Urban environments emit 75% of global GHGs

UN Habitat
Our MISSION is to rapidly transform the built environment from the major contributor of greenhouse gas emissions to a central solution to the climate crisis.

Architecture 2030 provides the LEADERSHIP and designs the HIGH-IMPACT ACTIONS needed to achieve a carbon-neutral built environment by 2050.
ZERO Cities
City of Bellingham

Climate Protection Action Plan

Greenhouse Gas Monitoring Report

Emissions Reduction Measures
2018 Update

Community Emissions Analysis by Sector
Transportation accounted for an estimated 32% of Bellingham community greenhouse gas emissions in 2015 (Figure 13). A significant portion of transportation emissions come from Interstate 5 traffic passing through Bellingham, which is outside the influence of City climate policies. Bellingham community transportation emissions are difficult to estimate over this time period because transportation models changed from a state-level model to a more accurate local model. For consistency, the local model was backcast to 2005 and 2000, though this represents

Figure 13. 2015 Bellingham community CO2 emissions by sector
BUILDING SECTOR

43% OF EMISSIONS

residential

commercial
EXISTING BUILDING STOCK
BUILDING AREA SUMMARY

BELLINGHAM, WA

Current Building Stock
113,911,581 square feet
25,295 buildings

Current Building Area by Type
- COMMERCIAL 28%
- SINGLE FAMILY 48%
- MULTIFAMILY 24%

Current Building Area by Size

<table>
<thead>
<tr>
<th>Building Size</th>
<th>Million ft²</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10k ft²</td>
<td>1,658</td>
</tr>
<tr>
<td>10-20k ft²</td>
<td>3,135</td>
</tr>
<tr>
<td>20-50k ft²</td>
<td>19,039</td>
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</table>

Building Size Distribution

<table>
<thead>
<tr>
<th>Building Size</th>
<th>Building Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10k ft²</td>
<td>23,832</td>
</tr>
<tr>
<td>10-20k ft²</td>
<td>844</td>
</tr>
<tr>
<td>20-50k ft²</td>
<td>423</td>
</tr>
<tr>
<td>50-100k ft²</td>
<td>133</td>
</tr>
<tr>
<td>100k+ ft²</td>
<td>63</td>
</tr>
</tbody>
</table>
BUILDING ENERGY SOURCE SUMMARY

Emissions factor: 0.1445 MT CO₂e/MMBtu

2017 Electricity Grid Fuel Mix
- Coal 33.3%
- Hydro 21.0%
- Wind 8.3%
- Non-Firm Contract 11.8%
- Natural Gas/Oil 18.2%
- System 7.1%
- Biomass 0.3%

Current Fuel Mix: Energy Consumption
- Natural Gas 48%
- Electricity 52%

Current Fuel Mix: GHG Emissions
- Natural Gas 54%
- Electricity 46%

2017 Total Electricity Emissions
- Coal 47%
- Natural Gas/Oil 26%
- Non-Firm Contract 17%
- System 10%
- Hydro 0%
- Wind 0%
- Biomass 0%
BIG BUILDINGS / SMALL BUILDINGS
6% of the total number of buildings in Bellingham are greater than 10,000 ft² and produce 52% of citywide building sector GHG emissions.
BUILDING STOCK PROJECTIONS
BUILDING AREA PROJECTIONS

BELLINGHAM, WA

Building Area Trends

Building Area by Type

Existing Buildings Area

New Buildings Area

Million ft²


NEW BUILDINGS

EXISTING BUILDINGS

0 20 40 60 80 100 120 140 160

0 10 20 30 40 50 60 70

2017 2035

SINGLE FAMILY

MULTIFAMILY

COMMERCIAL

2017 2035

0 10 20 30 40 50 60 70

Existing Buildings Area

New Buildings Area
Building GHG Emissions Trends

- **NEW BUILDINGS**
- **EXISTING BUILDINGS**

**Emissions (Thousand MT CO₂e)**

- **Electricity Emissions Factor**
- **Natural Gas Emissions Factor**

**Building GHG Emissions by Type**

- **SINGLE FAMILY**
- **MULTI FAMILY**
- **COMMERCIAL**

- **2017**
- **2035**
POLICY PLANNING
1,500 buildings in Bellingham are greater than 10,000 ft² and produce 52% of citywide building sector GHG emissions.
24,000 buildings in Bellingham are less than 10,000 ft\(^2\) and produce 48% of citywide building sector GHG emissions.
GETTING TO ZERO!
NO BUILDING STOCK OR ELECTRICITY GRID IMPROVEMENTS

Getting to Zero

Building GHG Emissions Trends

- Electricity Emissions Factor
- Natural Gas Emissions Factor

Emissions ( Thousand MT CO2-e)

- New Buildings
- Existing Buildings

Y-axis: Emissions (Thousand MT CO2-e)
X-axis: Years (2017 to 2035)
CARBON FREE GRID

Building GHG Emissions Trends

- NEW BUILDINGS
- EXISTING BUILDINGS

Emissions (Thousand MT CO2-e)

- Electricity Emissions Factor
- Natural Gas Emissions Factor

38%
CARBON FREE GRID + ZNC NEW CONSTRUCTION

Building GHG Emissions Trends

Emissions (Thousands MT CO2-e)

- Electricity Emissions Factor
- Natural Gas Emissions Factor

EXISTING BUILDINGS
Building GHG Emissions Trends

- Existing Buildings
- Electricity Emissions Factor
- Natural Gas Emissions Factor

Getting to Zero
- Carbon Free Grid
- ZNC New Construction
- All Electric
- Big Buildings

Bellingham, WA

72%
GETTING TO ZERO

CARBON FREE GRID

ZNC NEW CONSTRUCTION

ALL ELECTRIC BIG BUILDINGS

ALL ELECTRIC SINGLE FAMILY HOMES

Building GHG Emissions Trends

Emissions (Thousands MT CO2-e)


94%
A framework of integrated policies for national and sub-national governments (state, provincial and municipal) to phase out CO₂ emissions in the built environment by 2050. It is structured to deliver energy and emissions reductions, zero-net-carbon building codes, rapid expansion of local renewable energy systems, and the development of equitable, resilient and healthy communities.