

# **Strategies for Reducing Greenhouse Gas Emissions During Development and Redevelopment in Montgomery County, Maryland**



George Washington University M.P.P. Capstone Project  
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## Executive Summary

### Purpose

On Earth Day 2008, Montgomery County adopted legislation to codify its greenhouse gas (GHG) reduction goals. In doing so, the county established a Sustainability Working Group (SWG) and charged it with creating the County's Climate Protection Plan (CPP). This paper offers an analysis of potential actions that could be taken by the County with respect to new development and redevelopment (re/development) projects in order to address the County's greenhouse gas reduction goals.

### Scope and Methodology

Our research uncovered city, county and state examples of addressing sustainability goals through the development review process. This paper evaluates two policy approaches available to the County:

- Direct Regulation – Under this approach, the County would mandate direct regulation forcing developers to reduce emissions. Developers would be required to implement certain GHG Reduction Actions from a GHG Reduction Schedule as developed by the County. Any project that fails to implement the GHG Reduction Actions would be denied permits.
- Allow for Offsetting of New or Existing Fee - Under this approach, the county would establish an offset structure allowing developers to take certain actions that reduce GHG emissions (Reduction Actions) in order to avoid paying a new GHG fee or to reduce existing development fees. The approach would have two phases. In the first phase, the Montgomery County Planning Board (MCPB) would create a Soft Schedule of GHG Reduction Actions selected from a List of Actions (see Appendix C for more information). Developers would be motivated to adopt these voluntary GHG reduction Actions through incentive policies implemented by the County. The incentive policies available include: tax abatement programs, density bonuses, expedited permitting, and technical assistance. In the second phase, MCPB would require developers to quantify direct and indirect GHG impacts. The MCPB could then use the reported GHG emission data to further identify the GHG Reduction Actions that are best suited to achieving their goals for inclusion in a Hard Schedule. The County would set a minimum threshold of points that developers must obtain and then implement policy incentives to induce developers to implement more than the minimally required Reduction Actions.

GHG Reduction Actions were identified for inclusion in the List of Actions by surveying the reduction schedules of four case study cities. In each case, the city created a flexible “point system” by which developers can accrue points to count toward a development goal. By accruing enough points, the developer receives certain incentives and/or privileges. Short descriptions of each city program are below:

- City of Boulder, Colorado, Green Points and Green Building Program - This program mandates that minimum requirements are met and a specific amount of points are obtained from the City's schedule of sustainable development actions before a building permit is obtained.
- City of Austin, Texas, Austin Energy Green Building - This mainly voluntary program is a five star rating system for residential, multifamily, and commercial development. For each of the three categories, there are minimum requirements to obtain one star and then a point schedule from which developers can choose actions to implement that will improve their rating.

- City of West Hollywood, California, Green Building Program - This program requires all residential and commercial development and redevelopment projects to meet a minimum number of green building requirements, with several zoning incentives available for projects that meet an additional tier of requirements.
- City of Scottsdale, Arizona, Green Building Program -This is a voluntary green building program that gives builders incentive to participate through a number of measures including expedited plan approvals. There are two companion green building programs, one for commercial developers and one for residential projects.

Offsite Reductions are an additional mechanism for reducing GHG emissions during re/development known as. This mechanism allows developers to implement GHG Reduction Actions at locations beyond the boundaries of their project site but within Montgomery County. On-site reduction activities may become increasingly costly and have diminishing returns. Allowing for offsite reductions could potentially create efficiencies and encourage reduction activities to occur where they otherwise would not.

Efforts at the state and county level to better quantify GHG emissions were examined as potential models for Montgomery County. King County, WA has constructed an effective methodology for planners to estimate GHG emissions associated with development. The Commonwealth of Massachusetts has identified an effective method for developers to calculate GHG emissions. Each of these methods proved practical and intelligent steps toward GHG emission regulation during re/development.

## **Recommendations**

1. *Offsetting a new fee or existing APFO fees with incentive policies is more suited to Montgomery County than direct regulation:*

It is not recommended that Montgomery County pursue a direct regulation system due to the large amount of administrative resources required to administer a direct regulation policy and the potentially large costs that it would impose on developers.

Instead the Group recommends MCPB develop a system to offset a new fee or existing AFPO fees with incentive policies for developers who implement GHG Reduction Actions from a GHG Reduction Schedule. Implementation of the schedule should occur in two phases. In the first phase MCPB should compile a Soft Schedule of GHG Reduction Actions for developers to implement at the planning stage of their project from the List of Actions and induce developers to implement some of these Actions by utilizing incentive policies such as tax abatement, density bonuses, expedited permitting, and/or technical assistance. During this phase, Montgomery County should also request that developers voluntarily quantify and report the GHG emissions associated with their project plan. In the second phase, MCPB should use the reported data to enhance the GHG Reduction Actions in the List of Actions and compile the actions that are best suited to achieving MCPB's CPP goals into a Hard Schedule. MCPB should set a minimum level of points that developers must obtain and then incentivize them to implement Reduction Actions above the minimum threshold using the same incentive policies considered for the Soft Schedule. Further, the Group recommends that MCPB consider using a "feebate"

mechanism to simultaneously incentivize the implementation of GHG Reduction Actions above the minimum and assess a fee on those that do not meet the minimum.

A second mechanism that MCPB should consider for offsetting fees is Off-site Reductions. However, on-site reductions – such as those included in the List of Actions – should be given priority over off-site reductions and MCPD should evaluate additional considerations before pursuing this mechanism.

*2. Consider the following suggestions for constructing the GHG Reduction Schedule:*

When constructing the Soft and Hard GHG Reduction Schedules MCPB should:

- Focus on including GHG Reduction Actions that actually reduce emissions such as the 16 that the Group has selected based on their ability to meet certain criteria in the List of Actions and are included in Appendix C.
- Begin with a voluntary schedule and provide incentive policies for compliance.
- Develop a suite of schedules that are tailored to the specific types of development.
- Consider special exclusions to the program based on local needs such as a size minimum.
- Encourage participation and compliance beyond minimal requirement or threshold.
- Consider Montgomery County budget constraints.
- Ensure actions included in the Soft and Hard Schedules address CPP goals.

*3. Consider the following suggestions for developing the GHG Emissions Quantification and Reporting System:*

Reporting System- Montgomery County should model its methodology for collecting data on emissions reductions from GHG Reduction Actions in the Soft Schedule after King County's worksheet. This information will inform the Hard Schedule. King County's worksheet is preferable because it is tailored to the county level and already addresses the three emissions categories that MC is concerned with: embodied, energy usage, and transportation. Although MC staff would have to update the data used in the worksheet formulas indefinitely, it is a useful model that is ready to use.

Quantification System- Montgomery County should follow Massachusetts' example by reviewing and approving software for developers to utilize software when quantifying GHG emissions from re/development. It appears Massachusetts is introducing its developers to the process of calculating GHG emissions with an eye toward GHG regulation in the future. This method of introduction and acclimation to GHG emission quantification and reporting is a practical and intelligent step toward GHG emission regulation during re/development. Massachusetts' approach is preferable because it allows private software/consulting firms to update methodology instead of relying on King County or burdening MC staff with staying abreast of the latest numbers and formulas. Once sufficient data has been collected, MC can issue a Hard Schedule based on the county's emissions and attach the incentive policies it deems best suited to induce developers' compliance.

Seek Authority to Mandate Quantification and Reporting- Montgomery County should determine whether it can require GHG quantification and reporting for re/development under MEPA as has King County and Massachusetts. Obtaining all GHG emissions data from re/development would inform the suitability of the GHG Reduction Actions in the List of Actions to a much greater extent than if MCPD were only to receive data from developers who participated in the incentive policies program.

## Introduction

Montgomery County (the County) is experiencing tremendous growth in its population and employment and this trend is expected to continue. Large growth is almost always coupled with increased greenhouse gas emissions which contribute to climate change. In 2005, a greenhouse gas (GHG) emissions baseline was conducted for the entire County. The inventory indicated that total measured GHG emissions in the County in 2005 were 12.592 million metric tons of carbon dioxide equivalents (MMT<sub>CO2e</sub>), with three sectors accounting for 99 percent of the total—energy use in residential buildings, energy use in commercial/multifamily/public buildings, and transportation, with each contributing roughly a third of the emissions. Based on a current forecast, the County’s projected ‘business as usual’ emissions would total 16.638 MMT<sub>CO2e</sub> by 2050.<sup>1</sup> Montgomery County is a national leader in local-level action on climate change. This is exemplified by their Growth Policy and Climate Protection Plan.

### **A. *Montgomery County Growth Policy***

Montgomery County’s Growth Policy guides the development and provision of adequate public services. The growth policy implements a 1973 law, the Adequate Public Facilities Ordinance (APFO), which encourages development in areas where public services are in place. The Montgomery County Planning Board (MCPD) helps ensure that current and future residents have basic amenities such as hassle-free roads, ample school space, convenient mass transit, and rapid response times from public safety agencies. The Growth Policy provides guidelines that direct where new development takes place, and matches growth to the availability of public services like transportation and schools. However, the 2009-2011 Growth Policy looks at more than just congestion and school capacity. It also focuses on ways to enhance quality of life in their communities. The new Growth Policy works towards considering the natural environment in the design of buildings and streets to create a better place to live.<sup>2</sup>

### **B. *Montgomery County Climate Protection Plan***

On Earth Day 2008, Montgomery County adopted Bill 32-07 which codified the County’s GHG reduction goals. The bill established the Sustainability Working Group (SWG) and charged it with developing the Climate Protection Plan (CPP) to “reduce countywide GHG emissions to 80% below the amount...in the base year [FY 2005]...including a plan to stop increasing countywide GHG emissions by 2010 and achieve a 10% reduction every 5 years through 2050.” In order to meet the 2.518 MMT<sub>CO2e</sub> target by 2050, emissions will have to be reduced by 14.199 MMT<sub>CO2e</sub>. This is greater than the County’s total 2005 emissions. Clearly there is much work to be done.<sup>3</sup>

The SWG consists of 26 representatives: 15 from the County government, County agencies, or regional organizations, and 11 from the public. SWG established committees to look more closely at issues in seven distinct areas:

- Renewable energy
- Residential building energy efficiency
- Commercial/multi-family/pubic building energy efficiency

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<sup>1</sup> Montgomery County Climate Protection Plan

<sup>2</sup> MontgomeryPlanning.org

<sup>3</sup> Montgomery County Climate Protection Plan

- Transportation
- Forestry and agriculture
- Long-term planning (including land-use planning)
- Education and outreach.

The working group developed three over-arching criteria to use in selecting 58 recommendations for reducing countywide GHG emissions:

- The action is a proven practice or complements, expands, or strengthens a program or policy already in place;
- The action is technically and logistically feasible in the short term; and
- The general steps required for implementation can be defined.<sup>4</sup>

All work for this project was done with the Climate Protection Plan in mind. Specifically, as much as possible, connections were made back to this Plan to ensure that Montgomery County continues to meet the recommendations and goals set forth in this document.

### ***C. The George Washington University Research Project for Montgomery County***

In January 2009, the Montgomery County Planning Board (MCPB) commissioned a group of George Washington University (GWU) Master of Public Policy students (the Group) to help pursue their CPP goal of reducing countywide GHG emissions. Specifically, MCPB was interested in evaluating various approaches to reducing GHG emissions during new development and redevelopment (re/development).

To provide MCPB with various approaches for reducing GHG emissions during re/development the Group has researched efforts taken at the city, county, and state level within the U.S. Because local level GHG emissions reduction during re/development is not yet widely practiced in the United States, it was important for the Group to draw on lessons learned from green building programs at all of these different levels to adequately inform its analysis.

## **Two Approaches to GHG Emissions Reduction in Montgomery County**

Two approaches were identified for reducing GHG emissions through development: directly regulating GHG emissions, or offsetting either the existing APFO fees or a new impact fee using a “GHG Reduction Schedule.”

The direct regulation approach would mandate that during the planning stage developers implement “GHG Reduction Actions”, actions that can be implemented during re/development to mitigate GHG emissions, compiled by the County into a schedule to receive their development permits. The Group evaluated this approach because it helps MCPB achieve its goals in the CPP by immediately stopping GHG emissions during re/development and potentially reducing emissions going forward.

The approach of offsetting either existing APFO fees or a new impact fee would use incentive policies to induce developers to implement GHG Reduction Actions from a schedule and to quantify and report the GHG emissions during the planning stage. The Group evaluated this approach because it helps MCPB achieve its goals in the CPP by immediately reducing GHG emissions during re/development using incentives instead of a mandate.

The following sections provide discussions of each approach, concluding that offsetting an existing or new fee is a superior approach to direct regulation. The case for the offsetting approach

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<sup>4</sup> Montgomery County Climate Protection Plan

includes examples of successfully implemented schedules at the city level and current GHG emission quantification and reporting systems at the county and state levels. This paper also includes a discussion of incentive policies for inducing developers' to go above and beyond minimum requirements to be set by Montgomery County.

#### **A. Direct Regulation**

One policy option that could be used by Montgomery County to reduce the amount of GHG emissions associated with re/development is direct regulation. Under this policy, developers would be mandated to implement certain GHG Reduction Actions identified by the county and compiled in a schedule assembled by the county. The county would choose the actions based upon their cost and ability to reduce GHG emissions as well as other criteria they deem suitable to their local needs. Should developers choose not to implement the actions outlined in the schedule, they would not be granted permits to continue their development project. For example, Montgomery County requires that all new County buildings and all development over 10,000 square feet obtain the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Silver certification.<sup>5</sup> This is an example of direct regulation used to achieve sustainability goals.

In an effort to regulate the use of GHG Reduction Actions in a manner that would minimize cost to developers and residents, Montgomery County would need to continuously review the schedule of actions to ensure that it contains the best available technologies. Continuous review of the best available technologies would also be required to make sure that reductions are adequate to realize the targets set forth in the county's CPP.

#### Pros of Direct Regulation

Using direct regulation to reduce GHG emissions has several advantages for the County. The first advantage of using regulation to encourage reductions is the County's ability to directly control the type and level of GHG Reduction Actions implemented. Under direct regulation, developers would not have the option of paying an impact fee in lieu of implementing GHG Reduction Actions. This would mean that all of the available actions are implemented by every developer, and that ultimately all mandated reductions are realized.

Another benefit of regulation is its ability to enforce best practices while still maintaining the level of the APFO, and protecting the state of transportation and education infrastructure in the County. Since developers would be directly mandated to implement GHG Reduction Actions and would not be allowed to offset any impact fees, the level of the APFO fees collected by the county would remain unchanged.

#### Cons of Direct Regulation

Implementation of regulation to mandate the use of GHG Reduction Actions also has many disadvantages for the County. The first disadvantage of regulation is the fact that the costs of achieving desired reduction levels under a direct regulation policy may be excessively high. Regulations generally fail to consider the marginal costs to firms of reducing pollution. Depending on location and type of structure being built, different developers face differing costs of reduction. An efficient policy that minimizes cost would ensure that the marginal cost of the last unit reduced would be the same for every

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<sup>5</sup> <http://bcap-energy.org/node/276>- Bill No.17-06



developer within the county. Direct regulation's failure to consider the marginal cost to each developer means that the cost of reductions is not minimized.<sup>6</sup>

Another disadvantage of direct regulation is the amount of research and oversight it would require on the part of Montgomery County. Allowing each individual firm to decide which best practice to implement in order to reduce GHG emissions utilizes the collective rationality of all the firms in order to determine the most innovative and efficient best practice solutions. Centralizing all of the decision making ability within the administration of Montgomery County fails to utilize the total amount of innovation that is found amongst all of the firms. It is very unlikely that Montgomery County could provide the amount of review and research that would be required to arrive at the same innovative and efficient solutions that could be realized by the collective firms in the market.

### ***B. Offsetting APFO Fees or New GHG Impact Fee using Incentive Policies***

As an alternative to direct regulation, development impact fees are a policy tool designed to slow the negative impacts that rapid development have on a given metro area and to raise revenue for the development of facilities within the jurisdiction.<sup>7</sup> Impact fees are currently widely accepted amongst many jurisdictions. Historically, impact fees have been used to raise money for the jurisdiction to improve and add capacity to schools, roads, and water and sewage systems. In this section, ways in which Montgomery County could use existing and new impact fees to encourage developers to implement GHG Reduction Actions will be discussed.

#### **1. Offsetting APFO Fees**

One option for Montgomery County to create incentives for implementing GHG Reduction Actions could involve the use of current impact fees that are assessed under the Adequate Public Facilities Ordinance (APFO). The APFO, Section 50-35(k) of the County Code, was adopted in 1973 as a means to tie re/development with the development and availability of public facilities such as schools, roads, and transportation facilities.. Before a development plan can be approved, the Planning Board must assure that adequate public facilities are in place to support that development, and then determine the level of fees that would be needed to provide the availability of public facilities.

Once the level of the APFO is determined and assessed by the Planning Board, County policymakers would then provide incentives to developers to limit the impact of the APFO fee or allow developers to offset some portion of the APFO fee in exchange for the implementation of GHG Reduction Actions. In order to provide incentives to developers to implement GHG Reduction Actions, the County could use an array of policy options. Four of these policy options, found to be used heavily across the country, are identified and explained briefly below.

Whether or not a developer is willing to undertake GHG Reduction Actions is dependent upon the level of benefits the developer receives through a policy incentive. In general, a developer will be willing to implement reductions so long as the benefit received from the incentive is greater than or equal to the cost of implementing the GHG Reduction Actions.<sup>8</sup> For example, should a developer be given \$5,000 in tax abatements, or alternatively, if the developer saves \$5,000 in interest payments through the use of expedited permitting, than the developer would be willing to install a more efficient HVAC system so long as the cost of that system is less than \$5,000.

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<sup>6</sup> Friedman, p.38

<sup>7</sup> MEPA, p.7

<sup>8</sup> Friedman, p.637

Additionally, the amount of the fee will determine the total level of GHG Reduction Actions the developer is willing to undertake. Generally, if the level of an impact fee is set higher, developers will be willing to undertake more actions in an effort to offset the higher fee.<sup>9</sup>

The amount of incentives to grant to developers or the amount of the fee that developers will be allowed to offset should be determined through a preselected schedule of GHG Reduction Actions compiled by the county. Which actions to include in the schedule should be determined based upon the amount of GHG abatements that the action has and if the action helps meet the goals and recommendations set forth in the Climate Protection Plan. Actions that reduce more GHG emissions should be given more weight in the schedule, and thus be granted more incentives or tax abatements.

There are several pros and cons associated with providing incentives through the APFO or allowing developers to offset existing development fees.

#### Pros of Offsetting APFO Fees

One advantage of allowing developers to offset current APFO or development fees is that it incentivizes the implementation of GHG Reduction Actions without increasing the total cost of development in the County. Increasing the cost of development could slow the pace of development within the County or bring it to a halt.

Another advantage of using the APFO to create incentives and encourage GHG reductions is the fact that it is currently in place throughout the county. County policymakers are already familiar with the APFO fee; therefore, they already have a good understanding of the elasticity of the fee and how raising it would affect development within the County. Further, developers are familiar with the APFO fee and should be considering the fee in their calculation of when and where to develop.

#### Cons of Offsetting APFO Fees

The major disadvantage of allowing developers to offset the existing APFO or development fees is that it may, in the long run, cause the state of public facilities in the County to deteriorate. As developers implement GHG Reduction Actions and are allowed to offset the fees, less money will be collected by the County. This could impair the County's ability to construct and maintain its facilities.

## **2. Incentive Policies**

In order to encourage developers to adopt practices aimed at reducing GHGs, municipalities must provide incentives for them to do so. In short, GHG Reduction Actions will not yield benefits to developers in the short-term. Because they are focused on long-term benefits, these policy incentives make it economically feasible for the private sector to adopt GHG Reduction Actions.<sup>10</sup> A few examples of these incentives are tax abatements, density bonuses, expedited permitting, and technical assistance. To better inform Montgomery County's selection of the incentive policies that best fit its needs, the pros and cons associated with each of these incentives are examined. Using the guidelines of the U.S. Green Building Council,<sup>11</sup> a sample of these incentives are listed in Appendix A.

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<sup>9</sup> Ibid

<sup>10</sup> Del Rio Gonzales, p.292

<sup>11</sup> U.S. Green Building Council

### **a) Tax Abatement**

Tax incentives are a proven method of implementing policy for green building projects. The level of tax incentive can be varied and matched to different levels of green certification, and work well with both short-term and long-term environmental goals. The adjustable nature of this type of incentive is particularly well suited for matching to quantitative outputs such as GHG reduction.

Tax abatement is one of the most flexible incentives because municipalities have the opportunity to approve a number of green performance standards and to allocate the abatement to whatever tax jurisdiction the municipality has the authority to levy. It is important to remember that many developers/owners have different priorities depending on whether they are small developers, large developers, short-term investors, developers who want to maintain several properties, building owners, corporate building tenants, or residential building tenants. These parties have divergent interests and needs, and tax incentives should be available to entice each group.

#### Pros of Tax Abatement<sup>12</sup>

- Additional costs for designing and building green are typically paid up front; yet the benefits gained from reduced energy costs are earned over the building's lifetime. As such, short-term investors may never realize the lifetime cost savings. Immediate tax benefits can encourage them to build green.
- Building owners that rent properties may also never realize energy savings and therefore prefer to spread the benefit over several years.
- Incremental tax rebates, which would be offered at different levels of development, have also been suggested as a means to encourage all parties involved in the development/ownership process to build green. For example, a portion of the rebate can be given during the design process for efficient design intent, and a portion can then be given for efficient operation of the building at one year out, three years out, etc.

#### Cons of Tax Abatement<sup>13</sup>

- Tax abatements have generally been offered as temporary, short-term incentives. This is profitable for entities buying and selling quickly. However, many large projects can take several years to complete, so developers may not be able to reap the same financial benefits from the abatement as short-term buyers/sellers since it may no longer be available when the project is finished.
- However, some programs remain complicated in nature, and builders and owners often find the effort to complete the application process for these programs to be time consuming and, as a result, not cost-effective. Streamlining the application process will ensure that the credits are used more and thus more effective.
- By their very nature tax incentives decrease the tax base thus reducing the funds available to implement other GHG reduction efforts the County may wish to engage in, not to mention other services such as roads and schools.

### **b) Density Bonus**

A density bonus is an incentive-based tool that permits developers to increase the maximum allowable development on a property in exchange for helping the community to achieve public policy goals.

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<sup>12</sup> The American Institute of Architects

<sup>13</sup> Ibid

Density bonus programs appeal to developers because they allow them to utilize more floor space and develop more units which should lead to an increase in profits. This tool works best in areas where growth pressures are strong and land availability limited.

#### Pros of a Density Bonus<sup>14</sup>

- These programs can be particularly attractive to developers and owners in cities and counties that have capacity shortfalls.
- Additional space allowances increase profits for developers and building owners and GHG reductions in transfer costs can translate into incentives for the buyer.

#### Cons of a Density Bonus<sup>15</sup>

- In order for these programs to be effective, bonus density must maintain comprehensive green requirements and therefore preserve the exclusivity of the incentive. As green building becomes more commonplace, municipalities may need to reexamine the stringency of the requirements for density bonuses and increase them accordingly.

### **c) Expedited Permitting**

Streamlining the permitting process for building, plan, and site permits can save developers substantial time and money. This may require the reorganization of municipal staff or initially cost the jurisdiction in other indirect ways, but, overall, such a program can result in great cost savings to both the jurisdiction and the architects and developers involved in a project.

#### Pros of Expedited Permitting<sup>16</sup>

- Permit streamlining programs offer jurisdictions the ability to increase tax revenue while supplying the development community with a valuable resource.
- Expedited permitting saves developers money because it limits the amount of time they are paying interest on borrowed money for the building to sit vacant.

#### Cons of Expedited Permitting<sup>17</sup>

- As more projects go green additional pressure is put on permitting agencies, because of increased capacity.
- Unfortunately, one of the problems faced by many smaller permitting agencies is that they do not have the time or money to adequately staff their existing responsibilities, let alone additional requirements, and therefore solutions need to be found.
- Building permitting bodies must have knowledgeable, trained professionals at all levels of review. These permitting professionals should be trained in LEED and/or other green rating systems used in the community.

### **d) Technical Assistance**

Education is a key component of all incentive options. It is important for government to provide quality service to the development and design community by training planners, building inspectors, and other local officials, as these are the main points of contact between the jurisdiction and private building

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<sup>14</sup> Ibid

<sup>15</sup> Ibid

<sup>16</sup> Ibid

<sup>17</sup> Ibid

interests. Accredited officials have the opportunity to develop better master plans and use green building checklists as guides to declare a building “certifiable.”

#### Pros of Technical Assistance<sup>18</sup>

- Well-trained local officials can also educate the community at large and promote voluntary and residential efforts. This fosters a culture of sustainable design throughout the community, and, in the long term, this can be much more effective than formal legislation and regulations.
- Jurisdictions can earn revenue by offering consulting on green building projects.

#### Cons of Technical Assistance<sup>19</sup>

- Enthusiastic political advocates of sustainable design will continue to raise awareness but this must be matched by technical expertise.
- Demand for sustainable design is increasing rapidly, but even in the development community there are still questions over exactly what kind of green design techniques are most effective and in demand.

### **3. Offsetting a New Impact Fee**

Allowing re/development to offset existing fees or expedite the permitting process may encourage more efficient building practices. However, Montgomery County may find that the use of these existing processes and fees may either have significant negative impacts on their current policy priorities or may be insufficient to realize GHG reduction levels outlined in the Climate Protection Plan.

For the purposes of this section, any of the above policy tools: tax abatements, expedited permitting, density bonuses, or technical assistance are assumed to have a net negative impact on the county’s existing Adequate Public Facilities Ordinance (APFO) fees. To reduce this strain on the existing APFO fees, an additional fee may need to be adopted.

A new fee may be required in order to realize the GHG reduction levels mandated by the CPP. The County may find that the current APFO fees are not sufficient enough incentives to encourage reduction levels that are mandated under the CPP; a new fee may be needed to provide extra incentive to realize reductions. These re/development fees would be in addition to the fees assessed under the current APFO, and would result in a total impact fee level beyond what is currently assessed to re/development.

The Group recommends that Montgomery County only adopt a new impact fee with the understanding that it is intended to encourage GHG reductions, not as an attempt to slow growth or raise revenue for the County. Imposing a new impact fee without allowing developers to offset this fee through the implementation of GHG Reduction Actions would simply slow the pace of growth within the County and raise revenue for the County. Allowing developers to offset the fee through the incentive policies outlined above gives them an incentive to implement actions in order to reduce the impact of the fee.

The level of this new impact fee would be set by the MCPB and would dictate the total level of reductions that developers are willing to undertake. Setting the impact fee at higher levels would encourage developers to undertake more costly reduction actions in an effort to reduce the total cost of

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<sup>18</sup> Ibid

<sup>19</sup> Ibid

the fee.<sup>20</sup> In order to determine the most efficient higher level of this re/development fee, more research on behalf of the county would be needed.

Montgomery County would allow developers to offset the increased impact fee using the same policy tool set outlined in the previous section. In order to determine the appropriate policy option to use with each GHG Reduction Action and the amount of fee offset that would be allowed, further study by the county would be required.

#### Pros of Offsetting a New Impact Fee

The addition of a new impact fee has several benefits to Montgomery County, including: allowing the County to directly control the amount of GHG Reduction Actions undertaken, the protection of the state of schools and transportation facilities within the County, and the creation of an environmental preservation trust fund.

The ability to directly control the level of GHG reductions pursued within the county is one benefit realized with the implementation of a new impact fee. Since the level of fees imposed under the APFO is set using a variety of considerations involving school and transportation infrastructure in the County, it may be ineffective at allowing policymakers to directly control the level of GHG reductions undertaken by public and private developers. The APFO level is not determined using the level of GHG reduction desired under the Climate Protection Plan. However, the addition of a new impact fee, with the level being determined solely by the desired amount of GHG reductions, would allow policymakers to have more direct control of the amount of reductions undertaken. This would also allow policy makers to revise and adjust the level of the impact fee as needed to realize the reduction levels outlined in the CPP. As noted earlier, setting the GHG impact fee at higher levels would encourage developers to realize a greater level of GHG reduction, either through the implementation of a greater number or more costly GHG Reduction Actions. Should the County realize that the initial level of fees imposed under the impact fee is inadequate to realize the reduction levels outlined in the CPP, policymakers would then have the ability to revise and increase the level of the fee to incentivize further reductions. Determining when to raise the fee and the most efficient level to raise it to would require continuous monitoring and revision by the County.

Another advantage of implementing a new impact fee also allows the county to encourage reductions while maintaining the current state of the education and transportation infrastructure within the county. By imposing a new GHG-based impact fee, then allowing developers to offset this fee, County policymakers can encourage developers to implement GHG Reduction Actions while still retaining the County's ability to maintain its public service facilities.

One additional benefit of implementing a new impact fee is that it allows County policymakers to establish an environmental preservation trust fund. Should developers determine that the cost of implementing any additional GHG Reduction Actions would be greater than the cost of the impact fee; developers would most likely pay the fee in lieu of implementing any further GHG Reduction Actions. The total amount of fees collected using the impact fee may represent a substantial amount of revenue, and could be used to establish an environmental preservation trust. This trust fund could then be used to pursue some goals of the Climate Protection Plan not addressed by the new impact fee, such as wastewater management and solid waste management projects.

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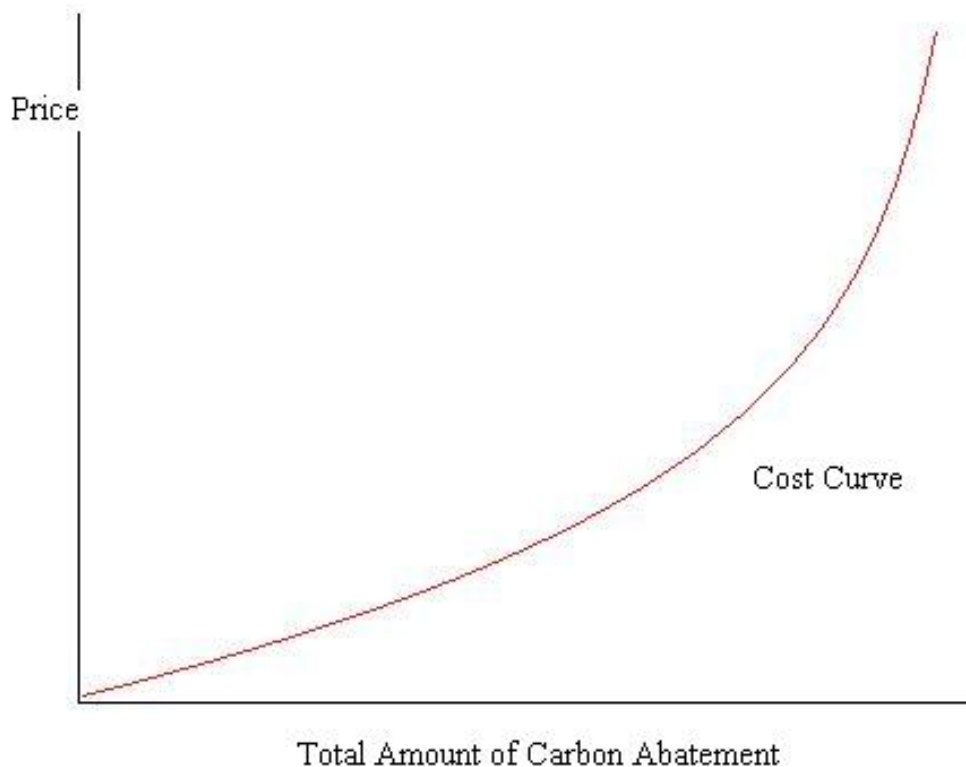
<sup>20</sup> Kingsley, p.637

### Cons of Offsetting a New Impact Fee

Adopting a new impact fee would also have several shortcomings. Due to the nature and price structure of GHG Reduction Actions, the level of the fee may need to be set extremely high. Additionally, the addition of a GHG impact fee on top of the existing APFO fee may increase development fees to a level that significantly slows the pace of growth in Montgomery County. Lastly, knowing the most efficient level at which to set the fee would require much research and review on the part of the County.

The general price structure of GHG abatement costs is one of increasing marginal costs. The cost to abate, or reduce, one more unit of GHG emissions, increases as the total level of GHG reduction is increased. This general price structure of GHG abatement costs was supported in the *McKinsey Quarterly* article "A cost curve for green house gas reduction", a study commissioned by the U.S. Environmental Protection Agency.<sup>21</sup> For an illustration of this cost structure, refer to Figure 1.

**Figure 1- Carbon Abatement Cost Curve**



The reduction of one more unit of GHG, moving right along the x-axis, becomes increasingly expensive as the total level of abatement increases. Developers will choose to implement the most cost effective GHG Reduction Actions first; they will implement the action that reduces the most carbon for the least amount of money. As the GHG impact fee encourages developers to reduce more GHG emissions, developers will be forced to undertake more expensive practices to reduce emissions. As a result, the fee level that may be required to implement the practices needed to realize GHG emission levels outlined in the CPP may be extremely high.

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<sup>21</sup> Per-Anders, p.38

The high level of GHG impact fees that may be needed to realize the reduction levels outlined in the Climate Protection Plan could prove to be excessively burdensome on re/development. Should the level of the impact fee be set too high, developers may find that it is easier to develop in Arlington County, Fairfax County, or other areas surrounding the Washington, DC metropolitan Area. This would be counterproductive to the County's goal of encouraging the development of more efficient buildings. If the development of new energy efficient buildings is priced out of the market, the County will be left with a stagnate inventory of older, less efficient buildings. Consumers and business will substitute continued use of less efficient older buildings for the development of more efficient buildings.

The most efficient level at which to set the GHG impact fee will be a level that is sufficiently high enough to encourage the implementation of GHG Reduction Actions, and is still low enough so as not to discourage re/development. In order to determine this most efficient level for the GHG impact fee, much examination and analysis by policymakers in Montgomery County will be required. When attempting to determine the most efficient level policymakers should undertake a cost-benefit- analysis considering such factors as the price of implementing the GHG Reduction Actions, their GHG reduction impact, cost savings to businesses, the desirability of developing in Montgomery County, and the historic rate of development. Because the technology associated with GHG emission reductions is constantly and rapidly changing, policymakers should continuously analyze and review the level of the impact fee to ensure that it remains at the most efficient level.

#### Additional Considerations of Impact Fees

When deciding whether to allow developers to offset the existing APFO fee or to adopt a new fee, Montgomery County will have to give much thought to its' policy priorities within the County. The costs of imposing a new fee will have to be carefully weighed and considered against the costs to public facilities of allowing developers to offset the APFO. In terms of efficiency of decision-making and efficiency of encouraging GHG Reduction Actions, these two practices are essentially the same. Determining which to adopt will be predominately a product of determining the policy priorities within the county.

### ***C. Mechanisms for Reducing GHG Emissions During Re/development***

Having established that direct regulation is not an attractive approach for MCPD to achieve its goals in the CPP, the Group recommends that MCPD adopt a system for developers to offset either a new GHG impact fee or existing AFPO or development fees using the incentive polices above that best suit its local needs. The following are mechanisms for developers to employ for reducing GHG emissions and qualify for the incentive policies to offset either fee.

#### **1. Primary Reduction Mechanism – GHG Reduction Schedule**

The primary mechanism for developers to reduce their GHG emissions is use of a GHG Reduction Schedule. This schedule is similar to a LEED schedule where developers are given a list of actions from which they can choose to reach a certain level of points to obtain a green building certification. However, the GHG Reduction Schedule is a list of reduction actions that specifically target reducing or preventing GHG emissions in re/development. Implementation of the GHG Reduction Schedule would require two phases. In the first phase, MCPB should compile a voluntary "Soft Schedule" of GHG Reduction Actions that public and private developers (developers) can implement. Meanwhile, MCPB



should request that developers of State- or County- sponsored projects quantify and report their GHG emissions. MCPB should then choose from the Group's list of incentive policies outlined below to induce developers' to implement GHG Reduction Actions.

The reported data from developers would inform the second phase of this approach which is to create a "Hard Schedule" whose GHG Reduction Actions would be selected based on the reported GHG emission data. For the Hard Schedule, a minimum threshold of points would be set by the County and this would be required for all development projects. MCPB could then utilize the Group's list of incentive policies to induce developers to go beyond the minimum points value. For example, the Group recommends that MCPB use a "feebate" mechanism to simultaneously incentivize the implementation of GHG Reduction Actions above the minimum threshold and impose a fee on those that do not meet the minimum threshold.

In Section III, the Group discusses and makes recommendations about the structure of a GHG Reduction Schedule and actions that should be included in it.

**a) Incentive Policies for Soft Schedule**

Montgomery County should choose from the previously discussed incentive policies for phase one of this approach. For phase one, MCPDB would choose the incentive policies best suited to induce developers to implement GHG Reduction Actions and to report quantifications of the GHG emissions associated with their project .

**b) Additional Incentive Policy for Hard Schedule: "Feebate"**

In addition to the incentive policies considered for the Soft Schedule, MCPB should consider the use of a "feebate" for the Hard Schedule.

**(1) "Feebate"<sup>22</sup>**

A feebate simultaneously assesses a fee based on the projected GHG emissions associated with the project to developers who do not meet a minimum threshold, and rewards compliance with a full offset of the fee and a rebate for GHG Reduction Actions taken beyond the required threshold. A good example of a feebate which couples a Reduction Schedule with incentive policies can be seen in Portland, Oregon. Portland is planning to implement its own green building schedule. What is unique about Portland is their plan to attach a "feebate" to this schedule. For new and major remodels of commercial and multifamily projects and new residential construction, developers who:

- Do not meet enough points on the Schedule will be charged a conventional fee based on the gross square footage of the building.
- Obtain the required points will neither be charged a fee nor receive any further incentives.
- Exceed the required points will receive a green building feebate, which is a one-time reward payment from the City.

The fees collected under this program will be put into a fund that will pay for "feebate" rewards, technical assistance, project recognition, and green building education programs. Though the feebate shares the pros and cons associated with the previous analysis of offsetting impact fees, the added

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<sup>22</sup> <http://www.portlandonline.com/osd/index.cfm?c=45879&a=220879>

mechanism of the fund for collecting fees and disbursing rebates is a more sophisticated approach that simultaneously incentivizes developers to meet, and possibly exceed, minimum thresholds while assessing those that do not meet minimum thresholds a (generally) undesirable fee. Coupling this incentive policy to a Schedule can be effective because it combines a flexible menu of Reduction Actions from which developers can choose how they reduce GHG emissions for their project and an incentive for them to make reductions above the minimum requirements. See Appendix B for a link to more information about the Portland, Oregon “feebate” program.

If Montgomery County wants to meet the aggressive GHG reduction goals set forth in the Climate Protection Plan, they will need to couple any type of schedule, hard or soft, with effective policy incentives that motivate developers to go above and beyond minimum requirements.

## **2. Secondary Reduction Mechanism: Off-site Reductions**

As previously mentioned, the GHG Reduction Schedule would be implemented at the planning stage. However, the Group identified an additional mechanism for offsetting whichever fee MCPB deems most applicable to their needs that developers could commit to in their planning but implement at a later time: Off-site Reductions.

In an effort to increase the impact and effectiveness of the reduction incentives outlined above, Montgomery County may consider the possibility of allowing developers to implement GHG Reduction Actions off-site. As developers are encouraged to implement more and more reductions on-site, they may find that the GHG Reduction Actions become increasingly costly and have diminishing impacts. Also, due to the nature of some emission intensive industries, such as the manufacturing of concrete and refrigeration warehouses, on-site Reduction Actions may be extremely expensive at best or altogether not possible. To mitigate the problems associated with only allowing on-site carbon mitigation, the adoption of a policy allowing developers to implement mitigation practices off-site may be useful.

The idea of trading GHG emission reductions amongst entities is not a new one in the field of international and national energy policy. A carbon emission permit trading system is one policy tool that was key to the formulation of the Kyoto Protocol. Under article 17 of the Protocol countries that could reduce their GHG emissions the most efficiently would be allowed to sell their additional emissions permits to countries that are exceeding their emissions target.<sup>23</sup> Additionally, in their *GHG Emissions Policy and Protocol* the Massachusetts EPA has outlined the possibility of allowing the implementation of off-site reductions.<sup>24</sup> However, very little has been done thus far to implement an off-site emissions trading system on the city/county level.

Under the Montgomery County off-site emissions reduction policy, developers would first be encouraged to mitigate as much emissions as possible on-site and on-site abatement would be given priority over off-site reductions. On-site reductions could be prioritized over off-site reductions by granting them more points in the GHG Reduction Schedule. However, if during the planning process, developers are able to prove off-site reductions will be less costly, will realize more emission reductions, and will generally be more efficient, then off-site reductions permits should be granted. Once developers implement the GHG Reduction Actions off-site, then they would be allowed to offset their fees or be granted one of the policy benefits as outlined in the sections above.

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<sup>23</sup> Kyoto Protocol, Article 17

<sup>24</sup> MEPA, p.7

Off-site reductions could take many forms. For example, developers may chose to implement a renewable energy generation system off-site, such as a bank of solar panels or wind generation. Alternatively, developers may choose to implement some of the GHG Reduction Actions at a neighboring, pre-established facility. This would reduce the amount of emissions generated by the neighboring facility and have the same net effect as if the GHG Reduction Actions were implemented at the developer’s facility.

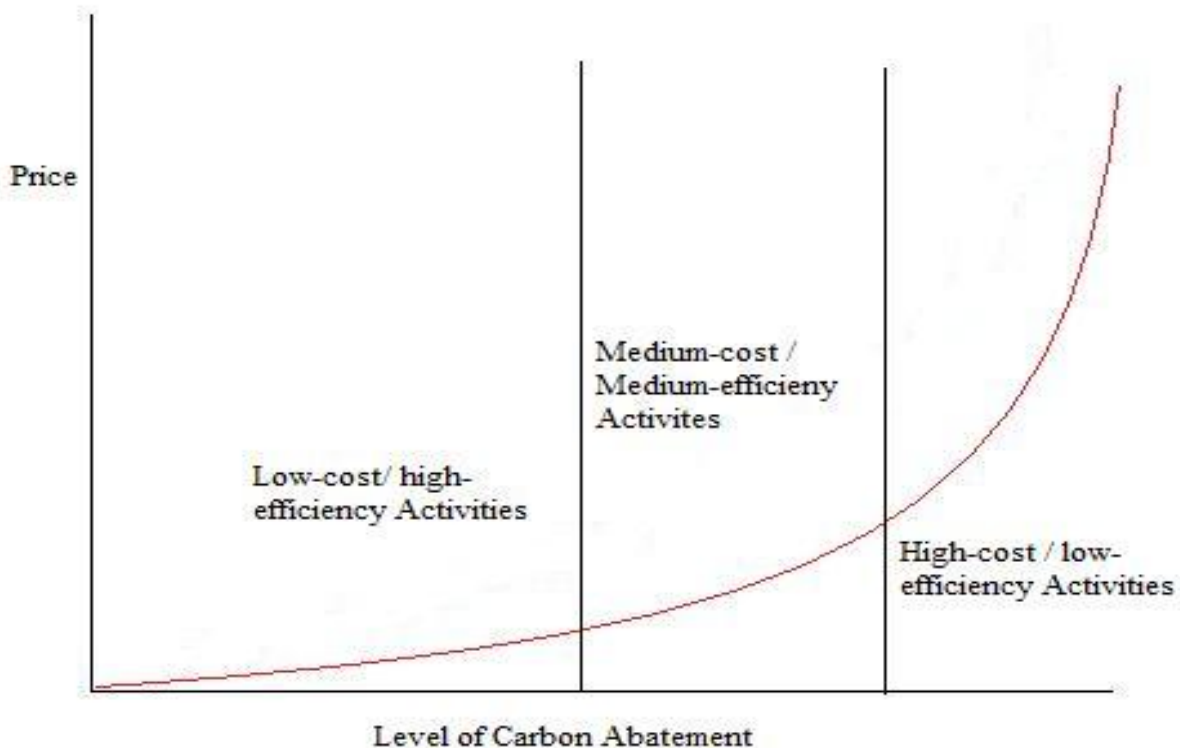
Introducing the possibility of mitigating emissions off-site would make the Montgomery County GHG emission policy more efficient and help to realize the target set forth in the CPP. Allowing developers to implement Reduction Actions off-site would have several benefits and disadvantages.

Pros of Off-Site Reductions

Allowing developers the possibility of reducing emissions off-site has the benefits of potentially realizing cheaper, more efficient levels of reductions and encouraging reductions at pre-established facilities throughout the County.

Allowing developers the opportunity to forgo further costly, less efficient reductions on-site in exchange for producing cheaper, more efficient reductions off-site will increase the impact and total level of reductions produced by Montgomery County’s GHG emissions policy. For the purposes of this section, GHG emissions activities can be grouped into three categories: low, medium, and high-cost activities. The relative cost is determined not only by the final price of the activities, but also by the amount of reductions each activity will have compared to its cost. Efficiencies for these activities are high, medium, and low respectively. Refer to figure 2 for illustration.

**Figure 2- Level of Carbon Abatement for Low, Medium, and High Cost Activities**



Given the choice, developers would always prefer to implement the low-cost / high-efficiency activities. They are able to produce significant amount of reductions for the lowest cost possible. However, due to increasing marginal costs as they implement more GHG Reduction Actions on-site they may find that they are unable to implement any further low-cost / high-efficiency on-site and would be forced to turn to higher-cost / lower-efficiency activities. Allowing reductions to be implemented off-site would allow these developers to implement more low-cost / high-efficiency activities.

Reductions off-site allow for the implementation of more low-cost / high-efficiency activities on the County-wide level. This would mean that the County could enjoy more net high-efficiency activities than if off-site trading were not permitted. This will allow for the County and developers to realize the reduction targets outlined in the CPP through market forces in the cheapest most efficient way possible.

As outlined in the example above, many developers may chose to implement Reduction Actions in neighboring, pre-established facilities which creates the benefit of encouraging the improved efficiency of existing buildings. By choosing to implement off-site trading as part of the GHG emissions policy, Montgomery County could produce increased efficiencies at existing buildings without having to pass regulations targeting existing buildings. This would result in a more efficient level of existing commercial, residential, and industrial real estate stock throughout the county, without any further regulation being passed.

#### Cons of Off-site Reductions

One main disadvantage of allowing off-site reductions is the added administrative burden that it brings to the planning process. Enforcing any reductions achieved off-site is going to require additional administrative oversight on the part of Montgomery County. Should developers chose to implement GHG Reduction Actions at an alternate site, Montgomery County would then have to send code enforcement officers to two sites to ensure that reductions actually be implemented. If off-site reductions are implemented out of the County, it may be impossible for county administrators to ensure that GHG Reduction Actions are actually implemented.

Adding an additional party to the planning process will only add to the administrative hassle of implementing an off-site mitigation program. Institutions receiving the efficiency in lieu of the primary developer may be hesitant to participate in the program. However, the received benefit of energy cost savings realized through increased efficiency may be incentive enough to participate in the program.

#### Additional Considerations for Offsite Reductions

There are a few factors that should be given serious additional consideration when developing an off-site trading system:

- As stated above, on-site reductions should always be given priority over any off-site GHG Reduction Actions. On-site reductions will be easier to enforce and oversee administratively. However, off-site reductions should be given serious consideration when they will produce sufficient increases in efficiency or when on-site reductions are not possible.
- Also, off-site reduction sites should always be limited to within the jurisdiction of Montgomery County. Allowing reduction practices to be approved for sites outside of Montgomery County will have a large adverse effect on the County's ability to exercise oversight over the project, ensure that reductions get implemented, or enforce any kind

of sanctions should the organization fail to implement the reductions. Additionally, having reductions occur outside of the County fails to achieve Montgomery County's goal of achieving the reduction levels outlined in the CPP within the County.

**D. Recommendations: System to Offset Existing or New Fees**

*It is not recommended that Montgomery County pursue a direct regulation system.*

This system requires too much administrative resources and would impose potentially large costs on developers.

*It is recommended that Montgomery County offset a new GHG impact fee or existing APFO fees with incentive policies using GHG Reduction Schedule and/or Offsite Reductions to reduce GHG emissions during re/development.*

The development of this system should occur in two phases. In the first phase MCPB should compile a Soft Schedule of GHG Reduction Actions for developers to implement at the planning stage of their project. Policy incentives discussed previously in this section should be used to induce developers to implement Reduction Actions. Montgomery County should also request that developers voluntarily quantify and report the GHG emissions associated with their project plan. In the second phase, MCPB should use the reported data to enhance the GHG Reduction Actions and compile the actions that are best suited to achieving MCPB's CPP goals into a Hard Schedule. MCPD could incentivize developers to implement Reduction Actions above a minimum threshold (set by the County) by using the same incentive policies considered for the Soft Schedule. Further, the County should consider using a feebate system which rewards compliance beyond the established threshold and assesses a fee to those who do not meet that threshold. A second mechanism that MCPB should consider for offsetting whichever fee MCPB deems most applicable to their needs, which developers could commit to in their design planning and implement at a later time, is Off-site Reductions. However, on-site reductions should be given priority over off-site reductions and MCPB should evaluate the additional considerations discussed above before pursuing this mechanism.

## **Constructing the GHG Reduction Schedule**

As previously discussed, the GHG Reduction Schedule provides developers with a mechanism to offset either a new fee or the APFO fees. Using research on city green building programs and county/state systems for quantifying and reporting GHG emissions, this section will set forth recommendations for the structure of this Schedule and suggest Reduction Actions that should be included in the initial Soft Schedule.

**A. City Models for Green Building Programs**

The Group found four examples of U.S. cities that have implemented robust sustainable development programs. The four Green Building Programs examined below – Boulder, CO; Austin, TX; West Hollywood, CA; and Scottsdale, AZ – include concrete actions that reduce GHG emissions, making them suitable for inclusion in this evaluation. However, these cities do not identify or quantify the GHG emissions reduced by these actions.

To evaluate which actions were suitable for MCPB to utilize in their GHG Reduction Schedule, the Group first identified actions from these example programs that developers in the County could perform during re/development. Next the Group identified each GHG Reduction Actions' ability to reduce GHG

emissions, or GHG Reduction Value, based on its ability to: reduce or eliminate carbon-based electricity, reduce vehicular GHG emissions, sink GHGs through reforestation, or conserve embodied GHGs. To further establish the suitability of the action for the GHG Reduction Schedule, the Group determined whether the action related to activities listed in the LEED ND schedule. If it did, the relevant LEED ND schedule item was provided. Point values assigned to each action in the specific city program and, if applicable, the LEED ND schedule was provided so that Montgomery County can refer to this in the future when making decisions about what point value to assign to Reduction Actions. Finally, the Group determined whether the action fulfilled a recommendation in the CPP. As with the LEED ND comparison, if the action fulfilled a CPP recommendation, that recommendation was listed. This raw data is shown in Table 2 of Appendix C.

Further, the Group selected 13 Reduction Actions that appear on at least two of the four city schedules and address a recommendation identified in the Climate Protection Plan. And, 3 more Reduction Actions that, while they do not address a recommendation identified in the CPP, appear on three or four of the city schedules. Together, these 16 Reduction Actions (shown in Table 1 of Appendix C) are the Group's recommendation to Montgomery County for initial inclusion on the Soft Schedule. However, Montgomery County should also review all Reduction Actions included in Table 1 as there are undoubtedly additional actions that would meet County needs and, as we discuss shortly, providing developers flexibility in obtaining a point threshold is key to a program such as this one..

Below is a description of each program used to inform the actions we have selected, followed by a set of recommendations for the structure of the GHG Reduction Schedule.

### **1. City of Boulder, Colorado - Green Points and Green Building Program**

In 1996, the City of Boulder, Colorado mandated a residential green building code. The Green Points and Green Building Program (further referenced as the "Green Program" in this section) is supported by the City's Office of Environmental Affairs and Planning and Development Services. There are four main purposes to the Green Program. The first is to help homeowners build "green" by providing them with resources on where to find products and designs. The second purpose is to encourage homeowners to utilize cost-effective and sustainable remodeling and building methods. The third purpose is to reduce solid waste and increase the recycling of construction materials. The fourth purpose is to "promote better indoor air quality." This program provides choices that provide flexibility for homeowners to tailor their "green" design to their own preferences.<sup>25</sup>

The Green Program applies to all new residential construction and additions and remodels that are larger than 500 square feet (for one and two family and multifamily dwellings).<sup>26</sup> In order to receive a building permit, residents must meet certain building requirements and earn points by selecting green building options from a list provided by the City.<sup>27</sup> Applicants that are pursuing the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) Silver certification (or higher) are exempt from the Green Program. All new construction projects have green building requirements and green point requirements. Green building requirements include energy efficiency, construction waste recycling, and demolition management.

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<sup>25</sup> City of Boulder, Green points and green building program, 2009

<sup>26</sup> City of Boulder, Green points and green building program, 2009; City of Boulder, Green building & green points application for new construction, 2009; and City of Boulder, Green building & green points application for additions and remodels, 2009

<sup>27</sup> City of Boulder, Green points and green building program, 2009

For energy efficiency, it must be demonstrated that the building meets compliance with the Home Energy Rating System (HERS).<sup>28</sup> The HERS index is a scoring system setup by the Residential Energy Services Network (RESNET) where the lower a home's HERS index, the more energy efficient it is in comparison to the reference home.<sup>29</sup> The features assessed in the HERS rating cannot be used towards the green points count discussed below. Table 1 in Appendix D shows the required HERS index rating by the size of the building. For example, a building with an HERS rating of 70 is 30% more efficient than the reference home. In addition to having mandatory building requirements, all new construction also has a mandatory green point requirement. The minimum point requirements are shown in Table 2 in Appendix D.<sup>30</sup>

The City of Boulder developed a list of options for obtaining points. Each option has a corresponding possible point value. The applicant must provide the needed verification documents throughout the process to show that they have met the requirement to obtain the points. The options are broken into larger categories that include: site development, waste management, water efficiency, material efficient framing and structure, sustainable products, indoor air quality, homeowner information, and design process and innovation. As can be seen in Appendix E, Boulder has given its applicants a list of more than 100 possible points and the highest point requirement is 60 (for single family homes which are larger than 5,001 square feet). Further, the points schedule includes "innovation points" which allows for builder creativity and even more flexibility. More information on the specifics of each feature can be found in the Green Buildings and Green Points Guideline Booklet (see Appendix B for link to document).<sup>31</sup>

Just as with new construction, all additions and remodels have mandatory green building requirements and mandatory green point requirements. Certain additions or remodels are large enough that they count as "new construction" under the Green Program. If the project meets the requirements in Table 3 in Appendix D, the applicant must follow the new construction energy efficiency requirements rather than the addition or remodel energy efficiency requirements.<sup>32</sup> Additions and remodels that do not meet or exceed the thresholds listed in Table 4 in Appendix D have different energy efficiency requirements than new construction. If the applicant is updating the energy efficiency of the entire structure, they must show that it meets a certain HERS rating. Table 4 in Appendix D shows the energy efficiency thresholds required for additions and remodels. Any remodel that removes less than 25% of the total wall and ceiling areas is not required to meet any of the energy efficiency requirements listed in Table 4.<sup>33</sup>

In addition to the energy efficiency requirements, there are other mandatory green building categories for all additions and remodels. These include:

- The applicant must obtain an energy audit and provide proof of completion with the building permit application.

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<sup>28</sup> City of Boulder, Green building & green points application for new construction, 2009

<sup>29</sup> United States Protection Agency, 2009

<sup>30</sup> City of Boulder, Green building & green points application for new construction, 2009 and City of Boulder, Ordinance No. 7570, 2009

<sup>31</sup> Ibid

<sup>32</sup> Ibid

<sup>33</sup> Ibid

- Before the final inspection, at least 50% of the light fixtures must contain energy efficient light bulbs.
- If the applicant is replacing the furnace, it must be replaced with a direct vent furnace that has a minimum of 90% annual fuel utilization efficiency (AFUE).
- If the applicant is replacing a boiler, it must be replaced with a direct vent unit that has a minimum 85% AFUE.
- A minimum of 50% of construction waste must be recycled.
- If demolishing more than 50% of exterior walls, 65% of material (by weight) should be diverted from the landfill City of Boulder, Green building & green points application for additions and remodels, 2009 and City of Boulder, Ordinance No. 7570, 2009).

The minimum point requirement for additions and remodels are shown in Table 5 in Appendix D. One caveat is that for projects that are an addition and a remodel, the applicant must add up the areas of the project together and use that size in the “addition” category to determine the number of points required. As with new construction, the City of Boulder developed a list of options for obtaining points. The applicant must provide the needed verification documents throughout the process to show that they have met the requirement to obtain the points. As can be seen in Appendix F, Boulder has given its applicants a list of more than 200 possible points and the highest point requirement is 45 which, again, allows for a large degree of flexibility in deciding which options to pursue. More information on the specifics of each feature can be found in the Green Buildings and Green Points Guideline Booklet (see Appendix B for link to document).<sup>34</sup>

## 2. City of Austin, Texas - Austin Energy Green Building

Created in 1991, the Austin Energy Green Building program is a comprehensive program that encourages sustainable building techniques in residential, multi-family, commercial and municipal construction. Unlike the Boulder, Colorado program, the Austin, Texas program is largely voluntary. However, there are some zones of Austin where meeting a certain rating under the Green Building program is required for all buildings in the zone. One star is given to a project that meets all of the basic requirements, and additional stars are given as more points are obtained, with five being the most stars a project can obtain. Some points in the rating tools give the applicant the option to choose a performance or prescriptive path. A prescriptive path tells them exactly what needs to be done to obtain that point. A performance-based path allows the applicant to choose other ways to meet the required performance measure as long as value is demonstrated. The program was developed in phases, with the residential rating tool develop in 1991, the commercial tool developed in 1995, and the multifamily tool developed in 1998. Rather than using Austin’s Green Building rating tools, all municipal buildings are required to obtain LEED Silver certification.<sup>35</sup> Additional information can be found at the [austinenergy.com](http://austinenergy.com) link listed in Appendix B.

The single-family-home rating program is applicable for all single-family homes and townhouses. The rating system is shown in Table 6 in Appendix D. Starting at the 3 star rating; applicants must meet the point requirements and specific requirements. As can be seen in Appendix G, the Austin, Texas single-family home rating tool has sixteen basic requirements to obtain a 1 star rating and then a possibility of more than 300 points to obtain the points requirements for each star rating. The measures for points are broken out into categories that include: planning process, site selection, design, material efficiency and construction waste, integrated pest management, thermal envelope and moisture

<sup>34</sup> Ibid

<sup>35</sup> Austin Energy, [Austinenergy.com](http://austinenergy.com) energy efficiency, 2009



control, plumbing and appliances, mechanical, electrical, interior construction and finishes, site work and landscaping, and additions and innovations.<sup>36</sup> Links to more detailed information regarding the measures listed in the single-family home rating tool are listed in Appendix B.

The multifamily rating program is applicable to multifamily and mixed-use development up to six stories. The rating system is shown in Table 7 in Appendix D.<sup>37</sup> As can be seen in Appendix H, the Austin, Texas multifamily home rating tool has fourteen basic requirements to obtain a 1 star rating and then a possibility of more than 80 points to obtain the points requirements for each star rating. The measures for points are broken out into categories that include: site, energy, water, indoor environmental quality, materials and resources, and innovation.<sup>38</sup> This rating packet also includes many calculators and resource lists to help applicants with the planning process. Links to more detailed information regarding measures listed in the multifamily rating tool can be found in Appendix B.

The commercial rating program is applicable to development over six stories. The rating system is shown in Table 8 in Appendix D.<sup>39</sup> As can be seen in Appendix I, the Austin, Texas commercial rating tool has eight basic requirements to obtain a 1 star rating and then a possibility of more than 70 points to obtain the points requirements for each star rating. The measures for points are broken out into categories that include: team, site, energy, water, indoor environmental quality (IEQ), materials and resources, education, and innovation.<sup>40</sup> Links to more detailed information regarding measures listed in the multifamily rating tool can be found in Appendix B.

### **3. City of West Hollywood, California - Green Building Program**

On December 15th, 2005, the West Hollywood City Council passed an ordinance to create a “green building program with incentives for exemplary projects”.<sup>41</sup> Effective since October 1, 2007, the program includes a mandatory green building point system for private development and an incentive based program for high-achieving projects.<sup>42</sup>

According to the City, the key features of the ordinance are flexibility, responsiveness to local conditions, and cost-effectiveness. The ordinance focuses on three policy components:

- Establishes development standards that apply to all development, including all new residential and commercial projects as well as remodels and tenant improvements;
- Develops a point system for new construction with incentives for projects that achieve "exemplary" status; and
- Implements a "green building" education and outreach program.

The “standards” component represents requirements for all remodels, tenant improvements, additions and new construction. These standards were incorporated by the City directly into its existing Zoning Ordinance so that all new and re-development projects incorporate elements such as drought-tolerant landscaping, low-flow plumbing fixtures, and energy efficient appliances. A full description of these standards can be found via a link included in Appendix B to this report.

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<sup>36</sup> Austin Energy, Residential (single-family home) rating form, 2009

<sup>37</sup> Austin Energy, Multifamily guidebook, 2009 and Austin Energy, Multifamily rating 2009

<sup>38</sup> Austin Energy, Multifamily rating 2009

<sup>39</sup> Austin Energy, Commercial guidebook, 2009 and Austin Energy, Commercial rating form, 2009

<sup>40</sup> Austin Energy, Commercial rating form, 2009

<sup>41</sup> West Hollywood Ordinance 07-762, 2007

<sup>42</sup> Ibid

The “point-system” component applies to all new commercial development projects as well as all new residential projects with three or more units.<sup>43</sup> This component establishes a point schedule, to be maintained and updated as necessary by the Community Development Department, for green building efforts taken by developers. Each party applying for a discretionary land use or development permit must submit a preliminary “green building plan”, describing which points within the point system the project will address.<sup>44</sup> Upon final approval, a final “green building plan” must indicate which points will be addressed as well as where compliance with each point is demonstrated on the plans.

All projects must select and comply with a minimum of 60 points from the Point System. Similar to the Bolder Green Points and Green Building Program, a project is exempt from this minimum requirement if it has achieved a minimum rating of “certified” with the United States Green Building Council’s Leadership in Energy and Environmental Design (LEED).<sup>45</sup>

Through a series of development incentives, the City has provided motive for developers to comply with 90 points from the Point System. Should a project elect to comply with 90 points, it shall have the choice of eight options that relax requirements on further development. These options (along with the full Point Schedule as established by the Community Development Department) are included in Appendix (J).

#### **4. City of Scottsdale, Arizona - Green Building Program**

Since 1998, the City of Scottsdale has administered a voluntary Green Building Program that offers incentives to builders who pursue activities included in the city’s Green Building point rating system. The city rates projects based on six categories: Site Use; Energy; Indoor Air Quality; Building Materials; Solid Waste; and Water.<sup>46</sup> The point rating system is designed by the City to offer flexibility by offering more than 150 options while maintaining a “whole building systems” approach.<sup>47</sup> Each builder participating in the program is expected to attend two lectures, workshops or seminars focusing on energy resource efficient building. Incentives offered to Builders for participation include pre-review project qualification, expedited plan review, jobsite signage, and architect/builder participation listing on the city’s website.<sup>48</sup>

The Green Building Program is designed for both residential and commercial development, with separate point schedules developed for each. The residential program applies to all one and two-family dwellings as well as multiple single family dwellings not more than three stories in height.<sup>49</sup> As with other programs selected for examination in this paper, participants in the residential program must meet a set of mandatory requirements based on site, energy performance, heating and air conditioning efficiency, indoor environmental quality, lighting, plumbing, and solid waste. Following the mandatory requirements, participants may pursue any combination of initiatives to achieve 50 points (as an entry level participant) or 100 points (for advanced level participants).<sup>50</sup>

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<sup>43</sup> Ibid

<sup>44</sup> Ibid

<sup>45</sup> Ibid

<sup>46</sup> Floyd, Anthony

<sup>47</sup> Scottsdale Green Building Program, Overview, 2009

<sup>48</sup> <http://www.iccsafe.org/news/green/pdf/0605BSJ34.pdf>

<sup>49</sup> Scottsdale Green Home Rating Checklist

<sup>50</sup> Ibid

The commercial counterpart applies to all new construction and major renovation projects, and is designed to “address the local issues of Scottsdale in the regional context of the Sonoran Desert”.<sup>51</sup> Six checklist categories guide developers’ participation: sustainable sites; water efficiency; energy and atmosphere; materials and resources; and indoor environmental quality. Participation is measured by four established rating levels: level one requires participants to meet certain prerequisites for each of the six checklist subsets. Level two requires participants to meet 25-49 percent of checklist items. Level three requires 50-74 percent of items to be addressed, and Level four is designated for participants who achieve 75 percent or more of checklist items.<sup>52</sup> The full schedules are included in Appendix K and L.

**B. Recommendations: Structure of the GHG Reduction Schedule**

A close look at all four of these programs provides some insight into recommendations for the structure of a Montgomery County GHG Reduction Schedule.

**Focus on GHG Reducing Activities:** While all four examples are useful in informing our discussion of the structure of Montgomery County’s Greenhouse Gas Reduction Schedule, all of them include actions that are not directly related to reducing GHG emissions. Therefore, the Group has selected those actions from these programs which do reduce greenhouse gas emissions and placed them into Table 2 in Appendix C. It is recommended that Montgomery County start with these actions as they begin to develop the specifics of the Soft Schedule.

**Begin with voluntary schedule, provide incentives for participation:** An examination of the demographics of the four localities as compared to Montgomery County shows that, predictably, all vary widely from those of Montgomery County (see Table 1).

**Table 1: Montgomery County Compared to Four Model Cities**

Demographic	Montgomery County	City of Boulder	Austin, Texas	West Hollywood	Scottsdale
Number of Residents (in 2007)	930,813	93,552	743,074	35,000	202,705
Size (in square miles)	496 (97% urban)	24.4	251.5	1.9 miles	184
Average Number of People (per square mile)	1878	3838	2954	18,993	1100

Sources: City-Data.com, Boulder, Colorado, 2009 and  
 City-Data.com, Montgomery County, Maryland, 2009 and  
 City-Data.com, Austin, Texas, 2009, and  
 City-Data.com, West Hollywood, California, 2009  
 City-Data.com, Scottsdale, Arizona, 2009

What this difference in demographics indicates is that Montgomery County cannot just adopt one cities’ approach. Certain provisions will have to be made to account for the differences between these areas. Boulder is much smaller in population and in area and, therefore, mandating a residential green building system may not be feasible, at least initially, for Montgomery County. However, Austin, Texas is closer in size to Montgomery County. As mentioned above, Austin phased in their different rating tools for

<sup>51</sup> Scottsdale Commercial Green Building Checklist

<sup>52</sup> Ibid

different types of development over time. One thing that is missing from Austin's program is incentives for voluntary adoption of the program. Scottsdale's voluntary program includes incentives such as expedited plan approval for participation. Attaching incentives to the Montgomery County Greenhouse Gas Reduction Schedule will increase participation while the program is in a voluntary phase.

It is practical for Montgomery County begin with a voluntary program that provides incentives for developers or homeowners to follow the requirements. More examples of incentive policies that can accompany this program are listed in Section II. However, an example might be a waiver on the permit fee (or other building costs) for meeting mandatory building requirements such as the ones Boulder has and then additional incentives that are applied based on the amount of points that are met under the GHG Reduction Schedule. Further, as Austin did, given its size, Montgomery County should start with a Schedule that focuses on one type of development (i.e., commercial). Starting with voluntary requirements and phasing in one schedule at a time will allow for developers to get used to the new program and for Montgomery County to learn from their mistakes and successes over time to develop a comprehensive and effective program.

**Develop a suite of schedules that are tailored to the specific types of development:** The Boulder program is only for residential development while the Austin, Texas example covers commercial, residential and multifamily development. Likewise, the West Hollywood green building plan applies to commercial and residential projects, while Scottsdale has separate plans for each type of development. Montgomery County is looking for a schedule that can be applied to all facets of development- residential, commercial, municipal, etc. However, looking at all of the examples, it seems clear that for a county as diverse as Montgomery, one schedule could not fit both residential new development and residential additions and remodeling. With this in mind, one schedule will also not fit all types of development. Therefore, Montgomery County should develop a suite of schedules that are tailored to the specific types of development. There may also need to be, as Boulder did with their program, sub-schedules that address differences in things like new construction and additions/remodels.

**Consider special exclusions to the program based on local needs:** Building off the second recommendation, it is important to determine what applies and what does not. This will become particularly important if/when the GHG Reduction Schedule becomes mandatory. For example, Boulder set size thresholds for what projects need not go through the program. It is recommended that a size minimum be put on projects that are required to comply with the Schedule to eliminate unnecessary burden being placed on small projects. Further, Boulder and West Hollywood exclude any applicant that is applying for LEED Silver certification from their program. This avoids redundancy in effort between the two programs. However, the main reason for Montgomery County's Schedule is to ensure developers of all kinds are taking certain measures to reduce greenhouse gas emissions and while the LEED program does include some actions that reduce greenhouse gas emissions, this is not its main focus. Therefore, simply excluding applicants trying for LEED Silver certification should not be included in the structure of the Montgomery County Schedule. Rather, any requirement based on the LEED Silver standard should consider LEED requirements that are carbon reducing in nature.

**Consider how to encourage participation beyond what is minimally required:** Montgomery County's program must allow for applicant flexibility. Boulder and West Hollywood set base requirements that had to be met for all projects. This establishes a level playing ground for all those participating because they all must start at the same point. However, each type of project is also required to obtain a certain number of points. The key here is that, on both lists, Boulder provides ample options to obtain points well above the highest point requirement to ensure applicants have a large degree of flexibility in

determining how they meet this requirement. Austin, Texas also provided ample available points in all of their rating tools to ensure compliance flexibility, as did Scottsdale's voluntary program. This flexibility enables the developer to decide which options best suit their development and to also consider cost when going through the points program. Another key feature of all four lists is the option of including "innovation points". It is conceivable that no matter how much input and research is put into developing a GHG Reduction Schedule, there will always be additional ways to reduce the impact of development. "Innovation points" allow for even greater flexibility and creativity. "Innovation points" also provides Montgomery County with a way to learn about new reduction techniques and trends in development. Further, it is important to have different point requirements for different types and sizes of development. As seen in the Boulder example, it is unfair to assume a large multi-family apartment building can meet the same number of points as a small, single family home. Therefore, points need to be scaled to project size. However, one feature that neither the Boulder program nor the Austin, Texas program include is an incentive to obtain more points than the minimum. It is recommended that the Montgomery County program include incentive policies for developers to obtain more points than what is minimally required in order to help it meet the aggressive CPP GHG reduction goals. Examples of these incentives are discussed in Section II.

**Consider County budget restraints:** If the GHG Reduction Schedule is eventually made mandatory in Montgomery County, it needs to be accompanied by some measure of enforcement. For both West Hollywood and Boulder, this includes requiring certain paperwork and a plan for how the applicant is going to meet Program requirements before they can obtain a building permit. This also includes periodic inspections and a final inspection when the construction is complete. Their program also includes hefty documentation requirements: all components of the plan need to be documented and verification documents need to be maintained. Given the size of Montgomery County, the upkeep and tracking of such paperwork and inspections will add a substantial amount of work and personnel time commitments. Therefore, enforcement of the Schedule needs to be scaled around what is feasible and within the budget of the County.

**Ensure actions included on the GHG Reduction Schedule specifically address goals set forth in county's CPP:** Finally, the categories of actions listed on all four cities' lists show that a schedule can be written to address many of the recommendations in the Climate Protection Plan. Many of the actions fit recommendations like switching to renewable energy (specifically solar), increasing residential and multi-family building energy efficiency, and considering land use when planning a project. This shows that Montgomery County can address many of its already established priorities by including Reduction Actions in their schedule that specifically address each of these areas. Further, Montgomery County could bolster the support of their priorities in the Climate Protection Plan by making some of the options required, rather than optional. They could require that, within the overall minimum of points needed, a certain percentage has to come from increasing energy efficiency. This is exemplified in the Austin, Texas single-family rating tool where, to achieve a rating higher than 3 star, the applicant must meet a certain point level. In addition, certain actions on the list are required. As mentioned above, it is important that if restrictions like these are placed into the schedule, that there is also ample allowance for flexibility within how to meet the remaining points needed.<sup>53</sup> As previously mentioned, all of the GHG Reduction Actions related to GHG emissions that the Group came across in our research have been pulled out and compiled into Table 2 in Appendix C. As mentioned in the introduction to this section, this table contains a List of Actions of these GHG Reduction Actions and their applicability (if any) to the Climate Protection Plan to provide Montgomery County with a vision of how these actions can help

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<sup>53</sup> Friedman, p.637

achieve goals contained in the CPP. The Group believes this List of Actions and the recommended GHG Reduction Actions are valuable resources for MCPB to utilize when developing its Soft Schedule.

## **Constructing a System for Quantifying and Reporting GHG Emissions During Re/development**

While the Soft Schedule provides MCPB with a valuable tool to immediately begin reducing GHG emission in the County, without the capacity to measure those reductions, the extent to which each action is actually reducing emissions is unclear. Therefore, the second component of Phase 1 for the GHG Reduction Schedule would induce developers to quantify and report the GHG emissions associated with their projects, as well as all reduction activities that were undertaken. Collecting this information is vital to enhancing the value of the GHG Reduction Actions in the List of Actions to provide a benchmark against which MCPD can determine which actions to use in the Hard Schedule.

The following are county and state models for quantifying and reporting GHG emissions to inform MCPD's reporting structure.

### **A. County Model for GHG Emission Quantification and Reporting System**

#### **King County, WA – Executive Order PUT 7-10**

In 2007, King County Executive, Ron Sims, issued Executive Order PUT 7-10 requiring and empowering King County Departments to “evaluate the climate impacts of those actions being evaluated under SEPA.”<sup>54</sup> Sims interpreted the Washington State Environment Policy Act (SEPA) to authorize King County to require agencies to include greenhouse gas emissions as one of the items that are disclosed on the SEPA checklist.<sup>55</sup> To estimate total GHG emissions from embodied, energy usage, and transportation related sources the Department of Development and Environmental Services (DDES) in consultation with the development and environmental communities and other county Departments developed a simple worksheet to provide the required information.<sup>56</sup>

King County's Executive Order PUT 7-10 is similar to Montgomery County City Council Bill 34-07 requiring the Montgomery County Planning Department to assess certain plans' “potential impact on GHG emissions in the County, consider ways to reduce vehicle miles traveled in the County, and consider options that would minimize those emissions.”<sup>57</sup> King County has taken the next step of producing its own worksheet for calculating GHG emissions associated with Re/development.

King County's use of this worksheet to build an inventory of the County's GHG emissions is a valuable model for Montgomery County to follow. While the Group cannot completely support the worksheet's reliance on data from earlier this decade, the effort to collect information on embodied emissions is particularly relevant to MC which will mostly face planning for redevelopment of existing structure. Understanding the GHG emissions associated with altering those structures will be extremely valuable for MCPD going forward. However, should Montgomery County adopt King County's methodology, it

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<sup>54</sup> King County Administrative Policies and Procedures, Executive Order PUT 7-10: Executive Order on the Evaluation of Climate Change Impacts through the State Environmental Policy Act, September 1, 2007.

<sup>55</sup> Sims, Ron. “Letter to the Honorable Dow Constantine, Chair, King County Council”, February 11, 2009.

<sup>56</sup> King County Department of Development and Environmental Services, SEPA GHG Emissions Worksheet, Version 1.7, December 26, 2007. <http://www.metrokc.gov/permits/info/site/ClimateChange.aspx#SEPA>

<sup>57</sup> City Council for Montgomery County, MD, Bill 34-07, April 22, 2008, pp. 1

would either rely on King County to update this worksheet, or it must do so itself and continue to do so for the foreseeable future.

## **B. State Models for a GHG Emission Quantification and Reporting System**

### **California - Assembly Bill No. 32**

California is moving forward on GHG regulation to comply with AB 32, the California Global Warming Solutions Act of 2006.<sup>58</sup> This act requires that California establish a “comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions of greenhouse gases.” The act also makes the California Air Resources Board (CARB) responsible for monitoring and reducing GHG emissions. The bill requires CARB to reduce statewide GHG emissions to 1990 levels by the year 2020.

On December 2, 2008, in the first regulation adopted in association with AB 32, CARB approved final regulations for the mandatory quantification and reporting of GHG emissions beginning in 2009.<sup>59</sup> The regulation requires certain operators, retail providers and marketers involved in electric generation within California to comply with quantification and reporting guidelines associated with their GHG emissions. Those entities that fall under the regulation must submit Emission Data Reports summarizing their 2008 GHG emissions by either April 1 or June 1, 2009 and on an annual basis thereafter. Although CARB only requires entities involved in electric generation to report GHG emissions, its intention to use that data to develop statewide regulations qualifies it as an important model for Montgomery County to follow for lessons on how to reduce county wide GHG emissions.

### **Massachusetts - Environmental Policy Act Greenhouse Gas Emissions Policy and Protocol**

Massachusetts is the only state to require state agencies and private developers to assess greenhouse gas emissions in their environmental review documents via the Massachusetts’ Greenhouse Gas (GHG) Emissions Policy and Protocol of 2007 (GHG Policy), as revised on February 3, 2009.<sup>60</sup> The GHG Policy requires developers of all projects requiring environmental impact reports (EIRs) prepared under the Massachusetts Environmental Policy Act (MassEPA) to quantify direct and indirect GHG impacts, as well as the impact of selected mitigation measures on GHG emissions.<sup>61</sup> Projects with little or no emissions are exempted from the GHG Policy.

Modeled on the National Environmental Policy Act (NEPA), MassEPA requires project developers to study the environmental consequences of their actions and take all feasible measures to avoid, minimize, and mitigate damage to the environment. The GHG Policy draws its authority to require these actions from its groundbreaking finding that “...’damage to the environment’ as used in MassEPA includes the emission of greenhouse gases caused by Projects subject to MassEPA review.”<sup>62</sup>

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<sup>58</sup> AB 32 Fact Sheet - California Global Warming Solutions Act of 2006,” California Air Resources Board, Sacramento, CA, Sept. 2006

<sup>59</sup> California Requires Mandatory Greenhouse Gas Emissions Reporting in 2009,” Energy Law Update, December 2008

<sup>60</sup> Massachusetts Executive Office of Energy and Environmental Affairs Greenhouse Gas Emissions Policy (February 3, 2009)

<sup>61</sup> Mass. Gen. Laws, Ch. 30, § 61-62I

<sup>62</sup> Ibid

The GHG Policy is further reinforced by Massachusetts' Global Warming Solutions Act of 2008 that changed state law to allow agencies, departments, boards, commissions or authorities to consider "reasonably foreseeable climate change impacts, including additional greenhouse gas emissions, and effects, such as predicted sea level rise" when considering and issuing permits, licenses and other administrative approvals and decisions.<sup>63</sup> For more details on the GHG Policy see Appendix M.

The value of the GHG Policy model to MC is that it offers an alternative to the King County model for quantifying and reporting emissions during re/development. Like King County's interpretation of Executive Order PUT 7-10, Massachusetts' interprets MassEPA to authorize its GHG Emissions Policy & Protocol requirement that developers requiring an EIR under MassEPA quantify direct/indirect GHG impacts as well as the impact of selected mitigation measures on GHG emissions is similar to King County's interpretation of SEPA to authorize Executive Order PUT 7-10 to require developers to estimate the Total GHG emissions of developers' projects. Both King County and Massachusetts require GHG quantification and reporting for re/development associated with their respective state environmental policies.

Both models also quantify GHG emissions related to energy usage and transportation. However, a key difference is that King County's third category of GHG emissions quantifies embodied emissions, while Massachusetts' third category quantifies stationary on-site emissions. This difference is likely a consequence of each having different local interests. King County does not anticipate further industrial development so it is not concerned about stationary on-site emissions. However it is unclear why Massachusetts did not see fit to quantify embodied emissions in its GHG policy. This makes the Massachusetts reporting model less applicable to MC who does not anticipate any new industrial development, though it does include on-site fuels use for buildings as part of the emissions factors for buildings.

Another key difference between these models is that each has approached the process of quantification and reporting differently. King County developed its own worksheet for planners to use based on local King County, Washington, and national data. Conversely, Massachusetts approved various versions of computer software for quantifying onsite and energy usage related emissions, while relying on EPA tools for quantifying transportation-related emissions. Moreover, as a statewide policy, Massachusetts' GHG Policy has more extensive reporting demands of developers than King County's Executive Order PUT 7-10. It requires that developers illustrate multiple scenarios for its proposed project, some that include measures for mitigating GHG emissions, and explain its rationale for choosing the proposed project. It allows, but does not encourage, the use of Offsite Reductions as potential mitigation measures. However, it does not require that the developer take any action as a result of the analysis, nor does it place an emissions cap or threshold on projects. For further details see Appendix M.

### ***C. Potential for MCPD to Interpret MEPA to Mandate Quantification and Reporting***

While quantification and reporting during Phase 1 would be strictly voluntary, it is worth noting that MCPB could pursue making a similar interpretation of Maryland's MEPA law as King County, California, and Massachusetts made of their respective laws. These governments interpreted their laws to give them the authority to mandate developers' quantification and reporting of GHG emissions. The Group recommends that MCPD explore whether such an interpretation of MEPA is legally feasible.

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<sup>63</sup> Ibid



Under §1–301 of the Natural Resources Article of Maryland’s Annotated Code, “State agencies” including the executive and administrative departments, offices, boards, commissions, and other units of the State government and any such bodies created by the State, have the authority to require an “Environmental effects report” on each proposed state action for legislative appropriations or other legislative actions that will alter the quality of the air, land, or water resources that significantly affects the environment.<sup>64</sup> This policy is commonly referred to as the Maryland Environmental Policy Act (MEPA).

The shared purpose of this law with SEPA and MassEPA to prevent damages to the environment from government sponsored projects provides an opportunity for MCPB to pursue similar GHG quantification and reporting requirements. However, Maryland has not sought to pursue a robust GHG policy similar to Massachusetts’ GHG Policy, or require GHG emission reporting like California. Montgomery County has taken the initiative to require GHG emissions assessment from its Planning Board for certain plans through City Council Bill 34-07. Considering Montgomery County’s directive to assess GHG impacts of development plans, the Group draws the following conclusions from our research on city, county, and state research.

## Final Recommendations

1. *Offsetting a new fee or existing APFO fees with incentive policies is more suited to Montgomery County than direct regulation:*

It is not recommended that Montgomery County pursue a direct regulation system due to the large amount of administrative resources required to administer a direct regulation policy and the potentially large costs that it would impose on developers.

Instead the Group recommends MCPB develop a system to offset a new fee or existing APFO fees with incentive policies for developers who implement GHG Reduction Actions from a GHG Reduction Schedule. Implementation of the schedule should occur in two phases. In the first phase MCPB should compile a Soft Schedule of GHG Reduction Actions for developers to implement at the planning stage of their project from the List of Actions and induce developers to implement some of these Actions by utilizing incentive policies such as tax abatement, density bonuses, expedited permitting, and/or technical assistance. During this phase, Montgomery County should also request that developers voluntarily quantify and report the GHG emissions associated with their project plan. In the second phase, MCPB should use the reported data to enhance the GHG Reduction Actions in the List of Actions and compile the actions that are best suited to achieving MCPB’s CPP goals into a Hard Schedule. MCPB should set a minimum level of points that developers must obtain and then incentivize them to implement Reduction Actions above the minimum threshold using the same incentive policies considered for the Soft Schedule. Further, the Group recommends that MCPB consider using a “feebate” mechanism to simultaneously incentivize the implementation of GHG Reduction Actions above the minimum and assess a fee on those that do not meet the minimum.

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<sup>64</sup> Maryland Annotated Code, Natural Resources Article, §1–301

A second mechanism that MCPB should consider for offsetting fees is Off-site Reductions. However, on-site reductions – such as those included in the List of Actions – should be given priority over off-site reductions and MCPD should evaluate additional considerations before pursuing this mechanism.

*2. Consider the following suggestions for constructing the GHG Reduction Schedule:*

When constructing the Soft and Hard GHG Reduction Schedules MCPB should:

- Focus on including GHG Reduction Actions that actually reduce emissions such as the 16 that the Group has selected based on their ability to meet certain criteria in the List of Actions and are included in Appendix C.
- Begin with a voluntary schedule and provide incentive policies for compliance.
- Develop a suite of schedules that are tailored to the specific types of development.
- Consider special exclusions to the program based on local needs such as a size minimum.
- Encourage participation and compliance beyond minimal requirement or threshold.
- Consider Montgomery County budget constraints.
- Ensure actions included in the Soft and Hard Schedules address CPP goals.

*3. Consider the following suggestions for developing the GHG Emissions Quantification and Reporting System:*

Reporting System- Montgomery County should model its methodology for collecting data on emissions reductions from GHG Reduction Actions in the Soft Schedule after King County's worksheet. This information will inform the Hard Schedule. King County's worksheet is preferable because it is tailored to the county level and already addresses the three emissions categories that MC is concerned with: embodied, energy usage, and transportation. Although MC staff would have to update the data used in the worksheet formulas indefinitely, it is a useful model that is ready to use.

Quantification System- Montgomery County should follow Massachusetts' example by reviewing and approving software for developers to utilize software when quantifying GHG emissions from re/development. It appears Massachusetts is introducing its developers to the process of calculating GHG emissions with an eye toward GHG regulation in the future. This method of introduction and acclimation to GHG emission quantification and reporting is a practical and intelligent step toward GHG emission regulation during re/development. Massachusetts' approach is preferable because it allows private software/consulting firms to update methodology instead of relying on King County or burdening MC staff with staying abreast of the latest numbers and formulas. Once sufficient data has been collected, MC can issue a Hard Schedule based on the county's emissions and attach the incentive policies it deems best suited to induce developers' compliance.

Seek Authority to Mandate Quantification and Reporting- Montgomery County should determine whether it can require GHG quantification and reporting for re/development under MEPA as has King County and Massachusetts. Obtaining all GHG emissions data from re/development would inform the suitability of the GHG Reduction Actions in the List of Actions to a much greater extent than if MCPD were only to receive data from developers who participated in the incentive policies program.

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## Appendix A

### Tax Abatement

#### Cincinnati, OH

On December 12, 2007, the Cincinnati City Council adopted Ordinance 446-2007, amending Ordinance 182-2007 and providing an automatic 100% real property tax exemption of the assessed property value for newly-constructed or rehabilitated commercial or residential properties that earn a minimum of LEED Certified. Buildings that earn LEED Certified, Silver or Gold can receive a real property tax abatement up to \$500,000, with no limit for LEED Platinum buildings. The property tax exemption period is 15 years for new residential, commercial, or industrial buildings; 12 years for renovated commercial and industrial buildings and renovated residential buildings with 4 or more units; and 10 years for renovated residential buildings with 1-3 units.

[http://city-egov.cincinnati-oh.gov/Webtop/ws/council/public/child/Blob/21605.pdf?rpp=-10&m=2&w=doc\\_no%3D'200701240'](http://city-egov.cincinnati-oh.gov/Webtop/ws/council/public/child/Blob/21605.pdf?rpp=-10&m=2&w=doc_no%3D'200701240')

#### Harris County, TX

On May 20, 2008, the Harris County Commissioners Court adopted an ordinance establishing a partial tax abatement for costs incurred by developers to certify buildings with the U.S. Green Building Council. Buildings that meet the Certified level would be eligible for tax abatements of 1 percent of the construction costs. Buildings with higher ratings would get higher discounts with buildings that meet the platinum certification level eligible for tax abatements of 10 percent of the construction costs.

<http://www.co.harris.tx.us/CmpDocuments/103/Economic%20Development/2008-05-20%20Approved%20Tax%20Abatement%20Guidelines.pdf>

#### Chatham County, GA

In May, 2006, the Board of Commissioners of Chatham County passed an ordinance (page 79-85) amending Chapter 7 of the county code that gives full property state and county tax abatement for commercial buildings achieving LEED Gold certification for the first five years, then tapering off by 20% each year until the tenth year. Qualifying projects are new or expanding businesses in an enterprise zone that increase employment opportunities.

[http://www.chathamcounty.org/Chatham/uploads/Agn2006/m2006\\_05\\_12.PDF](http://www.chathamcounty.org/Chatham/uploads/Agn2006/m2006_05_12.PDF)

### Density Bonus

#### Brookhaven, NY

On May 1, 2007, the Brookhaven Town Board adopted Green Building/LEED Standards for New Large Commercial Retailer Development requiring all new commercial shopping centers 125,000 sq ft and larger to obtain a green building permit. The policy also established a density bonus of a 1% increase in floor area ratio (FAR) per level of LEED certification achieved.

<http://www.brookhaven.org/TownCalendar/tabid/55/ctl/ViewEvent/mid/610/EventId/257/EventDate/20070501/Default.aspx> (open the Decisions document and scroll down to page 3)

#### Kearny, NJ

On September 11, 2007, the Kearny Town Council adopted Ordinance 54, requiring all new municipal buildings to earn a minimum of LEED Silver certification. The ordinance also offers density bonuses to private redevelopment projects that earn LEED certification: an additional 0.3 FAR (Floor Area Ratio) or 3 additional dwelling units per acre for LEED Platinum; an additional 0.25 FAR or 2 additional dwelling

units per acre for LEED Gold; an additional 0.2 FAR or 1 additional dwelling unit per acre for LEED Silver; an additional 0.15 FAR or 0.5 additional dwelling units per acre for LEED Certified.

<https://www.usgbc.org/ShowFile.aspx?DocumentID=4447>

### **Pittsburgh, PA**

On November 26, 2007, the Pittsburgh City Council approved an amendment to The Pittsburgh Code entitled “Sustainable Development Bonuses,” granting a density bonus of an additional 20% Floor Area Ratio and an additional variance of 20% of the permitted height for all projects that earn LEED for New Construction or LEED for Core and Shell certification. The bonus is available in all nonresidential zoning districts.

<http://legistar.city.pittsburgh.pa.us/detailreport/Reports/Temp/48200916593.pdf>

### **Seattle, WA**

On April 12, 2006, Mayor Nickels signed new downtown zoning legislation. The complex package of regulations, adopted by City Council April 3, updates rules for the central office core and adjoining areas, including Denny Triangle and a portion of Belltown. Changes in the new regulations were made to provide greater heights and/or greater floor area for commercial and residential buildings. To gain greater height or density, projects must achieve a LEED™ Silver rating, as well as contribute to affordable housing and other public amenities. The zoning changes also offer greater transferable development rights for historic structures.

[http://www.seattle.gov/dpd/stellent/groups/pan/@pan/@sustainableblding/documents/web\\_informat\\_ional/dpdp\\_018423.pdf](http://www.seattle.gov/dpd/stellent/groups/pan/@pan/@sustainableblding/documents/web_informat_ional/dpdp_018423.pdf)

## **Expedited Permitting**

### **San Mateo County, CA**

On February 26, 2008, the San Mateo County Board of Supervisors adopted Ordinance 04411, requiring all new commercial and industrial buildings and building additions over 3,000 sq ft to be LEED Certified. The Ordinance further provides expedited permitting for projects earning a minimum of LEED Silver certification. The ordinance also requires all new residential buildings to earn LEED for Homes Certified or earn 50 Green Points on the appropriate GreenPoint Rated checklist, with expedited permitting available to LEED for Homes certified projects and projects GreenPoint Rated at 75 points or higher.

[http://www.co.sanmateo.ca.us/vgn/images/portal/cit\\_609/9/47/1243662796green%20building%20ordinance.pdf](http://www.co.sanmateo.ca.us/vgn/images/portal/cit_609/9/47/1243662796green%20building%20ordinance.pdf)

### **Los Altos Hills, CA**

On October 9, 2008, the Los Altos Hill Town Council adopted an ordinance requiring all new municipal building over 1,000 sq ft to achieve at minimum LEED Certification. New residential projects and major additions must achieve LEED Certification under LEED for Homes or 50 points on the GreenPoint checklist. Residential projects that achieve LEED Silver certification shall qualify for expedited building plan review. Residential projects that achieve LEED Gold certification shall qualify for guaranteed building inspections within two working days of a request for inspection. Residential projects that achieve LEED Platinum shall receive a customized plaque recognizing the special achievement.

[http://www.losaltoshills.ca.gov/documents/city\\_council\\_meetings/2008/LAH\\_City\\_Council\\_2008-10-09/LAHCC\\_20081009\\_AI04.pdf](http://www.losaltoshills.ca.gov/documents/city_council_meetings/2008/LAH_City_Council_2008-10-09/LAHCC_20081009_AI04.pdf) (scroll down to page 2)

### **Dallas, TX**

On April 10, 2008 the City of Dallas adopted a green building ordinance requiring energy and water efficiency improvements for new residential and commercial buildings. Starting in October of 2009 and

prior to 2011, new residential construction must submit a residential green building checklist (LEED for Homes, GreenPoint Rated, Green Communities, GreenBuilt North Texas or equivalents) and new commercial construction greater than 50,000 sq feet must attempt a number of priority LEED credits. Expedited permitting is available for all covered projects. After 2011, all new residential and commercial construction must submit a complete scorecard for one of the approved rating systems.

<https://www.usgbc.org/ShowFile.aspx?DocumentID=4046>

### **Chandler, AZ**

On June 26, 2008, the Chandler City Council adopted Resolution #4199, requiring that all new municipal buildings over 5,000 sq ft earn LEED Silver certification and that all renovations of municipal buildings over 5,000 sq ft follow LEED guidelines. The Resolution also provides for expedited plan review for private developments that register with the intent to certify at LEED Silver or better. The resolution further offers LEED certification fee reimbursements: 50% for LEED Certified and LEED Silver projects; 100% for LEED Gold and LEED Platinum projects. Projects that earn a minimum of LEED Certified will also be recognized in various ways by the City of Chandler, including inclusion on the Chandler Green Building Program Participant list and signage recognizing the building as being green.

[http://www.chandleraz.gov/Content/20080626\\_15.pdf](http://www.chandleraz.gov/Content/20080626_15.pdf) (scroll down to page 10)

## **Technical Assistance**

### **Seattle, WA**

The City of Seattle's Green Building Program cut its teeth on City-owned green facilities, starting in 2000. We're now taking what we learned from this experience and sharing it with others. With leadership from Mayor Greg Nickels, our program evolved in 2006 to include a greater focus on greening all of Seattle's built environment. Our newly consolidated program, called CITY Green Building, is located within the Seattle Department of Planning and Development (DPD). Our new structure allows us to better serve the private sector, and to capture green building opportunities with more permitted construction projects.

<http://www.seattle.gov/dpd/GreenBuilding/OurProgram/Overview/default.asp>



## Appendix B

Documents mentioned in the main text that are available for additional research and information.

- Portland, Oregon feebate- Provides more detailed information on the feebate:  
<http://www.portlandonline.com/osd/index.cfm?c=45879&a=220879>
- 2009 Green Points Guideline Booklet- Provides more detailed information on the Boulder, Colorado Green Building and Green Points program, including more detailed information on the option to obtain points in the Green Points schedules:  
[http://www.bouldercolorado.gov/files/PDS/green\\_points/902\\_gp\\_guideline\\_booklet\\_2\\_12\\_09.pdf](http://www.bouldercolorado.gov/files/PDS/green_points/902_gp_guideline_booklet_2_12_09.pdf)
- [Austinenergy.com](http://www.austinenergy.com)- Provides more detailed information on the Austin Green Building program:  
<http://www.austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/index.htm>
- Guide to the Single-Family Home Rating- Provides more detailed information on the actions included in the Austin, Texas single-family rating tool:  
<http://austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/Participation/aegbMultifamilyGuidebook.pdf>.
- Multifamily Guidebook- Provides more detailed information on the actions included in the Austin, Texas multifamily rating tool:  
<http://austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/Participation/aegbMultifamilyGuidebook.pdf>.
- Commercial Guidebook- Provides more detailed information on the actions included in the Austin, Texas commercial rating tool:  
<http://austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/Participation/aegbCommercialGuidebook.pdf>.
- Austin, Texas rating forms:
  - Single-family:  
<http://austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/Participation/aegbResidentialRating.pdf>.
  - Multifamily:  
<http://austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/Participation/participationFormsAndGuides.htm>.
  - Commercial:  
<http://austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/Participation/participationFormsAndGuides.htm>.
- Additional information on City of West Hollywood, CA Green Building Program:  
<http://www.weho.org/index.cfm/fuseaction/DetailGroup/navid/53/cid/4493/>

## Appendix C

### List of Actions

The Group found four examples of U.S. cities that have implemented robust sustainable development programs. The four Green Building Programs examined – Boulder, CO; Austin, TX; West Hollywood, CA; and Scottsdale, AZ – include concrete actions that reduce GHG emissions, making them suitable for inclusion in this evaluation. However, these cities do not identify or quantify the GHG emissions reduced by these actions.

To evaluate which actions were suitable for MCPB to utilize in their GHG Reduction Schedule, the Group first identified actions from these example programs that developers in the County could perform during re/development. Next the Group identified each GHG Reduction Actions' ability to reduce GHG emissions, or GHG Reduction Value, based on its ability to: reduce or eliminate carbon-based electricity, reduce vehicular GHG emissions, sink GHGs through reforestation, or conserve embodied GHGs. To further establish the suitability of the action for the GHG Reduction Schedule, the Group determined whether the action related to activities listed in the LEED ND schedule. If it did, the relevant LEED ND schedule item was provided. Point values assigned to each action in the specific city program and, if applicable, the LEED ND schedule was provided so that Montgomery County can refer to this in the future when making decisions about what point value to assign to Reduction Actions. Finally, the Group determined whether the action fulfilled a recommendation in the CPP. As with the LEED ND comparison, if the action fulfilled a CPP recommendation, that recommendation was listed. This raw data is shown in Table 2 of Appendix C.

Further, the Group selected 13 Reduction Actions that appear on at least two of the four city schedules and address a recommendation identified in the Climate Protection Plan. And, 3 more Reduction Actions that, while they do not address a recommendation identified in the CPP, appear on three or four of the city schedules. Together, these 16 Reduction Actions (shown in Table 1 of Appendix C) are the Group's recommendation to Montgomery County for initial inclusion on the Soft Schedule. However, Montgomery County should also review all Reduction Actions included in Table 1 as there are undoubtedly additional actions that would meet County needs and provide developers with flexibility in obtaining a point threshold which is key to a program such as this one.

Appendix C: Key

**KEY**

**GHG Reduction Values**

electricity	reduce/eliminate carbon-based electricity
autos	reduce vehicular GHG emissions
reforestation	reforestation sinks GHG emissions
conservation	conservation of embodied CO2 prevents GHG emissions

Recommendation	Category	Code	GHG Reduction Value
Adopt <b>building design guidelines</b> applicable to all County government and agency buildings requiring the use of <b>geoexchange</b> , or the most effective system available, as the primary heating and cooling energy source.	Renewable Energy	RE-2	electricity
Support the <b>installation of solar photovoltaic systems</b> through the use of power purchase agreements in public facilities.	Renewable Energy	RE-3	electricity
The County should <b>facilitate customer aggregation of renewable energy</b> , including voluntary purchases of electricity from renewable sources or renewable energy certificates, and <b>renewable energy installations</b> .	Renewable Energy	RE-5	electricity
Develop <b>energy efficiency programs</b> , in coordination with State and utility-based programs, to <b>assist low income households address their energy needs</b> .	Residential Building Energy Efficiency	EER-2	electricity
Enhance consumer awareness of energy consumption by advocating for <b>utility programs that provide home-energy consumption displays</b> and develop other County programs to increase <b>availability and affordability of in-home energy displays</b> .	Residential Building Energy Efficiency	EER-3	electricity
Promote the deployment of <b>smart grid technologies by utilities</b> serving Montgomery County.	Residential Building Energy Efficiency	EER-6	electricity
Require <b>ENERGY STAR appliances and equipment</b> , and EPEAT registered IT equipment, in public facilities.	Commercial, Multi-family, and Public Building Energy Efficiency	EEC-1	electricity
Use <b>energy efficient lighting</b> technologies when installing new streetlights or replacing existing streetlights.	Commercial, Multi-family, and Public Building Energy Efficiency	EEC-8	electricity

Recommendation	Category	Code	GHG Reduction Value
Establish a <b>car sharing program</b> in Parking Lot District facilities	Transportation	T-2	autos
Identify <b>pedestrian improvements</b> to maximize walking and bicycling to recreation centers, libraries, shopping centers and schools.	Transportation	T-5	autos
<b>Plan, design and construct bicycle paths</b> , lanes and shared signed roadways, as well as facilities supporting bicycling, to encourage increased use of bicycling for commuting and other transportation needs.	Transportation	T-6	autos
Extend the County's current <b>property tax credit for energy conservation and renewable energy measures to include tree planting.</b>	Forestry & Agriculture	F&A-4	reforestation
Create <b>landscape incentives</b> in urban areas to increase number, quality, and survivability of trees planted in the public right-of-way and on private property.	Forestry & Agriculture	F&A-5	reforestation
Increase shade tree planting and maintenance in public and private parking lots.	Forestry & Agriculture	F&A-6	reforestation
The County's <b>Growth Policy should direct growth to areas with significant existing or planned transit resources</b> , and promote development that fulfills smart growth criteria such as those required as part of the LEED) for Neighborhood Development or more s	Land Use & Planning	LUP-1	autos
Master Plans should plan for redevelopment to create <b>compact, livable places</b> with a variety of housing types and mixed uses that invite people to walk or bike safely to work, to shop, and to participate in community life without a long commute by car. The	Land Use & Planning	LUP-3	autos; conservation
A <b>Green Infrastructure Plan</b> should be adopted to <b>protect an interconnected network of forests, fields and wetlands</b> and provide priorities for <b>protection, restoration and mitigation of loss of natural resources.</b> This plan will be considered in master plans	Land Use & Planning	LUP-4	conservation

Appendix C: Table 1 – Recommended Actions for the Soft Schedule from the List of Actions

Reduction Action	Relevance to Re/development	GHG Reduction Value	LEED ND Practice	Climate Protection Plan - Recommendation Code	Boulder	Austin	West Hollywood	Scottsdale
<b>Site Specific</b>								
Save mature trees/Plant new trees	Conserve/enhance habitat	conservation	Conservation of wetlands/farmland/ecological species conservation	LUP-4	x		x	
Plant new shade trees	Conserve/enhance habitat	reforestation	Restoration of habitat or wetlands	F&A-6	x		x	
<b>Energy Efficiency</b>								
Wall insulation	Implement/increase energy efficiency	electricity	Building energy efficiency		x	x	x	x
Ceiling insulation	Implement/increase energy efficiency	electricity	Building energy efficiency		x	x	x	x
Energy Star advanced lighting	Implement/increase energy efficiency	electricity	Building energy efficiency	EEC-1	x	x	x	x
Efficient light controls	Implement/increase energy efficiency	electricity	Building energy efficiency	EEC-1	x	x	x	x
Energy Star appliances	Implement/increase energy efficiency	electricity	Building energy efficiency	EEC-1	x	x	x	x
Energy Star programmable thermostat	Implement/increase energy efficiency	electricity	Building energy efficiency	EER-3		x	x	x
Water heater meets at least one of the following: 1. Gas- minimum Energy Factor 2. Gas tankless 3. Solar thermal 4. Gas boilers are Energy Star labeled	Implement/increase energy efficiency	electricity	Building energy efficiency	EEC-1	x	x	x	x
Exceed Minimum state requirement or International Energy code	Implement/increase energy efficiency	electricity	Building energy efficiency	EEC-3		x	x	x
Install Energy Star programmable thermostat	Implement/increase energy efficiency	electricity	Building energy efficiency	EEC-1		x	x	x
Install a minimum number of ceiling fans	Implement/increase energy efficiency	electricity	Building energy efficiency			x	x	x
<b>Renewable Energy</b>								
Passive solar heating design	Install renewable energy generation technology	electricity	Solar orientation	RE-5	x	x	x	
Solar thermal hot water systems	Install renewable energy generation technology	electricity	Solar orientation	RE-5	x		x	
Pre-plumb for solar thermal system	Install renewable energy generation technology	electricity	Solar orientation	RE-5	x		x	
Active solar electric system	Install renewable energy generation technology	electricity	Solar orientation	RE-5	x	x		x

Appendix C: Table 2 – List of Actions

Reduction Action	Green Building Program	Program Points Value	Relevance to Re/development	GHG Reduction Value	LEED ND Practice	LEED ND Points Value	Climate Protection Plan - Recommendation Code
<b>Boulder- New Construction</b>							
Demonstrate energy efficiency using Home Rating System (HERS)	Boulder	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Save mature trees	Boulder	5 (1 per tree)	Conserve/enhance habitat	conservation	Conservation of wetlands/farmland/ecological species conservation	Prerequisite	LUP-4
Plant new shade trees	Boulder	5 (1 per tree)	Conserve/enhance habitat	reforestation	Restoration of habitat or wetlands	1	F&A-6
Insulated headers	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Energy efficient roof trusses	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
HVAC ducts within conditioned spaces	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Structural Insulated Panels (SIPs)	Boulder	Up to 8	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Locally sourced materials	Boulder	2	Utilize local products	conservation	Regional priority credit	4	
<b>Boulder- Additions and Remodels</b>							
Demonstrate energy efficiency using Home Rating System (HERS)	Boulder	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Demonstrate project meets requirements of IECC	Boulder	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Energy audit	Boulder	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Lighting efficiency	Boulder	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Direct vent furnace	Boulder	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Direct vent boiler	Boulder	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Save mature trees	Boulder	5 (1 per tree)	Conserve/enhance habitat	conservation	Conservation of wetlands/farmland/ecological species conservation	Prerequisite	LUP-4
Plant new shade trees	Boulder	5 (1 per tree)	Conserve/enhance habitat	reforestation	Restoration of habitat or wetlands	1	F&A-6
Wall insulation	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Ceiling insulation	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Basement/foundation insulation	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Insulated pre-cast concrete foundation	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Insulated pre-cast forms	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	

Reduction Action	Green Building Program	Program Points Value	Relevance to Re/development	GHG Reduction Value	LEED ND Practice	LEED ND Points Value	Climate Protection Plan - Recommendation Code
Windows R-value	Boulder	Up to 5	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Windows SHGC	Boulder	Up to 5	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Air sealing	Boulder	2-5	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
HVAC commissioning	Boulder	3	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Ground source heat pump	Boulder	Up to 10	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Direct vent space/water heating	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Energy Star boiler	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Zoned hydronic radiant heating	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Passive cooling	Boulder	2-5	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Whole house fan	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Evaporative cooling system	Boulder	3	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Tankless water heater	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Point-of-use water heater	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Energy Star advanced lighting	Boulder	5	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Efficient light controls	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Energy Star appliances	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Passive solar heating design	Boulder	Up to 12	Install renewable energy generation technology	electricity	Solar orientation	1	RE-5
Solar thermal hot water systems	Boulder	8	Install renewable energy generation technology	electricity	Solar orientation	1	RE-5
Solar thermal heated pool/spa	Boulder	3	Install renewable energy generation technology	electricity	Solar orientation	1	RE-5
Pre-plumb for solar thermal system	Boulder	2	Install renewable energy generation technology	electricity	Solar orientation	1	RE-5
Active solar electric system	Boulder	Up to 12	Install renewable energy generation technology	electricity	Solar orientation	1	RE-5

Reduction Action	Green Building Program	Program Points Value	Relevance to Re/development	GHG Reduction Value	LEED ND Practice	LEED ND Points Value	Climate Protection Plan - Recommendation Code
Pre-wire for future active solar	Boulder	2	Install renewable energy generation technology	electricity	Solar orientation	1	RE-3, RE-5
Insulated headers	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Energy efficient roof trusses	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
HVAC ducts within conditioned spaces	Boulder	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Structural Insulated Panels (SIPs)	Boulder	Up to 8	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Locally sourced materials	Boulder	Up to 10	Utilize local products	conservation	Regional priority credit	4	
<b>Austin- Single-Family</b>							
Energy-efficient home design	Austin	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Cooling and heating equipment minimum efficiency for split systems	Austin	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Window efficiency	Austin	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Wall insulation	Austin	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Floor insulation over ambient or unconditioned space	Austin	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Gas water heater minimum efficiency	Austin	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
A minimum of 75% of all lamps/bulbs are Energy Star-compliant	Austin	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Public transit stop is within 1/4 mile walk	Austin	2	Reduce vehicular transportation/transportation emissions	autos	Reduced automobile dependence	7	LUP-1
Grocery store is within a 1/2 mile walk	Austin	2	Reduce vehicular transportation/transportation emissions	autos	Compact development	6	LUP-3
Public hike and bike trail, green belt, or park is within 1/2 mile walk	Austin	2	Reduce vehicular transportation/transportation emissions	autos	Diversity of uses	4	LUP-3
Energy-efficient design allows for minimum of 600 sqft of living space per ton of cooling if home is 1500 sqft of larger	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Energy-efficient design allows for minimum of 700 sqft of living space per ton of cooling if home is 1500 sqft of larger	Austin	3	Implement/increase energy efficiency	electricity	Building energy efficiency	2	



Reduction Action	Green Building Program	Program Points Value	Relevance to Re/development	GHG Reduction Value	LEED ND Practice	LEED ND Points Value	Climate Protection Plan - Recommendation Code
Energy-efficient design allows for minimum of 800 sqft of living space per ton of cooling if home is 1500 sqft of larger	Austin	4	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Indoor cooling equipment is located within the thermal envelope	Austin	3	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
All duct work is located within the thermal envelope OR home has no duct work	Austin	5	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
All water heaters in 1-story home located within 20 piped feet of appliance or fixtures they serve; 30 piped feet for 2-story	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
No fireplace located within conditioned space	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Windows designed for daylighting	Austin	3	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Designed, effective cross-ventilation in main living areas	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Designed, effective stack ventilation	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Shading on east and west walls of living space for at least 50% of wall area	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Total glazing area is no greater than 18% of conditioned floor area	Austin	3	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Glazing on east and west walls combined do not exceed 25% of total glazing area; glazing on west wall does not exceed 10% of west wall and glazing on east wall does not exceed 10% of east wall	Austin	5	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
No skylights into conditioned space	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Conditioned space: maximum of 1,500 sqft	Austin	3	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Conditioned space: maximum of 1,200 sqft	Austin	4	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Conditioned space: maximum of 900 sqft	Austin	5	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Windows U-value of 0.51 or lower	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Glazing has a SHGC of 0.30 or lower	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Roofing meets requirements of Energy Star; minimum ten-year warranty	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	

Reduction Action	Green Building Program	Program Points Value	Relevance to Re/development	GHG Reduction Value	LEED ND Practice	LEED ND Points Value	Climate Protection Plan - Recommendation Code
Blower door test performed and results in envelope leakage no greater than 0.40	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Greater than or equal to R-2 insulation of all water lines located outside the thermal envelope and in exterior walls	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Push-button on-demand hot water recirculation system	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Whole-house, ductless, mini-split heating and cooling system	Austin	5	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Gas furnace is sealed-combustion/direct-vent model	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Hydronic space heat is supplied by gas water heater or is solar-assisted	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Ductwork system is masked/sealed at supplies and returns during construction	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Energy Star programmable thermostat	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EER-3
Air distribution system leakage no greater than 5%	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Ceiling fans in all bedrooms	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Whole-house fan with insulated cover	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Recessed-can lighting fixtures do not break through the thermal envelope or no recessed-can fixtures are installed	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Energy Star Advanced Lighting Package requirements	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Energy Star-qualified fixtures- 5 from the following list: appliances, light fixtures/luminaires, ceiling fans, and or ventilation fans	Austin	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
A minimum of 90% of lamps/bulbs are Energy Star-compliant	Austin	3	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
All exterior lighting has motion detectors with photocell controllers or is solar-powered	Austin	1	Install renewable energy generation technology	electricity	Solar orientation	1	RE-3
Solar PV power system installed: 1.5kW minimum	Austin	5	Install renewable energy generation technology	electricity	Solar orientation	1	RE-3
A minimum of 1.5 kW additional solar PV installed (in addition to above)	Austin	2	Install renewable energy generation technology	electricity	Solar orientation	1	RE-3

Reduction Action	Green Building Program	Program Points Value	Relevance to Re/development	GHG Reduction Value	LEED ND Practice	LEED ND Points Value	Climate Protection Plan - Recommendation Code
<b>Austin- Multifamily</b>							
Provide covered bicycle parking for 15% of residents and permanent building occupants and provide a safe path from property entrance to bike parking	Austin	Mandatory	Reduce vehicular transportation/transportation emissions	autos	Bicycle network and storage	1	T-6
Buildings 4-6 stories above grade: Exceed the current Austin Energy Building Envelope requirement	Austin	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Residential buildings 3 stories or less above grade: Meet one of the following options: 1. Exceed the current Austin Energy Code's Building Envelope require	Austin	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Dwellings: At least 50% of all indoor lamps in high use areas are Energy Star-compliant high efficacy lamps OR install 3 Energy Star fixtures in high use area. High use area include kitchen, dining room, living room, family room, bedroom, bathroom, and ha	Austin	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Main building entrance is located within 1/4 mile of the stops for at least two Capital Metro bus lines or within 1/2 mile of a rail stop	Austin	1	Reduce vehicular transportation/transportation emissions	autos	Reduced automobile dependence	7	LUP-1
Site meets one of the following: 1. Vegetated open-grid pavement system 2. Locate 50% of parking underground or in structured parking 3. High albedo paving materials on at least 30% of non-roof impervious surfaces 4. Vegetative shading of at least 30% of	Austin	1	Conserve/enhance habitat	conservation	Conservation management of habitat or wetlands	1	LUP-4
Buildings 4-6 stories must exceed current code building by 17.5% or better. Residential buildings three stories or less may use Energy Gauge USA to demonstrate above the code savings.	Austin	12	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Schedule lists several roofing, ductwork, and envelope choices. Include 1 item from roofing, 2 items from ductwork, and 1 item from envelope.	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	

Reduction Action	Green Building Program	Program Points Value	Relevance to Re/development	GHG Reduction Value	LEED ND Practice	LEED ND Points Value	Climate Protection Plan - Recommendation Code
Schedule lists several roofing, ductwork, and envelope choices. Include 2 items from roofing, 3 items from ductwork, and 1 item from envelope.	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Schedule lists several roofing, ductwork, and envelope choices. Include 3 items from roofing, 4 items from ductwork, and 2 items from envelope.	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Dwellings served by split or individual systems: 14 SEER OR Chillers: 10% better than code OR Water-source heat pumps: 10% better than code	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Water heater meets at least one of the following: 1. Gas- minimum Energy Factor 2. Gas tankless 3. Solar thermal 4. Gas boilers are Energy Star labeled	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Gas furnaces are Energy Star labeled. If gas is not available, Energy Star is labeled.	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Ceiling fans installed in all main rooms and bedrooms AND fans are Energy Star-compliant	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
75% of all indoor lamps are Energy Star-compliant high efficacy lamps	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
100% of all indoor lamps are Energy Star-compliant high efficacy lamps	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
100% of all indoor fixtures are Energy Star-compliant	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
10-year GreenChoice commercial agreement for 100% of building's electricity use. If GreenChoice subscriptions are unavailable, 2-year contract for Texas or Green e-certified National RECs for 100% of building's annual electricity use.	Austin	1	Install renewable energy generation technology	electricity	Building energy efficiency	2	RE-5
10 kW minimum or generate 25% of annual kWh usage- renewable energy	Austin	1	Install renewable energy generation technology	electricity			RE-5
15 kW minimum or generate 50% of annual kWh usage- renewable energy	Austin	1	Install renewable energy generation technology	electricity			RE-5
20 kW minimum or generate 75% of annual kWh usage- renewable energy	Austin	1	Install renewable energy generation technology	electricity			RE-5
Greater than 20 kW minimum or generate more than 90% of annual kWh usage- renewable energy	Austin	1	Install renewable energy generation technology	electricity			RE-5
Tie into Austin's district cooling loop for all HVAC energy needs	Austin	1	Implement/increase energy efficiency	electricity	District heating and cooling	2	
Energy Star-labeled refrigerators	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Energy Star-labeled dish washers	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1

Reduction Action	Green Building Program	Program Points Value	Relevance to Re/development	GHG Reduction Value	LEED ND Practice	LEED ND Points Value	Climate Protection Plan - Recommendation Code
Energy Star-labeled clothes washers	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Central laundry site participates in COA Water Conservation Multifamily Rebate program for coin-operated equipment AND equipment is Energy Star listed.	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Common space exterior lighting is controlled by automatic daylight controls or controlled by an astronomical time switch in series with a photo sensor.	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
The development does not include clothes washer hook-ups in dwellings.	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Provide adequate daylighting and integrate daylighting systems with electric lighting systems and controls.	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Texas sourced materials for at least 30% of project building materials	Austin	1	Utilize local products	conservation	Regional priority credit	4	
Texas sourced materials for at least 50% of project building materials	Austin	1	Utilize local products	conservation	Regional priority credit	4	
<b>Austin- Commercial</b>							
Exceed current City of Austin Energy Code Building Interior Lighting and Envelope requirements by 15% each or exceed code building performance by 15%.	Austin	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Building(s) connected with neighboring properties with pedestrian and/or bicycle only paths that are separate from vehicular traffic. Project includes or is located within 1/2 mile walking distance of residences and at least 10 Basic Services which are ac	Austin	1	Reduce vehicular transportation/transportation emissions	autos	Bicycle network and storage	1	T-6
Locate building within 1/4 of at least 2 bus stops or within 1/2 mile of a rail stop.	Austin	1	Reduce vehicular transportation/transportation emissions	autos	Reduced automobile dependence	7	LUP-1
Bicycle securing areas and shower/changing facilities for 10% or more of the building occupants. One bicycle parking space per rider, one shower per 25 riders, temporary lockers, and safe routing on property.	Austin	1	Reduce vehicular transportation/transportation emissions	autos	Bicycle network and storage	1	T-6

Reduction Action	Green Building Program	Program Points Value	Relevance to Re/development	GHG Reduction Value	LEED ND Practice	LEED ND Points Value	Climate Protection Plan - Recommendation Code
Parking does not exceed minimum local zoning requirements. Preferred parking for carpools for min. 5% of building occupants.	Austin	1	Reduce vehicular transportation/transportation emissions	autos	Reduced automobile dependence	7	
Install any combination of vegetated and reflective roofs.	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Exceed current building code by 17.5% or better.	Austin	12	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
GreenChoice commercial agreement. If GreenChoice subscriptions are unavailable, 2-year contract for Texas or Green e-certified National RECs for 100% of building's annual electricity use.	Austin	1	Implement/increase energy efficiency	electricity			RE-5
On-site renewable energy system for 2% of energy needs.	Austin	1	Install renewable energy generation technology	electricity			RE-5
On-site renewable energy system for 5% of energy needs.	Austin	1	Install renewable energy generation technology	electricity			RE-5
Tie into Austin's district cooling loop for all HVAC energy needs	Austin	1	Implement/increase energy efficiency	electricity	District heating and cooling	2	
Provide adequate daylighting and integrate daylighting systems with electric lighting systems and controls.	Austin	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Texas sourced materials for at least 30% of project building materials	Austin	1	Utilize local products	conservation	Regional priority credit	4	
Texas sourced materials for at least 50% of project building materials	Austin	1	Utilize local products	conservation	Regional priority credit	4	
<b>West Hollywood</b>							
Preserve existing trees over 6" in diameter	West Hollywood	3 (1 per tree)	Conserve/enhance habitat	conservation	Conservation of wetlands/farmland/ecological species conservation	Prerequisite	LUP-4
Plant deciduous canopy trees on exposed west or south elevations	West Hollywood	5 (1 per tree)	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Provide narrow floor plates and/or courtyards to enable natural ventilation	West Hollywood	5	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Provide operable windows to enable natural cross ventilation	West Hollywood	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Install exterior shading devices on south and west facing windows	West Hollywood	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Provide ceiling fans	West Hollywood	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	

Reduction Action	Green Building Program	Program Points Value	Relevance to Re/development	GHG Reduction Value	LEED ND Practice	LEED ND Points Value	Climate Protection Plan - Recommendation Code
Eliminate air conditioning	West Hollywood	3	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Insulate full length of all hot water pipes	West Hollywood	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Install low flow showerheads	West Hollywood	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Install water efficient kitchen and bathroom faucets	West Hollywood	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Install water efficient toilets	West Hollywood	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Install water efficient urinals	West Hollywood	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Install tankless water heaters	West Hollywood	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Install cellulose, cotton batt, bio-based foam in walls	West Hollywood	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Install cellulose, cotton batt, bio-based foam in ceilings	West Hollywood	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-3
Exceed Title 24 Energy code by 5 percent	West Hollywood	5	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-3
Exceed Title 24 Energy code by more than 5 percent	West Hollywood	15	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-3
Participate in Energy Star (residential) or Savings by Design (commercial) programs	West Hollywood	3	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Pre-plumb and provide conduit for solar heating	West Hollywood	1	Install renewable energy generation technology	electricity	Solar orientation	1	RE-3
Install solar water heating system domestic hot water	West Hollywood	2	Install renewable energy generation technology	electricity	Solar orientation	1	RE-3
Install solar water heating system for pool heating	West Hollywood	2	Install renewable energy generation technology	electricity	Solar orientation	1	RE-3
Install photovoltaic panels	West Hollywood	10	Install renewable energy generation technology	electricity	Solar orientation	1	RE-3
Install Energy Star lighting	West Hollywood	3	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Install Energy Star exit signs	West Hollywood	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1

Reduction Action	Green Building Program	Program Points Value	Relevance to Re/development	GHG Reduction Value	LEED ND Practice	LEED ND Points Value	Climate Protection Plan - Recommendation Code
Install Energy Star programmable thermostats	West Hollywood	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Install timer or photo sensor for exterior lights	West Hollywood	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Seal all ducts with mastic (residential) or install per SMACNA standards (commercial)	West Hollywood	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Install Energy Star or Cool Roof	West Hollywood	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
<b>Scottsdale- Residential</b>							
Building designed to be at least 30 percent above the 2006 International Energy Conservation Code or obtain Energy Star Home Certification	Scottsdale Res	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1/EEC-3
Provide on-site renewable energy power system with a peak electrical generating capacity of not less than 10 percent of the electrical service load. Provide on-site solar water heating system that provides not less than 80 percent of domestic hot water ne	Scottsdale Res	Mandatory	Install renewable energy generation technology	electricity	On site renewable	3	
Building has a continuous air/thermal barrier	Scottsdale Res	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Seal all penetrations and connections in building envelope	Scottsdale Res	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Size space heating and cooling system according to building heating and cooling loads calculated using ACCA Manual or equivalent	Scottsdale Res	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
All ductwork joints shall be sealed with water-based mastic	Scottsdale Res	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
All ducts shall be insulated and tested for duct leakage	Scottsdale Res	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Install Energy Star programmable thermostat	Scottsdale Res	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Install a minimum of three reversible, multi speed ceiling fans	Scottsdale Res	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
At least 80 percent of all interior lighting shall be either Energy Starr labeled fixtures or Energy Star labeled luminaries installed in conventional fixtures	Scottsdale Res	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Install Energy Star labeled water heaters and fully insulate hot water lines to minimum R-2 standard	Scottsdale Res	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Install a demand-controlled hot water circulation loop and pump when water heaters located more than 20 feet from furthest fixture served	Scottsdale Res	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Install Water Sense labeled toilets including dual-flush toilets in all bathrooms	Scottsdale Res	Mandatory	Implement/increase energy efficiency	electricity	Building energy efficiency	2	



Reduction Action	Green Building Program	Program Points Value	Relevance to Re/development	GHG Reduction Value	LEED ND Practice	LEED ND Points Value	Climate Protection Plan - Recommendation Code
Dwelling under 3000 feet	Scottsdale Res	1 point per 100 feet under 3000	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Dwelling over 3500 feet	Scottsdale Res	Neg 1 point per 250 feet over 3500	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Utility supplied power available throughout construction process (additional points for renewable power used throughout construction)	Scottsdale Res	1 (4)	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Dwelling designed to exceed 30 percent efficiency above IECC	Scottsdale Res	2 points per 5 percent above	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Participate in third party energy certificate program such as Energy Star Home	Scottsdale Res	6	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Energy Usage guarantee provided by builder	Scottsdale Res	6	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Insulation applied at roof sheathing	Scottsdale Res	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Roof system qualifies as Energy Star Roof	Scottsdale Res	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Blown in insulation used in walls, ceilings	Scottsdale Res	4	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
HVAC system zoned so that no more than two rooms are controlled by the same thermostat	Scottsdale Res	4	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Install "whole house" fan to cool house in hot months	Scottsdale Res	1	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Windows configured to allow for cross ventilation	Scottsdale Res	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Daylighting allows for natural light to enter home from two sides of rooms in at least 50 percent of liveable floor area	Scottsdale Res	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
80 percent of light fixtures have efficiency of 40 lumens per watt or more	Scottsdale Res	2	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
Maximum indoor lighting wattage does not exceed .5 watts per sq ft.	Scottsdale Res	3	Implement/increase energy efficiency	electricity	Building energy efficiency	2	

Reduction Action	Green Building Program	Program Points Value	Relevance to Re/development	GHG Reduction Value	LEED ND Practice	LEED ND Points Value	Climate Protection Plan - Recommendation Code
Dwelling has Energy Star appliances	Scottsdale Res	3 (1 per appliance)	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Dwelling has a roof area to accommodate future photovoltaic panels	Scottsdale Res	2	Install renewable energy generation technology	electricity	On site renewable	3	RE-3
Dwelling generates enough on-site power to be zero-net energy	Scottsdale Res	8	Install renewable energy generation technology	electricity	On site renewable	3	RE-5
All toilets are high efficiency at 1.1 gallons per flush	Scottsdale Res	3	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
All bathroom faucets and showerheads are high efficiency	Scottsdale Res	3	Implement/increase energy efficiency	electricity	Building energy efficiency	2	
<b>Scottsdale- Commercial</b>							
Locate building to encourage pedestrian access and pedestrian oriented uses	Scottsdale Comm	NA	Reduce vehicular transportation/transportation emissions	autos	Reduced automobile dependence	7	LUP-1
Use Energy Star compliant or other emissivity roofing	Scottsdale Comm	NA	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-1
Meet Minimum requirements of ASHRAE 90.1 or 2003 International Energy Conservation Code	Scottsdale Comm	NA	Implement/increase energy efficiency	electricity	Building energy efficiency	2	EEC-3
Supply at least 5 percent of the project's peak power demand through the use of on-site renewable energy (or provide at least 50 percent of project's electrical energy from renewable sources by engaging in at least a two year renewable energy contract) (Ad	Scottsdale Comm	NA	Install renewable energy generation technology	electricity	On site renewable	3	

## Appendix D

**Table 1: Required HERS Index Rating by Size**

Source: City of Boulder, Green building & green points application for new construction, 2009

Type of Project	Required HERS Index
New construction- up to 3,000 square feet	70
New construction- 3,001 to 5,000 square feet	60
New construction- 5,001 square feet and up	35
All multi-unit dwellings	70

**Table 2: Minimum Green Points Requirements  
(New Construction)**

Source: City of Boulder, Green building & green points application for new construction, 2009

Project Description	Points Requirement
Single Family- 1,501-3,000 square feet	20
Single Family- 3,001-5,000 square feet	40
Single Family- 5,001 square feet and up	60
Multi-Family- 1,001-2,000 square feet	10
Multi-Family- 2,001-3,000 square feet	20
Multi-Family- 3,001 square feet and up	30

**Table 3: New Construction Thresholds for Additions and Remodels**

Source: City of Boulder, Green building & green points application for additions and remodels, 2009

Total Area of Structure After Addition/Remodel	Percent of Existing Structure
500 to 3,000 square feet	100%
3,001 to 5,000 square feet	50%
5,001 square feet and up	25%

**Table 4: Remodels and Additions Energy Efficiency Thresholds**

Source: City of Boulder, Green building & green points application for additions and remodels, 2009

Total Area	Required HERS Index Rating for Entire Structure (if entire structure is made energy efficient)	Required Increased Efficiency Above IECC (if only addition or remodel is energy efficient)
Up to 3,000 square feet	100	15%
3,001-5,000 square feet	85	30%
5,001 square feet and up	70	50%

**Table 5: Minimum Green Points Requirements (Additions and Remodels)**

Source: City of Boulder, Green building & green points application for additions and remodels, 2009

Project Description	Points Requirement
Addition- 500-1,000 square feet	15
Addition- 1,001-2,000 square feet	20
Addition- 2,001-3,000 square feet	30
Addition- 3,001 square feet and up	45
Remodel- 500-1,000 square feet	10
Remodel- 1,001-2,000 square feet	15
Remodel- 2,001-3,000 square feet	20
Remodel- 3,001 square feet and up	30

**Table 6: Star Rating for Single-Family Homes**

Source: Austin Energy, Guide to the single-family home rating, 2009

Star Rating	Points Requirement
1 Star	0 Points- All basic requirements must be met to obtain 1 Star.
2 Star	50-74 points
3 Star	50-74 points plus special requirements
4 Star	75-99 points plus the 3 Star special requirements and additional special requirements
5 Star	100-124 points plus 3 and 4 Star special requirements and additional special requirements

**Table 7: Star Rating for Multifamily Homes**

Source: Austin Energy, Multifamily guidebook, 2009

Star Rating	Points Requirement
1 Star	0 Points- All basic requirements must be met to obtain 1 Star.
2 Star	29-35 points
3 Star	36-42 points
4 Star	43-56 points
5 Star	57 or more points

**Table 8: Star Rating for Commercial Development**

Source: Austin Energy, Commercial guidebook, 2009

Star Rating	Points Requirement
1 Star	0 Points- All basic requirements must be met to obtain 1 Star.
2 Star	30-26 points
3 Star	37-43 points
4 Star	44-48 points
5 Star	49 or more points

## **Appendix E**

**Green Points Program Structure for New Construction** (Source: City of Boulder, Green building & green points application for new construction, 2009)

See separate PDF - **Green Points Program Structure for New Construction**

## **Appendix F**

**Green Points Program Structure for Additions and Remodels** (Source: City of Boulder, Green building & green points application for additions and remodels, 2009)

See separate PDF - **Green Points Program Structure for Additions and Remodels**

## **Appendix G**

**Single-Family Green Building Points Schedule** (Source: Austin Energy, Residential (single-family home) rating form, 2009)

See separate PDF - **Single-Family Green Building Points Schedule**

## **Appendix H**

**Multifamily Green Building Points Schedule** (Source: Austin Energy, Multifamily rating 2009, 2009)

See separate PDF - **Multifamily Green Building Points Schedule**

## **Appendix I**

**Commercial Green Building Points Schedule** (Source: Austin Energy, Commercial rating form, 2009)

See separate PDF - **Commercial Green Building Points Schedule**

## **Appendix J**

**City of West Hollywood Schedule**

See separate PDF - **City of West Hollywood Schedule**

## **Appendix K**

**Scottsdale Schedule - Commercial**

See separate PDF - **Scottsdale Schedule - Commercial**

## **Appendix L**

**Scottsdale Schedule - Residential**

See separate PDF - **Scottsdale Schedule - Residential**

## Appendix M

### **Massachusetts - Environmental Policy Act Greenhouse Gas Emissions Policy and Protocol**

The following sections summarize the key components of the GHG Policy that Montgomery County could utilize as a model for requiring GHG quantification and reporting. While it is not clear whether a state-wide emissions cap is the intent of the Massachusetts GHG Policy, as is the case in California, the quantification and reporting methodology is robust and specific after two full years in effect. Therefore, Massachusetts is the superior state example to inform Montgomery County's efforts to reduce GHG emissions during project development.

#### Calculating Emissions

The Secretary of Energy and Environmental Affairs (EEA) convened a technical advisory committee (TAC) of agency officials, private air quality consultants, and other stakeholders in April 2007 to develop a standardized protocol for the EIR emissions analysis. The TAC reviewed existing emissions quantification protocols, evaluated energy modeling software and developed solutions for potential real-world challenges that the implementation of the Policy and Protocol might present for developers. Staff also met with other stakeholders from the real estate, construction and environmental community to gather input on the process. The TAC produced methodologies for calculating emissions in the following categories:

- Direct emissions from stationary sources
- Indirect emissions from energy consumption in buildings
- Indirect emissions from transportation

The GHG Policy does not require analysis of construction period emissions or embodied emissions. It does not create thresholds, limits, or targets on GHG emissions. Neither does it require accurate projections. It only requires quantification and reporting from these sources.

#### Baseline

Quantification and reporting requires that the developer quantify the potential annual GHG emissions from the proposed project according to the GHG Quantification Protocol (the Protocol) outlined in the following sections (or other protocols that are accepted on a case-by-case basis), and report in the EIR on the results of the analysis. Emissions should be expressed in short tons (2,000 lbs) per year (tpy). The developer should establish a project baseline condition that includes emissions from energy usage and transportation. The baseline for energy usage should be developed by calculating GHG emissions derived from electricity, heating or cooling from offsite suppliers and on-site fuel based on code-compliant buildings using energy usage modeling software. Transportation emissions are calculated using an EEA pre-approved formula described in the "Indirect Emissions from Transportation" section

#### Direct Emissions from Stationary Sources

"Direct Emissions" for a project means the emissions from on-site stationary sources of the facility itself. Stationary sources include, but are not limited to, boilers, heaters, furnaces, incinerators, ovens, internal combustion engines (including emergency generators), combustion turbines, and any other equipment or machinery that combusts carbon bearing fuels or waste streams.

In order to quantify direct emissions, the developer should reasonably estimate fuel usage from the Project's stationary sources. Once fuel usage is estimated, the developer can derive the approximate carbon dioxide (CO<sub>2</sub>) emissions by using a reliable data source that contains emission factors for CO<sub>2</sub> based on fuel type. For most fuel types, the Energy Information Administration

Documentation for Emissions of GHGs in the United States 2003 (May 2005) provides the appropriate factors. For fuel types not covered in this document, the developer should use another reliable data source in consultation with the MEPA Office.

#### Indirect Emissions from Energy Consumption

“Indirect Emissions” for a project means the emissions from the consumption of energy generated offsite from combusted fossil fuels through the purchase of electricity.

The developer should use energy modeling software to quantify projected energy usage from stationary sources and energy consumption. Energy modeling software simulates the energy use of a building throughout a year of operation. The TAC approved the following energy modeling software for ease of use and usefulness of results for MEPA review: EQUEST, Energy-1 0, Visual DOE, and DOE2. However, EEA does not require the use of a specific model; developers may use comparable energy modeling software for their analyses so long as the model estimates both fuel and electricity usage. No model is expected to calculate emissions with 100 percent accuracy. The value of modeling is its ability to compare alternative mitigation strategies and show the resulting differences in energy use.

In order to quantify indirect emissions from energy consumption, the developer should multiply total purchased electricity usage by an emissions factor that calculates the CO<sub>2</sub> emitted through the generation of electricity. The developer should use the ISO-New England Marginal Emissions Report, which provides CO<sub>2</sub> emission factors expressed as pounds of CO<sub>2</sub> per megawatt hour for a variety of stationary on-site sources.

#### Indirect Emissions from Transportation

EEA approved the following formula to calculate indirect transportation-related emissions from traffic congestion and associated fuel combustion:

- Establish a baseline of projected new trips using standard EEA/EOT TIA methodology and ITE trip generation rates;
- Calculate Vehicle Miles Traveled (VMT) for weekday and weekend conditions;
- Calculate annual VMT: (260 x weekday VMT) + (105 x weekend VMT);
- Use EPA MOBILE 6.2 CO<sub>2</sub> emission factors to calculate total CO<sub>2</sub> emissions.

#### Other Emissions

On a case-by-case basis, EEA may require modeling of GHG emissions from sources other than the three categories covered by this Policy.

#### Total GHG Emissions and Mitigation Measures

The developer should calculate and compare the baseline with the proposed project and other alternatives that have greater GHG-mitigation than the proposed project.

The energy modeling software should be used to measure the impact of mitigation measures on direct and indirect emissions from buildings and energy use. The GHG policy includes a list of suggested measures.

To evaluate the impact of transportation mitigation, an accurate range of trip reductions associated with Transportation Demand Management (TDM) measures can be identified. Two models are recommended for generating reasonable estimates of trip reductions associated with TDM programs. These include the US Environmental Protection Agency (EPA) COMMUTER model and the Work Trip Reduction Model.

### Offsets

Direct mitigation is prioritized over off-site measures. However, EEA is receptive to proposals to mitigate such emissions through off-site measures when avoidance or minimization strategies are not feasible. Off-site measures or other offsets should have local or regional benefits and must be verifiable and enforceable. If a developer proposes offsets consisting of monetary contributions, the developer will be required to verify that the funds are directly responsible for GHG emissions reductions.

### Project Selection

When comparing the preferred alternative to other alternatives with greater GHG reduction, the developer should explain which alternatives were rejected, and the reasons for rejecting them. The alternatives analysis should clearly demonstrate consistency with the objectives of MEPA review, and should fully explain any trade-offs inherent in the evaluation of GHG reduction measures.