

# The Chevy Chase Challenge

A Climate Action Plan 2008-2012  
Town of Chevy Chase, MD

Adopted December 10, 2008

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## From the Mayor

I am proud to say that the Town of Chevy Chase now has a strategy to reduce its impact on global warming: The Chevy Chase Challenge. Because we are a small town many might ask whether anything we do will have an impact on climate change. When we signed the U.S. Mayors' Climate Protection Agreement in 2006, we joined a national movement to avert a climate debacle. Today over 900 cities and towns have signed the Mayors' Agreement which means that 82 million of us are working together to contribute to a brighter, cooler future. The Chevy Chase Challenge is our strategy for engaging Town residents in this larger movement. We pledge to reduce our greenhouse gas emissions 12% below 2007 levels by the year 2012. Most of the reductions will come from voluntary actions by Town residents to improve home energy efficiency and spend a little less time driving their cars. It can be a win-win situation for all. Energy efficient homes are more comfortable, have lower utilities bills, and better air quality. By using cars less we will improve our fitness, reduce air pollution, and reduce the cost of getting around. We are also hoping that the Town government will contribute to achieving the goal by, for example, improving streetlights and increasing tree cover.

Over the next four years the Climate Protection Committee will be organizing many events and activities to engage residents in the Chevy Chase Challenge. Participation offers Town residents the opportunity to have fun, save money, and learn a lot while we do our part. I urge all residents to participate in as many ways as they can. Look for notices in the Forecast, on the Town Crier, and on the Town's website. Let's make our Town a model for other towns in the region and nationally.

I extend my sincere thanks to the many the volunteers who have worked hard to making the Chevy Chase Challenge a reality: Rob Enelow, Carla Graeff, Betsey Haddad, Betsy Johnson, Andy Knaus, Elizabeth Mumford, Christine Real de Azua, Dian Seidel, Stuart Sessions, Catherine Fraas, Jack Palmer, Stephen Seidel, Michael Whelan and especially Judy McGuire who chairs the Climate Protection Committee.

Sincerely,

Kathy Strom

## Executive Summary

Human beings are changing Earth's atmosphere in ways that will fundamentally alter our planet's climate. If unchecked, the impacts of this climate change would be severe and widespread, reaching many locations including the Town of Chevy Chase. The primary source of man-made greenhouse gases is the burning of fossil fuels -- coal, natural gas, oil and gasoline -- to power our cars, homes, utilities and appliances.

The Town of Chevy Chase can do its part in minimizing global warming by implementing the Chevy Chase Challenge, a climate action plan. This entails using known technologies and strategies to conserve energy while also saving money, raising the comfort level of our homes, increasing property values, improving health and quality of life, and enhancing community connectedness. In a sense our task is easy. Many of us can afford to retrofit our houses for energy efficiency, buy fuel-efficient cars and solar panels. We can even influence policy at the local, state and national levels. But in another sense, our task is difficult. We may opt out of energy conservation because many of us can afford to pay more for energy. The real challenge, then, is to use our resources and intelligence to choose the environmentally responsible path and to set an example for similar communities across the country.

In May 2006, the Town of Chevy Chase signed the U.S. Mayors' Climate Protection Agreement, committing us to reduce our greenhouse gas (GHG) emissions by 7% below 1990 levels by 2012. In April 2008 the Climate Protection Committee reported on the Town's current greenhouse gas emissions (available on the Town's website). To achieve the Mayors' Agreement goal, we need to reduce our emissions by 13% below 2007 levels. Our strategy focuses heavily on motivating residents to improve home energy efficiency (85% of reductions), inspiring people to reduce their car use by walking, biking, carpooling, and using mass transit (9% of reductions), promoting renewable energy production (largely solar) in town (5%), and from energy efficient streetlights (1%)

Some may say that a town of fewer than three thousand people cannot make any difference to global warming. Through the Mayors' Agreement, however, we join more than 80 million people in 852 towns and cities in our efforts to achieve the same goal. Together we can make a difference and serve as a model for other towns like ours.

The benefits to the Town residents from the Chevy Chase Challenge include lower utility bills and gasoline expenditures, increased home comfort, improved health and fitness, enhanced self-reliance, increased social interactions among Town residents, and greater engagement at the local, state and national levels of government. We will also gain a sense of satisfaction from stepping up to the challenge of the most complex and pervasive environmental crisis of our time.

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## Preface

The Chevy Chase Challenge is the work of the Climate Protection Committee, a group of volunteers tasked by the Mayor of the Town of Chevy Chase with recommending ways to meet the commitments the Town made by signing the U.S. Mayors' Climate Protection Agreement. This climate action plan is neither a scientific document nor a bureaucratic one. It is a plan of action written by and for residents. Those involved in developing the climate action plan include a climate scientist, an environmental economist, an architect, a retired teacher, activists in environmental organizations, a wind power specialist, a retired EPA official, a marketing professional, and many current and past project managers who have volunteered many hours to this task. We share a common concern about the climate crisis and the overarching goal of mobilizing the Town to reduce its carbon footprint significantly. The personal tone of the plan reflects our belief that, particularly in our small residential town, meeting this goal will be more a matter of personal and household changes than of governmental policy and regulation. We cannot and should not look to government or industry or scientists to solve the problem without also doing everything we can in our personal lives to prevent a climate crisis. Therefore this document generally uses a first person perspective to emphasize that *we* are the most critical actors on this stage.

# The Chevy Chase Challenge

## **I. Action is Urgently Needed to Avert a Climate Crisis**

Human beings are changing Earth's atmosphere in ways that will fundamentally alter our planet's climate, leading to higher temperatures, increased drought, floods, and extreme weather events, and rising sea levels. The impacts from the projected warming would be severe and widespread, causing human health problems, stressing agriculture and natural ecosystems, exterminating up to 30% of species, and threatening to displace millions of people in coastal areas as the seas rise.

Many impacts of climate change will be felt by the residents of the Town and state: longer and more frequent heat waves, greater intensity of rainfall and increased run-off and localized flooding, and new distributions of insects, plants and weed species that will challenge local farmers, gardeners and the natural habitat. Climate change could also substantially impact our most critical regional ecosystem, the Chesapeake Bay, including the local economy, species survival, fisheries, flooding, wetlands ecosystems, and the very existence of many Chesapeake islands.

The primary source of man-made climate-altering "greenhouse gases"<sup>1</sup> is the burning of fossil fuels -- coal, natural gas, oil and gasoline -- to power our cars, factories, utilities and appliances. Because trees absorb and store carbon dioxide (the most important greenhouse gas), deforestation has also increased atmospheric levels of carbon dioxide. In Maryland, our greenhouse gas emissions derive primarily from electricity (45.7%), residential, commercial and industrial non-electric fuels (20.0%), and transportation (32.5%). For our town, emissions of greenhouse gases come primarily from two sources: 64 % from our houses and 24% from our cars. For more details on climate change see Appendix 1.

## **II. Our Commitment**

In May 2006, the Town of Chevy Chase signed the U.S. Mayors' Climate Protection Agreement, which commits us to meet the goals of the Kyoto Protocol. The first milestone is to reduce greenhouse gas emissions to a level 7% below 1990 levels by 2012. The initial step in complying with the U.S. Mayors' Agreement was to measure the Town's greenhouse gas emissions and a report on this subject was completed in May 2008 (available on the Town's website). Adopting the Chevy Chase Challenge will fulfill the second and third steps in meeting the Mayors' Agreement requirements: establishing a specific numerical emissions reduction goal and specifying our detailed strategy for achieving it. Over the next four years, as we implement our climate action plan and measure our impact, we will complete the final steps necessary for the Town to comply with its commitments under the Mayors' Agreement.

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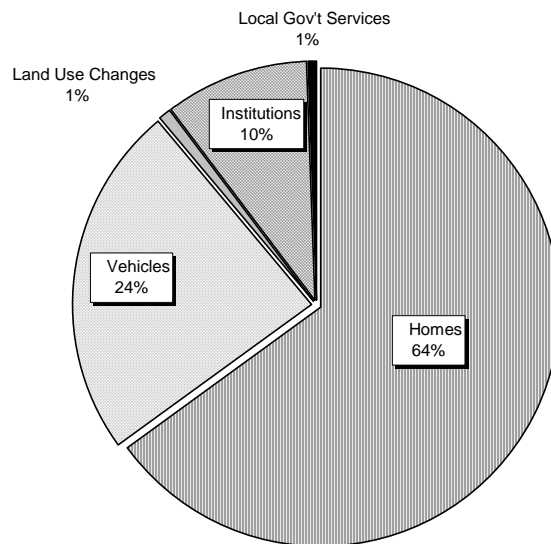
<sup>1</sup> Primarily carbon dioxide (CO<sub>2</sub>), methane, nitrous oxides, and long-lived chlorinated and fluorinated compounds).

Some may say that a town of fewer than three thousand people cannot possibly make a difference to global warming. Through the Mayors' Agreement, however, we join with more than 80 million people in 852 towns and cities, each of which has pledged to achieve the same goal. Over and above the reductions in carbon dioxide resulting from our actions, we can make an impact by being a model for other towns; showing them that, with leadership and motivation, every town, every home, and every citizen can help prevent a climate crisis and enhance our quality of life at the same time.

### **III. Our Greenhouse Gas Emissions**

In 2007 the town undertook a Greenhouse Gas Assessment (for details see Appendix 2), which revealed emissions of 25,261 tons of CO<sub>2</sub> per year in the measured activities.

**Fig. 1. Town of Chevy Chase Emissions by Sector  
(total 25,261 tons CO<sub>2</sub>/yr)**



- Almost two-thirds (64%) of the CO<sub>2</sub> emissions derive from our homes. This is in large part because of the residential nature of the town and because our housing stock consists of single unit detached homes, 90% of which were built before 1960 to earlier, energy-inefficient building codes. Almost two-thirds of home energy use (61%) is for heating and cooling.
- Almost one-quarter of the emissions (24%) derive from our automobile use. Emissions derive from the large number of cars rather than from annual miles

per car or lower-than-average gas mileage. Three-quarters of automobile emissions are for purposes other than commuting to work.

- The three institutions in town (Leland Center, Chevy Chase Elementary School, and 4H National Headquarters) generate 10% of the Town’s emissions, 75% of which comes from the 4H.
- The rest of emissions derive from town operations and land use changes (each less than 1%).

**IV. Our Goal: Reduce CO2 emissions by at least 2999 tons by 2012**

In keeping with the U.S. Mayors’ Agreement, we propose to reduce our emissions by 7% below 1990 levels. Starting with our measured emissions in 2007, we used historical trends in per capita greenhouse gas emissions in the State of Maryland to predict what 1990 levels were and reduced that by 7%. This makes our goal to reduce our emissions by at least 12% below 2007 levels to 22,262 tons by 2012.

**Table 1. Greenhouse Gas Emissions, Town of Chevy Chase (in tons/year)**

	Total Town CO <sub>2</sub> emissions	CO <sub>2</sub> emissions per person	CO <sub>2</sub> emissions per household
1990 Estimate	23,938	8.9	23.4
2007 GHG Assessment	25,261	9.2	24.7
2012 Business as Usual	25,647	9.2	25.1
2012 Goal (7% below 1990)	22,262	8.0	21.8
2012 Reduction needed (below 2007)	2,999	1.2	2.9
% reduction needed	11.9%	12.6%	11.9%

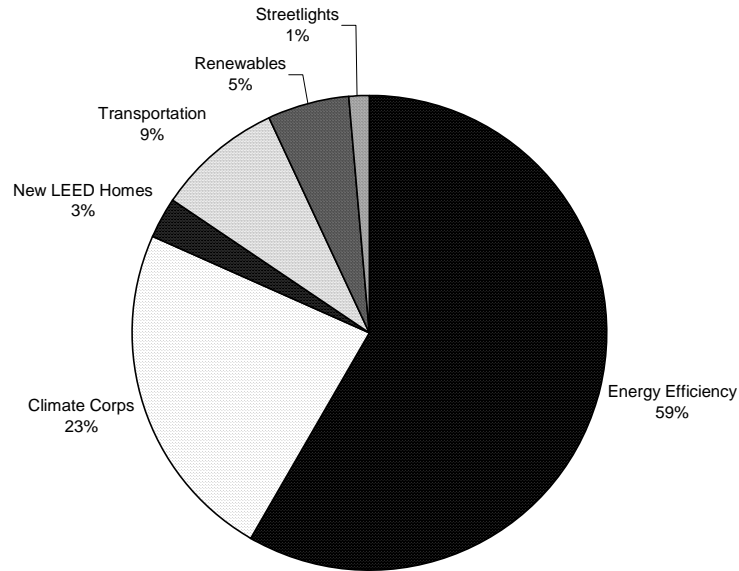
A 12% reduction from current levels is eminently achievable with existing technology and modest changes in energy use habits.

**V. Our Strategy: The Chevy Chase Challenge**

The Climate Protection Committee recommends that the Town undertake a community-wide initiative, called the Chevy Chase Challenge, that engages a broad spectrum of residents in efforts to reduce our carbon footprint. This initiative should be fun and educational and should strengthen the social fabric and reputation of our Town. While CO<sub>2</sub> emissions reduction is the goal, side effects of the initiative include improved home comfort, reduced energy costs, enhanced community spirit, greater family togetherness and fitness (from substituting walking and biking for car travel), and reduced crime (because residents are walking and biking on the streets more).

The composition of expected emissions reductions are summarized in the graph below:

Fig. 2. Sources of GHG Reductions Town of Chevy Chase



**A. Home energy consumption (reduction 2908 tons CO<sub>2</sub> per year by 2012)**

Because homes constitute the biggest portion of our greenhouse gas emissions and because reducing home emissions is both feasible and money-saving in the long run, the highest priority and most significant source of emissions reduction in the Chevy Chase Challenge is to improve home energy efficiency. This will be done through three mechanisms: energy efficiency upgrades to old homes, energy efficient practices, and providing incentives for new homes to exceed the county standard for home efficiency.

**Energy Efficiency Upgrades (reduction: 2013 tons).** With old homes, it is relatively straightforward to reduce home energy consumption by 15-20% or more by plugging air leaks, improving insulation, installing energy efficient heating and air-conditioning systems and appliances, and by instituting a number of other changes. While there is usually a large upfront cost (typically \$250 to \$5000), the return on investment is attractive (5-7 year payback periods) and there are ways to finance them through home mortgages or other financial instruments which reduce the total monthly cash outflow (utilities plus mortgage payment) immediately. In addition, since the County may soon require disclosure of energy costs at the time of home sales, energy efficiency upgrades can enhance resale value.

The Chevy Chase Challenge will encourage all residents, especially those living in older homes, to improve the energy efficiency of their homes. The Climate

Protection Committee has and will continue to promote home energy audits and remedial work by prescreening home energy auditors and contractors and negotiating discounted prices, facilitating easy access to products and information for residents, and tracking performance. The Maryland State Home Performance with Energy Star Program awards certificates to homes that reduce their energy consumption by at least 10%. Montgomery County provides a \$250 property tax rebate per year to homeowners who provide documentation of specific energy efficiency upgrades. We suggest that the Town also provide financial incentives for documented reductions in greenhouse gas emissions: a \$250 rebate for each ton of CO<sub>2</sub> reduction (documentation based on actual utilities bills).

**Energy Efficient Practices: The Climate Corps (reduction: 805 tons).**

The Town will select, train, equip, and supervise a *Climate Corps*, comprised of high school students and/or scouts or block captains to make home visits and provide recommendations to residents about how to save energy. Such recommendations might include setting programmable thermostats, reducing phantom loads on plugs, reducing hot water use, maintaining HVAC equipment, installing weather-stripping, changing lighting, car maintenance, etc. They would also help homeowners track their energy use and calculate their carbon footprint. Climate Corps members would receive training, a tool kit (with equipment to do their job as well as some giveaways) and t-shirts. The Climate Corps would communicate the results using creative means (YouTube videos, science fair projects, hands on activities) and create a buzz around home energy habits. The Climate Protection Committee will work with schools to assure that the Climate Corps work is eligible for service learning credits for students. It is hoped that we can use a block captain approach to reach nearly universal coverage by the Climate Corps.

**Energy Efficient New Homes (reduction: 90 tons).** While Montgomery County has passed a law requiring that all new homes built after 2010 meet Energy Star standards (an automatic 15% reduction in energy consumption), the Town of Chevy Chase aspires to go further. We would like all new houses to be sustainably built and achieve LEED Certification (Silver or better)<sup>2</sup> or comparable standards that exceed County energy efficiency standards. A working group of local architects and professionals in the building trade will develop a proposal for the Town Council to provide incentives for higher efficiency and sustainability standards in new homes.

**B. Transportation (reduction: 304 tons CO<sub>2</sub> per year by 2012)**

Automobile use contributes close to one-quarter of the measured greenhouse gas emissions from the Town but this source may be hard to reduce because commuting and driving habits are deeply ingrained. Our location close to Bethesda (including Metro) should enable us to drive less but people often find reasons not to walk, bike, carpool, or take public transportation. We need to make it easy, fun, and habit-forming to get around the region in climate-friendly ways. Our modest goal to reduce

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<sup>2</sup>based on the standards of the U.S. Green Building Council  
<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=147>

emissions from automobiles is modest (5%) should be achievable with minor changes in transportation habits of residents.

**Facilitating carpooling** could include promoting existing carpool match-up resources, facilitating quick response ride boards, sharing destination information, or a slug-line at the Leland Canter.

**Encouraging biking.** The Town could sponsor a Bike Day in early April each year, work with CCES parents on a “Safe Routes to School”, sponsor contests and recognize residents who substitute bikes for cars, install bike racks, give away bike odometers and set up a monthly mileage registry. Bike maintenance could be promoted as an employment training program for town teens as well.

**Encouraging walking.** To encourage residents to walk to Bethesda for their errands, entertainment, and to access public transportation, the Town could sponsor walking contests, give away pedometers, recognitions, and record mileage each month. The Town could also make available lightweight attractive carts for people to carry home their purchases.

**Shuttle buses to common destinations.** One approach to reducing individual car use is to provide shuttles to common destinations at popular times (e.g. to Metro during AM and PM rush hour, to nearby grocery stores one day a week, to Montgomery Mall on Saturdays, to Georgetown and the Theatre District on Saturday evenings). A detailed proposal is attached (Appendix 1). Careful study of the actual demand, net reduction in car use, and willingness to pay for shuttles is needed before action is taken.

### **C. Renewable Energy (reduction: 188-900 tons CO<sub>2</sub> per year by 2012)**

The Town should promote the production of renewable energy (solar and geothermal) in town. This would complement the work of Common Cents Solar (a community corporation) that is currently promoting the installation of photovoltaics and solar hot water on private roofs in town and is exploring doing the same on the roofs of the Town’s public institutions. It is likely that at least 50 private solar installations will be installed by 2012 and generate 150 kilowatts of electricity (saving approximately 188 tons of CO<sub>2</sub>/year). Additional installations on the roofs of institutions in town could increase the local solar energy produced substantially. It makes sense for a private entity to lead the process since greater public rebates and tax incentives are available to the private sector and the Town does not have the administrative or financial systems to manage a large capital investment project like this. Nonetheless, the Town should look for opportunities to support and complement Common Cents Solar in promoting local production of renewable energy. This may overlap with the LEED new homes initiative to the extent that the Town can provide incentives for geothermal energy systems.

#### **D. Energy Efficient Streetlights (reduction: 49-98 tons CO<sub>2</sub> per year by 2012)**

The Town currently has 279 streetlights, 96% of which are mercury vapor with the remainder high-pressure sodium, both of which are about one-quarter as energy efficient as induction or LED streetlights. The Town pays PEPCO, which owns the streetlights, an all-inclusive rate for street lighting that includes electricity and maintenance. The Town purchases Renewable Energy Credits (RECs) to offset its streetlight greenhouse gas emissions. PEPCO will not, at present, convert its streetlights to induction or LED lights nor has it established a price at which the streetlights can be purchased so that towns can install their own lights. Several towns and cities around the country have introduced more efficient streetlights<sup>3</sup> and effected great cost savings and greenhouse gas reductions. The Climate Protection Committee recommends that the Town do the following:

- Pressure PEPCO (joining with State Delegate Al Carr and the towns of Kensington and Chevy Chase View) to offer LED or induction streetlights
- Request a pilot test of both LED and induction streetlights in our town so that residents can choose the preferred lighting.
- Negotiate with PEPCO to get a firm price on buying streetlights

Based on the pilot experience, progress with PEPCO, and financial analysis, we recommend converting to high efficiency streetlights in 2010. If PEPCO continues to own the streetlights and not to offer renewable energy, the Town should join the local energy buying consortium of towns for a reduced rate on renewable energy.

#### **E. Increasing Tree Cover (reduction: 23 tons per CO<sub>2</sub> year by 2012)**

The Town should continue to increase its own planting and care of trees and promote private tree planting and care. If the Town tree stock (public and private) were to show a net increase of 5% per year starting in 2009 (i.e. planting 130 new trees per year), 22.8 tons of carbon would be removed in the year 2012<sup>4</sup>. The Town should plant only native trees that are better adapted to local conditions and provide incentives to residents to plant and care for trees. Incentives could include the Town purchase of trees, a Town-negotiated price for desirable trees, free tree planting and maintenance, or loaning out Treegators for private trees for the first two years after transplanting. This task should be assigned to the Environment Committee for action, with participation from Climate Protection Committee members.

#### **F. Reducing Solid Waste and Improving Reuse (reduction: <32 tons CO<sub>2</sub> per year by 2012)**

The current volume of solid waste and recycling in town is unknown as is the proportion of potentially recyclable materials that fail to be recycled. The town emits

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<sup>3</sup> Ann Arbor, MI, Toronto, Ontario, Raleigh, NC, Welland, Ontario, Austin, TX, and Anchorage, AK.

<sup>4</sup> Using the Department of Energy method for calculation carbon sequestration by trees and assuming moderate growth hardwood trees with 87.5% survival.

52 tons of CO<sub>2</sub> each year transporting trash, yard waste, leaves, and “treasure” (this does not include the resources lost and greenhouse gases generated from processing the waste). The first step for the Chevy Chase Challenge is to monitor the amount and composition of trash (the various contractors should be required to report weights of their loads when they dump them at County sites). The second step is to implement a program of resident education and incentives to encourage reuse (including composting), recycling, and repurposing waste. Some actions can be taken immediately. For instance, the Town should locate and do whatever is necessary (including scheduling) to induce reclamation organizations to travel around town before the Trash and Treasure contractor to pick up electronics, furniture, appliances, clothing, and other items that can be repurposed, reclaimed, or responsibly recycled. This solid waste reduction task should be assigned to a joint Public Services and Environment Subcommittee with participation of Climate Protection Committee members as well.

#### **G. Preparing for Climate Change.**

Some adverse effects of climate change will occur whether or not we are successful in reducing our CO<sub>2</sub> emissions. They are likely to include more severe rainstorms (resulting in increased flooding and more electricity outages), droughts, heat waves, and worse air pollution. Many Town residents will be adversely affected at one time or another by these changes. The Town Council should assess the adequacy of the County’s preparedness for such events and augment it with a Town-specific communications and emergency action plan for such disasters. This will probably include identifying all vulnerable residents (aged, infirm, handicapped, and those requiring electronic medical devices) and making sure there is some system for ensuring their safety during weather related emergencies. Arranging for a safe haven, having back up energy generators, and maintaining a stock pile of critical supplies (water, in particular) may be required. This task should be assigned to the Community Relations Committee as part of the revitalized Block Captains program.

**H. Promotion and Education.** None of the above actions will take place without an effective communications program. Preaching about climate change irritates people. Simply making information available has limited impact. The Chevy Chase Challenge must create an engaging, multifaceted communications program that motivates residents to reduce their carbon footprint, educates them about how to do it, builds commitment to the goals and long term participation, and encourages residents to create and share new solutions. This requires understanding residents’ motivations and constraints and designing a program to make climate-friendly choices as attractive as possible. For some residents, saving money is of the greatest concern. For others it is convenience. For many it is concern about the environment or global warming. Some residents do not believe global warming is manmade but would make changes to enhance their property value. Many elderly residents are unsure how long they will continue to live in their homes and are reluctant to make home-improvements that may not pay off before they have to leave. The communications program will be designed to reach each segment of the population and make sure the

Chevy Chase Challenge addresses their needs. The communications strategy and program is intertwined with and will help define and direct the home energy efficiency, transportation, and other components of the Chevy Chase Challenge.

To incorporate good marketing practices and skills into our strategy, the Climate Protection Committee has developed a relationship with the University Maryland Chapter of the American Marketing Association (and its faculty advisor) that will provide valuable inputs. We also suggest contracting a professional marketing and communications firm to develop a comprehensive communications strategy. When possible we will draw on expertise of residents as well.

One objective of the Chevy Chase Challenge is to bring the Town's climate initiative "out of the closet" and make it a front burner issue for the Town and the Town Council. The signs at the entrance to the Town, for instance, could announce the Chevy Chase Challenge; Council members should become well informed about it and become spokesmen to local news media; it should have a line item in the Town budget; and goals should be included in the annual work plan.

## **VI. Measuring progress**

The Town will obtain the data required to monitor progress via home energy audits, the climate corps, contests, and incentive programs. Measurement is critical to provide feedback to residents, build momentum, and measure impact of the climate action plan. For monitoring purposes, participation rates will be used to gauge progress and to improve the program. Actual CO<sub>2</sub> emissions will be used to measure impact.

Many of those who participate in the initiative will be able to provide energy use data as part of measuring their own progress and that of the Town. From information on utilities bills (kwh, therms and fuel oil volume) and gasoline usage is it easy to calculate CO<sub>2</sub> emissions. Because our initial greenhouse gas assessment was based on a small sample, we will attempt to retroactively adjust the 2007 figures, if needed, to reflect actual data provided by residents. Regular data summaries will be provided to the Town Council and to residents and an annual update will be widely circulated starting in January 2010. Extreme care will be taken to protect privacy of participants and only collective data will be reported, except where prior permission has been given by an individual.

## **VII. Implementation**

So as not to overburden town staff with additional responsibilities, we propose hiring a part time (10-15 hours per week) Climate Intern on the Town Staff. Other small towns signing the Mayors' Agreement (including Anchorage Alaska) have highly recommended hiring a climate intern as an effective way to keep a climate action plan on track. A tentative job description and recruitment notice are attached (Appendix 5). The major role of the Climate Intern would be to serve as the "go to"

person on climate issues on the Town staff, to research and organize town operations related work (streetlights, trash, trees), to work with common tasks with the Climate Protection Committee, and to create and maintain a website specifically for the Chevy Chase Challenge linked to the Town website.

The Climate Protection Committee has accomplished a great deal with relatively little budget over the last two years (see Appendix 6). Committee labor will continue to comprise a major and growing resource for implementing and overseeing the Chevy Chase Challenge and we anticipate creating several working groups specifically for implementation. In addition, we anticipate requiring the services of consultants, in particular professional communications and marketing experts. We also expect to devote budget to communications materials, events, giveaways, and incentives.

The Climate Protection Committee will accomplish its main work through 2012 via new working groups: home efficiency improvements, the Climate Corps, new LEED homes, transportation, communications, and monitoring. Working groups should be small (four people, perhaps) and task oriented (specific terms of reference to be drafted), and should expire when the task is completed. In addition, there are several actions in the Chevy Chase Challenge that pertain to standing committees and should be tasked to them. The Climate Protection Committee will provide volunteers for those committees. We suggest that the Town Council task the Environment Committee with developing a plan for increasing net tree cover by 5% per year, a joint Public Services and Environment subcommittee to develop a proposal to reduce the environmental and climate impact of solid waste disposal in town, and the Community Relations Committee with developing an emergency preparedness plan using the Block Captain model that was successfully used in 1999 to address the potential millennium (Y2K) problem. The Public Services Committee, in collaboration with the Climate Intern, would develop a proposal for energy efficient streetlights.

## **VIII. Summary**

This document has described briefly a strategy of reducing the Town's impact on climate change. The strategy is ambitious but doable. With strong leadership from the Town Council and enthusiastic participation by residents, the Chevy Chase Challenge will not only enhance the reputation of our town, it will provide many concrete and intrinsic benefits to residents. The Climate Protection Committee will continue to commit substantial volunteer labor to ensure that the Chevy Chase Challenge is a success.

## **Appendix 1. Climate Change Science**

### **Background**

Climate change is now widely accepted as the single greatest environmental challenge facing our generation. Since the birth of civilization, society has benefited from a climate system that has been reasonably friendly and sufficiently stable to allow economies to expand, cities to thrive near the coasts, and wildlife to flourish in appropriate habitats. But the outlook for our future climate portends unprecedented changes. Because of our growing reliance on fossil fuels (coal, oil and natural gas), we are now changing the earth's atmosphere in ways that will fundamentally alter our planet's climate, leading to higher temperatures, increased drought, floods and other extreme weather events, and rising sea levels.

We will be adversely affected by it and actions we take are critical to prevent it. While there are many high level actions that need to be taken --- research and development of new energy sources and technologies, policy and regulatory changes, and better transportation, land use and taxation policies – individual and local action is critical to preventing catastrophe. The good news is that most of these changes we can take to reduce our impact on the climate also save money, particularly as fuel prices increase.

In May 2006, the Town of Chevy Chase signed the U.S. Mayors' Climate Protection Agreement, which commits us to meet the goals of the Kyoto Protocol. The first milestone is to reduce greenhouse gas emissions to a level 7% below 1990 levels by 2012. As an initial step in complying with the U.S. Mayors' Agreement, the Town has measured its greenhouse gas emissions. In this document, we accomplish the second and third steps in meeting the Mayors' Agreement requirements: establishing a specific numerical goal corresponding to the 7% reduction target for the Town and specifying our detailed strategy for achieving the goal. Over the next four years as we implement our climate action plan and measure our impact, we will complete the steps necessary for the Town to comply with its commitments under the Mayors' Agreement.

Some may say that a town of fewer than 3000 people cannot make any difference to global warming. But we aren't alone: "we" are actually 80 million people in 852 towns and cities that have signed the U.S. Mayors' Agreement (as of August 25, 2008), each of which has pledged itself to achieve the same goal. Over and above the reductions in carbon dioxide resulting from our actions, we can make an impact by being a model for other towns; showing them that, with leadership and support, every town, every home, and every citizen can help prevent a climate crisis and enhance our quality of life at the same time.

### **The Thickening Blanket of Greenhouse Gases**

The scientific community has long known that the Earth absorbs energy from the Sun, and radiates it back into space; that energy is trapped by "greenhouse gases" (carbon dioxide (CO<sub>2</sub>), methane, nitrous oxides, and long-lived chlorinated and

fluorinated compounds) which act like a thin blanket around the planet; and that human beings have added billions of tons of additional greenhouse gases to the atmosphere each year thus preventing more of the energy from escaping (See Figure 1 below). If these gases were not present in our atmosphere, the earth's temperature (the current global average is about 58 degrees Fahrenheit) would be a very inhospitable 60 degrees Fahrenheit colder. Instead, the concentration of these gases in the atmosphere has grown from 280 parts per million in the 1850s to 379 parts per million in 2005, an increase of nearly 30 percent and as a result the planet has grown warmer.

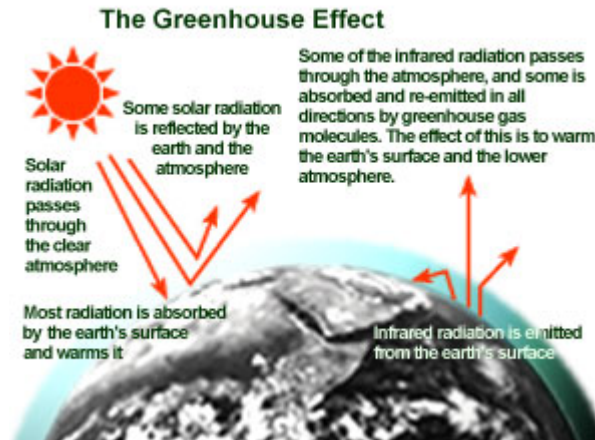


Figure 1: The Greenhouse Effect Source: US EPA

## Sources of Greenhouse Gases

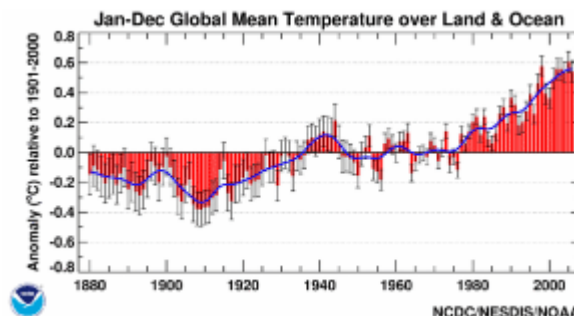
The primary source of man-made greenhouse gases is the burning of fossil fuels -- coal, natural gas, oil and gasoline -- to power our cars, factories, utilities and appliances. Because trees absorb and store carbon dioxide, deforestation has also increased atmospheric levels of carbon dioxide. In Maryland, our greenhouse gas emissions derive primarily from electricity (45.7%), residential, commercial and industrial non-electric fuels (20.0%), and transportation (32.5%). For our town, emissions of greenhouse gases come primarily from two sources: 64 % from our houses and 24% from our cars.

## Past and Future Changes in Climate

The scientific community has looked closely at both past and possible future changes in climate and how these relate to increases in greenhouse gas emissions. The state of science of climate change is periodically assessed by the Intergovernmental Panel on Climate Change (IPCC), a United Nations body that in 2007 was awarded the Nobel Prize (shared with Al Gore) for its work on understanding and explaining climate change. The following information is drawn from the most recent review of the body of scientific evidence issued by the IPCC.<sup>5</sup>

The IPCC concludes that, “warming of the climate system is unequivocal.” On a worldwide basis 11 of the last 12 years (1995-2006) rank among the 12 warmest years dating back to when records began to be kept in 1850. Average global temperatures have increased by 0.74 degrees Centigrade over the past 100 years. (See Figure 2, below). The IPCC also concludes that most of the observed warming since the mid-20<sup>th</sup> century is very likely due to atmospheric increases in manmade greenhouse gases, not the natural variability of the climate system.

Figure 2: Annual Average Global Surface Temperature Anomalies 1880-2006. Source: NOAA (Surface temperature records such as the one shown here have been quality controlled to remove the effects of urbanization at observing stations in and around cities.)



Another conclusion is that sea level has risen by 3.1 millimeters per year since 1993 due to thermal expansion of the oceans (water expands when heated) and melting glaciers, ice caps and polar ice sheets. Mountain glaciers and snow cover have also declined in both hemispheres. Although the number of tropical cyclones does not appear to have been affected, there is evidence of an increase in the number of intense storms in the North Atlantic since 1970.

<sup>7</sup> For a detailed description of how Renewable Energy Credits work see <http://www.eere.energy.gov/greenpower/markets/certificates.shtml?page=0>

Future changes in climate will be determined by current atmospheric greenhouse gas concentrations and by the amount of greenhouse gas emissions added to our atmosphere over the coming years and decades. In particular, a continuing increase in use of fossil fuels will largely drive the future rate of increase of global temperatures. The more coal, oil, and natural gas that is consumed, the greater the likely changes in climate. Increases in global population and higher incomes are two important factors driving future demand for fossil fuels. How efficiently we use energy and the rate at which we adopt low-carbon technologies (e.g., more efficient lighting, solar and wind energy, hybrid cars, etc) are also critical determinants of how successfully we may slow the build-up of greenhouse gases in the atmosphere. In the absence of any policies and actions to reduce fossil fuel use, it seems likely that carbon dioxide levels will rise by an additional 25-90% from 2000-2030. Although significant uncertainties exist, both in future greenhouse gas emissions projections and their impact on temperature, the IPCC estimates that temperatures from greenhouse gas emissions could increase from 4 degrees to 8 degrees Fahrenheit by the end of the century.

### **Impacts from Climate Change**

Although a change in temperature of a few degrees Fahrenheit may not seem large, the temperature change between the last Ice Age and today was roughly 9 degrees Fahrenheit, only slightly more than the 4-8 degrees change that is projected if we continue our present course. The impacts from the projected warming and other associated changes would be widespread.

- Human health could be adversely affected from changes in disease vectors and infectious diseases as tropical conditions spread.
- Agricultural productivity in some regions could be reduced, contributing to malnutrition from decreased cereal productivity.
- Natural ecosystems could be stressed from rapid changes in temperature and water availability. There could be widespread bleaching of coral reefs and up to 30 percent of species would face increased risks of extinction.
- Sea level could endanger millions of residents of low-lying areas, particularly in developing countries and small islands.

The impacts of climate change are likely to affect adversely everyone, including the residents of the Town of Chevy Chase. For example, insects could become more prevalent because fewer would be killed off in milder winters. We would see longer and more frequent heat waves and the temperature would reach above 90 or even 100 degrees Fahrenheit on more days. Greater intensity of rainfall could increase run-off and make localized flooding more problematic. Changes in temperature could alter the types of plants (and weeds) that thrive locally and present new challenges to the local farmers and gardeners and to the natural habitat.

Impacts of climate change could also substantially impact our most critical regional ecosystem, the Chesapeake Bay. One study<sup>6</sup> indicates that greater and earlier seasonal warming of the bay will adversely affect fishing and shellfish harvests. Analysis by the Chesapeake Bay Foundation concludes that

- Rising water temperatures are stressing fish from Pennsylvania brook trout to striped bass, and contributing to algal blooms and fish-killing dead zones in the Bay.
- Rising sea levels threaten to inundate miles of Chesapeake shoreline. According to some scientists, the region might see as much as a 3 to 4 foot sea level rise this century.
- The wetlands at Blackwater Wildlife Refuge are disappearing, as are the Bay's iconic islands—Sharp's Island disappeared completely in 1962.
- In low-lying areas, storm surges combined with higher sea levels and increasingly erratic storm activity, may create a “perfect storm” that will flood thousands of acres. Many of those areas are economically disadvantaged, and the combination of flooding and limited access to emergency facilities—facilities that might themselves be flooded—could be disastrous.

### **The Imperative to Reduce Emissions of Greenhouse Gases**

Climate change is already beginning to be experienced throughout the world. The magnitude and rate at which these changes occur will be strongly influenced by current and future emissions of greenhouse gases. Greater and more rapid action to reduce these emissions will minimize adverse consequences for ourselves and for future generations. A particularly problematic characteristic of most greenhouse gases is their long atmospheric lifetimes. Once emitted, carbon dioxide quickly disperses globally and stays in the atmosphere for over 100 years. In contrast, the problems posed by most other forms of pollution shrink at a much more rapid rate when the emissions causing the problems are reduced or stopped. Such problems as smog (ground level ozone from traffic, industrial emissions, use of paints and solvents, etc.) or acid rain (caused largely by emissions of sulfur and nitrogen oxides) will respond rather quickly when emission-reduction policies are implemented. For greenhouse gases, though, the picture is very different. Even to stabilize atmospheric concentrations of CO<sub>2</sub> at current levels, would require a very sharp reduction in greenhouse gas emissions beginning now and that reaches at least 70-80 percent by the middle of this century. This longer-term goal is essential to keep in mind in developing nearer term strategies that begin to address this problem.

## **Appendix 2. The Greenhouse Gas Assessment**

(see also

<http://www.townofchevychase.org/assets/documents/pdfs/GHG%20Assessment%206-9%20redraft.pdf>)

The sources of greenhouse gases that were covered in the Greenhouse Gas Assessment (GHGA) were energy use in our homes, our use of vehicles, land use changes, energy used for local government services, and energy use by major installations in Town (Chevy Chase Elementary School, the Leland Center, and the 4H National Headquarters). As for other greenhouse gas assessments done in other communities, several other sources of GHGs were defined as outside the scope of our GHGA, either because they were too difficult to estimate or because they would be extremely difficult to affect via local community initiatives. Thus, the GHGA does not cover the impact of many of our purchasing and consumption decisions (e.g. “lifestyle” issues like how we choose to vacation and whether we buy local fruits and produce or foods shipped long distances), what we do away from Town (airplane flights for instance), or the impact of others’ actions when in Town (school buses and other non-residents who drive through town).

To provide the basic data for the GHGA, a survey was circulated to all residents in late 2007 requesting information about homes, automobiles, and demographics. About 150 homes responded (a 15% response rate). This sample appears reasonably representative of the Town as a whole, judging by the strong correspondence between the data from the survey and the information from the latest Census for those questions that were asked in both the survey and the Census.

In addition to the survey, the GHGA also relies on detailed energy usage information for several recent years volunteered by the owners of 35 homes in Town. These and other data were used to calibrate a U.S. Department of Energy computer model so as to simulate current energy usage by the average home in Chevy Chase. With this model calibrated to the average home in Chevy Chase, we can estimate the contribution of each element in our home (e.g., the furnace or water heater or microwave oven) to total home energy use, as well as the energy and cost impact of various changes in equipment or practices (e.g., what happens if I turn the thermostat down by two degrees in the winter, and how will my utility bills respond?)

In the 2000 census, the Town of Chevy Chase had a population of 2726 living in 1021 homes. Compared to the national average, the Town has high household income and a relatively more middle-aged population. All of our homes are single detached units. Our homes are 50% larger than the national average (2700 square feet vs. 1800 square feet) and older (89% of our homes were built before 1980 compared to 63% nationwide). While most of our heating and cooling systems are much newer (and more efficient) than the homes themselves – 64% of them were installed since 1990 – it is likely that inadequate insulation and draftiness make homes in the Town wasteful of energy. That and the increased size of houses increases our carbon footprint. Fortunately, most homes in town have converted to natural gas for heating and hot water and to central air conditioning instead of window units. These factors tend to mitigate our carbon footprint.

Over the past ten years, several changes have taken place which are likely to alter our carbon footprint. Over one-third of our homes have fewer occupants, 60% have installed a new washer or water heater, 43% have added insulation or more energy efficient windows, and 53% have installed a more efficient heating or cooling system. While 3% say they have changed their thermostat setting to use *more* energy, 51% say they have done the opposite. More than one-third of homes have lost a major shade tree (which increases energy needed to air condition in summer) and 27% have increased their home's square footage by more than 10%, which increases energy consumption for both heating and air conditioning.

Notwithstanding all these changes, between 2004 and 2007, electricity and natural gas usage has not changed appreciably. In 2007 the average home in the Town used about 15,000 kilowatt hours (kwh) of electricity and 1150 therms of natural gas, resulting in an annual utility bill of about \$4,300 at mid-2007 rates. Using a simulator on the Department of Energy website, the GHGA assessment estimated that the average home in the Town could save almost thirty percent of its annual utility bills by making cost-effective upgrades to the structure, appliances, and lighting.

As of the 2000 Census, 24 households in town owned no cars, 313 owned one car, 534 owned two cars, and 116 owned three or more cars. According to survey and parking sticker databases, the median age of vehicles is 5.5 years (compared to 9.0 in the rest of the country), average fuel economy is 22.6 mpg (compared with 22.4 nationally), and average miles driven is just over 8000 per car per year (compared with 12,247 nationally), resulting in fuel consumption of 355 gallons/year for cars owned by Town residents (compared with 554 gallons per year per car nationally). In 2007, nearly 40% of the new vehicles purchased by Town residents were fuel-efficient hybrids, compared to 2% nationally. The fuel-efficient nature of Chevy Chase cars is probably offset, however, by the fuel-inefficient nature of urban driving. Town residents also have excellent access to mass transit and bike paths, which likely accounts for the lower number of miles in a year that the average car in the Town of Chevy Chase is driven relative to the national average.

Of the 1306 Town residents over age 16 commuting to work, 1.7% walked, 1.1% used "other means" (including bike), 19.1% took public transit, 9.5% carpooled and 59.3% drove alone. A larger proportion of Town residents used public transportation, walked or biked than the national average, but fewer carpooled. Although a high proportion commutes in single occupancy vehicles, this is less than the national average of about 80%. Only 22% of all vehicle miles traveled by cars owned by Town residents are for commuting to work, however.

While the Town is blessed with an abundance of large shade trees and a moderate amount of green space in the form of lawns and shrubs (all of which consume or "sequester" CO<sub>2</sub>), loss of such "biomass" in town has contributed to increasing our carbon footprint over time. Most of this loss is from removing canopy trees. The GHGA was not able to get full data on planting of replacement trees particularly on private property, however. Smaller trees consume less CO<sub>2</sub> than mature trees.

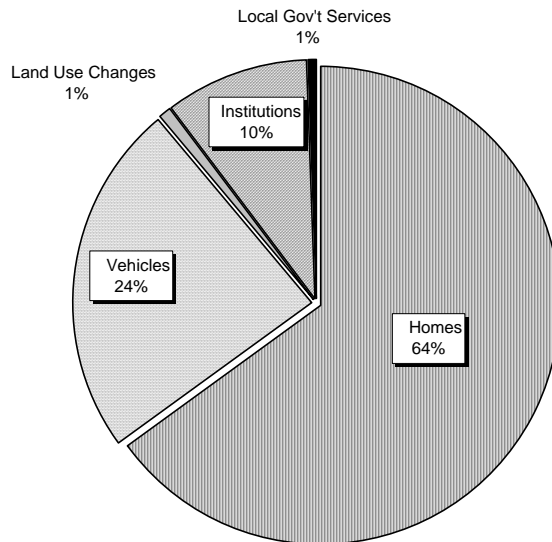
The institutions in town are hefty users of energy:

Institution	Electricity Usage (kilowatt hours/year)	Natural Gas Consumption (therms/year)	Bus diesel idling
Chevy Chase Elementary School	441,300	21,900	??
Leland Center	290,800	6,700	0
4H National Headquarters	>2,000,000	>100,000	?

Town operations are largely contracted out. Information on fuel use by each contractor was obtained in order to estimate greenhouse gas emissions. By far the biggest source of greenhouse gases in Town operations is our streetlights, which use almost 160,000 kilowatt hours of energy per year (generating 98 tons of CO<sub>2</sub>). The next biggest sources of greenhouse gases are police patrols at 58 tons (because patrol car engines are almost always running) followed by trash collection at 28 tons (including recycling, household trash, and Trash and Treasure) and leaf pickup (18 tons). The Town vehicle fleet generates an estimated 42 tons of CO<sub>2</sub> per year.

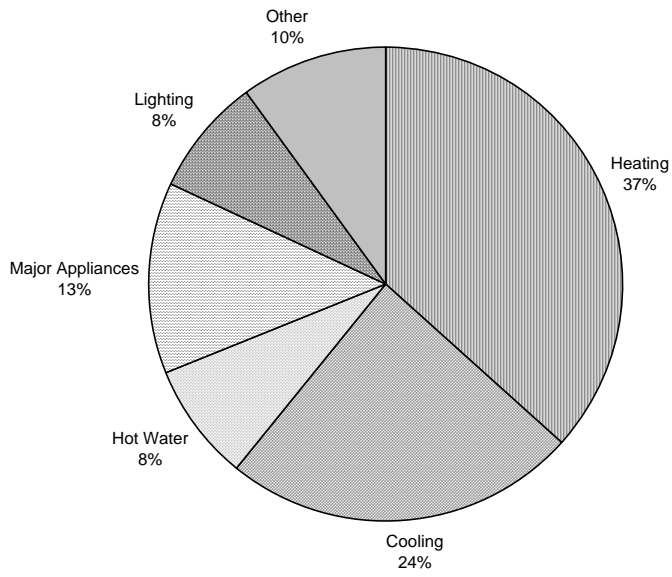
Converting all the disparate sources of energy into carbon dioxide (CO<sub>2</sub>) equivalents and dividing them by the number of households in town, the GHGA calculated total CO<sub>2</sub> emissions and emissions per person and per household. These

**Chevy Chase Emissions by Sector  
(total 26,251 tons CO<sub>2</sub>/yr)**

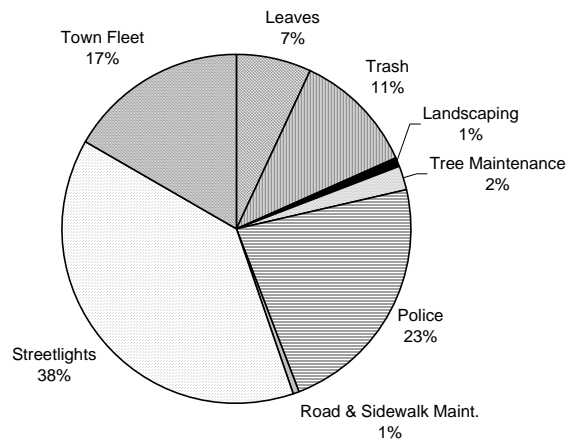


are shown below.

**Home CO2 Emissions by Source**



**Chevy Chase Town Government GHG Emissions by Service (total 162 tons CO2/yr)**



There are sources of CO<sub>2</sub> emissions that were knowingly left “off the books” in our methodology – energy used in lawn care, airplane travel, and the energy imbedded of water and sanitation, for instance. We will attempt to fill in these blanks as the Challenge proceeds, fine-tune the Challenge itself (if needed) to reduce these sources (or provide in-town offsets), and track progress separately from the originally measured emissions. Much, perhaps half, of the actual carbon footprint of Town residents will never be measured by us. That uncaptured part is the “carbon overhead” that comes with living in the United States and includes such things as government operations, infrastructure, and the military. According to a recent MIT study, that overhead is approximately 8.5 tons per person. While national, state, and local climate action plans will, we hope, reduce that overhead, there is little we can do about it beyond pressuring elected officials. That overhead makes it all the more imperative for us to reduce our discretionary carbon footprint as much as possible. The good news is that with full participation we can easily achieve the 2012 goal of the U.S. Mayors’ Agreement. The “low hanging fruit” is there to be picked.

### **Appendix 3. Shuttle Bus Calculations**

A Preliminary Study of Shuttle Bus Services for the Town of Chevy Chase, Maryland  
Catherine Fraas, June 23, 2007

Costs, Gasoline, CO<sub>2</sub> Emissions

Bethesda Metro (School Bus Route)

Total Distance: 38 miles/day

Gasoline: 4.8 gallons/day

CO<sub>2</sub> Emissions: 105 lbs CO<sub>2</sub>/day; 27,417 lbs/year

Costs and Savings: Should it be possible to secure a shuttle bus for only 1 hour at a time (at \$75/hour), then running a shuttle between the Town and the Metro for two hours every day (once in the morning, once in the evening) should cost \$150/day or \$750/week.

Gas and CO<sub>2</sub> savings from using a shuttle instead of individual cars vary widely, depending on type of car driven, what part of the Town commuters drive from, and how many commuters there are. Assuming 60 riders, who would otherwise drive from the exact center of the Town in relatively new non-SUVs, a shuttle bus route would save 40,000 lbs CO<sub>2</sub>/year.

Giant Food (Personal Pick-up)

Total Distance: 9.2 miles round-trip

Gasoline: 1.2 gallons

CO<sub>2</sub> Emissions: 32 lbs CO<sub>2</sub>/trip, 8300 lbs/year (at 1 trip every weekday)

Costs and Savings: If it's possible to secure a bus for individual hours, running a shuttle between Chevy Chase and the Giant for an hour every weekday would cost \$75/day or \$375/week, for 2 hours every weekday, \$150/day or \$750/week, and for 2 hours/day on the weekends, \$300/week.

CO<sub>2</sub> savings from using a shuttle instead of individual cars vary widely, depending on type of car driven, what part of the Town commuters drive from, and how many commuters there are. Assuming 20 riders from the very center of Town, who would all drive fairly new non-SUVs to the Giant once a week, a shuttle bus route would save 5500 lbs CO<sub>2</sub>/year.

Montgomery Mall (Personal Pick-up)

Total Distance: 14.1 miles (non-highway)

Gasoline: 1.8 gallons

CO<sub>2</sub> Emissions: 39 lbs CO<sub>2</sub>/trip; 2028 lbs/year

Costs and Savings: See "Giant Food Costs," above

CO<sub>2</sub> savings from using a shuttle instead of individual cars vary widely, depending on type of car driven, what part of the Town commuters drive from, and how many commuters there are. Assuming 20 riders from the very center of Town, all of whom would drive fairly new non-SUVs, a shuttle route would save 12100 lbs CO<sub>2</sub>/year.

#### Georgetown Route (Personal Pick-up)

Total Distance: 12.7 miles

Gasoline: 1.6 gallons

CO<sub>2</sub> Emissions: 35 lbs /trip; 7300 lbs/year (at 4 trips/week)

Costs and Savings: Were it possible to lease a bus just for two trips to Georgetown on Friday and Saturday nights, I would assume it would cost a full hour per trip, or \$300 for the week, \$15,600/year.

CO<sub>2</sub> savings from using a shuttle instead of individual cars vary widely, depending on type of car driven, from what parts of the Town drivers originate, and how many commuters there are. Assuming 35 riders per trip, each who would otherwise drive a relatively new non-SUV from the exact center of Town to one location in Georgetown, a shuttle bus would save 28,000 lbs CO<sub>2</sub>/year.

#### DC Theatre Route (Personal Pick-up)

Total Distance: 38.8 miles

Gasoline: 4.85 gallons

CO<sub>2</sub> Emissions: 108 lbs CO<sub>2</sub>/trip; 22500 lbs/year (at 4 trips/week)

Costs and Savings: Were it possible to lease a bus for just two trips to DC theatres on Friday and Saturday nights, I would assume it would cost a full hour per trip, or \$300/week, \$15,600/year.

savings from using a shuttle bus instead of individual cars vary widely, depending on type of car driven, from what parts of the Town riders originate, and how many riders there are. Assuming 20 riders per trip, all of whom would otherwise drive a relatively new non-SUV from the exact center of Town to one theatre, a shuttle bus would save 5,700 lbs CO<sub>2</sub>/year.

#### Routes

It seems reasonable to assume that different shuttle routes within the Town would be appropriate for trips to different destinations. Carrying heavy groceries, for example, would make walking from a bus stop uncomfortable, if not impossible. It can generally be assumed, however, that the average briefcase is much lighter than the average load of groceries, and that the shuttle route (for pick-up and drop-off in the Town) for the Metro shuttle can therefore be more cursory than the shuttle routes for supermarkets. Under these assumptions, I have used two separate within-Town route distance estimations in my calculations. For the Metro shuttle, I have used a route based on the public school bus route (approx. 2.5 mi.), and for the supermarket, Mall, Georgetown, and DC Theatre shuttles I have assumed that the shuttle would drive door-to-door for the particular people who have requested it.

The personal pick-up/drop-off route has been the more problematic, calculation-wise. I have assumed that this route would generally be 3.5x longer than the school bus route, which should account for both the increased distance involved in personal pick-up and drop-off and for the gas used idling while waiting for riders to board and disembark (actually, I assumed that the route would be 3x longer and that some gas would be spent while idling, but instead of calculating them separately, I bundled gas spent going nowhere in with gas spent going somewhere). Calculations with this route should be reasonably accurate if there are few passengers who live far apart in

the Town or a moderate number of passengers who live moderately far apart.

#### Destinations

A shuttle bus system only makes sense if it is used for destinations to and from which residents travel regularly. I have used five destinations/destination routes, based both on request and on my own judgment. While I would have run a calculation for a multi-supermarket trip around Bethesda, the Bethesda Circulator already travels to or near most grocery stores in the city, and sending this shuttle around, too, seemed redundant. It should be noted, also, that the J2 bus on the Metrobus system does run to Montgomery Mall.

Calculations for the single-destination routes are the most reliable. For the Georgetown and DC Theatre routes (the multi-destination routes), I picked locations in Georgetown and various DC Theatres and calculated routes incorporating those locations. The DC Theatre is notably longer than the Georgetown route because it incorporates more disparate destinations.

#### Vehicles

##### Leasing Vehicles:

I have contacted several companies about contract shuttle services and shuttle leasing. They have not all gotten back to me with relevant information. I do know that one company leases buses and vans for a minimum of 4 hours at a time and \$75/hour, though I don't know whether or not that price would hold for a long-term, regular contract. Unless ridership is very high, I do not think it would be worthwhile to purchase buses, given the upfront, maintenance, and storage costs.

##### Vehicle Types:

The types of vehicles available for small-scale (under 30 passengers) transportation are:

Van (17 ft, 12 passengers)

Cutaway Bus (23 ft., 17 passengers)

Small Transit Bus (27 ft., 25 passengers)

##### Gas Mileage/Emissions:

Given information from several sources, I have estimated 8 miles/gallon for the bus. This number may be high or low given traffic conditions and temperature, but it should be about right. According to an EPA study, 19.4 lbs CO<sub>2</sub> are produced from 1 gallon of gasoline and 22.2 lb are produced from 1 gallon of diesel. These numbers seem high, given that 1 gallon of gasoline does not weigh 19 lbs; only the carbon involved in CO<sub>2</sub> production comes from the gasoline, and is oxidized by air.

#### Questions and Considerations

##### Calculations:

These CO<sub>2</sub> savings seem high to me. They are dependent on high ridership, which is only possible through convenience and low prices. If ridership is too low, the shuttle would waste carbon ridiculously. I have made assumptions about timing and

destinations, but they could very easily be inappropriate to the needs of Town residents. If that's the case, it shouldn't be too difficult to run buses to more preferable destinations, but some sort of accurate polling would have to happen to find out what destinations those are.

Wait times:

The problem with the personal pick-up system is the wait time. While it should be possible to keep the personal pick-up shuttle running briskly, it will necessarily run slowly if it has a lot of passengers. The only solutions I can think of are limiting ridership and/or running extra buses.

Payment:

Any shuttle option is expensive and ridership is not guaranteed. How much is the Town willing to pay towards the program? And, no matter the price, how should residents pay? By subscription? Per trip? Should the Town pay for the program entirely, and be repaid by riders?

School Bus:

When a resident mentioned interest in a shuttle bus program to me, she said something along the lines of: "[w]e all drive to the same places, to the same schools." Is there interest in a Town bus to local private schools?

#### Appendix 4. Reducing energy demand of streetlights by introducing LED or induction streetlights

Background: The Town of Chevy Chase between 10/07 and 9/08 used about 157,000 kilowatt hours (kwh) of electricity to power its streetlights, costing the town about \$40,000 and generating 98 tons of CO<sub>2</sub> per year. We have 279 streetlights as follows:

Streetlights in the Town of Chevy Chase

253	100W	Mercury Vapor
15	175W	Mercury Vapor
1	250 W	Mercury Vapor
6	100W	High Pressure Sodium
4	70 W	High Pressure Sodium

PEPCO owns and maintains the town's streetlights and the maintenance cost is imbedded in our electricity rates. The town could reduce its streetlight CO<sub>2</sub> emissions by switching to more energy efficient lighting fixtures and/or by purchasing 100% renewable energy to power the streetlights. The town has been buying Renewable Energy Credits (also called green tags or offsets) for the last two years through Carbunfund.org (approximately \$780/year)<sup>7</sup> to counterbalance the CO<sub>2</sub> we emit from streetlight power. This is because we were informed by PEPCO<sup>8</sup> that we could not buy renewable energy for the streetlights, which turns out to be untrue (per Al Carr). The best option is to reduce energy consumption and then buy renewable source electricity or offsets.

#### More Efficient Streetlights

In a previous proposal to the town, the Climate Protection Committee reviewed and rejected solar powered streetlights due to expense (\$3500-4000/streetlight) and tree cover. Light Emitting Diode (LED) streetlights have improved dramatically in recent years to the point that several cities have replaced their streetlights with LED fixtures. Not only do LED lights draw less energy (and therefore emit less CO<sub>2</sub>) but they require considerably less maintenance because they last much longer. They also cause less light pollution into the skies and private property. According to Ann Arbor Michigan, which has installed 1000 LEDs downtown, the annual savings per streetlight is about \$100 (they save far more on maintenance than they do on the reduced cost of the electricity) and almost 600 pounds of CO<sub>2</sub> per year per streetlight.

Induction streetlights are another highly efficient option. According to a vendor (<http://www.gg-energy.com/download/ecoWATT.pdf>) induction streetlights last for 15 years (vs. 2 for HPS lights), save \$80/yr/light, and reduce CO<sub>2</sub> by 870 lb/yr compared to high-pressure sodium lights (they do even better compared to mercury vapor). They also reduce light pollution.

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<sup>8</sup> Steve Custer who is in charge of streetlights for PEPCO.

PEPCO has recently been mandated by the U.S. Department of Energy to replace all mercury vapor lamps because of mercury toxicity. The Town of Chevy Chase is early on their schedule to have its lights replaced. PEPCO is planning to replace all mercury vapor lamps with high pressure sodium lamps. PEPCO is not considering LED or induction lights because it has no experience with them (and therefore cannot estimate the maintenance pricing). The Public Services Commission has not established a rate for LEDs or induction lights (because no energy company has yet proposed one).

Nonetheless, Washington Grove has requested that PEPCO install LED streetlights there as a pilot. Chevy Chase View, which installed induction lights in their decorative streetlights, still has not been reimbursed for the savings from having more energy efficient lights. Kensington, MD is contemplating installing induction lights but is awaiting a rate quote from PEPCO and deciding whether to buy the streetlights from PEPCO. They have contracted a company (Municipal Energy Enterprises) to facilitate the negotiations and transition to the new lighting.

Unless it is advised otherwise, PEPCO will replace the mercury vapor lights with high pressure sodium lights. If the Town wanted LED streetlights (or even a pilot test) we would need to pressure PEPCO for this.

If it chose to reduce its streetlights' carbon footprint virtually to zero, the town would need to purchase the streetlights, contract a streetlight maintenance contractor, and then purchase renewable energy to power its streetlights.

The Town Manager for Kensington says that PEPCO has informed them that they will charge \$490 for Mercury Vapor streetlights and \$370 for High Pressure Sodium streetlights. Given this price structure, it would be far more economical to wait to buy the lights until PEPCO has replaced the MV lights with HPS lights and then replace them when they burn out (average life expectancy is two years). In our case that would mean a savings of \$34,701. A high estimate of the annual service and maintenance cost would be about \$487/month for the current lights (we currently pay PEPCO \$1167 per month)<sup>9</sup>. If Ann Arbor's experience is replicable here, the maintenance costs would fall dramatically with LED or induction lights because the energy efficient lights last five times longer.

In addition to changing the street lights, the Town should attempt to join the local consortium of municipalities that buy renewable electricity at a reduced rate (currently 9.9 cents/kwh, according to Al Carr, compared to our current rate that is 12.75 cents/kwh).

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<sup>9</sup> Based on information supplied by Tom Feck, Montgomery Lighting Service, who provides maintenance for Montgomery Village streetlights. This is based on actual data, prorated for our number of streetlights, for High Pressure Sodium streetlights. The costs given, however, include maintenance of poles, which in our case, continue to be owned and serviced by PEPCO. Maintenance costs of LED or Induction lights would be lower due to longer life expectancy of the bulbs.

Rough Estimate of Payback Period

Cost to buy streetlights <sup>10</sup>	\$103,230
Cost to buy LED lights <sup>11</sup>	\$118,017
Total Costs	\$221,247
Maintenance savings/yr	\$10,000
Electricity savings/year <sup>12</sup>	\$ 6,300
Annual Savings	\$16,300

Payback period (assuming no interest charges): 13.6 years

This is a conservative estimate since the price of electricity is likely to increase and the savings on maintenance is likely to be larger. Induction lights would have comparable economics. If a contractor were hired to manage the process the costs would increase apace and the payback period lengthen.

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<sup>10</sup> Based on Kensington's figure

<sup>11</sup> Based on Ann Arbor's figures

<sup>12</sup> Assumes current rate (\$0.1467/kwh including distribution and generation charges) would fall by 3-5¢/kwh

## Appendix 5. Job Description of Climate Intern

The Town of Chevy Chase seeks to engage a part-time Climate Intern to help implement the Town's climate action plan, The Chevy Chase Challenge. The Climate Intern reports to the Town Manager and coordinates with other Town Staff.

Duties:

The Climate intern's duties will include some or all of the following:

- Provide staff support for Town's efforts on the Chevy Chase Challenge. The Climate intern will be responsible for providing staff support as needed on compiling energy usage by Town contractors, researching energy efficient streetlighting, verifying and compiling resident energy use when these data are submitted to the Town (for instance, for rebates), organizing communications and other materials in the Town office that pertain to the Chevy Chase Challenge and for any other energy saving activities or renewable energy production projects
- Support the Climate Protection Committee and its working groups. The Climate Intern will work closely with the Climate Protection Committee, maintain bilateral communications between Town staff and the Committee on progress and activities, serve as the point person on the Town Staff for Committee work, and support volunteers in their work on the Chevy Chase Challenge.
- Develop and maintain a website (linked to the Town website) for the Chevy Chase Challenge in close coordination with the Climate Protection Committee and Town staff. Actively seek out content for the website and coordinate closely with the Communications Working Group on content, style, and language.
- Serve as liaison for the Climate Corps in scheduling home visits.
- Monitor national, state, county, and private sector energy efficiency and renewable energy incentives and provide assistance to town residents in applying for incentives.
- Serve as a promoter and model for the Chevy Chase Challenge among Town staff and residents.

### Job Demands

This is a part time (10-15 hours per week) position without benefits. The Climate Intern will have flexibility in hours but should spend some portion of each week during business hours in the Town Office. The Climate Intern may be expected to work during occasional evenings and weekends to provide support to meetings and events.

### Qualifications

The individual selected for this position should be enthusiastic about the global warming problem and personally committed to addressing it. The individual is expected to be generally knowledgeable about the problem and eager to learn but not necessarily an expert. The work requires good knowledge of and experience in website construction and maintenance as well as other electronic communications methods. Because the Climate Intern is expected to interact with residents and staff, the individual should have good communications and interpersonal skills. Good organizational skills required as well as basic database management experience (Excel).

## **Appendix 6. Accomplishments of Climate Protection Committee 2006-2008** (update April 9, 2008)

Members: Rob Enelow (Council liaison), Carla Graeff, Betsey Haddad, Betsy Johnson, Andy Knaus, Lynn Lichtenstein, Judith McGuire (Chair), Elizabeth Mumford, Christine Real de Azua, Dian Seidel, Stuart Sessions. In addition, Jack Palmer and Stephen Seidel have agreed to work on the climate action plan drafting committee.

Meetings: fourth Tuesday of the month.

Activities to date:

1. Compact Fluorescent Lightbulbs: Distributed to almost half of households with educational materials (distributed at events, house-to-house distribution, and in new residents pack). We also got the Town to provide a disposal bin for used CFLs (which, because they contain small amounts of mercury, need to be recycled as hazardous waste).
2. Table at 4<sup>th</sup> of July Picnic (2006, 2007) to distribute CFLs and provide information about global warming and energy conservation.
3. Got town to buy Renewable Energy Credits for streetlights. Investigating buying renewable energy in future (with consortium) and converting to higher efficiency bulbs.
4. Sponsored talks (mansionization and global warming, LEED for homes, composting hands-on demonstrations, Inconvenient Truth, gardening and global warming)
5. Publicity about political and other events (Clean Cars Act, Global Warming Act, rallies in Annapolis, Solar House Tour, Solar Decathlon on Mall)
6. Monthly column in "Forecast": Global Warming (06/06), The 5-Bulb Challenge (07/06), Energy Efficiency at Home (09/06), Energy Audits (10/06), Raking Leaves (11/06), Green Gift Ideas (12/06), Energy Saving Ideas (01/07), Mayor's Agreement on Climate Change (02/07), Walking and Biking (03/07), Water Conservation (04/07), Maryland Environmental Legislation (05/07), Green Tags (06/07), Composting (7/07), Fall Composting (10/07), Climate Pledge (11/07), Living la vida LoCO<sub>2</sub> (12/07), (Diet for a new year (1/08), Recycling (3/08) Living la Vida LoCO<sub>2</sub> – 2 (4/08)
7. Greenhouse Gas Survey – 150 responses
8. Climate Pledge (and reusable grocery bag) – 52 pledges
9. Proposal to require all new houses to be Energy Star certified as part of new building regulations ordinance (failed for time being)
10. GHG assessment results (to be presented April 29, 2008)
11. Climate Action Plan (propose town brainstorming, June 12; presentation to Council July 9, 2008)

## Appendix 7. Statements of Purpose of Working Groups

1. **Communications.** The purpose of the communications working group is to devise and oversee the implementation of a communications program supporting the actions of the Chevy Chase Challenge.
2. **Home energy efficiency.** The purpose of the Home Energy Efficiency Working Group is to promote greater home efficiency through getting home energy audits and undertaking remedial work to improve the building envelope and introduce more energy efficient HVAC and appliances
3. **Climate Corps.** A great deal of energy can be saved by simple changes in behavior like turning off the lights, turning down (or up) the thermostat, closing the shades in the summer, taking shorter showers, and not running exhaust fans for a long time while the heating or air conditioning is on. While it is possible to change behavior purely through making information available, the success rate is low. Personal contact makes a much greater impression. The Chevy Chase Challenge, therefore, proposes establishing a “climate corps” program where high school students (and possibly retired residents and other adults) become the conduit through which to reach households (their own and those of their neighbors). Such a program has been successful in Prince George’s county. This program would train students, provide them with a tee-shirts, materials for their job, and a tool kit, certify them as climate guardians and offer them service-learning credits for their work. They will be encouraged to start with their own homes (and their own behaviors), document and measure impact, and extend their knowledge to friends and neighbors on their block and elsewhere in town. They would communicate the results using creative means (YouTube videos, science fair projects, hands on activities). The best students would be used to recruit and train new members and to go beyond their own block boundaries. The climate corps’ work would also include energy use in transportation (checking tire inflation, gasoline mileage, and finding non-single-occupancy-vehicle options for common trips) and include tools to help them in this work.
4. **New Homes.** The purpose of the New Homes Working Group is to devise a set of incentives to promote LEED Silver, Gold or Platinum level or equivalent certification for all new homes built in town without simultaneously encouraging tearing down houses.
5. **Monitoring and Evaluation.** The purpose of the Monitoring and Evaluation Working Group is to develop and implement a system to determine how well the Town is implementing the Chevy Chase Challenge and achieving the greenhouse gas reduction goals.
3. **Transportation.** The purpose of the Transportation Working Group is to devise and oversee the implementation of a program to get around burning less fossil fuels. The working groups will consider facilitating carpooling, encouraging biking and walking, encourage using public transportation, and consider the feasibility and cost of a shuttle vehicle.
6. **Solid Waste.** The purpose of the Solid Waste Working Group is to develop a program of education and incentives that will reduce the overall energy devoted to waste disposal in town (trash, recycling, lawn waste, leaves, trash and treasure)

and will encourage the absolute reduction in solid waste (and its haulage) and the reuse and repurposing of previously discarded items. Such items to be considered might include rewarding residents who throw out less trash, take trash barrels to the street, and/or who recycle more (RecycleBank), rewarding residents who compost leaves, yard waste and edibles, changing the frequency of trash pickups, reorganizing Trash and Treasure to reduce volume sent to trash. This will be assigned to the joint Public Services/Environment Sub Committee.

7. **Increasing Tree Cover**. The purpose of the More Trees Working Group is to devise and oversee the implementation of a program to increase planting of trees on both public and private property in Town. This will be assigned to the Environment Committee.
8. **Emergency Preparedness**. The purpose of the Emergency Preparedness Working Group is to develop a plan for the town to locate and provide emergency support to aged and infirm residents who might be adversely affected by the expected increase in adverse weather events and their consequences (flooding, power outages, heat waves, hurricanes, winter storms). This will be assigned to the Community Relations Committee.