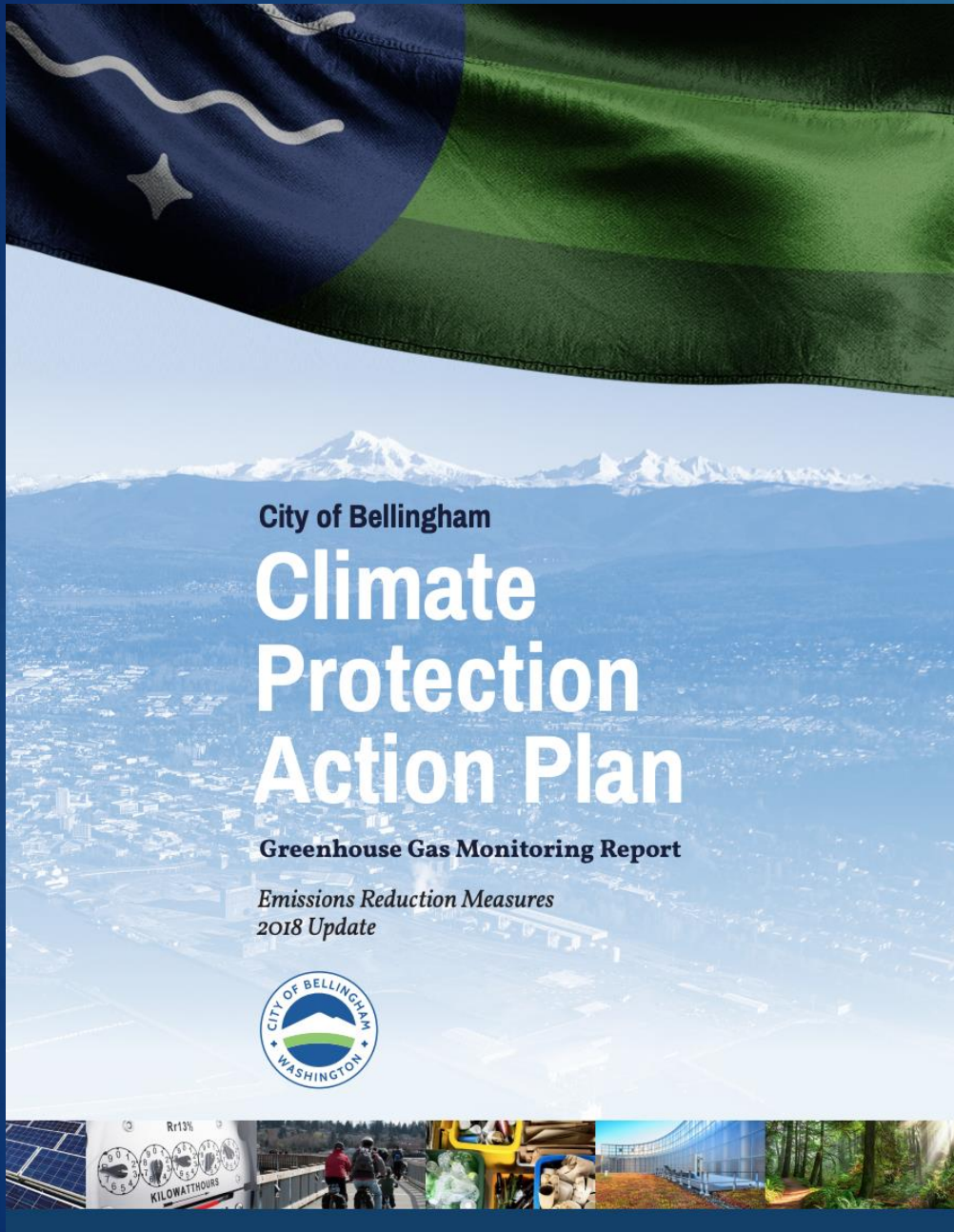


BUILDINGS WORKING GROUP



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

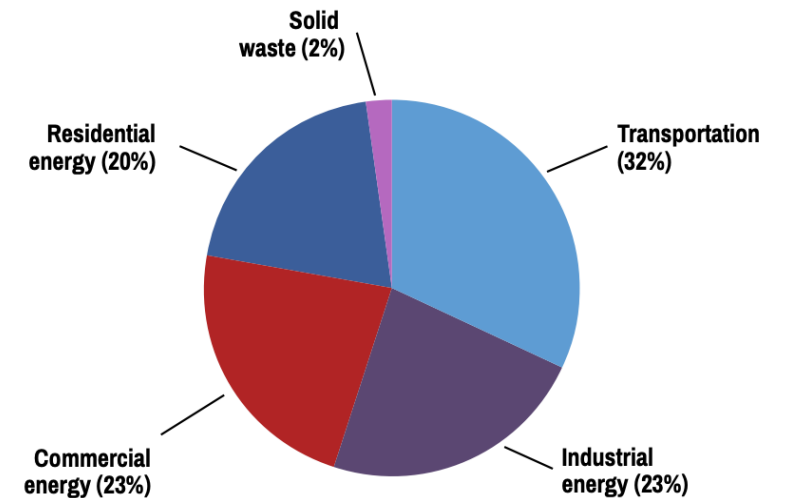


Figure 13. 2015 Bellingham community CO₂e missions by sector

BUILDING SECTOR

43%
OF EMISSIONS

Greenhouse Gas Monitoring Report

Emissions Reduction Measures
2018 Update

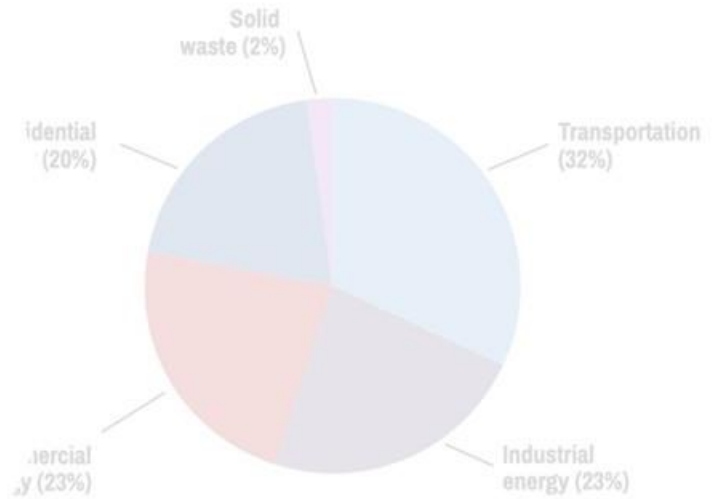
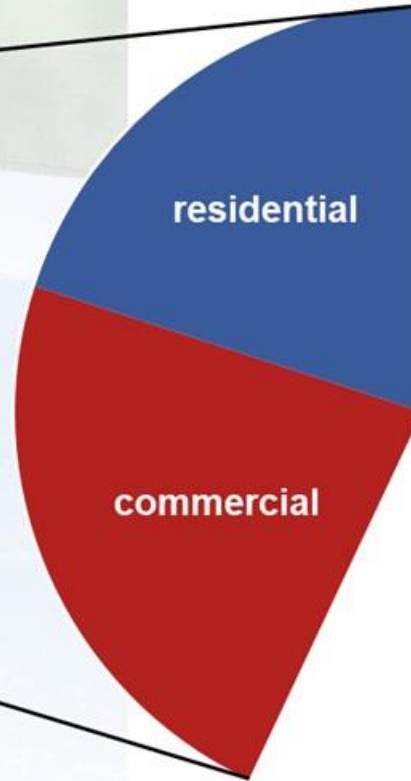
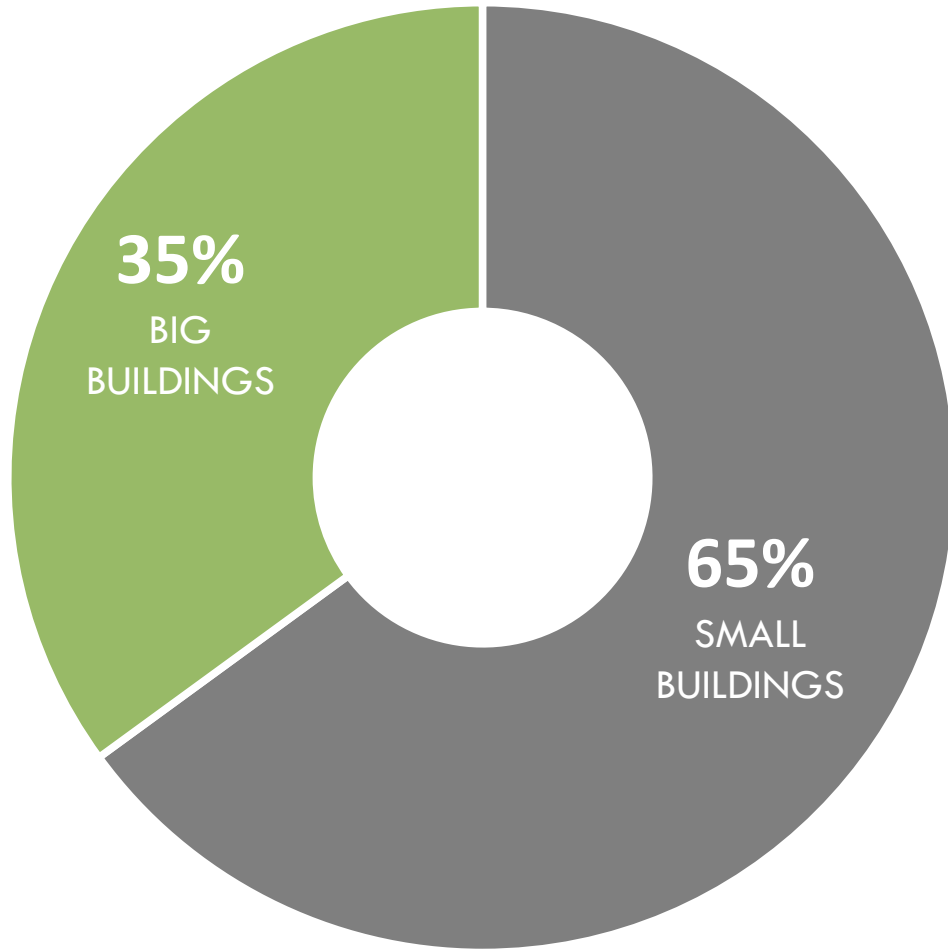


Figure 13. 2015 Bellingham community CO₂e emissions by sector

JO5
presents

Total Building GHG Emissions in 2035

Existing & New Buildings, Business-as-Usual

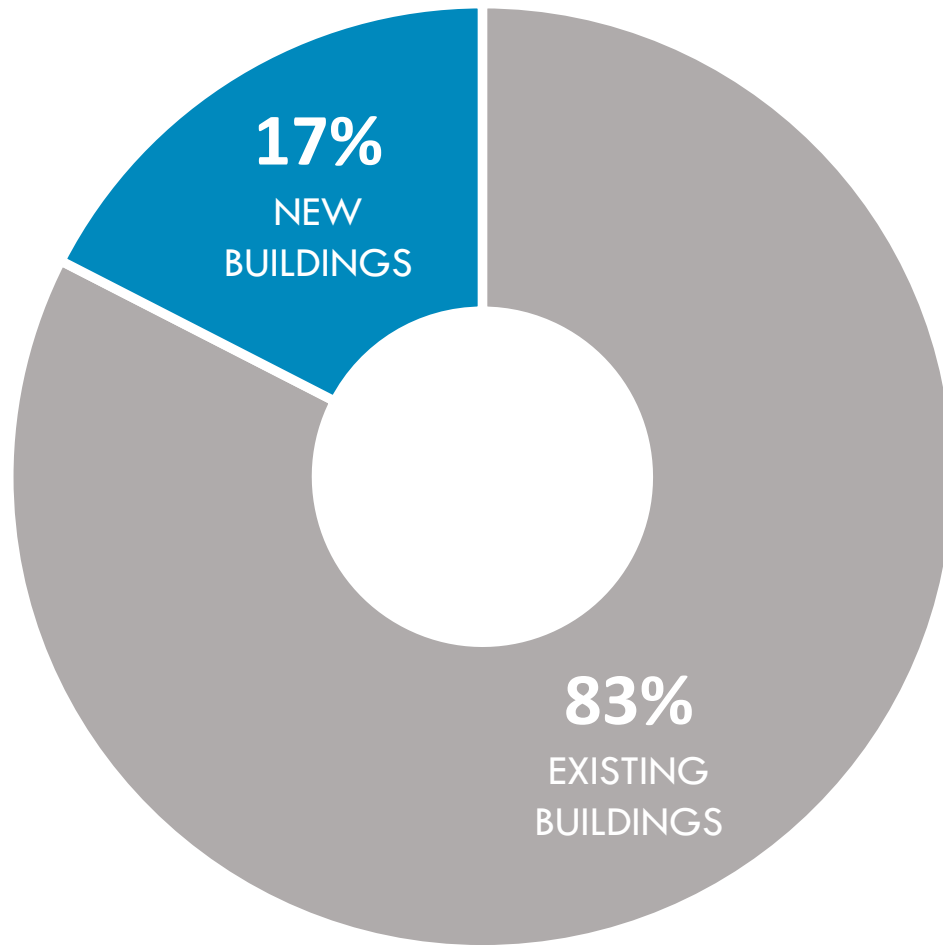


**We have to address
both big and small
buildings to meet goals**

Charts showing business-as-usual, no action scenario, with the assumption that the electricity grid is 100% carbon neutral in 2045 as is legally required by the Washington State Clean Electricity Bill (E2SSB 5116).

Total Building GHG Emissions in 2035

Existing & New Buildings, Business-as-Usual

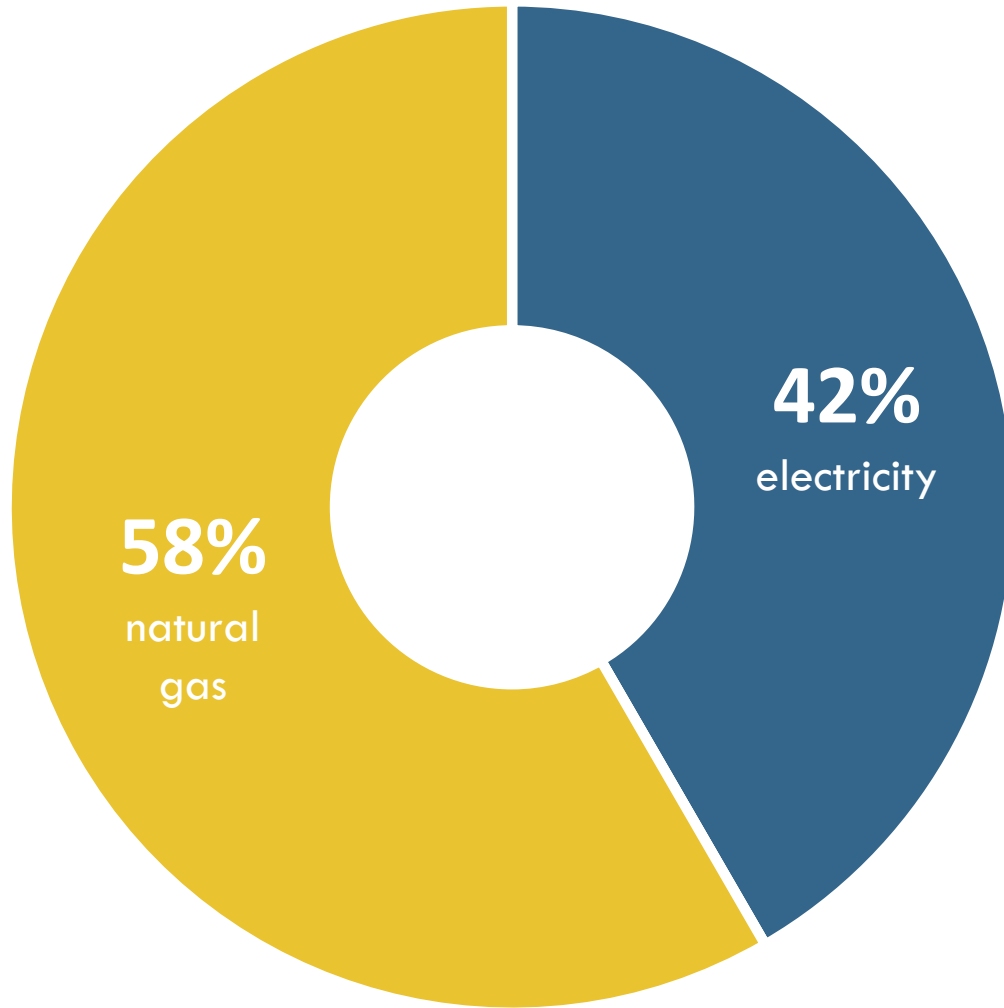


We have to address both existing and new buildings to meet goals

Charts showing business-as-usual, no action scenario, with the assumption that the electricity grid is 100% carbon neutral in 2045 as is legally required by the Washington State Clean Electricity Bill (E2SSB 5116).

Total Building GHG Emissions in 2035

Existing & New Buildings, Business-as-Usual



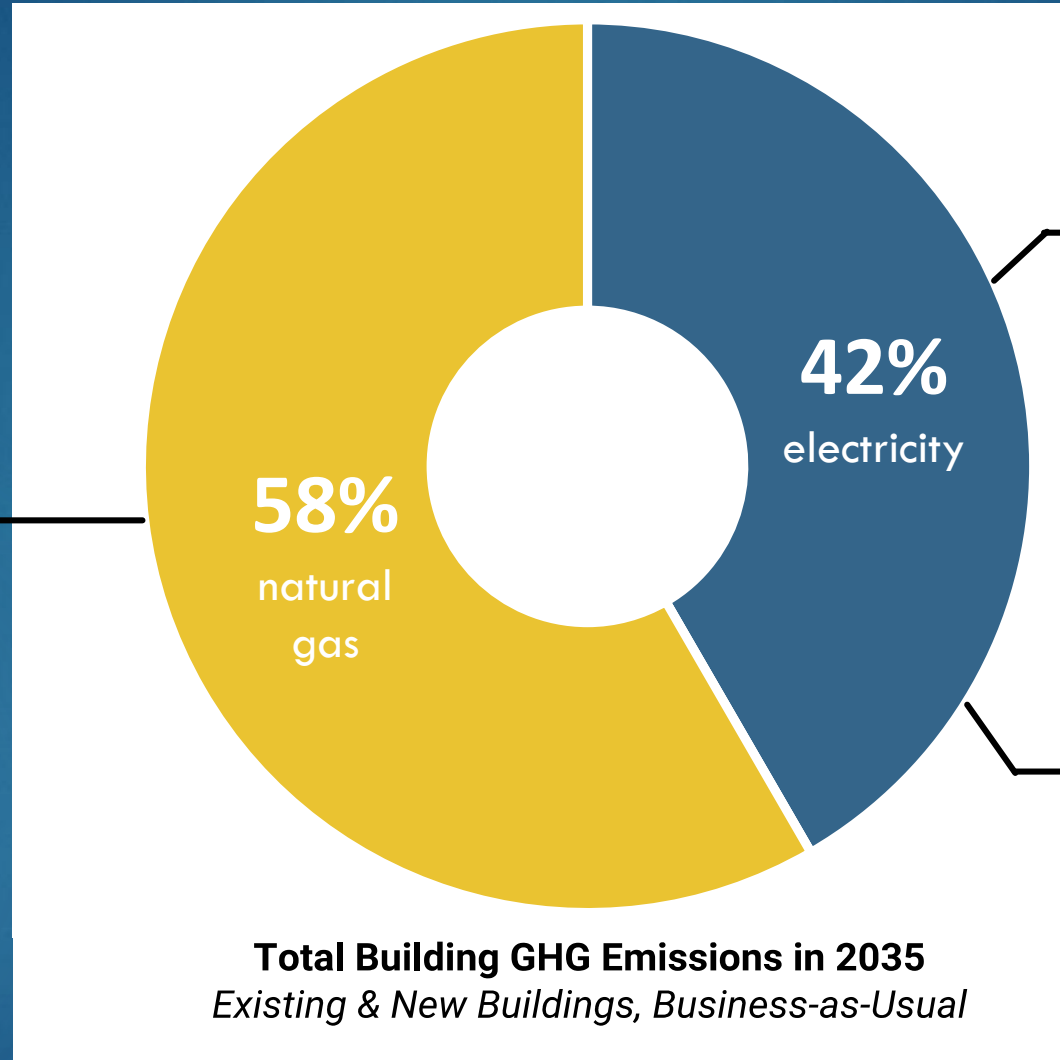
Goal: eliminate both sets of emissions

(from big & small, new & existing buildings)

Charts showing business-as-usual, no action scenario, with the assumption that the electricity grid is 100% carbon neutral in 2045 as is legally required by the Washington State Clean Electricity Bill (E2SSB 5116).

HOW?

Electrification



Energy Efficiency

Renewable Energy

Charts showing business-as-usual, no action scenario, with the assumption that the electricity grid is 100% carbon neutral in 2045 as is legally required by the Washington State Clean Electricity Bill (E2SSB 5116).

ALL THREE ACTIONS NEED TO BE TAKEN TOGETHER

Electrification
without
Renewables

=

Eliminates natural gas
emissions but not
electricity emissions

Electrification &
Renewables
without
Energy Efficiency

=

More \$\$ spent on bigger
systems, more electricity
demand

ELECTRIFICATION

Proposed Measures



Parker Apartments, Seattle: All electric, low-income housing

Measure #1a

Electrify water and space heating in existing buildings at point of equipment replacement

(all buildings have heating systems electrified by 2040; look to accelerate to 2035)

Measure	Benefits	Challenges
1a. Electrify water and space heating in existing buildings at point of equipment replacement	<ul style="list-style-type: none">• <u>Technical</u>: Technology available with few exceptions• <u>Environmental</u>: Largest impact on GHG within building sector• <u>Social</u>: Health benefits; high performance/high efficiency• <u>Financial</u>: Net capital costs relatively low at point of replacement, with some exceptions	<ul style="list-style-type: none">• <u>Social</u>: Consumers/some contractors may not be familiar with the technology• <u>Financial</u>: Incentives and finance will be required to reduce or eliminate costs for some populations or types of equipment; utility rebates for conversion often not available

Measure #1b

Electrify new buildings at time of construction

(some exceptions if electric systems not technically feasible)

Measure	Benefits	Challenges
1b. Electrify new buildings at time of construction	<ul style="list-style-type: none">• <u>Technical</u>: Technology available with few exceptions; likely 100% applicable before 2035• <u>Environmental</u>: Will save 17% of building GHG emissions by 2035• <u>Social</u>: Health benefits; high performance/high efficiency• <u>Financial</u>: Often no net increase in costs	<ul style="list-style-type: none">• <u>Technical</u>: Some specialized applications may require exceptions• <u>Social</u>: Some consumers may not want electric equipment – e.g. stoves. Education is needed on performance of electric versions

RENEWABLE ENERGY

Proposed Measure



Buildings Generate or Purchase Renewable Energy

- ▶ Building owners choose *one of the three* following options:
 - ▶ Install rooftop solar on at least 50% of solar-ready roof/site area
 - ▶ Buy into local community solar project (enough to meet at least 50% of building energy demand)
 - ▶ Sign up for PSE Green Direct or similar
 - ▶ Program offering(s) must be structured so that there is no cost premium for low-income residents

Measure #2

Buildings generate or purchase renewable energy (three pathways available)

Measure	Benefits	Challenges
2. Buildings generate or purchase renewable energy	<ul style="list-style-type: none">• <u>Technical</u>: No technical barriers.• <u>Environmental</u>: Will offset fossil fuel component of grid energy• <u>Social</u>: Will generate local jobs; may reduce energy bills• <u>Financial</u>: Low or no cost options will be available; On-site solar reduces energy bills	<ul style="list-style-type: none">• <u>Social</u>: Community solar/ credit options require program design; People may not be familiar with options• <u>Financial</u>: Subsidies may be required in some cases; Shrinking state subsidies may make onsite solar less desirable

A quick case for efficiency

- ▶ **Negawatt** – A unit (in watts) of energy saved
The cheapest energy is the energy we don't use!
- ▶ 2018 IEA report: Cost-effective, comprehensive EE policies could allow 60% more building space in 2040 for **no additional energy use**
- ▶ 2019 ACEEE report: Energy efficiency can **cut US energy use and GHG emissions in half by 2050**
- ▶ WA legislature: Investments in conservation and efficiency **reduce the need for adding costly future generation**
- ▶ **Co-benefits** → reduced energy burden, improved IAQ/home health, greater comfort, local job creation and business expansion

ENERGY EFFICIENCY

Proposed Measures



ENERGY EFFICIENCY FOR OWNER-OCCUPIED HOMES

- ▶ Deepest and most enduring energy savings through **weatherization**
 - ▶ Improve the thermal (**insulation**) and pressure (**air sealing**) boundaries
- ▶ **Measure 3a:**
 - ▶ Applies to **owner-occupied residential buildings built before 1990**
 - ▶ Triggered at **point of sale** with **24 month implementation** period
 - ▶ **Air sealing standard** → minimum 400 CFM50 reduction or a 20% reduction, whichever is greater + meet ventilation requirements
 - ▶ **Insulation standard** → minimum R-49 in attic, R-11 in walls and R-30 in floor (or fill available cavities)
 - ▶ No-cost/subsidized pathways for low- and moderate-income households

Measure #3a

Energy Efficiency for Owner-Occupied Residences

(Focus on buildings built before 1990)

Measure	Benefits	Challenges
3a. Energy Efficiency for Owner-Occupied Residences	<ul style="list-style-type: none">• <u>Technical</u>: No technical barriers.• <u>Environmental</u>: Reduce energy use and GHGs; help reduce grid demand• <u>Social</u>: Greater comfort and air quality; cost savings possible; creates jobs• <u>Financial</u>: Some low/no cost options already available; reduced utility bills	<ul style="list-style-type: none">• <u>Social</u>: Some projects could be disruptive to homeowners• <u>Financial</u>: Low income weatherization program may need more resources; incentives may be needed for some middle-income households; CEC has limited resources

ENERGY EFFICIENCY FOR RESIDENTIAL RENTALS

- ▶ More than **half of Bellingham's housing stock** consists of rentals
- ▶ **Split incentive** → owner determines building improvements, but tenants typically pay utility bills
- ▶ **Measure 3b:**
 - ▶ Applies to **residential rentals built before 1990**
 - ▶ Upgrades required **within 3 to 6 years** of enacting legislation (on rental inspection cycle)
 - ▶ **Air sealing standard** → minimum 400 CFM50 reduction or a 20% reduction, whichever is greater + meet ventilation requirements
 - ▶ **Insulation standard** → minimum R-49 in attic, R-11 in walls and R-30 in floor (or fill available cavities)

Measure #3b

Energy Efficiency for Rental Residences

(Focus on buildings built before 1990)

Measure	Benefits	Challenges
3b. Energy Efficiency for Rental Residences	<ul style="list-style-type: none">• <u>Technical</u>: No technical barriers.• <u>Environmental</u>: Reduce energy use and GHGs; help reduce grid demand• <u>Social</u>: Greater comfort and air quality; cost savings possible; creates jobs• <u>Financial</u>: Some low/no cost options already available; reduced utility bills	<ul style="list-style-type: none">• <u>Social</u>: Some projects could be disruptive to renters• <u>Financial</u>: Low income weatherization program may need more resources; incentives will be needed for some units to avoid rent increases; CEC has limited resources

ENERGY EFFICIENCY FOR COMMERCIAL BUILDINGS

- ▶ Focus on a range of energy efficiency retrofits in **lighting and other system (e.g. HVAC) upgrades**
- ▶ Mirrors Boulder's (CO) **Building Performance Energy Requirements**
- ▶ **Measure 3c:** [applies to **non-residential commercial buildings > 10,000 sq.ft.**]
 - ▶ Perform an **energy assessment** and **implement cost-effective measures**
 - ▶ Implement one-time **lighting upgrades**
 - ▶ **Perform Retro-commissioning (RCx)** every 10 years and implement cost effective RCx measures

Measure #3c

Energy Efficiency for Commercial Properties

Measure	Benefits	Challenges
3c. Energy Efficiency for Commercial Properties	<ul style="list-style-type: none">• <u>Technical</u>: No technical barriers.• <u>Environmental</u>: Reduce energy use and GHGs; help reduce grid demand• <u>Social</u>: Greater comfort and air quality; cost savings possible; creates jobs• <u>Financial</u>: Upgrades during periodic maintenance cycles reduce up-front costs; many projects have short paybacks	<ul style="list-style-type: none">• <u>Social</u>: Some projects could be disruptive to commercial businesses• <u>Financial</u>: CEC has limited resources

TECHNICAL ASSISTANCE AND FINANCE

How to make it all work:

▶ **Proactive technical assistance:**

- Provide design assistance and referrals
- Reduce permitting times, reduce or eliminate fees for certain projects
- Create web page and other communications strategies to publicize programs and provide information on finance and incentives

▶ **Money to reduce project costs:**

- Create additional local financial assistance capacity
- Provide monetary incentives when needed
- Identify or help develop new programs and techniques – private financing, state financing, new mechanisms to reduce up-front costs (e.g. on-bill financing)

Measure #4a

Create a technical assistance program

(City works with community partners to create a seamless support system to accelerate projects)

Measure	Benefits	Challenges
4a. Create a technical assistance program	<ul style="list-style-type: none">• <u>Technical</u>: n/a• <u>Environmental</u>: This measure supports other measures; no direct impact• <u>Social</u>: Fills knowledge and assistance gap to support social acceptance of electrification and renewable goals• <u>Financial</u>: Reduces costs and barriers to electrification and renewable goals	<ul style="list-style-type: none">• <u>Social</u>: Will require reorganization of some City activities; high need for City/community/contractor education• <u>Financial</u>: Expanded capacity will require City commitment

Measure #4b

Create a Bellingham Clean Energy Fund

(reduce costs of commercial and residential projects, with focus on low- and moderate-income households)

Measure	Benefits	Challenges
4b. Create a Bellingham Clean Energy Fund	<ul style="list-style-type: none">• <u>Technical</u>: n/a• <u>Environmental</u>: This measure supports other measures; no direct impact• <u>Social</u>: Promotes social acceptance of electrification and renewable goals• <u>Financial</u>: Multiple funding sources possible; Reduces costs of electrification and renewable goals	<ul style="list-style-type: none">• <u>Social</u>: One mechanism to support fund (gas tax) would require a public vote and would not be popular with some building owners• <u>Financial</u>: Funding sources are not certain; if funded by gas tax, could raise monthly tax on some residents

Measure #4c

Identify and promote other financing sources and mechanisms

Measure	Benefits	Challenges
4c. Identify and promote other financing sources and mechanisms	<ul style="list-style-type: none">• <u>Technical</u>: n/a• <u>Environmental</u>: This measure supports other measures; no direct impact• <u>Social</u>: Increases support for measures and facilitates completion• <u>Financial</u>: Reduces costs of numerous types of projects; Brings in outside public and private dollars to the community	<ul style="list-style-type: none">• <u>Financial</u>: Some programs not available yet (PACE financing, on-bill financing) and would need to be created; Need a full assessment of how different programs fill various needs--remaining gaps will need to be filled

The End



Photo credit: New Buildings Institute