

MEMORANDUM | September 30, 2011

**TO** Sandrine Thibault, Burlington Department of Planning & Zoning

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**SUBJECT** Executive Summary: Climate, Energy, and Green Infrastructure Analysis

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The City of Burlington, Vermont is currently in the process of developing a land use and development master plan for its downtown/waterfront area. The City envisions a plan that actively promotes climate-conscious development and transportation strategies. As a part of that process, the City's Department of Planning & Zoning (DPZ) contracted Industrial Economics, Incorporated (IEc) to conduct a Climate, Energy and Green Infrastructure Analysis. This analysis consisted of:

- Task 1: IEc assessed the City's current practices and future plans to identify potential opportunities and challenges associated with enhancing energy efficiency and green buildings, renewable energy, green infrastructure, and transportation in the downtown/waterfront area.
- Task 2: IEc developed information to assess greenhouse gas (GHG) emissions reductions that could be realized by promoting development in downtown Burlington, rather than at the suburban fringe.
- Task 3: IEc prepared three case studies of successful or promising strategies employed in other cities, focused on transportation, building energy efficiency, and green infrastructure.
- Task 4: IEc developed recommendations for the City to consider as it moves forward with its sustainability agenda.

This executive summary presents key results of IEc's work on each of these four tasks. Our intention is for DPZ to use this information as an input into the City's ongoing master planning process.

Overall, IEc found that Burlington has laid a solid foundation for advancing a robust sustainability and livability agenda. Burlington already has many sustainability and climate change policies and programs underway. Thus, the City needs to ensure that current policies and programs have the resources needed to succeed. Burlington should also be careful to undertake only those policy changes or new programs that can make a clear contribution to the City's goals, and can be sustained over time.

#### **TASK 1: CHALLENGES AND OPPORTUNITIES FOR GREEN DEVELOPMENT IN THE DOWNTOWN/ WATERFRONT AREA**

In Task 1, IEc evaluated the City's current practices and future plans to identify potential opportunities and challenges associated with enhancing energy efficiency and green buildings, renewable energy, green infrastructure, and transportation in the downtown/waterfront area.

As a first step in Task 1, IEc reviewed Burlington's development policy and planning framework. We found that Burlington's framework allows for a mix of uses in the downtown/waterfront area; that the Municipal Development Plan (MDP) action plans provide a set of tangible action items to facilitate achieving the City's

goals; and that the documents recognize the importance of housing in the downtown and waterfront areas, but may overly restrict housing development. The remainder of the Task 1 memorandum focuses on four areas: green building/energy efficiency, renewable energy, green infrastructure, and transportation.

**Green Building/Energy Efficiency.** The City is promoting efficiency through the Burlington Electric Department (BED). BED works closely with developers to conduct energy code compliance, offer technical assistance, and provide incentives for energy efficiency. Funded by a ratepayer Energy Efficiency Charge, BED uses generous rebates as an incentive for developers to implement efficiency measures. BED also supports the development of green buildings; in several cases, BED has paid for a LEED AP to shepherd a building through the LEED accreditation process. BED is in the process of implementing a number of actions from the Climate Action Plan (CAP). These include, but are not limited to, installing “smart meters” that can help influence user behavior to reduce electricity use; implementing the Property Owners Win with Efficiency and Renewables (POWER) program, which allows for loans funded through special tax assessments; and replacing existing street lights with LEDs over a 10-year period.

**Renewable Energy.** Burlington has achieved modest success in the use of renewable energy, with the notable achievement being the McNeil biomass plant. The City has placed increased renewables as important action item in both MDP and CAP. The CAP actions specifically call for the implementation of several initiatives that could affect the downtown/waterfront area, including, but not limited to:

- A “Solar on Schools” program that seeks to place solar panels on seven schools.
- A renewable resource rider that would set stable rates above the retail cost of electricity to encourage the net metering of solar-generated electricity.
- A “Solar City” project that aims to install solar panels on municipal buildings.

While Burlington’s solar potential (about 1,500 kilowatt-hours per square meter per year) is low compared to many parts of the nation, it still allows for successful solar installation under proper conditions.<sup>1</sup> Geothermal energy is another potential resource for the City to consider. The upfront costs of geothermal energy vary greatly, depending on a number of site-specific factors. It does not appear that wind will be economically viable in the downtown/waterfront area. A recent study conducted by the Carbon Trust found that small urban wind turbines are typically mounted at low heights and are not in a position to catch enough wind to generate a substantial amount of electricity. At low generation rates, the cost of electricity is very high.<sup>2</sup>

**Green Infrastructure/Stormwater Management.** Burlington created a dedicated stormwater management plan in 2009. The stormwater program is responsible for wastewater disposal permitting, project review, technical assistance, assessing user fees and credits, code enforcement, and education and outreach. At present, the Program Administrator is responsible for strategic planning, project review, NPDES permitting, technical assistance, regulatory enforcement, approving credits, and additional administrative responsibilities. By assigning all of these functions to one person, the City is likely limiting the potential reach of the stormwater program. Burlington funds the program through a user fee added to property owners’ water and sewer bills. Property owners can gain credits against the user fee by implementing stormwater management techniques; however, the stormwater fee does not provide an adequate incentive for installing green infrastructure, as evidenced by the lack of credits awarded by the program to date. The ordinance provides protections that are consistent with best management practices for stormwater and erosion control.

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<sup>1</sup> National Renewable Energy Laboratory. “Photovoltaic Solar Potential in the United States.” 2008. Available at: <http://www.nrel.gov/gis/solar.html>.

<sup>2</sup> Page, L. “Carbon Trust: Rooftop windmills are eco own-goal.” The Register. August 7, 2008. Available at: [http://www.theregister.co.uk/2008/08/07/rooftop\\_wind\\_turbines\\_eco\\_own\\_goal/page2.html](http://www.theregister.co.uk/2008/08/07/rooftop_wind_turbines_eco_own_goal/page2.html).

**Transportation.** In March 2011, the City adopted a new transportation plan. It is too early to critically evaluate the extent to which the plan has resulted in positive changes to the transportation system, but overall, the plan appears to be well-conceived. Innovative ideas for the downtown/waterfront area include:

- Prioritizing maintenance over new road construction.
- Supporting alternative funding sources for public transit.
- Advocating the development of a downtown transportation management association (TMA) to practice Transportation Demand Management (TDM).
- Introduce market pricing concepts to the downtown/waterfront area through a pilot program.

Our evaluation identified parking as a central issue. The Comprehensive Development Ordinance sets minimum off-street parking requirements for the downtown/waterfront area. Critics contend that minimum parking requirements raise the costs of goods and housing, reduce the land available for development and increase urban sprawl, and reduce the viability of transit.<sup>3</sup> Business owners express concern that a lack of parking will serve as a deterrent to people using the business district. The City has recognized both sides of the debate by substantially reducing minimum parking requirements in the downtown/waterfront area, and by implementing parking maximums. However, to-date, Burlington has retained a no net loss policy on parking.

## **TASK 2: COMPACT DEVELOPMENT, TRAVEL PATTERNS, AND GREENHOUSE GAS EMISSIONS - LITERATURE AND METRICS**

In Task 2, we reviewed key literature on the relationship between the built environment, vehicle miles traveled (VMT), energy use, and CO<sub>2</sub> emissions. We also identified relevant local data sources and metrics that can be used to track key environmental outcomes over time.

Researchers agree that denser areas are generally associated with lower VMT, but there is considerable disagreement as to the size of the effect. *Growing Cooler* estimates that doubling residential density would result in a five percent reduction in citywide VMT; a smaller change in density would result in a proportionately smaller decrease in VMT.<sup>4</sup> Other studies produce different estimates, but overall, the literature does not suggest that denser development, on its own, will have a major impact on citywide VMT or CO<sub>2</sub> emissions. Other land use factors appear to be more important than density in influencing VMT; of these, destination accessibility may be the most important (i.e., the number of jobs or other attractions reachable within a given travel time).<sup>5</sup> If increased density is coupled with other aspects of compact development, such as a well-balanced mix of land uses, short distances from homes to key destinations, a pedestrian-friendly street network, and accessible transit, greater savings could result than from increased density alone.<sup>6</sup>

On the household level, individuals or families choosing to live in a compact development are likely to have substantially lower VMT. The literature suggests that compact development options will reduce an individual's need to drive 20 to 40 percent compared to development at the outer suburban edge.<sup>7</sup>

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<sup>3</sup> For an excellent summary of the parking requirement debate, see Sherman, A. "The Effects of Residential Off-Street Parking Availability on Travel Behavior in San Francisco." San Jose State University Department of Urban and Regional Planning. May 2010. Available at: [http://www.sjsu.edu/urbanplanning/docs/URBP298Docs/urbp298\\_HonorsReport\\_Sherman.pdf](http://www.sjsu.edu/urbanplanning/docs/URBP298Docs/urbp298_HonorsReport_Sherman.pdf).

<sup>4</sup> Ewing, Reid et al. *Growing Cooler: The Evidence on Urban Development and Climate Change*. Urban Land Institute, 2008. P. 70.

<sup>5</sup> Ewing, Reid and Robert Cervero. "Travel and the Built Environment: A Meta-Analysis." *Journal of the American Planning Association* 76(3), Summer 2010. P. 275.

<sup>6</sup> National Research Council Transportation Research Board. "Special Report 298: Driving and the Built Environment: The Effects of Compact Development on Motorized Travel, Energy Use, and CO<sub>2</sub> Emissions." National Academy of Sciences, 2009. Available at: <http://onlinepubs.trb.org/Onlinepubs/sr/sr298.pdf>. P. 4.

<sup>7</sup> Ewing et al. 2008, p. 9.

Other considerations include that public transit has its own emissions that dampen savings realized by reduced automobile use. A bus using conventional fuel would need to carry an average of 11.7 passengers at all times in order to be as efficient as a group of cars.<sup>8,9</sup> Also, reductions in VMT produce corresponding reductions in CO<sub>2</sub> emissions, but the relationship is not one-to-one. Taking into account penalties from shorter trip lengths and increased congestion, both of which may result from more compact development, the literature suggests that a one percent reduction in VMT due to compact development translates into a 0.93 percent reduction in CO<sub>2</sub> from automobiles.<sup>10</sup> Because Burlington has relatively little traffic compared to larger urban areas, the observed ratio may be closer to 1.0. Using these numbers, a 30 percent reduction in VMT would translate into a 28 – 30 percent reduction in automobile CO<sub>2</sub> emissions for affected households. Looking forward, there does not appear to be sufficient data for Burlington officials to measure environmental benefits *caused by* changes in the City’s development patterns. However, local-level data will enable officials to monitor whether changes in VMT, energy use, and CO<sub>2</sub> emissions are occurring *in tandem with* changes to the built environment. We recommend that Burlington use Vermont data from the National Household Travel Survey as a data source for VMT. Based on average emission rates and the adjustment factors noted above, every one VMT decreased should result in a net decrease of 0.86 – 0.93 lb. CO<sub>2</sub>. To estimate environmental gains from public transportation, we recommend the following calculation:

**EXHIBIT 1: CALCULATING ENVIRONMENTAL GAINS FROM PUBLIC TRANSPORTATION**

ROW	CALCULATION STEP	CURRENT VALUE	DATA SOURCE
[1]	Total Bus Gallons (Diesel) Consumed	372,534	CCTA
[2]	/ Total Bus Passenger-Miles	Unknown	CCTA
[3]	= Bus Gallons (Diesel) per Person-Mile	[1] / [2]	Calculated
[4]	x CO <sub>2</sub> per Gallon (Diesel)	22.2 lb.	EPA
[5]	= Bus CO <sub>2</sub> per Person-Mile	[3] x [4]	Calculated
[6]	Automobile Gallons (Gasoline) per Person-Mile	0.03	U.S. Average
[7]	x CO <sub>2</sub> per Gallon (Gasoline)	19.4 lb.	EPA
[8]	= Automobile CO <sub>2</sub> per Person-Mile	[6] x [7] = 0.582 lb.	Calculated
[9]	Net CO <sub>2</sub> Reduction per Passenger-Mile from Riding Bus	[8] - [5]	Calculated
[10]	Total CO <sub>2</sub> Reduction from Riding Bus	[9] x [2]	Calculated

Development modes also impact residential building energy use. This is mainly because compact development tends to promote multi-family buildings and smaller single-family homes. Such buildings have lower volumes and outside surface area per person, resulting in lower heating and cooling loads. For example, Kockelman et al. estimated that a family moving from a 2,400 sq. ft. detached single-family home to a modestly smaller 2,000 sq. ft. apartment would save an average of 37 percent of total energy use.<sup>11</sup>

**TASK 3: CASE STUDIES**

In Task 3, IEc developed case studies of other cities that have implemented promising urban development strategies focused on alternative energy, transportation, green buildings, and/or green infrastructure. A common theme identified is the importance of ongoing communication and outreach.

<sup>8</sup> Department of Energy Center for Transportation Analysis. "Transportation Energy Data Book." Edition 29, June 30, 2010. Table 2-12. Available at: <http://cta.ornl.gov/data/index.shtml>

<sup>9</sup> I.e., 39,906 Btu per vehicle-mile / (5,465 Btu per vehicle-mile / 1.6 passengers) = 11.7 passengers.

<sup>10</sup> Ewing et al. 2008, p. 34.

<sup>11</sup> Kockelman, K. et al. "GHG Emissions Control Options: Opportunities for Conservation." University of Texas, Austin, 2009. Available at: <http://onlinepubs.trb.org/Onlinepubs/sr/sr298kockelman.pdf>. Cited in Transportation Research Board 2009, pp. 175, 199.

**Boulder, CO: Bus Passes and Municipal Parking.** The EcoPass is an unlimited-use pass for yearly access to all area transit services, offered at a group discount rate. EcoPasses are available to employers to purchase for their employees to provide an incentive for taking public transit. A second type of EcoPass, the “Neighborhood EcoPass,” provides a group of residents with a group rate for the EcoPass, without having to receive the pass from an employer.<sup>12</sup>

GO Boulder, a group within the City’s Transportation Division, provides additional benefits beyond the group discount rate, including a 50 percent subsidy for the first year in the EcoPass program and a 25 percent subsidy in the second year. GO Boulder also spends approximately \$1 million per year investing in transit service above what the Regional Transit District (RTD) provides. GO Boulder buses run so frequently that schedules need not be provided, making public transit an even more attractive option.

A parking program further reduces automobile use in Boulder’s downtown area. The City used bonds and property taxes to build shared parking structures, install parking pay stations, and improve signage at parking garages to reduce the amount of circling to find available parking spots. A portion of the revenue generated from parking fees (about \$750,000 in 2010) is used to pay for EcoPasses for all downtown employees.<sup>13</sup>

The major barrier the GO Boulder team faced with the EcoPass is that most of the transit system and the EcoPass itself are owned by RTD, a regional authority operating out of Denver. RTD does not support the subsidies that GO Boulder offers on the EcoPass. Three other groups needed to be convinced that the EcoPass and parking fee programs were a good idea: the Chamber of Commerce, employers, and developers. Thus, the Boulder team conducted extensive outreach to move these programs forward.

The EcoPass program has been successful in encouraging transit. The team has found that an employee or resident with an EcoPass is five to nine times more likely to take public transit compared to an individual without an EcoPass. Also, when an employer provides an EcoPass to its employees, about 38 percent of the employees will drive to work in a single occupancy vehicle, compared to 70 percent of employees that are not provided with an EcoPass.

**Berkeley, CA: Municipal Building Energy Retrofits.** The City of Berkeley began energy retrofits of municipal buildings in the early 1990s. This initiative is currently under the purview of the Office of Energy and Sustainable Development (OESD). OESD places a high priority on making municipal buildings more energy-efficient. Working cooperatively with the Department of Public Works, OESD staff seek to identify opportunities to incorporate energy efficiency retrofit measures into otherwise scheduled building maintenance activities. Retrofits generally include updated lighting, heating and ventilation systems, and building control systems, along with the addition of occupancy sensors for lights.

The main barrier to retrofits is funding. Retrofits can only be done when there are enough upfront funds and/or financing to support them. For large projects, the City often relies on utility rebates and financing. For example, Pacific Gas and Electric is currently offering zero percent financing for efficiency projects.

To date, the City has saved 2.1 million kWh of electricity and 37,520 therms of heat from retrofit projects in municipal buildings, for an annual savings of \$370,000. Throughout implementation, OESD has found it important to coordinate with other agencies. Coordination with Public Works is particularly beneficial, and maintenance projects now routinely include consideration of energy efficiency upgrade opportunities.

**Portland, OR: Stormwater Management.** A “Green Street” is a street that uses vegetated facilities to manage stormwater, improve water quality, replenish groundwater, make streetscapes attractive, and improve access

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<sup>12</sup> An overview of the EcoPass program is available at: <http://www.rtd-denver.com/EcoPass.shtml>

<sup>13</sup> Information on parking pricing can be found at: [http://www.bouldercolorado.gov/index.php?option=com\\_content&task=view&id=899](http://www.bouldercolorado.gov/index.php?option=com_content&task=view&id=899)

for pedestrians and bicyclists. Portland began exploring a Green Streets initiative in 2005.<sup>14</sup> During Phase 1, a cross-bureau team developed a guidance document, which is now included in the City's Stormwater Management Manual.<sup>15</sup> The team initiated Phase 2 in 2006, during which they wrote a citywide Green Streets policy; the City Council approved this policy in 2007.

The program is funded by capital dollars and the City's general fund. Transportation enhancement projects fund some Green Street facilities, as all new city infrastructure projects are required to consider Green Streets. When new development projects have difficulty funding Green Streets, they can access Portland's "One Percent for Green" fund.<sup>16</sup> Construction projects within the right-of-way that fall outside the requirements of the Stormwater Management Manual are required to contribute one percent of construction costs to this fund.

Staff within the Watershed Revegetation Program visit the facilities at least twice per year to perform maintenance. In addition, through the "Green Streets Steward Program," volunteers can become "stewards" of Green Streets, providing needed maintenance such as weed removal, plant trimming, and trash cleanup.

Despite some dedicated funding sources and a volunteer maintenance corps, funding for the Green Streets program remains a challenge. In addition, the Bureau of Environmental Services (BES) experienced difficulty in identifying the best plant types to be used in Green Street facilities. BES has also found that outreach to both other agencies and the public is essential to program success; the bureau has a group of staff members specifically devoted to outreach.

Results indicate that Green Street facilities are effective, as evidenced by a 90 percent average reduction in peak flow from green infrastructure facilities and an average retention of 80 percent of rain water annually.<sup>17</sup> The effectiveness of individual facilities can vary according to several factors, including prior conditions, maintenance, and physical elements of the facility.

#### **TASK 4: IMPLEMENTATION RECOMMENDATIONS**

In the final task, IEC provided a set of recommendations to guide Burlington's implementation of its sustainability agenda. The key recommendations from Task 4 are as follows:

***Adopt a form-based code (FBC).*** IEC recommends that Burlington shift its zoning code to a form-based code (FBC). FBCs use physical form rather than the separation of uses as the organizing principle for development. They are prescriptive solutions that focus on identifying the types and features of development desired by the community at specific locations. Through the use of FBCs, Burlington would have more control over land use than conventional zoning, allowing the City to effectively implement policies and programs that are crucial for realizing the City's sustainability and livability goals. FBCs have been shown in many communities to be more effective than conventional zoning in realizing densities, better pedestrian orientation, and a reduction in auto dependency.<sup>18</sup> FBCs can also include provisions that prescribe the location and development of renewable energy, transportation nodes, and green infrastructure measures.

***Reconsider current parking policies.*** Burlington's no net loss parking policy and off-street parking minimums are in conflict with the City's sustainability goals. To move residents towards public

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<sup>14</sup> Information on the Green Streets program is available at: <http://www.portlandonline.com/BES/index.cfm?c=44407&>

<sup>15</sup> The Stormwater Management Manual is available at: <http://www.portlandonline.com/bes/index.cfm?c=47952>

<sup>16</sup> Information on the fund can be found at: <http://www.portlandonline.com/BES/index.cfm?a=341452&c=44407>

<sup>17</sup> City of Portland, *Stormwater Management Facilities Monitoring Report*, December 2010, p. S-5. Available at: <http://www.portlandonline.com/bes/index.cfm?c=36055&a=343463>

<sup>18</sup> Brad Broberg. "New Kind of Zoning, Cities of All Kinds Adopting Form-Based Codes." *On Common Ground*, a publication of National Association of Realtors, Winter 2010. See also Bill Spikowski. "Form-Based Codes." *Florida Planning*, Winter 2010.

transportation for commuting and walking in the downtown area, both of which are necessary for realizing the City's GHG emission goals, the cost of parking needs to rise. Boulder, Colorado, discussed above, has raised parking fees without any apparent negative impact on downtown businesses. The current low cost of parking downtown also represents a missed opportunity to raise revenues for parking and transportation improvements. The City should also consider allowing new development to provide cash-in-lieu of parking to create additional revenue. The revenues collected through cash-in-lieu of parking and higher parking fees could fund more strategically located garage parking, and/or street design and traffic control improvements.

Changes to parking policy could be coupled with innovations such as demand-responsive meter rates and shared parking. Other cities have been successful with this approach. Redwood City, California uses demand-responsive meter rates that produce an average 18 percent availability in the downtown area. Before program implementation, these parking spaces were always occupied by day-long employees. Now, the program provides greater access for shoppers and visitors.<sup>19</sup>

**Take steps to ensure the success of the new transportation plan.** Burlington's Transportation Plan sets a preliminary goal to increase annual transit ridership by five percent annually. Increasing service frequency on key routes is an appropriate first step. The Chittenden County Transportation Authority (CCTA) notes that most of its buses provide service every 30 minutes; the key recommendation of the Burlington Transportation Plan is to establish 15-minute service on the four major routes bringing riders into Burlington. Incentives to use transit will also be important to spur additional ridership; In Burlington, the CCTA's Smart Business program could be a useful tool for encouraging transit ridership. Boulder's EcoPass program could provide a useful model for successful implementation of a similar incentive program.

**Develop a re-commissioning program for the City's older building stock.** Over time, building system operations may cease to work in peak condition due to wear and tear, human error, changes in building operations, weather conditions, or other reasons. Re-commissioning, which includes testing and adjusting building systems to meet the original design intent and/or optimizing systems to satisfy current needs, can yield significant energy and cost savings at the building level. At a minimum, Burlington should require City buildings and schools to undergo re-commissioning on a fixed schedule, such as every five years. For privately-owned buildings, Burlington could require or incentivize re-commissioning at the point of sale.

**Develop a strategic plan for Burlington's green infrastructure initiatives, and ensure available resources to support it.** Current staffing is inadequate to support the green infrastructure program, and the stormwater fee does not provide an adequate incentive for green infrastructure. To develop a strategic plan, City officials should:

- Develop a few scenarios for the size and scope of a long-term green infrastructure program.
- Analyze funding needs in terms of staffing and other operating costs for each scenario over time.
- Analyze the potential for stormwater fees and other potential revenues to meet the funding needs estimated under each scenario.

As part of this analysis, the City should examine the impacts of raising its stormwater fee. The current user fee of \$1.17 per thousand square feet of impervious surface is too low to stimulate significant interest in earning green infrastructure credits. In contrast, Portland, Oregon, discussed above, charges \$9.97 per

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<sup>19</sup> Seattle Department of Transportation. "Best Practices in Transportation Demand Management." Seattle Urban Mobility Plan. January 2008. Available at: <http://www.seattle.gov/transportation/docs/ump/07%20SEATTLE%20Best%20Practices%20in%20Transportation%20Demand%20Management.pdf>.

thousand square feet of impervious surface for non-residential properties.<sup>20</sup> The City could also consider cost-sharing opportunities or low-interest loans for green infrastructure projects, such as under Philadelphia's SMIP program (briefly discussed in Task 3).

***Develop an outreach and communication strategy.*** Burlington should invest in communication and outreach for its sustainability programs, to market the concept of a Sustainable Burlington. All stakeholders will benefit from Burlington centralizing information on its climate change and sustainability plan onto one well-designed, branded website (e.g., "LivableBurlington.gov"). The City's sustainability page should explain what the City is trying to accomplish with its sustainability plan and should provide a compelling, concise argument about how climate action, livability, and economic stability are intrinsically linked for Burlington. Boulder County, Colorado and Seattle, Washington both have sustainability sites that Burlington could use as examples.<sup>21,22</sup>

Additional outreach and communications efforts would also benefit the City:

- Local businesses may want information on how sustainability initiatives can improve their bottom lines by creating a more livable, vibrant, and economically stable downtown. They will also benefit from reassurance that a lack of on-site parking will not negatively impact customer traffic.
- Existing and potential community members should understand the livability benefits of a vibrant, pedestrian-friendly downtown, such as the ability to walk to work and other key destinations.
- Other City agencies may require information on how Burlington's sustainability initiatives fit into existing procedures, how they are paid for, and what the environmental benefits will be.

In addition to the key recommendations detailed above, IEc also made several additional recommendations for Burlington's agencies to consider. These include:

- Implement and maintain stricter building standards, either by keeping Burlington's energy code state-of-the-art, implementing a "stretch" code, or by mandating buildings to meet green building standards such as LEED or the International Green Construction Code (IgCC).
- Reach out to experts to obtain guidance on implementing a green historic preservation program.
- Integrate energy efficiency into the capital planning process for municipal buildings.
- Focus on energy efficiency first, with renewable energy use a secondary strategy.
- Conduct additional feasibility analyses on renewable energy, particularly solar and geothermal, and integrate the results of these analyses into the form-based code.
- Create a green roofs program to bridge information gaps and provide incentives for users.
- Work with the Parks and Recreation Department to manage urban forestry as green infrastructure.
- Review Burlington's existing transportation assumptions and performance metrics using the information provided in the Task 2 memorandum.
- Increase service frequency for the City Loop bus route.
- Consider switching the CCTA bus fleet to biodiesel.

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<sup>20</sup> City of Portland, Oregon, Portland Bureau of Environmental Services. "Drainage/Stormwater Management User Service Charges and Discounts." Available at: <http://www.portlandonline.com/bes/index.cfm?a=354259&c=55059>.

<sup>21</sup> Boulder County. "About Sustainability." 2011. Available at: <http://www.bouldercounty.org/sustain/initiative/pages/aboutsustain.aspx>

<sup>22</sup> City of Seattle Office of Sustainability and Environment website. 2011. Available at: <http://www.seattle.gov/environment/>