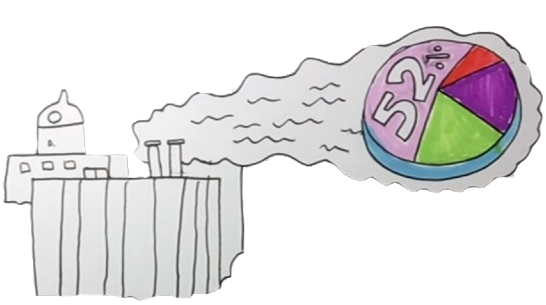
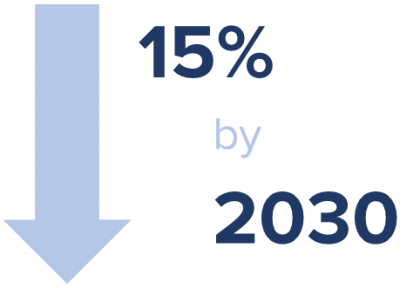
Building(s) for the Future Summit
Breakout Group: Large Residential and Commercial Buildings
January 15, 2020, 12:30 - 3:00pm

Welcome to Building(s) for the Future and the "Large Residential and Commercial Buildings" breakout group. Missoula has worked to advance climate mitigation and adaptation efforts in recent years (adoption of the 100% Clean Electricity Resolution, Climate Ready Missoula plan, Zero by Fifty plan, etc). Buildings play a role in each of these efforts as **they comprise 52% of our community's carbon emissions, according to 2014 data.**[1] They are increasingly important as pressures mount for development to keep pace with community growth, and in order to meet our carbon neutrality and 100% clean electricity goals, we estimate that Missoula must **reduce total building emissions 15% by 2030.**





To "build for the future," we need to consider ways to decarbonize the design, construction, operation, and deconstruction of our building stock. Over the past several months, we've done extensive research and received technical support from the American Council for an Energy-Efficient Economy (ACEEE) and National League of Cities on building policy and program precedents and best practices to inform our conversation. Panelists from across the country will share inspiring and innovative approaches, and our breakout group will build on their presentations to chart the path forward for how Missoula can build a more equitable, low-carbon future by focusing on ways to reduce the energy use intensity of large residential and commercial buildings.

A Note on Size: While this group is called "large" residential and commercial buildings, we haven't determined the size threshold that determines whether a building is large or not.

Primary Strategies to Consider

With technical assistance from the American Council for an Energy-Efficient Economy, the National League of Cities, and community members, we have identified several strategies

[1] Climate Smart Missoula and City of Missoula. "Missoula Community Greenhouse Gas Emissions Inventory," March 2017.

that Missoula should consider implementing. This list is not meant to be exhaustive (we hope you will provide additional ideas!), and they are brief descriptions rather than comprehensive explanations of how such a program or policy would be designed or implemented. Where possible, we have included an estimate of the $/MT of CO_2 reduced to help evaluate their impact and cost. Our hope is that the following will jumpstart the group's conversation and help all participants begin from a place of shared understanding. As you read, consider the pros and cons of each, as well as what you believe Missoula should prioritize pursuing in the next year, 5 years, and 10 years. Strategies include:

- Energy use disclosure ordinance (benchmarking and transparency)
- Building energy (or emissions) performance standards (BEPS)
- High performance standards for new buildings via zoning
- Mandatory retro-commissioning and/or tune-ups of commercial and/or multifamily buildings
- Voluntary stretch code
- Energy savings competition
- Energy efficiency "bulk buy"

For an overview of all the strategies being discussed today, including the ones in this background brief, please reference Appendix A.

Energy use disclosure ordinance (benchmarking and transparency)

An energy use disclosure ordinance, or benchmarking and transparency policies, require commercial and/or residential building owners to disclose their building's energy consumption (typically via Energy Star Portfolio Manager) on an annual basis to local government. The data is then compared to buildings of a similar type and size and then made publicly available. Over the past decade, disclosure ordinances have emerged across the United States as an effective tool to boost energy efficiency in buildings and are seen as a critical first step for data-driven decision making and the creation of stronger market signals.[2] They do not mandate energy efficiency or a certain building performance standard.[3] For more on mandating a performance standard, see "Building energy (or emissions) performance standard" below.

Energy use disclosure ordinances are typically implemented via the passage of a local ordinance and target buildings by size and type. The size cutoff ranges across jurisdictions, though most of Missoula's peer communities apply benchmarking to buildings 25,000 sf and larger. The first step of the ordinance process is a building inventory to understand the size and use of buildings within the jurisdiction, which will help determine the appropriate building size that the program will address. For reference, the Missoula County Courthouse and Annex is 85,000 sf. Disclosure ordinances are often phased over time, and it's possible to phase them so

[2] Natalie Mims et al., "Evaluation of U.S. Building Energy Benchmarking and Transparency Programs: Attributes, Impacts, and Best Practices," (Berkeley, CA: Lawrence Berkeley National Library, April 2017).
[3] Ibid.

smaller buildings are required to disclose later in the process, increasing the total number of buildings that fall under the policy.

~$17 - $46/ MT of CO_2 reduced

Disclosure ordinances are most effective when paired with an additional policy, such as mandatory retro-commissioning or building energy performance standards (see below).

Building energy (or emissions) performance standards (BEPS)

A building energy (or emissions) performance standard sets energy or emissions standards that larger multifamily and commercial buildings must meet by a certain date. In addition to a long term policy goal, such as 80% energy use intensity reduction by 2035, BEPS include interim goals that must be met along the way (e.g., 38 EUI by 2025, 34 EUI by 2030, 31 by 2035, etc.).[4] Rather than increase education about a building's energy (via disclosure) or encourage energy efficiency (via an engagement campaign), BEPS *require* a standard to be met.

BEPS are implemented via local ordinance, applying to buildings of certain sizes and types, and they phase in over time, beginning with extensive stakeholder engagement and benchmarking to define appropriate targets. These preliminary steps ensure a performance standard is not unreasonable or unrealistic. Program design should also be paired with resources such as financial incentives, financing, and technical assistance, which will be especially important for affordable housing projects that are required to comply.

Greenhouse gas reductions are a direct reflection of the specific performance standard, so the exact GHG potential for a BEPS in Missoula cannot be determined at this time. However, ACEEE projects that an average BEPS applies to ⅔ of buildings and that 30% energy savings are possible in participating buildings that must comply with these standards.[5]

A note on legality: The legal relationship between state building codes and a building energy performance standard is murky - while local governments are not explicitly prohibited from establishing a BEPS, Governor Bullock's Climate Solutions Plan identifies BEPS in mitigation action 2K: *the State, through legislation, should explicitly allow Montana local governments to adopt building performance standards and Montana cities should adopt such standards tailored for their individual circumstances.*[6] This strategy suggests it may be legally contested if Missoula pursued it prior to the state legislature taking action to explicitly allow BEPS.

---

[4] Kimberly Cheslak, "Implementing Building Performance Standards: Consistency Is Key," *New Buildings Institute Codes and Policy*, September 29, 2020.
[5] Steven Nadel and Adam Hinge, "Mandatory Building Performance Standards: A Key Policy for Achieving Climate Goals" (Washington D.C.: American Council for an Energy-Efficient Economy, June 2020).
[6] State of Montana. (2020). Montana Climate Solutions Plan. Helena, MT.

~$8/MT of CO_2 reduced if ⅔ buildings participate and 30% reduction in each building

High performance standards for new buildings via zoning

While a BEPS applies to existing buildings, there is also an opportunity to mandate higher performance standards for new buildings via zoning. The City or County could mandate buildings over a certain size adhere to higher performance standards (such as LEED certification or Energy Use Intensity) through amending the zoning code. Currently, the City of Cambridge, MA and Boston, MA mandate efficiency requirements for buildings over 25,000 sf and 50,000 sf, respectively.[7]

Mandatory retro-commissioning and/or tune-ups of commercial and/or multifamily buildings

Mandatory retro-commissioning (RCx) requires large buildings to perform a prescribed set of operations and maintenance improvements designed to reduce building energy use every 5 years. Rather than require a certain standard be met (like BEPS), retro-commissioning requires *a set of actions be taken.* RCx programs are also implemented via local ordinance, applying to buildings of certain sizes and types, and they too phase in over time, beginning with union and trade group engagement and cost studies of retro-commissioning in publicly owned buildings. These steps help ensure that the required actions are not too costly to property owners. Program design should also be paired with a suite of financial incentives and technical support. Studies estimate that mandatory retro-commissioning can achieve whole-building energy savings of ~15%.[8]

~$27/MT of CO_2 reduced if ⅔ buildings participate and 15% reduction in each building

Voluntary stretch code[9]

A stretch code is a code or alternative compliance path that is more aggressive than base code, resulting in buildings that achieve higher energy savings.[10] The state of Montana allows localities to adopt voluntary stretch energy building codes, but they cannot require projects to adhere to this higher performance code.[11] While it is not legal to require adherence to a stretch code at this time, the Montana Climate Solutions Plan identifies this as a key mitigation strategy.

---

[7]Cambridge Community Development Program. "Article 22 Green Building Requirements & Dashboard," n.d. and Green Buildings, Pub. L. No. Article 37 (n.d.).

[8] Dan York et al., "Frontiers of Energy Efficiency: Next Generation Programs Reach for High Energy Savings" (Washington, D.C.: American Council for an Energy-Efficient Economy, January 2013).

[9] In 2018, the Missoula City Council passed Resolution 8250 to instruct staff to investigate the feasibility of a stretch code and if practical, develop a voluntary, incentive based stretch code for Missoula.

[10] "Stretch Codes," *New Buildings Institute*, n.d..

[11] In some states, such as Massachusetts, the state allows local jurisdictions to vote on whether or not they would like to require the stretch code instead of the base code. For more information, see: State of

Regardless of whether they are mandatory or voluntary, stretch codes provide an opportunity to train the building and development communities in advanced practices before the underlying energy code is improved and help accelerate market acceptance and adoption of more stringent energy efficiency codes in the future.[12] Depending on the stretch code itself, buildings that adhere to the stretch code could perform 20% - 40% better than the base code. Stretch codes are most effective when paired with incentives.

Energy savings competition

An energy savings competition could encourage local businesses, homeowners, and renters to reduce their energy consumption. Program design of such competitions varies greatly, and Missoula would need to engage all relevant stakeholders when identifying the details of a Missoula based competition. Generally speaking, competitions measure the change in participants' energy use from before the competition to during the competition and provide prizes to winners, utilizing online software to engage participants and track results via a public leaderboard or dashboard.[13] Missoula would not be the first Montana community to design an energy savings competition: Bozeman, MT hosted the "Energy Smackdown" competition in 2015.[14]

In a review of energy savings competitions, they were found to achieve, on average, a 5% reduction in electricity usage.[15] If paired with other incentives that could make whole home retrofits possible, energy savings could be much more substantial. Rutland NeighborWorks in Vermont spearheaded a program that allowed 5% of residences to undergo a comprehensive retrofit, which led to 30% savings in each household.[16] For an energy savings competition to be most effective, it needs to be paired with other resources, such as robust customer service: a recent study by Vine and Jones found that competition alone was not sufficient to achieve energy usage reductions.[17]

Energy efficiency "bulk buy"

A bulk buy program is when a local government makes a bulk purchase of high efficiency products (heat pumps, LED light bulbs, etc.) and then provides them to citizens at a below market cost to fill gaps in existing rebate and incentive programs.[18] This could reduce the

---

Massachusetts, "Building Energy Code: Summary of State Building Energy Codes Including the Stretch Code."

[12] "Stretch Codes," *New Buildings Institute*, n.d..

[13] Ariel Drehobl, Maxine Chikumbo, and Kate Tanabe. "Reducing Energy Waste through Municipally Led Behavior Change Programs." Washington, D. C.: American Council for an Energy-Efficient Economy, November 2018.

[14] Montana Right Now. "City Launches Bozeman Energy Smackdown," May 29, 2015.

[15] Edward Vine and Christopher Jones, "A Review of Energy Reduction Competitions: What Have We Learned?" (Berkeley, CA: California Institute for Energy and Environment, May 2015), p. v.

[16] Ibid.

[17] Ibid.

[18] "A2Zero: Ann Arbor's Living Carbon Neutrality Plan," April 2020.

upfront cost of high efficiency heating and lighting systems for property owners interested in improving the energy efficiency and property value of their assets. Such a purchase could be made in collaboration with other Montana cities to drive down cost and amplify benefits.[19] Ann Arbor, MI recently identified it as a top strategy to meeting their city's carbon neutrality goal, with an estimated cost of $3.92/MT of CO_2 reduced and strong health, economic, and equity co-benefits.[20]

~$4/ MT of CO_2 reduced[21]

Foundational Strategies to Consider

Each of the primary strategies are more feasible when paired with one or more of the foundational strategies below. As you evaluate the primary strategies above, consider these foundational strategies and what they would need to look like or include in order for Missoula to be successful. Foundational strategies include:

- Expand available financing options (variety of forms)
- 1-stop energy shop for residential and commercial properties
- Workforce development
- Expand access to low carbon and high efficiency materials

Expand available financing options (can take a variety of forms)

- **Private financial institutions** can offer (or expand their offerings) of financial products for energy efficiency, renewable energy, and electrification efforts.
- **Utilities** can offer on-bill financing or on-bill repayment. In on-bill financing, the utility incurs the cost of the upgrade and it is repaid in monthly installments on the bill. On-bill repayment is the same except that a third-party provides the up-front capital for the improvement.
- **The City of Missoula**, as a charter city, can establish PACE financing where a clean energy improvement is paid for via property taxes. The repayment is attached to the property rather than the individual. **Missoula County** may also be able to establish a similar program tied to property taxes.

1-stop energy shop for residential and commercial properties

Technical assistance will be central to high compliance rates for any of the above policies. A 1-stop energy shop would centralize incentives and technical assistance to make it as easy as

[19] Bozeman has identified "Increase energy efficiency in existing buildings" as a top strategy in their recent climate plan. For more information, see: City of Bozeman, MT, "Bozeman Climate Plan" (City of Bozeman, MT, 2020).
[20] "A2Zero: Ann Arbor's Living Carbon Neutrality Plan," April 2020.
[21] Ibid.

possible to implement energy efficiency measures. The 1-stop shop could serve both large building owners and also be a resource to households and renters as it evolved. 1-stop shops are typically pursued in partnership with the local utility, though Missoula may be able to create a 1-stop shop independently with appropriate funding.

Workforce development

The policies and programs, if pursued, will likely increase demand for a skilled workforce of energy service companies and contractors who can perform quality building retrofits, retro-commissioning services, and/or tune-ups. Missoula will need to pursue partnerships between local energy efficiency businesses, Missoula College, and other relevant stakeholders to develop a robust clean energy workforce. Workforce development programs can and should diversify the clean energy workforce and support the hiring and training of those typically not employed in these jobs.

Expand access to low carbon and high efficiency materials

Building materials are constantly evolving. As low-carbon, high efficiency materials (cross laminated timber, high efficiency windows, etc.) become more cost effective, it will be easier to incorporate them into large building projects. Additionally, this is a potential opportunity for supporting local entrepreneurs that focus on the manufacturing and distribution of these materials.

This work was funded by the National League of Cities' Leadership in Community Resilience grant. For more information, visit www.missoulaclimate.org/buildings.

Appendix A: Overview of Strategies

KEY									
Type of Tool			Building Stage				Feasibility Analysis		Group Codes
Incentive/Financial	Regulatory	Programmatic	Blueprint	Construction	Operation	Next Life (Decon/Rehab)	Move ahead	Some reservations	OWN - Owner Occupied Housing RENT - Rental Housing SUB - Low Carbon Subdivisions LARGE - Large Buildings INNOV - Promotion + Innovation INCENT - Developer Incentives

Tool Name	Other Possible Outcomes (in addition to low-carbon buildings)	Implementation Lever	Could advance objectives of...	$/MT of CO_2e Estimate	Legality	Selected Precedents	Groups Discussing
Expand financing	• Economic development	Public private partnership		N/A		Clearwater Credit Union, People's Gas in IL, Alabama Power	ALL
Expanded financing can take a variety of forms. **Private financial institutions** can offer (or expand offerings) of financial products for energy efficiency, renewable energy, and electrification. **Utilities** can offer on-bill financing or on-bill repayment. **The City of Missoula or Missoula County** can establish financing programs where repayment is attached to the property rather than the individual.							
One-Stop shop	• Greater coordination • Increased community awareness	Public private partnership		N/A		Energy Trust of Oregon and Energy Works of Fort Collins, CO	ALL
The 1-stop shop approach makes energy efficiency more accessible for a larger portion of the population (commercial and residential) by simplifying a complicated process. It typically requires a strong partnership with the local utility.							
Workforce development	• Economic development	Public private partnership		N/A		Philadelphia, PA, Minneapolis, MN, and Raleigh, NC	ALL
Developing a skilled workforce of energy service companies and contractors who can perform high-quality building audits and retrofits is a key component of any of the strategies in this table. Missoula will need to pursue partnerships between local businesses, Missoula College, and other relevant stakeholders. Workforce development programs can and should diversify the clean energy workforce.							
Expand access to materials	• Economic development	Public private partnership		N/A			ALL
Building materials are constantly evolving. Low-carbon, high efficiency materials are becoming more cost effective, and they present an opportunity to support local entrepreneurs that focus on the manufacturing and distribution of these materials.							
Home energy label ordinance	• Increased consumer awareness • Economic development	Local ordinance		N/A		Minneapolis, MN	OWN, RENT, SUB
All home sales and rental leases must disclose the unit's energy report card at time of sale or lease.							
Residential energy conservation ordinance (RECO)	• Increased consumer awareness • Economic development	Local ordinance		N/A		Burlington, VT, San Francisco, CA, and Berkeley, CA	OWN
RECOs require prospective sellers or buyers to perform a set of low-cost energy efficiency imprvements. These ordinances could result in 10 - 20% energy savings for the average home.							
Energy savings competition	• Increased community awareness	Public private partnership		N/A		Bozeman, MT, Fargo, ND	OWN, RENT, INNOV, LARGE
An energy savings competition encourages owners and renters to reduce their energy consumption, all while building momentum and awareness at the ground level for greater energy awareness.							
Retrofit assistance program	• Preserve affordable housing • Economic development	New local government program		N/A		Boulder, CO, Minneapolis, MN, Milwaukee, WI, and Dallas, TX	OWN, RENT
A retrofit assistance program would be a new local government program for homeowners and landlords that provides grants or low-interest rate loans for energy efficiency upgrades. They often include no-sell or affordability covenants to preserve affordability. Programs should be designed in tandem with, and promoted to, low-income residents.							
Energy efficiency "bulk buy"	• Economic development	New local government program		$4/MT		Ann Arbor, MI	OWN, RENT, SUB, LARGE
A bulk buy program is when a local government makes a bulk purchase of high efficiency products (heat pumps, LED light bulbs, etc.) and provides them to citizens at a below market cost to fill gaps in existing rebate and incentive programs.							

KEY									
Type of Tool			Building Stage				Feasibility Analysis		Group Codes
Incentive/Financial	Regulatory	Programmatic	Blueprint	Construction	Operation	Next Life (Decon/Rehab)	Move ahead	Some reservations	OWN - Owner Occupied Housing RENT - Rental Housing SUB - Low Carbon Subdivisions LARGE - Large Buildings INNOV - Promotion + Innovation INCENT - Developer Incentives

Tool Name	Other Possible Outcomes (in addition to low-carbon buildings)	Implementation Lever	Could advance objectives of...	$/MT of CO_2e Estimate	Legality	Selected Precedents	Groups Discussing
Eco-District	• National recognition	Public private partnership		N/A		Minneapolis, MN, Denver, CO, Boston, MA	INNOV
District-level project that brings together area stakeholders to design and implement ambitious projects with outcomes in equity, resilience, and climate mitigation. Brings a unique branding opportunity with national recognition.							
Promotion of flagship projects	• Increased community awareness • Marketing opportunity for leaders	Public private partnership		N/A		Sarasota, FL	INNOV
Contrasts Eco-Districts by being able to exist city or county-wide, rather than in one neighborhood. Flagship projects may represent a range of "going beyond what's expected," such as with a deconstruction plan, all-electric heating and cooling, or reducing embodied carbon. Could be recognized with an online "story map," recognition placards, or building tours (online or in person).							
Rental certification program with energy efficiency requirements	• Increased comfort and health	Local ordinance		$30/MT		Ann Arbor, MI	RENT
Establish a rental property registry and attach energy efficiency requirements to the process of acquiring or renewing a rental property owner's certificate of occupancy. Provide financial incentives, technical assistance, and flexible compliance pathways to help property owners. Bozeman identified this as a key plan in their most recent climate action plan.							
Renewable energy for renters	• Economic development • Increase clean electricity supply	Public private partnership		N/A		Southern California Edison	RENT
Increase renters' access to clean energy via Missoula's 100% clean electricity efforts, specifically a solar-ease expansion, green tarriff, or utility owned community solar. **Solar-ease expansion** can expand focus to landlords and tenants, as well as develop a green lease that helps align tenant and landlord interests.							
Energy use disclosure ordinance (benchmarking and transparency)	• Increased data transparency	Local ordinance		$17-46/MT		Seattle, WA, Fort Collins, CO, and Philadelphia, PA	LARGE
Require large building projects to disclose their energy use via an online data portal. This lays the groundwork forr higher performance, as well as collects data to inform better decisions.							
Building energy performance standards (BEPS)	• Economic development	Local ordinance		$8/MT		Reno, NV, St. Louis, MO, Washington state	LARGE
Sets energy or emissions standards that large multifamily and commercial buildings must meet by a certain date. Typically includes a long term policy goal as well as interim goals that must be met along the way.							
High performance standards for new buildings via zoning	• Economic development	Zoning		N/A		Boston, MA, Cambridge, MA	LARGE
In contrast to a BEPS, which applies to existing buildings, there is an opportunity to mandate higher performance standards for new buildings via zoning. The City or County could mandate buildings over a certain size adhere to higher performance standards (such as LEED certification or Energy Use Intensity benchmarks).							
Mandatory retrocommissioning and/or tune-ups	• Economic development	Local ordinance		$27/MT		Seattle, WA, Philadelphia, PA, Los Angeles, CA	LARGE
Requires large buildings to perform a prescribed set of operations and maintenance improvements designed to reduce building energy use every 5 years. Rather than require a certain standard be met (like BEPS), it requires a **set of actions be taken.**							
Voluntary stretch code	• Increased training	Local adoption of stretch code		N/A		Santa Monica, CA	LARGE
A stretch code is a code or alternative compliance path that is more aggressive than base code. The state of Montana allows localities to adopt voluntary stretch energy building codes. They are most effective when paired with incentives.							

KEY									
Type of Tool			Building Stage				Feasibility Analysis		Group Codes
Incentive/Financial	Regulatory	Programmatic	Blueprint	Construction	Operation	Next Life (Decon/Rehab)	Move ahead	Some reservations	OWN - Owner Occupied Housing RENT - Rental Housing SUB - Low Carbon Subdivisions LARGE - Large Buildings INNOV - Promotion + Innovation INCENT - Developer Incentives

Tool Name	Other Possible Outcomes (in addition to low-carbon buildings)	Implementation Lever	Could advance objectives of...	$/MT of CO_2e Estimate	Legality	Selected Precedents	Groups Discussing
Density bonus	• Increased density	Zoning		N/A		Austin, TX, Seattle, WA	INCENT
Provides additional density for projects that go beyond base building code.							
Reduced parking requirements	• Greater walkability	Zoning		N/A		Flagstaff, AZ, Denver, CO, State of CA	INCENT
Allows projects that go beyond base building code to provide fewer minimum parking spaces.							
Impact and/or permit fees reduced	• Reduced revenue for local government	Zoning		N/A		St. Petersburg, FL, San Diego, CA	INCENT
Reduces impact and permit fees for projects that go beyond base building code.							
Permit process expedited		Zoning		N/A		Albuquerque, NM, Salt Lake City, UT, Chula Vista, CA, Miami, FL	INCENT
Provides a faster permitting process for projects that go beyond base building code.							
Property tax abatement	• Reduced revenue for local government	Zoning		N/A		Virginia Beach, VA, Cincinnati, OH, Cleveland, OH, Baltimore, MD	INCENT
Provides partial reduction in property taxes for projects that go beyond base building code.							
TIF made available	• Increased conversations about TIF	Missoula Redevelopment Agency		N/A		Chicago, IL	INCENT
Makes TIF funding available for projects that go beyond base building code.							