2016 CORVALLIS CLIMATE ACTION PLAN ISSUE PAPER NO. 3:
CLIMATE ACTION PLAN ELEMENTS, PLAN DEVELOPMENT PROCESS AND EVALUATION CRITERIA

(*DEVELOPMENTAL DRAFT TO BE COMPLETED THROUGH TASK TEAM INPUT AND ADDITIONAL PUBLIC ENGAGEMENT)*

ISSUE:

Development of a Climate Action Plan (CAP) consistent with the goals and project guidance established by the Corvallis City Council and the Climate Action Task Force (CATF) is currently underway. Although a framework for the plan has been developed and reviewed by the CATF, it is important that staff, consultants, the CATF, and external partners and reviewers work from a common understanding of the CAP elements, terminology and process for development of a CAP consistent with all five of the CATF-established goals. It is also important to ensure that the criteria identified and used to evaluate and prioritize the CAP actions identified through the planning effort are effective in addressing the CATF goals and priorities for the CAP. This paper details the elements that make up the CAP, defines terms for the purposes of their use in the Corvallis CAP, and presents evaluation criteria for review and discussion by the CATF.

SCOPE:

The City Council and the CATF established the scope of the CAP at the outset of the process. The CAP will incorporate both an internal operations plan for the City of Corvallis and a broader community plan. Both components of the CAP will address actions that will reduce future and past greenhouse gas (GHG) emissions. This mitigation will help the City and the community prepare for and adapt to impacts of climate change that are now underway and will accelerate in the coming decades. The components of the CAP are described below.

CAP Community Component:

The community plan component of the CAP addresses the collective inventory of GHG emissions generated throughout the city limits and areas of its jurisdiction or service provision. The "City of Corvallis 2012 Community Greenhouse Gas Inventory Report," completed in 2012, serves as the baseline of GHG emissions information against which future actions will be developed to meet the CATF's GHG emissions reduction target. Because GHGs are generated and can be mitigated across all sectors of the community, the City cannot solely develop or implement a community plan without the partnership and participation of the broader community. The City will play a significant role in implementing the community elements of the plan through its programs and services. However, other government and non-government agencies, businesses, non-profit organizations and citizens also will have roles to play in implementing a CAP that will succeed in reducing community-wide GHG emissions. Therefore, development of the community plan is occurring with broad solicited involvement from external stakeholders.

The City is seeking and encouraging participation from a broad spectrum of public institutions and agencies, businesses, industries, non-profit organizations, utilities, and experts to serve as representatives

of potential external partners who can join in identifying, prioritizing and implementing strategies and actions associated with the climate action goals. The community CAP will serve as a road map that can assist in future planning, interagency cooperative efforts, and as a basis to develop public-private partnerships in the interest of achieving meaningful GHG emissions reductions. However, it should be noted that a CAP that is adopted only by the City of Corvallis will not be a mandate or binding on any other community entity.

CAP Operations Component:

The operations plan component of the CAP addresses internal municipal functions only. The "Greenhouse Gas Inventory for Municipal Government Operations," completed in 2009 for 2008 and updated for the year 2013, serves as the baseline of GHG emissions information against which future actions will be developed to meet the CATF's GHG emissions reduction target. Strategies and actions included in the municipal operations plan also will support the community plan by reducing fossil fuel consumption and GHG emissions, and by achieving some co-benefits to the community, like improving safety, conserving community water supplies, and even potentially reducing some of the long-term and life-cycle costs of services to the community. The operations plan also may support the community plan by providing examples of high priority strategies that can be implemented in other similar organizations in the community to reduce GHG emissions.

CAP BUILDING BLOCKS—UNDERSTANDING THE CAP COMPONENTS AND TERMINOLOGY:

Across the spectrum of climate action plans that have been developed across the state and the nation, there is no standardized use of terms, formats or content. Therefore, it is important that a common definition or description of terms be developed for the Corvallis CAP to enhance clear communication and achieve common understandings. The Corvallis CAP will include the following terms and elements, with the understanding that other communities may define the framework for their plans differently.

- Goals
- Targets
- Strategies
- Actions

Goals:

Development of the Community and Operational CAP is being guided by a set of goals established by the Climate Action Task Force. They are an expression of desired outcomes for the plan and apply to all of the CAP elements. Goals provide the highest level overarching direction to set what the CAP is intended to achieve. All CAP objectives, targets, strategies, actions and implementation plans should be developed consistent with the goals. The CAP goals are found at: http://archive.corvallisoregon.gov/0/edoc/756880/CORVALLIS%20CLIMATE%20ACTION%20PLAN%20GOALS--APPRVOVED%20BY%20CATF%2012-15-15.pdf.

Targets:

Targets are specific performance outcomes that relate to defined timeframes or specific dates and specific actions or strategies. Strategies and actions are developed to enable achievement of established targets.

For example, the CATF has recommended preliminary greenhouse gas reduction targets to aim for in developing and implementing the CAP. The CATF set the Community GHG reduction targets to mirror the targets established by the State of Oregon, as follows:

- Reduce GHG emissions by 10% below 1990 levels by 2020;
- Reduce GHG emissions by 44% below 1990 levels by 2035; and
- Reduce GHG emissions by 75% below 1990 levels by 2050.

The background on how these targets were established is found at: http://archive.corvallisoregon.gov/0/edoc/756881/Issue%20Paper%201-%20GHG%20background%20Paper%20--revised%203-23-16.pdf.

Strategies:

Strategies are approaches used to achieve goals, and may define or direct modes of accomplishing specific actions. For example, a strategy might be "residential energy efficiency" and could be implemented through a partnership with a utility that could result in many actions from weatherization, to re-lamping to ductless heat pump installations. Strategies provide helpful guidance for implementation of the elements. It should be noted that many CAPs use the terms "objectives" and "strategies" almost interchangeably. For the purpose of clarity, the Corvallis CAP will only use the term strategies.

Actions:

Actions are very specific and clear steps that are identified to implement strategies focused on achieving high level goals and targets. For the purposes of the CAP, actions will be identified that can mitigate climate change by reducing GHG emissions, and that support the community in adapting to local physical impacts of climate change that are occurring already and will accelerate regardless of mitigation actions taken from this point forward. Actions may also promote or create "co-benefits" for the community in addition to achieving varying degrees of GHG mitigation or preparedness. Co-benefits include things like improvements to general environmental or ecosystem health, water and air quality, community health and well being, and social equity.

Climate Mitigation Actions vs. Adaptation, Preparedness and Resiliency Actions:

Both climate mitigation and climate adaptation actions (including actions that address community preparedness and resiliency) address climate change. The difference is that mitigation actions aim to reduce or prevent the generation of greenhouse gas emissions within the community or that are related to activities that occur within the community (like the manufacture and transport of goods and services that the community consumes). In contrast, adaptation actions prepare a community for the unavoidable chronic, accumulated or acute impacts of climate change, such as extreme weather events and sea level rise. Climate mitigation and adaptation actions are not always mutually exclusive and can have benefits in both areas.

Figure 1. below illustrates some examples of actions that relate to mitigation, adaptation or both.[1] Please note that this is for illustrative purposes only—not all of the actions identified have applicability to Corvallis.

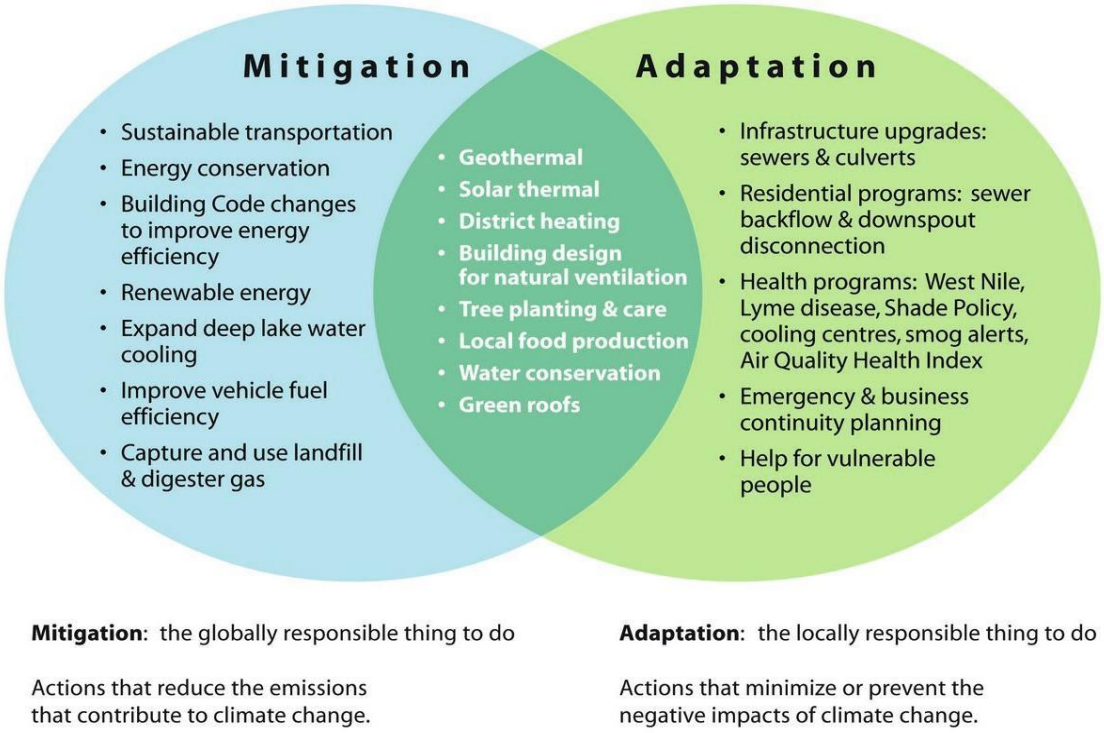


Figure 1. Climate Mitigation vs. Climate Adaptation

Source: Natural Resources Canada's Climate Change Adaptation Initiatives.

PRIORITIZING THE ACTIONS:

The process of prioritizing potential actions is a multi-step process. In order to initially prioritize actions, the cost effectiveness of GHG mitigation potential was assessed for each action. This exercise provided an initial lens to determine which actions have the greatest potential to reduce GHGs. The next step is to evaluate actions on their merit beyond GHG mitigation potential and score their capacity to contribute co-benefits and other important considerations (e.g., duration of benefit, life-cycle value). That step requires the development of evaluation criteria.

[1] Climate Smart Communities Climate Action Planning Guide; prepared by VHB Engineering, Surveying and Landscape Architecture, P.C. for the State of New York: New York Skate Energy Research and Development Authority (NYSERDA), Department of State, Department of Environmental Conservation, Department of Health, Department of Transportation, and the Public Service Commission; March, 2014, p. 5.

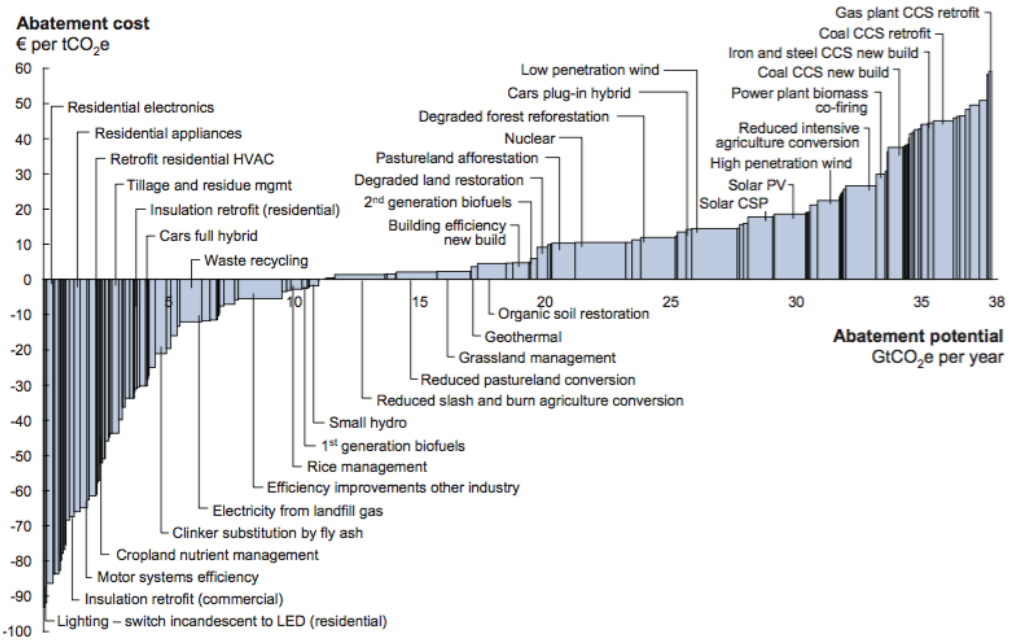
GHG Mitigation Potential:

Marginal greenhouse gas abatement cost curves (MACCs) were used to provide the initial lens for the cost effectiveness of GHG mitigation actions for Corvallis. McKinsey & Company first published a MACC in 2007 comparing mitigation options for the global economy. The McKinsey curve and subsequent MACCs are helpful because they graphically convey both the cost of mitigation and the total mitigation potential of an action or block of actions. Ultimately, MACCs can signal the mitigation options that can make the most significant reduction in emissions while being cost effective. Given the context and types of actions Corvallis is assessing, the following MACCs were evaluated:

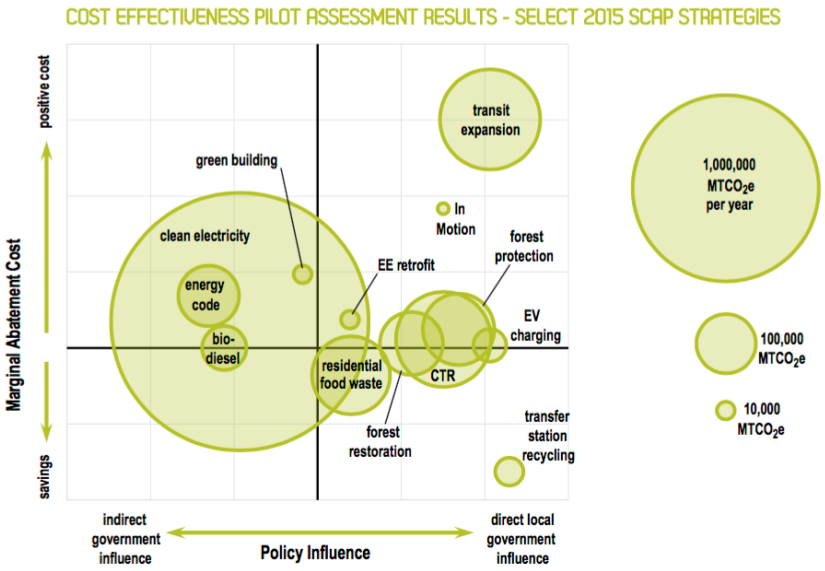
- Oregon Oregon Greenhouse Gas Marginal Abatement Cost Curve (Oregon Department of Energy)
- Pathways to a Low-Carbon Economy (McKinsey & Company)
- King County Strategic Climate Action Plan
- University of Washington Climate Action Plan

How they work:

MACCs are organized graphically on a X-Y axis. Action bars are shown left to right with the least expensive options on the left and the most expensive options for reducing GHGs on the right. The width of the bar shows the potential emissions reductions possible by employing that action. The horizontal axis shares the potential number of metric tons that could be achieved in a future year (e.g., 2022, 2035) and the vertical axis shows the cost of mitigation (in terms of cost per ton). Actions on the left side of the graph below the horizontal axis (negative cost in value) are cost saving measures that not only reduce GHG emissions but also reduce operational costs.



Source: http://www.mckinsey.com/business-functions/sustainability-and-resource-productivity/our-insights/pathways-to-a-low-carbon-economy



Source: King County Climate Action Plan, 2015
http://your.kingcounty.gov/dnrp/climate/documents/2015_King_County_SCAP-Full_Plan.pdf

One of the main limitations of abatement curves is that they are susceptible to dynamic changes to model and assumptions. Cost estimates used in MACCs are imprecise, in part because they make a number of assumptions based on the assumed project context, which changes over time. For instance, solar PV prices have dropped significantly in the past seven years while at the same time becoming more efficient. Additionally, abatement curves assume different levels of policy pathways and support from state and federal programs. Also, abatement curves often times offer will compare different timeframes (e.g., 2022 vs. 2035), mitigating a metric ton of carbon.

A MACC assessment is focused GHG emissions and does not evaluate additional relevant factors and co-benefits outside of GHGs. The use of the abatement curves is not meant to be a standalone analysis but rather will set the stage for evaluating actions by a comprehensive set of criteria. The following section describes the other evaluation criteria important in assessing potential climate actions.

Evaluation Criteria:

The evaluation criteria are tools that provide a framework to assess potential climate mitigation actions for their ability to achieve or implement the overarching goals, targets, and strategies of the CAP. A set of preliminary criteria, described below, are provided for CATF consideration. They were developed based on the CAP goals, and have been gathered and refined from a growing base of climate action planning standard guidance and practices. The CATF may modify the preliminary criteria or may identify additional criteria that staff and the consultants did not initially consider.

In addition to the GHG mitigation potential ranking that will occur as a "pre-sort," additional evaluation criteria fall into four major categories, including: effectiveness and feasibility, financial, co-benefits—people, and co-benefits—local ecosystems. The evaluation criteria that capture community co-benefits address the larger issues of community "livability" and "sustainability." The rating scheme applied uses

"1," "2," and "3" ratings with "1" being best. The ratings will help characterize and compare and prioritize the actions. The evaluation criteria and scoring metrics are provided below.

Effectiveness Criteria:

Duration of Benefits. – *How long will this action provide its benefit before stopping?*

(Could be mitigation or adaptation benefits, but may not apply to all adaptation actions):

"1" = Long term--Benefits last greater than 50 years
"2" = Mid-term--Benefits last 21-50 years
"3" = Short term—Benefits last 0-20 years

Implementation Time -- *How long will the action take to implement before it provides benefit?*

(Most important for mitigation actions because mitigation that occurs now has a much greater benefit related to achieving the target than mitigation that won't result for several years. There is more time flexibility in implementing adaptation measures because impacts of climate change are happening over a span of decades):

"1" = Action can be accomplished within next 5 years
"2" = Action will take 5 to 20 years to accomplish
"3" = Action will take longer than 20 years to accomplish

Mitigates and Adapts in One Action – *The Action provides for a decrease in greenhouse gas emissions and provides for resilience to a changing physical climate.*

"1" = Does both well
"2" = Does one better than the other
"3" = Does only one

Leverages Existing Efforts – *This action can share resources or be included into an existing program of set of activities. Reduces or eliminates upfront or ongoing costs.*

"1" = Already planned or underway; can easily be added to existing effort; or can easily be accommodated within current funding levels
"2" = Existing plans (e.g. CIP) support and can accommodate action
"3" = Needs new approval, funding, and possibly enabling policy

Political Support – *Will this action and the resources required have elected or administrative support to implement it?*

"1" = Aligns with existing policies
"2" = Likely to be supported

"3" = Unlikely to be supported in next 5 years

Financial Criteria:

(Keep in mind that the actions are also ordered by cost per volume of GHGs mitigated as an effectiveness/cost-effectiveness ranking that is calculated in the "pre-sorting" process described above.)

Life Cycle Value – *What is the **total** cost/benefit of ownership or implementation? Includes upfront costs, operation and maintenance costs, decommissioning costs and any revenues or income made.*

"1" = Small upfront investment extends asset and operating costs are less expensive than existing
"2" = Higher upfront capital cost, but lower life cycle cost of ownership
"3" = Higher total life cycle cost

Revenue generation or cost avoidance – *Will this action reduce existing costs or add new revenues?*

"1" = New revenue or cost reductions
"2" = Revenue neutral/break-even over time
"3" = Increased costs over time

Co-benefits—People:

Health and Safety – *Will the action promote ongoing health and/or provide for protection from acute hazards?*

"1" = Promotes health and wellbeing or prevents disease or protects during acute events within Corvallis.
"2" = Promotes health and wellbeing or prevents disease or protects during acute events outside of Corvallis (indirect benefit)
"3" = No or unknown health and safety benefits

Air Quality – *Will the action also reduce local air toxics that can harm human health?* (Please note that this is grouped with "people" because of the significant impact air quality can have on human health)

"1" = Expected improvement
"2" = No change
"3" = Gets worse

Jobs – *Will the action directly or indirectly create jobs? Note that temporary jobs and "permanent" jobs should be considered differently.*

"1" = New jobs expected locally as a result of the action
"2" = The action may cause new jobs to replace other jobs lost locally, or add jobs to the broader economy (indirect job benefit)

"3" = Unknown impact or lost jobs predicted

Distribution of Benefits (Opportunities for Social Equity) – Will the actions provide benefits to everyone in the community?

"1" = Improves equitable access to mitigation and adaptation opportunities throughout the community
"2" = Equal across neighborhoods/community sectors
"3" = Serves selected members of the community but not all

Co-benefits—Local Ecosystem:

Water quality, supply – *Does the action directly enhance or protect our drinking water supply or potential other sources?*

"1" = Expected improvement
"2" = No change
"3" = Gets worse

Natural system function (sequestration, soil health, bank stability, flood control, water filtration, habit function, urban heat management) – Will the action provide benefit for local ecosystems, whether it has a direct connection to human wellbeing or not?

"1" = Restores or enhances degraded conditions
"2" = Supports or protects existing conditions/functions
"3" = Degrades conditions

CAP Categories:

The categories described below are focus areas for mitigation and adaptation strategies and actions. The categories defined in the Corvallis CAP mirror or closely follow the categories established in many (perhaps the majority) of plans that have been developed throughout the country. While each category is a relatively distinct segment of focus, there is necessarily some overlap between and amongst them. This is a result of the interconnectedness of community impacts and benefits and should be expected to simplify the designation of responsibilities and resources to implement them. The following descriptions and discussion points under each category are intended to generally illustrate the category, why it's important, the scope and types of strategies that are generally included for mitigation and adaptation purposes and some implementation considerations that should be factored into implementation plans for climate action. The descriptions are not intended to be exclusive, but rather to provide an understanding of the categories.

Buildings and Energy:

What is it? This category looks at energy used in residential, commercial and industrial buildings in Corvallis. Buildings use energy to make them and to operate them. While the environmental (including

GHG emissions) impacts of construction are noticeable, the day to day energy use of a building after construction adds up to a much greater impact over a building's life, and can be overlooked as a source of long-term emissions and, therefore, an opportunity for mitigation. Building energy sources include the variety of sources used to generate electricity, as well as those sources that are deployed onsite for mechanical, heat and cooling purposes. These include methane, propane and sometimes liquid fuels and onsite renewables. Generally, commercial and residential building systems use energy for lighting, appliances, computers, mechanical systems for heating, ventilating and air conditioning, and other lifestyle-related choices. For industrial buildings, energy sources may be different, especially for heat, steam and other mechanical energy. Some of the other energy sources considered are wood waste and other energy dense waste products.

Why does it matter? The emissions from buildings represent X percent of the US CO_2e emitted. (i.e. X% in residential, X% in commercial, and X% in industrial). Residential buildings endure longer than other energy consuming systems (footnote needed), so retrofitting and planning for lower energy consumption, while keeping people comfortable in changing conditions can make a significant impact on building-related GHGs. According to the U.S. Environmental Protection Agency, in developed nations, people spend up to 90% of their lives in buildings so incorporating passive systems such as insulation into buildings is essential to provide comfort and greater energy efficiency in both colder and hotter conditions. There are also co-benefits that can result from increasing energy efficiency and reducing fossil fuel use, such as reduced energy bills (from home weatherization), and decreased environmental and health impacts from off-setting fossil fuel use with renewable resources and conservation.

What is the scope of actions for this element/category? New and old buildings, energy sources/generation, retrofits and devices for adaptation and efficiency, and on-site energy generation and storage.

What types of strategies mitigate GHG emissions or support adaptation in this element/category?

- Strategies that promote better weatherized outer shells and those that promote energy savings in the residential, commercial, and industrial sectors represent some of the most cost-effective options.[2] (Both mitigation and adaptation)
- Strategies that promote conversion of fossil-fuel derived energy sources to renewable energy sources. (Mitigation mostly)
- Strategies that engage state and federal policies and programs to impact efficiency standards, fuel sources and prices paid for fossil fuels. (Both mitigation and adaptation)
- Sources of energy that are local and do not depend on fossil fuel systems or interstate infrastructure to deliver power to the area. (Adaptation)
- Water efficiency inside the building that may reduce the need for scarcer water over time. (Adaptation)

[2] Oregon Global Warming Commission 2015 Biennial Report to the Legislature, p. 39.

Implementation and effectiveness considerations.

- In considering and prioritizing GHG reduction strategies, even in cases where electricity is relatively inexpensive and has relatively low GHG emissions, reducing consumption and/or redirecting the newly created margin of low carbon power toward carbon intensive uses, such as transportation or heating, helps manage a community's overall carbon (or GHG) footprint. Overlooking efficiency improvements reduces the pace of mitigation and families' ability to stay comfortable in chronic or acute cold or hot temperatures.
- Efforts should be made to strike a balance between investment in transitional technologies such as more efficient uses of natural gas and technologies that may need to develop further or reduce in cost before mass deployment such as onsite energy storage. Where funding can be identified, investing in long-term solutions can avoid two transitions costs and bring greater GHG reduction gains.

Land Use and Transportation:

What is it? This category considers the use of land and its proximity to other uses, which sets the demand for transportation and the vehicles (or not) that move goods and people. This is true for residential, commercial, and industrial sectors. Whether it is industrial uses moving materials and supplies in and goods out, running errands, commuting to work, or accessing services and recreational opportunities, how the community develops will determine the transportation infrastructure needed to serve the land uses. For example, increased urban density and mixed uses can result in reduced reliance on automobiles for local services.

The transportation infrastructure can enable or prevent certain travel modes and vehicle types from functioning. The modes range from active transportation such as walking and biking to mass transit such as buses to personal vehicles to freight and utility vehicles. Behind each of these modes are varying sources of energy with their own GHG footprints and range from food, to liquid fuels to electricity. This category addresses the relationships between land use patterns and transportation requirements, and seeks to identify actions that can reduce community GHGs by reducing fuel consumed, and therefore, GHGs emitted through the transportation system.

Why does it matter? Transportation fuels are the source of X% of US emissions and X% of community emissions. Vehicles and energy sources are changing rapidly and provide the community with genuine options for GHG reduction and climate change adaptation. Fleet fuel economy improvements, switching to alternative fuels and electric vehicles, and transitioning to a built environment and modes of travel that reduce reliance (and vehicle miles traveled) on single occupancy vehicles, can significantly reduce the community's long-term GHG emissions, air pollution, and result in other co-benefits to the community. For example, a 2012 report by the Union of Concerned Scientists showed the pollution equivalency to miles per gallon of electric vehicles (EVs) based upon regional electric grid mixes. Given that Renewable Energy Portfolio standards continue to rise, the MPG equivalency of EVs will rise over time.[3]

[3] State of Charge—Electric Vehicles Global Warming Emissions and Fuel Cost Savings across the United States; Anair, Don and Mahmassani, Amine; June, 2012

What is the scope of actions for this category? Land use policies; transportation systems and infrastructure; accessibility, efficiency and safety of bike and pedestrian infrastructure. Travel modes and vehicles, and fueling/energy infrastructure, delivery and production for use in Corvallis vehicles.

What types of strategies mitigate GHG emissions or support adaptation in this element/category?

- Strategies that encourage and support conversion of fleets to more efficient and/or renewably powered vehicles. (Mitigation mostly)
- Strategies that promote reduced vehicle miles traveled. (Mitigation and adaptation if energy sources disrupt or may be limited)
- Strategies that transition neighborhoods to mixed-use neighborhoods with goods, services and employment centers within walking/biking distance. (Both)

Implementation and effectiveness considerations.

- Changes in land use policies and zoning can have a substantial long-term impact. However, the resulting changes in the built environment and supporting infrastructure that in turn can result in GHG emissions reductions and increased resiliency to climate change impacts can take a very long time. Transportation infrastructure often needs modification, and increased mass transit service needs urban density and increased ridership to achieve GHG emissions reductions. Given that mitigations are needed more now given the pace of climate change than tomorrow, these should be considered for timing of benefit.
- Promotion/increases of active travel modes (i.e. biking and walking) can generate health and livability co-benefits as well as adaptation resiliency benefits. Considerations of safety must be paramount to encourage large scale movement of people in corridors with other modes.
- Alternative liquid fuels have limits to scaling based on availability and desirability of feedstocks. However, local low-carbon sources of energy should be considered essential for both resiliency and mitigation and are solutions that are deployed right now.
- Electric vehicles are highest efficiency options, including embedded and lifecycle energy consumption, for commute vehicles and nearly all of the uses for a vehicle other than occasional long distance trips.

<u>Consumption and Waste:</u>

What is it? This category considers everything in the lifecycle of consumer goods from extraction of raw materials to manufacturing, packaging, distribution, product use and associated (energy and resources demands) and finally, disposal. Although "embodied" GHG emissions are in everything we buy due to the energy used to produce and transport them, they are mostly invisible and therefore are discounted (unless they are goods like appliances or other products that require energy to operate). That energy is produced somehow, generating some level of GHGs. Reusing, buying used, buying durability, recycling and recovering energy from those materials that cannot be re-used can significantly reduce the GHGs associated with product manufacturing. Diverting food and vegetative waste from the garbage/landfill, composting, anaerobic digestion and landfill gas capture and use can reduce GHG emissions by preventing the "fugitive emissions" associated with organic matter decay. Biomethane also can be used as a local source of lower carbon fuels for hauling fleets.

Why does it matter? The consumption of goods, foods, and services typically makes up about half of a community's GHG emissions. Most consumption emissions occur elsewhere and are often overlooked because of this. Wiser consumption, like purchasing locally or buying more durable goods, can reduce those emissions by decreasing the travel required to get the product to you or by lessening the need for replacement goods in the future. Waste comprises a smaller portion of the community's GHG emissions (< 1%). Finding ways to convert "waste" into beneficial uses, like recovering methane from Coffin Butte Landfill, or composting home food and yard waste also can result in environmental and economic co-benefits for the community.

What is the scope of actions for this category? Individual and organizational purchasing patterns. Individual and organizational waste management and recycling systems. Purchasing locally produced goods and services.

What types of strategies mitigate GHG emissions or support adaptation in this element/category?

- Reduce/share goods; (Mitigation and adaptation)
- Repair and re-use working objects; (Mitigation and adaptation)
- Buy used, buy recycled content, durable and energy efficient; (Mitigation) and
- Recycle after useful life, compost, recover energy. (Mitigation and adaptation)

Implementation and effectiveness considerations.

- It is important to keep in mind that while robust recycling is an important consideration, modification of the how and what of consumption of goods on the front end makes the greatest impact on GHG emission reductions.

<u>Urban Natural Resources:</u>

What is it? This category addresses the natural systems that support the soil, air, water, plants, and animals in the city. Urban natural systems addressed in this CAP include: streams and their riparian areas; drinking water sources; natural and constructed drainage features that filter, retain, and clean stormwater; wetlands; wooded natural areas; vegetated open space areas; and the inventory of trees that create an "urban forest."

Why does it matter? The collective community maintenance and management of urban natural resources contributes to GHG emissions in only a very modest way, and can offset the release of GHGs in a modest way as well, through sequestration of carbon and cooling the environment. However, protecting, maintaining and enhancing natural resources within the urban environment can support the community's preparedness and resiliency to predicted impacts of climate change. Increased heat, drought, extreme weather events predicted to occur in the coming decades will challenge our infrastructure and services, and may threaten community health and the adequacy of local vegetation, habitat and water supplies that sustain local communities. Wetlands, healthy streams and drainageways, and open areas that provide groundwater recharge can help mitigate flashy peak stormwater/flood flows that might otherwise overwhelm constructed infrastructure, and can help maintain groundwater aquifers and water quality in the face of prolonged drought. In warmer conditions, urban forests provide local heat reduction and can provide relief in hot weather for high risk populations such as low income people and those with limited

mobility - without access to air conditioned spaces. Vegetation provides soil retention and water filtration, which can help urban infrastructure functions, prevent landslides and bank failures, and protect wildlife habitat. All of these environmental and natural resource protection strategies provide general livability and sustainability co-benefits to the community.

What is the scope of actions for this category? Natural resources/systems within the Corvallis urban growth boundary, and neighborhoods throughout the city.

What types of strategies mitigate GHG emissions or support adaptation in this element/category?

- Strategies that achieve significant watershed and riparian restoration can provide water quantity and quality when there is more population pressure and challenged supplies or storage of water. (Adaptation)
- Deciduous trees near buildings can provide shade in warm months and sunlight access in cold months. (Mitigation and Adaptation)

Implementation and effectiveness considerations. Passive infrastructure systems that work with natural systems tend to cost less over time and are more adaptable to future conditions (e.g. natural stormwater management systems and pervious vegetative areas to support groundwater supplies). Vegetation management needs to consider existing conditions and predicted changes in climate conditions. The benefits of trees relate more to community resiliency and adaptation than mitigation because the length of time it takes and the amount of carbon sequestration achieved per dollar spent is not effective at the local level.

Food and Agriculture:

What is it? This category includes everything related to our food production, delivery and distribution. It can also relate to local food distribution networks that support low income people, people with restricted mobility, and that divert food from the waste stream. Farms of all types serve Corvallis directly, and are a driver in the Corvallis area's economy because of agricultural exports.

Why does it matter? Farms are a source of income and food for much of the Corvallis community. Changing physical conditions due to climate change may require new crops and/or new cropping regimes and agricultural practices due to weather, pests, weeds, and water availability. Local food production may also change due to changing availability or cost of food transported into the community from elsewhere. A general shift in food consumption toward an increasingly plant based diet can reduce GHG emissions generated by the meat and dairy sectors, which are significantly more GHG producing that plant-based agriculture. Agriculture may provide a carbon sequestration opportunity and agricultural practices are evolving to include methods that are less fuel and carbon-based chemical intensive. In a resource constrained world, local agriculture could focus on feeding the local community as a first priority. Severe climate events could impact the local food supply, which may impact disadvantaged community members disproportionately. In a more optimistic scenario, Corvallis' agriculture segment of the economy can continue to prosper and create incomes. There are also co-benefits that can result from strategies such as community gardens that can support community livability and provide increased food security to some community members, and from local agricultural practices that generally improve the environment.

What is the scope of actions for this category? Corvallis metropolitan area and surrounding agricultural lands. Farms and food providers to the local community. Local non-profit service providers/food pantries, etc.

What types of strategies mitigate GHG emissions or support adaptation in this element/category?

- Capturing methane from animal waste (Mitigation)
- Reduction in the use of high carbon intensity nitrogen manufactured in other communities (Mitigation)
- Carbon sequestration and soil building through no-till practices (Mitigation and adaptation)
- Selecting crop types or new crops that can grow in the future conditions without the need for additional resources, such as irrigation from surface or ground water (Adaptation and Mitigation)

Implementation and effectiveness considerations.

The level of effort and resources required vs. the benefits gained for GHG emissions mitigation and climate change adaptation should be carefully considered. There are clearly resiliency, cultural and community development benefits from investing effort in a robust local food production and supply system, however, it should be recognized that these efforts cannot be expected to produce significant GHG mitigations in the near-term.

<u>Health, Social Services and Community Wellbeing:</u>

What is it? This category addresses community health, care and assistance programs, emergency services, and preparedness (or risk management) for potential/predicted negative community impacts of climate change. Changing conditions (such as increases in temperature, extreme weather, and fires), regulations and energy sources will create new and sometimes unanticipated changes that will affect people in many ways. The need to mitigate emissions creates opportunities to create health through active modes. The ability to adapt requires monitoring of the range of disease and carriers of disease, such as the West Nile Virus carried by mosquitoes farther north.

Why does it matter? Changing conditions such as increased energy costs, will disproportionately affect the lower income populations. Migration of people, flora and fauna may introduce new challenges such as fauna-carried diseases, and loss of existing native habitats that maintain natural system functions. More extreme weather events may threaten lives, such as elderly or health-compromised people in prolonged heat waves. Prolonged and extreme rains, or rapid snow melt can cause flooding and landslides, and heat waves and droughts may bring wildfires that threaten neighborhoods at the urban-wildland interface. There are also co-benefits that can result from strategies that promote increased community awareness and preparedness for things like hazards, disasters, and disease vectors, and the availability of services in the community to provide support.

What is the scope of actions for this category? Mostly, this category address adaptation and resilience action. Consideration of emergency management measures and actions that ensure the availability of social service life lines and access to medical services are part of expected adaptation needs. However, if the community transitions to eating a more local and plant-based diet, and toward increased walking and

biking as modes of transportation, the results can include long-term GHG emissions reduction and a more healthy and resilient group of people.

What types of strategies mitigate GHG emissions or support adaptation in this element/category?

- Encouragement of active transportation and eating more plants. (Mitigation and adaptation)
- Establishment of Emergency response protocols to deal with landslides, wildfire and or flooding. (Adaptation)
- Surveys of data and assets to determine where the physical hazards or disease patterns that may emerge under the future conditions. Planning accordingly. (Adaptation)

Implementation and effectiveness considerations.

- In developing emergency plans and social services that will support adaptation to predicted climate change impacts, it will be important to consider all neighborhoods and communities within the city and their levels of service.
- Although scientific studies show that the type of food we consume impacts on GHG emissions (i.e. animal-based food (meat and dairy) is a much higher intensity producer of GHGs than plant-based agriculture), the public's willingness to fundamentally shift their dietary patterns as a means to address the local GHG emissions reduction target is at best a significant uncertainty. Investing efforts and resources in persuading people to change their diets would, at best, produce long-term rather than short-term GHG mitigation benefits.

CAP DEVELOPMENT PROCESS:

The City Council and the CATF have established a time frame for development of the CAP that requires completion (i.e. adoption by the City Council) by December 31, 2016. They also established a scope and process that includes significant involvement from City staff, local community partners, interested stakeholders, and the general public. The process to develop the plan within the time frame is necessarily focused and time constrained, and tools have been developed by staff and the project consultant to support efficient and effective identification, evaluation and prioritization of actions that will be included in the recommended community and City operational CAP.

Six "Task Teams" have been created to work on each of the six categories of the CAP (see "CAP Categories" above). The Task Teams are composed of City staff throughout the organization, as well as representatives from major public institutions, non-profit service organizations, businesses and industries that are either service providers in the community, may be impacted significantly by climate change and mitigation efforts, or who have the potential to help in the community's efforts to reduce greenhouse gas emissions in significant ways. The City staff and external partners on the Task Teams are either topic experts or have access to multiple topic experts in their organizations to support development of the plan.

The Task Teams will be provided with background documents to help in understanding the science and the goals for the CAP, as well as tools that will help them identify potential climate change mitigation or adaptation actions and to evaluate them based the evaluation criteria described above. The preliminary criteria, which have been gathered through a review of other community climate action planning efforts, were refined by staff and the project consultant. The Task Teams will be provided with an inventory of

many typical climate change mitigation and adaptation actions that are being implemented by local communities throughout the nation which are "pre-sorted" based on their GHG mitigation potential as described above. The worksheets developed to support the Task Teams in completing this activity are attached to this document.

Staff and the project consultant will collect, assemble and order the Task Team recommended actions by the effectiveness and cost-effectiveness metrics. Each Task Team will then meet in a half-day workshop with the project staff and consultant to discuss, clarify and prioritize their recommended high priority actions. Please note that while the preliminary criteria were used to gather initial input from the Task Teams, any changes the CATF makes to the preliminary criteria based on the March 29, 2016 meeting discussion will be incorporated into to the review that occurs at the Task Team workshops. The results will then be formulated into a document that will be sent to a large list of external "Reviewers" who will be asked to review, collect feedback from interest groups they are part of, and provide that feedback back to the City. Staff and the project consultant will then compile all of the recommendations for consideration and direction by the CATF prior to implementing the broad public outreach process planned for the summer.