assistance, financial incentives, research and development (R&D), or general information and labeling programs (e.g., the EPA and DOE ENERGY STAR programs)—can shift consumer preferences and the availability of technologies. Implementation of these policies stimulates an array of changes in prices, investments, and expenditures. These changes include program costs and incentives that might be needed to shift behaviors and investments so that the energy (and GHG) emissions targets are satisfied. As changing demands confront a shifting mix of investments in different energy resources, overall energy prices are likely to change in response. The combination of new policies, new investments, and changed consumer or energy producer behaviors drive the final results that emerge from application of the DEEPER Model.

The DEEPER Model is benchmarked to both the historical record and the most current versions the Woods and Poole econometric forecasts and the *Annual Energy Outlook* projections for the region, which now extends out through 2040. Based on data available from other sources, we will make a reasoned estimate of how the local economy might grow through the year 2050 in a

Reference Case scenario, and how that, in turn, will affect energy use, energy prices, and carbon-dioxide emissions. The data sets to set up DEEPER for each of the nine counties in the COG region costs $1,000 each; this cost is included in our proposed budget.

Based on the scenario data mapped into the energy elements of the DEEPER modeling system, the macroeconomic module translates the selected energy policies into an annual array of physical energy impacts, investment flows, and energy expenditures over the desired period of analysis.

Figure 4: The DEEPER model is a dynamic input-output energy and economic assessment tool that builds from a 400-sector model of the U.S. economy that will be adapted to a 15-sector representation of the Washington metropolitan region.



DEEPER estimates the needed investment path for an alternative mix of energy efficiency and renewable energy technologies. It also evaluates the impacts of avoided or reduced investments and expenditures otherwise required by the electric generation sector. These quantities and expenditures feed directly into the final demand worksheet of the module. The final demand worksheet provides the detailed accounting that is needed to generate the implied net changes in sector spending. Once the mix of positive and negative changes in spending and investments have been established and adjusted to reflect changes in prices within the other modules of DEEPER, the net spending changes in each year of the model are converted into sector-specific changes in final energy demand.

DEEPER currently is being applied in San Diego County to develop a comprehensive energy plan to reduce GHG emissions and revitalize the local economy. The model has also been applied recently in the Nord-Pas de Calais region in France to help develop a master plan. The plan is intended to make the regional economy "one of the most resource-efficient, productive, and sustainable in the world."

The DEEPER analysis in the Nord-Pas de Calais case showed that the first step of this transformation is to seek greater levels of energy efficiency in the development of an interconnected infrastructure. Then, building on the many synergies that result from a logistics commons that link a variety of communications, storage, and renewable energy technologies that all contribute to greater levels of energy efficiency, productive investments can be directed toward greater innovation and job creation within the region. The master plan developed with Laitner's support and the application of the DEEPER model identifies the investments required to cut energy use by 60 percent by 2050. With a variety of renewable energy technologies providing the balance of regional energy needs, this long-term investment strategy will create more than 165,000 net jobs by 2050.

The CNA Team will analyze each of the selected GHG reduction strategies between 2005 and 2050 to determine their potential contribution to cutting GHGs, costs, and co-benefits. The DEEPER and EERPAT models produce annual results which we will present. We will also summarize them by the three periods set out in the RFP: 2012-2020, 2020-2040, and 2040-2050. We will prepare a Technical Memorandum summarizing the analysis and results and present it for comment to each sector subgroup.

These presentations will include each Sector Subgroup's GHG reduction strategies as well as the others', so that the members can begin to get a sense of how these strategies might add up to achieve COG's overall 2050 reduction target. In addition to the presentation of the strategic results, the Technical Memorandum will also provide documentation for the analysis, methods, tools and assumptions used.

Task 5 - Prepare and Present Interim Technical Report

The CNA Team will prepare a draft Interim Technical Report, taking into account the comments from the review by the three Sector Subgroups. If there are questions or concerns regarding any of the strategies, we will undertake additional analysis to address them and respond to the members who raised them. The CNA Team knows that by exploring the points of contention, additional analysis can help to resolve apparent conflicts. Some differences of opinion may arise from variances in application or weighting of criteria, and may need to be resolved at a higher level. When issues remain unresolved, we will highlight those in the Report and carefully explain the implications of those differences.

We will fully brief COG staff on the analysis and results up to this point, and support them in the preparation and delivery of presentations to the TPB, MWAQC, CEEPC, and COG Board.

Task 6 – Explore GHG Goals and Targets in Each Sector

This task gets to the core purpose of the project: to support the development of a strategy that COG can implement to achieve its target of 80 percent reduction in GHGs by 2050. The analytical elements to support COG's decision-making to be provided by the CNA Team will include the amount of GHGs that can be cut by given sectoral strategies, the cost to do so, the co-benefits that could be achieved as a result, and the degree to which the cuts will: 1) be likely to be achievable with no support, or modest additional support, 2) will be a "stretch" and so require policy action and investments by COG members, or 3) require federal policy and investments.

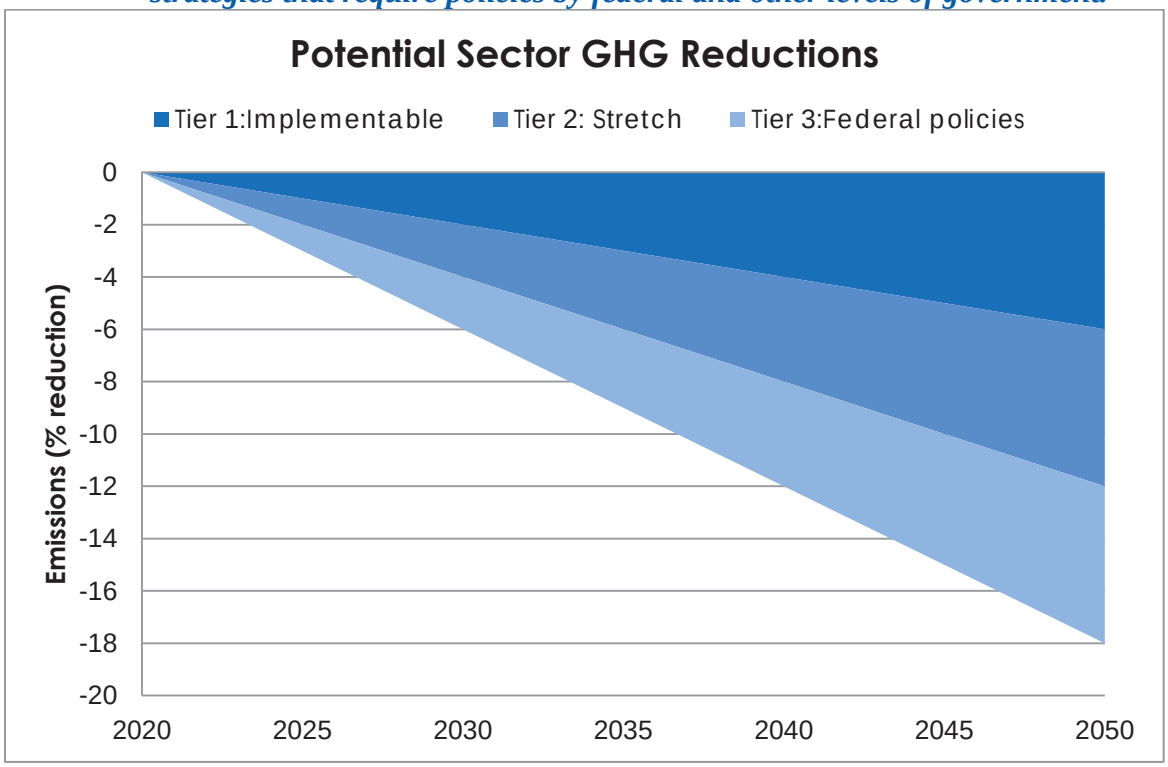
It is our experience with analysis of GHG targets that, given the 80 percent GHG reduction target, action at all three of the above tiers will be needed. However, we also know that considerable benefits can be achieved at reasonable cost if a strategy is comprehensive and synergistic – and we intend to support adoption of strategies that are both.

For this task, we return to the wedge model and update it with results from DEEPER and EERPAT analyses. While the two models are suitable for this task, they are complicated. The wedge model will provide a quick and fairly simple way for our team and COG staff to explore pathways and assumptions to meet the interim and final goals for GHG reductions by sector and strategy. For this stage of the analysis, we will break out each strategy by the tier shares.

Figure 5 below shows how these tiers and their assumptions will be considered and presented.

The analysis of potential reductions by what is readily implementable, what is a stretch requiring regional policy changes, and strategies that require policies by federal and other levels of government will require analysis of federal strategies. These could include policies such as the *Clean Power Plan* that has been proposed by EPA, incentive programs for energy conservation or renewable energy, and federal research that could change the cost or effectiveness of GHG reducing technologies, such as carbon capture and sequestration or high mileage vehicles. The DEEPER and EERPAT models are well-suited to this task, as they accommodate a range of policy and technology options that capture the three tiers.

Figure 5: The CNA Team will identify GHG reduction potentials for each sector by three tiers: 1) what is readily implementable, 2) what is a stretch requiring regional policy changes, and 3) strategies that require policies by federal and other levels of government.



To inform the examination of MWCOG's goals and targets, we will conduct a review of what goals and targets have been adopted or are being considered by other metropolitan regions. This will be an extension of the review we will have undertaken for task 2 to help identify potential Sector Subgroup strategies.

The CNA Team will prepare a Technical Memorandum for the MSWG exploring sectoral and overall goals and targets for MWCOG. The draft Technical Memorandum will outline the results of our scenario analysis, considering the potential reductions that the strategy can deliver, the costs, and the ability to provide co-benefits outlined under tasks 3: air quality, energy resilience, employment, congestion, water quality, water quantity. We will work with COG staff to help them adopt and apply the wedge model.

Task 7 – Prepare and Present Final Technical Report

The CNA Team will take comments received from the MSWG and make any adjustments necessary to prepare a draft Final Technical Report that combines the results of our sectoral analysis of goals and targets with the Interim Technical Memorandum. We will develop a draft outline for the Final Report to be approved by COG staff, in an effort to ensure the timely delivery of the report and satisfaction with its contents.

We will support COG staff in the preparation of presentation material and in the presentations themselves before the TPB, MWAQC, CEEPC, and COG Board according to the schedule.

Chapter 3: Services, Pricing, and Schedule

In this section, we provide our price proposal in order to satisfy the technical requirements. We organized the cost proposal according to the following tasks:

- Task 1: Finalize Contractor Work Plan and Schedule
- Task 2: Meet with Sector Subgroups and Review Proposed Strategies
- Task 3: Presentation of GHG Reduction Strategies for Analysis to MSWG
- Task 4: Analyze Selected Strategies
- Task 5: Prepare and Present Interim Technical Report
- Task 6: Explore GHG Goals and Targets in each Sector
- Task 7: Prepare and Present Final Technical Report

MWCOG GHG **RFP budget:**

POP: March 2015 - January 31, 2016

CNA	Role	Rate	Task 1: Finalize Contractor Work Plan and Schedule	Task 2: Meet with Sector Subgroups and Review Proposed Strategies	Task 3: Presentation of GHG Reduction Strategies for Analysis to MSWG	Task 4: Analyze Selected Strategies	Task 5: Prepare and Present Interim Technical Report	Task 6: Explore GHG Goals and Targets in each Sector	Task 7: Prepare and Present Final Technical Report	Total Hours	Total Cost
Paul Faeth	Senior Engineer	$ 328.21	2	8	8	32	16	16	16	**98**	**$ 32,164.58**
John Laitner	Senior Economist	$ 156.82	2	18	32	120	160	48	80	**460**	**$ 72,137.20**
Prasad Nerikar	Project Manager	$ 229.87	14	8	16	22	24	12	24	**120**	**$ 27,584.40**
Ashley Miller	Analyst	$ 76.46	4	16	4	4	24	16	24	**92**	**$ 7,034.32**
Don Cymrot	QA/QC	$ 336.48							8	**8**	**$ 2,691.84**
Bry Pollack	Editor	$ 141.15					10	10	20	**40**	**$ 5,646.00**
Subcontractors											
TEMOSS, Cherian Eapen	Senior Engineer	$ 102.12		30	30	30	30	30	30	**180**	**$ 18,381.60**
IME, Twyla Garrett	Senior Faciliatator	$ 190.36		30	30		20	20	20	**120**	**$ 22,843.20**
RGS, Robert Chamberlin	Senior Engineer (EERPAT)	$ 247.54	4	24	32	32	20	24	32	**168**	**$ 41,586.72**
RGS, Erica Wygonik	Sr. Model Analyst (EERPAT)	$ 161.69			8	16	8	16		**48**	**$ 7,761.12**
RGS, Eric Talbot	Model Analyst (EERPAT)	$ 112.61		4	8	60	8	40	8	**128**	**$ 14,414.08**
RGS, Haiyun Lin	Model Analyst (EERPAT)	$ 107.34			8	60	8	40	8	**124**	**$ 13,310.16**
	Subtotal Hours:		**26**	**138**	**176**	**376**	**328**	**272**	**270**	**1586**	**$ 265,555.22**

DBE		
$ 43,118.80	16%	

ODCS	
CNA Travel	$ 1,894.00
RGS Travel	$ 1,300.00
Subtotal ODCs:	**$ 3,194.00**
	$ 268,749.22

Assumptions

Task 1: CNA will provide for a 2-hour kickoff meeting with the COG Project Director to be attended by the CNA PM, CNA Technical Lead, and notetaker. It also provides for time to prepare for the meeting and/or write up the notes. It also provides 4 hours for the PM to develop and finalize the workplan.

Task 2: CNA will meet with each sector subgroup. We assume each meeting will last 2 hours each. There is time allocated for preparation and writing the summary notes. We have allocated one long distance trip for CNA and one long distance trip for RSG to meet with their respective sector subgroup counterparts. For the second sector subgroup meeting and in order to save long distance travel costs, we assume that we will use COG's teleconferencing or video conferencing capabilities. For these sector subgroup meetings, CNA assumes we will provide a facilitator.

Task 4: CNA assumes a facilitator will be required to assist in reaching consensus on GHG reduction strategies.

Task 5: CNA assumes that the use of COG teleconference or video conference facilities will be required to present the interim technical report.

Task 7: CNA assumes one long distance trip for CNA and RSG respectively to assist COG staff in presenting the final tech report will be required. A senior facilitator will also be utilized.

DBE Participation Plan

CNA is honoring our commitment to our Disadvantaged Business Enterprise (DBE) participation goal. Our goal is to provide **Temoss, LLC** (a certified minority business enterprise; MBE/DBE/SBE/ACDBE) and **IME Services, Inc.,** a certified woman-owned minority small business (GSA IT 70, LSDBE, DBE, SWAM, and MBE)—CNA's small, disadvantaged businesses for this effort—with 6.9 percent and 8.6 percent of the project value, respectively. For this effort, Temoss will provide Cherian Eapen as a Senior Engineer and IME will provide Senior Facilitator.

Below is CNA's DBE Participation Plan. A copy of Temoss' and IME's DBE Certifications is included at the end of this section.

DBE Subcontractor:	Percentage of Contract
Temoss, LLC	At least **6.9%**
Address: 23118 Birch Mead Road Clarksburg, MD 20871	
Certifying State: Maryland Department of Transportation	**DBE Certification #** 13-479

DBE Subcontractor:	Percentage of Contract
IME Services Inc.	At least **8.6%**
Address: 1010 Vermont Ave NW Suite 200 Washington, DC 20005	
Certifying State: Metropolitan Washington Unified Certification Program	**DBE Certification #** 916-W

CNA understands the value of working with DBEs and, as such, regularly searches for potential DBE and small business teaming partners from Governmental sources such as:

- The District of Columbia Department of Small and Local Business Development
- The Washington Metropolitan Area Transit Authority
- The Maryland Department of Transportation
- The Virginia Department of Minority Business Enterprise
- The Federal Acquisition Computer Network (FACNET) Contractor Registration Database
- The General Services Administration Office of Small Business Utilization
- The National Minority Purchasing Council Vendor Information Service
- The Office of Small and Disadvantaged Business Utilization in the Department of Commerce.

In addition, CNA routinely reaches out to the small business community through our membership in and attendance at various industry conferences held by professional associations such as:

- National Contract Management Association (NCMA)
- Association of Proposal Management Professionals (APMP)
- 2008 Grant Thornton Contractor Industry Roundtable
- Annual OSDBU Procurement Conferences
- The American Small Business Coalition
- Project Management Institute (PMI)
- Greater Washington Board of Trade.

During these conferences and meetings, CNA employees seek out small businesses and DBEs that may offer complementary skills and opportunities to generate new business in a teaming environment.

CNA makes a concerted effort to contract only with viable businesses by reviewing a firm's past performance references, reviewing direct contracting experience with the candidate, as well as examining the candidate's financial stability. CNA has access to business information reporting tools such as Dunn & Bradstreet, Guidestar.org, EPLS reports, ORCA, and CCR registration websites to verify the stability of our contracting partners. CNA takes the added step of requiring the completion of a CNA Representation and Certification package from all teaming members before executing a Teaming Agreement to ensure at the beginning of the Subcontracting process that there are no underlying issues tied to previous contract performance, required government filings, legal debarments, or other issues that may be indicative of risk during performance.

Although CNA endeavors to work with viable DBE and small businesses, we recognize that not all such partners are capable of leveraging large ODC purchases or other financial commitments required by some contracts. To that end, as necessary, CNA will work to identify methods to make large ODC or similar commitments ourselves in coordination with the DBE or small business to support contract performance and achieve the client's ultimate objectives. This has the added benefit to the client of reducing duplicative indirect rate burdens on these large costs.

DBE Certification

Temoss, LLC and IME Services DBE Certifications are provided on the next page.

Maryland Department of Transportation
The Secretary's Office

Martin O'Malley
Governor

Anthony G. Brown
Lt. Governor

James T. Smith, Jr.
Secretary

October 27, 2014

CHERIAN EAPEN
TEMOSS, LLC
23118 BIRCH MEAD ROAD
CLARKSBURG, MD 20871

Dear CHERIAN EAPEN (cert # 13-479):

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 October 27, 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

My telephone number is _____
Toll Free Number 1-888-713-1414 TTY Users Call Via MD Relay
7201 Corporate Center Drive, Hanover, Maryland 21076

METROPOLITAN WASHINGTON
UNIFIED CERTIFICATION PROGRAM
DDOT • 55 M Street S.E., 3rd Floor • Washington, D. C. 20003• (202) 671-0479
WMATA • 600 Fifth Street, N. W., 3rd Floor • Washington, D. C. 20001• (202) 962-6493

District Department of Transportation

metro

January 10, 2013

Ms. Twyla Garrett, President
IME Services, Inc.
1010 Vermont Ave., NW, Suite 200
Washington, DC 20005

RE: Certification No. **916-W**

Dear Ms. Garrett:

We are pleased to inform you that your firm has been found eligible to continue its certification as a Disadvantaged Business Enterprise (DBE) with the Metropolitan Washington Unified Certification Program (MWUCP), effective **January 10, 2013**. MWUCP participants include the Metropolitan Washington Area Transit Authority (WMATA) and the District of Columbia Department of Transportation (DDOT). **Your firm is subject to the requirements of the Disadvantaged Business Enterprise regulations, *Title 49, Code of Federal Regulations, Part 26*, as amended and all laws of this jurisdiction applicable to the transaction of business.** You are currently certified in the following North American Industry Classification System (NAICS) Code:

541511 – CUSTOM COMPUTER PROGRAMMING SERVICES
541512 – COMPUTER SYSTEMS DESIGN
541611 – ADMINISTRATIVE MANAGEMENT AND GENERAL MANAGEMENT CONSULTING SERVICES
541612 – HUMAN RESOURCE CONSULTING SERVICES
541618 – OTHER MANAGEMENT CONSULTING SERVICES (TELECOMMUNICATIONS MANGEMENT CONSULTING SERVICES)
541690 – OTHER SCIENTIFIC AND TECHNICAL CONSULTING SERVICES (ECONOMIC CONSULTING SERVICES)
611710 – EDUCATIONAL SUPPORT SERVICES

If you wish to add to the list of approved NAICS Codes, you must make such request in writing with supporting documentation to the MWUCP participant from which the original certification was received.

IME Services, Inc.
January 10, 2013
-2-

As a certified DBE, you are required to submit an annual "No Change"/"Notice Regarding Change" statement, attesting to your continued status as a "socially and economically disadvantaged individual". You must also submit the following: (1) a Personal Net Worth Statement (PNW); (2) the Individual Income Tax Return for that year; and (3) the Firm's Federal Tax Return for that year. The requisite forms are available at www.wmata.com. You can access these forms by first clicking on *Business with Metro* and then clicking on *Disadvantage Business Enterprise/forms*. The "No Change"/ "Notice Regarding" Change Statement and supporting documentation should be mailed annually on or before your firm's certification date to:

Washington Metropolitan Area Transit Authority
DBE & Compliance Office, 3C
600 5th Street, N.W.
Washington, DC 20001

If a change in the ownership, control or management of your firm has occurred, you must complete and submit a "Notice Regarding Change" statement immediately subsequent to the change.

Firms desiring information about DDOT procurement opportunities should go on line at http://ddot.dc.gov/dbe. To do business with WMATA, go on line at www.wmata.com or www.metroopensdoors.com to register as a vendor and for bidding opportunities.

A firm is considered graduated in all or some of the areas of work grouped under the NAICS Codes if the firm exceeds the size standards listed under the NAICS Codes. If a firm exceeds the size standard in any of its approved NAICS Codes, it is no longer certified as a Disadvantaged Business Enterprise under that specific NAICS Code. If a firm exceeds the size standards in all of its approved NAICS Codes or the established Personal Net Worth standard, it is no longer eligible to participate as a Disadvantaged Business Enterprise under the Federal U.S. Department of Transportation Program.

Your certification does not automatically expire, however; your firm must submit the required documents annually on or before your firm's certification date. Failure to provide the requested documents in a timely manner will result in immediate actions to decertify your firm's eligibility as a Disadvantaged Business Enterprise with the Metropolitan Washington Unified Certification Program.

If you have any questions, please contact Catherine M. Svoboda, DBE & Compliance Specialist at 202-962-1854 or via email at csvoboda@wmata.com.

Sincerely,

Debra A. Farrar-Dyke
Manager, Administrative Services and DBE Liaison

Chapter 4: References

We are proud of the quality of our work and the reputation we have developed by delivering the best people and support to our clients. We encourage COG to reach out to our references. After this section, we have detailed past performances for each of the referenced projects below.

CNA References

1. ***Metropolitan Washington Council of Governments, Energy Exercise***
   (Key Personnel: Paul Faeth and John "Skip" Laitner)

   Steve Bieber
   Water Resources Technical Manager
   Department of Environmental Programs
   Metropolitan Washington Council of Governments
   777 North Capitol Street, NE, Suite 300
   Washington, DC 20002
   Email: sbieber@mwcog.org
   Phone Number: (202) 962-3219

2. **The Mitchell Foundation, Water Use in the Texas Power Sector**
   (Key Personnel: Paul Faeth)

   Marilu Hastings
   Sustainability Program Director
   Cynthia & George Mitchell Foundation
   2630 Exposition Blvd. Suite #214
   Austin, TX 78703
   Email: mhastings@cgmf.org
   Email: sfiorenza@cgmf.org
   Phone: (512) 502-5182

3. **Northern France Chamber of Commerce**, ***Third Industrial Revolution Master Plan for Nord-Pais de Calais, France***
   (Key Personnel: John "Skip" Laitner)

   Claude Lenglet
   President and Director General
   Chamber of Commerce and Industry of the Nord de France Region
   299 Boulevard of Leeds
   CS 90028-5903
   Email: c.lenglet@norddefrance.cci.fr
   Phone Number: +33 (0)3 20 63 77 48

RSG References

1. ***Federal Highway Administration, Energy and Emission Reduction Policy Analysis Tool (EERPAT)***
   (Key Personnel: Robert Chamberlin)

   Diane Turchetta
   Federal Highway Administration
   1200 New Jersey Avenue, SE
   Washington, DC 20590
   Email: diane.turchetta@dot.gov
   Phone Number: (202) 493-0158

2. ***Ohio Department of Transportation, Transportation Vulnerability Assessment***
   (Key Personnel: Robert Chamberlin)

   Matt Perlik
   Ohio Department of Transportation
   1980 West Broad Street
   Columbus, OH 43223
   Email: matt.perlik@dot.state.oh.us
   Phone Number: (614) 466-1937

3. ***Utah Department of Transportation, Analysis of the Impact of High-Efficiency Vehicles on Future Fuels Tax Revenues***
   (Key Personnel: Robert Chamberlin)

   Cameron Kergaye
   Director of Research
   Utah Department of Transportation
   4501 South 2700 West
   Salt Lake City, UT 84114
   Email: ckergaye@utah.gov
   Phone Number: (801) 965-2576

Temoss, LLC References

1. ***Wilmington Area Planning Council, Red Clay Vally Scenic Byway***
   (Key Personnel: Cherian Eapen)

   Heather Dunigan
   Principal Planner
   Wilmington Area Planning Council (WILMAPCO)
   850 Library Avenue, Suite 100
   Newark, DE 19711
   Email: HDunigan@wilmapco.org
   Phone Number: (302) 737-6205, ext. 118

2. **EYA and Housing Opportunities Commission of Montgomery County, Chevy Chase Lake Residential Redevelopment**
(Key Personnel: Cherian Eapen)

McLean Quinn
Vice President, Land Acquisition and Development EYA
4800 Hampden Lane, Suite 300
Bethesda, MD 20814
Email: MQuinn@eya.com
Phone Number: (301) 634-8600

3. ***Mission First Housing Development Corporation, Mount Jezreel Baptist Church***
(Key Personnel: Cherian Eapen)

Donna Creedon
Project Manager
Mission First Housing Development Corporation
1330 New Hampshire Avenue, NW, Suite 116
Washington, DC 20036
Email: DCreedon@missionfirsthousing.org
Phone Number: (202) 223-3403

IME References

1. ***Metropolitan Washington Council of Governments, Energy Exercise***
(Key Personnel: Twyla Garrett)

Steve Bieber
Water Resources Technical Manager
Department of Environmental Programs
Metropolitan Washington Council of Governments
777 North Capitol Street, NE, Suite 300
Washington, DC 20002
Email: sbieber@mwcog.org
Phone Number: (202) 962-3219

2. ***National Capital Area Training Exercise***
(Key Personnel: Twyla Garrett)

David McMillion, Director
Public Safety and Health
Metropolitan Washington Council of Governments
777 North Capitol Street, NE, Suite 300
Washington, DC 20002
Telephone: (202) 962-3708

E-mail: dmcmillion@mwcog.org

3. **National Level Exercise 2010 Planning Support**
(Key Personnel: Twyla Garrett)
Steven Lowery
L3
Manager, Logistics and Mission Support
1320 Braddock Pl, Room #4118
Alexandria, VA 22314
(703) 664-2838

Past Performance Descriptions

In this section, CNA provides more detailed descriptions of the referenced projects.

CNA

Metropolitan Washington Council of Governments, Energy Exercise (CNA)	
Client Name and Contact Information	Steve Bieber Water Resources Technical Manager Department of Environmental Programs Metropolitan Washington Council of Governments 777 North Capitol Street, NE, Suite 300 Washington, DC 20002 Email: sbieber@mwcog.org Phone Number: (202) 962-3219
Period of Performance:	September 2014 – May 2015
Place of Service:	National Capital Region
Type of Contract:	Time and Materials
Value:	$97,458.23

Project Overview:

CNA, working COG and the Regional Emergency Support Function (RESF) 12, Energy, is developing a series of three workshops and a regional exercise to focus on complex issues, concerns and cascading impacts from a long-term power outage scenario. The purpose of the series is:

- Examine categories of plausible electrical grid failure and likely response scenarios;
- Identify potential resource needs and acquisition/delivery options;
- Identify options to support critical infrastructure and local community needs during a sustained power outage;
- Identify missing components in existing energy emergency plans (i.e., renewable energy and advanced public purpose microgrids) in the National Capital Region (NCR); and
- Set the foundation for ongoing analysis of threats, vulnerabilities, mitigation opportunities, and enhanced response capabilities, and the capacity to recover or adapt.

The **first workshop** provided information on the bulk electric system, blackouts, and black starts and an opportunity to identify consequences unfolding from the scenario context. In the **second workshop** participants endeavored to select a workable set of vulnerabilities and capabilities to serve as mitigation/response priorities. The **third workshop**, scheduled for March 31, 2015, will focus on reviewing these proposed measures and conceiving other possible changes in current plans to enhance region-wide mitigation and response. The **tabletop exercise**, to be held in May 2015, will be organized around the scenario outlined during the first

workshop. Participants will explore the vulnerabilities, capabilities, mitigation concepts, and response concepts that emerge from all three workshops. The exercise will be a "discovery" exercise, not a procedural exercise. In other words, the participants will seek to better understand the problems, interdependencies, and complexities associated with long-term grid failure.
In support of the workshops, CNA and the facilitator from IME, worked with the COG and the Exercise Design team to prepare for the workshops, including designing the agenda; conducting numerous interviews with key stakeholders; and developing workbooks, presentations, and other workshop materials.
Summary of Major Results Achieved:

- During Workshop #1, there was general consensus among participants during the panel discussion and the breakout sessions on the top three cascading effects that will arise as consequences from the scenario. These include:
  - Degradation or loss of ordinary communications capabilities;
  - Replenishment of fuel stocks; and
  - Management of the supply chain and prioritization of efforts to provide sufficient water, food, and shelter.
- During Workshop #2, the participants meaningfully confirmed the key vulnerabilities/capabilities identified by the first workshop that require strategic focus include: Water, Communications, and Fuel. There was also a consensus that there are no currently effective response strategies for water or communications in case of a long-term grid failure, highlighting the critical need for effective mitigation strategies/measures.

Relevant project activities include the following:

- **Key Stakeholder Interviews:** IME facilitator conducted more than 10 face-to-face interviews with a myriad of key stakeholders from government and private sector.
- **Panel Development:** CNA and the IME facilitator convened and coordinated panel of subject matter experts for the first workshop to discuss the functional impacts of a long-term power outage in the NCR.
- **Workshop #1:** CNA and IME supported workshop #1 which was attended by more than 30 agencies and companies. CNA developed the agenda and all workshop materials, to include a summary report.
- **Workshop #2:** CNA and IME supported workshop #2, where more than 20 NCR participants came to consensus on the areas requiring strategic focus.

The Mitchell Foundation, Water Use in the Texas Power Sector (CNA)	
Client Name and Contact Information	Marilu Hastings Sustainability Program Director Cynthia & George Mitchell Foundation 2630 Exposition Blvd. Suite #214 Austin, TX 78703 mhastings@cgmf.org sfiorenza@cgmf.org (512) 502-5182
Period of Performance:	April 2014 – March 2015
Place of Service:	CNA; Arlington, Virginia
Type of Contract:	Grant
Value:	$150,000

Project Overview:

The purpose of the project was to update an existing model developed at CNA to represent telectric power generation and its water requirements. We applied the model to evaluate the impacts of EPA's Clean Power Plan (CPP) on Texas. Texas has been in drought since 2011, and has been close to experiencing blackouts as a result. We found that policies to mitigate greenhouse gas emissions, including energy efficiency, wind, solar photovoltaics, and switching from coal to gas generation, could cut water use in Texas by between 20 to 35 percent, depending on the structure of the policy. We also found that criteria air pollutants would be substantially reduced. The reduction in water use would significantly improve the resilience of the power sector to drought and would also significantly reduce the risk of blackouts occurring.

Summary of Major Results Achieved:

- The results of the report were covered by more than 115 media outlets in Texas and across the U.S.
- The author briefed a variety of state agencies, including the Texas Public Utility Commission, Texas Water Development Board, and Texas Land Office, as well as private groups such as the Electricity Reliability Council of Texas (ERCOT), the Chamber of Commerce, electricity suppliers including the Gulf Coast Power Association, and the South-central Partnership for Energy Efficiency as a Resource (SPEER), among others.
- The next phase of the research will focus on developing a long-term clean energy plan for Texas.

Relevant project activities include the following:

- Developing and running an electric power sector model using mixed integer linear programming
- Developing and running GHG reduction strategies
- Evaluating GHG reductions, costs, and co-benefits of various GHG reduction strategies
- Interacting with stakeholders
- Composing technical reports and briefing policymakers

Third Industrial Revolution Master Plan for Nord-Pas de Calais, France (CNA)	
Client Name and Contact Information	Claude Lenglet President and Director General Chamber of Commerce and Industry of the Nord de France Region 299 Boulevard of Leeds CS 90028-5903 Email: c.lenglet@norddefrance.cci.fr Phone Number: +33 (0)3 20 63 77 48
Period of Performance:	January 2013 – October 2013
Place of Service:	Nord-Pas de Calais
Type of Contract:	Fixed cost
Value:	$300,000

Project Overview:

In his role as Chief Economist for the Third Industrial Revolution Initiatives, in 2013 John A. “Skip” Laitner spent almost six weeks on seven different occasions in France collaborating with eight working groups and others in the development of both best practices and an economic assessment that underpin a proposed restructuring of the economy of Nord-Pas de Calais. This included a three day deep-dive executive seminar with the Regional Council and the Chamber of Commerce in Nord-Pas de Calais. The multiple sessions included presentations from major corporations as Accenture, DNV KEMA (now DNV GL), Fraunhofer Institute for Solar Energy, Philips Lighting, Renault Nissan, Schneider Electric, and Tecnalia. This effort, together with many other interactions, resulted in a 300-page master plan that was formally delivered to Nord-Pas de Calais in a ceremony as part of the World Forum for a Responsible Economy convened in Lille on October 23-25, 2013. This plan laid out an investment strategy and program with the intent to reduce total energy consumption by as much as 60 percent and power all remaining energy needs with a portfolio of renewable energy resources, all by 2050.

As noted in the executive summary of the master plan, the “overall goal of the Third Industrial Revolution (TIR) in Nord-Pas de Calais is to make the regional economy one of the most resource-efficient, productive, and sustainable in the world.” The first step of this transformation was to seek greater levels of energy efficiency in the development of an interconnected infrastructure. Then, building on the many synergies that result from a logistics commons that link a variety of communications, storage, and renewable energy technologies that all contribute to greater levels of energy efficiency, productive investments can be directed toward greater innovation and job creation within the region.

According to the project’s director, "Mr. Laitner's participation was essential to the success of this project. In fact, he was invited, as part of the World forum Lille, to present his own thoughts on the master plan."

Summary of Major Results Achieved:
Using his own proprietary DEEPER modeling framework, Mr. Laitner developed the analytical tools that provided the economic foundation for the master plan. He provided background documentation on key financial strategies as well as best management practices that would mostly likely ensure a successful outcome of the master plan. Finally, he worked closely with eight working groups, involving more than 120 people from Nord-Pas de Calais, to pull key ideas, suggestions, and best practices into the development of the master plan.

According to Laitner's DEEPER modeling systems, the master plan will require the injection of 6 billion euros per year to reduce the final energy use by 60 percent by 2050. With a variety of renewable energy technologies providing the balance of regional energy needs, this long-term investment strategy will create more than 165,000 net jobs by 2050. With the active support of both the Chamber of Commerce and the Regional Council in Nord-Pas de Calais, efforts are now underway to implement the first set of projects and to identify the array of financial strategies that will successfully implement the master plan.

RSG

Federal Highway Administration, Energy and Emissions Reduction Policy Analysis Tool (EERPAT) (RSG)	
Client Name and Contact Information	Diane Turchetta Federal Highway Administration 1200 New Jersey Avenue, SE Washington, DC 20590 Email: diane.turchetta@dot.gov Phone Number: (202) 493-0158
Period of Performance:	May, 2012 – January, 2015
Place of Service:	Denver, CO; Olympia, WA; Montpelier, VT; Baltimore, MD
Type of Contract:	Task Plus Cost
Value:	$450,000

Project Overview:

As part of the Travel Model Improvement Program (TMIP), RSG has led pilot studies with four state DOTs (Washington, Colorado, Maryland, and Vermont) to develop, calibrate, and apply a set of linked models that estimate vehicle miles traveled (VMT) and the resulting emissions from the transportation sector. The model, known as the Energy and Emissions Reduction Policy Analysis Tool (EERPAT), provides specific insight into the types of policies that can reduce vehicle emissions and energy usage. EERPAT is used to test a wide range of policies, including fleet technology (e.g., alternative drivetrains such as electric vehicles), alternative fuels, pricing, land use/smart growth, investment into alternative modes (i.e., transit and bicycle/pedestrian facilities). RSG is also currently applying the EERPAT model for the Utah DOT to analyze the implications of higher-efficiency vehicles on state gasoline tax revenues in the future.
Maryland EERPAT Pilot/Baltimore Metropolitan Council Application:
For this project, RSG worked with Baltimore Metropolitan Council (BMC) staff to construct the statewide and metropolitan applications of the EERPAT. The State of Maryland enacted legislation (Maryland Greenhouse Gas Emissions Reductions Act of 2009 [Act]) requiring the State to achieve a 25% reduction in statewide greenhouse gas (GHG) emissions from 2006 levels by 2020. The Act also establishes a long-term goal of reducing GHG statewide emissions 80% below 2006 levels by 2050. To help meet these statewide goals, RSG developed state-level and metropolitan (Baltimore) EERPAT models to explore scenarios capturing synergies in technology, fuel, land use, and transportation supply/management policies/strategies with varying initiative levels. Individual policies were initially tested to understand the response of household travel demand. As a second round of analysis, policies were combined to determine the most effective mix of policy measures for achieving the state's GHG reduction goals.

Summary of Major Results Achieved:

- The Maryland pilot resulted in training of staff who are now capable to run EERPAT and report results relative to the goals set in the 2009 law.
- Key policy insights point to the importance of electric vehicle market share for light duty vehicles and projected fuel efficiency and fuel choice for heavy duty vehicles.
- The Baltimore Metropolitan Council, the MPO for the Baltimore region, is implementing EERPAT for a regional application to inform their "How Far Can We Get" program.

Washington EERPAT Project:

RSG worked with staff from the Washington Department of Transportation (WSDOT) Urban Planning office to develop a calibrated EERPAT model for Washington State. The model was calibrated to historic levels of vehicle miles traveled (VMT), fuel consumption, and auto ownership/fleet characteristics. WSDOT employed the model to inform policy for achieving the State's greenhouse gas (GHG) reduction goals established in the Governor's "Washington Climate Change Challenge." The targets established by the State of Washington aim to reduce GHG emissions to 1990 levels by the year 2020, and 50% below 1990 levels by 2050. WSDOT staff worked with RSG to test EERPAT's new Graphic User Interface (GUI), created by RSG, to set up scenarios, change input data, and perform policy analysis. The scenario analysis included individual and blends of policies covering travel demand management, vehicle technology, alternative fuel and fuel efficiency, parking, and pricing.

A common policy tested using EERPAT involves the penetration of hybrid electric, plug-in hybrid electric, and full-battery electric vehicles into the household vehicle fleet.

Summary of Major Results Achieved:

- The Washington pilot resulted in training of staff who are now capable to run EERPAT and report results relative to the goals established in the Governor's Climate Change Challenge.
- The WashDOT staff used the EERPAT model to develop sensitivity tests of different policies. Of particular interest was a set of Smart Growth and Travel Demand Management policies addressing workplace TDM incentives, growth in transit service, increased mode share of walking and biking for short distance trips, higher metropolitan population density, and increasing parking costs.
- The analysis showed that aggressive policy intervention would be necessary to achieve a 10- which, however, is highly contentious.

Colorado EERPAT Project:

The Colorado Department of Transportation (CDOT) conducted an Energy Smart Transportation Initiative (ESTI), which sets forth a variety of policies for managing transportation energy use. CDOT, in entering the EERPAT pilot process, desired to test several of the strategies described in ESTI. CDOT was also interested in reducing vehicular travel demand through land use mix, density, location, and design, reducing the need for costly roadway and infrastructure investments and providing other community benefits.

To illustrate, CDOT staff developed a scenario combining the following strategies:

- A higher share of urban growth within mixed use. For the Colorado DOT test case, it was assumed that 50% of population growth occurring in 4 metropolitan areas –Denver, Pikes Peak Area, Pueblo Area, and Grand Valley – beyond 2020 occurs in mixed land use areas.
- An increase in parking cost for work and non-work trips.
- An increase in the number of employers offering parking cash-out programs.

These combined policies resulted in a 4.5-7.0% reduction in VMT and GHG emissions, when compared to the Base Case.

Summary of Major Results Achieved:

- The Maryland pilot resulted in training of staff who are now capable to run EERPAT and report results relative to the goals set in the 2009 law.
- Key policy insights point to the importance of electric vehicle market share for light duty vehicles and projected fuel efficiency and fuel choice for heavy duty vehicles.
- The Baltimore Metropolitan Council, the MPO for the Baltimore region, is implementing EERPAT for a regional application to inform their "How Far Can We Get" program.

Vermont EERPAT Project:

Vermont's Comprehensive Energy Plan[1] sets forth an aggressive goal of satisfying 90% of the state's total energy needs through renewable energy sources by 2050. The plan states that "…(i)n order to make significant progress toward the state's overall energy consumption goal…by 2050, the Vermont Agency of Transportation has set a goal of 25% of all vehicles registered in Vermont be powered by renewable energy sources by 2030 (including electric vehicles and plug-in hybrids).
A variation of this policy – increasing the market penetration of alternate drive train vehicles (hybrid electric, plug-in hybrid, and battery electric) to 25% of the passenger vehicle fleet by 2050 – was simulated using the Vermont EERPAT model.

Summary of Major Results Achieved:

- EERPAT was used to simulate an aggressive adoption of alternate drive train vehicles by 2050.
- A policy run showed a 10% reduction in GHG emissions associated with the following market shares: 7% battery electric; 18% plug-in hybrid; and, 19% hybrid.
- Lower fuel costs associated with the alternate drive train vehicles, combined with lower fuel costs associated with the CAFÉ standards for light duty vehicles, causes bounceback in VMT. Namely, as household travel costs decline with greater fuel efficiency, a moderate increase in VMT is projected.
- Overall GHG emissions include emissions generated by the electricity sector during electric vehicle charging.

Ohio Department of Transportation, Transportation Infrastructure Vulnerability Assessment (RSG)	
Client Name and Contact Information	Matt Perlik Ohio Department of Transportation 1980 West Broad Street Columbus, OH 43223 Email: matt.perlik@dot.state.oh.us Phone Number: (614) 466-1937
Period of Performance:	August, 2013 – August, 2015
Place of Service:	Columbus, Ohio
Type of Contract:	Fixed Price
Value:	$235,000

Project Overview:

The Ohio Department of Transportation (ODOT) selected RSG to perform a transportation vulnerability assessment. The goal of the transportation vulnerability assessment was to determine consequences from a broad range of potential climate changes. As part of the project, RSG provided the foundation for ODOT to integrate the results of this vulnerability assessment into future decision-making processes and future adaptation/resiliency studies. Throughout the project, RSG collaborated with ODOT to identify segments or facilities at risk from climate change impacts within Ohio; these impacts were then categorized by region or type.

Summary of Major Results Achieved:

- RSG Inc. identified a range of adaptation and/or sustainability options or activities that ODOT can consider during future adaptation studies
- RSG developed an online application of FHWA's Vulnerability Assessment Screening Tool (VAST) which enables users to change the importance of vulnerability indicators (e.g. bridge scour, AADT) and view the resulting prioritized vulnerable assets on a map.
- Project included special research topics in pavement vulnerability and the potential of increasing freight movements through shipping due to the opening of the Northwest Passage.

Utah Department of Transportation, Analysis of the Impact of High-Efficiency Vehicles on Future Fuel Tax Revenues (RSG)	
Client Name and Contact Information	Cameron Kergaye Director of Research Utah Department of Transportation 4501 South 2700 West Salt Lake City, UT 84114 Email: ckergaye@utah.gov Phone Number: (801) 965-2576
Period of Performance:	August, 2014 – April, 2015
Place of Service:	Salt Lake City, Utah
Type of Contract:	Fixed Price
Value:	$50,000

Project Overview:

The Utah Department of Transportation (UDOT) Research Division retained RSG to analyze the potential impact of high-efficiency motor vehicles on future State of Utah revenues used to construct and maintain the highway network. High-efficiency motor vehicle use (including electric, hybrid, natural gas, and other alternative fuel vehicles) is on the rise in Utah and other states across the country. Vehicles with standard gasoline-powered engines are also being made more efficient—studies have been completed showing that the recently adopted Corporate Average Fuel Economy (CAFE) standards could cause a 20–60% drop in revenues across the United States by 2025. To address this question, RSG constructed the Energy and Emissions Reduction Policy Analysis Tool (EERPAT) model and calibrated the model to Utah state vehicle miles traveled (VMT), fleet characteristics (age mix and auto ownership), and demographic characteristics. The analysis incorporates assumptions of market penetration for alternative-fuel vehicles, including hybrid-electric, plug-in hybrid, battery-electric, and natural gas. The analysis shows significant reductions in future gas tax revenues based on varying assumptions of alternative-fuel vehicle market penetration and the adoption of Phase II heavy-duty vehicle standards.

Summary of Major Results Achieved:

- RSG's analysis revealed significant reductions in future gas tax revenues based on varying assumptions of alternative-fuel vehicle market penetration and the adoption of Phase II heavy-duty vehicle standards.
- The analysis shows a growing gap between transportation expenditures -- for operations and capital projects – and the sufficiency of the gas tax to meet these growing needs.
- Project results are being communicated to the State Legislature to initiate discussion of alternative transportation funding mechanisms..

TEMOSS

Wilmington Area Planning Council, Red Clay Valley Scenic Byway – Develop/Draft Design Overlay Standards (temoss, LLC)	
Client Name and Contact Information	Heather Dunigan Principal Planner Wilmington Area Planning Council (WILMAPCO) 850 Library Avenue, Suite 100 Newark, DE 19711 Email: HDunigan@wilmapco.org Phone Number: (302) 737-6205, ext. 118
Period of Performance:	February 2015 – February 2016
Place of Service:	Newark, DE
Type of Contract:	Sub-consultant to the Prime consultant (FFP)

Value:	$3,000 – $5,000

Project Overview: Develop/draft design overlay standards to improve protection for the Red Clay Valley Scenic Byways and to potentially incorporate overlay standards into the Uniform Development Code (UDC).

Project Scope and Objectives:

The objective of the Red Clay Valley Scenic Design Overlay Standards project is to build upon the strategies presented in the Red Clay Valley Corridor Management Plan (CMP) as they pertain to management of future land-use functions – including development and redevelopment – within the area. The approach to the project will involve Context Sensitive Design (CSD) strategies as well as restoration/enhancement efforts that will include refinements to the Unified Development Code.
The Red Clay Valley Scenic Byway is comprised of a network of 28 secondary roads within the Red Clay Creek Watershed, and is known for its scenic, natural, and historical resources. The project will include collaborative work with WILMAPCO and its planning partners, including the New Castle County Department of Land-use, Delaware Department of Transportation (DelDOT), the Delaware Nature Conservancy, and the Red Clay Valley Scenic Byway Alliance.

EYA and Housing Opportunities Commission (HOC) of Montgomery County, Chevy Chase Lake Residential Development (temoss, LLC)	
Client Name and Contact Information	McLean Quinn Vice President, Land Acquisition and Development EYA 4800 Hampden Lane, Suite 300 Bethesda, MD 20814 Email: MQuinn@eya.com Phone Number: (301) 634-8600
Period of Performance:	February 2013 – February 2016
Place of Service:	Chevy Chase, Maryland
Type of Contract:	Fixed Price
Value:	$25,000 – $30,000

Project Overview: Prepare traffic impact study for regulatory review, provide transportation planning input based on relevant master plan documents, and provide coordination with regulatory agencies.

Project Scope and Objectives: EYA and Housing Opportunities Commission (HOC) of Montgomery County are jointly redeveloping a 4.7-acre property ("Property") located along Chevy Chase Lake Drive in Chevy Chase, Maryland. The Property is located immediately next to the proposed Connecticut Avenue Purple Line Station. The Property is currently developed with 68 garden apartments and has sole access to Chevy Chase Lake Drive.

Under the redevelopment plan, existing garden apartments on the Property will be replaced with 62 townhouses and approximately 200 multi-family high-rise residential units. The project will involve dedication and construction of the section of a master-planned street within the Property (as recommended in the Chevy Chase Lake Sector Plan, to connect Chevy Chase Lake Drive to the south with Manor Road to the north) and will include adequate pedestrian/bicyclist connections to the proposed Purple Line station. Access to the townhouse portion of the development will be oriented towards Chevy Chase Lake Drive and access to the multi-family portion of the development will be oriented towards Private Street A.

Mission First Housing Development Corporation, Mount Jezreel Baptist Church Senior Housing/Mount Jezreel Christian School (temoss, LLC)	
Client Name and Contact Information	Donna Creedon Project Manager Mission First Housing Development Corporation

	1330 New Hampshire Avenue, NW, Suite 116 Washington, DC 20036 Email: DCreedon@missionfirsthousing.org Phone Number: (202) 223-3403
Period of Performance:	May 2014 – May 2017
Place of Service:	Silver Spring, Maryland
Type of Contract:	Fixed Price
Value:	$15,000 – $20,000

Project Overview: Prepare traffic impact study for regulatory review, provide transportation planning input based on relevant master plan documents, and provide coordination with regulatory agencies.

Project Scope and Objectives: Mount Jezreel Baptist Church is located at 420 University Boulevard East (MD 193) in Silver Spring, MD, along the east side of University Boulevard East, between Capital Beltway (I-495) to the north and Piney Branch Road (MD 320) to the south. The church property ("Property") is currently developed with a house of worship/sanctuary and the Mount Jezreel Christian School, which currently has 33 students enrolled in grades Pre-K through 6.

Mount Jezreel Baptist Church and Mission First Housing Group have filed a preliminary plan application to obtain approval for a 75-unit rental senior housing development on some vacant land on the Property. The Property currently consists of parcels P160 and P213 and a portion of existing, unimproved Malibu Drive right-of-way. The preliminary plan proposes to create two lots – Lot 1 and Lot 2 – with the proposed senior housing development to be located on Lot 1 and the existing Church and School to be located on Lot 2. As part of this preliminary plan, Mount Jezreel Baptist Church is also seeking approval for the existing Mount Jezreel Christian School on the Property to enroll up to 80 students. Access to the Property will continue to be provided to University Boulevard East. The proposed Purple Line Piney Branch Road Station will be located to the south of the Property, within a mile of the Property.

IME

Metropolitan Washington Council of Governments, Energy Exercise (IME, as a subcontractor to CNA)	
Client Name and Contact Information	Steve Bieber Water Resources Technical Manager Department of Environmental Programs Metropolitan Washington Council of Governments 777 North Capitol Street, NE, Suite 300 Washington, DC 20002 Email: sbieber@mwcog.org Phone Number: (202) 962-3219
Period of Performance:	September 2014 – May 2015
Place of Service:	National Capital Region
Type of Contract:	Time and Materials
Value:	$97,458.23

Project Overview:

Supporting the prime contractor CNA and working through COG and the Regional Emergency Support Function (RESF) 12, Energy, IME has assisted in developing a series of three workshops and a regional exercise to focus on complex issues, concerns and cascading impacts from a long-term power outage scenario. The purpose of the series is:

- Examine categories of plausible electrical grid failure and likely response scenarios;
- Identify potential resource needs and acquisition/delivery options;
- Identify options to support critical infrastructure and local community needs during a sustained power

outage;
- Identify missing components in existing energy emergency plans (i.e., renewable energy and advanced public purpose microgrids) in the National Capital Region (NCR); and
- Set the foundation for ongoing analysis of threats, vulnerabilities, mitigation opportunities, and enhanced response capabilities, and the capacity to recover or adapt.

The **first workshop** provided information on the bulk electric system, blackouts, and black starts and an opportunity to identify consequences unfolding from the scenario context. In the **second workshop** participants endeavored to select a workable set of vulnerabilities and capabilities to serve as mitigation/response priorities. The **third workshop**, scheduled for March 31, 2015, will focus on reviewing these proposed measures and conceiving other possible changes in current plans to enhance region-wide mitigation and response. The **tabletop exercise**, to be held in May 2015, will be organized around the scenario outlined during the first workshop. Participants will explore the vulnerabilities, capabilities, mitigation concepts, and response concepts that emerge from all three workshops. The exercise will be a "discovery" exercise, not a procedural exercise. In other words, the participants will seek to better understand the problems, interdependencies, and complexities associated with long-term grid failure.
In support of the workshops, CNA and the facilitator from IME, worked with the COG and the Exercise Design team to prepare for the workshops, including designing the agenda; conducting numerous interviews with key stakeholders; and developing workbooks, presentations, and other workshop materials.
Summary of Major Results Achieved:
- During Workshop #1, there was general consensus among participants during the panel discussion and the breakout sessions on the top three cascading effects that will arise as consequences from the scenario. These include:
  - Degradation or loss of ordinary communications capabilities;
  - Replenishment of fuel stocks; and
  - Management of the supply chain and prioritization of efforts to provide sufficient water, food, and shelter.
- During Workshop #2, the participants meaningfully confirmed the key vulnerabilities/capabilities identified by the first workshop that require strategic focus include: Water, Communications, and Fuel. There was also a consensus that there are no currently effective response strategies for water or communications in case of a long-term grid failure, highlighting the critical need for effective mitigation strategies/measures.

Relevant project activities include the following:
- **Key Stakeholder Interviews:** IME facilitator conducted more than 10 face-to-face interviews with a myriad of key stakeholders from government and private sector.
- **Panel Development:** CNA and the IME facilitator convened and coordinated panel of subject matter experts for the first workshop to discuss the functional impacts of a long-term power outage in the NCR.
- **Workshop #1:** CNA and IME supported workshop #1 which was attended by more than 30 agencies and companies. CNA developed the agenda and all workshop materials, to include a summary report.
- **Workshop #2:** CNA and IME supported workshop #2, where more than 20 NCR participants came to consensus on the areas requiring strategic focus.

National Capital Region Exercise and Training Panel Multiyear Training and Exercise Contract (IME, as a subcontractor to CNA)	
Client Name, Address and Telephone Number:	David McMillion, Director Public Safety and Health Metropolitan Washington Council of Governments 777 North Capitol Street, NE, Suite 300 Washington, DC 20002 Telephone: (202) 962-3708 E-mail: dmcmillion@mwcog.org
Period of Performance	July 2008 – July 2012
Place of Service:	National Capital Region (Washington, DC; Virginia; and Maryland)

Type of Contract:	IDIQ/Firm Fixed Price
Value: (varies due to IDIQ contract)	*2010 Senior Leader Seminar (SLS): $199,996; 2009 SLS: $181,000*

Project Overview:

IME as a subcontractor to CNA, was awarded a five-year IDIQ contract to provide training and exercise support for the National Capital Region (NCR) through a contract with the Metropolitan Washington Council of Governments (COG). All exercises are Homeland Security Exercise and Evaluation Program (HSEEP) - compliant.

2009 NCR EPC SLS. CNA, with partner IME, was awarded the 2009 National Capital Region (NCR) Emergency Preparedness Council's (EPC) Senior Leader Seminar (SLS), which was a regional energy exercise. This annual SLS provides an opportunity for NCR leaders, including elected officials, to discuss their respective roles and responsibilities in the context of a disaster that impacts all NCR jurisdictions. The goal of the 2009 SLS was to identify gaps in order to update the Regional Emergency Coordination Plan (RECP). Two objectives were to validate the principles and concepts of the RECP for use in coordinating a regional event; and to examine current NCR practices to identify changes required in the RECP, with a focus on senior-level coordination, communication, situational awareness, and decision-making, and the First Hour Checklist. To meet the goals and objectives, CNA and IME, working with an 11-person planning team composed of members from six different agencies, designed a two-part event: a morning workshop for representatives of the Regional Emergency Support Functions and Regional Programmatic Working Groups, and an afternoon Senior Leaders Seminar for the entire EPC and participants from the morning workshop. The seminar participants were asked to consider and discuss an extreme heat and drought scenario with energy implications. More than 73 NCR agencies and organizations and 114 representatives/players, including elected officials, participated in the seminar. The CNA-IME team was able to successfully achieve the goals and objectives of the event by identifying issues requiring policy discussion, changes to the RECP, and scenario-based improvement actions.

2010 NCR EPC SLS. The CNA-IME team was also awarded the 2010 NCR EPC SLS. CNA, working with an eight-person planning team drawn from seven different agencies, led by the Emergency Manager from Arlington County, designed the daylong event. The event included a morning workshop with multiple breakout groups, and an afternoon facilitated scenario-based discussion. Over 100 representatives/players from 58 organizations participated in the seminar. The scenario developed to support the objectives of the SLS was a simultaneous, multiple improvised explosive device (IED) event, with explosions in the District of Columbia, Fairfax County, and Montgomery County. The CNA-IME team collaboratively managed all aspects of the seminar, including all meeting logistics (including, for example, facility contracting, printing, and provision of food and beverages), and developing exercise materials (including the Workbook, Situation Manual (SitMan), Exercise Plan (ExPlan), and multimedia PowerPoint Briefings) and the After Action Report/Improvement Plan (AAR/IP).

2013 NCR EPC SLS. The CNA-IME team supported the cyber-focused 2013 NCR EPC SLS, held on November 1, 2013. The annual SLS provides an opportunity for NCR leaders, including elected officials, to discuss their respective roles and responsibilities in the context of a disaster affecting all NCR jurisdictions.

Prior to the establishment of this contract vehicle, the project manager managed/supported the 2008 and 2007 NCR EPC SLSs. The 2008 SLS involved a pandemic influenza scenario, and the 2007 SLS dealt with a vehicle-borne IED event with explosions in Springfield, Virginia and Prince George's County, Maryland, and a near-miss in Washington, DC.

National Level Exercise 2010 Planning Support, IME (subcontractor to L3)	
Client Name and Contact Information	Steven Lowery L3 Manager, Logistics and Mission Support 1320 Braddock Pl, Room #4118 Alexandria, VA 22314 (703) 664-2838
Period of Performance:	August 2009 – August 2010
Place of Service:	National Capital Region
Type of Contract:	Fixed Price

Value:	$35,000 – $40,000
As a subcontractor to L3, IME provided planning (IT and Communications Annex planning, IT COOP plans) support for the exercise development process for the full-scale NLE 2010. This support included on-site technical support for all of the preparatory planning conferences and exercises as well as the conduct of the exercise (IT support, LLIS support, National SimCell Support and NxMSEL support) and the follow-up exercises and conferences.	

Attachment A: Standard Terms and Conditions

ATTACHMENT A
STANDARD TERMS AND CONDITIONS

I. Energy Conservation – 42 U.S.C. 6321 et seq.

The Contractor agrees to comply with mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act.

II. Clean Water Requirements – 33 U.S.C. 1251 et seq.

1. The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended. The Contractor agrees to report each violation to COG and understands and agrees that COG will, in turn; report each violation as required to assure notification to appropriate federal agencies including the appropriate EPA Regional Office.
2. The Contractor also agrees to include these requirements in each subcontract exceeding $100,000 financed in whole or in part with Federal assistance.

III. Lobbying – 31 U.S.C. 1352 et seq.

(To be submitted with each bid or offer exceeding $100,000)

The undersigned certifies, to the best of his or her knowledge and belief, that:

1. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal Loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of and Federal contract, grant, loan, or cooperative agreement.
2. If any funds or than Federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form—LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions [as amended by "Government wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96). Note: Language in paragraph (2) herein as been modified in accordance with Section 10 of the Lobbying Disclosure Act of 1995 (P.L. 104-65, to be codified at 2 U.S.C. 1601, *et.seq.*)]
3. The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

[Note: Pursuant to 31 U.S.C. § 1352(c)(1)-(2)(A), any person who makes a prohibited expenditure or fails to file or amend a required certification or disclosure form shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such expenditure or failure.]

The Contractor, The CNA Corporation, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. A 3801, *et seq.*, apply to this certification and disclosure, if any.

Nicholas W. Hunter — Signature of Contractor's Authorized Official

Nicholas W. Hunter
Director, CAP — Name and Title of Contractor's Authorized Official

3/4/2015 — Date

IV. Access to Records and Reports – 49 U.S.C. 5325

1. The Contractor agrees to provide COG, and if applicable the state or federal funding agency, the Comptroller General of the United States or any of their authorized representatives access to any books, documents, papers and records of the Contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts and transactions.
2. The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.
3. The Contractor agrees to maintain all books, records, accounts and reports required under this contract for a period of not less than three years after the date of termination or expiration of this contract, except in the event of litigation or settlement of claims arising from the performance of this contract, in which case Contractor agrees to maintain same until COG, the applicable state or federal funding agency, the Comptroller General, or any of the their duly authorized representatives, have disposed of all such litigation, appeals, claims or exceptions related thereto.

V. Funding Agency Changes

Contractor shall at all times comply with all applicable state and federal agency regulations, policies, procedures and directives, including without limitation those listed directly or by reference in the funding agreement between such agency and COG, as they may be amended or promulgated from time to time during the term of this contract. Contractor's failure to comply shall constitute a material breach of this contract.

VI. Clean Air – 42 U.S.C. 7401 et seq

The Clean Air requirements apply to all contracts exceeding $100,000, including indefinite quantities where the amount is expected to exceed $100,000 in any year.

1. The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. §§ 7401 et seq. The Contractor agrees to report each violation to COG and understands and agrees that COG will, in turn; report each violation as required to assure notification to the funding federal agency, if any, and the appropriate EPA regional office.
2. The Contractor also agrees to include these requirements in each subcontract exceeding $100,000 financed in whole or in part with Federal assistance.

VII. Recycled Products – 42 U.S.C. 6962

The Recycled Products requirements apply to all contracts for items designated by the EPA, when COG or the contractor procures $10,000 or more of one of these items during the fiscal year, or has procured $10,000 or more of such items in the previous fiscal year, using federal funds.

The Contractor agrees to comply with all requirements of Section 6002 of the Resource Conservation and Recovery Act (RCRA), as amended (42 U.S.C. 6962), including but not limited to regulatory provisions of 40 CFR Part 247, and Executive Order 12873, as they apply to the procurement of the items designated in Subpart B of 40 CFR Part 247.

VIII. No Government Obligation to Third Parties

1. The Contractor acknowledges and agrees that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this contract and shall not be subject to any obligations or liabilities of COG, the Contractor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.
2. The Contractor agrees to include the above clause in each subcontract financed in whole or in part with Federal assistance. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions.

IX. Program Fraud and False or Fraudulent Statements and Related Acts – 31 U.S.C. 3801 et seq.

1. The Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. § 3801 et. seq. and all appropriate federal agency regulations apply to its actions pertaining to this Project. Upon execution of the underlying contract, the Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying contract of the Federally assisted project for which this contract work is being performed. In addition to other penalties that may be applicable, the Contractor further acknowledges that if it makes, or caused to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Contractor or to the extent the Federal Government deems appropriate.
2. The Contractor also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government under a contract connected with a project that is financed in whole or in part with Federal assistance, the Federal Government reserves the right to impose the penalties of 18 U.S.C. § 1001 and 49 U.S.C. § 5307(n) (1) on the Contractor, to the extent the Federal Government deems appropriate.
3. The Contractor agrees to include the above two clauses in each subcontract financed in whole or in part with Federal assistance. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to the provisions.

X. Termination – 49 U.S.C. Part 18

Applicable to all contracts in excess of $10,000

a. **Termination for Convenience** – COG, by written notice, may terminate this contract, in whole or in part, at any time by written notice to the Contractor when it is in COG's best interest. If this contract is terminated, COG shall be liable only for payment under the payment provisions of this contract for services rendered before the effective date of termination.
b. **Termination for Default [Breach or Cause]** – If the Contractor fails to perform in the manner called for in this contract, or if the Contractor fails to comply with any

other provisions of the contract, COG may terminate this contract for default. Termination shall be effected by serving a notice of termination on the Contractor setting forth the manner in which the Contract is in default. The Contractor will only be paid the contract price for services performed in accordance with the manner of performance set forth in the contract. If it is later determined by COG that the Contractor had an excusable reason for not performing, such as strike, fire, or flood, events which are beyond the control of the Contractor, COG, after setting up a new delivery of performance schedule, may allow the Contractor to continue work, or treat the termination as a termination for convenience.

c. COG in its sole discretion may, in the case of termination for breach or default, allow the Contractor ten (10) working days in which to cure the defect. In such case, the notice of termination will state the time period in which cure is permitted and other appropriate conditions.
If the Contractor fails to remedy to COG's satisfaction the breach or default of any of the terms, covenants, or conditions of this Contract within the 10 working days after receipt by Contractor of written notice from COG setting forth the nature of said breach or default, COG shall have the right to terminate the Contract without further obligation to Contractor. Any such termination for default shall not in any way operate to preclude COG from also pursuing all available remedies against Contractor and its sureties for said breach or default.

d. In the event COG elects to waive its remedies for any breach by Contractor of any covenant, term or condition of this Contract, such waiver by COG shall not limit COG's remedies for any succeeding breach of that or any other term, covenant, or condition of this Contract.

XI. Civil Rights Requirements – 29 U.S.C. § 62, 42 U.S.C. § 2000, 42 U.S.C. § 602, 42 U.S.C. § 12112, 42 U.S.C. § 12132, 49 U.S.C. § 5332

1. **Nondiscrimination** – In accordance with Title VI of the Civil Rights Act, as amended, 42 U.S.C. § 2000d, section 303 of the Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6102, section 202 of the Americans with Disabilities Act of 1990, 42 U.S.C. § 12132, and all other provisions of Federal law, the Contractor agrees that it will not discriminate against any employee or applicant for employment because of race, color, creed, national origin, sex, age, or disability. In addition, the Contractor agrees to comply with applicable Federal implementing regulations.
2. **Equal Employment Opportunity** – The following equal employment opportunity requirements apply to the underlying contract:
    a. **Race, Color, Creed, National Origin, Sex** – In accordance with Title VII of the Civil Rights Act, as amended, 42 U.S.C. § 2000e, the Contractor agrees to comply with all applicable equal employment opportunity requirements of U.S. Department of Labor (U.S. DOL) regulations, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," 41 CFR Parts 60 et seq., (which implement Executive Order No. 11246, "Equal Employment Opportunity," as amended by Executive Order No. 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," 42 U.S.C. § 2000e note), and with any applicable Federal Statutes, executive orders, regulations, and Federal policies that may in the future affect activities undertaken in the course of this Project. The Contractor agrees to take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, creed, national origin, sex, or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination;

rates of pay or other forms of compensation; and selection for training, including apprenticeship. In addition, the Contractor agrees to comply with any implementing requirements the funding federal agency may issue.

b. **Age** – In accordance with section 4 of the Age Discrimination in Employment Act of 1967, as amended, 29 U.S.C. § § 623 and other applicable law, the Contractor agrees to refrain from discrimination against present and prospective employees for reason of age. In addition, the Contractor agrees to comply with any implementing requirements the funding federal agency may issue.

c. **Disabilities** – In accordance with section 102 of the Americans with Disabilities Act, as amended, 42 U.S.C. § 12112, the Contractor agrees that it will comply with the requirements of U.S. Equal Employment Opportunity Commission, "Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act," 29 CFR Part 1630, pertaining to employment of persons with disabilities. In addition, the Contractor agrees to comply with any implementing requirements the funding federal agency my issue.

3. The Contractor also agrees to include these requirements in each subcontract financed in whole or in part with Federal Assistance, modified only if necessary to identify the affected parties.

XII. Breaches and Dispute Resolution

Disputes – Disputes arising in the performance of this Contract which are not resolved by agreement of the parties shall be decided in writing by the COG Executive Director or his/her designee. This decision shall be final and conclusive unless within ten (10) working days from the date of receipt of its copy, the Contractor mails or otherwise furnishes a written appeal to the Executive Director or his/her designee. In connection with any such appeal, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of its position. The decision of the Executive Director or his/her designee shall be binding upon the Contractor and the Contractor shall abide the decision.

Performance During Dispute – Unless otherwise directed by COG, Contractor shall continue performance under this Contract while matters in dispute are being resolved.

Claim for Damages – Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the party or of any of its employees, agents or others for acts it is legally liable, a claim for damages therefore shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

Remedies – Unless this contract provides otherwise, all claims, counterclaims, disputes and other matters in question between COG and the Contractor arising out of or relating to this agreement or its breach will be decided by arbitration if the parties mutually agree, or in a court of competent jurisdiction within the District of Columbia.

Rights and Remedies – The duties and obligations imposed by the Contract and the rights and remedies available there under shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law. No action or failure to act by COG or the Contractor shall constitute a waiver or any right or duty afforded to them under the Contract, not shall any such action or failure to act constitute an approval of or acquiescence in any breach there under, except as may be specifically agreed in writing.

XIII. Patent and Rights in Data

A. **Rights in Data** - The following requirements apply to each contract involving experimental, developmental or research work:

(1) The term "subject data" used in this clause means recorded information, whether or not copyrighted, that is delivered or specified to be delivered under the contract. The term includes graphic or pictorial delineation in media such as drawings or photographs; text in specifications or related performance or design-type documents; machine forms such as punched cards, magnetic tape, or computer memory printouts; and information retained in computer memory. Examples include, but are not limited to: computer software, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identifications, and related information. The term "subject data" does not include financial reports, cost analyses, and similar information incidental to contract administration.

(2) The following restrictions apply to all subject data first produced in the performance of the contract to which this Attachment has been added:

(a) Except for its own internal use, the Purchaser or Contractor may not publish or reproduce subject data in whole or in part, or in any manner or form, nor may the Purchaser or Contractor authorize others to do so, without the written consent of the Federal Government, until such time as the Federal Government may have either released or approved the release of such data to the public; this restriction on publication, however, does not apply to any contract with an academic institution.

(b) In accordance with 49 C.F.R. § 18.34 and 49 C.F.R. § 19.36, the Federal Government reserves a royalty-free, non-exclusive and irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use, for "Federal Government purposes," any subject data or copyright described in subsections (2)(b)1 and (2)(b)2 of this clause below. As used in the previous sentence, "for Federal Government purposes," means use only for the direct purposes of the Federal Government. Without the copyright owner's consent, the Federal Government may not extend its Federal license to any other party.

1. Any subject data developed under that contract, whether or not a copyright has been obtained; and

2. Any rights of copyright purchased by the Purchaser or Contractor using Federal assistance.

(c) For FTA Assisted Contracts - When FTA awards Federal assistance for experimental, developmental, or research work, it is FTA's general intention to increase transportation knowledge available to the public, rather than to restrict the benefits resulting from the work to participants in that work. Therefore, unless FTA determines otherwise, the Purchaser and the Contractor performing experimental, developmental, or research work required by the underlying contract to which this Attachment is added agrees to permit FTA to make available to the public, either FTA's license in the copyright to any subject data developed in the course of that contract, or a copy of the subject data first produced under the contract for which a copyright has not been obtained. If the experimental, developmental, or research work, which is the subject of the underlying contract, is not completed for any reason whatsoever, all data developed under that contract shall become subject data as defined in subsection (a) of this clause and shall be delivered as the Federal Government may direct. This subsection (c), however, does not apply to adaptations of automatic data processing equipment or programs for the Purchaser or Contractor's use whose costs are financed in whole or in part with Federal assistance provided by FTA for transportation capital projects.

(d) Unless prohibited by state law, upon request by the Federal Government, the Purchaser and the Contractor agree to indemnify, save, and hold harmless the Federal Government, its officers, agents, and employees acting within the scope of their official duties against any liability, including costs and expenses, resulting from any willful or intentional violation by the Purchaser or Contractor of proprietary rights, copyrights, or right of privacy, arising out of the publication, translation, reproduction, delivery, use, or disposition of any data furnished under that contract. Neither the Purchaser nor the Contractor shall be required to indemnify the Federal Government for any such liability arising out of the wrongful act of any employee, official, or agents of the Federal Government.
(e) Nothing contained in this clause on rights in data shall imply a license to the Federal Government under any patent or be construed as affecting the scope of any license or other right otherwise granted to the Federal Government under any patent.

(f) Data developed by the Purchaser or Contractor and financed entirely without using Federal assistance provided by the Federal Government that has been incorporated into work required by the underlying contract to which this Attachment has been added is exempt from the requirements of subsections (b), (c), and (d) of this clause, provided that the Purchaser or Contractor identifies that data in writing at the time of delivery of the contract work.

(g) Unless the federal funding agency determines otherwise, the Contractor agrees to include these requirements in each subcontract for experimental, developmental, or research work financed in whole or in part with Federal assistance.

(3) Unless the Federal Government later makes a contrary determination in writing, irrespective of the Contractor's status (i.e., a large business, small business, state government or state instrumentality, local government, nonprofit organization, institution of higher education, individual, etc.), the Purchaser and the Contractor agree to take the necessary actions to provide, through the federal funding agency, those rights in that invention due the Federal Government as described in

U.S. Department of Commerce regulations, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms under Government Grants, Contracts and Cooperative Agreements," 37 C.F.R. Part 401.

(4) The Contractor also agrees to include these requirements in each subcontract for experimental, developmental, or research work financed in whole or in part with Federal assistance provided by FTA.

B. **Patent Rights** - The following requirements apply to each contract involving experimental, developmental, or research work:

(1) General - If any invention, improvement, or discovery is conceived or first actually reduced to practice in the course of or under the contract to which this Attachment has been added, and that invention, improvement, or discovery is patentable under the laws of the United States of America or any foreign country, the Purchaser and Contractor agree to take actions necessary to provide immediate notice and a detailed report to the party at a higher tier until the Federal funding agency is ultimately notified.

(2) Unless the Federal Government later makes a contrary determination in writing, irrespective of the Contractor's status (a large business, small business, state government or state instrumentality, local government, nonprofit organization, institution of higher education, individual), the Purchaser and the Contractor agree to take the necessary actions to provide, through the Federal funding agency, those rights in that invention due the Federal Government as described in U.S. Department of Commerce regulations, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," 37 C.F.R. Part 401.

(3) The Contractor also agrees to include the requirements of this clause in each subcontract for experimental, developmental, or research work financed in whole or in part with Federal assistance.

XIV. Interest of Members of Congress

No member of or delegates to the Congress of the United States shall be admitted to a share or part of this Contract or to any benefit arising there from.

XV. Interest of Employees of COG

No employee of COG who exercises any functions or responsibilities in review or approval of the undertaking or carrying out the Project during his or her tenure or one year thereafter shall have any personal interest, direct or indirect, apart from his or her official duties, in this Contract or the proceeds thereof.

XVI. Interest of the Contractor

The Contractor covenants that it has presently no financial interest, shall not acquire any financial interest, direct or indirect, which would conflict in any manner or degree with the performance of services required to be performed under this Contract. The Contractor further covenants that, in the performance of this Contract, no person having any such interest shall be employed.

XVII. Allowable Costs

Only those costs which are consistent with Title 48 Part 31 of the Code of Federal Regulations shall be reimbursed under this Contract.

XVIII. Covenant Against Contingent Fees

The Contractor warrants that it has not employed any person to solicit or secure this Contract upon any agreement for a commission, percentage, brokerage or contingent fee. Breach of warranty shall give the Contracts Officer the right to terminate this Contract or, in his discretion, to deduct from the Contract price or consideration the amount of such commission, percentage, brokerage or contingent fees. This warranty shall not apply to commissions' payable by the Contractor upon contracts or sales secured or made through a bona fide established commercial or selling agency maintained by the Contractor for the purpose of securing business.

XIX. Indemnification

The Contractor, acting as an independent contractor, shall hold COG harmless from and shall be solely responsible, where found liable, for the payment of any and all claims for loss, personal injury, death, property damage, or otherwise, arising out of any act of omission or negligence of its employees or agents in connection with the performance of this work.

XX. Severability

It is understood and agreed by the parties that if any of these provisions shall contravene, or be invalid under, the laws of the particular state, county or jurisdiction where used, such contravention or invalidity shall not invalidate the whole agreement, but the Contract shall be construed as if not containing the particular provision or provisions held to be invalid in the said particular state, county or jurisdiction and the rights and obligations of the parties shall be construed and enforced accordingly.

XXI. Assignments

This Contract shall not be assigned, sublet or transferred in whole or in part by the Contractor, except with the previous written consent of the COG Contracting Officer or his designee.

XXII. Entire Agreement

This Contract sets forth the entire understanding of the parties and supersedes all previous agreements, whether oral or in writing, relating to the subject matter hereof. This Contract may only be altered, amended or modified in accordance with Changes Clause of this Contract.

XXIII Confidential or Personal Data

a. COG respects the privacy or business interests involved in confidential or personal data. It is COG's policy to obtain confidential or personal data or store or allow storage of such data only 1) when necessary to fulfill COG's information-gathering and data collection responsibilities, or 2) in conjunction with COG projects. COG intends to minimize risk of disclosure of such confidential or personal data.

b. Whenever feasible and the requirements of a project allow, the names of survey participants or users of a website or other data collection method shall not be accepted, recorded, stored or retained.

c. When COG engages in a project, which involves the collection or storage of confidential or personal information by or through use of surveys, websites or by other data collection, the following conditions shall be met:

   1) The survey, website or other collection method shall contain a set of conditions for use and a disclaimer of any COG liability for use, in language approved by COG in writing.

   2) The party(ies) working with COG shall demonstrate adherence to a federal or applicable state standard for protecting confidential or personal information.

   3) The confidential or personal information collected or stored by or through the survey, website or other data collection shall be kept confidential. All necessary steps shall be taken to protect the privacy of the users of the website or other data collection. Any confidential or personal information provided by users of the website or other data collection, including but not limited to their names and addresses, shall be protected.

   4) COG shall retain control over and ownership of all surveys, WebPages, control files and scripts, database schema, and database contents, in addition to all content which is published on or stored by the website or other data collection, unless COG specifically agrees in writing otherwise.

   5) No release of any announcements intended for public dissemination concerning the collection or storage of such information by or through the survey, website or other data collection shall occur until COG has given prior written authorization, unless COG specifically agrees in writing otherwise.

   6) In the event that information collected or stored by or through the survey, website or other data collection shall be stolen or handled incorrectly, the party(ies) working with COG on the project shall be responsible for any required notification to persons who have entered personal information in that system and all costs related thereto.

7) The project documents shall provide that other parties working with COG on the survey, website or other data collection or storage shall indemnify COG with at least the following commitment:

   The [CONTRACTOR or other party] shall indemnify and hold COG harmless from and shall be solely responsible, for the payment of any and all claims for loss, personal injury, death, property damage, infringement or misappropriation of any third party's intellectual property rights, violation of privacy, confidentiality or otherwise, arising out of any act of omission or negligence of its employees or agents in connection with the performance of the work under this [agreement or memorandum of understanding].

8) At the end of the project or contract, any personal or confidential information shall be given to COG or destroyed and a certification of destruction provided to COG by the contractor or other party.

XXIV. COG's Policies and Procedures

When federal law, or any grant conditions, certifications or assurances require COG to utilize competitive procurement procedures for selection of a contractor, COG's policies and procedures shall govern every aspect of the contractor selection process, e.g., the solicitation, evaluation, award, and post-award process (including, without limitation, any protest of an award, and the terms and conditions under which a contract may be approved, executed and administered). Any contractor and potential contractor will be provided with a copy of such policies and procedures, on request.

XXV. Additional Requirements

In addition to the terms and conditions expressly referenced in this CONTRACT, the SUBGRANTEE acknowledges and agrees that the terms and conditions of any federal or state grant that provides funding for this CONTRACT, in whole or in part, shall apply to and shall govern the parties' rights and obligations under this CONTRACT and shall be deemed additional terms, conditions and requirements of this CONTRACT.

XXVI. Priority of Requirements

In the event of a conflict between or among any of the terms, conditions and requirements applicable to this CONTRACT, the conflict shall be resolved by assigning the following priorities, in the order as stated below:

1) Terms and conditions of any grant that provides funding for this CONTRACT, in whole or in part;
2) Terms and conditions set forth or referenced within Attachment A to this CONTRACT;
3) Terms and conditions set forth or referenced within Parts I and II of this CONTRACT;
4) Terms, conditions, specifications, and requirements set forth within any solicitation (e.g., RFP or IFB) pursuant to which this CONTRACT was awarded.

Attachment B: Certification Regarding Debarment, Suspension, and Other Responsibility Matters

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.

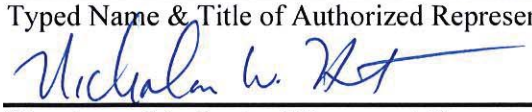
Vendor understands that a false statement on this certification may be grounds for rejection of any submitted proposal or quotation or termination of any award. In addition, under 18 USC Sec. 1001, a false statement may result in a fine of up to $10,000 or imprisonment for up to 5 years, or both if federal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

The CNA Corporation

Typed Name of Vendor

Nicholas W. Hunter, Director, CAP

Typed Name & Title of Authorized Representative



3/4/2015

Signature of Authorized Representative Date

Attachment C: Contact Information Sheet

ATTACHMENT C
CONTACT INFORMATION SHEET

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

RFP/RFQ No.: 15-010 Federal Tax ID No.: 54-1558882

Name of Offeror: The CNA Corporation

Address of Offeror: 3003 Washington Boulevard, Arlington, VA 22201

Telephone No: 703-824-2082 Fax No.: 703-824-2903 Website: www.cna.org

Name of Authorized Representative: Nicholas W. Hunter

Mailing Address (If different from Above): _____

Telephone No.: 703-824-2082 Mobile No.: _____ Other: _____

Email Address: huntern@cna.org

Name of Contact Person for this RFP/RFQ: Nicholas W. Hunter

Title of Contact Person: Director, CAP

Telephone No.: 703-824-2082 Mobile No.: _____ Other: _____

Email Address: huntern@cna.org

Attachment D: Resumes of Key Personnel

Attachment D includes full resumes of all proposed Key Personnel.

Prasad Nerikar (CNA), Project Manager

Academic Background

Master of Laws (LLM), Environmental Law – George Washington Law School 1994

Juris Doctor (JD) – American University Law School 1990

Bachelor of Arts (BA) – Political Science 1987

Skills and Subject Matter Expertise

Prasad Nerikar is the Director of Safety and Security for CNA Safety and Security Division. He is a senior environmental and emergency management professional with 25 years of professional experience supporting federal, state, and local clients. He has managed and provided diverse technical expertise in large and small-scale contracts in environmental and emergency management arenas, most notably in environmental emergencies. For EPA, Prasad managed both the September 11, 2001 and Anthrax Lessons Learned reports. Furthermore, Prasad has consulted with multi-national corporations in regulatory compliance issues such as product clearance, chemical control regulations, and environmental release requirements. He has experience in directing and managing business development activities, project execution, and staff development.

Work History

- **Director, Safety and Security (CNA) (2015 – Present) -** Leading research and marketing focused on environment policy, emergency management, homeland security, and climate change.
- **Senior Director: Environmental Policy and Emergency Management Programs-(SRA) (**2003 – 2015) Senior director for environmental policy and emergency management program coordination. Managed and provided technical expertise specializing in environmental and natural disaster emergency management, preparedness and homeland security issues for a functionally diverse client base. Directed business development, project execution and staff development for up to 25 emergency management and homeland security professionals. Prepared and conducted monthly project audits to ensure exceptional execution, contract compliance, financial accountability, timekeeping policy adherence, and procurement procedure compliance. Oversaw, reviewed and audited monthly financial, operational, and organizational status. Implemented adjustments in business operations and performance to meet quarterly, annual, and strategic planning goals. Managed and provided technical expertise to functionally diverse accounts.

- Program Manager: EPA Office of Emergency Management (OEM) Mission Support Contract - Managed EPA OEM contract for two consecutive contract cycles encompassing 12 years. Contract SOW areas included: preparedness planning, threat identification, emergency response, technical support for regulatory development related to chemical security, environmental, public health, and economic consequences of emergencies/adverse incidents, and EPA workshops. Contract values $25M and $56.5M respectively.\
- WORK ASSIGNMENT MANAGER - NATIONAL INCIDENT MANAGEMENT SYSTEM INTEGRATION / TEAM SUPPORT (EPA/OEM) - Managed development of EPA's National Incident Management System (NIMS) integration compliance policies and procedures, including policy, strategy, guidance development, and delivery of a 3-day ICS Symposium in support of its mission to provide national leadership in the prevention, preparedness and ability to respond to health and environmental emergencies.
- WORK ASSIGNMENT MANAGER - EMERGENCY OPERATIONS CENTER SUPPORT (EPA/OEM) - Led strategic policy and technical guidance between EPA Headquarters and its regions. Managed EPA incident activations for Hurricanes Katrina and Rita, Japanese Fukushima Reactor, Deepwater Horizon, and Superstorm Sandy.

- WORK ASSIGNMENT MANAGER - NATIONAL TOP OFFICIAL (TOPOFF 2/3/4) FULL-SCALE EXERCISES & SUPPORT (EPA/OEM) - Oversaw logistical support of EPA's involvement in TopOff 2, 3, and 4 exercises and all after-action activities. Managed SRA's support to EPA regional offices and headquarters during exercise activities.
- WORK ASSIGNMENT MANAGER - NATIONAL APPROACH TO RESPONSE ASSESSMENT (EPA/OEM) - Directed EPA's efforts to examine the National Approach to Response Program. Helped develop the Incident Management Assistance Team, and provided leadership in strategic planning, risk mitigation/management, and protection strategies against all-hazard attacks.
- WORK ASSIGNMENT MANAGER - COLUMBIA SHUTTLE LESSONS LEARNED (EPA/OEM) - Interviewed EPA Region 6 personnel and prepared after-action analyses. Compiled surveys and interviews, and reported findings to various government agencies/departments on the impact of the Columbia Shuttle Disaster and Response.

- **Project Manager - Computer Sciences Corporation (CSC) (**1997 – 2003) - Provided technical, analytical, meeting and management support to EPA's Emergency Response and Oil programs under the ORE contract.Delivered support to EPA OERR on a number of issues related to remedial aspects of the Superfund process, including 5-year review, remedy selection and Superfund redevelopment. Developed 20+ work plans, task orders and cost estimates in response to statements of work issued by EPA. Directed EPA's September 11, 2001 and Anthrax Lessons Learned (After Action) reports for the Office of Emergency and Remedial Response (OERR) submitted to EPA Administrator and Congress. Managed 7 Superfund work assignments totaling $3.2M under the Superfund contract and two task orders totaling $400K under the Office of Regulatory Enforcement (ORE) contract.

- **Client Manager - BDM International, Inc.** (1997) - Oversaw proposal management and coordination activities for various business units within the company. Supervised a professional 10-person team in charge of the proposal writing and production processes. Reviewed RFP requirements and compliance of proposals submitted to the EPA, DoD, and DOE.

- **Senior Analyst - SocioTechnical Research Applications (**1994 – 1997) - Provided detailed regulatory analysis of DOE's regulation on radioactive waste management. Analyzed legislative and regulatory responses to poor indoor air quality for EPA's Indoor Environments Division.

Selected Publications

Nerikar, Prasad. *This Wetland Is Your Land, This Wetland Is My Land: Section 404 of the Clean Water Act and Its Impact on the Private Development of Wetlands,* 4 Admin. L.J. 197 (1990) (selected by WESTLAW)

Nerikar, Prasad. Thesis: *To Disclose Or Not To Disclose? That Is The Question: Is Reform Needed of Section 14 of The Toxic Substances Control Act?*

Paul Faeth
Senior Engineer (CNA)

Academic Background

MSc, Engineering (Resource Systems and Policy Design), Dartmouth College, 1984

BSc, Agricultural Engineering, University of Florida, 1981

Skills and Subject Matter Expertise

Paul Faeth is Director, Energy, Water and Climate for CNA's Institute for Public Research, where he manages a program of work exploring the policy synergies between these themes. He has 30 years of experience working on and managing policy analysis concerning economics and the environment. His current work focuses on the impacts of EPA's Clean Power Plan on carbon dioxide reduction, air quality gains, and water use; the energy-water nexus in the power sectors of Texas, China, France, and India; the environmental impacts of fracking; the co-benefits of land-use change and conservation; and the impact of climate change on water security in Asia. Prior to joining CNA, Faeth was the President of Global Water Challenge, a coalition of 24 corporations, NGOs, foundations, universities, and health agencies, working together to promote and invest in safe drinking water and sanitation for the poor in developing countries. Faeth worked for 18 years at the World Resources Institute (WRI), a global environmental think tank, where he led the Institute's Economics Program and then became its Executive Vice-President and Managing Director, managing strategy and operations. Faeth's policy research at WRI included topics such as water, agriculture, climate change, and trade. Faeth also worked as an assistant program director for the International Institute for Environment and Development, and as an operations research analyst at the USDA's Economic Research Service.

Functional area of expertise #1. *Modeling policies and how they affect GHG mitigation, costs, air quality, and water use in the electric power sector*. Development of models to evaluate impacts, including mixed-integer linear programming and systems models. Developed the first policy model of the power sector to include water consumption and withdrawal.

Functional area of expertise #2: *Evaluation of land-use change and its impacts on multiple effects, including nutrient loading and water quality, air quality, forest fragmentation, and health risks*. Estimating GHG reductions from land-use changes and conservation. Completed the first study to holistically evaluate the potential environmental impacts of fracking.

Work History

- **Director, Energy, Water and Climate**, CNA (2010 – Present): Leading a research program focused on energy, water, climate change, and security. Responsible for strategic development, research, fundraising, and staffing. Supporting and/or overseeing several projects currently underway examining the energy-water-climate nexus; regional security implications of water scarcity and climate change in Asia; long-term cumulative environmental effects of fracking; and potential national and international security

impacts of disruptive energy technologies. Prior studies examined water use in the energy sector and its impacts on U.S. energy security, as well as the connections between water availability and conflict in developing countries. Secret-level security clearance active since 2010.

  - Developed innovative power sector modeling to conduct case studies in China, India, France, and Texas. The results showed that there are positive synergies among water use for cooling, conventional air pollutants, and greenhouse gas mitigation. In all of the cases, substantial development of wind resources and efficiency can promote sustainable use of water resources while also minimizing air pollution and carbon dioxide emissions.

- **President**, Global Water Challenge (2007 – 2010): Moved an informal coalition of 24 NGOs, PVOs (private voluntary organizations), corporations, health agencies, and foundations to an incorporated non-profit membership organization. Responsible for development of organizational mission and goals, business plan, and strategic plan, partnership development, and donor stewardship. Principal organizational spokesperson and liaison to government agencies and corporations.
  - Recruited and supported seven Fortune 100 companies to lobby the U.S. Congress for increased funding for water, sanitation, and hygiene (WASH) programs in developing countries. Efforts contributed to a ten-fold increase in funding of WASH programs, from $30 million in 2007 to $300 million in 2008 and thereafter.
  - Sponsored an international crowdsourcing competition to identify social entrepreneurs implementing innovative financing models for community water and sanitation provision. Secured a $1 million grant to enable the top five contestants to create pilots or scale up. The effort was awarded the "NGO Campaign of the Year" in 2008 by *Treehugger.com*.
  - Secured $2.3 million *pro bono* agreement with Deloitte to develop and implement an innovative reporting, monitoring, and evaluation system for water and sanitation projects.
  - Named one of *Washingtonian* magazine's "Local Eco-Heroes," April, 2008.
- **Executive Vice President and Managing Director**, World Resources Institute (2002 – 2006): Responsible for day-to-day management of the institute's full-time staff of 135, with approximately 150 partnerships in 58 countries. Focus on four program areas dealing with biological resources, climate change, sustainable enterprise, and environmental governance.
- **Acting Chief Financial Officer, Secretary-Treasurer, and Vice-President for Administration**, World Resources Institute (2004 – 2005): Implemented new budgeting and forecasting system that reduced staff effort yet provided better financial information regarding expenditure, funds in hand, and grants management.

- **Director, Economics Program**, World Resources Institute (1997 – 2002): Initiated and led the "Green Power Market Development Group." Within three years, the 13 corporate members were the largest buyers of five types of renewable energy in the U.S. The effort reduced the cost of renewable energy and led to major purchases by additional companies.
    - Led a collaborative effort with state governments and watershed groups to examine the costs and benefits of policies for nutrient reductions, including trading. Developed an on-line nutrient trading program to reduce hypoxia in the Chesapeake Bay.
    - Led a study to model the environmental and economic impacts on the agricultural sector of policies to implement the Kyoto Protocol in the U.S. Work was done in collaboration with the Farm Bureau, the National Corn Producers Association, the National Pork Producers, the Cotton Council, and the National Association of Wheat Growers. The analysis showed a benefit if offsets could be traded, and led these groups to publicly endorse the Protocol.
    - Team leader of a collaborative project to evaluate and implement economic instruments to protect water supplies while also providing biodiversity protection. Project sites were in Guatemala, Panama, and South Africa.
- **Senior Associate, Economics and Population Program**, World Resources Institute (1991 – 1997): Led a collaborative effort with General Motors, Monsanto, and BP to develop a climate action plan for businesses called *Safe Climate, Sound Business: An Action Agenda*. Created the first national U.S. agricultural policy model that could estimate the environmental impacts and economic costs of various policies. The model is still in use by the USDA. Developed methods used by numerous offset projects to evaluate their carbon sequestration benefits.
- **Associate, Economics and Population Program**, World Resources Institute (1988 – 1991): Headed the world's first carbon offset project and created the first model to estimate the carbon offset benefits of forestry projects. Developed methods to estimate the environmental impacts and economic performance of conventional and sustainable agricultural practices in the U.S., India, the Philippines, and Chile. Put together the world's first carbon offset, coupling an agroforestry project in Guatemala with an electric power plant in Connecticut.
- **Assistant Program Director**, International Institute for Environment and Development (1985 – 1988): Developed systems models looking at the ecology of game ranching in Botswana, agricultural development's impact on wildlife in Sri Lanka, and reef recovery in Hawaii.
- **Operations Research Analyst, Economic Research Service (ERS)**, U.S. Department of Agriculture (1983 – 1985): Worked on the development of several new models for food policy and trade analysis. Updated and ran ERS' principal policy model.

Professional Affiliations

- Member, IEEE Power & Energy Society
- Member, American Academy for the Advancement of Science

Selected Publications

Faeth, Paul. *The Impacts of EPA's Clean Power Plan on Electricity Generation and Water Use in Texas: Additional Scenarios.* Expected March 2015. CNA Corporation.

Habicht, Steven, Lars Hanson, and Paul Faeth. *The Potential Impacts of Fracking on Land-use, Water Quality, and Air Quality in the Delaware River Basin*. Expected March 2015. CNA Corporation.

Faeth, Paul. "Climate Change Mitigation Efforts Largely Overlook Water Role," *Bloomberg BNA Water Law & Policy Monitor*, February 19, 2015.

Faeth, Paul. *The Impacts of EPA's Clean Power Plan on Electricity Generation and Water Use in Texas*. November 2014. CNA Corporation. IRM-2014-U-009083.

Faeth, Paul, et al., *A Clash of Competing Necessities: Water Adequacy and Electric Reliability in China, India, France, and Texas*. July 2014. CNA Corporation. IRM-2014-U-007191.

Faeth, Paul, and Benjamin Sovacool. *Capturing Synergies Between Water Conservation and Carbon Dioxide Emissions in the Power Sector*. July 2014. CNA Corporation. IRM-2014-U-008090.

Faeth, Paul, and Erika Weinthal. "How Access to Clean Water Prevents Conflict." *Solutions* Vol. 3, Iss.1 (January 2012).

Faeth, Paul. "U.S. Energy Security and Water: The Challenges We Face," *Environment* (January-February 2012).

Faeth, Paul. "Water, Climate, and Conflict Vulnerabilities in Poor Countries," CNA White Paper, September, 2011.

La Vina, Antonio, Lindsey Fransen, Paul Faeth, and Yuko Kurauchi. *The Doha Round, Agricultural Subsidies and Developing Countries: "No Regrets" Policies for Livelihoods and the Environment* (World Resources Institute: Washington, D.C., May 2006).

Faeth, Paul and Suzie Greenhalgh. *A Climate and Environmental Strategy for U.S. Agriculture* (World Resources Institute: Washington, D.C., November 2000).

Faeth, Paul. *Fertile Ground: The Potential of Nutrient Trading to Cost-Effectively Improve Water Quality* (World Resources Institute: Washington, D.C., May 2000).

Austin, Duncan, Paul Faeth, et al. *How Much Sustainable Development Can We Expect from the Clean Development Mechanism*? (World Resources Institute: Washington D.C., November 1999).

Runge, C. Ford, Eugenio Cap, Paul Faeth, Patricia McGinnis, Demetri Papageorgio, James Tobey, and Robert Housman. *Sustainable Trade Expansion in Latin America and the Caribbean: Analysis and Assessment* (World Resources Institute: Washington, D.C., September, 1997). Also in Spanish.

Faeth, Paul. "Sustainability and U.S. Agriculture: Problems, Progress and Prospects," in Dower, et al. *Frontiers of Sustainability: Environmentally Sound Agriculture, Forestry, Transportation, and Power Production* (World Resources Institute and Island Press: Washington, D.C., 1997).

Repetto, Robert, Dale Rothman, Paul Faeth, and Duncan Austin. *Has Environmental Protection Really Reduced Productivity Growth? We Need Unbiased Measures* (World Resources Institute: Washington, D.C., 1996).

Faeth, Paul. *Growing Green: Enhancing the Economic and Environmental Performance of U.S. Agriculture* (World Resources Institute: Washington, D.C., 1995).

Faeth, Paul (editor). *Agricultural Policy and Sustainability: Case Studies from India, Chile, the Philippines and the United States* (World Resources Institute: Washington, D.C., 1993). (Author or co-author of three of the book's four chapters.)

Faeth, Paul. "An Economic Framework for Evaluating Agricultural Policy and the Sustainability of Production Systems," in *Agriculture Ecosystems and the Environment*, 46 (1993) 161-173. Also in Chinese.

Faeth, Paul, Cheryl Cort, and Robert Livernash. *Evaluating the Carbon Sequestration Benefits of Forestry Projects in Developing Countries* (World Resources Institute: Washington D.C. 1994).

Faeth, Paul, Robert Repetto, Kim Kroll, Qi Dai, and Glenn Helmers. *Paying the Farm Bill: U.S. Agricultural Policy and the Transition to Sustainable Agriculture* (World Resources Institute: Washington D.C., 1991).

John A. "Skip" Laitner
Senior Economist (CNA)

Academic Background

MA, Resource Economics, Antioch University, 1988

Skills and Subject Matter Expertise

John A. "Skip" Laitner is a resource economist and senior fellow at CNA, and also leads a team of consultants, the Economic and Human Dimensions Research Associates, based in Tucson, Arizona. He also serves as Chief Economist for Jeremy Rifkin's Third Industrial Revolution initiatives. He previously worked nearly a decade as a senior economist for technology policy with the U.S. Environmental Protection Agency (EPA). He left the federal service in June 2006 to focus his research on developing a more robust technology and behavioral characterization of energy efficiency resources for use in energy and climate policy analyses and within economic policy models.

In 1998, Skip was awarded EPA's Gold Medal for his work with a team of economists to evaluate the impact of different strategies that might assist in the implementation of smart and more productive climate policies. In 2003, the U.S. Combined Heat and Power Association gave him an award in acknowledgement of his contributions to the policy development of that industry. In 2004, his paper, "How Far Energy Efficiency?" catalyzed new research into the proper characterization of efficiency as a long-term economic development resource.

Author of more than 320 reports, journal articles, and book chapters, Skip has more than 40 years of involvement in the environmental, energy, and economic policy arenas. His expertise includes cost-benefit assessments, behavioral assessments, and the net employment and macroeconomic impacts of energy and climate policy scenarios. His most immediate research focuses on two areas: the first, building on the work of Robert U. Ayres and Benjamin Warr, examines the links between energy inefficiency and a productive economy. In a new book chapter, Skip provides a time series dataset that suggests the United States may be only 14 percent energy-efficient, and that it is this level of inefficiency which may constrain the future development of a more robust economy. The second area explores the ways that communities and the nation's utility industry can maximize the economic opportunity of productivity-led investments while minimizing the risk of rising energy prices and disrupting energy supplies.

Skip has been invited to provide technical seminars in a variety of locales worldwide, including Australia, Canada, China, France, Germany, Iceland, Ireland, Italy, Korea, the Netherlands, New Zealand, Russia, South Africa, and Spain. His clients have ranged from the United Nations and the Russian Presidential Academy of National Economy and Public Administration (RANEPA) to San Diego County, the Appalachian Regional Commission, the National Association of Regional Commissions, the Semiconductor Industry Association, the Argonne National Laboratory, and the U.S. Department of Energy. He has served as an adjunct faculty member for

the Virginia Polytechnic Institute and State University and the University of Oregon, teaching graduate-level courses on the economics of technology. Skip holds a master's degree in Resource Economics from Antioch University. In June 2013 he was elected to be President-Elect of the Association for Environmental Studies and Sciences (AESS). He will begin a two-year term as President of AESS in June 2015.

Among Skip's many publications is a book he co-edited with colleague Karen Ehrhardt-Martinez, *People-Centered Initiatives for Increasing Energy Savings* (Washington, DC: American Council for an Energy-Efficient Economy, 2010). He collaborated with best-selling author Jeremy Rifkin to produce the *Third Industrial Revolution Master Plan for Nord-Pas de Calais* (France), available at: www.thethirdindustrialrevolution.com/masterPlan.cfm. He is now leading a team of consultants to develop a comprehensive energy efficiency and renewable energy plan for San Diego County.

Skip is also a senior economist as part of a 2-3 year project for the Russian Presidential Academy of National Economy and Public Administration. In this capacity, Skip is helping to shape a deep de-carbonization strategy for Russia while catalyzing the development of a more robust and sustainable economy. He is the developer of the proprietary energy and economic impacts model, the **D**ynamic **E**nergy **E**fficiency **P**olicy **E**valuation **R**outine, or DEEPER Modeling System. DEEPER has been used to evaluate a variety of national, state, and local energy policy scenarios.

Work History

Principal and Consulting Economist, Economic and Human Dimensions Research Associates (August 2012 – Present): While I retain my role as a Senior Fellow with the American Council for an Energy-Efficient Economy, based in Washington, DC, I now provide, through my own group, Economic and Human Dimensions Research Associates, a variety of economic assessment and policy modeling services for a variety of clients in both the public and private sectors. I also serve as both a Senior Fellow with CNA's Institute for Public Research, in the Energy, Climate and Water Program, and as Chief Economist for Jeremy Rifkin's Third Industrial Revolution initiatives. Most recently, I was elected as President-Elect for the Association for Environmental Sciences and Studies (AESS), serving June 30, 2013 to June 30, 2014 after which time I will serve a two-year period as President of AESS. I am also an associate editor for energy efficiency as part of the editorial board for Wiley's Interdisciplinary Review Journal, *Energy and Environment*.

Director of Economic and Social Analysis, American Council for an Energy-Efficient Economy (ACEEE) (2006 – 2012): In that capacity I was responsible for a range of benefit-cost assessments of energy policies as they affect both climate and energy policies and the macroeconomy, including energy prices, net employment, and GDP impacts. Also had responsibilities for studies that assess the scale of opportunities associated with energy efficiency technologies and investments, as well as the economic modeling of the potential

impact of their deployment. I directed the work of a variety of professional staff, contractors, and interns.

Senior Economist, Office of Atmospheric Programs, U.S. Environmental Protection Agency (1997 – 2006): Had responsibility for the analysis and development of policy options for a variety of energy, climate change, and air pollution problems. This focused on the analysis and assessment of climate change policy options designed to provide further understanding of the macroeconomic benefits of energy efficiency and renewable energy at the national and regional levels through better linkage of technology costing models and macroeconomic or general equilibrium models. Also included in my job responsibilities were economic evaluations, industrial technology assessment, and technology policy analysis. I served as an EPA representative at a variety of international and interagency meetings and discussions. I also managed EPA laboratory and contractor resources in ways that supported EPA efforts.

Co-founder and Principal, Economic Research Associates (1985 – 1998): Clients included the Alabama Department of Economic and Community Affairs, the American Public Power Association, the Arizona Corporation Commission, the Arizona Department of Commerce, the Association of Idaho Cities, the City of San Jose, the Iowa Natural Heritage Foundation, the Iowa Department of Natural Resources, the Iowa Association of Municipal Utilities, the Minnesota Municipal Utilities Association, the Michigan Public Service Commission, Missouri Environmental Improvement and Energy Resources Authority, the Nebraska Legislature's Special Committee on Economic Development, the Nevada State Energy Office, the Oregon Economic Development Department, the South Dakota Northeast Council of Governments, the U.S. Department of Energy, the U.S. Environmental Protection Agency, the U.S. Territory of the Virgin Islands, the University of Oregon's Bureau of Governmental Research and Service, the Western Area Power Administration, and the Washington State Department of Community Development.

Senior Economist and Program Manager for Energy Efficiency and Economic Development, a program initiated by the American Council for an Energy-Efficient Economy (1993 – 1995): The program focused on the macroeconomic and employment impacts of energy efficiency initiatives. As part of the economic development program, I was responsible for the development of simple indices to gauge progress on energy efficiency at the national and state levels. I also conducted a large number of studies exploring the productivity and macroeconomic impacts of energy efficiency investments at the national, state, and local levels.

Chief of the Research Division, Nebraska Energy Office (1983 – 1986): Was responsible for the budget and supervision of five professional staff members and a number of interns and contractors. Much of the funding was the result of grants written on behalf of the agency. Primary research efforts focused upon end-use energy analysis and the development of decision support tools linking energy and economic development policies. A direct outcome of that

work was the development of a computer software package based upon the "goal programming" technique. Also developed were a number of templates for electronic spreadsheets to assist the agency in using benefit-cost and input-output analysis to evaluate energy programs and policies.

Co-founder, Executive Director, Director of Research, Community Action Research Group, an economic and legislative consulting firm based in Ames, Iowa (1977 – 1983): In addition to the regular duties of the director, was responsible for development of expert testimony in utility rate cases, community energy studies emphasizing the use of benefit-cost analysis, and policy analysis for Iowa energy and environmental legislative issues.

Environmental Research Director, Iowa Public Interest Research Group (1976 – 1977): As the Environmental Research Director, I was responsible for the development of environmental legislative issues and the training of student interns in the legislative process. I also maintained an active caseload in various agency proceedings involving energy and environmental matters.

Publications and Presentations (of More than 320 in Total)

Jeremy Rifkin, Benoit Lebot, John A. "Skip" Laitner, Solenne Bastie, Francis Hinterman and Shawn Moorhead *Nord-Pas de Calais Third Industrial Revolution Master Plan – 2013*, Bethesda, MD: TIR Consulting.

John A. "Skip" Laitner. *Climate and Economic Storms of our Grandchildren. Journal of Environmental Studies and Sciences*. © AESS 2013 doi: 10.1007/s13412-013-0152-x.

John A. "Skip" Laitner. *Linking Energy Efficiency to Economic Productivity: Recommendations for Improving the Robustness of the U.S. Economy* (Washington, DC: American Council for an Energy-Efficient Economy, 2013).

John A. "Skip" Laitner. *Calculating the Nation's Annual Energy Efficiency Investments* (Washington, DC: American Council for an Energy-Efficient Economy, 2013).

Christopher Busch, John A. "Skip" Laitner, Rob McCulloch, and Ivana Stosic. *Gearing Up: Smart Standards Create Good Jobs Building Cleaner Cars* (Washington, DC: BlueGreen Alliance and American Council for an Energy-Efficient Economy, June 2012).

John A. "Skip" Laitner, Steven Nadel, R. Neal Elliott, Harvey Sachs and Siddiq Kahn, *The Long-Term Energy Efficiency Potential: What the Evidence Suggests* (Washington, DC: American Council for an Energy-Efficient Economy, January 2012).

John A. "Skip" Laitner, Rachel Gold, Steven Nadel, Therese Langer, R. Neal Elliott, and Daniel Trombley. *The American Power Act and Enhanced Energy Efficiency Provisions: Impacts on the U.S. Economy* (Washington, DC: American Council for an Energy-Efficient Economy, June 2010).

Jeremy Rifkin, Nicholas Easley, John A. "Skip" Laitner, Mark Watts, and Gemma Fitzjohn-Sykes. *Utrecht Roadmap to a Third Industrial Revolution* (Bethesda, MD: Foundation on Economic Trends, 2010).

Jeremy Rifkin, Nicholas Easley, John A. "Skip" Laitner, Mark Watts, and Gemma Fitzjohn-Sykes. *A Third Industrial Revolution Master Plan to Transition Rome into the World's First Post-Carbon Biosphere City* (Bethesda, MD: Foundation on Economic Trends, 2010).

John A. "Skip" Laitner, Chris Poland Knight, Vanessa McKinney and Karen Ehrhardt-Martinez "Semiconductor Technologies: The Potential to Revolutionize U.S. Energy Productivity (Part I)," *Environmental Quality Management* Vol. 19, No. 3 (2009): 29-52.

John A. "Skip" Laitner. "Understanding the Size of the Energy Efficiency Resource: Ten Policy Recommendations to Accelerate More Productive Investments," *Policy and Society*. Vol. 27 (2009): 351–363.

Testimony of John A. 'Skip' Laitner on "The Oil Bubble or New Reality: How Will Skyrocketing Oil Prices Affect the U.S. Economy?" Joint Economic Committee, 110th Congress, Washington, DC, June 25, 2008

Testimony of John A. 'Skip' Laitner to Discuss Proposals for Near-Term Gasoline Demand Reductions. Senate Energy & Natural Resources Committee, Washington, DC, United States Senate, 2008.

Matthias Ruth, Clark Bernier, Alan Meier, and John A. "Skip" Laitner. "Powerplay: Exploring Decision Making Behaviors in Energy Efficiency Markets," *Technological Forecasting & Social Change*, 74 (2007): 470–490.

Donald A. Hanson and John A. "Skip" Laitner. "Modeling Detailed Energy-Efficiency Technologies and Technology Policies within a CGE Framework," *Energy Journal* (2006), Special Issue on Hybrid Modeling of Energy-Environment Policies: Reconciling Bottom-Up and Top-Down, pp. 151-169.

John A. "Skip" Laitner and Alan H. Sanstad. "Learning-by-Doing on Both the Demand and the Supply Sides: Implications for Electric Utility Investments in a Heuristic Model," *International Journal of Energy Technology and Policy* 2 (2004): 142-52.

Donald A. Hanson and John A. "Skip" Laitner. "An Integrated Analysis of Policies that Increase Investments in Advanced Energy-Efficient/Low-Carbon Technologies," *Energy Economics* 26 (4) (2004): 739-55.

Ernst Worrell, John A. "Skip" Laitner, Michael Ruth, and Hodayah Finman. "Productivity Benefits of Industrial Energy Efficiency Measures," *Energy*, Vol. 28 (2003): 1081-98.

Cherian Eapen, PTP
Principal, temoss, LLC

Academic Background

MS, Engineering Management, Northeastern University, 2001

MS, Civil Engineering (Traffic Engineering/Transportation Planning), University of Maryland, College Park, 1994

BS, Civil Engineering (Transportation), Bangalore University, India, 1988

Skills and Subject Matter Expertise

Mr. Cherian Eapen is a Professional Transportation Planner (PTP) with over 22 years of experience in transportation, urban, transit, regional, land use, and multi-modal accessibility planning, and traffic engineering – in both the private and public sectors.

Most recently, Mr. Eapen was with the Maryland-National Capital Park and Planning Commission (M-NCPPC) and provided comprehensive transportation planning support to the Montgomery County Planning Board on area master plans and sector plans, functional plans, reviews of subdivision, and multi-modal transportation planning including bringing Bikeshare to Montgomery County, long-range countywide transportation policy, and long-term regional facility planning studies.

Prior to his employment with M-NCPPC, Mr. Eapen worked as a Senior Transportation Engineer in Massachusetts and as a Senior Transportation Planner in Maryland. In these capacities, Mr. Eapen prepared and presented studies for commercial, retail, office, residential, institutional, and mixed-use development projects for several private and public sector clients.

Work History

Principal, temoss, LLC (2010 – Present): Provide comprehensive transportation, urban, regional, transit infrastructure, multi-modal accessibility, Transit-Oriented Development (TOD), and land use planning, and transportation management/policy solutions to private and public sector clients throughout the Washington, D.C. and Baltimore metropolitan areas. temoss, llc is especially proficient in supporting clients with regulatory review and approval processes in place at jurisdictions in the metropolitan area.

Planner/Coordinator, Area 1/Transportation Planning Division, Montgomery County Planning Department, Maryland-National Capital Park and Planning Commission, (2002 – 2012): Provided transportation planning lead/technical support to Montgomery County Planning Board on area master plans, sector plans, and functional plans as well as coordination on multi-modal transportation planning, long-range countywide transportation policy, and long-term regional facility planning studies.

Senior Transportation Engineer, MS Transportation Systems, Inc. (1998 – 2002): Prepared and presented traffic impact studies, transportation corridor studies, traffic calming studies, traffic safety/operational analyses, parking/circulation studies, signal warrant analyses, site

access/roadway improvement concept plans, and traffic signal designs/plans for several private and public sector clients in Massachusetts.

Senior Transportation Planner, Integrated Transportation Solutions, Inc. (1992 – 1998): Prepared traffic impact and traffic safety studies for several commercial, retail, office, residential, institutional, and mixed-use development projects in Montgomery, Frederick, Howard, and Prince George's Counties in the Maryland-Washington, D.C. area. Prepared several site access/circulation/roadway improvement concept plans, signal warrant analyses, and parking studies.

Professional Affiliations and Certifications

- Member/Alternate Member, MWCOG Transportation Planning Board (TPB) Citizens Advisory Committee (Maryland)
- Member, Institute of Transportation Engineers (ITE)
- Member, Maryland Transit Administration (MTA) Corridor Cities Transitway (CCT) Phase 1 BRT project Northern Section Area Advisory Committee.
- Certified Professional Transportation Planner (PTP), TPCB, Inc., License No. 130
- Certified Engineer-in-Training (EIT), State of Maryland, License No. 804854

Selected Publications and Presentations

"Transportation Planning for Schools: Making the Grade in Montgomery County," Co-presentation with Daniel Hardy, P.E., PTP, Renaissance Planning Group, presented at the ITE Mid-Colonial Annual Meeting in Annapolis, MD. April 2013.

"Traffic Planning for Solid Waste Facilities – Guidelines for Analysis," Co-authored with William J. Scully, P.E., MS Transportation Systems, Inc., presented at the Annual ITE Meeting in Chicago, August 2001.

Twyla N. Garrett, PhD
Senior Facilitator (IME, Inc.)

Academic Background

Executive Management Program, Organizational Management, Dartmouth College, 2012

PhD, Business Administration, Kennedy Western University, 1999

MA, University of Phoenix, 1996

BA, Accounting and Math, Ursuline College

Skills and Subject Matter Expertise

Dr. Twyla Garrett, PhD, CBM, CHS III is an executive consultant to federal, state, and local emergency management and homeland security professionals nationwide. Dr. Garrett has facilitated more than 25 tabletop and field exercises conducted across the United States. Garrett's other key qualifications include experience leading operations and administrative teams through all phases of large-scale technology rollout, including cost analysis, planning, vendor selection, acquisition, testing implementation, and closure. She was also invited to speak at the White House on the issues of creating jobs and economic growth.

Garrett is an expansive thinker with an outstanding record of achievement implementing business concepts, delivering innovative business solutions, and facilitating transitioning operations with a high level of risk management alternatives. She possesses a strong, proven ability to communicate to diverse audiences in a concise effective manner using various channels and methods.

Work History

President and CEO, IME (2000 – Present): Provide executive oversight and strategic guidance in support of IME's work across the public and private sectors nationwide. Since starting IME in 2000, Garrett has facilitated more than 25 tabletop and field exercises conducted in every region of the United States. She also has facilitated COOP exercises for the Washington, DC government and Hampton Roads, Virginia, and served as the Interoperability Working Group Coordinator for the Commonwealth of Virginia.

CIO Consultant, Commonwealth of Virginia, Virginia Secretary of Public Safety (2001 – 2003): Maintained appropriate networking, outreach, and two-way communication with identified constituents. Conducted program analyses (including cost-benefit and cost-effectiveness analyses) and information security risk assessments, and reported findings, analyses, and recommendations to client executive management. Designed and delivered formal security awareness courses, and developed and provided awareness materials to client security organizations.

IT Investment Manager and Chief of Economic Analysis, Department of the Navy (2000 – 2001): As a Chief Investment Manager and Chief of Economic Analysis for DIMHRS Management Support Team, I provided a wide range of management services including support of the Joint Integrated Group investment management process, schedules, milestones, briefings,

economic analyses and cost estimates, acquisition assistance, contract negotiation, and contract management. The DIMHRS/SEA staff consisted of 29 members under my leadership.

Senior Foreign Program Manager, Space and Naval Warfare Center, San Diego (1996 – 1999): As the senior FMS Case and Financial Manager for the Space and Naval Warfare Systems Command (SPAWAR) Foreign Military Sales, (FMS) Office, provided advice and expertise on all case development, system integration, and financial management issues. Duties included significant interaction with Embassy officials and Consulates on the financial management and accountability of FMS case contracts with the U.S. Navy and other matters, and providing high-level management briefings to both internal and external organizations.

Certifications and Professional Affiliations

- Certified Business Manager (CBM)
- Certified in Homeland Security (CHS), Level III
- Member, Project Management Institute (PMI)