



# 3.11 ENERGY

## 3.11.1 INTRODUCTION

The following section addresses the potential impacts associated with energy consumption in the Study Area. Energy consumption is qualitatively analyzed for buildings and vehicles. Energy consumption is not quantified given the unknowns on the type of development that may occur within the Study Area; however, information from Energy Star (Energy Star 2016a) that includes information on energy consumption by development is referenced to express an order of magnitude on energy consumption that could be expected. Information is provided on the different types of land use types expected based on the existing and total development addressed in Chapter 2. Fuel consumption from vehicles is also addressed qualitatively with information from the Puget Sound Regional Council (PSRC) on existing and forecasted average daily vehicle miles traveled (VMT) in the Puget Sound region and the average fuel economy of cars and trucks.

This analysis identifies significant impacts using the following thresholds:

- Fails to implement the City of Bellevue Environmental Sustainability Implementation (ESI) Key Performance Indicator (KPI) strategies and actions for decreasing emissions from energy consumed and VMT as a measure of energy use on a per capita basis. The ESI KPI identified City of Bellevue adopted targets for reductions in emissions from energy (identified as kilowatt and therms) consumed by 30 percent and an 11 percent reduction in emissions from both VMT and the drive alone rate.



- Fails to increase renewable energy supply implemented through solar and other forms of conservation and renewable energy resources. The ESI KPI identifies the increase in renewable energy installed.

There are no performance standards related to energy.

Mitigation measures to related to energy consumption are addressed after the Impacts section.

## 3.11.2 AFFECTED ENVIRONMENT

### REGULATORY ENVIRONMENT

The primary relevant regulation consists of the International Energy Conservation Code, as provided in Revised Code of Washington (RCW) 19.27A.020 and as adopted the State Building Code Council in Chapter 51-11C and 51-11R Washington Administrative Code (WAC).

The City of Bellevue (Bellevue City Code [BCC] 23.10) adopts the International Energy Conservation Code. This code generally states that the Washington State energy code shall be designed to construct increasingly energy efficient homes and buildings that help achieve the broader goal of building zero fossil-fuel greenhouse gas emission homes and buildings by the year 2031, and to require new buildings to meet a certain level of energy efficiency.

The Environmental Element and the Transportation Element of the City of Bellevue Comprehensive Plan include a number of goals related to the reduction of energy consumption. These include EN-4, EN-6, EN-47, and EN-48 in the Environmental Element that address reducing energy consumption to improve greenhouse gas emissions (GHG), and TR-38, TR-140, and TR-143 in the Transportation Element that address the use of new technologies and use of transit which reduce energy consumption and reduces GHG emissions. The City has developed an Environmental Stewardship Initiative. (City of Bellevue, 2013) It contains key performance indicators and strategies to reduce energy consumption and increase use of alternative energy sources.



## BACKGROUND

Puget Sound Energy's (PSE) electric and natural gas service area includes the Study Area. Peak energy consumption occurs in winter when heating demand is higher than summer cooling demand. Bellevue displays community energy usage trends on its energy dashboards (data provided as a courtesy to Bellevue solely for the purposes of GHG accounting). Trends show a general decline (2014 was one of the hottest summers on record, causing a summer peak load in contrast to normal winter peak) in per capita energy consumption even as overall energy use increased as a result of population and employment increasing. (City of Bellevue, 2018) The building sector accounts for 41 percent of energy consumption (ESI 2013-2018), and conservation efforts in these sectors mitigate the impact of increased overall energy use by decreasing the per capita consumption of electrical and gas energy. (City of Bellevue, 2013) The City of Bellevue offers a program geared towards solar power for residential and commercial properties. (City of Bellevue, 2017b)

The transportation sector accounts for 44 percent of energy consumption (ESI 2013-2018). The threshold measuring impacts of transportation to energy consumption are Vehicle Miles Travelled (VMT) and average fuel economy (AFE).

For the Puget Sound region, average daily VMT was 21.5 (PSRC, 2017). Within Bellevue, per capita VMT has been declining (City of Bellevue, 2018) even as overall vehicles have increased in the region (just like electricity).

Average fuel economy nationwide in 2016 was 24.7 miles per gallon. (U.S. Environmental Protection Agency, 2017b) As with VMT, per capita fuel consumption has been decreasing even as it increases overall.

The likely threshold for land use and population in the Study Area under the preferred and two alternatives is that energy consumption will continue to decline on a per capita basis while increasing overall. Conservation efforts in these sectors mitigate the impact of increased overall energy use by decreasing the per capita consumption of electrical and gas energy.



### 3.11.3 IMPACTS

Significant impacts would result if an alternative would cause either of these conditions:

- Fails to implement the City of Bellevue Environmental Sustainability Implementation (ESI) Key Performance Indicator (KPI) strategies and actions for decreasing emissions from energy consumed and VMT as a measure of energy use on a per capita basis. The ESI KPI identified City of Bellevue adopted targets for reductions in emissions from kilowatt and therms consumed by 30 percent and an 11 percent reduction in emissions from VMT and drive alone rate.
- Fails to increase renewable energy supply implemented through solar and other forms of conservation and renewable energy resources. The ESI KPI identifies the increase in renewable energy installed.

## IMPACTS COMMON TO ALL ALTERNATIVES

### Short-term Impacts

Construction, including demolition of existing developments, would require the consumption of energy. Energy would be consumed as part of the transport of materials, production related to building materials, and operation of equipment for both construction and demolition of existing buildings.

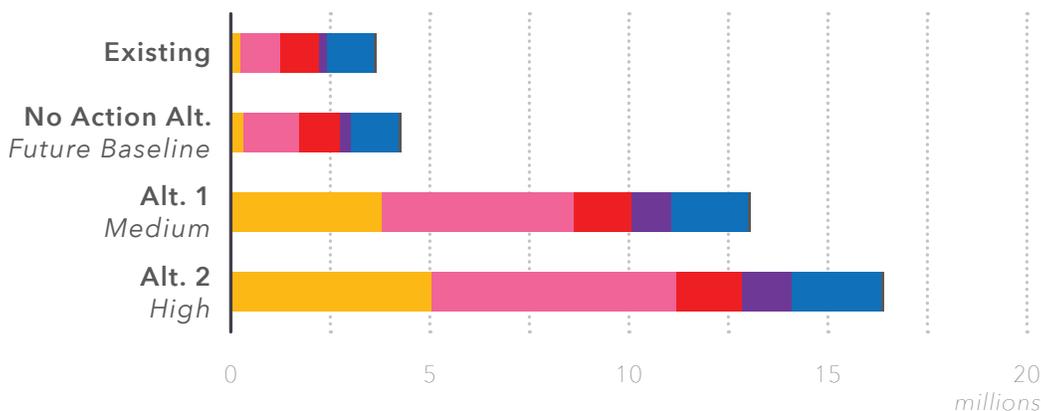
### Long-term Impacts

#### Energy Targets for Buildings/Operation

Development in the Study Area under all alternatives will primarily be comprised of retail/commercial, medical, office, housing, and hotel. Exhibit 3.11-1 provides information on the building space by alternative in 2035. The increases in development would increase population and employment in the Study Area which would increase energy consumption. As shown in Exhibit 3.11-1, Alternative 1 and 2 include over double the amount of square footage in 2035 than the No Action Alternative, with the majority of building type associated with housing (multifamily in higher density buildings) and office space.



### Square Footage by Building Type



**Exhibit 3.11-1**  
Building Space by Alternative, 2035

Source: Existing Space—City of Bellevue, 2017; Future Space—Leland Consulting Group 2017; BERK, 2017

### Share of Building Space by Building Type



Exhibit 3.11-2 provides information on energy consumption for the primary land use by type for a range of land use types including ones located in the Study Area. Energy consumption of these land use types is by the energy use intensity (EUI) which is defined as the buildings energy use as a function of its size or other characteristics. The lower the EUI the better the energy performance. (Energy Star 2016a) EUI is measured by thousands of British thermal units per square foot. Of the buildings in the Study Area, the hospitals in the northwest corner of the Study Area are the greatest consumers of energy because they are always open; have large number of employees, patients, and visitors; and facilities and activities large facilities including medical and lab equipment, heating/ventilation/cooling, food service, and refrigeration. (U.S. Energy Information Administration, 2012) After the hospitals, the largest consumers of energy are grocery stores. Bellevue reports the EUI for a number of

**Exhibit 3.11-2** Energy Usage by Primary Building Function

<b>USE TYPE</b>	<b>Site EUI (kBtu/sf)</b>
Convention Center/Performing Arts	45.3
Fire Station	88.3
Hospital	196.9
Medical Office	44.4
Worship Facility	36.8
Multifamily Housing	59.6
Mixed Use	78.8
Hotel	73.4
Office	67.3
Automobile Dealership	52.5
Retail Store	47.1
Convenience Store	192.9
Restaurant	223.8
Grocery Store	185.5

*EUI = Energy Use Intensity*

*kBtu/sf = thousands of British thermal units per square foot*

*Source: Energy Star, 2016b*

their buildings and information on EUI for Bellevue buildings was compared to the Energy Star data in Exhibit 3.11-2 for similar uses. Fire stations in Bellevue were EUI 63 and Energy Star indicates an EUI of 88.3, and offices in Bellevue were EUI 59 and Energy Star indicates 67.3. Based on the information Bellevue facilities are consuming less energy than the metrics currently used by Energy Star to determine energy consumption.

All new development or redevelopment would be designed and constructed to meet the applicable state and City building and energy conservation code requirements which would reduce energy consumption. A mixture of newer and older development would likely to be more energy efficient than existing development, based on changes to building codes and innovations in building and technologies. In addition, Puget Sound Energy has a number of programs geared towards reducing energy consumption for both small and larger users.



### **Vehicle Energy Use Targets**

All the alternatives will result in increases in consumption of energy for vehicles. Increase in density and the introduction of light rail would reduce vehicle energy usage as more people would be able to use transit. The alternatives would increase population and employment in the Study Area in the horizon year (2035) compared to the baseline year (2016). Although the change in VMT between the alternatives is significant, the VMT under all alternatives is a relatively small percentage of the citywide VMT. In addition, the associated fleet mix, emission reduction, and technology implementation due to fuel economy standards could offset this increase in VMT. Refer to Section 3.2, Air Quality and Greenhouse Gases, for information.

As noted in the Environmental Element of the Bellevue Comprehensive Plan, VMT in the Puget Sound Region has remained steady as population has grown. (City of Bellevue, 2015c) The chapter also provides information the use of green building to reduce resource consumption and reduce GHG emissions. The introduction of new vehicle technologies and increase in fuel economy would continue to increase vehicle mpg and decrease fuel consumption.

### **Solar Energy and Other Alternative Energy Sources**

As noted, the City Bellevue offers a program geared towards solar power for residential and commercial properties. The ESI identifies strategies and actions to develop alternative energy and reduce energy consumption including encouraging energy conservation through the energy code and other tools, streamlining permitting process for green building and renewable energy projects, and implementing renewable energy projects and the potential for district energy subareas. Installation of solar would depend on the building footprint and the installation of local generation technologies would require the construction of new facilities to generate and distribute energy, but given the smaller footprint can be blended to match existing infrastructure.

District energy is another potential form of alternative energy that could be used for energy in the Study Area. District energy includes a central plant that generates energy (heating and cooling) and distributes the energy to buildings, that require energy transfer systems, in the district through pipe system. There is also the



potential for alternative energy within individual buildings as long as the developments (multifamily, office, mixed use, and hotel) are large enough to support it. An example of an alternative energy source in a development is sewage heat recovery that captures heat from hot water flowing down drains (i.e., showers, dishwashers, and washing machines) and uses that heat to re-heat hot water tanks and the building and as an example typically works best with residential buildings of greater than 200 units. (PHCPPROS 2016)

With redevelopment potential under all alternatives, new forms of energy sources can be integrated into new construction, and more so under Alternatives 1 and 2 which allow more opportunities for compact mixed-use growth.

### **Grand Connection Options**

The Grand Connection Options would not result in additional impacts because there would be no vehicle usage; civic structures may be developed under some options and would use energy similar to that described above under impacts common to all alternatives. The Grand Connection Options would encourage the use of non-motorized usage which would reduce energy consumption associated with vehicles.

### **Public Space**

The Public Space Options would not result in additional impacts associated with energy consumption because there would be a focus on non-motorized use such as with the Eastside Rail Corridor and Grand Connection. Park spaces may attract some vehicle usage. To the extent there are civic structures developed in the park there could be some energy use similar to impacts common to all alternatives.

### **Performance Standards**

There are no performance standards related to energy.

## **IMPACTS OF THE NO ACTION ALTERNATIVE**

Impacts under the No Action Alternative would be the same as those described above under Impacts Common to All Alternatives. The development under No Action would not be to the same



scale as Alternatives 1 and 2 and increases in population would be lower given the low projection of new housing development. Although new development and redevelopment are lower, the No Action Alternative would result in increased energy consumption. Because the No Action Alternative would have minor increases in density, it would not have the same opportunities for energy savings. The No Action Alternative would not provide opportunities for compact walkable neighborhoods that reduce the dependency on vehicles. Additionally, because the No Action Alternative does not include much increase in housing it could result in residents in the region living further away and result in a greater VMT and fuel consumption. There is also the lost opportunity to connecting additional residents to transit with the East Link station in the Study Area. Because the No Action Alternative does not include the Grand Connection Options, there is no potential for additional decreases in vehicle energy consumption and a missing non-motorized link connecting Downtown Bellevue to the Eastside Rail Corridor Trail, which could further reduce energy consumption and encourage more people to use non-motorized modes.

## IMPACTS OF ALTERNATIVE 1

Impacts under Alternative 1 would result in greater densities and higher percentages of population and employment that would increase energy consumption when compared to the No Action Alternative. However, the increased density of development could reduce per capita energy use.

Based on information in the Exhibit 3.11-1, the majority of new development in the Study Area would be associated with housing and office. Because of the greater potential for larger developments compared to the No Action Alternative there is a greater likelihood of alternative energy sources, especially those that require greater densities. The increases in density would result in a more compact walkable neighborhood and provide opportunities for more residents and employees to use transit instead of drive compared to the No Action Alternative. Alternative 1 would also include the Grand Connection. These connections would result in reductions in vehicle fuel consumption in addition to the improvements in technology that are anticipated to reduce energy consumption.

Energy used during construction would be more than under No Action Alternative but less than under Alternative 2.



Under Alternative 1 there would be increases in building heights allowed in the Study Area could affect the use of solar on adjacent properties due to shading. Shading can negatively affect and reduce the effectiveness of solar panels. Refer to Section 3.8, Aesthetics, for information on shading as a result of increased height limits. However, under Alternative 1 because there is an increase in building heights on some developments the addition of solar may not be warranted because of the lack of available space on the rooftop especially on taller buildings that require additional equipment. The physical interference can be mitigated through the purchase of renewable credits (i.e., PSE's renewable energy program and alternative energy tariff).

## IMPACTS OF ALTERNATIVE 2

Alternative 2 would result in the greatest densities and higher percentages of population and employment that would increase energy demand, compared to the other alternatives. Alternative 2 would have the greatest increase in both residential and commercial energy customers. However, the increased density of development could reduce per capita energy use and encourage alternative modes similar to Alternative 1.

Energy used during construction would be the greatest under Alternative 2 because of the potential new development in the Study Area.

Similar to Alternative 1, there would be increase in building heights and similar impacts to the potential for solar use.

## 3.11.4 MITIGATION MEASURES

### INCORPORATED PLAN FEATURES

None.

### REGULATIONS AND COMMITMENTS

- The Bellevue Building Code, through incorporation of the state energy conservation code, establishes a baseline for energy efficiency in new construction and substantial alterations.



## OTHER PROPOSED MITIGATION MEASURES

- Installation of solar (photovoltaic) and other local generating technologies (i.e., district energy) would reduce demand on energy supplied from public generating and distribution facilities.
- Implementation of sustainable requirements including the construction and operation of LEED-compliant (or similar ranking system) buildings which would reduce the increase required in power systems.
- The use of passive systems and modern power saving units would reduce the use of power in building heating and cooling.
- Use of alternative forms of energy could be included in larger developments where installation is cost effective.
- Implementation of conservation efforts and renewable energy sources to conserve electricity in new developments, including energy efficient equipment (i.e., light bulbs, appliances, and heating and air conditioning), could reduce energy consumption.
- The implementation of actions identified in the ESI 2013–2018 related to code and standards would allow permits for energy efficient developments to be approved in a quicker timeline.

### 3.11.5 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

No significant unavoidable adverse impacts on energy are anticipated. The development capacities proposed under all alternatives would increase overall energy consumption. This is mitigated by identifying conservation, renewables, and alternative energy sources for energy supply. It is also mitigated by applying energy codes to new development which intends reductions in emissions associated with energy consumption and VMT measures for building and transportation energy usage per capita.

Average annual VMT per capita would decrease with increased average vehicle fuel efficiency and deliberating providing the infrastructure and opportunity for people living and working in the Study Area to access alternative transportation modes.



The No Action Alternative would not have the same opportunities to reduce energy consumption both buildings and vehicles as Alternative 1 and 2, but does not result in significant unavoidable adverse impacts because new development or redevelopment would still be constructed to meet energy codes and would have opportunities for solar or alternative energies to help meet energy targets.