

Takoma Park Sustainability and Climate Action Plan

February 28, 2019

TECHNICAL PROPOSAL

Prepared for:



City Of Takoma Park
7500 Maple Avenue
Takoma Park, MD 20912

CADMUS

The Cadmus Group
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In partnership with:



Gia Mathias and Daryl Braithwaite, City of Takoma Park
7500 Maple Avenue
Takoma Park, MD 20912

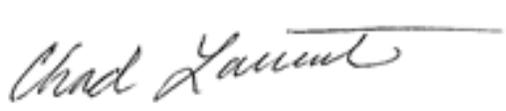
Dear Ms. Mathias and Mr. Braithwaite,

On behalf of The Cadmus Group LLC (Cadmus), I am pleased to submit the following proposal to the City of Takoma Park. Cadmus is well suited to effectively respond to all three tasks for this RFP— (1) Greenhouse Gas Inventories; (2) Climate Mitigation and Sustainability Planning and Support; and (3) Adaptation and Resiliency Services. Cadmus has three D.C., Maryland, Virginia-area (DMV) offices, and has supported local governments, regional organizations, non-profits and federal agencies in the DMV area over the past decade with clean energy, sustainability, and resiliency planning. For example, we were recently awarded a contract to support DC's Department of Energy and Environment on the implementation of Climate Ready DC for the next five years, and we have a long-term relationship with Arlington County through our support of their Arlington Initiative to Reduce Emissions (AIRE) program. In addition, prior to being selected as a contractor under Metropolitan Washington Council of Governments' (MWCOC) master agreement for climate planning, we supported the Council of Governments via a series of projects on solar energy and electric and alternative fuel vehicles. We are excited for the opportunity to support Takoma Park's next phase of its climate planning, which will include integrating resiliency and social equity.

As an optional addition to the proposed services, Cadmus is partnering with another leading sustainability consultancy, Kim Lundgren Associates, Inc. (KLA) for this proposal. KLA offers a unique suite of software services to support reporting on sustainability progress and visually communicating results to residents. KLA is a woman-owned, benefit corporation that has delivered solutions to create sustainable communities for the past 20 years.

I will serve as the primary point of contact for this proposal. Please feel free to contact me if you have any questions about this proposal, and thank you for your consideration.

Sincerely,



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INTRODUCTION

The City of Takoma Park has demonstrated a long-term commitment to climate change mitigation and sustainability. From preparing one of the pioneering community greenhouse gas inventories under the ICLEI methodology in 2000 to determining pathways to sustainable energy in 2014, Takoma Park has contributed to Maryland's 80% by 2050 and Montgomery County's 100% by 2035 GHG emission reduction goals. However, to prevent debilitating climate impacts in the coming decades, communities, such as Takoma Park, must continue to aggressively pursue GHG reductions, sustainability objectives, and energy goals, particularly where these pursuits can alleviate social inequities and support climate resiliency. The next phase of Takoma Park's climate planning offers an opportunity to integrate equity and resiliency into greenhouse gas reduction strategies and the City's long-term trajectory towards the achievement of Maryland's 2050 emissions reduction target.

Cadmus is uniquely positioned to help Takoma Park take its next step. Our team has helped communities across the United States and Canada navigate their paths to deep emissions reductions and resilience via our [Pathways to 100](#) framework prepared on behalf of several national foundations, which provides resources on energy supply and for EVs in partnership with the Urban Sustainability Directors Network. Our firm has been on the forefront of local-level climate and resilience planning, providing local governments with a diverse range of expertise on climate change and sustainability, policy and strategy development, strategic communications, integrating social equity into energy system transformation, and stakeholder and community engagement. Cadmus staff have collaborated with Boston, New York City, Washington D.C., Toronto, Cambridge, and numerous other leading cities around the world on the development of climate plans, sustainability strategies, and implementation and stakeholder and community engagement processes. Cadmus brings expertise in the following key areas:

- ***GHG Inventories for Local Governments.*** The Project Team has worked with local governments and companies of all sizes throughout the United States on GHG inventory development and climate planning. Cadmus staff understand and are responsive to the needs of local governments and are well-equipped to prepare robust GHG inventories and assessments. Cadmus has helped to develop state-level emissions quantification methods and **the GHG inventory for the Commonwealth of Massachusetts**, drawing from strong experience quantifying GHG emissions at the community level. Cadmus staff publications include GHG inventory resources **and guidance documents for the Environmental Protection Agency that have been used across the country**. We have also supported **greenhouse gas inventories for communities across the country from Acton, Massachusetts to Simi Valley, California**.
- ***Climate and Strategic Planning for Sustainability-Leading U.S. Cities.*** Our team has supported hundreds of U.S. municipalities with climate, energy, and sustainability planning and policy initiatives. This includes leading a department-wide engagement and strategic planning process for the **San Francisco Environment Department**; supporting climate adaptation and action plan development in **Denver**; 100% renewable planning effort for **King County, Washington**; and facilitating four working groups focused on scaling up climate-resilient solar PV and storage solutions in **New York City**. The

Cadmus Project Team is currently also supporting **Washington, D.C.** with the 5-year *Climate Ready D.C.* strategy prioritization and implementation planning process. Similar to the proposed process in Takoma Park, this exercise involves extensive stakeholder engagement and the production of actionable implementation roadmaps for a subset of existing climate strategies. From our breadth of experiences, we have developed **a proprietary database of over 650 climate strategies from cities all over the world**. This database includes detailed, first-hand knowledge of the many initiatives and plans we directly supported that can be used to help Takoma Park prioritize and determine next steps for climate action.

- ***Equity-centered Sustainability Planning and Thought Leadership.*** The Project Team brings a strong commitment to centering equity in climate planning and supporting the creation of programs and structures which begin to dismantle structural barriers within communities and institutions. In recent years, Cadmus has had the opportunity to help a variety of public agencies and organizations center equity in their climate and energy policies, programs, and planning processes. For example, Cadmus has worked with the **Urban Sustainability Director's Network (USDN)** and the **Canadian Urban Sustainability Practitioners (CUSP)** to [develop a guidebook](#) on designing equitable clean energy programs for low- and moderate-income communities, communities of color, and indigenous communities. Collectively, our team members have authored analytical frameworks, provided training and technical assistance, and advised communities to place social equity at the center of climate adaptation and mitigation programs.
- ***Local Presence, Knowledge, and Context.*** Cadmus has three offices in the DMV area, including an office in Bethesda, Maryland. We have worked closely with communities within MWCOG on a series of climate and energy initiatives providing us with in-depth local context. In 2018, Cadmus staff assisted **the Virginia Energy Sustainability Peer Network** with a strategy workshop on long-term energy planning. We also continue to support **Washington, D.C.** in analyzing funding and financing options for resiliency investments. Our team will leverage this knowledge to efficiently make recommendations for climate action strategies and provide guidance on climate risks facing Takoma Park. Beyond our work with local governments in the region, Cadmus has worked directly with **MWCOG, Arlington County, and federal agencies such as the Environmental Protection Agency, Department of Energy, and FEMA on clean energy and resiliency.**

We are proud to partner with another leading sustainability consultancy, Kim Lundgren Associates, Inc. (KLA), for this proposal. KLA is a woman-owned, benefit corporation that delivers solutions to create sustainable communities. Over the past 20 years, KLA staff have worked with local governments to design, secure funding for, implement, and evaluate sustainability programs focused on GHG accountability, climate change adaptation, and mitigation. KLA has **developed a proprietary sustainability dashboard**, which it has used to transparency communicate community sustainability goals to the general public and track progress for dozens of clients across the U.S. **KLA's services are available as an optional add-on to the proposed approach.**

TECHNICAL APPROACH

Project Management and Client Coordination

Cadmus takes a highly collaborative approach to client engagements that is built around clear and consistent channels of communication with client staff. Upon the award of the contract, the Cadmus team will host a **kick-off meeting** to confirm scope, roles and responsibilities, explore the City's near- and long-term sustainability goals, and discuss near-term tasks. The session will also be used to conduct a **stakeholder mapping exercise** to help the City identify key groups or stakeholders to engage during the process. The City can use the results of this exercise to inform their outreach and engagement around climate planning and further examine which groups tend to be underrepresented in sustainability proceedings in their local context. During the kick-off, we recommend that the stakeholder mapping exercise be preceded **by a presentation and exercise on centering equity in climate planning with Takoma Park staff to inform the discussion. This would include an introduction to Cadmus' [equity and energy planning framework](#) for City staff to apply and use throughout the development the Sustainability and Climate Action Plan.**

Within a week of this kick-off meeting, Cadmus will provide Takoma Park with a summary of key takeaways from the meeting and a **project workplan** outlining tasks, roles and responsibilities, and timelines for implementation that can serve as an ongoing reference point over the course of the project. The Project Manager will also establish **ongoing bi-weekly calls and a file repository** to provide status updates on project progress and to collaborate with the City's project lead and other involved staff.

Deliverables:

- *Kickoff meeting with key team members*
- *Stakeholder mapping and equity training*
- *Project workplan (Gantt chart, which includes roles, responsibilities, status, and timeline)*
- *Bi-weekly calls or meetings with Takoma Park Team*
- *SharePoint file repository*

Task 1 – Community Greenhouse Gas Inventory and Trends Analysis

The Cadmus team will **conduct a community greenhouse gas inventory** updating the analysis conducted in 2014 for the Sustainable Energy Action Plan. To maintain methodological consistency with the previous inventory and MWCOG practice, the team will utilize ICLEI's Community Protocol for Accounting and Reporting Greenhouse Gas Emissions. If desired, the team could prepare the inventory in accordance with other leading methodologies. For example, the inventory could be prepared consistent with the *Global Protocol for Community-Scale Greenhouse Gas Emissions (GPC)*, now the leading standard for community GHG inventories and the protocol required to conform with the *Global Covenant of Mayors (GCOM)*, the *Climate Registry Greenhouse Reporting Protocol*, and the Paris Agreement. Changes to the methodological approach can be clarified during the kick-off and subsequent meetings.

TASK 1.1 CONDUCT COMMUNITY GHG INVENTORY

The community-wide inventory will require the **calculation of both stationary and transportation emission sources at a community level**. The inventory will also include emissions from waste and wastewater, as was calculated in the 2014 Sustainable Energy Action Plan. Other sectors will be considered with the City during the scoping conversation described above. The inventory will encompass CO₂, N₂O, and CH₄ emissions and potentially other relevant GHGs. The team will **work with the City of Takoma Park to get needed data inputs and may also interview 2-4 staff members** to gain perspectives on emission-generating activities in the community, current sustainability programs and anticipated trends or changes.

Stationary Energy

Cadmus will work with City staff to identify all relevant subsectors with measurable GHG emissions within the stationary energy sector. This process will identify applicable energy sources and develop a methodology to quantify emissions for each subsector and fuel. **At a minimum, this assessment will quantify emissions from building energy use; stationary combustion to generate electricity, heat, and steam; and fugitive emissions from natural gas distribution.** Utility-aggregated consumption data collected from Pepco and natural gas consumption data from Washington Gas will be utilized as the key data sources for the majority of stationary energy use. To the extent data is available, the team will collect utility consumption data disaggregated by rate class to report by subsector. If data are available only at the sector level, the team will estimate subsector data using scaling factors.

Cadmus will work with the City to determine the appropriate methodology and emissions factors for electricity usage. We will likely **recommend quantifying emissions using both location-based and market-based methods**. A market-based method will allow the town to account for emissions reductions in the community from the increasing installation of renewable energy generation by Takoma Park businesses and residents. In contrast, the location-based method uses only average regional emissions factors and will not specifically account for increased renewable energy generation within the town. The location-based method will likely understate the impact of Takoma Park's existing clean energy installations installed on its facilities and throughout its community, but the comparison of both methods' results could be a useful reference point for validation.

To calculate GHG emissions from other stationary energy sources, such as heating from fuel oil, the team will explore primary data and estimation methods. Cadmus will contact major local distributors to request aggregate sales data. While this approach is preferable and achievable if vendors are willing to share this information, previous experience has shown that vendors are not always willing to share the request data. In that case, county or state data will need to be scaled to Takoma Park using GHG accounting protocol methodologies and data from sources such as the Montgomery County Assessor's Office database, the U.S. Census, and the Energy Information Administration (EIA).

To develop calculations for fugitive emissions from natural gas distribution, project staff will attempt to gather data from Washington Gas on the composition of pipelines in Takoma Park or to scale mileage data

from Washington Gas's whole distribution system, as reported to the Pipeline and Hazardous Materials Safety Administration (PHMSA), down to the county level based on available data.

Transportation

To quantify emissions from transportation, we will work with City staff to select an emissions method consistent with goals and available data. The 2014 Sustainable Energy Action Plan document suggests that in-boundary transportation methods were used, which focused on transportation within the City limits. *The Global Covenant of Mayors* guidance provides some flexibility on focusing on in-boundary transportation or the origin-destination approach, which can account for trips taken within the City that originate or terminate outside of its boundary. This can help account for commuters and can provide a more complete picture of transportation emissions. As referenced in the Sustainable Energy Action Plan, Takoma Park's previous transportation emissions were low due to the City's small geographic boundary. If there is an interest in understanding the contribution of commuter trips to transit emissions, then the methodology could be adjusted, should data be available.

To estimate emissions from each relevant vehicle category, Cadmus will multiply the vehicle miles traveled (VMT) by the per-mile emission factor, and then multiply this by the number of respective vehicles. For private automobiles, Cadmus will likely estimate VMT using data developed by Takoma Park, the National Capital Region Transportation Planning Board's Vehicle Census and the State Transportation Model. The project team will supplement and verify these data, as needed, with national data from federal data collection efforts.

To estimate emissions per-mile per vehicle, the project team will use the U.S. Environmental Protection Agency's MOVES2014a model, which includes 13 vehicle categories (including passenger cars, motorcycles, buses, and trucks) and six fuel categories (including conventional and alternative fuels). Cadmus will determine the number of vehicles by category using multiple sources—the American Community Survey (ACS) can provide the number of private automobiles per household, and the National Capital Region's data and national data can be used to estimate the number of private automobiles by fuel type and use. We will work with the City to determine the number of public and freight vehicles, using transportation demand models, data from fleet managers, and/or vehicle counts.

Waste and Wastewater

To calculate the GHG emissions from the waste sector, Cadmus will need to quantify the amount of waste generated, transported, and disposed during the inventory year using data collected by Takoma Park and its waste contractor. We will then apply emission factors based on the disposal methods used by Montgomery County or its waste contractor, or statewide average emissions factors. The project team will also work with Takoma Park staff and the Washington Suburban Sanitary Commission to quantify emissions from wastewater treatment facilities. Emissions to include in this analysis will include those from water treatment and pumping, and will likely be consistent with the data from the 2012 inventory.

TASK 1.2 COMPARATIVE ANALYSIS

After the completion of the inventory, the team will compare the analysis to the results from the 2012 inventory. Using information collected from the interviews in Task 1.1, additional desk research, and information and insights from the City’s ongoing sustainability programs, the team will analyse the data and **present key findings and figures to City staff and key external stakeholders identified during the project kick-off over a webinar presentation.** During this webinar, City staff will have the opportunity to ask queries and provide perspectives on the observed trends. The team will utilize the feedback from this meeting to conduct a deeper research phase and develop a set of recommended climate strategies for Takoma Park under Task 2.

Deliverables:

- *Data collection, analysis and 2-4 interviews with staff*
- *Draft and final community GHG inventory*
- *Trends analysis PowerPoint presentation and webinar*

Task 2 – Climate Mitigation and Sustainability Program Planning Support

Based on the results of the analysis in Task 1, Cadmus will develop and deliver strategy recommendations to City leadership and other stakeholders, as well as key next steps for reducing the City’s GHG footprint. The project team recommends a four-step process, outlined in Tasks 2.1 to 2.4 below. An optional task, 2.5, provides options for annual sustainability reporting via an online dashboard and advisory services on preparing annual reports.

TASK 2.1 – INITIAL STRATEGY DEVELOPMENT

Cadmus **will use the inventory results from Task 1 to develop a list of 10-15 key clean energy, transportation, and waste policies widely applicable to local governments and known to be most impactful based on other municipalities’ experiences.** This list will be based on Cadmus’ expertise and experience supporting municipal and other clients in developing roadmaps for deep decarbonization, a review of the actions identified in the 2014 Sustainable Energy Action Plan and a brief literature review of existing reports and policy frameworks. These resources could include the Carbon Neutral Cities Alliance (CNCA) deep decarbonization framework, Cadmus’ *Pathways to 100* framework for energy supply planning, an EV policy primer Cadmus developed with the Urban Sustainability Directors Network (USDN), and renewable heating and cooling roadmaps Cadmus has developed for the states of Massachusetts, Rhode Island, and New York, and with several cities via CNCA (Burlington, VT; Boston, MA; Boulder, CO; and New York City, NY).

TASK 2.2 – STAKEHOLDER WORKSHOP

The project team proposes **to hold a two to three-hour stakeholder workshop with 10 to 20 key town staff and leadership, as well as priority stakeholders from the community identified during the stakeholder mapping exercise.** The workshop will be facilitated by the project team and would provide

an overview of the inventory analysis and potential pathways for GHG emissions reductions identified in Task 2.1 along with the resiliency findings from Task 3. Following the presentation, the team will facilitate a discussion with stakeholders to collectively define the key priorities for GHG reduction strategies (e.g. biggest reduction impact, cost, timeframe, sector, equity impacts, etc.). The project team will then use the priorities developed by the group to discuss the major reduction strategies developed during Task 2.1. Stakeholders will also have the opportunity to propose additional strategies for the project team to consider. **The workshop will conclude with stakeholders indicating which strategies are highest priority for additional analysis by the project team.**

TASK 2.3: EVALUATE PRIORITY STRATEGIES

Based on the workshop results, the project team will pursue deeper quantitative and qualitative analysis on 6-8 priority strategies. The project team will use the results from the stakeholder workshop to prioritize a set of strategies for investigation with strong community buy-in, high mitigation potential, positive social impact, and where applicable, resiliency co-benefits. To estimate potential impacts associated with each strategy, Cadmus will develop a quantification methodology and simple excel-based scenario analysis model designed to calculate a reasonable range of expected GHG reductions for each strategy in the framework using high and low assumptions. For each of these strategies, the team will assess:

- The scale of the opportunity (in terms of GHG emissions reductions as well as secondary metrics such as energy savings, VMT reductions, or other metrics relevant to a given strategy).
- A likely range of implementation costs for such a strategy that would be borne by the City and by other stakeholders, as well as direct financial benefits (such as fuel savings).
- A qualitative assessment of the barriers and implementation pathways of such a strategy. This analysis will factor in the priorities and barriers discussed during the stakeholder workshop.

Final results will be aggregated as a wedge analysis, showing the potential of each strategy for helping Takoma Park to achieve GHG reduction goals.

TASK 2.4: SUSTAINABILITY AND CLIMATE ACTION PLAN

Results from the **strategy analysis (2.1-2.3) will be summarized into a final document for the City that communicates the potential impacts and cost-effectiveness of the identified strategies.** Copy for the document will be finalized iteratively with City staff before being shared more broadly. The document will integrate the inventory results and identify the most effective next steps for the City to take based on these results and the City's priorities. It will form the basis for a more detailed implementation plan for further emissions reductions in Takoma Park. Should the City choose to have a final presentation of the Sustainability and Climate Action Plan, Cadmus staff can be available to attend a public meeting and answer technical questions. Cadmus has an in-house design team that can provide design services for the report and outreach materials for an additional fee.

OPTIONAL: TASK 2.5 ANNUAL REPORTING AND DASHBOARDING

Kim Lundgren and Associates, Inc (KLA) **have developed an online sustainability dashboarding tool,** which can be used to communicate progress on key sustainability metrics and progress towards climate goals to

the general public. KLA can provide advisory support to the City on selecting metrics, communicating and preparing annual reports, and an introduction to the software tool. More information on the sustainability dashboard and sample visuals [are available online](#).

Deliverables:

- *List of 12-15 strategies*
- *Stakeholder workshop*
- *In-depth analysis of 6-8 strategies*
- *Draft and final copy of recommendations report*
- *Optional: Sustainability Dashboard account and annual reporting advisory support*

Task 3 – Adaptation and Resiliency Services

The Cadmus team will assess Takoma Park’s climate vulnerabilities via desk research and interviews with key City staff and stakeholders. It will utilize these inputs to assign risks utilizing methodologies outlined in the U.S. Climate Resilience Toolkit. These results will be used to identify strategies and ultimately will feed back and integrate into the strategic recommendations from Task 2.

TASK 3.1 DATA GATHERING

The team will begin to assess the Takoma Park’s climate risks and vulnerabilities **by conducting desk research of relevant state, local and regional plans**. This desk review will enable efficient identification of likely climate impacts and vulnerabilities specific to Takoma Park within a broader geographic context. Documents could include: *the Montgomery County Climate Mobilization Workgroup Report, Maryland’s Phase II Comprehensive Strategy for Reducing Vulnerability to Climate Change, MWCOG’s Summary of Potential Climate Change Impacts, Vulnerabilities and Adaptation Strategies within the Metropolitan Washington Region, the 2018 Maryland Commission on Climate Change Annual Report* and relevant data available for Takoma Park or neighboring communities, if available. These inputs will be reviewed and compiled to **develop a list of climate risks**.

TASK 3.2 IDENTIFY STRATEGIES AND INTEGRATE FINDINGS INTO SUSTAINABILITY AND CLIMATE ACTION PLAN

After completing desk research, the Cadmus team will work with City of Takoma Park staff to determine participants from key City departments or stakeholder organizations for **up to five interviews** to discuss the findings and key vulnerabilities within Takoma Park. Using these interviews and findings from the desk research, the team will **identify potential strategies for responding to major vulnerabilities identified via research**. These strategies will be informed by a scan of best practices within Cadmus’ proprietary database from communities with climate risk profiles similar to Takoma Park, documents such as the *NAACP’s Equity in Resilience Building for Climate Adaptation Planning*, which profiles options for resilience metrics and indicators and our experiences working with other local governments. **In addition, each of the climate strategies in Task 2 will be analyzed for climate adaptation co-benefits for the major climate risks identified in Task 3**. Beyond integrating the resilience findings into the Sustainability and Climate Action Plan, the team will develop a brief 3- to 5-page memo summarizing findings from Task 3 for City staff.

Deliverables:

- *Up to 5 interviews*
- *Integration of resilience and adaptation findings into Climate Recommendations (Task 2)*
- *3-5 page summary memo*

SCHEDULE

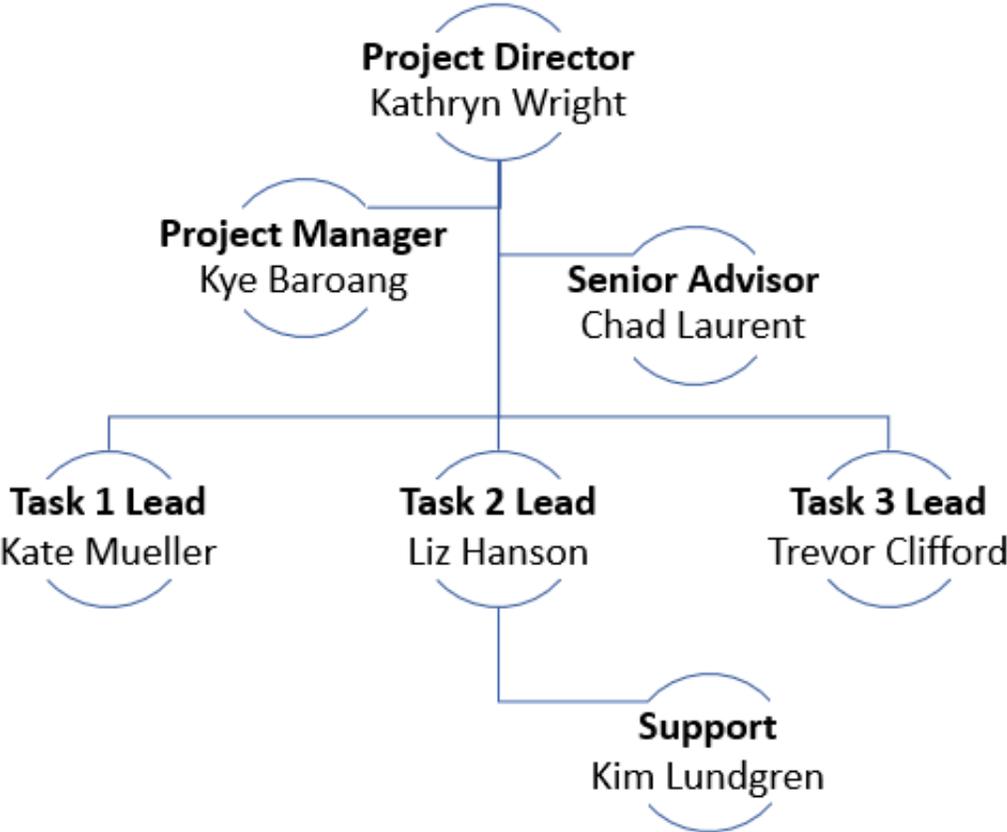
The proposed timeline is presented below. Cadmus is open to discussing changes in the timeline with City staff.

Task	April	May	June	July	August	September	October
PM and Client Coordination	Kickoff Meeting						
Task 1 – GHG Inventory			Webinar				
Task 2 – Climate Mitigation and Sustainability Program Planning Support					Stakeholder Meeting		Launch Event Support
Task 3 – Adaptation and Resilience Services							

KEY STAFF

The Project Team includes technical experts with deep climate mitigation experience, skilled facilitators trained in engaging a range of stakeholders and diverse community members, and local team members actively engaged in resiliency planning in the DMV area. The Project Team is based out of Cadmus’ DMV-area and Boston offices. The Project Manager, Kye Baroang is based in Bethesda, Maryland and thus available locally for in-person meetings, as needed.

Figure 6 – Project Team Roles



CADMUS BIOS

- ***Chad Laurent, Cadmus – Senior Advisor***

Chad Laurent specializes in renewable energy law and policy, sustainable business strategies, and renewable energy project development. As a Cadmus principal, he leads the firm's clean energy market development practice. Mr. Laurent is a nationally recognized expert in renewable energy market development strategies and frequently works with corporate, university, nonprofit, and municipal clients to develop renewable energy supply and procurement strategies to achieve climate adaptation goals. He has over 15 years of experience supporting dozens of municipalities with solar procurement including multi-megawatt-scale projects. His expertise includes procurement, financing, zoning, solar access and rights laws, permitting, planning, and renewable energy as an economic development tool. In addition, Mr. Laurent has worked with over 30 public-sector clients providing regulatory, technical, and program assistance for energy efficiency and renewable energy development. He currently manages Cadmus' role in multiple U.S. Department of Energy Solar Energy Technology Office programs including the SolSmart Designation program, the Solar in Your Community challenge, and Fleets 4 the Future. He was the lead author for the [Pathways to 100](#) and [Pathways to EV](#) reports and has managed multi-year, multimillion-dollar programs at the federal and state levels.

At Meister Consultants Group, which recently joined Cadmus, Mr. Laurent was the vice president and general counsel and also oversaw the firm's legal and financial operations. Previously, Mr. Laurent was a legal fellow at the Office of the Attorney General for the Commonwealth of Massachusetts, a law and policy fellow for the Executive Office of Energy and Environmental Affairs and was the manager of renewable energy programs at the Mass. Energy Consumers Alliance.

- ***Kathryn Wright, Cadmus – Project Director***

Ms. Wright, a Senior Associate at Cadmus, works with clients on climate and energy projects across North America and internationally. She is currently the Project Manager for a 5-year engagement with Washington D.C. focused on supporting implementation planning and financing strategies for the Climate Ready D.C. plan. She has supported climate and resilience planning efforts on behalf of the City of Boston, City of Toronto, the City and County of Denver, New York City, the City of San Francisco and dozens of additional communities through U.S. Department of Energy technical assistance programs, such as SolSmart and the Clean Energy Solutions Center. Recently, Ms. Wright has worked closely with the Urban Sustainability Directors Network on developing guidance and supporting communities with centering equity into long-term climate planning through frameworks and collaborative projects in the U.S. and Canada. Ms. Wright is an inaugural member of the NAACP's Equity in Green Buildings Conference and Working Group and serves on the Steering Committee of the National Adaptation Forum. She received a graduate degree from the Yale School of Forestry and Environmental Studies, where she focused on industrial ecology and energy. Prior to Cadmus, Ms. Wright worked the Connecticut Green Bank and the Center for Business and Environment at Yale on solar cost reductions and financing in Connecticut.

- ***Kye Baroang, Cadmus – Project Manager***

Kye Baroang, a Cadmus Associate, has over 12 years of experience in resilience and climate change adaptation, with a specialization in policy and climate risk screening. His primary sectors of focus include water resources management, climate-related disasters, and urban risk. Mr. Baroang's expertise ranges

from program management and policy analysis to technical training and tool development. He has managed multi-year, multi-country projects funded by U.S. Federal agencies, foreign governments, and commercial clients. Mr. Baroang leads climate risk assessments using the EPA's Climate Resilience Evaluation and Assessment Tool (CREAT) for a wide range of water utilities (e.g., Miami, Atlanta, and Moorhead, MN). He has provided policy guidance on integrating adaptation and climate risk management strategies into national and regional planning operations, including advising USAID's Bureau for Democracy, Conflict and Humanitarian Assistance (DCHA) on linking climate risk management requirements with Bureau-wide policy and programming. Mr. Baroang has provided technical guidance and review for climate risk screening for over \$1.5 billion of programming across various sectors. Mr. Baroang served on the adjunct faculty at Columbia University's School of International and Public Affairs (SIPA), where he co-led courses on international climate risk policy and planning. He has published and presented widely on climate risk, adaptation, and disasters, including contributions in a Cambridge University Press manuscript, Elsevier's Treatise on Water Science, and peer-reviewed journals. Mr. Baroang holds a Master of International Affairs (MIA) from Columbia University's School of International and Public Affairs and a bachelor's degree from Rice University in Economics and Policy Studies.

- ***Kate Mueller, Cadmus – Task 1 Lead***

Kate Mueller, an analyst at Cadmus, currently supports efforts for both municipal and commercial clients related to energy efficiency, renewable energy technology procurement, and energy resilience. As part of the Strategy and Policy practice, she is involved with projects at the interface of climate, energy, and environmental planning. She has experience with greenhouse gas inventory assessments, including her most recent engagement with Acton, Massachusetts and is knowledgeable in the field of environmental life cycle assessment, having performed LCAs on emerging renewable energy technologies and commercial buildings to evaluate impacts of manufacture, assembly, and operation. Additionally, Ms. Mueller has experience in energy systems analysis at the national and state level, with knowledge of least-cost optimization modeling for energy resource planning and an emphasis on distributed solar resources. Prior to joining Cadmus, Ms. Mueller conducted an evaluation of environmental impacts associated with commercial building replacement and developed methods for the calculation of environmental payback period. She has also participated in literature review and stakeholder engagement regarding energy storage implementation in the state of North Carolina.

- ***Liz Hanson, Cadmus – Task 2 Lead***

Liz Hanson, a Senior Analyst, works with state and local officials, as well as non-profit and private sector organizations, to develop and implement climate solutions. Her areas of expertise include environmental sustainability, climate resiliency, stakeholder engagement, policy analysis, and program development and implementation. She advises Washington D.C.'s Department of Energy and Environment on their implementation planning and financing strategies for the Climate Ready D.C. Plan and is supporting a strategic review of Mountain View, California's sustainability programs. Prior to joining Cadmus, Ms. Hanson served in the New York City Mayor's Office of Sustainability on the Building Energy Efficiency team. In this role, she led over fifty stakeholders and technical experts in determining how to decarbonize New York City's building stock by 2050. This work culminated in NYC's *Technical Working Group Report: Transforming New York City Buildings for a Low-Carbon Future* and its resulting programs. Previously, Ms.

Hanson served in the Massachusetts Executive Office of Energy and Environmental Affairs, where she worked across Massachusetts' state government to develop and implement a Coordinated Climate Preparedness Initiative to increase resiliency efforts in priority areas, including transportation, energy, built environments, and public health. This work involved managing an internal stakeholder process to develop new programs and identify necessary staff and financial resources, including successfully advocating for funding in the Massachusetts operating budget. In this role Ms. Hanson advised the Massachusetts Department of Transportation during development of their Boston Harbor Flood Risk Model and worked with the Massachusetts Office of Coastal Zone Management to create climate adaptation planning grants to assist cities and towns in advancing resilient strategies. Ms. Hanson received a graduate degree from Harvard University's John F. Kennedy School of Government (HKS), where she concentrated on Business and Government Policy and received a Certificate in Management, Leadership, and Decision-Making.

- ***Trevor Clifford, Cadmus – Task 3 Lead***

Trevor Clifford, an Analyst at The Cadmus Group LLC, is an urban planning and climate-disaster resilience professional with over four-years of demonstrated expertise building sustainable and resilient communities, businesses and nations by coordinating and collaborating with stakeholders to innovate research based strategies in varied international and domestic contexts and sectors. He supports the 2017 Hurricane Season Preparedness Assessment for the Federal Emergency Management Agency (FEMA's) National Preparedness Assessment Division (NPAD). In this capacity, he oversaw the development of the Decisions and Actions Chronology, and Housing and Infrastructure After Action Reports for Hurricanes Harvey, Irma, and Maria. Prior to joining Cadmus, Mr. Clifford worked with the United Nations to develop a GIS framework for the assessment and management of urban area disaster risks in the Asia-Pacific region. In a second role with the UN, he worked with chambers of commerce throughout Asia-Pacific to build small and medium enterprise capacities for business continuity and disaster resilience. He holds a B.S. in Social Science and Public Policy from the University of New South Wales in Sydney, Australia, an M.A. in Urban and Regional Planning from the University of Colorado, and a Graduate Diploma in Disaster Preparedness, Mitigation and Management from the Asian Institute of Technology in Bangkok, Thailand.

KIM LUNDGREN ASSOCIATES

- ***Kim Lundgren, KLA – Sustainability Reporting Expert***

Ms. Lundgren is the Chief Executive Officer of Kim Lundgren Associates, Inc., a woman-owned, benefits corporation that delivers solutions to create sustainable communities. Kim has nearly 20 years of professional experience, the last 16 of which have been spent working with local governments to design, secure funding for, implement, and evaluate sustainability programs focused on climate change adaptation and mitigation. As an early municipal sustainability pioneer, Kim developed the first climate action plan in Massachusetts and one of the first municipal climate adaptation plans in the country. As an experienced facilitator and strategist, Kim promotes a comprehensive approach to sustainability planning that encourages deep stakeholder engagement and the tracking of key sustainability indicators.

Previously, Kim was the Director of Sustainability at Vanasse Hangen Brustlin, Inc. and the U.S. Services Director at ICLEI-Local Governments for Sustainability. In both positions, Kim secured millions of dollars to build new teams and offices focused on delivering climate and sustainability programs to hundreds of local governments throughout the country. Kim holds a B.S. in Environmental Science from the University of Massachusetts, Amherst and a M.A. in Urban and Environmental Policy & Planning from Tufts University. Kim was one of the first 100 Envision accredited Sustainability Professionals and is a member of the STAR Communities Technical Advisory Group, the American Planning Association, and the American Public Works Association's Center for Sustainability.

SELECTED QUALIFICATIONS

A selection of projects from the Cadmus Group follow below. Our qualifications are organized in the areas of (1) GHG Inventory Projects, (2) Climate Change Mitigation and Sustainability Program Support, and (3) Adaptation and Resiliency Services. Please note that many of our projects are cross-cutting across these issues and represent our team's ability to work creatively with local governments and neighborhoods to foster change.

GHG Inventory Projects

COMMUNITY GHG INVENTORY POLICY

Client: City of Simi Valley, California

Cadmus developed a community-wide GHG inventory policy for the City of Simi Valley. The policy lays out a methodology and process so the city can systematically update its community GHG inventory consistent with the ICLEI Community Greenhouse Gas Reporting Protocol. The policy defined best practices and emissions factors to quantify emissions from buildings, on- and off-road transportation, distributed electric generation, and waste, water, wastewater, and municipal emissions. The policy also identified optional Scope 3 emissions categories and sources should the city choose to quantify those emissions. The policy defined required data collection methodologies, intervals for updating the GHG inventory, and the key personnel and departments responsible for various aspects of the GHG inventory. The city plans to use the policy to update its inventory in 2015 and 2020, in support of California's goal for cities and counties to reduce GHG emissions to 1990 levels.¹

MUNICIPAL AND COMMUNITY GHG INVENTORY AND RECOMMENDATIONS

Client: Town of Acton, Massachusetts

Cadmus and KLA collaborated to develop a municipal and community greenhouse gas inventory for the City of Acton, Massachusetts prepared using the Global Protocol for Community Greenhouse Gas Emissions. The analysis updated the Town's previous inventories and was prepared in close consultation with the Town's Green Advisory Board. The results of the analysis were developed into a series of recommendations for climate mitigation activities.

¹ City of Simi Valley. *Greenhouse Gas Inventory Policy*. Prepared by Cadmus. 2010–2012. Available online: <http://www.simivalley.org/Modules/ShowDocument.aspx?documentid=7823>

CITY CLIMATE ANALYSIS

Client: Bloomberg Family Foundation

Cadmus worked with the Bloomberg Family Foundation to develop an in-house model and analysis of city GHG reduction pathways to support the foundation’s broader engagement with cities to set and achieve climate targets based on the Paris Climate Agreement commitments. Cadmus’ custom tool develops an estimate of city-wide greenhouse gas emissions from building and transportation energy use, with user inputs allowing for an analysis of either a specific or genericized city. Based on research of the likely impacts of more than 40 policy strategies impacting building and transportation energy consumption or the grid electric power mix, the tool allows users to identify a range of likely impacts associated with various policy measures. The functionality of the tool is based on understanding the potential impacts from strategies available to cities under current state policy and regulation, as well as the impacts that could be achieved by collaborating with states to enable additional local government policies. Cadmus’ accompanying analysis considered the potential GHG emissions that local policy action could provide under a range of policy and regulatory environments, and assessed the size of the remaining emissions reductions that would be needed for cities to meet varying levels of GHG emission reductions.

MASSACHUSETTS GREENHOUSE GAS INVENTORY

Client: Massachusetts Department of Environmental Protection

Cadmus staff assisted with development of the 2010–2012 Massachusetts state GHG inventory, providing guidance on methodological improvements for quantifying fugitive GHG emissions from natural gas transmission and distribution infrastructure and collecting relevant activity data from state natural gas utilities. Cadmus staff also developed methods to forecast emissions from electricity production and natural gas transmission and distribution infrastructure.

CARBON DISCLOSURE PROJECT, GHG INVENTORY, AND VERIFICATION ASSISTANCE

Client: Marsh & McLennan Companies, Inc.

For this Fortune 500 finance company, Cadmus annually generates an extensive global GHG inventory that includes the following: implementing an extensive data collection process; calculating Scope 1, Scope 2, and Scope 3 emissions for over 500 facilities; and tracking emissions progress year over year. Cadmus also provides annual verification support to this client. For the past five years, this inventory has undergone third-party verification. Cadmus documents all assumptions and works with the verifier to ensure a smooth verification process for the client. Further, Cadmus helped develop a successful CDP Climate Change Information Request response strategy for improving the company’s CDP score annually.

Due to Cadmus’ assistance, the company improved its score from its first response to its most recent response by over 200%; earned a position in the Carbon Disclosure Leadership Index for 2011, 2013, and 2014; and continued its leadership-level scores for 2015, 2016, and 2017. As a part of the final reporting process, our team will provide a list of recommendations expected to improve the CDP’s score in future years. Using this list of recommendations from prior years, the company internally identified areas for improvements, conducted global energy audits, set an emissions reduction target, and established an internal committee dedicated to sustainability efforts.

Climate Change Mitigation and Sustainability Program Support

VIRGINIA SOLAR PEER LEARNING EXCHANGE STRATEGY AND FACILITATION

Client: Virginia Energy and Sustainability Peer Network (VESPN)

Cadmus supported VESPN—a regional USDN network—in convening a Peer Learning Exchange (PLE) to advance solar strategies in Virginia. The PLE brought together VESPN members, including Virginia USDN core members and strategic non-USDN energy and sustainability peers that represent various Virginia local governments. The PLE sought to 1) learn about Virginia’s solar landscape (e.g. market, policies, and regulatory framework; grid logistics), so VESPN members acquired the same knowledge level regarding the status of solar energy opportunities in Virginia; 2) identify and prioritize solar strategies for implementation in VESPN members’ jurisdictions; and 3) identify and prioritize solar strategies for collective action. The PLE was planned and facilitated using a framework derived from the Pathways to 100: An Energy Supply Transformation Primer for U.S. Cities guidebook.

BOSTON CLIMATE ACTION PLAN COMMUNITY SUMMIT AND WORKING GROUPS

Client: City of Boston, Massachusetts

The City of Boston hired Cadmus to support the design and execution of a community and stakeholder engagement process as part of its 2014 Climate Action Plan (CAP) Update. Cadmus’ support included leading the planning and implementation of the Greenovate Boston Community Summit, the flagship event of the City’s engagement initiatives. The Summit was a free, all-day conference that drew more than 500 residents, businesses, and community leaders and featured dozens of exhibitors, nine workshops led by community members, keynote addresses and discussion with leading local sustainability leaders, and an award ceremony where Mayor Walsh recognized leading businesses and community groups for their sustainability initiatives and commitments. Cadmus’ support also included process design, coordination, and facilitation of five stakeholder committees which included a combined 90 representatives from major Boston-area businesses, institutions, and community organizations. A steering committee and four thematic “strategy committees” were formed to provide input into the CAP Update through a series of Cadmus-facilitated discussions.

ARLINGTON INITIATIVE TO REDUCE EMISSIONS (AIRE) PROGRAM

Client: Arlington, VA

Cadmus is providing support for Arlington County’s community energy plan, including: creating metrics and data collection methods to measure the county’s progress toward achieving its energy and climate change goals, researching energy plans being implanted by other jurisdictions, analyzing life-cycle cost of district-energy-ready buildings, and making presentations on energy efficiency financing. In addition, Cadmus has performed ENERGY STAR certification building audits for county buildings and school buildings managed by Arlington County Public Schools.

SAN FRANCISCO ENVIRONMENT DEPARTMENT STRATEGIC PLANNING

Client: City of San Francisco Department of the Environment

Cadmus worked with the City of San Francisco in 2016 to support development of a new strategic plan for the City’s Department of the Environment. Cadmus designed and facilitated a series of interviews and workshops to engaged staff and stakeholders, evaluated proposed strategies and objectives in collaboration with Department staff, synthesized results into a draft strategic plan, and supported the process of securing approval of the plan from the City’s Commission on the Environment. Cadmus also conducted interviews and research to identify global trends and benchmark San Francisco’s proposed strategies against leading practices. Cadmus also advised Department senior staff on a range of topics

related to staff, stakeholder, and public engagement; operationalization of the strategies; and progress monitoring.

ENSURING EQUITY IN ENERGY TRANSFORMATION AND INNOVATION

Client: Urban Sustainability Directors Network (USDN)

Cadmus led a project with USDN, eight core cities, and 12 observing cities in the U.S. and Canada. The project aimed to build knowledge, tools, and partnerships that will increase equitable access to clean energy for low- and moderate-income households through innovations in local-level program design. Project outputs included a program design guidebook and checklist for local governments, and an inventory and in-depth case studies of worldwide best practices. To reflect and apply project findings, Cadmus organized and facilitated a two-day workshop for core cities and partners to collaboratively develop equity-oriented program solutions.

AGGREGATED ALTERNATIVE TECHNOLOGY ALLIANCE (AATA)

Client: US Department of Energy

Cadmus worked with the National Association of Regional Councils, five regional planning councils, including MWCOG, nine Clean Cities Coalitions, and five technical partners to increase the deployment of alternative fuel and electric vehicles in public fleets in the United States. By coordinating and consolidating demand for electric vehicles and charging infrastructure, by creating piggyback-ready contracts, and by providing best practice resources to educate procurement officials, Fleets for the Future is helping deploy alternative fuel and electric vehicles faster around the country. Cadmus is leading the technical team's activities, including 1) a comprehensive review of current research, best practices, regional plans and policies, and model procurement practices, 2) implementation of a national procurement and contract development, and 3) providing technical advice on regional procurements.

PENNSYLVANIA ELECTRIC VEHICLE ROADMAP

Client: Pennsylvania Department of Environmental Protection (DEP)

Cadmus worked with the Pennsylvania Department of Environmental Protection to develop Pennsylvania's Electric Vehicle Roadmap. Together with project partners Yborra and Associates and the U.S. DOT Volpe Center, Cadmus designed and implemented a stakeholder engagement and facilitation process, which engaged representatives from state agencies (energy, environment, and transportation), auto manufacturers, utilities, municipalities and planning commissions, research and advocacy groups, and regional transportation organizations, among others. Through the process, Cadmus worked with stakeholders to identify market development goals, analyze market barriers, assess best practices, and develop strategies, policies and programs to drive EV market development. Cadmus also conducted a comprehensive review of the literature, interviewing national thought leaders, the developing a database of U.S. and international best practices for EV deployment. In addition, Cadmus conducted scenario analyses, which assessed economic, environmental and energy indicators and inform development of policy, energy, environmental and energy impacts associated with business as usual, moderate, and aggressive EV deployment goals. The final deliverable was an EV strategy roadmap, informed by

stakeholders across the entire state, which is guiding Pennsylvania’s policy and market development strategy going forward.

RENEWABLE ENERGY TRANSITION PLANNING

Client: King County

Cadmus worked with King County, Washington to develop a renewable energy transition plan, in support of the County’s 90% renewable electricity by 2030 target. The project team facilitated two in-person workshops with county and city staff and a broader group of stakeholders and conducted one-on-one interviews with key stakeholders to define priorities and strategies for meeting the county’s goals. Based on this input, Cadmus conducted a barriers and opportunities analysis of nearly 40 policies, programs, and opportunities for collaboration that the county could pursue in making progress towards its goal and reviewed the suitability for implementation in King County. The team worked with the county to identify several policy pathways of interest and developed a custom in-house model to project the impact of these strategies. This modelling exercise involved forecasting the county’s future power mix under a business-as-usual scenario that accounted for a range of planned changes to the regional power system, and then accounting for the expected impacts of these policies based on a review of past program success elsewhere and on other literature on expected program impacts. The project culminated in a full report on strategies that the county could deploy in making progress towards its renewable energy goals.

ENVIRONMENTAL SUSTAINABILITY PROGRAM AND STRATEGIC PLAN SUPPORT

Client: City of Mountain View

Cadmus is reviewing and providing strategic feedback on Mountain View’s sustainability program and its efforts to reduce GHG emissions in the face of strong economic growth. The program review encompasses benchmarking of Mountain View action plans, roadmaps, and execution against other leading US and international cities; a review of sustainability goals and how these intersect with other city priorities; and synergies and tradeoffs among sustainability and other city goals. Process improvements and program effectiveness measurement tools will be suggested, and Cadmus will provide feedback on appropriate program resource allocations vs. varying city effort levels, to strengthen the sustainability program’s effectiveness.

AFFORDABLE ACCESS TO CLEAN AND EFFICIENT ENERGY WORKING GROUP

Client: Massachusetts Department of Energy Resources (MA DOER)

Cadmus led the stakeholder engagement and strategy development process for the Massachusetts Department of Energy Resource’s Affordable Access to Clean and Efficient Energy (AACEE) Working Group. Through five guided facilitations with a diverse group of stakeholders, Cadmus helped identify major barriers and potential solutions for improving access to energy efficiency and renewable energy technologies, incentives and resources by Massachusetts low and moderate income (LMI) residents. Cadmus conducted supporting research and served as an expert advisor on potential policy changes, grant programs, and other high impact recommendations suggested by working group members. Cadmus worked closely with MA DOER to further develop and prioritize these recommendations and draft them into a final report with implementation steps for DOER, DHCD and related MA state agencies.

BEYOND THE BAN FACILITATION

Client: UPSTREAM Policy Institute

Cadmus provided professional facilitation services to UPSTREAM, a nonprofit advocating for product-focused environmental policies to end plastic pollution and advance sustainability. UPSTREAM convened seven U.S. cities and several non-profit partners for a day and a half workshop to discuss disruptive and innovative city-level interventions to plastic pollution. Cadmus structured the meeting and facilitated discussions throughout the workshop, guiding participants through defining the problem of plastic pollution, brainstorming city-level solutions, developing implementation plans for several solutions, and determining next steps for action following the workshop. Cadmus provided guidance on interview questions and survey questions to support data collection from a broader subset of cities ahead of the workshop and provided a workshop summary and detailed workshop notes following the convening.

ENVIRONMENTAL SUSTAINABILITY PROGRAM AND STRATEGIC PLAN SUPPORT

Client: City of Mountain View

Cadmus is reviewing and providing strategic feedback on Mountain View's sustainability program and its efforts to reduce GHG emissions in the face of strong economic growth. The program review encompasses benchmarking of Mountain View action plans, roadmaps, and execution against other leading US and international cities; a review of sustainability goals and how these intersect with other city priorities; and synergies and tradeoffs among sustainability and other city goals. Process improvements and program effectiveness measurement tools will be suggested, and Cadmus will provide feedback on appropriate program resource allocations vs. varying city effort levels, to strengthen the sustainability program's effectiveness.

SAN FRANCISCO ENVIRONMENT DEPARTMENT STRATEGIC PLANNING

Client: City of San Francisco Department of the Environment

Cadmus worked with the City of San Francisco in 2016 to support development of a new strategic plan for the City's Department of the Environment. Cadmus designed and facilitated a series of interviews and workshops to engaged staff and stakeholders, evaluated proposed strategies and objectives in collaboration with Department staff, synthesized results into a draft strategic plan, and supported the process of securing approval of the plan from the City's Commission on the Environment. Cadmus also conducted interviews and research to identify global trends and benchmark San Francisco's proposed strategies against leading practices. Cadmus also advised Department senior staff on a range of topics related to staff, stakeholder, and public engagement; operationalization of the strategies; and progress monitoring.

Adaptation and Resiliency Services

CLIMATE PREPAREDNESS, ADAPTATION, AND RESILIENCE EXERCISE SERIES

Client: Federal Emergency Management Agency (FEMA)

Under the FEMA National Exercise Division Exercise Coordination Service Line, Cadmus supported FEMA and the White House in the design and conduct of a Climate Adaptation, Preparedness, and Resilience Exercise and Training Series. This Exercise and Training Series focused on engaging "whole community" members (e.g., local government officials, climate science experts, emergency managers, and other relevant stakeholders) and empowering them to understand and take action on approaches to address critical climate risks through adaptation and hazard mitigation planning at the community level. Through this project, Cadmus researched and developed comprehensive yet concise climate risk and resilience

profiles for each jurisdiction that informed the development of the exercise scenarios. Using the scenarios and participant feedback, Cadmus developed a series of training and exercise events that explored climate risk, adaptation measures, and resilience exercises in 9 local communities throughout the United States ,including: Washington, District of Columbia; Houston, Texas; Fort Collins and Colorado Springs, Colorado; Anchorage, Alaska; Norfolk, Virginia; Miami, Florida; Salt Lake City, Utah; and Durham, New Hampshire.

CLIMATE READY D.C. IMPLEMENTATION PLANNING

Client: Washington D.C. Department of Energy and Environment

Cadmus, Wood and the Resilient Design Institute are supporting the development of an implementation strategy for Washington D.C.'s climate resilience plan, Climate Ready D.C. The goal of the implementation plan is to develop a strategy to increase the resilience of the City's public and private sector assets and the well-being of its community members. A portion of this focus will include working with the 100 Resilient Cities initiative on pathways to institutionalize resilience in the public and private sector. The team will also focus on developing a series of financing strategies and funding recommendations for the new D.C. Green Bank, developing resilient design guidelines for facilities and providing technical assistance on resilience to D.C. agencies. The project launched in May 2018 and the initial implementation planning will conclude in May 2019.

CLIMATE PREPAREDNESS, ADAPTATION, AND RESILIENCE EXERCISE SERIES

Client: Federal Emergency Management Agency (FEMA)

Under the FEMA National Exercise Division Exercise Coordination Service Line, Cadmus supported FEMA and the White House in the design and conduct of a Climate Adaptation, Preparedness, and Resilience Exercise and Training Series. This Exercise and Training Series focused on engaging "whole community" members (e.g., local government officials, climate science experts, emergency managers, and other relevant stakeholders) and empowering them to understand and take action on approaches to address critical climate risks through adaptation and hazard mitigation planning at the community level. Through this project, Cadmus researched and developed comprehensive yet concise climate risk and resilience profiles for each jurisdiction that informed the development of the exercise scenarios. Using the scenarios and participant feedback, Cadmus developed a series of training and exercise events that explored climate risk, adaptation measures, and resilience exercises in 9 local communities throughout the United States ,including: Washington, District of Columbia; Houston, Texas; Fort Collins and Colorado Springs, Colorado; Anchorage, Alaska; Norfolk, Virginia; Miami, Florida; Salt Lake City, Utah; and Durham, New Hampshire.

DENVER CLIMATE ADAPTATION PLANNING SUPPORT

Client: City and County of Denver

Cadmus provided on-call consulting to support the City and County of Denver with its climate adaptation and mitigation planning processes. Cadmus has assisted Denver with developing their near- and long-term climate goals, identifying planning best practices and providing third-party review of its planning documents. The adaptation plan assisted Denver with tying in both its departmental and community adaptation efforts with its 2020 climate mitigation goals.

URBAN RESILIENCE CLIMATE CHANGE PERFORMANCE INDICATOR DEVELOPMENT FOR D.C.

Client: The U.S. Environmental Protection Agency

The U.S. Environmental Protection Agency's (EPA's) Global Change Impacts and Adaptation program, the Office of Research and Development (ORD) Global Change Research Program, evaluates the vulnerability of EPA's air, water, ecosystem, and human health protection efforts to climate change and other global change stressors at the federal to municipal levels. The program also researches and develops adaptation options to build resilience to these stressors. Cadmus assessed Washington, D.C.'s (the District's) resilience to climate change across eight sectors: water, energy, transportation, public health and emergency response, economy, land use/land cover, the natural environment, and telecommunications. Cadmus conducted an in-depth literature review of climate resilience planning efforts across the country and within D.C. This information was utilized to develop an urban resilience assessment tool and resilience indicators. Cadmus brought together experts from EPA, academia, industry, and the District's government for a full day workshop to assess the District's resilience to climate change. The study was close linked to the Sustainable DC mitigation plan. These indicators and tool supported the development of the Climate Ready DC plan.

SMART DISTRIBUTED GENERATION HUB: DEVELOPING A ROADMAP FOR RESILIENT SOLAR FOR NEW YORK CITY

Client: U.S. Department of Energy

Following New York City's large power outage due to Superstorm Sandy in 2013, cities around the United States are exploring options to deploy sustainable back-up electricity generation. The Smart Distributed Generation (DG) Hub has been created to explore ways to scale up resilient solar PV by convening four working groups (WGs) focusing on questions relating to technology hardware, communications and software, policy and legal topics, and economics and finance. The project is supported by the New York State Energy Research and Development Authority, the New York Power Authority, and more than 20 stakeholder groups committed to the project, including the NYC Mayor's Office, Consolidated Edison, National Grid, the Electric Power Research Institute, General Electric, SMA, Solar City. Cadmus facilitated the Economics and Finance Working Group, which developed a series of factsheets, and conducted market research on solar + storage projects costs and the value of resiliency. Cadmus was the lead author of the final resulting Resilient Solar Roadmap for New York City, which was focused on strategies to improve the deployment of resilient solar through the City starting with critical infrastructure facilities.

PRICE PROPOSAL

Cadmus proposes the following price to support Takoma Park with Tasks 1-3. Cadmus is open to discussing adjustments to scope and budget for the proposed engagement.

	Total Fee (Company)	Expenses
Project Management and Client Coordination	\$4,644.00 (Cadmus)	
Task 1	\$11,488.00 (Cadmus)	\$300.00 (Roundtrip ticket from Boston to Regan Airport for kickoff)
Task 2	\$18,372.00 (Cadmus)	\$300.00 (Roundtrip ticket from Boston to Regan Airport for stakeholder meeting)
Task 3	\$5,900.00 (Cadmus)	
Total	\$41,004.00 (Cadmus)	
Optional Add-on, Task 2.5	\$10,020 (KLA)	
Total with Optional Fee	\$51,024.00 (Cadmus, KLA)	

Cadmus can also provide additional support to Takoma Park on renewable energy via the [SolSmart program](#), a federally-funded designation and technical assistance program that is cost-free to communities. Cadmus is a technical assistance provider through the program and should Takoma Park choose to participate in the program, a portion of our time on relevant topics could be supported by this program’s grant funding.

CVS AND CREATIVE APPENDIX

C.V.s for key staff and a creative appendix with work samples follow on the subsequent pages of this proposal.

Kathryn Wright, Senior Associate

SUMMARY OF PROFESSIONAL EXPERIENCE

Ms. Wright, a Senior Associate at Cadmus, works with clients on climate and energy projects across North America and internationally. She is currently the Project Manager for a 5-year engagement with Washington D.C. focused on supporting implementation planning and financing strategies for the Climate Ready D.C. plan. She has supported climate and resilience planning efforts on behalf of the City of Boston, City of Toronto, the City and County of Denver, New York City, the City of San Francisco and dozens of additional communities through U.S. Department of Energy technical assistance programs, such as SolSmart and the Clean Energy Solutions Center. Recently, Ms. Wright has worked closely with the Urban Sustainability Directors Network on developing guidance and supporting communities with centering equity into long-term climate planning through frameworks and collaborative projects in the U.S. and Canada. Ms. Wright is an inaugural member of the NAACP's Equity in Green Buildings Conference and Working Group and serves on the Steering Committee of the National Adaptation Forum. She received a graduate degree from the Yale School of Forestry and Environmental Studies, where she focused on industrial ecology and energy. Prior to Cadmus, Ms. Wright worked the Connecticut Green Bank and the Center for Business and Environment at Yale on solar cost reductions and financing in Connecticut.

RELEVANT EXPERIENCE

- ***Climate Ready D.C. Implementation Planning Finance Strategies and Design Guidance, May 2018-Present.*** As Project Manager, Ms. Wright is supporting the development of an implementation strategy for Washington D.C.'s climate resilience plan, Climate Ready D.C. The goal of the implementation plan is to develop a strategy to increase the resilience of the City's public and private sector assets and the well-being of its community members. A portion of this focus will include working with the 100 Resilient Cities initiative on pathways to institutionalize resilience in the public and private sector. The team will also focus on developing a series of financing strategies and funding recommendations for the new D.C. Green Bank, developing resilient design guidelines for facilities and providing technical assistance on resilience to D.C. agencies. The project will conclude in May 2019.
- ***Sustainable Infrastructure Valuation, March 2018-Present.*** Ms. Wright is currently serving as the Project Manager to develop a report analyzing the current state of the market for sustainable infrastructure. In particular, the research focused on the opportunities for investors to consider environmental, social, and governance (ESG) factors when evaluating or valuing sustainable infrastructure investments. This included conducting desk research and interviews with infrastructure developers, policy experts, equity investors, and researchers to better understand the current state of practice regarding evaluation of ESG and the role ESG factors may play in investment decisions and analysis of the value of assets over time. It also included identifying and assessing the features and capabilities of eight leading tools that support ESG evaluation and valuation for various types of infrastructure. Cadmus prepared a summary of research and facilitated a convening of experts to provide input on the research and identify potential opportunities to advance the market in June 2018. The project will conclude with the publication of a public-facing report to be released at a launch event in 2019.

- ***SolSmart Community Technical Assistance and Designation Program, U.S. Department of Energy. 2015–Present.*** Ms. Wright is working with a national team to develop and implement an innovative and prominent national recognition program called SolSmart, which energizes local solar markets and advances soft cost reductions by recognizing community efforts to make communities solar PV friendly. Ms. Wright has been extensively involved in both halves of SolSmart, the delivery of solar technical assistance to municipalities, and the evaluation of communities for SolSmart designation and recognition. She supported the CT Green Bank’s SolSmart Advisor engagement during spring-fall 2017.
- ***Pathways to 100% Renewables Research Report and Energy and Equity Framework, The Kresge Energy and Summit Foundations, 2016–2017.*** Ms. Wright supported the research and development of a primer for the transformation of city energy systems. The primer presents a menu of approaches that city agencies can pursue alone or in collaboration with key stakeholder partners to create transformative change in local energy systems. Strategies included are consumer-oriented, focused on municipal operations, or focused on working with utilities serving municipalities. The primer also describes how the options available to cities vary based on state-level regulatory and policy actions and utility ownership models. Ms. Wright co-lead creation of the framework for incorporating equity into energy supply transformation, which was informed by an advisory committee of several field experts to ensure an understanding of equity impacts from the perspective of procedural, distributional, structural, and transgenerational impacts on low-income and minority communities.
- ***Green Banks Policy Report and Analyses for Seven States, Union of Concerned Scientists, 2015–2016.*** Cadmus conducted research of global best practices for financing energy efficiency and renewable energy investments on behalf of the Union of Concerned Scientists. This analysis was developed in a report showcasing green banks as a potential compliance mechanism for the EPA’s Clean Power Plan rule. This report was followed by a second phase after the final clean power plan rules were released, which featured modeling analysis for the impacts of a green bank on clean energy development in Virginia, Pennsylvania, and Michigan. A final phase of the project adapted the analysis for four additional states in the New England, New Hampshire, Vermont, Massachusetts and Maine following the Clean Power Plan stay. The fact sheets and model developed during Phase II and III of the project were utilized by the Union of Concerned Scientists staff as they worked with state legislators during the 2016 and 2017 legislative sessions. Ms. Wright was the lead analyst for the first phase, and led Phase II and III of the analyses.
- ***Smart Distributed Generation Hub- Resilient PV, U.S. Department of Energy, 2015–2017.*** The Smart Distributed Generation (DG) Hub has been created to explore ways to scale up resilient solar PV by convening four working groups (WGs) focusing on questions relating to hardware technology, communications and software, policy and legal topics, and economics and finance.

EDUCATION AND CERTIFICATIONS

LEED Green Associate, GBCI

Master of Environmental Management, Yale University, New Haven, Connecticut

BS Marketing, BA Environmental Studies, Minor German, University of Pittsburgh, Pittsburgh, Pennsylvania

SELECTED PUBLICATIONS AND PRESENTATIONS

Wright, K., Hanley, W. et. al. (February 2017) The Smart DG Hub Resilient Solar Roadmap. City University of New York on behalf of the U.S. Department of Energy Solar Market Pathways Program.

Shyduroff, et. Al. Unlocking Private Capital to Finance Sustainable Infrastructure. Environmental Defense Fund. (2017).

Belden, A., Clemmer, S. and Wright, K. (June 2015). Financing Clean Energy. Cost-effective tools for Clean Power Plan Compliance. Union of Concerned Scientists.

Sunrise New England Project Team. (2013) Sunrise New England Final Project Report. Rocky Hill, Connecticut: Energize Connecticut.

Chad Laurent, Esq., Principal

SUMMARY OF PROFESSIONAL EXPERIENCE

Chad Laurent, a Cadmus Principal, specializes in renewable energy law and policy, sustainable business strategies, and renewable energy project development. Mr. Laurent is a nationally recognized expert in renewable energy market development with 15 years of experience researching and designing voluntary and mandatory green power markets. He has consulted to the U.S. Department of Energy, World Bank, U.N. Agencies, corporate clients, and dozens of municipalities, among other clients. At Meister Consultants Group (MCG), which recently joined Cadmus, Mr. Laurent was the vice president and general counsel and oversaw the firm's legal and financial operations. Previously, Mr. Laurent was a legal fellow at the Office of the Attorney General for the Commonwealth of Massachusetts, a law and policy fellow for the Executive Office of Energy and Environmental Affairs, and the manager of renewable energy programs at the Massachusetts (Green) Energy Consumers Alliance.

RELEVANT EXPERIENCE

- Virginia Solar Peer Learning Exchange Strategy and Facilitation for the Virginia Energy and Sustainability Peer Network** Cadmus supported the Virginia Energy and Sustainability Peer Network (VESPN) – a regional Urban Sustainability Directors Network (USDN) network – convene a Peer Learning Exchange (PLE) to advance solar strategies in Virginia. The PLE brought together VESPN members who include Virginia USDN core members and strategic non-USDN energy and sustainability peers representing various Virginia local governments. The PLE's goal was to 1) learn the solar landscape in Virginia, e.g. market, policies and regulatory framework, grid logistics, etc. so that VESPN members acquire the same level of knowledge on the status of solar energy opportunities in Virginia, 2) identify and prioritize solar strategies for implementation in VESPN member jurisdictions; and 3) identify and prioritize solar strategies for collective action. The PLE was planned and facilitated using a framework derived from the Pathways to 100: An Energy Supply Transformation Primer for U.S. Cities guidebook.
- The New York Smart Distributed Generation (DG) Hub for the U.S. Department of Energy** The Smart Distributed Generation (DG) Hub was created by Sustainable CUNY to explore ways to scale up resilient solar PV by convening four working groups (WGs) focusing on questions relating to technology hardware, communications and software, policy and legal topics, and economics and finance. The project is supported by the New York State Energy Research and Development Authority, the New York Power Authority, and more than 20 stakeholder groups committed to the project. Cadmus led the development of the resilient solar roadmap for New York City, released in 2017, which focused on identifying pathways to remove technical, economic and policy barriers to the deployment of solar and energy storage technologies on targeted critical infrastructure facilities. Additionally, the Smart DG Hub developed a calculator that will help capture the full spectrum of value streams for solar systems with battery storage, such as supplying emergency power, peak shaving, and load shifting capabilities, consequently providing decision makers with the necessary tools to make educated investments.
- Analysis of Renewable Energy Procurement Options in Massachusetts For Inc/Boston Green Ribbon Commission** Cadmus developed a briefing document outlining the opportunities, barriers, and economics of large-scale renewable energy procurement in Massachusetts. The briefing

outlined four major pathways organizations can take to procure renewable energy, involving various forms of project development, ownership, and contractual or financial agreements. The report was developed to support ongoing discussions regarding potential collaboration on large scale green power procurement among major public, private, and institutional organizations in the Boston area that participate in the Boston Green Ribbon Commission (GRC). Cadmus presented the findings at a GRC event in April 2015 attended by more than 50 representatives of GRC members, City of Boston officials, renewable energy procurement specialists, and private sector representatives in the Greater Boston area.

- ***Coordination of Renewable Energy Procurement Prize for the Boston Green Ribbon Commission*** Cadmus worked with the Boston Green Ribbon Commission to coordinate and develop a renewable energy leadership prize. The Green Ribbon Commission Renewable Energy Leadership Prize will award \$100,000 to the team that develops the most compelling strategy for large-scale renewable energy generation procurement from either on-site or off-site sources. The prize is designed to inspire local large commercial, institutional, and public sector (CI&P) energy consumers to implement renewable energy procurement strategies at scale. Cadmus developed the framework of the prize, the request for proposals, formed and coordinated the expert judging panel and provided technical assistance and feedback throughout the prize process. The award was to be announced in February 2016.
- ***SolSmart Designation Program for U.S. Department of Energy*** Cadmus is working with a national team to develop and implement an innovative and prominent national recognition program called SolSmart that energizes local solar markets and advances soft cost reductions by recognizing community efforts to make communities solar PV friendly. Cadmus has been centrally involved in both halves of SolSmart, the delivery of solar technical assistance to municipalities and the evaluation of communities for SolSmart designation and recognition. Cadmus led the development of designation criteria by the convening and facilitation of a Criteria Advisory Committee made up of key stakeholders. The SolSmart team will enable at least 300 communities across the U.S. to qualify for the SolSmart designation via a three-pronged approach to delivering technical assistance: one on one technical assistance delivery to communities from a team of experienced national experts; the use of SolSmart Advisors to help chosen communities identify and reduce soft cost barriers; and peer mentorship and learning. Cadmus is providing expertise and project coordination across all three technical assistance delivery mechanisms.

EDUCATION AND CERTIFICATIONS

Juris Doctor, Suffolk University Law School, Boston

Rappaport Honors Fellow in Law and Public Policy in collaboration with the Rappaport Institute at Harvard University

BS, Natural Resource Ecology and Management, University of Michigan, Ann Arbor

BS, Environmental Policy and Behavior, University of Michigan, Ann Arbor

Lyle E. Craine award for undergraduate achievement in environmental policy

PROFESSIONAL MEMBERSHIPS AND ASSOCIATIONS

Bar Admission, Massachusetts Bar

Law and Policy Expert, Clean Energy Solutions Center

Professionally Trained Mediator and Facilitator

Advisory Board Member, 100% Renewable and Equitable Cities

SELECTED PUBLICATIONS

Lead Author. *Pathways to 100: An Energy Supply Transformation Primer for U.S. Cities*. Meister Consultants Group, A Cadmus Company, Energy Foundation, and The Kresge Foundation. March 2017. <http://www.mc-group.com/pathways-to-100/>

Institutional Renewable Energy Procurement: Guidance for Purchasing and Making Associated Environmental Impact Claims. Prepared for the Boston Green Ribbon Commission. October 2016.

Utility Ownership of Rooftop Solar PV: An Emerging Business Model for Municipal Utilities. NC Clean Energy Technology Center (formerly the NC Solar Center) & Meister Consultants Group/SunShot Solar Outreach Partnership (SolarOPs), U.S. Department of Energy. November 2015.

Kye Baroang, Associate

PROFESSIONAL EXPERIENCE AND QUALIFICATIONS

Kye Baroang, an Associate in both the Domestic Water Group and International Practice at Cadmus, has a Master of International Affairs (with concentrations in urban policy and environmental policy) and more than twelve years of professional experience. He provides project management and technical leadership for a range of clients, including EPA, USAID, and FAA as well as local agencies. His project management responsibilities include developing work plans and budgets, tracking progress and budgets, and leading deliverable development. In addition, he provides technical guidance, develops and implements trainings, and drafts policy and process documents around integrating resilience and climate risk management into planning, design, and operations. This includes providing in-person technical support and suites of tailored resources on integration, as well as screening environmental impacts and climate risk for numerous sectoral portfolios covering \$200+ million. Mr. Baroang’s work on integrating resilience and risk includes critical infrastructure, construction, transportation, and urban areas. Mr. Baroang also leads activities focused on communication and outreach around emergency planning and preparedness for federal, state, local and private sector stakeholders.

EDUCATION AND CERTIFICATIONS

Master of International Affairs, Environmental Policy/Urban Policy, Columbia University, 2009

B.A., Economics and Policy Studies, Rice University, 2004

PROFESSIONAL EXPERIENCE

- **EPA Water Security Division Work Assignment 2-33 (EP-C-15-022):** Support for Creating Resilient Water Utilities Initiative – Tool Development and Technical Assistance: Mr. Baroang serves as Deputy Project Manager for this WA that provides training and technical guidance for using EPA’s Climate Resilience Evaluation & Awareness Tool (CREAT) platform. He leads climate risk and resilience assessments with water utilities across the U.S. (e.g., Atlanta, Miami, and Moorhead, MN).
- **EPA Water Security Division Work Assignment (WA) 2-37 (EP-C-15-022):** Emergency Preparedness, Reponse and Recovery: Mr. Baroang serves as Deputy Project Manager for this WA supporting EPA’s Emergency Response (ER) Team to integrate resilience and emergency planning into agency operations within the water sector. The WA includes developing and implementing tabletop exercises for utilities and other stakeholders, supporting development of both Earthquake and Drought GeoPlatform tools, and creating case studies and videos on water utility drought response. He also leads the team developing and implementing a communications and outreach strategy for the ER team to effectively inform potential users of EPA’s critical resilience tools and services.
- **USAID Global Environmental Management Support Project**, including the following activities:
 - Provide technical guidance and develop material for integrating climate risk management (CRM) into USAID Bureau and office-level environmental compliance processes and documentation.

- Lead 7-member team providing technical and compliance review of project/activity-level integration of CRM across multiple offices within USAID’s Bureau for Democracy, Conflict, and Humanitarian Assistance (DCHA). Reviews cover multiple portfolios of \$200+ million.
 - Lead integration of CRM into country and office-level strategy as well as portfolio and project design USAID at various levels. Screening covers multiple portfolios of \$500+ million.
 - Lead development and implementation of training materials for integrating environmental compliance and climate risks, delivered both domestically (e.g., DC-based training of implementing partners for USAID Office of American Schools and Hospitals Abroad) and internationally (e.g., for USAID Middle East Regional Platform in Frankfurt, Germany).
 - Led environmental safeguards assessment for \$290 million USAID East Africa Economic Growth Portfolio.
 - Provided technical support for development of a case study on integrating CRM screening into environmental compliance for the DCHA Office of Food for Peace (FFP).
- **USAID Climate Integration Support Facility BPA: Purchase Order Climate Risk Profiles:** Mr. Baroang serves as Climate Integration Specialist/SME providing technical oversight and content for development of at least 7 Climate Risk Profiles covering countries or entire regions.
 - **FAA ACRP 11-08/16-02 Task Order Support for ACRP Insight Events:** Mr. Baroang led literature review, subject matter expert identification, and development of an annotated bibliography for an Insight Event on Economic and Social Sustainability at Airports. This included SME engagement, identification of key themes, and development of a preliminary list of 400 potential SME committee members.
 - **EPA Energy Supply and Industry Branch Task Order 404 (BPA-12-H-0038) Green Power Partnership Program Development and Renewable Energy Policy Support:** Mr. Baroang served as interim/alternate Project Manager, managing operations, budget and technical contributions for TO supporting analysis of emerging renewable energy policies, technologies, and relevant greenhouse gas (GHG) accounting protocols, as well as evaluating new and innovative energy strategies for reducing GHG emissions.
 - **EPA Energy Supply and Industry Branch Task Order 404 (BPA-12-H-0038) Technical Support for the CHP Partnership:** Mr. Baroang served as interim/alternate Project Manager managing operations, budget and technical contributions for TO conducting technical and economic analyses (e.g., feasibility analyses and environmental benefit calculations) and technical advice for projects and policies aligned with the Combined Heat and Power Partnership.

Previous Positions (2008 – 2014) In previous positions, Mr. Baroang worked on resilience, risk management, climate vulnerability and adaptation, and info sharing programs within academic and nonprofit sectors. He held several positions while at Columbia University: Program Manager for the Center on Globalization and Sustainable Development at Columbia U. (2011-2014), Adjunct Faculty at the School of International and Public Affairs (2011-2012), and Researcher & Coordinator for the International Research Institute for Climate & Society (2008-2011).

SELECTED PUBLICATIONS AND PRESENTATIONS

Quinn, C., **K. Baroang**, et al. (2018) Integration of Climate Risk Management into USAID Programming and Environmental Procedures: A Food For Peace Case Study. USAID. pp. 1-18.

Brown, C., **K. Baroang**, et al. (2013) Managing Climate Risk in Water Supply Systems. London: IWA Publishing. pp. 1-168.

Baroang, K., M. Hellmuth, and P. Block. (2009) Identifying Uncertainty & Defining Risk in the Context of the 4th World Water Development Report. Discussion Paper, UN World Water Assessment Programme. pp. 1-33.

Kate Mueller, Analyst

PROFESSIONAL EXPERIENCE AND QUALIFICATIONS

Kate Mueller, an analyst at Cadmus, currently supports efforts for both municipal and commercial clients related to energy efficiency, renewable energy technology procurement, and climate resilience. As part of the Strategy and Policy practice, she is involved with projects at the interface of climate, energy, and environmental planning. She has experience with greenhouse gas inventory assessments and is knowledgeable in the field of environmental life cycle assessment, having performed LCAs on emerging renewable energy technologies and commercial buildings to evaluate impacts of manufacture, assembly, and operation. Additionally, Ms. Mueller has experience in energy systems analysis at the national and state level, with knowledge of least-cost optimization modeling for energy resource planning and an emphasis on distributed solar resources.

Prior to joining Cadmus, Ms. Mueller conducted an evaluation of environmental impacts associated with commercial building replacement and developed methods for the calculation of environmental payback period. She has also participated in literature review and stakeholder engagement regarding energy storage implementation in the state of North Carolina.

EDUCATION AND CERTIFICATIONS

MS, Civil Engineering, North Carolina State University

BS, Civil Engineering, North Carolina State University

Engineer Intern (EI), NCEES

RELEVANT EXPERIENCE

- **Town of Acton, Ma Carbon Neutrality Initiative.** As part of the town of Acton carbon neutrality initiative, Cadmus developed a community greenhouse gas inventory for the town to identify emissions sources and quantities, as well as provide recommendations on areas of focus for emissions reduction. Ms. Mueller served as the project manager and primary analyst for the project.
- **City of Cambridge Comprehensive Retrofit Program.** This project seeks to develop a voluntary, comprehensive building retrofit program to enable buildings to meet proposed energy efficiency performance requirements in the City of Cambridge, MA. The proposed requirements were created in support of the City's Net Zero Action Plan goals. Ms. Mueller supports this project with research on existing and proposed energy efficiency programs offered by utilities in Massachusetts and stakeholder engagement to determine local needs and barriers to energy efficiency implementation.
- **Climate Ready DC Implementation Planning.** Cadmus is providing planning support to the District of Columbia for implementation of its *Climate Ready DC* climate adaptation plan. Cadmus works closely with DC Department of Energy and Environment (DC DOEE) staff to develop detailed implementation pathways for the more than 70 climate resilience strategies adopted in the Climate Ready DC plan. Ms. Mueller is supporting the project through the development of an implementation plan for community resilience hubs
- **Commercial Solar Consulting Services.** Cadmus is leading Massachusetts Clean Energy Center's Commercial Solar and Storage Hub to support the development of onsite commercial solar and

solar + storage projects for the Commonwealth of Massachusetts. Cadmus performs market research, develops public facing resources and provides technical assistance and consumer guidance through the Commercial Solar and Storage Hub website. Ms. Mueller supports the project as part of the “Ask and Advisor” service allows customers interested in installing solar PV or solar + storage with ongoing technical assistance on topics including project development, procurement support, and financial analysis.

- **SolSmart (SPARC).** SolSmart is a program commissioned by the US Department of Energy to help communities reduce the soft-costs of solar installation. The program both evaluates communities for SolSmart designation and provides technical assistance to communities looking to pursue the designation. Ms. Mueller currently supports the program through the development of resources for local governments on solar + storage benefits and procurement.
- **Energy Storage Study for North Carolina.** Ms. Mueller supported collaborative efforts to provide policy guidance to the NC General Assembly and NC Utilities Commission regarding implementation of energy storage within the state. Relevant tasks included literature review and stakeholder engagement to collect feedback on priorities and perceived feasibility of energy storage implementation.
- **US Renewable Energy Transition Analysis.** Ms. Mueller obtained experience evaluating existing analyses of large-scale transition to a 100% renewable energy system using TEMOA, a least-cost energy resource optimization model. This role involved assessment of existing energy policy and the addition of model functionalities for distributed solar and biofuels resources to determine effects on future electricity resource composition within the US.

TECHNICAL SKILLS

Ms. Mueller has knowledge of Python and linear/mathematical programming, as well as experience with OpenLCA, an open-source life cycle assessment software.

PROFESSIONAL MEMBERSHIPS AND ASSOCIATIONS

US Green Building Council, Member; Past Emerging Professionals Co-Chair

Liz Hanson, Senior Analyst

EDUCATION

Master in Public Policy, Harvard Kennedy School, 2018

B.A. Political Science and Economics Minor, Temple University, 2010

PROFESSIONAL EXPERIENCE AND QUALIFICATIONS

Liz Hanson, a senior analyst, works with state and local officials, as well as non-profit and private sector organizations, to develop and implement climate solutions. Her areas of expertise include environmental sustainability, climate resiliency, stakeholder engagement, policy analysis, and program development and implementation. Ms. Hanson supports A Better City and Boston's Green Ribbon Commission's commercial estate working group with research and analysis to increase the energy efficiency and resiliency of Boston's commercial buildings. She advises Washington D.C.'s Department of Energy And Environment on their implementation planning and financing strategies for the Climate Ready D.C. Plan and is supporting a strategic review of Mountain View, California's sustainability programs. Prior to joining Cadmus, Ms. Hanson served in the New York City Mayor's Office of Sustainability on the building energy efficiency team. In this role, she led over fifty stakeholders and technical experts in determining how to decarbonize New York City's building stock by 2050. This work culminated in NYC's technical working group report: transforming New York City buildings for a low-carbon future and its resulting programs. Previously, Ms. Hanson served in the Massachusetts Executive Office of Energy and Environmental Affairs, where she worked across Massachusetts' state government to develop and implement a coordinated climate preparedness initiative to increase resiliency efforts in priority areas, including transportation, energy, built environments, and public health. This work involved managing an internal stakeholder process to develop new programs and identify necessary staff and financial resources, including successfully advocating for funding in the Massachusetts operating budget. In this role Ms. Hanson advised the Massachusetts Department of Transportation during development of their Boston Harbor flood risk model and worked with the Massachusetts office of coastal zone management to create climate adaptation planning grants to assist cities and towns in advancing resilient strategies. Ms. Hanson received a graduate degree from Harvard University's John F. Kennedy school of government (HKS), where she concentrated on business and government policy and received a certificate in management, leadership, and decision-making.

RELEVANT EXPERIENCE

- Confidential Client – City Energy Supply Transformation Prospectus Development (2019 – Present):** Cadmus is supporting a group of organizations by developing prospectuses for collaborative funding opportunities that support cities transitioning to 100% renewable energy. Utilizing the *Pathways to 100* and *Road to Renewables* reports, Cadmus facilitated a two-day retreat in 2018 to prioritize opportunities most likely to advance decarbonization of city energy supplies. Cadmus' current scope of work builds on this prioritization and includes facilitating three advisory working groups and researching and producing actionable strategy prospectuses for the top three opportunities. Ms. Hanson serves as the project manager and lead for one of the three opportunity areas.

- **New York State Energy Research and Development Authority – Commercial Tenant Steering Committee Engagement and Facilitation (2018 – Present):** Cadmus is supporting the New York State Energy Research and Development Authority’s (NYSERDA) in redesigning their Commercial Tenant Program. The program provides energy analysis and implementation support for tenants to help them enhance the comfort, efficiency, and productivity of their office spaces. Cadmus’ work includes facilitation and logistical support for the program’s Steering Committee, as well research and strategic advisory support to guide the revision of the Commercial Tenant Program Opportunity Notice. This work is intended to better align the Commercial Tenant Program with market needs to meet the goals of the Clean Energy Fund. Ms. Hanson is the Project Manager and co-facilitator for this task.
- **Massachusetts Department of Energy Resources – Affordable Access to Regional Collaboration (2018 – Present):** Cadmus is supporting the Department of Energy Resource’s (DOER) to build and institutionalize knowledge of clean energy opportunities for low income households among local organizations, including regional planning agencies (RPAs), municipalities, affordable housing owners or developers and community-based or other local organizations. Cadmus is designing and implementing a training program for RPA Awardees staff covering affordable housing and clean energy technology, programs, incentives and policies in Massachusetts. This training program will consist of four half-day in-person trainings, quarterly webinars and informational and training materials (i.e. factsheets) that RPA staff may use to conduct external trainings. Cadmus will also provide ongoing advisory support to assist RPAs and designing, and analyzing, key metrics to evaluate the program. Ms. Hanson is the Project Manager and a co-facilitator for this project.
- **City of Mountain View – Environmental Sustainability Program Assessment and Strategic Plan Support (2018 – Present):** Cadmus is reviewing and providing strategic feedback on Mountain View’s sustainability program and its efforts to reduce GHG emissions in the face of strong economic growth. The program review encompasses benchmarking of Mountain View action plans, roadmaps, and execution against other leading US and international cities; a review of sustainability goals and how these intersect with other city priorities; and synergies and tradeoffs among sustainability and other city goals. This work includes hosting internal and external stakeholder engagement workshops to determine process improvements and program effectiveness measurement tools, as well as appropriate program resource allocations to strengthen the sustainability program’s effectiveness. Ms. Hanson is supporting stakeholder engagement activities, as well as city benchmarking to determine potential priorities for roadmap development.
- **Washington D.C. Department of Energy and Environment – Climate Ready D.C. Implementation Planning, Finance Strategies, and Design Guidance (2018-Present):** Cadmus, Wood and the Resilient Design Institute are supporting the development of an implementation strategy for Washington D.C.’s climate resilience plan, Climate Ready D.C. The goal of the implementation plan

is to develop a strategy to increase the resilience of the City's public and private sector assets and the well-being of its community members. A portion of this focus will include working with the 100 Resilient Cities initiative on pathways to institutionalize resilience in the public and private sector. The team will also focus on developing a series of financing strategies and funding recommendations for the new D.C. Green Bank, developing resilient design guidelines for facilities and providing technical assistance on resilience to D.C. agencies. The project launched in May 2018 and the initial implementation planning will conclude in May 2019. Ms. Hanson is a lead for the finance task of the implementation plan.

- **Boston Green Ribbon Commission – Commercial Real Estate Working Group Support (2013-Present):** MCG, working in collaboration with local non-profit A Better City (ABC), coordinates the Commercial Real Estate Working Group of the Boston Green Ribbon Commission. The Commission is a group of leaders from Boston's largest commercial property owners, health care organizations and institutions of higher education that have organized to assist the City in meeting its goal of reducing greenhouse gas emissions 25 percent by 2020 and increasing resiliency. Projects have included the implementation and evaluation of a virtual energy assessment audit program for commercial buildings, stakeholder facilitation and policy analysis for Boston's BERDO programs and subsequent reporting years, prioritization of strategies to support emission reductions for the large buildings and institutional sectors for the City of Boston's Climate Action Plan including green leasing, net zero energy buildings, behavior-based energy efficiency program research and design for tenants and engagement with Massachusetts Energy Efficiency Advisory Council's commercial real estate roadmap and three-year utility energy efficiency plans. Ms. Hanson supports the Commercial Real Estate Working Group as lead for the building codes task.

Trevor Clifford, Analyst

SUMMARY OF PROFESSIONAL EXPERIENCE

Trevor Clifford is an Analyst at The Cadmus Group LLC and has three years of experience in urban planning and disaster preparedness assessment and program design. He is currently supporting the implementation of Climate Ready DC, the District of Columbia’s climate change adaptation plan, and the development of the 2018 Hurricane/Disaster Season Summary of Findings report for the Federal Emergency Management Agency (FEMA’s) National Preparedness Assessment Division (NPAD). Similarly, Mr. Clifford supported the development of the 2017 Hurricane Season After-Action Review (AAR) for FEMA’s NPAD. In this capacity, he oversaw the development of the Decisions and Events Chronology, and the writing AAR’s sections on responding during long-term infrastructure outages and mass care to initial housing operations. Prior to joining Cadmus, Mr. Clifford worked with the United Nations to build the disaster resilience of small and medium-sized enterprises and supply chains, and develop a GIS framework for the assessment and management of urban area disaster risks in the Asia-Pacific region. Domestically, he has worked with local transportation agencies and stakeholders to conduct land-use, urban design and demographic assessments, and conducted urban form assessments using GIS to inform the re:Code LA zoning code update.

THE CADMUS GROUP, LLC – ANALYST (WASHINGTON, DC) PRESENT

2017-

- **Strategy and Policy**
- **Climate Ready DC** – Implementing the climate change adaptation and resilience actions identified in the Climate Ready DC plan by providing technical and strategic guidance, including program design, and funding and finance
- **Urban Sustainability Directors Network** – Developing case studies to advance the adoption of municipal renewable energy initiatives in support of the Urban Sustainability Directors Network, including the identification and prioritization of context-based strategies to do so
- **National Preparedness Assessment Division, FEMA**
Supported the analysis, design, and development of risk and capability assessments and reports to help FEMA NPAD measure overall national preparedness, as well as the effectiveness of preparedness programs.
- **2018 Hurricane/Disaster Season Summary of Findings** – Supporting analysis and writing of an after-action review for 2018 hurricane season. Analyzed 2018 Hurricane Season Response and Recovery efforts through post-disaster interviews to identify areas for improvement, strengths, and potential best practices in areas such as private sector integration.
- **2017 Hurricane Season AAR** – Authored the mass care to initial housing operations and responding during long-term infrastructure outages sections of the 2017 Hurricane Season AAR for all impacted jurisdictions. This required collecting and analyzing qualitative and quantitative data through engagement with senior leadership at the federal, state, and local levels
- **Puerto Rico Emergency Management Agency (PREMA) Hurricane Maria AAR** – Authored the PREMA Hurricane Maria AAR by conducting interviews and analyzing findings with whole

community leadership across the Commonwealth of Puerto Rico. This analysis included all phases of disaster management, including prevention, mitigation, preparedness, response, and recovery.

- **2017 Hurricane Season Chronology** – Produced a chronology of nearly 1,000 key response and recovery decisions and events that took place during Hurricanes Harvey, Irma, and Maria, with a small team, to enhance senior FEMA staff understanding of hurricane response efforts
- **Dataset and Data Tools Training Material** – Developed training materials, including slide decks and one-pages, with a small team to help FEMA NPAD staff enhance their understanding of FEMA’s preparedness datasets and data tools.
- **Hurricane Matthew Preparedness Assessment** – Produced a response and recovery process improvement Menu of Options for Joint Field Office (JFO) Senior Leadership, informed by interviews conducted with JFO Section Chiefs to assess Hurricane Matthew response and recovery decision making processes.

THE UNITED NATIONS – CONSULTANT (BANGKOK, TH) 2016-2016

- ***Economic and Social Commission for Asia and the Pacific, Statistics Division***
- **GIS Disaster Risk Assessment** – Designed and piloted a GIS tool, methodology, and step-by-step manual for the Disaster-Related Statistics Framework (DRSF) to support the identification and management of climate and disaster risks in urban areas
- **Urban Planning and GIS for Disaster Risk Management Book Chapter** – Developed substantive materials regarding urban planning and GIS best practices for climate-disaster resilience for the DRSF, including case studies and data analyses

THE UNITED NATIONS – CONSULTANT (BANGKOK, TH) 2017-2017

- ***Economic and Social Commission for Asia and the Pacific, Information and Communication Technology and Disaster Risk Reduction Division***
- **Small and Medium-Sized Enterprise (SME) Disaster Resilience Guidelines** – Developed strategic guidelines informing chambers of commerce across Asia and the Pacific how they may SME capacities for business continuity and disaster resilience
- **SME Disaster Resilience Training Modules** – Created training modules, including PowerPoint decks and one-pagers, for chambers of commerce to develop SME continuity of operations capabilities and resilience capacities
- **SME Disaster Resilience Workshop** – a Provided substantive and technical support for the 2017 Asia-Pacific Business Forum in Dhaka, Bangladesh regarding the role of chambers of commerce in facilitating SME disaster risk management for resilient supply chains

REGIONAL TRANSPORTATION DISTRICT – ASSISTANT URBAN PLANNER (DENVER, CO) 2014-2015

TRANSIT ORIENTED DEVELOPMENT

- **Transit-Oriented Development, Research and Analysis** – Produced the outward facing 2014 Transit-Oriented Development (TOD) Status Report—collecting, researching, analyzing and presenting information—using ArcGIS and Adobe CS6, conveying regional TOD trends and impacts
- **Transit-Oriented Development, Public Private Partnership** – Created a pilot program with internal and external stakeholders to establish new ways for the Regional Transportation District to enter into public-private partnerships for affordable housing and equity in TOD

WINTER AND COMPANY – ASSISTANT URBAN PLANNER (BOULDER, CO) 2015-2015

- **Urban Form and Zoning Code Assessment** – Established 12 neighborhood typologies through the development of urban form indicators and conducted neighborhood scale contextual analysis using QGIS and Adobe Creative Suite, informing zoning code development

DENVER REGIONAL MOBILITY AND ACCESS COUNCIL – FELLOW, URBAN PLANNER (DENVER, CO) 2014-2014

- **Mobility and Accessibility Audit Tool** – Developed and implemented a community-based participatory mapping tool and guide to audit block level streetscapes for impediments and barriers to transit access and prioritize capital improvements for universal design
- **Workshop Facilitation** – Facilitated bi-monthly 30-person stakeholder workshops and training programs, informing survey design and use

CITY AND COUNTY OF DENVER MAYOR’S OFFICE OF SUSTAINABILITY – ASSISTANT (DENVER, CO) 2014-2014

- **Sustainable Procurement Policy** – Served as the Director of Sustainability’s policy advisor, conducting qualitative research, writing white papers, and initiating public-private partnerships

THE DOWNTOWN DENVER PARTNERSHIP – ASSISTANT (DENVER, CO) 2013-2013

- **Survey Design, Implementation, and Analysis** – Designed and distributed surveys to downtown commuters, receiving a record 4,485 responses, analyzing and reporting response data in the outward facing 2013 Downtown Denver Commuter Survey Report

EDUCATION AND CERTIFICATIONS

BS, Public Policy and Social Science, University of New South Wales

MA, Urban and Regional Planning, University of Colorado Denver

MA, Disaster Preparedness, Mitigation and Management, Asian Institute of Technology