MONTANA CLIMATE SOLUTIONS COUNCIL

Greenhouse Gas Mitigation Strategies Committee

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GHG MITIGATION STRATEGIES COMMITTEE

Draft White Papers – Version 4.2

Report Sections

Section I.

INVENTORY AND MODELING

1.1 ELECTRIC RETAIL LOAD MODELING FOR 2035 DECARBONIZATION

PRIMARY AUTHORS:

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KEY ISSUE

The Executive Order (EO) requires the Climate Solutions Council (Council) to develop a Montana Climate Solutions Plan which includes recommendations to achieve an interim goal of net greenhouse gas neutrality for average annual electric loads in the state by no later than 2035 and a goal of net greenhouse gas neutrality economy-wide at a date to be determined by the Council.

Assumptions:

The modeling workgroup assumed that "net greenhouse gas neutrality" as used in the Executive Order means achieving net zero anthropogenic emissions from all greenhouse gases, not just carbon dioxide emissions. The modeling workgroup also assumed that "average annual electric loads" (AAEL) as stated in the EO means the aggregate of all retail load within Montana (residential, commercial and industrial) divided by 8,760 (number of hours in a year).

Utilizing existing data, the workgroup estimated the current AAEL in Montana to be roughly 1800- 2000 aMW. Further refinement through additional data collection or modeling is necessary. Additionally, the council will need to help the work group prescribe a forecast for load growth in Montana through 2035, which may include electrification of automobiles and other sectors. Under the current resource mix (hydro, coal, renewables, natural gas, etc) the carbon emissions generated by the current AAEL is estimated at 13-14 million tons. This could also be further refined if the Council desires. For purposes of modeling and data gathering, the workgroup assumed that the greenhouse gas emissions generated by the current AAEL is the same as carbon emissions (no more or no less). The goal, then, is to reduce by 2035 the emission for the average retail loads GHG emissions of approximately 13-14 million tons to as close to zero as possible, then balance any remaining GHGs with an equivalent amount of offsets.

Modeling can help us with that task. At a simple level, modeling can inform us as to how these numbers (AAEL and corresponding emissions) may change over time, given certain variables. Those variables can range from the known (future coal retirements, planned resource acquisitions) to the abstract (future population growth, climate change, electrification of vehicles and the corresponding demand for more electricity, emerging technologies, etc). Projecting the future costs of these variables can be difficult, and assessing resource adequacy and reliability is always a challenge. In this respect, modeling can be quite complex (and therefore expensive), particularly where the goal is economy-wide.

The Council will need to consider how much modeling is necessary to meet the tasks outlined in the EO. This white paper outlines what information is currently available, how it can inform the Council's work, and what other modeling might be done depending on the direction the Council wishes to go.

Key Issues/Problem Statement:

1. What data and modeling resources are available to help the Council understand options for achieving the above goals, and what additional modeling might be needed?

2. What data and/or modeling is needed to accurately assess

- Current and future AAEL in Montana
- Current and future greenhouse gas emissions based on projected AAEL in Montana
- Potential paths to decarbonize AAEL in Montana by 2035
- An understanding of how the retirement of carbon resources will affect GHG emissions levels over time
- Current and future GHG emissions economy-wide, and how those emissions can be held at net-zero by a certain date

PROGRESS TO DATE

The modeling workgroup identified the following entities and/or studies which have examined one or more of the issues outlined or provide data at the national, regional, state or local level:

- U.S. Energy Information Administration (EIA)
- Environmental Protection Agency (EPA)
- Bonneville Power Administration (BPA)
- Montana Dakota Utilities (MDU) Integrated Resources Portfolio (IRP) 2019
- Northwestern Energy IRP 2019
- Northwestern Energy Network Resource list on their Open Access Same-Time Information System (OASIS)
- E3 Resource Adequacy in the Pacific Northwest; Serving Load Reliably Under a Changing Resource Mix 2019
- Montana DEQ Historical Energy Stats and Understanding Energy in Montana (for historical perspective and general numbers)
- The Clean Energy Transition Institute (CETI) and Evolved Energy Research (Evolve); Northwest deep carbonization study

The workgroup further determined that:

- As of the release of the paper, a significant amount of data regarding electric load exists from the following utilities: Western Montana Electric Co-ops served by BPA, Northwestern Energy, Montana Dakota Utilities, and Eastern Montana Co-ops served by WAPA and Basin Electric. To incorporate the data from these various sources into a modeling exercise designed to assess future AAEL and emissions would require additional work.
- Using available data for 2016-18, we have been able to determine a carbon intensity level (amount of emissions based on average megawatts used) for each Montana utility. This was done by DEQ using EIA sales data by utility (EIA-861) multiplied by the balancing area emissions rate for each utility as reported by EPA/eGRID. The Council should decide whether information on carbon production at the individual utility level is useful and, if so, whether the information needs to be updated.

The workgroup also considered a number of ways to analyze the system, or different approaches for decarbonization utilizing different studies (some already exist, some would have to be generated:

- Link generation to specific load within Montana. In some areas of Montana, electricity comes from carbon free resources that are located out-of-state. That portion of load can be factored in as a reduction to overall carbon (GHG) emissions.
- Use the Northwest Power and Conservation Council's (NWPCC) Marginal and Avoided Cost of Carbon study (2018), which examines the impact of future CO2 regulation in long-term utility resource planning.

The NWPCC deems this an important exercise, at least for the Columbia region, because improper accounting for this risk when evaluating resources may result in poor resource decisions and higher costs for the region's ratepayers. The Council could use the study to compare what the regional energy system looks like in 2035 under a "business as usual" case, versus what the system might look like with zero carbon emissions for retail load. This way, the Council could see the differences in cost and generation mix between the two scenarios. Note that the relevance to Montana may be limited as the modeling takes into account various Columbia River hydro conditions that affect Montana's BPA customers, but not other utilities.

- Model the build-out of Montana's supply of carbon free resources (i.e., wind and solar) and plan to export the energy to reduce generation of carbon emitting resources (i.e., natural gas) in other places. This assumes that carbon reduction outside Montana using carbon-free resources in Montana can count toward GHG reduction targets.
- The Western Interstate Energy Board commissioned Energy Strategies in 2019 to study the changing resource mix, carbon reduction goals, and their implications in the west. The study provides decision makers potential options to improve the flexibility of the grid under future conditions. The study considers the 2025-2035 time horizon and evaluates system flexibility for this future using modeling tools designed to simulate grid operations, transmission capabilities, and system reliability. Results indicate that flexibility challenges exist in the west and, absent implementation flexibility solutions, the west may lack sufficient grid flexibility to achieve state energy goals. This inability to export power because of broad and more frequent oversupply conditions means that it is critical to have a diverse resource mix. Electrification, which is not considered in detail, can have a mitigating effect so long as it is implemented properly. In the long-term, results indicate that it will be very difficult, or at least extremely costly, to achieve Western policy targets without broad coordination of wholesale markets. Results also indicate that gas, Montana wind, long-duration pumped storage, and increased access to Southwest market purchases, are all viable capacity solutions for the Northwest. The council should consider how this study might inform its work.
- The Clean Energy Transition Institute (CETI) and Evolved Energy Research (Evolve) presented their Northwest deep carbonization study at the December 10th full council meeting in Helena. The study provides an economy wide look at various pathways to achieve an 86% reduction in carbon from the baseline of 1990 in 2050, and the costs associated with those pathways. The study also assumes that the electric sector will be 96% below the 1990 baseline, and the GHG emissions will be primarily due to the need for natural gas to balance the grid. By 2050, 95 Gigawatts (GW) of generation nameplate capacity are added to the system (44 GW wind, 35 GW solar 14 GW gas, primarily for reliability, capacity value in times of low hydro, wind, solar combined with 2 GW storage). Fossil fuel use in electric generation is about 4% of the total generation primarily in natural gas fleet. Some of the new load includes: Electrolysis to produce Hydrogen uses 21,400 GWh; Direct Carbon Capture uses 3,340 GWh; and Electric Boilers uses 2,950 GWh, This helps to reduce the oversupply issues from the increase in variable generation added to the system. The study does not include benefits from avoiding climate change, reducing air pollution, improved health.

GAPS

(These are potential gaps, depending on the direction the Council wishes to take)

- Absence of a consistent approach or established methodology for determining CO2 emissions from AAEL for each Montana utility

- Limited or absence of data for CO2 emissions from all Montana utilities
- Difficulty in linking out-of-state generation to specific retail load within Montana
- Limited research on how other states have modeled emissions reductions: MSU students are working to summarize various studies completed in other states.
- Projecting closure dates for carbon emitting resources is difficult
- What new generation might be added to meet MT load
- Understanding how energy imbalance markets might help
- Projecting AAEL growth
- The need to account for reliability and capacity in the modeling exercises
- The need or degree to which costs must factor into modeling
- The need or ability to accurately model net GHG neutrality economy-wide at a future date. The only economy-wide study currently available is the CETI/Evolve work.
- Working with an outside firm such as CETI or E3 would allow an unbiased description of potential resources and costs associated with achieving the EO purpose. While the workgroup might be able to assemble a list of potential resources, it will be difficult to accurately assess financial costs and system adequacy without a model similar to the E3 or CETI study (although NPWCC or MSU might be able to help)
- Based on existing data, the workgroup assumed that the partial retirement of some but not all of the Colstrip units, retirement of Lewis and Clark, Colstrip Energy Limited Partnership (CELP) and Yellowstone Energy Limited Partnership (YELP) will reduce Montana in-state electric production CO2 emissions significantly. This alone will significantly contribute to the EO's net GHG goal for AAEL. The more difficult question is how the resource gap will be filled, at what cost, and to what degree of reliability given various other factors in play (transportation electrification, etc). In order to compile appropriate data and modeling, the working group would appreciate guidance from the Council as to how specific the Council wishes to be in its strategy recommendations set forth in the EO.

Questions for the Group:

1. Should the modeling group focus on AAEL only, or at the economy-wide scale as well?
2. Does the Council want to refine the AAEL and emissions of 1800-2000 aMW and 13-14 million tons?
3. Does it matter whether AAEL is analyzed using carbon emissions or GHG emissions? Is there a difference?
4. Is it helpful to calculate load at the individual utility level?
5. Is the council concerned with resource adequacy and balancing needs of the electrical system?
6. How complex should the modeling be and who should do it?

RECOMMENDATIONS

RECOMMENDATION 1: PROPOSED STUDY

The most efficient way to get accurate and credible information about options to achieve the targets set forth in the EO would be to contract with a firm like CETI. The workgroup recommends that CETI do the following:

- Calculate a baseline for AAEL in Montana from 2016-18.
- Project that baseline forward to 2035.
- Using their modeling capabilities, run multiple pathways for carbon neutrality for the electric sector by 2035 (sample pathways include the status quo, various energy portfolios, buying renewable energy credits, carbon capture, others?).
- Have Council members come up with a preferred alternative for achieving the target, or use the modeling to explore the strategies outlined in the EO, Section 1.
- Do the same for the economy-wide goal, providing parameters that make sense for Montana (i.e., electrification of all vehicles may not be possible by 2035, so factor that into the equation).
- Based on the results, the Council will have a better idea about setting a time frame for meeting the economy-wide goal, as well as strategies for achieving that goal.

Section II.

Energy Efficiency
Residential and Commercial Buildings
Tribal and Local Governments

2.1 REVISE MT ENERGY CODES ADMINISTRATIVE PROCESS

PRIMARY AUTHORS:

- Kathy Hadley
- *Does the White Paper need to be coordinated with other Committees? NO*

KEY ISSUE

The overall goal is to reduce GHG emissions. Building energy codes are an effective way to save energy over the long term. The value of energy efficiency in properly implemented construction standards is universally recognized as the easiest and most cost-effective way to help consumers and businesses save energy and money, make housing and businesses more affordable, and reduce greenhouse gas emissions. All of these benefits are difficult or impossible to capture if they are not taken into consideration at the time of construction. (https://aceee.org/topics/building-policies). The building energy codes help Montana residential and commercial business save significant energy. Energy cost savings for Montana resulting from the state updating its commercial and residential building energy codes in accordance with federal law are significant, estimated to be on the order of nearly $35 million annually by 2030. (https://www.energycodes.gov/adoption/states/montana).

In addition, since the goal is to reduce GHG emissions, consideration must be given to all sources of those emissions and integrated strategies developed in order to accomplish that objective. Two critical elements to achieve zero or close to it economy wide GHG emissions will be to decarbonize the electric sector and to electrify the transportation sector. Some jurisdictions have utilized building codes in furtherance of this larger, more integrated approach targeting emission reductions, So, for example, including as part of commercial building codes a requirement for vehicle charging stations.

PROGRESS TO DATE

Montana has a strong state building code bureau and programs that they administer. The state has had building energy codes for many years which are periodically updated. Given the climate crisis, this may be the time to investigate opportunities to improve how energy building codes are adopted and enforced in Montana, allowing us to save even more energy and reduce greenhouse gas emissions. For example, in Montana it takes multiple years to adopt new building codes (which the IECC updates every 3 years). The state currently uses a relatively long process of adopting updated energy codes and before they are done with the process, another new set of IECC standards are issued. In addition, the energy building codes have been isolated from the other building codes, making the energy codes adoption process more cumbersome and time consuming. Another issue regarding enforcement is that up until a couple years ago cities could enforce the building codes within 3 miles of their city limits, where most of the new construction occurs. Currently, cities cannot do these inspections, reducing enforcement in areas of the highest construction growth in MT.

GAPS

An area that needs further discussion/investigation is whether we want to ensure this recommendation focuses on building code changes that advance energy efficiency. The question is would we need/want to clarify that if building code changes are made, the Council recommends the codes be used for purposes of energy efficiency improvements and not, as some states have done, use the codes to advance renewable energy?

STAKEHOLDERS

IDENTIFY STAKEHOLDERS WHO NEED TO BE ENGAGED IN EITHER DEVELOPMENT OF RECOMMENDATIONS OR THEIR IMPLEMENTATION.

- MT Dept Labor and Industry, Building Codes Bureau
- MT Building Association
- Residential and commercial building contractors
- Local Building Inspectors
- Energy Advocates

RECOMMENDATIONS

RECOMMENDATION 1: REVISE MT BUILDING ENERGY CODES AMINISTRATIVE PROCESS

1. Regular adoption of updated International Energy Conservation Code (IECC) codes every 3 years, with amendments appropriate to MT. Adoption process needs to occur within 12 months of a new code being issued by the ICC.
2. Require that the energy code be considered as the same time as the other codes to avoid the current situation where the energy code will take effect months later than the other codes.
3. Reinstate a city jurisdiction's authority to enforce the energy code for up to three miles beyond their boundary.
4. Require that all builders operating in the self-certification areas of the state be required to submit, to the Building Codes Bureau, a written statement that a house complies with the state energy code and/or have the appropriate state agency enforce building codes outside of local jurisdictions.
5. Modify language regarding energy stretch codes to allow a jurisdiction to require compliance with that local stretch code in their jurisdiction. Explore the possibility of developing a stretch code for the entire state that would be optional for local jurisdiction adoption.
6. Investigate the feasibility of requiring energy rating labeling for new home sales and new commercial buildings.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**

The State Building Codes Bureau could modify current administrative processes/practices to reduce the length of time it takes to adopt new energy codes and to help with enforcement of the codes outside of local jurisdictions. The legislature would need to act to allow cities to do inspections outside their city limits. I don't know if the legislature would need to act on "stretch codes".

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**

Pros- Adoption of these recommendations would result in additional energy savings and fewer greenhouse gas emissions over time from new residential and commercial buildings. It would allow local communities to adopt voluntary stretch codes if they so choose.

Cons- Some people will be against reinstating energy code inspections within 3 miles of cities.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

  I'm guessing the impact could be medium to high simply because building codes are such an effective way to save energy over the long term.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

  No significant adverse impacts.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

  State staff time to improve the energy code adoption process, cities may need more staff.

- **Provide an estimate of a reasonable timeframe to implement this recommendation. Does this recommendation address short, medium, or long term goals?**

  One to two years.

NOTE: There is dissent to this recommendation regarding #3 from Alan Olsen and Gary Wiens, with regard to authorizing a city to enforce code outside of the city's jurisdiction:

- **"Electric co-ops have great trepidation with cities going outside city limits to impose their standards.**
  - **Rationale: Counties are more likely to be philosophically aligned with rural people.**
  - **Building standards are effective if focused on new construction but if retrofits occur, we believe they must be limited to permanent energy-efficiency measures. These measures are generally cost effective, provided they have a reasonable payback period."**
- **"Co-ops are also concerned about imposing a surcharge on consumers for energy efficiency measures.**
  - **Co-ops favor programs such as the federal Rural Economic Development and Energy and Loan and Grant program but worry about the co-op – and thus the rest of its consumers – being liable if someone paying back a loan sells their house. There is a substantial risk of that liability not being transferrable to the purchaser of the home."**

There was also a request to include MACO and the League of Cities in further consideration of this proposal.

2.2 UTILITY PROCUREMENT STANDARDS

01/15/2020

PRIMARY AUTHOR:

Chuck Magraw

KEY ISSUE

The rate of energy savings in Montana is quite low: around 0.5% annually. States that are high performing acquire energy efficiency at over 2.0% annually. The acquisition of energy efficiency will reduce the need for electricity generation, reducing GHG emissions.

In addition to the issue of the absolute of amount of electricity consumed, there is a need to ensure sufficient generating capacity to serve load when required. Demand response, which is used to shift demand away from high load periods, is a tool that can be used to help balance supply and load and, at the same time, can also reduce greenhouse gas emissions since carbon producing resources may be used to meet demand during high load periods, and could also potentially obviate the need for new generation (which, may be fossil fuel generation). Storage can also play a role in this regard since it can serve as a generation resource during heavy load periods and, if it uses renewable resources to "charge," would constitute a non-carbon generation resource.

To decarbonize our electricity sector and our economy, Montana, like other states, will have to produce all or most electricity from renewable resources, electrify our transportation sector, and shift water and space-heating from natural gas to electricity. In order to accomplish this, and take advantage of an electric system powered by variable renewable energy, load will have to better connected with supply and grid requirements. Demand response and storage will be a critical part of this, as will valuing energy efficiency based on its time dimension, i.e., when it occurs.

PROGRESS TO DATE

27 states currently have an energy efficiency resource standard, which is simply a standard that establishes a level of energy efficiency to be acquired on an annual basis. In those states, energy efficiency acquisition has increased considerably. In states without an EERS, energy efficiency acquisition is not robust.

Demand response resources have been, and are increasingly being called upon, to shift load away from periods of high demand. For example, Montana-Dakota Utilities runs a demand response program in its service territory, targeting 25 MW of peak load reduction and Idaho Power aggressively seeks demand response resources. Many of the nation's utilities are required to and have procured storage, the cost of which continues to decline. For example, this summer NV Energy announced plans to pair over 1000 MW of solar with nearly 600 MW of battery storage. In a number of states, utilities are required, as a result of legislative or utility commission actions, to procure a certain amount of demand response and/or storage resources.

GAPS

To have a complete understanding of this issue, it would be helpful to know, on a utility by utility basis, the precise level of energy savings as a result of energy efficiency acquisition efforts.

STAKEHOLDERS

- Utilities
- Public Service Commission
- Legislature
- Energy Efficiency Providers
- Low-Income Groups

RECOMMENDATIONS

RECOMMENDATION 1: ENERGY EFFICIENCY RESOURCE STANDARD

The recommendation is for the establishment of a graduated standard that is applied to each investor owned utility (IOU) in the state. An energy efficiency resource standard (EERS), applied statewide to the state's IOUs, would ensure that the benefits of energy efficiency – to customers, to the utilities, to local economies – are realized. The standard would be set at 1% energy savings on an annual basis within 3 years after program implementation, then rising to 1.5% annually for the next 4 years, and to 2% annually thereafter. In order to ensure that the utilities are not disincentivized from adopting policies that promote beneficial electrification, e.g., converting from natural gas or propane to electric heat, load growth attributable to these activities would be excluded from total sale volumes and thus would not have any effect in the calculation of energy savings that must be acquired to meet the standard.

Finally, it is also important to note that an energy efficiency standard could also specify some amount of energy efficiency acquisition targeted at low-income Montanans. Low income household receive significant benefits from energy efficiency acquisition since low income customers spend a disproportionately large amount of their disposable income on meeting their energy needs (compared to more well off customers) and because of barriers to efficiency acquisition that impact these customers more than others.

Note that the standard as written does not apply to the state's electric cooperatives. Discussions are ongoing within the Climate Council, including a representative of the electric cooperatives who is on the Council, about the applicability of such a standard insofar as it relates to the cooperatives. The Council requests comments on the issue of whether and how such a standard should apply to the cooperatives.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**

  The recommendation could be required by statute. The Public Service Commission could require that the utilities under its jurisdiction meet the standard. It could also be implemented voluntarily by the utilities.

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**

  There are no cons to the recommendation. There is a significant amount of cost-effective energy efficiency potential in Montana. Acquiring that energy efficiency will save customers money, even customers that don't "participate" in energy efficiency. It will make the grid more resilient. It could obviate the need to construct or acquire the output from new generating resources. It will lead to increased energy efficiency small business development and economic activity, which will keep money in local economies.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

  Medium to high effectiveness. If the "issue" the above question refers to is reducing carbon emissions, it's only medium effective because Montana electricity generation (and consumption) is relatively carbon free and will become even cleaner, not too far into the future, with the retirement of existing fossil generation

(including 2 "dirty" QFs). Consequently, EE acquisition in Montana does not produce the same level of benefits as it would say in a state with more fossil generation and in-state consumption of that generation. But, there is fossil fuel generation in Montana and Montana imports some electricity that is also derived from fossil fuels. In addition, there is the possibility of adding fossil fuel generation in Montana for Montana customers. Accordingly, energy efficiency acquisition would supplant some of that generation.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

  None.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

  Unknown. There will be some, minor, costs to administer such a program. While there will be costs to acquire energy efficiency, costs that will need to be recovered from customers, by definition cost-effective energy efficiency results in more benefits than costs.

- **Provide an estimate of a reasonable timeframe to implement this recommendation. Does this recommendation address short, medium, or long term goals?**

  The recommendation could be adopted, as noted above, by the legislature, the Public Service Commission, or individual utilities voluntarily. Utilities would need some amount of lead time to put in place and ramp up energy efficiency programs. A year after the program is put in place will be sufficient in this regard.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals?**

  All that needs to happen is to ensure that the required savings targets are being met.

RECOMMENDATION 2: DEMAND RESPONSE STANDARD

In order to help address the potential capacity deficit issue in Montana (i.e., insufficient generation to meet peak load periods) and to more closely match energy use with generation and grid services, the state's utilities should be required to procure demand response resources. The proposal here is for the State's investor owned utilities to acquire, within 5 years after implementation, a total of 35 MW of demand response resources, calculated based on each utility's overall system contribution to Montana load.

Generally, DR can be broken down into Load Response and Price Response. While price response has its place (see Time of Use rates recommendation), this standard envisions 50 MW of load response:

- Load control (hot water heaters, air conditioning) - equipment is cycled for short periods of time; applicable for residential as commercial customers
- Curtailable load – larger commercial/industrial operations nominate an amount of load to be curtailed when an event is called

- Interruptible rate – applicable for commercial/industrial operations that can curtail most or all of their load. (Note: Montana Power instituted an interruptible rate in the 1980s.)

Note that the standard as written does not apply to the state's electric cooperatives. Discussions are ongoing within the Climate Council, including a representative of the electric cooperatives who is on the Council, about the applicability of such a standard insofar as it relates to the cooperatives. The Council requests comments on the issue of whether and how such a standard should apply to the cooperatives.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowers, industry etc.)?**

  Legislation could require utilities to acquire demand response resources, the PSC could require that utilities under its jurisdiction meet a standard, or utilities could voluntarily commit to acquiring a certain amount of demand response resources.

- **Describe the pros and cons of the recommendation. including any co-benefits for mitigation and adaptation to climate change.**

  The pro of a DR standard is that it would help Montana utilities address concerns over resource adequacy, and by reducing load in critical hours could obviate the need for additional generation (which would likely be fossil fuel generation). DR is generally deployed only during the extreme peaks (5-10 times per year) which are inherently tied to extreme weather conditions, exacerbated by climate change. Equally importantly, as discussed above, with electrification and significant additions of renewable generation, the grid will have to become more flexible and responsive to changing load conditions. Demand response (and storage) will play an important role enabling this to occur.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

  Medium – DR obviates the need for additional generation, most likely of the fossil-fuel variety.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

  There are no significant impacts. DR programs are generally voluntary in nature and participants are compensated for their participation in the program.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

  Similar costs to any new generation, paid initially by utilities and recovered in rates.

- **Provide an estimate of a reasonable timeframe to implement this recommendation.**

  The recommendation could be implemented in the next legislative session.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals? Does this recommendation address short, medium, or long term goals?**

  DR programs are generally verifiable as the utility sees a significant decrease in the daily load curve. As such, utilities would not seek new generation to fill those capacity needs.

RECOMMENDATION 3: ENERGY STORAGE STANDARD

In order to assist with renewable resource deployment, to allow for the development of micro-grids, to help address the potential capacity deficit issue in Montana (i.e., insufficient generation to meet peak load periods) and to more closely match energy use with generation and grid services, the state's utilities should be required to procure energy storage. The proposal here is for the State's investor owned utilities to acquire, within 2 years after implementation, a total of 35 MW of energy storage, calculated based on each utility's overall system contribution to Montana load.

Note that the standard as written does not apply to the state's electric cooperatives. Discussions are ongoing within the Climate Council, including a representative of the electric cooperatives who is on the Council, about the applicability of such a standard insofar as it relates to the cooperatives. The Council requests comments on the issue of whether and how such a standard should apply to the cooperatives.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**

  The recommendation could be required by statute. The Public Service Commission could require that the utilities under its jurisdiction meet the standard. It could also be implemented voluntarily by the utilities.

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**

  As noted above, storage will be required for added grid flexibility and reliability needs. In this regard, it is important to understand that storage can serve as both generation and load; that is, it can serve as a generation resource when energized and as a load (meaning it requires generation) when it is energizing. This dual function is one of the features of storage that enables overall system optimization and enhanced grid reliability.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

  High effectiveness. The deployment of storage resources is critical for the reasons discussed above.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

None that we are aware of.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

  The costs of storage continue to decrease. Battery technology continues to improve. Since the amount of storage proposed to be acquired by this recommendation is small, costs will be modest, particularly in light of the benefits to utilities and their customers from its deployment.

- **Provide an estimate of a reasonable timeframe to implement this recommendation.**

  The recommendation could be implemented in the next legislative session. Or by the PSC as a result of a contested case. Or immediately by a utility.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals? Does this recommendation address short, medium, or long term goals?**

  Modeling would be necessary to determine, in the context of a given utility, the precise extent to which storage resources lower customer costs, enhance reliability, enable additional renewable resources, and address capacity concerns, among other things.

2.3 UPDATING UTILITY EE PROGRAMS

PRIMARY AUTHORS:

- Diego Rivas

KEY ISSUE

Cost-effective energy efficiency is the cheapest, cleanest, and most readily available resource. Without focus and attention on acquiring *all* cost-effective energy efficiency, GHG reduction strategies will be more costly.

However, there remain hundreds of MWs of energy efficiency that is not even being targeted due to small barriers. For many residential customers, access to capital to pay for initial EE investments is difficult. For many commercial customers, the effort of going through the process for a one-time rebate from the utility is not worth the time.

These proposals seek to ensure that all customers are targeted by utilities for EE upgrades, saving customers money, and reducing GHG emissions.

PROGRESS TO DATE

At least one rural electric cooperative in Montana has instituted on-bill financing for customers.

Pay-for-Performance has seen success in other states, moving from pilot phase to full implementation. Montana's utilities can learn from previous efforts.

STAKEHOLDERS

- Utilities
- Banks
- Commercial building owners/real estate management companies
- ESCOs

RECOMMENDATIONS

RECOMMENDATION 1: ON-BILL FINANCING/REPAYMENT

One of the largest barriers to energy efficiency acquisition is the upfront cost to individuals, households, and businesses. To help alleviate this issue, utilities should provide the opportunity for customers to apply for loans that are paid back in installments included in monthly energy bills. On-bill financing is an energy efficiency uptake tool that has been utilized by utilities for decades, yet has failed to gain traction in Montana. Flathead Electric Cooperative is believed to be the only utility in the state providing an on-bill financing option, having alleviated the upfront cost burden for over 500 customers in just eight years. Regardless of a utilities size or access to capital, all utilities can use this tool to spur energy efficiency acquisition. Utilities could choose to provide the upfront capital (on-bill financing) or work with a third-party to make the initial investment (on-bill repayment).

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**

  Utilities and coops. Legislation may be need for investor-owned utilities.

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**

  The pro is that many more people would have access to capital to pay the upfront cost for energy efficiency upgrades. There are no cons.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

  Medium – many more households would participate in energy efficiency programs with access to on-bill financing, thus reducing energy use and GHG emissions.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

  None.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

  Some modest administrative costs to set up the program.

- **Provide an estimate of a reasonable timeframe to implement this recommendation. Does this recommendation address short, medium, or long term goals?**

  On-bill financing/repayment can be set up within 6 months to one year.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals?**

  Like all utility programs, an evaluation would need to occur on a regular basis.

RECOMMENDATION 2: PAY-4-PERFORMANCE

Montana's regulated utilities – and any other utility/co-op with a prevalence of large building commercial load – should implement a program to directly pay building owners for energy saved. Currently, utility energy efficiency incentives are comprised of one-off rebates for installation of EE measures. However, many large building owners, with multiple tenants and multiple meters, are unwilling to make EE investments on behalf of their tenants.

Under P4P, there is no rebate; rather, the utility pays for savings over time. Put another way, the utility is buying kwh saved. Rather than one-time incentive payments based on deemed savings of individual measures, the utility pays in real-time for real, meter based savings. P4P delivers persistent savings as customers are motivated to maintain savings over time. As such, there is no need to determine what measures are "eligible," and building owners determine the best manner to reduce energy usage.

The following is a over-simplified hypothetical for demonstrative purposes only.

1) Commercial Building Monthly Usage Baseline: 50,000 kwh

2) Building owner installs energy efficiency measures, likely working with an energy services company.

3) Utility pays no upfront incentives for measures

4) Commercial Building Monthly Usage post-installation: 45,000 kwh

5) Commercial Building receives payment from utility (e.g. $0.02/kwh) for energy saved: $100/month (assuming savings are maintained)

6) Building owner, in conjunction with the utility and ESCo, perform periodic measurement and verification.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowers, industry etc.)?**

Utilities with an abundance of office building sized commercial load, likely limited to investor-owned utilities, though larger co-ops may also pay willing/able to implement the program. Approval would likely be need by the Montana Public Service Commission for regulated utilities.

- **Describe the pros and cons of the recommendation. including any co-benefits for mitigation and adaptation to climate change.**

  The pro is acquisition of energy efficiency from a class of customer that is typically hard to reach. Furthermore, payments are made based on actual energy savings rather than assumptions. There are no cons.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

  High. In order to achieved maximum GHG reduction at the lowest cost, it is imperative that commercial customers contribute heavily to energy savings.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

  None.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

  An initial pool of money would be needed pay for the initial pilot project. $5 million over five years is a rough estimate. These moneys would come from utility supply budgets that would normally go to purchasing electrons elsewhere.

- **Provide an estimate of a reasonable timeframe to implement this recommendation.**

  Setup of pilot project with approval would take roughly one year. The pilot phase should be conducted over 4-5 years.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals? Does this recommendation address short, medium, or long term goals?**

  Like all utility efficiency programs, program evaluation would need to occur on a regular basis.

2.4 REGULATORY APPROACHES INCLUDING RATE DESIGN

PRIMARY AUTHORS:

- Diego Rivas, NW Energy Coalition

KEY ISSUE

The overall regulatory structure that utilities operate under, including the way utilities charge for energy supply and associated services, determines the business environment the utility operates in. As such, these factors affect how the utility sells its products, what it deems important, and how it perceives customers and its obligations to society, among other things. In short, how the utility goes about its business (as directed by the Montana PSC for investor owned utilities and by boards for cooperatives) plays a critical role in determining how much energy customers use and the characteristics of that use.

For example, as a function of the way rates are designed, utility revenues are largely driven by the throughput incentive. That is, more energy (electricity or natural gas) sales means the utility is more likely to recover its authorized revenue requirement or, in the case of a public utility, to cover its costs, meaning utilities have a disincentive to invest in or encourage energy efficiency and conservation, because that would depress sales and be at odds with the business model that it is using. Furthermore, rates are not designed to send appropriate signals to customers to reduce energy usage. Energy usage directly impacts greenhouse gas emissions.

PROGRESS TO DATE

This is a time of great ferment in the utility business. Many utilities and utility commissions across the country are beginning to think about and address issues with the utility business model. This industry-wide change is being caused by three principal drivers: economic inefficiency of the present system, technological disruption, and the need to reduce GHG emissions. Across the country there have been many steps taken – by legislatures, utility commissions, and utilities – to design rates to encourage efficiency and conservation.

GAPS

If anything, utility rate designs are headed in the wrong direction with regards to encouraging efficiency and conservation. While some investor-owned utilities are open to the idea of rate design changes, legislators and regulators are hesitant to approve proposals. Electric cooperatives, and in Montana a great many cooperatives are very rural in nature and thus, even more so than utilities with a more diverse, urban customer base, face flat or declining load growth, and are also hesitant to make changes. Indeed, coops have instead embraced high fixed charges with lower per unit energy charges, further eroding the price signals received by customers that would encourage decreased energy usage.

STAKEHOLDERS

- Investor owned utilities
- Rural electric cooperatives
- Montana Public Service Commission
- Montana Legislature
- Montana Consumer Counsel
- Low-income advocates
- Energy efficiency advocates

RECOMMENDATIONS

RECOMMENDATION 1: DECOUPLING

Decoupling, or revenue regulation, breaks the link between utility sales and utility revenue. In simple terms, under a decoupling mechanism a utility such as NorthWestern Energy or MDU is assured of being able to recover the revenue that the Commission has authorized it to recover, no more and no less. Should the utility recover less than the authorized amount, rates would increase in order to recover those revenues. On the other hand, should a utility sell more energy than was projected when rates were set and recover more than the authorized revenue, rates would decrease in order to refund the over collection.

As a result, utilities are no longer held captive by the throughput incentive, and can actively pursue and encourage energy efficiency and conservation. Decoupling on its own does not address the issue of energy efficiency and conservation; however, a decoupling mechanism opens the door to a plethora of further options to make acquisition of all cost-effective energy efficiency a reality (see below). Using less energy not only means less GHG emissions, but also makes total GHG reduction easier and less costly.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**
    - Regulated, investor-owned utilities would need approval from the Montana Public Service Commission. Co-ops could also implement decoupling, likely with approval from their board of trustees.
- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**
    - The pros to decoupling come from further advancements made in acquiring, or encouraging, energy efficiency and conservation. Using less energy reduces the current need for resources, including GHG emitting thermal plants, as well as reducing the need for future thermal development. In addition and importantly, decoupling will make utilities less hostile the adoption of distributed generation, like net-metered rooftop solar, because they also financially suffer when customers self-generate.
    - There are no explicit cons to the recommendation.
- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**
    - Medium. Decoupling on its own would not have an impact per se. However, it presents utilities further opportunities, and removes a disincentive to the cleanest energy resource – energy efficiency.
- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**
    - A poorly designed decoupling mechanism could have adverse impacts on all customers, but most specifically on low-income customers. To mitigate these potential impacts, the mechanism should

include strong low-income protection measures as well as requirements for energy efficiency acquisition, which inherently reduces costs on the system.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**
    - None
- **Provide an estimate of a reasonable timeframe to implement this recommendation. Does this recommendation address short, medium, or long term goals?**
    - Decoupling can be implemented within a year, giving time to develop and flush out the specifics of the mechanism. Once implemented, it can assist in meeting short, medium, *and* long-term goals.
- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals?**
    - Further steps must be taken to ensure utilities are actively acquiring energy efficiency. This determination can easily be made by comparing current acquisition rate with future ones.

RECOMMENDATION 2: TIME-OF-USE RATES

Currently, most (if not all) utility customers in Montana pay the same energy charge no matter when they use the energy (electricity or gas). Under this flat- rate design, the per kilowatt or per therm charge is stagnant, meaning there is no price signal to use energy during non-peak times. In Montana, peak times usually mean that a utility's generation is fully operational, meaning GHG emitting thermal units are emitting. Furthermore, increases in peak load, lead utilities to build additional natural gas "peaker" units, increasing emissions.

Time of use rates (TOU), on the other hand, send price signals to customers to shift load to non-peak times, such as at night or during the middle of the day. Peak times in Montana generally occur during the evening (after work) hours in winter months, though increasingly utilities are facing summer peak issues as air conditioning load becomes more prevalent.

To address this issue, utilities and co-ops should consider implementing a three-tiered TOU pricing rate design. The first and cheapest tier – the low usage times – should be priced below the "flat rate" charge (e.g. $0.06/kwh) to encourage customers to shift load to these times. The second tier – average usage times – should be priced somewhere near the "flat rate" charge (eg. $0.11/kwh). Finally, the third tier – peak times – should be appropriately priced so as to send a proper signal that customers should only use energy essential to home/business operation (e.g. $0.16/kwh).

Below is an example for demonstrative purposes only. Each utility should determine the appropriate times and prices for its service territory:

Tier 1: 9:00pm – 6:00 a.m Mon-Fri - $0.06/kwh
Tier 2: 9:00 a.m – 4:00p. Mon-Fri; 6:00 a.m.-10:00 p.m. Sat-Sun - $0.11/kwh
Tier 3: 6:00 a.m – 9:00 a.m; 4:00 p.m – 9:00 p.m Mon-Fri - $0.16/kwh

NOTE: TOU rates may not be applicable to large industrial, agriculture, or large irrigators who already operate under demand charges.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowers, industry etc.)?**

  Regulated, investor-owned utilities would need approval from the Montana Public Service Commission. Co-ops could also implement decoupling, likely with approval from their board of trustees.

- **Describe the pros and cons of the recommendation. including any co-benefits for mitigation and adaptation to climate change.**

  The benefit of TOU pricing is shifting load to non-peak times, lessening the need to build new resources to meet peak demand (currently utilities rely on natural gas peaker plants). A secondary benefit is renewed focus on energy efficiency and conservation, as homes and businesses seek ways to reduce their energy use during peak times, translating into overall reduced energy use, and thus GHG emissions.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

  High. Shifting load to non-peak times directly impacts the need for utilities to run and/or build thermal peaking units.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

  A recent imperial study indicates that TOU pricing provides benefits for 97% of customers.[1] Utilities, through a pilot process, can further investigate impacts to customer groups. TOU pricing must, of course, carefully consider impacts to low-income customers. Accordingly, a TOU proposal should be accompanied by an analysis of what such a pricing scheme would mean for those customers and how adverse impacts, if any, can be mitigated.

  It should be noted that agricultural and industrial classes often incur demand charges, which address the same issue. TOU rates are generally not applied to classes that incur a demand charge,

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

  Utilities would need to install advanced metering infrastructure (AMI), otherwise known as smart meters. The costs of these installations would be passed on to customers. Due to its many benefits for customers and utilities, many utilities have already deployed smart meter technology. NorthWestern Energy has indicated they will begin AMI deployment in the near future.

- **Provide an estimate of a reasonable timeframe to implement this recommendation.**

[1] https://citizensutilityboard.org/wp-content/uploads/2017/11/FinalRealTimePricingWhitepaper.pdf

Utilities would likely need a period of time to run a pilot TOU project in order to determine pricing structure, time blocks, etc. Full implementation could reasonably occur within two years of beginning a pilot.

RECOMMENDATION 3: INCLINING BLOCK RATES

Currently, most Montana utility customers pay the same amount per unit (kwh or therm) regardless of the amount they use. For example, a customer that uses 600 kwh/month pays the same for each kwh as does a customer that uses 2,500 kwh per month. As such, there is no price signal to conserve energy or use the energy more efficiently.

To address this issue and encourage energy efficiency and conservation, utilities and co-ops should consider adopting Inclining Block Rates (IBR). Utilizing this rate structure, utilities, through higher prices for energy consumed within the higher blocks, encourage large users to reduce their energy usage.

Below is an example for demonstrative purposes only. Each utility should determine the appropriate block levels and prices for its service territory:

Block 1: 0-500 kwh - $0.10/kwh
Block 2: 501-1000 kwh - $0.13/kwh
Block 3: 1001-2000 kwh - $0.16/kwh
Block 4: 2000+ kwh - $0.19/kwh

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**
    - Regulated, investor-owned utilities would need approval from the Montana Public Service Commission. Co-ops could also implement decoupling, likely with approval from their board of trustees.
- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**
    - IBR, through strong price signals, directly encourage energy efficiency and conservation. Using less energy reduces the current need for resources, including GHG emitting thermal plants, as well as reducing the need for future thermal development, and thus future GHG emissions.
- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**
    - High. Through direct encouragement of energy efficiency and conservation, utilities can expect to see immediate decrease in load, translating to reduce GHG emissions.
- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

- IBR would likely mean higher initial energy bills for large users, including some businesses and industry. However, through energy efficiency and conservation, energy bills would likely decrease in the long-term.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**
    - None.
- **Provide an estimate of a reasonable timeframe to implement this recommendation.**
    - 1 year

RECOMMENDATION 4: PERFORMANCE BASED REGULATION FOR INVESTOR OWNED UTILITIES

Change the business model for investor owned utilities (IOUs) operating in Montana, such that rate of return for the utility is calculated based on performance against certain pre-defined metrics rather than spending or costs. For example, metrics could include environmental impact, mitigation of climate and environmental risks and investment risk, reliability and availability, safety, conditions for connection, social obligation, and ratepayer satisfaction. (See writeup by Center for New Energy Economy). In the UK, regulated utilities receive a profit based on the RIIO Model, where Revenue= Incentives + Innovation + Outputs. (See Handbook for Implementing the RIIO Model, Ofgem)

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**
    - The Public Service Commission or the legislature.
- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**
    - The aim is to adjust the utility's profit motive, such that mitigating and minimizing negative environmental and social/ health impacts as well as providing reliable service is incentivized. Integrating greenhouse gas emissions and co-pollutants into a performance rating could help spur more programs aimed at energy efficiency, as well as more renewable generation. Incorporating mitigation of investment risk more explicitly into the calculation of returns would help utilities prioritize low-GHG emitting energy resources over higher-GHG emitting resources that are also at higher risk of becoming stranded assets. This could also incentivize utilities to place higher priority on planning for climate impacts (like wildfire and flooding) on the grid.
    - Cons: This would constitute a fundamental change in the way utilities are regulated. Accordingly, much work and thought would have to go into establishing a new regulatory framework. Moreover, although there is a potential for utility gains as a result of shifting to this new model, utilities, by nature, are conservative and risk averse so would likely have concerns about such a change. It would be advisable to have utility buy-in, if only at a high level.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**
    - This could have a high impact. This change would align the utility's profit motive and responsibility to shareholders with factors that could help incentivize renewable generation and climate mitigation/ adaptation.
- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**
    - None that we are aware of.
- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**
    - Unknown.
- **Provide an estimate of a reasonable timeframe to implement this recommendation.**
    - Since utility involvement in such a change is advisable, and since even if the legislature directed such a change in regulatory treatment, a stakeholder should be utilized to design a system of performance based regulation. This would take some time.
- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals? Does this recommendation address short, medium, or long term goals?**
    - It would be necessary to assess the specific performance metrics against the results to determine whether the regulatory structure is accomplishing its intended results. Since, for example, the purpose of moving in this direction is to make more paramount in utility decision making clean energy acquisition, the rate and extent of such acquisition could be used to determine success. Utility financial health is, of course, another important factor that would need to be considered. A financially unhealthy utility benefits no one.

2.5 MOBILE HOME REPLACEMENT PROGRAM

PRIMARY AUTHORS:
Chuck Magraw

KEY ISSUE

THERE ARE MANY PRE-1976 MOBILE HOMES IN USE IN MONTANA. ONE ESTIMATE STATES THAT MONTANA IS ONLY BEHIND NEW MEXICO IN THE NUMBER OF OCCUPIED PRE-1976 MOBILE HOMES. THE U.S. GOVERNMENT

ACCOUNTABILITY OFFICE STATES THAT THESE OLDER MANUFACTURE HOMES ARE GENERALLY CONSIDERED TO BE THE LEAST ENERGY EFFICIENT OF ALL HOUSING UNITS.

PROGRESS TO DATE

SEVERAL YEARS AGO, USING RECOVERY ACT FUNDING, MONTANA RAN A SMALL MOBILE HOME REPLACEMENT PROGRAM.

GAPS

NEEDED: AN INVENTORY OF PRE-1976 MOBILE HOMES TO BETTER UNDERSTAND THE SCOPE OF THE PROBLEM.

STAKEHOLDERS

- COMMUNITTY ACTION AGENCIES
- TRIBAL GOVERNMENTS
- DEPARTMENT OF PUBLIC HEALTH AND HUMAN SERVICES
- DEPARTMENT OF ENVIRONMENTAL QUALITY

RECOMMENDATIONS

RECOMMENDATION 1: DEVELOP A MOBILE HOME REPLACEMENT PROGRAM

Establish a group of stakeholders charged with developing a mobile home replacement program and identifying funding sources.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**

The recommendation is for the establishment of a stakeholder group. Thus, the recommendation could be implemented in any number of ways. But, it would probably be best if the stakeholder group was convened by an agency of the state and/or federal government.

Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.

Low-income Montanans, who are least able to afford energy services, reside in these units. Accordingly, replacing pre-1976 mobile homes with newer mobile homes would not only reduce greenhouse gas emissions but would reduce low-income Montanans energy bills and improve their lives.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

Simply establishing the stakeholder group will not necessarily lead to greenhouse gas emission reductions so this question does not really apply.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

No.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

Minimal.

- **Provide an estimate of a reasonable timeframe to implement this recommendation. Does this recommendation address short, medium, or long term goals?**

The stakeholder group would need several months to complete their work.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals?**

If the stakeholder group is successful a mobile home replacement program will be determined to be feasible.

2.6 COMMERCIAL AUDITS

PRIMARY AUTHORS:

Steve Thompson, Diego Rivas

KEY ISSUE

Energy audits are the first step in understanding energy efficiency improvements that should be undertaken by a residential customer or a business. While residential customers (and some small commercial) have access to free preliminary energy audits through some utilities, larger commercial entities must upfront the cost of the audits. Due to the cost and time, many commercial accounts chose not to take this important first step. Often, an in-depth energy audit is necessary to understand the energy conservation measures available to all of the building systems and to investigate the potential for alternative energy. In-depth energy audits investigate the energy conservation opportunities for heating, ventilation, and cooling (HVAC), lighting, building envelope, motors, and refrigeration. Without these audits, investments in efficiency are not efficient, or, more likely, the efficiency investments are never made.

PROGRESS TO DATE

The National Center for Appropriate Technology received federal funding for a commercial audit program. Funding has expired. This two-year program, known as the Montana Resource Efficiency Program, was a partnership with the Montana DEQ funded by an EPA Pollution Prevention Program. The program assisted 188 businesses and governments and authored 48 in-depth audit reports. Energy bill savings amounted to $10,018,409, from 131,153,591 kWh and 6,766,218,000 Btu in energy savings.

GAPS

STAKEHOLDERS

- Utilities
- Commercial customers
- Energy Services Company's (ESCOs)

RECOMMENDATIONS

RECOMMENDATION 1: RENEWAL OF THE MREP PROGRAM

In-depth energy audits are necessary for businesses, schools, government agencies, and communities to discern the appropriate energy conservation and renewable energy measures available to them. These audits should be performed by independent agencies that do not profit off of the audit recommendations by selling equipment, designs, or financing of the energy projects identified in the energy audit reports. The energy auditors should be advocates for energy conservation, renewable energy resources, and the people and commerce of Montana. Previous Montana programs of this scope include the Montana Resource Efficiency Program and the Energy Efficiency Program.

The state of Montana should provide funding to continue the Montana Resource Efficiency Program.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**

Legislation would be required in order to implement the recommendation.

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**

- Audits point commercial customers towards necessary and cost-effective energy efficiency upgrades. These upgrades could also include adaptation benefits, such as reducing moisture, improved insulation, etc. They can, and often do, also increase the safety of building occupants.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

Medium. While audits themselves do not save energy, they do ensure that investments are made in areas where energy savings are most likely to occur. The MREP program assisted businesses in energy savings that amounted to 131,153,591 kWh and 6,766,218,000 Btu in energy savings as a direct result of energy audits.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**
    - NEED COST INFO

- **Provide an estimate of a reasonable timeframe to implement this recommendation. Does this recommendation address short, medium, or long term goals?**

Immediately. All that is needed is funding – the program has already existed in the past.

2.7 WATER HEATERS

RECOMMENDATIONS

RECOMMENDATION: CREATE INCENTIVES TO TIE WATER HEATERS TO THE ELECTRIC GRID TO CREATE A NEW SOURCE OF ENERGY STORAGE

Implement incentives for programs to replace residential and commercial water heaters with grid-interactive electric water heaters that allow bidirectional control, allowing a utility or third-party aggregator to turn them on and off at optimal times of day and use them as a sort of battery to manage electric load variability associated with wind and solar energy.

According to the Department of Energy, residential water heaters are responsible for approximately 17% of household energy use. Because hot water can be stored for hours at a time, the ability to control when water is heated helps utilities store energy at times of peak production (earlier in the day) and decrease the energy demand at times of peak demand (after the sun goes down). Grid-integrated electric water heaters help store energy produced by renewable power sources with low-cost, low-impact technology. This program could be viewed as both a limited energy storage option and demand management program.

Arizona Public Service, Portland General Electric, and Green Mountain Power, among other utilities, have launched pilot programs in the last several years to test out grid-integrated water heating as part of load flexibility programs. Several electric cooperatives have also begun using water heaters to get the most out of community solar projects, including Steele-Waseca Cooperative Electric in Minnesota.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**
    - NorthWestern Energy, MDU, and electric cooperatives could launch studies and pilot programs and offer rebates for (or give away, like Steele-Waseca Co-op) grid-interactive water heaters.
    - The legislature (or local governments) could create incentives or requirements to install grid-interactive water heaters in new buildings and public housing.
    - The state government could replace water heaters in state buildings with electric grid-interactive water heaters.

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**
    - Pros: Replacing natural gas water heaters with electric water heaters, in tandem with an increase in renewable energy sources in Montana, could directly reduce a significant source of greenhouse gas emissions in the state. A large network of grid-interactive water heaters could have a large impact on Montana's capacity to scale up renewable energy and manage load variability, especially when paired with other demand management strategies and storage technologies. Utilities can see some benefits

in load shifting even if not all customers adopt grid-interactive water heaters (or an add-on device that would make existing heaters grid-interactive). Programs could take advantage of the relatively short life-span of water heaters (approximately 8-12 years) to incentivize replacement with heaters that include a grid-interactive portion.
    - Cons: Some models of grid-interactive water heaters would require connection to the Internet or a cell network (more study is needed to determine whether this could work in areas that have intermittent or poor connection). It would take coordination and might require strong incentives or mandates, in some places, to scale a program like this up quickly.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**
    - Large-scale replacement of natural gas and standard electric water heaters with grid-integrated electric water heaters would have a high impact with few negative consequences, as long as the issue of cell or internet connection is taken into consideration in the setup of any program.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

    - This storage technology takes advantage of the physics of heating and cooling rather than relying on mineral-intensive batteries or large-scale storage systems. It is low-cost, has minimal environmental impacts, and several pilot tests have concluded there was no negative impact on hot water availability (Esource.com).
    - More study is needed to determine how this might work in areas with intermittent or no cell or internet service. In the meantime, a study could identify areas with reliable grid-connection and focus on launching a program with customers in said areas.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**
    - Not sure. It would likely depend on the type of program.

- **Provide an estimate of a reasonable timeframe to implement this recommendation.**
    - Utilities could implement a pilot program in the next year or so. The legislature could pass incentives in the next session (2021).

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals? Does this recommendation address short, medium, or long term goals?**
    - How many water heaters in Montana are powered by natural gas? How long would it take to scale this up? The recommendation could address short, medium, and long-term goals if the pilot program becomes a larger program that allows integration of a high percentage of renewable energy projects.

NOTE: The GHG Committee agreed in principal to move this forward, although we had not seen the written recommendation prior to our discussion. Additional discussion/revisions may be in order.

Section III.

Renewable Energy
Transmission & Markets
Peak and Capacity Challenges Efficiency

3.1 RENEWABLE ENERGY RECOMMENDATIONS

PRIMARY AUTHORS:

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KEY ISSUE

The Executive Order issued by Governor Bullock includes a directive to provide "recommendations toward achieving an interim goal of net greenhouse gas neutrality for average annual electric loads in the state by no later than 2035." The Order further requires including strategies related to expanding renewable energy generation, on all scales and of various types. The recommendations included in this whitepaper address renewable energy generation at both the distributed generation and utility scales, as well as recommendations for battery storage and other renewable energy related activities.

PROGRESS TO DATE

NWE has provided some information on existing carbon-free supply resources, including wind, hydro, and solar projects. Further, they have provided information on upgrades to the hydro system. This information will be included in future iterations of this whitepaper.

RECOMMENDATIONS

The recommendations in this section have either consensus support, or a mix of support and neutrality. The RE Group included additional recommendations that have stated opposition in the section below.

RECOMMENDATION 1: REQUEST LEGISLATIVE STUDY ON THE UNIVERSAL SYSTEM BENEFITS PROGRAM FUNDING MECHANISM FOR ELECTRIC CUSTOMERS.

In 1997, Montana's energy utilities were restructured, which deregulated the supply of electricity and natural gas. At the time, it was acknowledged there were a number of activities that were undertaken by the state's utilities which provided societal benefits that could be negatively affected by deregulation. To ensure these activities continued in the future, the legislature established a universal system benefits (USB) program and approved a USB charge to be added to natural gas and electric utility bills of all utility customers. There are differences between natural gas and electric USB programs, but both programs provide funding support for three common activities: cost-effective local energy conservation, low-income energy bill discounts, and weatherization activities. Electric USB charges also fund energy research and development, renewable energy development, and market transformation programs. Natural gas USB funding is based on 1.12 % of the utility's annual natural gas revenues from the previous year. Electric USB collections were set based on 2.4 % of the utilities 1995 revenues and over the last 20 years, there has been a decline in the effective value of electric USB funds. We request the Legislature to evaluate and identify the impacts of any proposed changes to the electric USB funding formula.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**
    - If as a result of the evaluation a change in funding was needed, it would require legislation.

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**
    - I don't know the magnitude of the funding change (hopefully NorthWesten Energy and the Montana Coops could provide information about the difference in revenues between 1995 and 2019). The pros include more funding for energy efficiency and renewable energy programs across the state which would benefit low income electric utility customers and customers eligible for energy efficiency and renewable energy projects. It would reduce energy consumption for some customers and help produce more clean energy for others. It would help mitigate energy use in Montana. On the negative side, all electric utility customers would see an increase in their monthly energy bill from an increase in their USB tariff.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of** change identified by the committee?
    - Not sure how to answer this.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**
    - To answer this, we would need to calculate the differences in utility revenues from 1995 to 2019 and apply the 2.4% USB charge to those revenues to understand the magnitude of this proposed change. Currently USB tariffs cost about $1/month for electric utility customers. This proposed change may be seen as significant by some utility customers, while others might look at the change as insignificant. Not sure whether this change would adversely affect utilities from a program staffing or administration perspective. This change should be positive for the environment.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**
    - The administrative system is in place to collect USB funds and administer the program so those cost changes should be minimal. Electric utilities may see increase program costs if they have significantly more funding for their USB programs. We would need more information from the electric utilities to better answer this question.
- **Provide an estimate of a reasonable timeframe to implement this recommendation. Does this recommendation address short, medium, or long term goals?**
    - This recommendation could be implemented in the next legislative session if it was supported by the electric utilities, low income, energy efficiency and renewable energy interested parties. If implemented it would address long term goals of helping to reduce energy use in Montana.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals?**
    - Annual, publicly available program reports by the electric utilities or PSC/MT Department of Revenue that provide specific information on actual energy savings and the amount of clean energy generation over time from the electric USB state program.

RECOMMENDATION 2: ENCOURAGE EXPANDED COMMUNITY SOLAR DEVELOPMENT

Extend or make permanent the current five-year property tax holiday for community solar energy development by electric utilities (MCA 15-6-225 "Small Electrical Generation Equipment Exemption"). Community solar benefits average Montanans by making it possible for them to afford investments in renewable energy without having to pay the high cost of owning a renewable energy generator. Maintenance costs are also reduced because these costs are shared by participating individual consumers. Under current property tax law, after expiration of the five-year tax holiday, these community solar arrays are treated as utility property for tax purposes. This means tax costs have to be baked into the cost of development, making them more cost prohibitive for the average individual Montanan. This change would also bolster a state position of encouraging voluntary carbon-reduction actions by both utilities and electricity consumers.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation?**
    - The Legislature and, based on a positive outcome by the Legislature, electric utilities would respond by considering development of community solar.

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**
    - Encourage electric cooperatives or other electric utilities to voluntarily consider development of more cost-based community solar arrays, which expand the affordability and accessibility of solar energy usage by middle or even lower-income Montanans.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**
    - Medium to low impact because community solar arrays are not likely to be built in Montana at a utility scale. These arrays depend on the voluntary commitment of individual co-op members to purchase the output, making it more challenging to develop them. However, it advances the guiding principles by allowing the average Montanan to participate in carbon reduction efforts.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**
    - Adverse impacts would be to all taxpayers due to loss of property tax income. Those impacts could be mitigated by only modest extension of the five-year property tax holiday for these solar arrays.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

- Unknown at this time.

- **Provide an estimate of a reasonable timeframe to implement this recommendation.**
  - 2023 Legislature. An interim study by the 2021 Legislature may be needed.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals? Does this recommendation address short, medium, or long-term goals?**
  - Action by the Legislature.

RECOMMENDATION 3: ENACT POLICY TO ENABLE SHARED SOLAR FOR INVESTOR OWNED UTILITIES

Interpretations of statute suggest that investor-owned utilities in Montana cannot offer shared solar programs. This language should be changed such that investor owned utilities, like many of the electric cooperatives in the state, can develop large solar arrays and sell subscriptions to Montanans.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**
  - Montana Legislature

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**
  - Increased solar development. Shared solar provides access for individuals, households, and businesses that may not otherwise be able to install a distributed generation system on-site. For example, renters, buildings with shaded roofs, etc. This will also allow the utility to control the siting of the array, which can provide more efficient solar production and more efficient grid interconnection. Shared solar subscribers can help finance projects, lessening burden on developer.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**
  - Medium, perhaps low. If the shared solar programs are successful, it would allow utilities to develop the projects with minimal (if any) impacts to rates.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**
  - The shared solar arrays should not present any impacts on other rate payers, since subscriptions will help pay for the costs of the system and the energy flows directly onto the utility's system (not a single customer's home/business).

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

- The recommendation is legislative, so cost is low. The actual implementation of the solar development will require private resources from the developer (utility) and subscribers.

- **Provide an estimate of a reasonable timeframe to implement this recommendation. Does this recommendation address short, medium, or long term goals?**
  - Could be implemented as early as the next Legislative session (2021).

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals?**
  - The legislation would enable shared solar for IOU's, but it would then be up to the IOU's to develop the projects.

RECOMMENDATION 4: STUDY THE FEASABILITY OF ENCOURAGING GREATER UTILITY SCALE RENEWABLE ENERGY DEVELOPMENT THROUGH REDUCING PROPERTY TAXES ON NEW RENEWABLE ENERGY IN MONTANA **(NEW PROJECTS ONLY*)**.

Montana currently has by far the highest taxes on renewable energy in the region compared to North Dakota, South Dakota and Minnesota. North Dakota's taxes on a 150 MW generator, for example, are only ¼ the amount of taxes on the same-sized generator developed in Montana. Taxes in South Dakota and Minnesota are only slightly higher than those in North Dakota.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation?**
  - The Legislature. Renewable-energy developers would likely respond positively if Montana's taxes on renewable energy were reduced.

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**
  - The challenge is the potential cost to Montana's property tax revenues. The benefit is a potentially major increase in non-carbon-emitting electricity resources.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**
  - Depending on the degree to which Montana's tax rates for renewables is competitive with other states in the region, the potential is for high effectiveness in addressing the issue of carbon emissions. The reason is the likely significant size of utility-scale generation.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**
  - Taxpayers would be impacted. Positive environmental impacts. However, one major area of concern for electric cooperatives in any state policy advancing the development of renewable energy: By and large such policies tend to advance resources that have already received federal assistance through

federal production tax credits and investment tax credits. This disadvantages base-load resources that are a necessity in the resource mix for the most robust reliability to serve customers in Montana. This could be problematic and end up costing co-op members money on stranded assets that have to be paid back, unlike an IOU that can seek rate relief from the PSC.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**
    - Cost unknown at this time.

- **Provide an estimate of a reasonable timeframe to implement this recommendation.**
    - This is a major change in Montana tax policy that will be difficult to accomplish in the next Legislature. At least four years to implement would be more realistic.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals? Does this recommendation address short, medium, or long term goals?**
    - A study of likely impacts is needed to assess potential success in reducing Montana's carbon footprint. This recommendation addresses long-term goals.

NOTE: Further discussion regarding revenue impacts is needed.

*** NOTE: Electric cooperatives request the proposal on utility-scale renewable energy development incentives be narrowed to only include new renewable energy development.**

RECOMMENDATION 5: ESTABLISH STATE INCENTIVIZES FOR THE INSTALLATION OF UTILITY-SCALE STORAGE DEVELOPMENT.

Information on utility-scale projects is needed to determine the feasibility of installing storage to offset intermittency of renewable energy such as wind or solar renewables. Costs of storage technology are a barrier to pilot projects. State incentives would help mitigate these costs. The purpose of this incentive is to seek to offset the intermittency of renewable energy such as wind or solar.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation?**
    - The Legislature or Governor through administrative action – grants, etc.

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**
    - The positive is greater movement toward utilization of storage technology. Reduction on carbon emissions. The challenge is the cost to taxpayers.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**
    - Pilot projects are a low effectiveness in addressing the issue of carbon emissions but a high effectiveness in advancing the principles of moving utilities toward storage technology.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**
    - Pilot projects do not appear to have significant adverse impacts.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**
    - Unknown – requiring a state study of costs.

- **Provide an estimate of a reasonable timeframe to implement this recommendation.**
    - 4 to 6 years.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals? Does this recommendation address short, medium, or long-term goals?**
    - An assessment after 2 to 4 years to determine if pilot projects are being undertaken by utilities. This recommendation addresses long-term goals but does not ensure wide-scale installation of storage technology.

NOTE: There is general agreement in the Committee to move this recommendation forward. However, the Committee believes the recommendation as currently drafted needs work, including clarification of how it applies to various types of storage, e.g., battery, hydrogen, pumped storage, etc.

NOTE: Regarding battery storage, the co-ops would want to utilize information in a utility-scale battery pilot project to:

- **Allow for the development of staff capabilities internally to integrate and operate new and emerging technologies;**
- **Provide information necessary to assess the demand reduction capabilities of the system under peak loading conditions;**
- **Provide information regarding system resiliency in the event of widespread power disruption to our members;**
- **Allow for the integration of local renewable generation to develop and test microgrid solutions on our system, and;**
- **Provide information necessary to develop rates that reflect the overall cost/benefit of a system including initial investment, demand savings, improved reliability and resiliency, etc.**
- **Potential stakeholders would be electric utilities, DEQ, BPA, WAPA and energy conservation organizations.**

NOTE: This recommendation might be combined with Recommendation C below.

RECOMMENDATION 6: PROVIDE INCENTIVES FOR SOLAR-READY AND SOLAR-INTEGRATED DESIGN AND BUILDING

Solar Ready Design and Building. In a report titled, "Solar Ready: An Overview of Implementation Practices", National Renewable Energy Laboratory experts define a solar ready building as one that is engineered and designed for solar installation, even if the solar installation does not happen at the time of construction. The report states that creating a solar ready structure improves the cost effectiveness of solar when pursued at a later date, which eliminates barriers to future solar applications and facilitates market growth. Examples provided in the report demonstrate significant savings if solar-ready measures are implemented during design and construction versus if those measures must be taken during solar installation.

The State of Montana should develop incentives that encourage solar-ready design for new buildings in Montana. The incentives should focus on two types of buildings: 1) residential (single or multi-family structures) and 2) small buildings designed for multi-family housing, commercial use, or mixed-use applications. This second group of buildings typically have flat roofs and are excellent candidates for solar.

There are numerous resources that provide guidance on the design elements that should be considered in order to achieve a "solar-ready" building. A key supporting element for this recommendation will be educational materials made available to those designing, developing, and building homes and commercial buildings. The list below provides both resources on solar-ready design as well as examples of educational materials used in other states.

Resources and Examples:

- Watson et al, National Renewable Energy Laboratory, Solar Ready: An Overview of Implementation Practices. 2012. https://www.nrel.gov/docs/fy12osti/51296.pdf
- Lisell et al, National Renewable Energy Laboratory, Solar Ready Buildings Planning Guide. 2009. https://www.nrel.gov/docs/fy10osti/46078.pdf
- Minnesota Solar Ready Construction Specification: http://mn.gov/commerce-stat/pdfs/solar-ready-construction.pdf
- Solar Ready Building Design Guidelines for the Twin Cities, Minnesota: http://mn.gov/commerce-stat/pdfs/solar-ready-building.pdf
- Rooftop Solar Ready Construction Guidelines (Ohio-Kentucky-Indiana Regional Council of Governments): https://www.solsmart.org/media/OKI_RooftopSolarReadyConstructionGuidelines.pdf

Solar Integrated Design and Building. Solar integration means that a solar collector (photovoltaic, water heating, or other type) is included in the design and construction of the building. As described in the section above, designing and constructing the building with solar in mind can create efficiencies that significantly reduce the installation costs. The additional costs of adding solar can be balanced by the lower, long-term operating costs of the building.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**
    - Montana Legislature. Other stakeholders include: Montana Building Codes Council, Department of Labor and Industry

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**
    - New solar that is integrated into the building design will immediately reduce the emissions from electrical end-use on site. A solar-ready design will lead to a more efficient and effective use of solar once integrated. This may also reduce certain installation costs associated with building alterations and may streamline the installation process.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**
    - Medium to low impact. Providing incentives does not ensure that additional solar installation will occur. However, providing incentives increases the likelihood of installation, and should increase the efficiency of the array's operation. Additional distributed generation systems will reduce emissions associated with electrical end use. The extent to which they do so will depend on the size of the array.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**
    - None identified.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**
    - Unknown at this time, and will depend on the type and value of the incentive(s). Suggest working with DOR, Legislative Services, or others to determine fiscal impact.

- **Provide an estimate of a reasonable timeframe to implement this recommendation.**
    - Unknown at this time. Legislation could be passed as soon as the 2021 session.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals? Does this recommendation address short, medium, or long term goals?**
    - Monitor implementation of the new incentive. The Department of Revenue tracks use of state tax incentives, and may be able to provide metrics with its annual reports. This will demonstrate how effective the incentive is in promoting solar-ready design and/or solar-integrated design.
    - Building owners/operators could be surveyed to voluntarily provide energy production metrics from the array. This data could be compared to building energy use to understand what percentage of the building's total energy is offset from the solar production.

RECOMMENDATIONS

The recommendations included below are NOT consensus recommendations, meaning that there were one or more individuals opposing the recommendation. These recommendations are being included per the recommendations of Council leadership to be sent to the full Council for further discussion.

RECOMMENDATION A: INCREASE THE ALLOWABLE SYSTEMS SIZE FOR DISTRIBUTED GENERATION SYSTEMS

The current system size cap for small-scale generation interconnecting to the grid is restrictive for entities like commercial buildings, schools, libraries, and private businesses. The current cap of 50kW was passed in 1999 and has not been updated since. Meanwhile, solar technology has become more efficient and less costly. Increasing the allowable system size will allow users to meet more of their energy needs with solar, wind, micro-hydro, and other eligible technologies.

NOTE: May not be able to move forward with consensus until rate design concerns from parties are settled. Gary Wiens, NWE, and Alan Olsen oppose:

- **"Montana's electric cooperatives support development of customer-owned renewable resource generation facilities and many of them have long encouraged such development by allowing interconnection of these facilities to the cooperative utility distribution system."**
- **"However, government-imposed, one-size-fits-all net metering mandates could easily affect rates paid by other non-generating customers as well as create potentially serious safety risks and power quality concerns. Higher rates for other customers could be the result because mandated net metering fails to take into account the widely varying costs, rates, rate structures, and power supply and delivery issues facing each local co-op. Safety risks are created if cooperatives are prohibited from requiring customer installation of adequate equipment to prevent back feeding of power output from customer generation facilities. Power quality could easily deteriorate if the cooperative utility is not exerting maximum flexibility in absorbing power output from a customer generation facility."**
- **"Montana Electric Cooperatives' Association supports continuation of the existing voluntary approach to net metering for Montana's electric cooperatives because it provides for maximum flexibility."**
- **"Because not-for-profit, customer-owned electric cooperatives must pass all costs onto their members, the voluntary approach ensures net-metering programs won't harm other customers."**
- **"A voluntary approach honors the customer-owned nature of electric cooperatives and recognizes the many and widely differing sets of circumstances facing each local co-op."**

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**
    - Montana Legislature. Rural Electric Cooperatives could also voluntarily increase their caps*.
- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**

- The current system size cap for small-scale generation interconnecting to the grid is restrictive for entities like commercial buildings, schools, libraries, and others that could offset much more of their energy loads if the system capacity restriction was increased.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**
  - Medium impact. It would have a very significant impact on schools, libraries, businesses, and other larger energy users. Relative to utility scale development of renewables, it has a lower impact.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**
  - None identified. For public buildings (e.g. schools, libraries, state agencies), larger systems have a net benefit to all Montanans through lowered operating costs of publicly funded entities.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**
  - Costs of implementation is minimal, since it is a policy recommendation. The actual development of the additional distributed generation systems would be a mix of private and public funds, depending on who is developing the project. With the cost of solar, in particular, dropping there is likely to be long-term net savings on investments.

- **Provide an estimate of a reasonable timeframe to implement this recommendation.**
  - Legislation could be passed as early as the 2021 Legislative Session.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals? Does this recommendation address short, medium, or long term goals?**
  - Track development of distributed generation systems in Montana that are larger than the current systems caps for IOUs and Co-ops.
  - This recommendation could successfully reduce thermal resource emissions as quickly as a developer can put a project together (within months of the law being enacted). It will also have long term benefits.

*A related recommendation would be to *require* cooperatives to offer a certain cap size as well. Implementation would require though, as cooperatives are not subject to the same statutory requirements.

RECOMMENDATION B: INCREASE AND UPDATE THE STATE RENEWABLE ENERGY PORTFOLIO STANDARD

Increase and update Montana's renewable portfolio standard, and add a carve-out for energy storage projects. Montana's standard was established in 2005 and has not been updated since the third increase took effect in 2015 (15% for 2015 and each year thereafter). RPS regulations vary across the country, including several states that have adopted 100% renewable standards.

NOTE: Alan Olsen, Gary Wiens and NWE oppose this proposal. There was conversation about hydro power, and to what extent it should be included or excluded from the RPS. This included considerations of new vs. existing hydro, and run of the river vs. stored. Additionally, the opposition to preclude hydro could change if the RPS is set at a high enough level (e.g., over 80%). Additionally, Alan questioned whether an RPS is needed at all.

- **Mandated renewable energy portfolios will force consumer-owned electric cooperatives to substantially raise rates. These impacts would be particularly harmful to cooperatives serving sparsely populated rural areas, where customer density levels are extremely low and where poles and wires costs are much higher;**
- **Montana's electric cooperatives already voluntarily purchase substantial quantities of renewable energy. As of 2017, approximately 75 percent of the electricity we purchase statewide was from non-carbon energy resources. Our purchase of coal-fired generation had fallen to 16 percent statewide as of 2017 and this number continues to decline. In addition to our growing hydropower resource purchases, a major developer and purchaser of renewable energy is Basin Electric Cooperative, one of the top 3 biggest power suppliers to Montana's electric co-ops. Basin recently announced purchase of 300 MW of utility-scale solar that is expected to be commercial by 2023.**

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**
    - Montana Legislature

- Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.
    - In Montana, 15 renewable projects were opened from 2005-2014, with an increase in job creation and negligible impact to ratepayers, per the ETIC study of its impact.
    - Pros of an energy storage carve-out: energy storage can help minimize the impacts of large-scale grid disruptions. It is also important and useful in ensuring flexibility and reliability and maximizing the percentage of renewable energy. Cons: Storage technology is in various stages of development and some ideas are not yet scalable.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**
    - Medium to high, depending on the standards chosen and the speed of adoption. A stronger and more ambitious standard aimed at increasing new renewable resources would create a stronger market signal than a modest increase.
    - According to the National Conference of State Legislatures (NCSL), "Roughly half of the growth in U.S. renewable energy generation since 2000 can be attributed to state renewable energy requirements."
    - This could serve as a guidepost for continuing to ramp up renewables in Montana, while various incentives, disincentives, and technological improvements are created to overcome barriers to a higher renewable mix.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies**

could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?

- Whether or not large-scale and run of the river hydropower is included would affect the environmental impact.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**
  - Not sure how that would be calculated. Depends on many other factors, incentives, etc.

- **Provide an estimate of a reasonable timeframe to implement this recommendation. Does this recommendation address short, medium, or long term goals?**
  - The next Legislative session (2021). It could address both short and long-term goals.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals?**
  - Continued reporting and assessment

C. ENERGY STORAGE

01/21/20

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- CAITLIN PISERCHIA
- CHUCK MAGRAW

DOES THE WHITE PAPER NEED TO BE COORDINATED WITH OTHER COMMITTEES?

NO

KEY ISSUE

ENERGY STORAGE IS AN EMERGING TECHNOLOGY THAT WILL PLAY A CRITICAL ROLE IN MANY ASPECTS OF ELECTRICTY SYSTEM MANAGEMENT, INCLUDING HELPING TO ADDRESS THE INTERMITTENCY OF RENEWABLE GENERATION, ENSURING SYSTEM RESILIANCE DURING CLIMATIC EVENTS, AND BETTER CONNECTING GRID NEEDS AND LOAD TO SYSTEM RESOURCES. MONTANA ENERGY STORAGE DEVELOPMENT IS NOT KEEPING PACE WITH WHAT IS HAPPENNING ELESEWHERE IN THE COUNTRY. IN PART THIS IS DUE TO A LACK OF UNDERSTANDING OF THE POTENTIAL BENEFITS OF STORAGE. IN ADDITION, THERE HAS BEEN A RELATIVE LACK OF ENGAGEMENT

PROGRESS TO DATE

VERY LITTLE PROGRESS ON THE ISSUE HAS BEEN MADE. UTILITY INTEGRATED RESOURCE PLANS HAVE DISCUSSED STORAGE AT A HIGH LEVEL.

GAPS

THERE ARE MANY INFORMATION GAPS, WHICH IS WHAT THIS RECOMMENDATION SEEKS TO ADDRESS

STAKEHOLDERS

- THE MONTANA PUBLIC SERVICE COMMISSION
- UTILITIES
- STORAGE DEVELOPERS
- MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY
- CLEAN ENERGY ADVOCATES

RECOMMENDATIONS

RECOMMENDATION 1: MONTANA PSC STORAGE DOCKET

The recommendation is for the Montana Public Service Commission to open a docket investigating energy storage: its costs, its applications, its feasibility in Montana, its benefits and other matters pertinent to determining whether the treatment of Montana utilities insofar as storage procurement is concerned is in the best interests of a utility's customers.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowers, industry etc.)?**

  The Montana PSC.

- **Describe the pros and cons of the recommendation. including any co-benefits for mitigation and adaptation to climate change.**

  Pros: information relevant to storage developed will be obtained that will inform future decisions.

  Cons: Like any proceeding before the Montana PSC, staff and Commissioner time will have to be devoted to the task.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

  It will depend on how robustly the docket delves into questions around storage and what is the follow up.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

  No.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

  Unknown

- **Provide an estimate of a reasonable timeframe to implement this recommendation.**

  Approximately 6 months.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals? Does this recommendation address short, medium, or long term goals?**

  A docket before the PSC will be initiated.

NOTE: This recommendation might be combined with 3.1 Recommendation 5.

Section IV.

Farms, Ranch Land, Forest, and Wood Products

4.1 AGRICULTURAL WORKING LANDS

PRIMARY AUTHORS:

- Ben Thomas, Montana Department of Agriculture
- Laura Peterson, Indigo Agriculture

KEY ISSUE

Sequestering more carbon (or potentially other GHGs) on agricultural land.

PROGRESS TO DATE

This is a new, evolving area that we except to be part of any federal climate solution over the next decade. We want to position Montana's landowners and operators to benefit from ecosystem markets relating to climate.

GAPS

- Methodology for verifying carbon sequestration in ag lands (including rangelands) – there are tools for modeling or estimating GHGs, but outcomes-based tools for measuring and verifying the amount of carbon sequestered by ag lands needs to be further developed

STAKEHOLDERS

Stakeholders include Montana-based grower associations, including but not limited to:

- Montana Farmers Union & Montana Farm Bureau
- Montana Ag Organizations such as Montana Grain Growers, Montana Stockgrowers Association
- State, Regional and National Environmental NGOs, including but not limited to:
  - http://hs.umt.edu/evst/resources/conservation-directory.php [hs.umt.edu]
- Land Trusts
- Universities in Montana

RECOMMENDATIONS

RECOMMENDATION 1: PATHWAY FOR PRODUCERS TO PARTICIPATE IN CARBON MARKETS

Montana should develop a comprehensive strategy to improving pathways for farmers and ranchers to participate in the carbon markets

NOTE: This recommendation would benefit from more specificity regarding who (which agency?) would lead the effort.

As Appropriate, consider the following relevant to the recommendation:

- Emission trading markets are a developing tool for industry to monetize carbon sequestration and soil health practices. By improving the pace of developments of the markets and by improving access to the markets by Montana farmers and ranchers, the agriculture industry can increase sequestration of GHGs while supporting producers by diversifying on-farm income streams.

- Certain practices on agricultural land have the effect of sequestering carbon. These include but are not limited to no-till or reduced tillage, crop rotation patterns, cover cropping, and types of rangeland management. Montana producers have increased adoption of these practices in part due to existing incentives (mostly Federal) and in part because of other benefits to the producer or the land. Expanding incentives will further increase adoption.

- The State of Montana should form a Montana Carbon Committee, appointed by the Governor and made of producers representative of the agriculture community and agricultural researchers.

    - MCC would be charged with developing the regulatory framework for carbon credits relating to agricultural practices.

    - The State of Montana would serve as an aggregator for carbon credits generated in Montana. The benefit of statewide aggregation is easier access to global carbon markets. It also removed on onus on producer for marketed small amounts of credits.

    - MCC funded by a percentage of credits sold. Funding must be sufficient to hire appropriate level of staff to administer the program, including certification and compliance.

- The State of Montana should develop a Carbon Market Navigator. The Navigator would help producers identify practices they can implement within their operation and also identify markets to exchange credits for adoption of those practices.

    - The Navigator would be a cooperative endeavor by the State of Montana, private associations, and individuals.

    - This online-tool would provide resources for producers interested in adopting beneficial practices, including information on specific practices, state or federal programs, and more.

- The State of Montana should explore the use of tax incentives that increase adoption of carbon sequestration practices on agricultural land.

    - This could include tax credits, tax rebates, or other methods of reducing overall tax liability for producers to increase beneficial practices.

- Advancing recommendations that provide financial incentives, including decrease tax liability, would significantly increase the impact on carbon sequestration.

- Implementation of these recommendations would require action and continued involvement by the Montana legislature, Montana executive leadership, private associations at both the state and national level, producers as individuals and through grower associations, landowners, and more.

RECOMMENDATION 2: INCREASE RESEARCH ON HOW MUCH CARBON IS STORED ON AG LANDS

This recommendation seeks to increase the state's knowledge base for sequestering carbon on agricultural lands in Montana. Ideally, a lookup table would be created in collaboration with USDA. This could also include further research in technologies that monitor/verify carbon sequestration on ag lands (including rangelands).

NOTE: This recommendation would benefit from more specificity regarding who (which agency?) would lead the effort.

As Appropriate, consider the following relevant to the recommendation:

- There are many benefits to increasing this research. Increasing knowledge for how carbon is stored will help establish baselines and create the playing field for the financial opportunities that are available to landowners and operators through carbon markets. We also anticipate future conservation programs to account for carbon sequestration in greater detail. Helping landowners and operators receive the financial benefits from ecosystem markets positively impacts soil health – from increasing water holding capacity to microbiology activity through grazing practices, cover crops and other conservation efforts.

- This research on carbon sequestration is difficult because of how site-specific it is.

- Taking soil samples to establish a soil data layer would have a high impact on addressing the issue because this knowledge enables other improvements.

- Calibrating models – with site-specific data in Montana – that exist would have a high impact on enabling landowners and operators in Montana to reduce soil sampling costs yet demonstrate accuracy at local levels over time, across the state and across soil types. (The more growers, the more samples, the better the calibration.)

- Research not only helps you quantify carbon sequestered, but also helps bolster your case at the farm level for adoption of those practices.

- Protecting landowner and operator data – especially as information on conservation practices needs to be accounted for in models – will always be very important.

- This is a scalable activity, so dollars could be allocated according to budget fluctuations annually.

- Collecting samples could start now and would need to be updated, so that models can be updated, in the future, at least every five years. Updates need to be regular enough to incorporate some management practices won't be incorporated in prior those models.

- X amount of soil samples collected or x amount of landowners and operators participation.

Section V.

Transportation

5.1 TAKE ACTIONS THAT LEAD TO THE WIDESPREAD ADOPTION OF LOW AND ZERO EMISSION VEHICLES IN MONTANA

PRIMARY AUTHOR: CHUCK MAGRAW
01/20/20
NOTE: This section has not been fully vetted by the GHG Committee.

KEY ISSUE

GREENHOUSE GAS EMISSIONS FROM THE TRANSPORTATION SECTOR MAKE UP A SIGNFICANT PERCENTAGE OF MONTANA'S OVERALL EMISSION PROFILE. IN THE WESTERN U.S., STATE-WIDE EMISSIONS FROM THIS SECTOR ARE USUALLY THE LARGEST SINGLE SOURCE OF EMISSIONS. WITHOUT A CONCERTED EFFORT TO CONTROL AND REDUCE EMISSIONS FROM THE TRANSPORTATION SECTOR, GIVEN POPULATION TRENDS AND LAND USE PATTERNS, EMISSIONS ARE LIKELY TO GROW IN ABSOLUTE NUMBERS AND BECOME A GREATER AND GREATER PERCENTAGE OF OVERALL EMISSIONS. IT IS COMMONLY UNDERSTOOD THAT IN THE NEXT FEW DECADES, IN ORDER TO MEET MID-CENTURY OR NEAR MID-CENTURY TARGETS TO ELIMINATE OR LARGELY ELIMINATE GREENHOUSE GAS EMISSIONS, THE TRANSPORTATION SYSTEM WILL HAVE TO BE ELECTRIFIED.

PROGRESS TO DATE

THERE HAS BEEN VERY LITTLE EFFORT IN MONTANA TO REDUCE GHG EMISSIONS FROM THE TRANSPORTATION SECTOR. ON THE 2019 AMERICAN COUNCIL FOR AN ENERGY EFFICIENT ECONOMY SCORECARD MONTANA RANKED LAST OUT OF THE 50 STATES IN ENERGY EFFICIENT TRANSPORTATION POLICIES.

THE STATE IS SPENDING ITS SHARE – UP TO THE MAXIMUM IT IS ALLOWED TO SPEND – OF THE VOLKSWAGON SETTLEMENT FUNDS ON ELECTRIC VEHICLES AND CHARGING INFRASTRUCTURE.

OTHER STATES HAVE ADOPTED A VARIETY OF POLICIES AND TAKEN A VARIETY OF ACTIONS TO INCENTIVIZE, REQUIRE, AND DEVELOP LOW OR ZERO EMISSION VEHICLES AND INFRASTRUSTURE AND THAT SEEK TO REDUCE VEHICLE MILES TRAVELED OR MORE DIRECTLY SEEK TO REDUCE GHG EMISSIONS THROUGH THE ADOPTION OF VEHICLE EMISSION STANDARDS. THIS SET OF RECOMMENDATIONS FOCUSSES ON REDUCING VEHICLE EMISSIONS AS OPPOSED TO ACTIONS AROUND OVERALL TRANSPORTATION SYSTEM MANAGEMENT.

GAPS

IT WILL BE NECESSARY TO CONDUCT MODELING TO EXPLORE MONTANA'S TRANSPORTATION RELATED EMISSIONS AND WHAT MUST OCCUFR IN ORDER TO ACHIEVE THE OBJECTIVES OF THE GOVERNOR'S EXECUTIVE ORDER.

STAKEHOLDERS

- Legislature
- Utilities
- Governmental entities (Montana Department of Transportation, Montana Department of Environmental Quality)
- Citizens Groups
- Labor
- Industry

RECOMMENDATIONS

RECOMMENDATION 1: ADOPT LOW EMISSION VEHICLE STANDARDS

Begin a process, to adopt low-emission vehicle emission standards, which have been adopted by California and 14 other states, by the fall of 2020. At the same time Montana should consider whether to adopt the entire set of Advanced Clean Car regulations promulgated by California that includes a technology forcing mandate for zero-emission vehicles.

In 2007, Governor Schweitzer's Climate Change Advisory Committee, recommended, without dissent, that Montana join, along with, at that time, 10 other states, the California clean cars program. The Committee determined that this measure was the single most cost-effective measure of all GHG reduction measures recommended by the Committee.

Fourteen states have adopted California's standards and two other states, Minnesota and New Mexico, have announced their intention to adopt the standards. The ability of California to issue standards is being challenged by the Trump administration. Consequently, as the American Council for and Energy Efficient Economy states, "other states' adoption and support of California's standards will be critical in maintaining California's authority and progress toward clean, fuel-efficient vehicles."

In July, 2019, in response to actions by the Trump administration in this regard, Governor Bullock, along with 23 other governors, including all the states that have adopted the standards, called for a strong clean car standards in order to accomplish meaningful reductions in greenhouse gas emissions.

As Appropriate, consider the following relevant to the recommendation (All answers are specific to the low-emission vehicle standards not zero-emission vehicle standards):

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**

  The executive branch of Montana state government.

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**

  Pros: Reduced greenhouse gas emissions. Better air quality leading to improved health. Consumer benefits in the form of reduced expenditures for gasoline and vehicle expenses (since a low-vehicle emission fleet will require additional hybrid, plug-in hybrid, and electric vehicles which cost much less to maintain than traditional internal combustion vehicles), which will keep more money in local economies, producing ancillary spin-off benefits.
  Cons: potentially a reduction in the amount of gas tax revenue. Loss of service related expenditures at dealerships.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

  High effectiveness.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

  See above.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

  Negligible.

- **Provide an estimate of a reasonable timeframe to implement this recommendation. Does this recommendation address short, medium, or long term goals?**

  Unknown. Within a year however.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals.**

  A rulemaking is commenced and concluded.

RECOMMENDATION 2: TAX INCENTIVES FOR LOW AND ZERO EMISSION VEHICLE PURCHASE

The State should provide a tax incentive for the purchase of low and zero emission vehicles. Such an incentive would boost vehicle sales leading to a reduction in greenhouse gas emissions while benefitting consumers. About 20 states have adopted such incentives.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**

  The legislature.

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**

  Pros: Reduced greenhouse gas emissions. Reduced air quality impacts due to improved gas mileage. Improved health outcomes. Consumer benefits in the form of reduced expenditures for gasoline and vehicle expenses (since a low-vehicle emission fleet will require additional hybrid, plug-in hybrid, and electric vehicles which cost much less maintain than a traditional internal combustion vehicle), which will keep more money in local economies, producing ancillary spin-off benefits.
  Cons: like any tax incentive, there would be a reduction in the overall amount of taxes collected as a result of applying the incentive. Loss of service calls at dealerships reducing revenue.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

High effectiveness. Tax incentives work.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

  See above.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

  Will depend on the size of the incentive and how many take advantage of it.

- **Provide an estimate of a reasonable timeframe to implement this recommendation. Does this recommendation address short, medium, or long term goals?**

  2021 legislature.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals.**

  Use of the incentive leading to an increase in zero and low-emission vehicles in Montana

RECOMMENDATION 3: STATE REQUIREMENTS AND INCENTIVES FOR EV CHARGING INFRASTRUCTURE

The state should develop a goal for EV charging infrastructure in Montana and should take actions that will lead to the attainment of that goal. For example, a requirement to install a certain number of charging stations could be included in commercial building codes. The state could also require the installation of EV charging stations at all public buildings. Incentives could take the form of tax credits for businesses that install EV charging stations at their establishments.

In order to effectuate this overarching recommendation the Governor should issue an Executive Order stating the importance of deploying EV charging infrastructure in the State and creating a task force comprised of state agencies and other informed and involved stakeholders charged with creating a plan and action items leading to implementation. The work of the task force should be concluded by the end of 2020 so that, if necessary, legislation can be introduced in the 2021 session.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**

  The Governor can and should take the first step leading to the implementation of the overarching recommendation, namely, the deployment of charging infrastructure in the State.

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**

  Pros: the near term recommendation here – for the Governor to issue an Executive Order and convene a task force – is necessary if 1) the State is going to begin to and be serious about deploying charging infrastructure and 2) the State is going to go about this task in a thoughtful manner.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

  Unknown. It will depend, in the first instance, on the terms and directives of the Executive Order and how effective the task force is at performing its assigned task.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

  No

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

  Unknown. Time spent on the effort will be the biggest cost.

- **Provide an estimate of a reasonable timeframe to implement this recommendation. Does this recommendation address short, medium, or long term goals?**

  To maximize the utility of the recommendation, the work of the task force should be completed by the end of 2020.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals.**

  Meaningful action items will be identified by the task force.

RECOMMENDATION 4: UTILITY ENGAGEMENT IN DEVELOPING EV INFRASTRUCTURE

As a result of changes in the electric industry, the business model of utilities must also change if utilities are going to continue to play their important societal role. Making utilities a partner in the deployment of EV infrastructure takes advantage of the fact that EVs represent a potential source of new sales for utilities, which will create more certainty for utilities and enable them to better adapt to changing conditions.

Legislation should be enacted that would require the investor-owned utilities to file plans every 2 years with the Public Service Commission with the goal of accelerating transportation electrification. These plans should include such things as: an analysis of the existing market, existing policies, barriers to EV growth, the impact of rate design and the development of new rate structures that would promote the adoption of EVs. The plans, through an open, public process, would be subject to Commission approval, disapproval, or modification.

With respect to the state's electric cooperatives, there are two proposals that the Council requests comment on (including any other suggestions) The first is proposed by the author of the recommendation, the second by the Montana Electric Cooperative Association.

1) Every two years the Montana Electric Cooperatives Association, on behalf of its member electric cooperatives, would also be required to prepare and submit to the Montana Department of Environmental Quality a report that discusses EV charging and utility rates in the service territories of member cooperatives, including policies adopted by member cooperatives that address EV charging and utility rates.

2) The Montana Electric Cooperatives Association may be periodically contacted to request an update on electric cooperatives' activities regarding electric vehicle charging stations and infrastructure development.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**

Since the recommendation calls for legislation, it would be up to the legislature to implement it, with subsequent implementation being undertaken by the Public Service Commission and the Department of Environmental Quality.

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**

  Pros: if implemented, utility filings with appropriate governmental entities would help to ensure that utilities are engaged in the build out of EV infrastructure and that utility policies are not a barrier to EV adoption.

  Cons: None. Minor regulatory burden.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

  Medium to High. Obviously, requiring the filing of reports by utilities is not an onerous exercise, nor will it, in and of itself, lead to the widespread adoption of EVs. But, the action, along with other actions, is an important element in an overall package that seeks to achieve this objective.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

  None.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

  Unknown but insubstantial.

- **Provide an estimate of a reasonable timeframe to implement this recommendation. Does this recommendation address short, medium, or long term goals?**

Implementing the legislation will require legislation.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals?**

  As noted above, this action cannot be viewed in isolation from other actions that promote adoption of EVs.

RECOMMENDATION 5: OPPOSE A PENALTY ON OWNERS OF ELECTRIC VEHICLES TO "MAKE UP" FOR A DECREASE IN GASOLINE SALES AND ASSOCIATED GAS TAX REVENUES

At present, those engaged in the sale and the consumption of petroleum products are imposing costs on society as a result of GHG emissions and the fact that those costs are being "externalized," meaning that those who are causing the costs to be incurred (those who are involved in the petroleum business and the consumers of petroleum products) are not paying those costs but, rather, are imposing them on society at large. In part, this is why GHG emission abatement has proven so difficult: prices are not taking into account costs. In order to address the fact that human activity is rapidly raising levels of GHG in the atmosphere and radically altering the earth's climate, the tools that society has to transform markets must be utilized.

Accordingly, and particularly with regard to emissions from the transportation sector, which are the result of millions of individual decisions, there must be customer incentives, such as tax incentives, to promote the purchase of electric vehicles. Since society should want to encourage the purchase of electric vehicles it would be ill-advised and counter-productive to discourage their purchase by prioritizing gas tax revenues and penalizing electric vehicle owners to ensure those revenues are not diminished.

If the intent of imposing such a counter-incentive on electric vehicle ownership is to ensure sufficient funding for transportation system infrastructure, other metrics, rather than fuel use, could be utilized for taxation purposes, such as a vehicle miles traveled tax. Another method, although this would be less fair to EV owners, would be to assess an annual fee on EV owners equivalent to the average amount of gas tax paid per car per year.

AS APPROPRIATE, CONSIDER THE FOLLOWING RELEVANT TO THE RECOMMENDATION:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**

This recommendation simply calls upon the Council to enunciate its opposition to the imposition of a penalty on EVs in order to "make up" for lost gas tax revenues.

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**

  Pros: Potential EV owners will not be disincentivized from purchasing an EV.

  Cons: Potential revenue issues from loss of fuel taxes.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

High. It is critical to ensure the adoption of EVs that potential owners of EVs not only receive vehicle incentives but not be disincented.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

  No, at least in the short term. In the long term and with significant EV adoption it will be necessary to evaluate the precise impact of declining revenues as a result of declining fuel purchases and consider alternative ways to generate such revenue.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

  Unknown. See above.

- **Provide an estimate of a reasonable timeframe to implement this recommendation. Does this recommendation address short, medium, or long term goals?**

  All time frames.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals?**

  Increased EV adoption.

RECOMMENDATION 6: REST AREA CHARGING STATIONS

The recommendation is for the Montana Department of Transportation (MDT) to develop a plan to install DC charging stations at rest areas administered by the Department. There are approximately 45 rest areas (most but not all open all-year round) located on Montana interstate highways. Additional rest areas are located on other US routes and State highways. The objective is to provide the traveling public with sufficient charging infrastructure so as to make it possible for electric vehicles to traverse the long travel distances in Montana and to make it more convenient for EV owners to travel in Montana. The plan should set forth the rest areas that should receive charging infrastructure, a schedule for installation, and funding requirements and sources. Due to the need to develop charging infrastructure expeditously the plan should not look beyond 2030.

As part of the plan preparation, MDT will need to consult with the Federal Highway Administration (FHWA) and address legal issues related to the placement of charging stations at rest areas. Other states are currently addressing these issues.

AS APPROPRIATE, CONSIDER THE FOLLOWING RELEVANT TO THE RECOMMENDATION:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**

  MDT.

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**

  The development of fast-charging stations at rest areas would be a significant development in charging station deployment since it would allow Montanans and the travelling public convenient access to charging infrastructure while traveling across Montana.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

  High. Rest area charging stations are a natural place to locate such infrastructure. Ease of access is to charging stations is very important to ensure widespread EV adoption.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

  No.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

  Unknown. MDT staff time and resources to prepare such a plan will, presumably, constitute the bulk of the costs to implement the recommendation.

- **Provide an estimate of a reasonable timeframe to implement this recommendation.**

  Six months to one year.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals? Does this recommendation address short, medium, or long term goals?**

  A plan will be developed resulting in EV charging stations being installed at rest areas.

RECOMMENDATION 7: SIGNAGE DEPLOYMENT

The Montana Department of Transportation (MDT) would be responsible for deploying uniform signage to indicate the location of public charging stations. Consistent and visible charging signage will result in increased public interest in EVs and may help address concerns regarding range. The Federal Highway Administration has adopted a design for EV charging station signs. MDT would be responsible for determining signage placement and funding, consistent with its usual practices regarding signage.

AS APPROPRIATE, CONSIDER THE FOLLOWING RELEVANT TO THE RECOMMENDATION:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**

MDT

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**

  Pros: See above

  Cons: None

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

  The action would be part of a suite of actions that will promote EV deployment.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**

  No

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**

  Unknown.

- **Provide an estimate of a reasonable timeframe to implement this recommendation.**

- Over the next few years and on an ongoing basis as charging stations are installed.

- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals? Does this recommendation address short, medium, or long term goals?**

  Increased EV deployment as a result of this and other integrated actions.

5.2 TRANSPORTATION SYSTEM MANAGEMENT

01/21/20

PRIMARY AUTHOR:

CHUCK MAGRAW

DOES THE WHITE PAPER NEED TO BE COORDINATED WITH OTHER COMMITTEES?

NO

KEY ISSUE

TRANSPORTATION RELATED GREENHOUSE GAS EMISSIONS OCCUR NOT JUST BECAUSE OUR TRANSPORTATION FLEET USES FOSSIL FUEL BUT ALSO BECAUSE OF THE NATURE OF OUR OVERALL TRANSPORTATION SYSTEM. WHAT WE BUILD, WHERE WE LIVE, WHERE WE WORK AND HOW WE GET THERE, WHAT CONVEYANCE DO WE USE TO COMMUTE OR RUN ERRANDS, WHAT ALTERNATIVES ARE AVAILABLE TO US IF WE DON'T WANT TO RELY ON A VEHICLE. ALL OF THESE ARE RELATED AND DETERMINE OVERALL DRIVING PATTERNS AND HOW MUCH WE UTILIZE VEHICLES, WHICH, OF COURSE, DETERMINES, GIVEN THE NATURE OF OUR PRESENT DAY VEHICLE FLEET, THE LEVEL OF GREENHOUSE GAS EMISSIONS FROM THIS SECTOR.

MONTANANS DRIVE A LOT. OUT OF THE 50 STATES AND INCLUDING WASHINGTON D.C. ON A PER PERSON BASIS, WE DRIVE MORE THAN 40 OTHER JURISDICTIONS. LIKE OTHER WESTERN STATES, MONTANA HAS NOT BEEN ABLE TO GET A GOOD HANDLE ON THIS ISSUE. WE EXPERIENCE SPRAWL, WHICH CAUSES DISPERSED DEVELOPMENT THAT RESULTS IN ADDITIONAL VEHICLE MILES TRAVELLED, WHICH HAPPENS AT A RAPID PACE, CAUSING NEW EXPANDED INFRASTRUCTURE TO BE BUILT TO ADDRESS IMPACTS FROM NEW GROWTH, WHICH STARTS THE CYCLE OVER AGAIN. NOR IN THE FACE OF THIS GROWTH IS IT ENTIRELY POSSIBLE TO PROMOTE ALTERNATIVE SOLUTIONS. THERE ARE OTHER NEEDS THAT SEEM TO BE MORE PRESSING, LIKE THE NEW INTERCHANGE OR THE WIDENED HIGHWAY. IN OTHER WORDS, WE CATER TO OUR CAR CULTURE AND LACK THE ABILITY TO STEP BACK AND REALLY CONSIDER WHAT SHOULD HAPPEN (UNLESS WE WANT OUR STATE TO LOOK LIKE EVERY OTHER WESTERN STATE) AND THEN TO TAKE STEPS TO HOWEVER SLOWLY CHANGE OUR PRESENT PRACTICES. THESE RECOMMENDATIONS CONCERN THEMSELVES WITH THIS ISSUE.

PROGRESS TO DATE

OTHER STATES ARE ADDRESSING THE ISSUE IN A VARIETY OF WAYS. FOR EXAMPLE,

MONTANA HAS NOT IGNORED THE ISSUE. THE MONTANA DEPARTMENT OF TRANSPORTATION HAS, FOR EXAMPLE.

NOTWITHSTANDING THESE EFFORTS BY MDT, AS NOTED IN THE PREVIOUS DISCUSSION CONCERNING THE ADOPTION OF ZERO AND LOW EMISSION VEHICLES, IN A NATIONAL SCORECARD RANKING STATES ON EFFICIENT TRANSPORTATION POLICIES, MONTANA RANKS LAST.

GAPS

IT WOULD BE BENEFICIAL TO BETTER UNDERSTAND MDT'S POLICIES AND PRACTICES IN THIS AREA. IN PART THIS DIFFICULTY ARISES BECAUSE THE DEPARTMENT DOES NOT SEEM TO TAKE A COMPREHENSIVE OR HOLISTIC APPROACH TO ADDRESSING THE PROBLEM. A SPECIFIC RECOMMENDATION BELOW SEEKS TO ADDRESS THIS SITUATION. IT WOULD ALSO BE HELPFUL TO CONDUCT A SURVERY OF OTHER STATE POLICIES AND PRACTICES, WHICH MIGHT INFORM MONTANA DECISIONMAKING.

STAKEHOLDERS

- MONTANA DEPARTMENT OF TRANSPORTATION
- DEPARTMENT OF ENVIRONMENTAL QUALITY
- OTHER GOVERNMENTAL ENTITIES, INCLUDING COUNTIES AND CITIES
- TRANSPORTATION MANAGEMENT SPECIALISTS, INCLUDING ACADEMIC EXPERTISE

RECOMMENDATIONS

RECOMMENDATION 1: TRANSPORTATION SYSTEM MANAGEMENT COORDINATOR

Create the position of transportation system management coordinator within the Planning Department of MDT and develop processes that enable that individual and any subsequent staff to meaningfully participate in agency decision making.

There does not seem to be anyone at MDT who is made responsible for thinking about and engaging on the subject of Montana's overall transportation system, which involves, as discussed above, a host of different, sometimes competing considerations, issues, and concerns. Indeed, MDT seems not to have a position that is focuses on any mode of personal transportation other than vehicles. Since there is no single entity charged with the responsibility of considering issues related to the system as a whole, it is very likely that the issue gets overlooked by the Department. Put another way, the subject is not made a priority by the Department. Instead, and quite naturally, the Department concerns itself with those matters requiring immediate attention, which are most always building and maintaining infrastructure for vehicles.

RECOMMENDATION 2: WEB/APP BASED RIDE SHARING TOOL

MDT should develop and host a ride sharing internet tool that will enable drivers and riders to connect with each other so as to reduce vehicle miles travelled and costs for Montanans while also lessening the burden on existing transportation infrastructure.

Section VI.

Industrial
Oil & Gas
Carbon Capture and Storage

6.1 INDUSTRIAL SUBCOMMITTEE

PRIMARY AUTHORS:

- Alan Olson, MPA

KEY ISSUE

The Industrial Subcommittee is directed to develop recommendations for reducing GHG emissions from the industrial sector.

PROGRESS TO DATE

This subcommittee discussed various strategies to approach the objective of reducing GHG emissions from the industrial sector including:

The identification of the existing industries (individual and sector-wide) for which GHG emissions should be assessed;

The threshold for GHG emissions that should be inventoried;

Once the industries are identified that are at or above the inventory threshold, establish a path forward to collect the relevant data and then determine how to appropriately reduce GHFG emissions;

Other??

GAPS

The key gap in this effort is the absence of accurate GHG emissions data from industry (both individual and sector-wide) operations.

STAKEHOLDERS

- Various trade Associations (MPA, TSRA, etc.)
- Potentially Obvious Emitters with Knowledge of Process Operations
- Various Conservation Groups
- Other?

RECOMMENDATIONS

RECOMMENDATION 1: INDUSTRIAL GHG EMISSIONS REDUCTION

The industrial subcommittee recommends that a GHG emissions reporting program be developed to encourage facilities or industrial sectors that produce more than 25,000 metric tons of CO2e to annually report GHG emissions.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**
    - DEQ, with funding and stakeholder involvement, could develop this program.

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**
    - The legislature has previously declined similar legislation (over several different legislative sessions) that required DEQ to develop a GHG emissions reporting program. Appropriate communications with the legislature (interim committees or full session) needs to occur before proceeding.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**
    - Establishing a GHG emissions reporting program is key to understanding the level of GHG emissions from Montana industries/sectors and the subsequent reductions of GHG emissions.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**
    - TBD by the stakeholder group used to develop the GHG emissions reporting program.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**
    - TBD by the stakeholder group used to develop the GHG emissions reporting program.

- **Provide an estimate of a reasonable timeframe to implement this recommendation. Does this recommendation address short, medium, or long term goals?**
    - DEQ, with funding and stakeholder involvement, could develop a GHG emissions reporting program by 12/31/2020. GHG emissions information could reasonably be submitted by January 2022.

6.2 METHANE EMISSIONS

PRIMARY AUTHORS:

- Chuck Magraw, NRDC
- Alan Olson, MPA

KEY ISSUE

Methane emissions from human activities, and the need to control these emissions in light of their global warming potential, are receiving more and more attention. Methane emissions are sourced from oil and gas operations, landfills, wastewater facilities, and agriculture activities. Methane is a greenhouse gas with considerably more global warming potential than carbon dioxide. A significant increase in oil and gas development across the country due to innovations in and the widespread adoption of drilling technology has heightened the concern over methane emissions. This White Paper addresses methane emissions and possible ways to address the release of these emissions into the atmosphere.

PROGRESS TO DATE

There has been considerable work undertaken in recent years to identify sources of methane emissions and ways to control these emissions. Much of this work has focused on identifying (and to the extent possible quantifying) methane emissions from oil and gas operations and putting in place, either through a regulatory system or a collaborative approach, control measures. For example, New Mexico is currently involved in stakeholder process that includes industry participation that will lead to the development of a regulatory strategy to control methane from oil and gas operations. And, the Interstate Natural Gas Association of America (INGA) and its members have committed to adopting and improving practices to reduce methane emissions. In conjunction with this this effort some INGA members participate in voluntary programs intended to reduce emissions. Because there are so many potential point sources of methane, it is difficult to determine not only the extent of emissions but the piece of equipment, well, or type of activity that is responsible for the release. Much work has occurred, some of it using infrared cameras and specialized software, to identify methane sources.

Presently, the Montana Department of Environmental Quality's oil and gas operations registration program and the Montana Board of Oil and Gas waste prevention rule prevent the release of methane into the atmosphere.

GAPS

There is a lack of data on the nature and extent of methane emissions in Montana from all sources. In other words, not only is there an absence of information on emission levels but there is also a lack of information on the extent to which methane emissions are arising from any particular category of point sources or from any specific source within an overall category of point sources.

STAKEHOLDERS

- INDUSTRY TRADE ASSOCIATIONS
- CONSERVATION ORGANIZATIONS
- AFFECTED PRODUCERS WITH PROCESS KNOWLEDGE
- MT DEQ, MT BOGC

RECOMMENDATIONS

RECOMMENDATION 1: IDENTIFY AND QUANTIFY METHANE EMISSIONS IN MONTANA

Because, at present, it is not known to any reasonable degree of certainty the extent of methane emissions, making decisions in the absence of good information would be ill-advised. A study should be conducted that examines methane emissions in Montana. Since so much work has gone on elsewhere that has examined methane releases from oil and gas production, both in terms of identifying releases and devising control measures, a study should focus on oil and gas operations but should not neglect other potential sources of methane. Study design would be informed by a group of stakeholders working with the consulting firm or firms that are actually conducting the study.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**

- The study could be required to be performed by the legislature. Or the study could be initiated by Montana DEQ and/or the Board of Oil and Gas. Funding will be required to conduct a study. Funding could come from a legislative appropriation in conjunction with a directive to undertake the study. If the study was implemented by either or both of Montana DEQ and the Board of Oil and Gas it could be funded through a grant (which would have to be obtained) and/or existing program funds.

- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**
    - The benefits of such a study are obvious: a study would provide information as to how important it is to control methane emissions in Montana. If methane emissions are significant, the need to institute control measures becomes a priority.

- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee**
    - N/A

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**
    - No.

- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**
    - Unknown.

- **Provide an estimate of a reasonable timeframe to implement this recommendation.**
    - Unknown.

RECOMMENDATION 2: OIL AND GAS OPERATOR UTILIZATON OF BEST MANAGEMENT PRACTICES

Direct staff at MT DEQ and MT BOGC to meet regionally with oil and gas operators at a minimum of once annually to promote BMPs and work towards educating well and pipeline operators on methane gas capture and reduction in fugitive emissions.

BMPs have been enunciated by the US EPA and have utilized by the industry on a voluntary basis and have been made a part of various state's regulatory requirements as a tool to address methane emissions from oil and gas operations.

As an example of BMPs, 74% of Montana's oil production comes from producers that are members of the Environmental Partnership, https://theenvironmentalpartnership.org/. Oil production BMPs focused through the

Environmental Partnership include leak detection and repair, high-bleed pneumatic controllers, and the manual liquids unloading process.

Regarding leak detection and repair, Environmental Partnership members are committed to leak monitoring using optical gas imaging and /or portable analyzers and repairing identified leaks in a timely manner.

High-bleed pneumatic controllers have been identified as the source of 63% of methane emissions in the petroleum industry nationwide. Prior to 2018, nationwide more than 28,000 high-bleed controllers have been replaced, retrofitted, or removed. In 2018 another 3000 plus have been replaced, retrofitted, or removed. In discussions with major pipeline operators and oil producers in Montana no high-bleed controllers have been installed since 2015. As upgrades and retrofits are scheduled existing high-bleed controllers are being replaced, retrofitted, or removed.

Manual liquids unloading process is a process to unload water from gas wells that can build up and hinder gas production. Using mechanical means to remove water from the well bore in place of allowing the well to purge to the atmosphere greatly reduces methane emissions.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowners, industry etc.)?**
    - MT DEQ, BOGC, trade organizations, other interested parties
- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**
    - Pros: Non-confrontational
    - Cons: Reluctance of operators to participate
- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**
    - Recommendation would likely have a medium to high effectiveness due to the non-confrontational manner of addressing the issue. Politically neutral, “education before regulation.”
- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**
    - No adverse impact with strong potential of reduction of fugitive methane gas emissions.
- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**
    - Estimated costs are $0.00 as these discussions can be carried out with existing agency field trips.

- **Provide an estimate of a reasonable timeframe to implement this recommendation. Does this recommendation address short, medium, or long term goals?**
    - This recommendation can be implemented immediately as an initial medium-term goal.
- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals?**
    - Implementation can be determined through follow-up visits. Any participation would result in long term reduction of methane emissions.

RECOMMENDATION 3: **PROPER PLUGGING AND ABANDONMENT OF ORPHANED (ABANDONED) WELLS**

Properly plugging and abandonment of orphaned (abandoned) oil and gas wells for which there is no identifiable well operator will eliminate potential fugitive emissions of methane gas.

The program would be implemented by the MT BOGC using their biennial $650,000.00 statutory appropriation for reclamation projects. The key to the success is the need to ensure the BOGC receives the statutory appropriation in a timely manner. BOGC may have to adjust the environmental ranking criteria to move wells with potential to emit methane to a higher priority.

In the past similar programs were also directed through local conservation districts with funding from RDGP grants allowing a local program such as a conservation district or county government to disperse the monies locally for reclamation and remediation programs.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation (legislature, Governor, local government, utility/co-ops, homeowners, businesses, agriculture, landowers, industry etc.)?**
    - The program would be implemented by the MT BOGC using their statutory appropriation for reclamation projects. The key to the success is the need to ensure the BOGC receives the statutory appropriation in a timely manner.
    - In the past similar programs were also directed through local conservation districts with funding from RDGP grants allowing the local program to disperse the monies locally.
- **Describe the pros and cons of the recommendation. including any co-benefits for mitigation and adaptation to climate change.**
    - Pros: elimination of potential fugitive methane gas emissions.
    - Cons: None
- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**

- The impacts from this recommendation are unknown currently as there is no way to reliably measure fugitive emissions of methane gas from orphaned wells.

- **Identify whether this recommendation would have any significant adverse impacts on specific groups of people, industries, businesses or others. If there are significant adverse impacts, what mitigation strategies could be used to reduce those impacts? Similarly, are there adverse impacts to the environment to consider?**
  - No adverse effects
- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**
  - Existing statutory appropriation to BOGC is $650,000.00 per biennium. (15-38-202(2)(b)(i) MCA)
  - Potential for other groups to apply for RDGP grant funding in increments of $300,000.00
- **Provide an estimate of a reasonable timeframe to implement this recommendation.**
  - 2021 legislative session
- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals? Does this recommendation address short, medium, or long term goals?**
  - An effective orphaned well plugging program by the MT BOGC or other entities can prevent venting methane gas. If implemented the action of properly abandoning a well bore would address long term goals.

6.3 CARBON CAPTURE AND STORAGE

PRIMARY AUTHORS:

- Shaun McGrath, DEQ
- Gary Wiens, MT Electric Coop Assoc
- Tom Kaiserski, MDOC

KEY ISSUE

Even as Montana diversifies its energy portfolio, fossil fuels are expected to meet a portion of the energy demand for several decades. Accelerating deployment of carbon capture technology is essential to reduce emissions from these power plants, and meet the net-neutral goal. Moreover, more than half of the models cited in the Intergovernmental Panel on Climate Change's Fifth Assessment Report required carbon capture for a goal of staying within 2 degrees Celsius of warming from pre-industrial days. For models without carbon capture, emissions reduction costs rose 138 percent. (C2ES)

The Great Plains Institute notes that authoritative analysis by the International Energy Agency IEA) as well as the Intergovernmental Panel on Climate Change shows the critical role carbon capture must play in achieving US and global carbon reduction targets by 2050. The bulk of US carbon emissions comes from three sources; Transportation (29%), Electricity (28%), and Industrial (22%). Carbon capture enables many industries to reduce or eliminate their carbon emissions, while protecting and creating high-wage jobs. Moreover, for key carbon-intensive industries such as steel and cement, significant CO2 and CO emissions result from the chemistry of the

production process itself, regardless of energy inputs. Thus, carbon capture is an essential emissions reduction tool for major industrial sectors that are otherwise difficult to decarbonize.

NOTE: Caitlyn expressed opposition to this recommendation, particularly regarding the background write-up. She is concerned about using CCS as a justification for extending the extraction of fossil fuels.

NOTE:

PROGRESS TO DATE

Information provided by the Great Plains Institute shows that carbon capture is proven. The US has near a half-century's commercial experience safely capturing, transporting, using and storing CO2 at large-scale, with no loss of life or significant environmental incident since projects began in the 1970's. Globally, there are 19 large-scale projects in operation (10 of which are in the US), 4 under construction and 28 projects in various stages of development. Captured CO2 is transported via pipeline from the emissions source to geologic formations. There are currently about 5,100 miles of CO2 pipelines in the US including the Denbury Resources owned pipeline that provides CO2 from a natural gas processing source in Wyoming; the captured CO2 is used for enhanced oil recovery in the Bell Creek field of southeast Montana.

The Montana government has continually demonstrated strong support for carbon capture through participation in collaborative regional initiatives, state-level legislation on carbon capture and storage and support for federal legislation on carbon capture and storage. Governor Bullock co-founded multiple regional and national initiatives supporting carbon capture, including the State Carbon Capture Work Group, the Governors' Partnership for Carbon Capture and the Regional Carbon Capture Deployment Initiative. Governor Bullock also entered a Carbon Capture MOU in 2018 along with the Canadian Province of Saskatchewan that includes participation with the States of North Dakota and Wyoming.

Since 2015 the State Carbon Capture Work Group has made comprehensive state and federal policy recommendations and delivered four CCS reports:

- Putting the Puzzle Together: State and Federal Policy Drivers for Growing America's Carbon Capture and CO2-EOR Industry.
- 21st Century Energy Infrastructure: Policy Recommendations for Development of American CO2 Pipeline Networks
- Electricity Market Design and Carbon Capture Technology: The Opportunities and Challenges
- Capturing and Utilizing CO2 from Ethanol: Adding Economic Value and Jobs to Rural Economies and Communities While Reducing Emissions.

The Energy Research Institute at Montana State University has mapped state CO2 resources, potential carbon sequestration, CO2- enhance oil recovery locations, and potential CO2 pipeline routes. They also have expertise in site characterization and knowledge of the regulatory environment.

The Petra Nova facility, a coal-fired power plant located near Houston, Texas, is one of only two operating power plants with carbon capture and storage (CCS) in the world, and it is the only such facility in the United States. The 115megawatt (MW) Boundary Dam plant in Saskatchewan, Canada, near the border with Montana and North Dakota, is the other electric utility facility using a CCS system.

CCS technology mitigates the release of carbon dioxide (CO2) from the combustion of fossil fuels. Three potential approaches allow power plants to capture CO2:

- **Post-combustion** capture involves sending the power plant's emissions through an absorption process where a solvent captures up to 90% of the CO2. The recovered CO2 goes through a regenerator that strips the CO2 from the solvent while the remaining emissions (primarily nitrogen) are vented to the atmosphere.

- With **oxy-combustion** capture, the fossil fuel is burned in pure oxygen instead of air. The result of this process captures nearly pure CO2.

- With **pre-combustion** capture, the fossil fuel is turned into a synthetic gas consisting of relatively pure hydrogen and CO2.

Petra Nova's post-combustion CO2 capture system began operations in January 2017. The 240-megawatt (MW) carbon capture system that was added to Unit 8 (654 MW capacity) of the existing W.A. Parish pulverized coal-fired generating plant receives about 37% of Unit 8's emissions, which are diverted through a flue gas slipstream. Petra Nova's carbon-capture system is designed to capture about 90% of the carbon dioxide (CO2) emitted from the flue gas slipstream, or about 33% of the total emissions from Unit 8. The post-combustion process is energy intensive and requires a dedicated natural gas unit to accommodate the energy requirements of the carbon-capture process.

The carbon dioxide captured by Petra Nova's system is then used in enhanced oil recovery at nearby oil fields. Enhanced oil recovery involves injecting water, chemicals, or gases (such as carbon dioxide) into oil reservoirs to increase the ability of oil to flow to a well. Petra Nova CCS retrofit costs were reported to be $1 billion, or $4,200/kW, and the project was completed on budget and on time (USEIA)

According to an IEA analysis, approximately 37% net lifecycle emissions reductions can be achieved through geologically storing industrial and power plant CO2 through enhanced oil recovery, including the additional oil produced.

The Montana Department of Commerce accompanied Talen Energy and other stakeholders to Estevan Saskatchewan in 2018 and toured the Boundary Dam power plant that is capturing approximately 1 million tons of CO2 per year. SaskPower stated at that time that they could replicate the CCS project at 40% of original costs. The 99.9+ percent pure stream of CO2 is monetized through sale to the oil industry for enhanced oil recovery.

In 2017 the existing federal 45Q performance-based tax credit for carbon capture projects was revamped in a globally significant way as it increased credit values, expands eligibility to include other beneficial uses of captured carbon, creates greater financial security, expands eligibility to more industries and enables the owner of capture equipment to transfer the credit to another party. The revamped credit provides a foundational policy for incentivizing carbon capture deployment in multiple industries, much like the role the federal production tax credit and investment credit has played in wind and solar development. (GPI)

GAPS

At the federal level significant factors impacting deployment of CCS are the of lack understanding of the importance of the 45 Q federal tax credit, the lack of U.S. Treasury Department guidance for those seeking to claim the 45Q tax credit, its engagement among key stakeholders and the fact that it is a time-limited opportunity; to qualify for 45Q, any project must begin construction between now and the end of 2023.

At the state level there is a need to inventory state policies to assure that policies are in place that can positively affect the economics of the entire value chain that stretches from the capture of CO2 from industrial and power plant sources through to utilization and associated geologic storage of CO2 through EOR or storage in saline geologic formations. This type of inventory could be accomplished in part as part of the council's deliberations. On a longer time-horizon, there is a need to gather more detailed geologic site characterization data to identify the best saline formations in Montana to target for CO2 injection.

STAKEHOLDERS

- Multiple Montana State agencies; Governor's Office, Commerce, DEQ, DLI, DNRC, others
- Dr. Lee Spangler, Director of the Energy Research Institute and the Big Sky Carbon Sequestration Partnership at Montana State University Al Ekblad, Executive Director, Montana AFL- CIO
- Brad Crabtree, Vice President, Carbon Management, Great Plains Institute
- Gordon Criswell, Environmental Manager, Talen EnergyMichael Enright, Beowulf Energy

RECOMMENDATIONS

RECOMMENDATION 1: MT DEPT. OF ENVIRONMENTAL QUALITY/BOARD OF OIL AND GAS CONSERVATION SHOULD SEEK PRIMACY FOR CLASS VI DEEP INJECTION WELLS.

Section 1421 of the Safe Drinking Water Act (SDWA) requires EPA to develop UIC program requirements that protect underground sources of drinking water from endangerment. EPA has developed UIC program requirements that are designed to be adopted by states, territories, and tribes. Primary enforcement authority, often called primacy, refers to state, territory, or tribal responsibilities associated with implementing EPA approved UIC programs. A state, territory, or tribe with UIC primacy, or primary enforcement authority oversees the UIC program in that state, territory, or tribe.

Class VI wells are used to inject carbon dioxide (CO2) into deep rock formations. This long-term underground storage is called geologic sequestration (GS). Geologic sequestration refers to technologies to reduce CO2 emissions to the atmosphere and mitigate climate change. EPA has finalized requirements for GS, including the development of a new class of wells, Class VI, under the authority of the SDWA's UIC program. These requirements, also known as the Class VI rule, are designed to protect underground sources of drinking water.

North Dakota is the only state with primary enforcement authority for UIC Class VI wells. EPA directly implements the Class VI program in all other states, territories, and tribes.

RECOMMENDATION 2: STATE FUNDING FOR CCS

State support for R&D projects and carbon capture and storage (CCS) will be key in helping reliable base-load generation remain part of the resource mix that renewable energy needs. In Montana's cold winters, for example, wind energy cannot operate at extreme subzero temperatures. Natural gas also has limitations in extreme cold weather. Development of carbon-capture technology in Montana can be encouraged with the state creating a partnership with federal Department of Energy grants in which the state leverages DOE funds by providing its own funds for CCS. Earmarking a portion of existing coal severance tax revenue would be an appropriate utilization of a portion of these revenues.

As Appropriate, consider the following relevant to the recommendation:

- **Who could implement the recommendation?**
    - The Governor can assist in implementation through changes in state programs. The Legislature may have to approve spending or tax changes to further R&D & CCS projects. Earmarking a portion of existing coal severance tax revenue may be one way to raise money for further R & D & CCS projects.
- **Describe the pros and cons of the recommendation, including any co-benefits for mitigation and adaptation to climate change.**
    - Costs to taxpayers is the major challenge. A major positive is Montana's tangible contribution to development of affordable CCS technology.
- **Identify whether this recommendation would likely have a high, medium or low effectiveness or impact in addressing the issue and why. How does the recommendation advance the guiding principles or theory of change identified by the committee?**
    - High impact on carbon reduction. The proposal also helps protect energy jobs in Montana.
- **What are the estimated costs or resources (both public and private) needed to implement this recommendation (if possible)?**
    - Unknown at this time.
- **Provide an estimate of a reasonable timeframe to implement this recommendation.**
    - This is a long-term public policy objective likely requiring several years to implement.
- **What needs to happen to determine whether this recommendation, if implemented, is successful in achieving its goals? Does this recommendation address short, medium, or long term goals?**
    - Unknown. This addresses long-term goals.

Section VII.

State Agencies

7.1 MONTANA'S STATE AGENCIES

PRIMARY AUTHORS:

- Lauren Berka, Department of Administration

KEY ISSUE

Section 3 of Executive Order No. 8-2019 creating the Montana Climate Solutions Council directs individual state agencies to "develop initiatives and goals for efficiencies in resource management and operations." This white paper addresses the Executive Order's directive in Section 3(b), which directs state agencies to make "climate an immediate and actionable priority" through "individual agencies initiatives and quantifiable goals that can be implemented now, with measurable progress made by June 30, 2020."

PROGRESS TO DATE

The State has made various efforts towards sustainability in the past.

Governor Brian Schweitzer issued a letter on December 13, 2005, directing the Montana Department of Environmental Quality to establish a Climate Change Advisory Committee (CCAC). Under this initiative, the CCAC recommended that Montana state government move the state "toward a stock of buildings that has much higher energy efficiency and by improving efficiency in the operations of state buildings." The CCAC also recommended that the Montana state government lead by example in reducing its own GHG emissions to 1990 levels by 2018 (2 years earlier than the statewide goal) and 5% below 1990 levels by 2020 (5% lower than the statewide goal for 2020). The lastly CCAC recommended that Montana state and local government agencies explore enacting procurement policies and/or joining the EPA SmartWay program and utilizing the SmartWay Upgrade Kits that result in adoption of lower-emitting vehicle fleets.

Governor Bullock's administration issued the "Montana Energy Future" or, "Energy Blueprint" report in December 2014. This report included several recommendations specific to state agencies, including solar development, lighting, desktop computers, as well as requiring the completion of several different reports.

The progress made in these areas will be described in greater detail below.

State Fleet

The MDT Equipment Bureau manages two fleets of vehicles. The State Motor Pool operates and maintains a fleet of vehicles available to all state offices and employees who conduct official state business and it made up of approximately 1,000 vehicles located throughout the state. The Equipment program provides light duty vehicles and heavy equipment for MDT employees to perform road construction and maintenance activities and conduct official state business. The fleet is made up of approximately 4,700 pieces of equipment.

A summary of ways MDT has worked toward reducing greenhouse gas emissions currently and in past years are as follows:

1. Purchased approximately 181 hybrid sedans and small utility vehicles over the past 10 years that have a fuel efficiency of 40+ miles per gallon. MDT is purchasing 6 hybrid sedans in FY20.
2. Purchased electric vehicles for the Department of Environmental Quality.
3. Replaced almost 50 larger sedans with smaller compact sedans that have better fuel economy.
4. Work with DOA to require all vehicle vendors to provide a CAFE (Corporate Average Fuel Economy) rating for vehicles with a gross vehicle weight of less than 8,600 lbs and use the CAFE as a factor in awarding purchasing bids.

5. Research Compressed Natural Gas (CNG) and alternative fuels. Research and tested biodiesel and diesel additives in past years.
6. Purchase tier 4 diesel engines in heavy duty trucks and equipment. This is required of all diesel engines by the EPA. These engines use Diesel Exhaust Fluid (DEF) to control emissions.
7. Research tandem axle trucks, which are controlled by a computer to shut off engine after 5 minutes of idling.
8. Encourage carpooling and car sharing among state employees.

MDT continues to monitor and discuss ways to continue to reduce greenhouse gas emissions and other strategies that are either in process or have potential for future reductions are:

1. Finalizing our idling policy to reduce unnecessary idling.
2. Reviewing electric vehicle technologies and considering plans to purchase more electric vehicles in the future.
3. Promoting more use of digital technologies and video conferencing to reduce employee travel for meetings and state business.
4. Considering Automatic Vehicle Locator (AVL) options for vehicles and equipment to monitor fuel usage, excessive idling, excessive speeds and emissions output to help formulate policies for vehicle usage.

Benchmarking State Building Energy Use

Governor Bullock's 2014 Energy Blueprint directed the Montana Department of Environmental Quality "to benchmark the energy use of all state buildings, providing a priority for needed energy efficiency upgrades and investments."

- As of July 1, 2019, State Building Energy Conservation has benchmarked 174 properties totaling 764 buildings and 17.9 million square feet. This includes all buildings over 5,000 square feet for which the state has utility data. Current data is through December 2018 where possible. Weather normalized energy use is down 20% since 2007 and 4.7% since 2012. Of the benchmarked properties, 40 are currently eligible to receive Energy Star scores. Of these, 28 are above the median score of 50 with 15 scoring over 75 which may qualify the buildings for Energy Star. Of the 12 buildings scoring below 50, only 4 are below 25. The Montana Mental Health Nursing Care Center has moved from a score of 9 to 20 and is expected to show continued improvement as gas use is down 20% from 2018 and electricity is showing a similar decrease. Energy projects have been initiated for several facilities, one of which is the Butte Job Service which has an Energy Star score of 21. Other facilities with low scores include the Western Montana Veterans home, which is looking at a lighting upgrade, and facilities at Fort Harrison. Data for the benchmarked properties is included on the DEQ website.

State Data Center

Bullock's 2014 Energy Blueprint directed the Department of Administration and the Governor's Budget Office to "review the expected energy savings on the Helena campus from upgrading existing lighting to LEDs and converting existing PCs to VDMs [Virtual Desktop Machines], and issuing a report no later than September 1, 2017."

At the Miles City Data Center:

- A hot/cold aisle separation system was added. Hot/Cold separation provides a series "one-pass" path for chilled air to flow through the servers (extracting heat) before returning to the chiller systems. This arrangement reduced the use of air cooling fan systems from four systems to two systems.
- A "dry" cooling system was added to allow for "free" cooling when outdoor air temperatures are low; during the winter months.
- A 3-stage pumping system was added to the coolant water system to better match pumping loads to cooling requirements.

- Adjustable speed drives were added to the air circulation systems on the server floor, to better match supplied air flow to cooling requirements.
- Since installation,
- The facility PUE factor reduced from 3.2 to 2.1. The PUE (Power Usage Effectiveness) is a unitless factor used to represent efficiency at data centers. Lower PUE factor numbers indicate more efficient energy usage. A PUE factor of 1.0 is the best possible.
- The above energy improvements reduced operating costs $30,000 per year for the past two consecutive years.
- Currently the server load is 62kw.

At the Helena Data Center:

- Previously chilled air from the Kyoto® cooling system, was uniformly discharged at the "cooling wall" onto the data center floor; however, air baffles were added to the "cooling wall" to better direct the chilled air into the cold aisles. This is another form of hot/cold aisle separation. As a result of this change, the system PUE factor reduced from 1.22 to 1.14, and correspondingly $16,000 per year in savings has been measured since making this energy improvement.
- Server virtualization efforts have reduced the total server load by 38kw (from 214kw to 176kw). At a blended rate of $0.12/kwh this is an additional savings of $39,945 per year.

Solar

Governor Bullock's 2014 Energy Blueprint directed the following action items with regard to solar:

- Direct DEQ to study an optimal 50kW system for the Metcalf building, and include provisions for installation adaptability to make this package suitable for installation on numerous state buildings.
- Direct DEQ to assess the suitability of other state buildings around Montana (not on the Helena campus) for solar development, and at selected facilities determine the appropriately-sized solar facilities and associated equipment, to provide working packages with specific recommendations as well as general guidance for solar project developers considering maximum limit net metered systems or systems installed behind the meter.
- Direct DEQ and the Department of Administration to develop language suitable for a Request for Proposal to allow a state agency interested in solar for its facilities to specify all system components (e.g., PV panels, rack systems, net metering, utility connection safety equipment, shipping, equipment and system warranties, disconnects and panel enclosures, installation, maintenance, etc.).
- Direct the Department of Administration and DEQ to work with the Governor's Budget Office to explore the opportunities and constraints regarding the development of a financing structure to put private capital to work at a smaller scale with pooled projects, providing resources to add solar to state facilities.
- Direct the Departments of Natural Resources and Conservation and Environmental Quality to develop, based on input from solar developers, screening criteria to identify properties that may have high value for solar development.
- Direct the Departments of Natural Resources and Conservation, Environmental Quality, and Transportation to engage in a comprehensive review of their land ownerships using the criteria to identify specific candidate properties within their ownerships, and to produce a listing of those properties.

As of the end of 2019, the following had been completed with regards to solar:

- The Energy Bureau studied the feasibility of solar on 19 different state buildings. Subsequently, an in-depth analysis was completed on 5 state facilities.

- DEQ has conducted research and met with A&E to begin development of standard language. Additional meetings and eventual development of standard language will be completed following development of additional model/pilot RFPs. Two RFPs have been developed, neither of which resulted in solar projects being constructed. Detailed designs and RFPs were developed for50 kW arrays at 5 S. Last Chance Gulch and Montana Tech, and although neither projects were ultimately built due to cost constraints, the process provided useful experience with integrating solar in re-roofing projects and new construction.
- The Energy Bureau has reviewed several different financing mechanisms to support adding solar to state facilities, including public/private financing options, bond and third-party ownership hybrid models, energy performance contracting, and self-ownership of solar on state owned buildings with financing provided through DEQ's State Building Energy Conservation Program. Due to legal ambiguity related to third-party ownership of solar in Montana, DEQ has not pursued that option. SBECP and energy performance contracting options have not been shown to deliver economically viable projects at this time.

GAPS

While studies and reports about strategies for climate adaptation and mitigation in Montana have previously been completed, none have focused specifically on cataloging the efforts state agencies have made towards sustainability. Efforts have been made to introduce sustainability priorities into procurement and state fleet policies, as well as the growth of the state's recycling program, but many of these initiatives have not been tracked and so it is not currently possible to know how effective they have been. Similarly, the solar panels which were installed on the boiler plant next to the Capitol building currently do not function with an analytical package and so it is difficult to say what the return on this investment has been.

Other states have first undertaken surveys of their state's current efforts at sustainability in order to first establish baseline metrics against which to chart progress. Given the inconsistent knowledge of previous steps the state has taken, it would be a useful exercise to survey the existing landscape in order to better understand what is currently being done and also why previous efforts may have languished. As a part of this initial white paper draft, a preliminary survey was sent to state agency directors, asking them to report on which sustainability efforts their agencies currently engage, if any. A few agencies responded to the survey, but in order to gather a comprehensive picture, a much larger and more thorough survey would need to be undertaken. It would likely be more effective if an individual or team spent time talking with agency leaders to better understand not only how they are seeking to be sustainable, but also what their unique challenges are.

In addition to producing a more robust survey of state agencies' current status, a successful project to improve state agencies' sustainability practices would also likely involve a committed team/committee/council dedicated to investigating recommendations and compiling useful case studies for comparison. Some of the initiatives state agencies could undertake would require the participation of many stakeholders in order to be long-lasting and effective. Thankfully, there are many fellow states and private entities to turn to for advice and best practices, but the effort is certain to be more successful if a strategic plan is first developed before committing to specific goals or initiatives.

Individual state agencies have also undertaken a variety of independent efforts towards the goal of sustainability and energy efficiency. Some of these efforts are known, however, many have not been recorded or coordinated with other agencies' efforts. Any future efforts should chronicle existing state agencies' efforts.

STAKEHOLDERS

At a minimum, these efforts would need to include the twelve cabinet-reporting state agencies:

- Department of Administration
- Department of Agriculture
- Department of Commerce
- Department of Corrections
- Department of Environmental Quality
- Department of Fish, Wildlife, and Parks
- Department of Labor & Industry
- Department of Livestock
- Department of Natural Resources & Conservation
- Department of Public Health & Human Services
- Department of Revenue
- Department of Transportation

RECOMMENDATIONS

RECOMMENDATION 1: CREATION OF OFFICE OF ENTERPRISE SUSTAINABILITY

Many other states have opted to create a "Office of Enterprise Sustainability" or designated a "State Sustainability Officer." These measures have elevated the importance of sustainability priorities and afforded some protection and consistently to these efforts regardless of administrative or other changes. Montana has convened several councils and committees focused on climate change, namely the Governor's Climate Change Advisory Committee which produced a "Montana Climate Change Action Plan" in November 2007 and the current Montana Climate Solutions Council.

Sometimes these offices or positions have been created by executive order or through legislative action. While an office or officer position could be voluntary, most states who have adopted this model have institutionalized it with some kind of permanent funding mechanism, which may need to be achieved through legislative action. It could seek an independent source of funding or be funded through contributions from each of the agencies. In some instances, states have funded a single "Sustainability Officer" position but relied on volunteers from each of the agencies. Those who have not institutionalized an office or position with a permanent source of funding have often found that efforts withered in the face of budget cuts or changing administrative directives.

Establishing a "sustainability office" or "sustainability officer" would lend permanence to the objective of "leading by example" and would provide a platform for studying, planning, and enacting sustainability recommendations. At a minimum, this office should:

- Establish a comprehensive history of sustainability efforts that have already been undertaken by state agencies. Coordinate with all state agencies to understand how they have already been implementing sustainability practices. Specifically, this history should investigate:
    - Governor Bullock's Energy Blueprint directs DEQ to benchmark energy use in all state buildings.
    - Progress towards Governor Bullock's Energy Blueprint recommendation that the state transition personal desktops to Virtual Desktop Machines.
    - Progress towards replacement of existing lighting to LEDs

    - Report on energy savings at Helena & Miles City data centers
    - Review of solar generation at state-owned facilities
        - The Energy Bureau studied the feasibility of solar on 19 different state buildings. Subsequently, an in-depth analysis was completed on 5 state facilities.
        - DEQ has conducted research and met with A&E to begin development of standard language. Additional meetings and eventual development of standard language will be completed following development of additional model/pilot RFPs. Two RFPs have been developed, neither of which resulted in solar projects being constructed. Detailed designs and RFPs were developed for50 kW arrays at 5 S. Last Chance Gulch and Montana Tech, and although neither projects were ultimately built due to cost constraints, the process provided useful experience with integrating solar in re-roofing projects and new construction.
        - The Energy Bureau has reviewed several different financing mechanisms to support adding solar to state facilities, including public/private financing options, bond and third-party ownership hybrid models, energy performance contracting, and self-ownership of solar on state owned buildings with financing provided through DEQ's State Building Energy Conservation Program. Due to legal ambiguity related to third-party ownership of solar in Montana, DEQ has not pursued that option. SBECP and energy performance contracting options have not been shown to deliver economically viable projects at this time.
    - Reports of efficiency savings from lighting and technology improvements
- Consult with agency leaders to determine priorities and identify existing resources in order to develop concrete goals for agencies, both individually and across the enterprise. Work with state agency leaders and work together to contribute towards a realistic and enduring program of goals for state agencies.
- Maintain executive branch focus on and long-term commitment to sustainability objectives. Coordinate state agency efforts and prevent redundant or duplicative efforts. Serve as an official source of information about sustainability requirements and agency responsibilities.
- Coordinate with state agencies and other stakeholders to work to implement sustainability mandates and goals. Provide assistance with planning in order to ensure successful realization of sustainability goals.
- Discover what private sector entities are currently doing to realize sustainability objectives. Seek out public and private partners in order to develop a network for sharing knowledge, experience, and best practices.
- Work with agencies to determine how to develop baseline metrics for state agencies.
- Serve as a strategic advocate for the state's sustainability efforts, able to communicate the value of sustainability efforts to a wide variety of audiences.

Funding would undoubtedly be an initial complication for this recommendation. An executive order could mandate creation of an office or a position, and could potentially direct agencies to contribute towards funding, however, it may require legislative process and approval at some point. Some members of the legislature may be critical of the creation of another office or position. Additionally, some agency leadership could resist contributing to the creation of an office if their participation and cooperation is not first secured. Furthermore, even if agency leadership is supportive of the creation of an office or position, they may not wish to devote their agency's resources towards staffing a volunteer "sustainability coordinator" position. Depending on the amount of work required of agency coordinators, employees and supervisors may be resistant to sharing resources in this way. While having a dedicated coordinator in each agency to work with a sustainability office/officer would be ideal, this would likely confront funding issues. Agencies may not want, or be able, to shift an employee's work

responsibilities in this way. At the same time, they may not have the ability to fund a dedicated sustainability coordinator position. If this model relies on a volunteer sustainability coordinator model, it may be difficult to compel participation, cooperation, and contribution towards sustainability goals. Even if a sustainability office or officer were created, it may be difficult for a single individual to secure agency participation if agencies are not (1) required to comply and (2) given opportunities to meaningfully participate in the process.

Although the creation of an office/officer would not immediately realize a goal of net greenhouse gas neutrality, this would be an effective step in demonstrating the seriousness of the state in showing progress towards and commitment to climate solutions, first and foremost within state government. Enshrining an office or officer position would be an increased likelihood that these efforts would endure regardless of political change or shifting priorities.

This recommendation could be implemented quickly and could serve to satisfy the Executive Order's mandate that state agencies demonstrate "measurable progress" by June 30, 2020. The creation of a permanent office or officer position would also serve the realization of long-term goals, as its existence would decrease the likelihood that sustainability efforts among state agencies would weaken over time.

RECOMMENDATION 2: CREATION OF BUILDING ANALYTICS & BASELINE METRICS

Currently, the state does not have the means of establishing robust baseline metrics for energy usage in most of its Capitol Complex buildings. Most buildings are not centrally metered and so it is impossible to pinpoint how much energy a building, much less a specific part of a building, is using. In some cases, multiple buildings share single systems and so more refined metrics become even more difficult. The state receives campus energy data from Northwestern Energy, is unable to determine which buildings are performing adequately and which buildings are using excessive gas, electricity, or water.

DOA's General Services Division has taken measures to amalgamate the mixture of proprietary control systems on campus into a structured and open framework. This has involved replacing proprietary licensing and installing updated supervisory controls in each building. Capitol Campus buildings are currently being attached to a campus-wide server so that day to day maintenance, trending, logging, and alarming for all buildings can be monitored. These are critical steps that will facilitate analytics in the future. This system is almost complete.

In addition to bringing all the Capitol Complex buildings onto a single control system, another significant improvement would be the installation of power monitoring devices to quantify energy demand from each building. There is already some inconsistent energy metering installed around campus, however, without metering in place at the source, it is not possible to determine efficiency loss or gain. An energy monitoring system would be the first step. There are many competing energy monitoring systems available, but according to our facilities staff, a simple system that will provide electrical, gas, and water usage to each building is all that would be needed at this point.

Without first establishing baseline metrics, it is impossible to demonstrate – much less identify – progress. Building analytical systems would not only enable the creation of baseline metrics, they would also allow facilities crews to monitor building performance and make real-time adjustments to save energy. Building analytics would allow staff to more accurately identify and address energy waste as well as provide detailed reports on each building's energy usage.

For those buildings that are currently eligible for building analytics systems, these systems are being evaluated and installed by a single state employee. By current estimates, this process will likely require a minimum of five years

to complete. This process could be expedited by securing additional funds to purchase the analytics systems and/or hiring a contractor to complete the installations. In order to outfit all the Capitol Complex buildings with analytics systems, however, several buildings would first have to have their power systems updated significantly. The state currently has a $45-$60 million maintenance backlog and these building updates would have to prioritized over other needs. Currently, no capital, beyond what is already budgeted, is available for these investments.

An executive order could elevate the urgency of some of these priorities, however, it is likely that ultimately, the legislature would need to approve reallocation or increase funding to realize these goals.

It appears the establishment of these baseline metrics, while perhaps not seemingly demonstrating immediate progress towards mitigation and adaptation goals, is actually critical to chart future progress. It would also be a crucial tool for communicating the relevance and value of sustainability efforts: in real dollars and cents saved taxpayers. In this way, implementing this recommendation would address the long-term goal of ensuring sustainability and its attendant benefits – including being responsible stewards of public resources and saving taxpayers' money – remains a priority for state agencies.

The installation of building analytics systems could also realize short-term goals by providing state agencies with accurate data on their energy usage and allow them to make real-time adjustments in order to save energy. This would yield immediate benefits in terms of realizing the Executive Order's mandate to realize net greenhouse gas neutrality. While the total amount of greenhouse gases emitted by state-owned buildings may be small compared to other sources, it could demonstrate the commitment of state government to realizing the goals outlined in the order.

These baseline metrics could result in a kind of annual "sustainability" report that chronicles agencies' sustainability efforts, including greenhouse gas mitigation, energy and water savings, as well as other efforts to make state government more efficient and resilient. Other states have developed these annual reporting tools and published this information so that state agencies, as well as the legislature and the public, can hold one them accountable. An "annual report" or a reporting tool updated in real-time, could serve to make sustainability goals of energy and water reduction more tangible.

According to DOA's General Services Division, the following is a list of Capitol Complex buildings that, with some effort, could have a building analytics package implemented.

These are listed from most practical to least practical:

1. DOC, #5 Last Chance Gulch
    a. GSD is just completing an HVAC controls upgrade of this building. This is the easiest system to add analytics because the baseline is known. It is possible to determine the energy usage of this building, despite not having metering, because it is not combined with other buildings on the Capitol Campus.
2. Montana Outdoor Discovery Center, Highway 12
    a. This building operates well, is fairly new, and the equipment is well maintained. There is currently separate NorthWestern Energy metering for a baseline. Analytics could be added.
3. DNRC Building, 1424 9th Street
    a. This building could have analytics applied, but we will have no baseline as there is no metering in place.
4. FWP Building, 1420 E 6th Street

a. GSD has upgraded and verified the operation of majority of the systems in this building. This building could have analytics applied, but we will have no baseline as there is no metering in place.

5. Metcalf Building, 1520 6th Avenue
    a. Analytics could be added. There is energy usage information available, but due to inconsistencies in programming, naming conventions, and poor network design, the software provider would have a significant task in adding the analytics. Despite some mechanical problems, the building seems to work as originally designed.
6. The Capitol Building
    a. The building has a mix of controls, old and new equipment, many different programming styles, and many different naming conventions. These inconsistencies make application of analytics difficult. This building is a candidate, but the amount of time required by the analytics provider to set up the software might make it cost prohibitive. No baseline for energy usage exists for this building.

RECOMMENDATION 3: NEW MONTANA HERITAGE CENTER

The state currently has the opportunity to build a new Montana Heritage Center. This will be the first time a new building has been built on the Capitol Complex (~10-mile radius around Capitol) in more than 30 years. This would be an opportunity to mandate that the new building meet certain sustainable criteria. The new building would also provide opportunities for improved infrastructure for surrounding buildings and the possible inclusion of electric vehicle charging stations, none which are currently available on the Capitol Campus. For example, a new Heritage Center could provide power and mechanical systems for surrounding buildings, replacing outdated and inefficient existing ones.

As of 2009, 17-7-213, MCA requires all new buildings and major renovations to be constructed and operated as high-performance buildings. This Council could encourage appropriate entities to refine the meaning of "high-performance," perhaps by mandating the new building achieve a certain level of 3rd party certification (i.e. "LEED" or "Green Globe"). The energy efficiency benefits from building to LEED specifications can be expected to save significant expenses in energy costs and maintenance. These benefits would need to be made clear throughout the process. It should be noted, however, that pursuing LEED certification can incur additional costs during the design and construction phases. Additionally, it requires planning for ongoing maintenance costs in order to maintain the LEED certification. These costs may require an escalation beyond the existing appropriation.

While this new building would not be operational for several more years, once this building was completed and online, it could be one of the most efficient buildings in the State's portfolio. While adding a new building to the State's real estate portfolio will not necessarily decrease the State's overall net energy usage or greenhouse gas emissions, it could be built to provide energy for surrounding buildings and eventually replace older, less efficient buildings.

RECOMMENDATION 4: OTHER POSSIBILITIES FOR CONSIDERATION

There are many other recommendations that could be investigated and potentially sent to the Governor.

1. Procurement Policies
    a. As part of their sustainability efforts, many states have revised their state's procurement policies in order to seek realization of sustainability goals. The state currently has some procurement policies in effect, however, these could be reviewed, refined, and reinforced.

b. In terms of procurement policies, the state adopted 75-10-806, MCA, which details policies related to state government procurement of recycled supplies and materials and mandates that the Department of Administration "shall write purchasing specifications that incorporate requirements for the purchase of materials and supplies made from recycled materials if the use is technologically practical and reasonably cost-effective." These requirements must be incorporated into the purchase of:
    i. (a) paper and paper products;
    ii. (b) plastic and plastic products;
    iii. (c) glass and glass products;
    iv. (d) automobile and truck tires;
    v. (e) motor oil and lubricants; and
    vi. (f) other materials and supplies as determined by the department of administration.
c. 75-10-806, MCA further details that "it is the goal of the state that 95% of the paper and paper products used by state agencies, universities, and the legislature must be made from recycled material that maximizes postconsumer material content" and mandates that the state "shall, to the maximum extent possible, purchase for use by state agencies paper and paper products that contain postconsumer material rather than new material." These guidelines for the recycled material content of paper should "be consistent with nationwide standards for recycled paper." 75-10-806, MCA stipulated that DOA should establish a "joint recycling market development task force," including representatives of the recycling industry, wholesalers, state agencies, and citizen and environmental organizations, as well as other interested persons. The task force was asked to:
    i. (a) assist the department of administration in developing purchasing specifications as required in subsection (1);
    ii. (b) develop additional mechanisms for state government to develop markets for recycled materials;
    iii. (c) identify procurement barriers that discriminate against the purchase of supplies and products that contain recycled material; and
    iv. (d) develop recommendations for an informational program designed to educate state employees on how to reduce waste and recycle in the workplace.

2. State Fleet
    a. Some efforts have been directed at state fleet policies in the past and these could be revisited and refined. Many other states have made fleet policies hallmarks of their sustainability programs.
    b. The MDT Equipment Bureau manages two fleets of vehicles. The State Motor Pool operates and maintains a fleet of vehicles available to all state employees who conduct official state business and it made up of approximately 1,000 vehicles located throughout the state. The Equipment program provides light duty vehicles and heavy equipment for MDT employees to perform road construction and maintenance activities and conduct official state business. The fleet is made up of approximately 4,700 pieces of equipment.
    c. An ongoing initiative for our programs is to purchase vehicles and equipment that meet the state's needs as customers and also provide fuel efficiency in the fleet. A summary of ways MDT has worked toward reducing greenhouse gas emissions currently and in past years:
        i. Purchased approximately 181 hybrid sedans and small utility vehicles over the past 10 years that have a fuel efficiency of 40+ miles per gallon. MDT is purchasing six hybrid sedans in FY20.

ii. Purchased electric vehicles for the Department of Environmental Quality.
iii. Replaced almost 50 larger sedans with smaller compact sedans that have better fuel economy.
iv. Worked with DOA to require all vehicle vendors to provide a CAFE (Corporate Average Fuel Economy) rating for vehicles with a gross vehicle weight of less than 8,600 lbs and use the CAFE as a factor in awarding purchasing bids.
v. Researched Compressed Natural Gas (CNG) and alternative fuels. Research and tested biodiesel and diesel additives in past years.
vi. Purchased tier 4 diesel engines in heavy duty trucks and equipment. This is required of all diesel engines by the EPA. These engines use Diesel Exhaust Fluid (DEF) to control emissions.
vii. Tandem axle trucks are controlled by a computer to shut off engine after 5 minutes of idling.
viii. Encourage carpooling and car sharing among state employees.

d. We continue to monitor and discuss ways to continue to reduce greenhouse gas emissions and other strategies that are either in process or have potential for future reductions:
i. Finalizing our idling policy to reduce unnecessary idling.
ii. Reviewing electric vehicle technologies and considering plans to purchase more electric vehicles in the future.
iii. Promoting more use of digital technologies and video conferencing to reduce employee travel for meetings and state business.
iv. Considering Automatic Vehicle Locator (AVL) options for vehicles and equipment to monitor fuel usage, excessive idling, excessive speeds and emissions output to help formulate policies for vehicle usage.

3. Flexible Scheduling
a. Many states have been turning to various types of "alternative workplace solutions" to reduce the quantity and sizes of facilities they maintain. This could take many forms, but other states have increased the availability of offsite work options and shared coworking spaces available for employees. Others have created "conference centers" in order to reduce the number of conference rooms sitting empty and unused. This reduces the need for office space to be maintained, to such a degree in some states, entire buildings have been repurposed or demolished. The benefits of flexible work arrangements are amplified when employees are relocated away from aging and inefficient buildings and into either flexible workspaces or off-site locations (such as employees' homes or public spaces) in which the state incurs no costs.
b. Another tactic some states are adopting is transitioning buildings to alternate schedules, such as four-day, ten-hour schedules, as opposed to the traditional five-day, eight-hour schedule. A modified schedule such as this could allow a building to be placed in "weekend" energy mode, adding a third day of reduced energy usage per week. Considering these types of solutions could multiply the impact in a geographically large state such as Montana: if fewer employees were commuting to work or traveling for meetings because of the increased availability of flexible work scheduling and remote conferencing solutions, this could represent a significant decrease not only in vehicle emissions, but also in energy spent by the State in powering building infrastructure.
c. In order to be implemented, this recommendation would require significant buy-in from a variety of stakeholders. Many states, as well as public and private entities provide telecommuting/teleworking/flexible work schedule options to their employees and so there are

many examples to learn from. Tennessee, for example, has recently received a lot of press coverage about their efforts to create alternative workplace solutions. This recommendation would almost certainly require the creation of a task force or committee to study this issue and gather input from state agencies and executive branch leadership. It would likely require several years to be fully implemented. Without a study, there is not an easy way to identify how much energy or money the State could potentially save. This would have to be studied as part of the research and planning phase.

d. While some measures may need legislative approval, many of these changes could theoretically be achieved through internal state policies. The Governor, for example, could mandate limits on the ability for state employees to travel for work meetings or require more remote conferencing. However, significant efforts would have to be made to bring consistency across all state agencies. Achieving a massive overall of state human resource policies such as this may be accompanied by additional costs for research, study, and implementation and the state's current workforce may not be able to take on a large project such as this without additional funding resources. One agency could serve as a pilot for funding the feasibility of this measure, any associated costs, and cost avoidance and savings.

e. If some flexible scheduling were to be implemented, this could be immediately effective in reducing greenhouse gas emissions as well as the state's overall energy usage. In order to demonstrate the degree of cost savings and avoidance, however, some work would need to first be completed. If building analytics were operational by the time flexible scheduling was made available, it would be fairly easy to demonstrate how flexible scheduling has reduced the state's emissions and saved energy. However, in the absence of these metrics, other means of demonstrating success would need to be developed.

4. Recycling Program
    a. The state's current recycling program has existed for five years. Some form of a recycling program has existed in the state for over twenty years, but its scope and the types of materials recycled has changed over time. The state currently has recycling stations in each of its buildings on the Capitol Complex. These stations accept paper, plastics, aluminum, and glass. The current recycling program, however, is limited by the recycling options that are available in Helena. Only limited types of plastics are accepted and there is currently not an organics/composting option available.
    b. The state currently has a recycling program, but state agencies could undertake a review of the program and study how the state's program compares with other states. Other states, for example, tally pounds of recycling, organics, and trash waste.
5. Capitol Complex Master Plan
    a. A Capitol Complex Master Plan was conceptualized in 2010. Realizing elements of the Master Plan could yield progress towards the goals set forth in the Executive Order. The Master Plan calls for the addition of parking structures on the Capitol Complex and the closure of several streets to cars in favor of pedestrian traffic. The consolidation of parking across campus could allow several objectives to be achieved:
        i. Installation of electric vehicle charging stations.
        ii. Could also be designed to include solar panels or a grass roof.
        iii. Covered parking would lead to reduced snow removal costs.
        iv. Existing parking lots could be resurfaced with infilled green space. Replacing several surface parking lots with one parking structure could significantly increase the number

of trees and the amount of green space on campus, which would have the added benefit of providing greenhouse gas offsets.

v. Increase of pedestrian and non-motorized travel spaces around the campus.

6. Scheduled Maintenance Plan
    a. Updating the state's scheduled maintenance plan. The state could consider creating a comprehensive plan for improving energy efficiency as part of routine maintenance, which would not necessarily require additional funding. For example, replacing used inefficient lightbulbs with more efficient LEDs on an as-needed, routine maintenance schedule.
7. Electric Vehicle Charging Station(s)
    a. In October 2017, the Governors of Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming signed a Memorandum of Understanding (MOU) to establish a Regional Electric Vehicle Plan for the West ("REV West Plan"). Through the REV West Plan, the Signatory States agreed to work together to create an Intermountain West Electric Vehicle (EV) Corridor that will make it possible to seamlessly drive an EV across the western states' major transportation corridors. There are currently ten public charging station ports (electric vehicle supply equipment or EVSE) in Helena, but none on the Capitol Campus. Utah and Colorado have both created "Electric Vehicle Plans" that include not only the installation of EVSEs on state property, but also transitioning the state fleet of vehicles to electric. As a point of comparison, Utah has multiple charging stations across several State sites, including its Capitol Building which has six "Level 2" chargers. These states utilized a combination of state money and grant funding to install these stations. One of the sources that Utah tapped into, for example, was the Volkswagen Diesel Emissions Settlement. Montana will receive $12.6 million from this settlement. States can use up to 15 percent of their funds for light duty electric vehicle charging stations available to the public or located at workplaces or multi-unit housing locations. Typically, EVSE units can cost between $12,000-$15,000 and the settlement can allocate $8,500 per unit. Additional funds have often been secured by other grant sources.
8. Bike Share / Alternative Commuting Incentive
    a. Some employers offer incentives for utilizing "alternate" means for commuting to work, e.g.: walking, biking, public transportation, or carpooling. Some examples of incentives other employers use include on-site bicycle storage, on-site locker rooms and showers, and bike/walk-to-work subsidies, allowances, or reimbursements. For example: employees might receive an additional 15-minutes per day of vacation for every day that they use an alternative means of transportation to work (walk, bike, public transportation, carpool), capped at a total of 3 additional vacation days a year, or take advantage of 15-minutes of "flex time" at both the beginning and end of the work day if they use alternative means of transportation to work.
9. Maintenance Backlog
    a. The state currently has a $45-$65 million maintenance backlog. Before the state considers more serious investments in energy-saving, such as solar panels, some of these maintenance backlogs should probably be addressed. For example, a building's roof may need to be replaced prior to installing solar panels.
10. Lighting around Capitol Building
    a. DOA's General Services Division has researched installing LED lights around Capitol building, replacing the current less-efficient lightbulbs. However, the City of Helena has a light pollution ordinance in place that may make it difficult to use LED lightbulbs for this purpose. The idea has stalled at this point.