MONTANA CLIMATE SOLUTIONS PLAN

Preliminary Recommendations and Key Questions

For Partner and Public Comment

January 31, 2020

Modified February 12, 2020

Contents

Introduction

On July 1, 2019, Governor Bullock issued Executive Order 8-2019, creating the Montana Climate Solutions Council and joining the State of Montana to the U.S. Climate Alliance. The Council is tasked with providing to the Governor a Climate Solutions Plan, by June 1, 2020, that provides recommendations and strategies aimed at preparing Montanans for climate impacts; reducing greenhouse gas emissions—including achieving 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; advancing the research, development and commercialization of new technologies necessary to meet these goals; and addressing the needs of communities and workers in transitions through economic and workforce development efforts.

Montana's climate is already changing. Our temperatures are 3 degrees warmer on average than they were just a few decades ago; early spring runoff is impacting our water availability and causing flooding; our fire seasons are by some estimates 78 days longer than they were 30 years ago and by most accounts more severe. In 2017, the state experienced our largest and most expensive fire season on record since the big burn of 1910. We had double the incidence of respiratory related ER visits in affected counties; we endured periodic waves of evacuations; and tragically, we lost the lives of two wildland firefighters. The state lost up to 800,000 visitors due to 2017 fires and smoke, resulting in an estimated loss of $240.5 million in visitor spending. According to the Montana Climate Assessment (MCA), the State could experience an additional 3-7 degrees increase in average temperatures by mid-century, including an increase in incidences of extreme heat that could dramatically increase many of these impacts moving forward.

Within our state borders, we have also begun to experience transitions in our economy and our energy sector that reflect the changes that are happening across our nation and around the world. How the state elects to respond to the shifting demands and needs of the global economy can help assure our sustained economic growth and position us to continue to provide the food, energy, products,

technology, tourism opportunities and other goods and services to the nation and the world that drive our economy.

Planning for climate change can help the state prepare for risks amid these uncertainties. Not only does the state face a series of physical risks tied to a changing climate, the state and our businesses also face a series of fiscal, economic, financial and policy risks tied to the changes happening around us. Planning for climate change not only helps us manage the costs tied to these risks through proactive efforts to manage risk and uncertainty, it also offers opportunities for the state to capture and localize the market for innovation happening in response to climate challenges, offering a chance for the state to both safeguard our traditional strengths, and diversify and grow new opportunities for our future. While there are many benefits to climate planning and action, many members of the Council stress that great care must be taken to evaluate individual policies to determine the implications for issues like costs, equity across communities, and reliability of our energy system.

The Climate Solutions Council invites the public and partners to provide comment and feedback on this preliminary report. The preliminary recommendations, dissenting views and key questions reflect the early thinking of Council members and are provided in this draft to encourage upfront engagement as the Council deliberates toward its final product in June. Comments may be submitted to ClimateCouncil@mt.gov through March 31, 2020. Additional information regarding the Council, including meeting notes, composition, the Governor's Executive Order, the Council's Charter and other background is available at: https://deq.mt.gov/Climate.

Over the coming months, the Council looks forward to working with partners to refine these recommendations and to build the policies, programs and partnerships that will be required to ensure effective implementation. Responding to the challenges and opportunities associated with climate change in Montana will ultimately require a durable and sustained commitment on the part of citizens, businesses, neighbors, partners and our elected officials.

1. Preparing Montanans For Climate Impacts

Climate change-driven severe weather events like wildfires, drought, and flooding, continue to threaten people, communities and businesses across Montana. The State must prioritize efforts that will prepare our communities, infrastructure and economies for anticipated climate impacts. This includes ensuring that our natural resources - our farms, forests, rangelands, wildlife and water supplies - continue to sustain our livelihoods and quality of life. Building resilience will require addressing current climate variability and recent extreme events as well as preparing for future change and emergent threats. Given recent climate projections, there is an urgency to strengthen efforts across Montana.

The Climate Solutions Council established the Climate Adaptation, Information and Decision Support Committee to develop strategies to prepare the state for climate impacts. Adaptation knits together a range of activities from translating science into usable information to building the partnerships required to implement strategies that reduce risk. The practice of adaptation commonly includes five general stages: 1) awareness, 2) assessment, 3) planning, 4) implementation, and 5) monitoring.

A foundation of the best available science and locally relevant knowledge, experience, and information is critical to inform decision-making. However, sound science and information alone are insufficient to effectively manage climate related risks—efforts to translate that science into accessible information and to build capacity, outreach, and delivery mechanisms in response to the needs of government agencies, tribal nations, land managers, business owners, non-profits, and individuals is often necessary. Planning exercises can assist decision makers in assessing vulnerabilities and identifying appropriate strategies to minimize or eliminate risks. In the end, effective adaptation is an iterative process that requires taking action to reduce risks as well as a commitment to monitoring results and learning from successes and failures, and a willingness to try a different approach if necessary.

Montanans have diverse experiences planning for climate impacts, including efforts at municipal, county, watershed and Tribal Nation scales. Committee members discussed their past experiences involving Climate Smart Missoula, the Blackfeet Nation, Montana Disaster and Emergency Services, the Montana Climate Office's work with state agencies to develop early warning systems for drought and flooding, research and community engagement from the Montana University System, and the Department of Natural Resources and Conservation's work with federal partners in the Upper Missouri River Headwaters through the National Drought Resiliency Partnership. Council members also reflected on the findings and process used to develop the National Climate Assessment and the 2017 Montana Climate Assessment, including the state-based workshops, questionnaires and listening sessions used to guide the MCA's development. Based on these experiences and best practices, Council members identified the following guiding principles for effective adaptation.

GUIDING PRINCIPLES FOR EFFECTIVE CLIMATE ADAPTATION:

1. Montana agencies, communities and stakeholders should approach climate change and its impacts with an understanding of the state's geography, culture, history, economy, and resources.
2. Addressing the impacts of climate change requires robust, community-driven and bottom-up planning based on an understanding of climate projections and the specific vulnerabilities and risks that different sectors and communities will experience, including a focus on explicit goals and effective actions to build resilience.
3. A common framework using the best available science to develop adaptation plans can help highlight commonalities and differences across the approaches used by different jurisdictions and sectors, facilitating comparison and learning among users and the identification of best practices.
4. Recommendations should build on and be integrated into existing programs wherever possible.
5. Adaptation efforts should be coordinated with related efforts, especially strategies to reduce emissions and foster innovation to achieve multiple beneficial outcomes and synergies.
6. Communities cannot do adaptation planning individually and without support. The state needs to provide coordinated assistance to gather and share information, build and support networks and partnerships among communities, universities, non-profit and philanthropic organizations, provide sustained funding for planning, and leverage federal dollars and capacity.

Committee members developed, and the Council has advanced, the following early recommendations for public and partner input. Additional details may be found in the Committee's white papers found on the Department of Environmental Quality's Climate Solutions Council website.

Preliminary Council Recommendations:

1A: SUPPORT A COMMON FRAMEWORK FOR PREPARING FOR CLIMATE IMPACTS AT MULTIPLE SCALES BY GROWING AND SUSTAINING CLIMATE SCIENCE AND INFORMATION DEVELOPMENT

Key Strategies:

- Expand staffing and capacity of the Montana Climate Office to build upon current efforts to analyze historical and projected climate trends, and contribute to assessment and adaptation needs.
- Sustain periodic and ongoing climate assessments led by the Montana University System informed by the needs and expertise of state, local and tribal nation governments, businesses and stakeholders.
- Further develop and support the Montana Climate Data Layer Under the Montana Spatial Data Infrastructure and Montana Library based on the work of the Montana Climate Office and ongoing assessments.

1B: ESTABLISH A CLIMATE ADVISORY COUNCIL WITHIN THE MONTANA UNIVERSITY SYSTEM TO COORDINATE RESEARCH AND ASSESSMENT NEEDS AND FACILITATE EXTENSION OF CLIMATE INFORMATION AND SERVICES TO MONTANANS

Key Strategies:

- Prioritize and conduct research with University Social Scientists to better understand the climate information needs of agricultural producers, forest land managers, tourism and recreation businesses, state, local and tribal governments and other stakeholders in Montana.
- Provide guidance and strategic direction to the Montana Climate Office on matters related to climate modeling priorities, information dissemination, decision support tools, and technology application for resource management.
- Develop and coordinate a network of Climate Extension Specialists with possible shared appointments between the Montana Climate Office, Tribal Colleges, MSU Agricultural Experiment Stations, MSU Extension, and the Montana Forest and Conservation Experiment Station in coordination with relevant state agencies. Use this network to support a communications strategy for target audiences and to support capacity needs for planning, grant applications and other user needs.

- Co-develop, field test, review and evaluate adaptation programs and strategies to identify best practices and lessons learned and ensure strategies deliver results and effective risk management for end users.
- Further develop drought and flood early warning systems to support community, tribal, state and federal responses.
- Develop county and municipal scale climate data toolkits to support efficient local adaptation planning.

1C: BUILD COMMUNITY RESILIENCE TO CLIMATE CHANGE THROUGH EFFECTIVE PLANNING

Key Strategies:

- Support the Climate Smart Montana network as a platform for communities to share ideas, processes, lessons learned, and resilience plans, so that no community needs to reinvent the wheel.
- Leverage the experiences of practitioners across the state to develop a roadmap and toolkit for planning such as building from ongoing efforts of the Department of Commerce's Montana Ready Communities Initiative.
- Develop strategies to integrate climate adaptation with disaster mitigation plans, wildfire plans, drought and flood plans, and others that can support resilience planning and facilitate implementation.
- Incorporate strategies from the forthcoming assessment of climate-related health risks and monitor climate-related illnesses to support local, regional and tribal health providers in response to extreme climate events such as extreme heat, vector-borne diseases, water-related illnesses, food safety and nutrition, wildfires, allergens and air quality, and mental health.
- Learn from and integrate traditional and indigenous knowledge into adaptation efforts.
- Build on and complement the climate adaptation work already happening on tribal lands throughout the state, while recognizing the leadership provided by Montana's sovereign tribal nations.
- Explore opportunities to integrate adaptation planning with planning to reduce greenhouse gas emissions, especially when solutions offer local resiliency to potential regional energy disruptions, and further local economic development goals.
- Be attentive to a range of co-benefits, as strategies are developed and implemented.

1D: ADAPT MONTANA'S BUILT ENVIRONMENT TO CLIMATE CHANGE

Key Strategies:

- Integrate adaptation actions with the Montana Disaster and Emergency Services Division's Hazard Mitigation Programs by working with communities to identify their highest priority risks

and vulnerabilities and implement hazard mitigation plans that incorporate climate impacts. Evaluate vulnerabilities for Montana's critical infrastructure (roads, bridges, power lines, telecommunications etc.) and develop coordinated federal, state, local and tribal nation resiliency strategies where needed.

- Ensure local governments have access to updated information concerning current and future high-risk floodplain and wildfire prone-wildland urban interface zones. Support state and local code updates to further reduce risks and impacts.
- Implement active management across ownership boundaries to reduce wildfire risks and sustain watershed functions as identified in Montana's updated Forest Action Plan. Implement an engagement process to educate and inform stakeholders on the Department of Environmental Quality's Smoke Management Program, highlighting the ability to use prescribed fire for forest fuel reduction on a year-round basis and the need for funding to improve smoke management forecasting.
- Support local governments to integrate flood, disaster, and wildfire protection planning with community land use planning and decisions when requested by local officials.
- Ensure local infrastructure such as schools, hospitals, community centers, and shelters incorporate adaptation strategies to address the needs of the young, sick, aging and other vulnerable populations related to climate impacts such as smoke and air quality, extreme heat, flooding, winter emergencies and distributed energy needs.
- Expand the use of nature-based solutions that use natural systems, mimic natural processes, or work in tandem with traditional approaches to address natural hazards like flooding, erosion, drought, and heat islands. Incorporating these nature-based solutions in local planning, zoning, regulations, and built projects can help communities reduce their exposure to these impacts, resulting in reduced costs, economic enhancement, and safer, more resilient communities. Examples include urban park development, beaver mimicry, wetland and riparian restoration etc.
- Increase urban forest canopy in communities large and small to provide cooling shade, sustain public health and reduce energy consumption

1E: PROTECT OUTDOOR RECREATION AND TOURISM RESOURCES TO MAINTAIN A DIVERSE AND HEALTHY ECONOMY, POSITIVE MENTAL AND PHYSICAL HEALTH OUTCOMES, AND A RESILIENT, HIGH QUALITY OF LIFE FOR RESIDENTS AS WELL AS VISITORS

Key Strategies:

- Develop and strengthen networks of outdoor recreation and tourism professionals across agencies, jurisdictions and the private sector to improve collaborative approaches to identifying risks and vulnerabilities and to adaptation planning.
- Develop climate information and tools specific to the outdoor recreation and tourism sectors and include climate adaptation strategies related to outdoor recreation and tourism in local plans and policies such as parks and recreation plans and hazard mitigation plans.

- Identify and support funding strategies to address local business recovery needs, particularly in the travel and tourism sectors, associated with extreme weather events.

1F: BUILD THE RESILIENCE OF MONTANA'S PRIVATE WORKING LANDSCAPES (FARMS, RANGELANDS, AND FORESTS) AND SUPPORT VOLUNTARY AND INCENTIVE-DRIVEN EFFORTS FOR CLIMATE SMART MANAGEMENT THAT REDUCES RISKS, IMPROVES BOTTOM LINES, AND ENHANCES CARBON STORAGE IN SOILS, FORESTS AND WOOD PRODUCTS

Key Strategies:

- Recognize Montana producers for their high adoption rates of soil health practices including no/conservation tillage and cover crops, improved grazing systems and efforts to maintain and restore native rangelands.
- Explore partnerships with producers and their associations to research conservation practice adoption factors, cost savings, and climate related co-benefits, such as carbon storage, increased water holding capacity in soils, and reductions in pest and disease risks.
- Partner with USDA resources like the Climate Hubs, NRCS, and Rural Development to explore farm-scale and regional on farm conservation and energy planning strategies and align state and federal funding programs to support producer-identified implementation priorities.
- Explore opportunities for Montana farmers, ranchers and forest landowners to diversify income streams through emerging carbon markets by developing pilot projects or programs that aggregate and quantify enhanced carbon management. Consider other creative efforts that reward producers for climate resilience and carbon management such as cost-share or insurance premium reduction payments, marketing and labeling tools and others.
- Target Farm Bill programs to private working lands that support drought, watershed and wildfire resilience needs.
- Expand operator and manufacturing capacity and diversification of uses of long-lived wood products (*see Chapter 3 for additional wood products innovation discussion*).

1G: SUPPORT CLIMATE RESILIENT FORESTS, RANGELANDS, AND WILDLIFE USING AN ALL-LANDS, ALL-HANDS APPROACH ACROSS OWNERSHIP BOUNDARIES

Key Strategies:

- Continue to address wildland fire risks through coordinating interagency planning and response, supporting wildfire-adapted communities, and building resilient landscapes through active forest management to improve safety and protect communities across ownership boundaries.
- Use forest management to maintain structure and composition to increase resiliency to insects, disease and uncharacteristic stand-replacing wildfires; protect municipal watersheds; and maintain the long-term capacity of forests to continue to buffer emissions as natural carbon sinks.

- Maintain a diverse rangeland ecosystem that supports agriculture, recreation, wildlife and pollinators across all ownerships through coordination, flexible tools and conservation incentives.
- Promote best management practices for building resiliency in rangelands to increase soil carbon and soil water holding capacity
- Support establishment or enhancement of infrastructure that improves grazing management on rangeland, including technologies for monitoring range and stockwater conditions and livestock health.
- Strengthen existing partnerships and build new collaborations across agencies, disciplines and jurisdictions to share knowledge and ensure the climate adaptation needs of species, habitats and ecosystems are incorporated into relevant planning and management.
- Prioritize and conduct additional research and vulnerability assessments for species, habitats, and ecosystems as part of periodic statewide climate assessments.
- Provide end users and decision-makers with information about climate change effects on fish, wildlife, habitats, and ecosystems; adaptation and mitigation options; training opportunities; case studies; recommended peer-reviewed research; and contacts in a user-friendly format. Encourage use of this information in adaptation planning and project environmental reviews. Monitor integration of wildlife adaptation efforts into state agency projects, environmental reviews, plans, and relevant communications and training.
- Strengthen partnerships between local, state, federal, and tribal government; private landowners; and conservation organizations to implement landscape-scale conservation.
- Protect, enhance, and restore rivers, streams, lakes, reservoirs, wetlands, and riparian areas that are critical to fish, wildlife, and plant populations. Provide for aquatic organism passage, where appropriate.
- Continue to prevent and minimize the spread of invasive species and insect and disease infestations that can be exacerbated by climate change including policies and programs for monitoring, early detection and rapid response.

1H: PROTECTING MONTANA'S WATER QUALITY AND QUANTITY FROM CLIMATE CHANGE

Key Strategies:

- Promote wetland and stream function through restoring and protecting river corridors, floodplains and wetlands and supporting related education efforts.
- Integrate local drought and water quality planning into other climate and land use planning efforts.
- Invest in tools to improve statewide monitoring and assessment of water resources.
- Incorporate green infrastructure and adaptive water management that combine flooding mitigation, water storage, and water quality improvement into stormwater infrastructure and natural storage utilizing ditches, floodplains, and irrigated lands.

Questions to guide partner and public feedback:

- How can Montana best coordinate climate services to bridge the gap between climate information and action to prepare communities for impacts? What should be the role of the university system and state government? How should this work be funded?
- How can the state best support the unique climate planning needs of local governments? How can it learn from and support the climate adaptation efforts of tribal nations?
- How can the state and university system better understand the climate information and support needs of businesses across key sectors of the economy: including agriculture, construction, natural resources, forestry, health care, outdoor recreation, tourism and others?
- How can the state and university systems support planning that is adaptive to changing conditions and emerging science about climate impacts?
- How can capacity that is built to address climate adaptation goals also benefit community transition planning and strategies? How should the climate Council consider opportunities to integrate climate adaptation planning with community economic development and workforce planning needed to foster resilience and prepare for transitions? How can partnerships, information, and capacity be leveraged?
- Is there value in developing estimates of the costs and benefits of climate preparedness and impacts?
- What adaptation strategies are missing? Where can recommendations be strengthened or prioritized to have the most impact? What other risks and vulnerabilities need to be addressed?
- How do we align existing programs and resources, build capacity and secure funding for planning and implementation of these strategies?

2. Strategies to Reduce Greenhouse Gas Emissions

Executive Order 8-2019 requires the Climate Solutions Council to develop a Montana Climate Solutions Plan that 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.

The Council formed the Greenhouse Gas Mitigation Committee to begin to formulate strategies that can achieve the goals outlined by the Governor. According to the Federal Government's 4th National Climate Assessment released in 2018, "in the absence of more significant global mitigation efforts, climate change is projected to impose substantial damages on the U.S. economy, human health, and the environment. Under scenarios with high emissions and limited or no adaptation, annual losses in some sectors are estimated to grow to hundreds of billions of dollars by the end of the century. It is very likely that some physical and ecological impacts will be irreversible for thousands of years, while others will be

permanent." The urgency to respond to these threats is significant, and Montana has an opportunity to provide leadership and both prepare for and inform future Federal policies in response to climate change.

Using available data and studies, the Greenhouse Gas Mitigation Committee began to wrestle with what at first appears to be a simple math problem derived from the Executive Order's goals, but upon closer inspection requires a dynamic understanding of the electric supply system, its regional context, and the role different sectors of the economy play in producing greenhouse gas emissions and could possibly play in reducing emissions. To understand possible scenarios to achieve the Governor's goals there are a number of variables at play, ranging from the known (future generation facility retirements, planned resource acquisitions) to the uncertain (future population growth, rate of electric vehicle adoption and the corresponding demand for more electricity, emerging technologies, etc). To address common needs of policy and decision makers, often these variables must be coupled with additional assumptions regarding cost and system integration, allowing for evaluations of whether the mix of resources and infrastructure ultimately meets widely held goals such as maintaining electric system reliability and affordability.

Several studies and models have been developed to assist states, regions and utilities understand least cost alternatives and pathways toward achieving emissions reductions goals or targets. These modeling efforts of future scenarios can help structure stakeholder conversations, better inform decision makers regarding tradeoffs, and provide the context needed to design and implement policy packages that are consistent with long-term goals.

George Box famously said that "all models are wrong, but some models are useful." The goal of a greenhouse gas reduction modeling exercise is not to correctly determine a single solution or accurately predict the future—it is to inform decisions made under uncertainty, to offer a set of measuring sticks to evaluate the compatibility of policy options and to test those options in terms of their feasibility, costs, and emission reduction potential. Given the current dependence of the economy on carbon-based energy sources, and the interactions between sectors, a modeling effort can help scope the timing of infrastructure changes, technology options, investment requirements, research, development and commercialization needs and other areas that help align public, private and academic sector goals and expectations.

The Council anticipates engaging a consultant to assist with modeling for the state that can help define scenarios to reduce emissions. In the interim, the Committee and Council members have reviewed several regionally relevant studies and modeling efforts, including the Northwest Deep Decarbonization Study completed by the Clean Energy Transition Institute (CETI) and Evolved Energy Research and presented 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 for the states of Montana, Idaho, Oregon and Washington, and the costs associated with those pathways using current technologies. The Council encourages partners and the public to review the CETI study found here: https://www.cleanenergytransition.org/meeting-the-challenge.

Most studies of our region offer a relatively similar set of findings:

- Aggressive and timely adoption of energy efficiency measures and the electrification of end uses such as water heating, home heating and cooling, and passenger vehicles are key drivers of reducing costs associated with clean energy transitions.
- Efforts to reduce the carbon intensity of electrical generation becomes increasingly important, primarily relying on maximizing renewable energy deployment. Use of very limited and intermittent reliance upon gas-fired generation to help balance loads and maintain current reliability standards amid new load growth, often significantly reduces the costs of transitions.
- Similarly, efforts to reduce the carbon intensity of fuels through increasing production of biofuels and over time relying on emerging technologies that deploy hydrogen, carbon capture and synthetic gas further reduces the intensity of these fuels and allows for even lower emissions tied to freight, aviation and other needs across the economy.
- The development of an integrated western electricity market will enable additional renewable energy development, increase system reliability, and be economically efficient, resulting in cost savings.

Many models demonstrate that this mix of solutions, appropriately timed, can provide energy services allowing for continued economic growth, provide similar or better housing, transport and public amenities, and support high levels of industrial and commercial activity. They often demonstrate that the cumulative costs of these transitions can be minimal, even when not considering the many benefits and avoided costs tied to reduced emissions, energy costs, public health benefits and reductions in climate impacts. Several Council members have outstanding concerns regarding the assumptions, costs and findings of some modeling efforts, including the work of CETI and Evolved Energy Research. Further discussion is warranted and the Council looks forward to continued dialogue to better understand these concerns to inform efforts at improving modeling to meet long term goals and evaluate tradeoffs, and better understand the limitations of current assessments.

Based upon an assessment of emissions trends by sector, Committee members have developed the following early recommendations. Recommendations receiving consensus support are offered first, followed by those advanced with dissenting views of one or more members of the Council. In some instances, dissenting views and outstanding issues have been reframed as key questions for partner and public input in the guiding questions that follow. Additional details may be found in the Committee's white papers found on the Department of Environmental Quality's Climate Solutions Council website. The Committee continues deliberations in other areas not yet developed and vetted for public and partner input.

Preliminary Council Consensus Recommendations:

SECTION I.
Energy Efficiency - Residential and Commercial Buildings, Tribal and Local Governments

2A: MODERNIZE MONTANA BUILDING ENERGY CODES AND ADMINISTRATIVE PROCESSES TO PROMOTE ENERGY EFFICIENCY AND OTHER CLIMATE BENEFITS

Description: 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.

Key Strategies:

- Support regular adoption of updated International Energy Conservation Code (IECC) codes every 3 years, with amendments appropriate to MT. The adoption process must be accelerated to occur within 12 months of a new code being issued by the International Code Council (ICC). Consider capacity building support to meet accelerated adoption objectives.
- Require that the energy code be considered at the same time as the other codes to avoid the current situation where the energy code lags adoption of other codes.
- 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.
- 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.
- Investigate the feasibility of requiring energy rating labeling for new home sales and new commercial buildings.

2B: ESTABLISH A GRADUATED ENERGY EFFICIENCY STANDARD, A DEMAND RESPONSE STANDARD, AND AN ENERGY STORAGE STANDARD FOR THE STATE'S INVESTOR OWNED UTILITIES (IOUs)

Description: 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. A graduated energy efficiency standard establishes specific targets for energy savings that utilities or non-utility program administrators must meet through customer energy efficiency programs. Demand Response involves reducing power consumption at industrial sites, commercial buildings, homes and other locations to save energy and meet utility peak demands. Energy storage can provide power that can be dispatched to better integrate intermittent resources like renewable energy, but it can also provide management of intermittent demand – helping to flatten demand requirements of the utility and allow the utility to implement voltage regulation and other efforts to improve system efficiency.

Key Strategies:

- Adopt a new energy efficiency standard at 1% energy savings on an annual basis within 3 years after program implementation, then increase the standard to 1.5% annually for the next 4 years, and to 2% annually thereafter for IOUs.
    - 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 efficiency standard.
    - The proposal could consider specifying some amount of energy efficiency acquisition targeted at low-income Montanans. Low-income households receive significant benefits from energy efficiency acquisition since low-income customers spend a disproportionately large amount of their income on meeting energy needs.
- Adopt a Demand Response Standard that would require the state's IOUs 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.
    - Efforts could focus on 1) Load control for residential and commercial customers (hot water heaters, air conditioning) - where equipment is cycled for short periods of time; 2) Curtailable load for larger commercial/industrial operations – where operators nominate an amount of load to be curtailed when an event is called and 3) Interruptible rate for commercial/industrial operations that can curtail most or all of their load.
- Adopt an Energy Storage Standard that would require the state's IOUs 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.

2C: ADVANCE EFFORTS TO PROMOTE ENERGY EFFICIENCY THROUGH TOOLS LIKE ON-BILL FINANCING

Description: 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. Financing through the USDA's Energy Efficiency and Conservation Loan Program can assist Cooperatives in developing/financing programs.

Key Strategies:

- Evaluate barriers to the adoption of on-bill financing in Montana and lessons learned from experiences around the country. Explore voluntary partnerships and legislative options to further incentivize adoption by Montana utilities and rural electric cooperatives.

2D: ADOPT RATE STRATEGIES LIKE DECOUPLING, TIME-OF-USE RATES, INCLINING BLOCK RATES AND/OR PERFORMANCE MEASURES TO FACILITATE ENERGY EFFICIENCY

Description: Decoupling is an approach to better align utility profit incentives with customers' energy service needs. In simple terms, under a decoupling mechanism a utility 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. The mechanism removes the incentive to maximize energy sales in order to achieve recovery, and thus makes energy efficiency and distributed generation options more attractive to utilities.

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 (TOU) rates, 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.

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). Utilities utilizing this rate structure encourage large users to reduce their energy usage through higher prices for energy consumed within the higher blocks.

Performance based measures 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 only 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. In the UK, regulated utilities receive a profit based on the RIIO Model, where Revenue= Incentives + Innovation + Outputs.

Key Strategies:

- Work with the PSC, IOUs, rural electric cooperatives and other stakeholders to advance proposals for Decoupling, TOU Rates, inclining block rates and/or performance measures.
- 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 (e.g. $0.11/kwh). Finally, the third tier – peak times – should be appropriately priced to send a proper signal that customers should only use energy essential to home/business operation (e.g. $0.16/kwh). Committee members wish to emphasize

that TOU rates will not be applicable to large industrial, agriculture, or large irrigators who already operate under demand charges.

2E: SUPPORT PROGRAMS TO ADVANCE COMMERCIAL ENERGY AUDITS, GRID-INTEGRATED WATER HEATERS, AND MOBILE HOME REPLACEMENT

Description: 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. Previous Montana programs of this scope include the Montana Resource Efficiency Program and the Energy Efficiency Program. The Montana Resource Efficiency Program has a proven track record of success assisting 188 businesses and governments and authoring 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.

Grid-interactive electric water heaters can assist with load control. By shifting water heating load from morning and evening to mid-day and overnight water heat energy requirements can be served more economically while still meeting customer needs during peak use times. Water heaters can also be controlled on a minute-to-minute basis to provide voltage support and frequency regulation service to the grid at a much lower cost than generating units or batteries.

Many Montanans still occupy pre-1976 mobile homes, considered to be among the least energy efficient housing stocks in the country. 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.

Key Strategies:

- Explore budget resources through the legislature to support Commercial Energy Audits.
- Develop one or more pilot programs to deploy and test grid interactive water heaters to evaluate performance and savings.
- Inventory current needs and convene stakeholders to explore a program for mobile home replacement to meet both energy efficiency and environmental justice goals.

SECTION II:
Renewable Energy, Transmission & Markets, Peak and Capacity Challenges Efficiency

2F: REQUEST A LEGISLATIVE STUDY ON THE UNIVERSAL SYSTEM BENEFITS PROGRAM FUNDING MECHANISM FOR ELECTRIC CUSTOMERS

Description: 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 several 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. Over the last 20 years, there has been a decline in the effective value of electric USB funds.

Key Strategies:

- The Council recommends the Legislature evaluate and consider changes to the electric USB funding formula.

2G: ENCOURAGE EXPANDED COMMUNITY SOLAR DEVELOPMENT AND ENACT POLICY TO ENABLE SHARED SOLAR FOR INVESTOR OWNED UTILITIES

Description: Community solar can benefit many 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.

Shared solar provides access for individuals, households, and businesses that may not otherwise be able to install a distributed generation system on-site (e.g. renters, buildings with shaded roofs, etc.). Shared solar allows 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 the developer.

Key Strategies:

- 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").
- Advance legislation that clarifies investor-owned utilities' ability to offer shared solar programs.

2H: PROVIDE INCENTIVES FOR SOLAR-READY AND SOLAR-INTEGRATED DESIGN AND BUILDING

Description: 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 later, 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.

Key Strategies:

- 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.
- Incorporate solar-ready design standards into residential and commercial building codes.

2I: STUDY THE FEASIBILITY OF ENCOURAGING GREATER UTILITY SCALE RENEWABLE ENERGY DEVELOPMENT THROUGH REDUCING PROPERTY TAXES ON NEW RENEWABLE ENERGY IN MONTANA

Description: 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.

Key Strategies:

- Conduct independent research to compare taxation across states and renewable energy projects to determine if rates should be adjusted for new projects. Committee members emphasize that any proposed adjustments must fully consider revenue impacts.

2J: ENCOURAGE THE PUBLIC SERVICE COMMISSION TO OPEN A DOCKET ON ENERGY STORAGE AND EXPLORE STATE INCENTIVES FOR THE INSTALLATION OF UTILITY-SCALE STORAGE DEVELOPMENT

Description: 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. Costs of storage technology are a barrier to pilot projects. State incentives would help mitigate these costs.

Key Strategies:

- Encourage 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.
- Utility scale storage projects may benefit from pilots that 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; allow for the integration of local renewable generation to develop and test microgrid solutions, 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.

2K: ADVANCE EFFORTS TO TAKE ADVANTAGE OF A COORDINATED WESTERN ELECTRICITY MARKET

Description: The Western United State electric grid is comprised of 38 balancing areas that create economic, contractual and practical obstacles to buying and selling electricity creating extensive market inefficiencies. As energy systems transform in response to new technologies and market conditions, opportunities to integrate the regional market for electricity to manage loads, take advantage of price and supply conditions and other factors are becoming more attractive. A regional energy market would benefit Montana due to the abundant renewable energy opportunities found within the state.

Key Strategy:

- The Governor and the legislature should actively work to build partnerships with other states toward the development of a western electricity market.

SECTION III:
Transportation

2L: ADOPT LOW EMISSION VEHICLE STANDARDS AND ESTABLISH TAX INCENTIVES FOR LOW AND ZERO EMISSIONS VEHICLES

Description: Fourteen states have adopted Low Emission Vehicle standards and two other states, Minnesota and New Mexico, are in the process of adopting the standards, which are broadly supported by the auto industry. About 20 states have adopted tax incentives to boost vehicle sales leading to a reduction in greenhouse gas emissions while benefiting consumers.

Key Strategies:

- Begin a process, to adopt low-emission vehicle emission standards by the fall of 2020.
- Explore state tax incentives for the purchase of low and zero emission vehicles.

2M: ADVANCE COMPREHENSIVE STRATEGIES TO DEVELOP AND EXPAND ELECTRIC VEHICLE INFRASTRUCTURE AND ACCESSIBILITY

Description: The states of Colorado, Idaho, Montana, Nevada, New Mexico, Utah and Wyoming have entered into a memorandum of understanding acknowledging the value that improved availability of regional electric vehicle infrastructure offers for access to highways, promotion of tourism and recreation in rural communities, and related economic development. While private sector roles for advancing infrastructure will be critical, partnerships will also be needed to overcome initial hurdles to electric vehicle adoption attributed to a lack of infrastructure.

Key Strategies:

- 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.
- Explore partnerships with utilities to expand EV infrastructure and adoption.
- Legislation should be considered to require investor-owned utilities to file plans every two 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. Alternatively, the PSC could establish these requirements independently.
- The Montana Department of Transportation (MDT) should develop a plan to install DC charging stations at rest areas administered by the Department. There are approximately 45 rest areas (not all are open 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 to make it possible for electric vehicles to traverse long distances and to make it more convenient for EV owners to travel in the state. The plan should designate 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 expeditiously 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.
- 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. FHWA 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.

- Efforts to address taxation of electric or low emissions vehicles should be equitable and should avoid creating disincentives for adoption. If the intent with taxation is to provide sufficient funding for transportation system infrastructure, other metrics, rather than fuel use, could be utilized for taxation purposes, such as a tax based upon vehicle miles traveled. Another method would be to assess an annual fee on EV owners equivalent to the average amount of gas tax paid per car per year.

2N: IMPROVE STATEWIDE TRANSPORTATION MANAGEMENT TO FOSTER ALTERNATIVES AND SUPPORT THE NEEDS OF COMMUNITIES

Description: Transportation related Greenhouse Gas Emissions occur not just because our fleet uses fossil fuels, but also because of the nature of our overall transportation system. Montanan's have the 10th highest reliance on personal vehicles of any state in the nation, reflecting our geographic range, but also limited integrated transportation and growth planning and transportation alternatives.

Key Strategies:

- Create the position of transportation system management coordinator within the Planning Department of MDT.
- Develop and host a ride sharing internet tool at MDT 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.
- Develop planning for expanded bike infrastructure including protected bike lanes working with appropriate local jurisdictions.

SECTION IV:
Industrial, Oil and Gas, Agriculture and Forestry

2O: IMPROVE GREENHOUSE GAS EMISSIONS AND CARBON SEQUESTRATION INVENTORY AND ACCOUNTING SPANNING NON-ELECTRIC AND TRANSPORTATION SECTORS ACROSS MONTANA'S ECONOMY

Description: Presently, the state lacks a comprehensive inventory or estimates of greenhouse gas sources and sinks spanning other critical sectors of the economy, including industrial sources, oil and gas production and agriculture, forestry and wood products. These estimates and inventories are critical to understanding economy wide strategies to reduce emissions and boost the capacity of carbon storage in healthy soils, forests and in wood products.

Key Strategies:

- Using widely available methods, develop greenhouse gas emissions and sink estimates for key sectors of Montana's economy and land use.
- Develop a reporting program to encourage facilities or industrial sectors that produce more than 25,000 metric tons of CO2e to annually report GHG emissions in line with federal standards or those widely used by other states.
- Explore partnerships to reduce emissions/enhance carbon storage spanning the sectors.
    - In the Oil and Gas Sector, consider directing staff at MT DEQ and MT Board of Oil and Gas Conservation to meet with oil and gas operators at a minimum of once annually to promote best management practices such as leak detection and repair, high-bleed pneumatic controllers, and the manual liquids unloading process. Work toward educating well and pipeline operators on methane gas capture and reduction in fugitive emissions.
    - Consider working with the Montana Board of Oil and Gas Conservation to continue use of their Damage Mitigation Account to properly plug orphaned (abandoned) oil and gas wells for which there is no identifiable well operator. This program works toward eliminating potential fugitive emissions of methane gas along with addressing other issues. BOGC may have to adjust their environmental ranking criteria to move wells with greater potential to emit methane to a higher priority. Steps should be taken to ensure the Damage Mitigation Account is funded as required by statute to enable proper administration of the BOGC damage mitigation program. No general fund monies are contributed to the BOGC Damage Mitigation Account.
    - In forestry and agriculture, integrate strategies with voluntary and incentive-driven approaches, including potential carbon markets, as outlined in Chapter 1. Consider use of widely available tools from the USDA for estimating greenhouse gas emissions and sinks, including tools like COMET-FARM and COMET PLANNER that allow for farm-scale and regional estimations of the benefits of conservation practices for carbon management and reduced emissions.
- Conduct a study of non-CO2 based greenhouse gas emissions in Montana, including methane, utilizing recent advances in identifying releases, spanning diverse sources. Consider other methane emission sources such as solid waste disposal facilities, agricultural operations, and hydropower sources in addition to oil and gas.

Preliminary Council Recommendations Advanced with Dissenting Views Expressed:

The recommendations below are being advanced with dissenting views of one or more members of the Council. In some instances, dissenting views and outstanding issues have been reframed as key questions for partner and public input in the guiding questions that follow. Additional details may be found in the Committee's white papers found on the Department of Environmental Quality's Climate Solutions Council website. The Committee continues deliberations in other areas not yet developed and vetted for public and partner input.

2P: ADVANCE EFFORTS TO DEVELOP AND DEPLOY CARBON CAPTURE AND STORAGE TECHNOLOGIES (CCS)

Description: 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 and storage (CCS) technology is essential to reduce emissions from these power plants, and to support other needs such as renewable fuel production central to meeting 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 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.

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.

Key Strategies:

- DEQ should consider seeking primacy for Class VI deep injection wells. 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 Safe Drinking Water Act's Underground Injection Control 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. State management of the program could expedite permitting while maintaining appropriate safeguards to water supplies. MT Board of Oil and Gas Conservation already has statutory authority to regulate class VI disposal wells. No application for primacy currently exists.
- Identify and dedicate state funding to advance Carbon Capture and Storage. 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.

Dissenting View: One Council member expressed reservations regarding this recommendation and its potential to extend the state's reliance on fossil fuels and foster disincentives for an accelerated energy transition.

2Q: INCREASE THE ALLOWABLE SYSTEMS SIZE FOR DISTRIBUTED GENERATION SYSTEMS

Description: 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.

Key Strategy: Evaluate and institute a new cap for distributed energy systems.

Dissenting Views: Some Council members expressed concerns regarding this recommendation and indicated they may be unresolvable until utility rate design concerns are resolved. It is argued that in some instances, net metering requirements will increase costs borne by other customers who do not self-generate and create potentially serious safety risks and power quality concerns. While highly contested among stakeholders, some argue that higher rates for other customers will occur in some instances due to a failure to consider widely varying costs, rates, rate structures, and power supply and delivery issues.

2R: INCREASE AND UPDATE THE STATE RENEWABLE ENERGY PORTFOLIO STANDARD

Description: 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 are pursuing 100% renewable standards.

Key Strategy: Increase Montana's Renewable Portfolio Standard.

Dissenting Views: Some Council members expressed concerns regarding this recommendation. Issues regarding the magnitude of the revised standard, the role of hydropower, and the relevance of its application to the state's Rural Electric Cooperatives were the primary concerns.

Questions to guide partner and public feedback:

- How can the state, cities and counties work more collaboratively to enforce the energy code and advance energy efficiency objectives?
- How should the state consider future renewable energy requirements for energy providers?

- What policies should the state implement related to “beneficial electrification,” which entails replacing the direct use of fossil fuels with electricity in a way that reduces GHG emissions and lowers overall costs?
- How should the Public Service Commission evaluate greenhouse gas impacts of decisions and rate-payer risks?
- What policies to further advance clean energy solutions should be considered for the unique business model facing the state’s rural electric cooperatives? How can the state advance voluntary measures in coordination with electric co-ops?
- Are there improvements that could be made to the way the state engages with local governments, counties and tribal nations regarding transportation projects and planning? What programs or policies should the state implement to ensure our communities are accessible and affordable while addressing issues related to vehicle congestion and miles traveled?
- How can state agencies continue to foster leadership around sustainability, clean energy and emissions reductions?
- How can the state assist and learn from local government and tribal nation greenhouse gas reduction efforts?
- How should the state consider possible economy-wide emissions policy proposals such as a price on carbon or cap and trade proposals?
- How can Montana best lead on efforts to reduce greenhouse gas emissions? How should the state consider policy options and solutions in the context of potential Federal policy or policies?
- How should the state consider new technologies in planning for greenhouse gas mitigation like renewable hydrogen or modular nuclear?
- How should the Council think about balancing regulatory and incentive based tools? How should the Council consider fiscal impacts and revenue sources for incentive programs?

3. Capturing Innovation Opportunities in Montana’s Response to Climate Change and Addressing the Needs of Workers and Communities in Transitions.

Section I. Montana’s Innovation Landscape

Responding to the impacts of climate change in Montana will require new technological approaches to agriculture, energy systems, infrastructure, and carbon mitigation and storage, among others. Developing and commercializing new technological approaches can generate opportunities for Montana to create new jobs, private investment, public funding, and businesses.

The Technology Innovation for Climate Solutions and Community Transitions Committee was tasked in part with developing strategies to support the research, development, commercialization and adoption of new technologies to address climate change. The approach the Committee has followed is to define and identify existing elements of the "innovation landscape," or the systems, networks, and partnerships that align the state's unique skills, assets, and institutions to support technology and policy innovation. The focus on the innovation landscape is consistent with emerging economic development literature and practice in the changing U.S. economy.

Defining Concepts of the Innovation Landscape

Innovation: Innovation is defined as new combinations of existing knowledge, capabilities, and resources that contribute to social and economic change. Innovation does not necessarily require new invention but is focused on implementation or putting new or existing ideas, processes, and technologies into practice in novel or new ways. In the context of climate change, using existing technologies will be critical for implementing immediate to short-term climate solutions. New inventions will also be important, as our state looks to develop technologies for reducing emissions and adapting to impacts not just in Montana, but nationally and internationally, as well.

Innovation Landscape: The innovation landscape is the networks, systems, and institutions that can be aligned to define and act on strategic priorities. Elements of the innovation landscape include the institutions (universities, government, non-governmental organizations, industry associations, and labor unions), the policy environment and culture among these institutions that allow them to collaborate and leverage unique strengths and skills, financing (e.g., venture capital, government grants, private foundations), physical assets and materials, and human capital.

Assessing Montana's Innovation Landscape: Strengths and Assets

Employing an innovation landscape approach will help Montana stay nimble given market uncertainties.

Assessing the capacity of Montana's innovation landscape draws on existing models of how innovation often occurs. The innovation process is commonly described as a series of steps, from basic research through to commercialization. The innovation process is rarely linear, however. Knowledge and hard lessons are learned at each step, which leads to better understanding and advancement in research, product development and ultimately commercialization.

For the purposes of the Montana Climate Solutions Council, a critical opportunity for capacity building evident in Montana's success stories and those of other existing state innovation initiatives is that realizing the fruits of innovation most often requires collaboration and support from public and private institutions. A review of state and regional innovation initiatives in the U.S. reports that "continuous public investment has been critical in training a large number of people over many years and in creating the necessary environment to foster new technology-based businesses." Basic and applied research, for example, benefit from public investment and informal or formal collaboration networks among public universities, government, and the business community. Public investments and partnerships remain

important throughout the product development and commercialization process. Integrating public, philanthropic, non-governmental, and private institutions is a basic requirement of a functional innovation landscape.

The Committee has reviewed several case studies of the Montana Innovation Landscape demonstrating existing assets and strengths and gaps. The case studies are intended to help identify recommendations that could support Montana's efforts to better integrate existing components of the innovation landscape and suggest direct actions to build needed capacity in Montana institutions as well as address gaps in other elements of the state's innovation landscape.

Case Studies

Assessing Montana's innovation landscape benefits from exploring case studies of existing research, product development, and commercialization efforts to understand why they succeeded or failed in practice. Case studies serve multiple purposes: concrete examples of actual projects will help communicate how the innovation landscape is defined and elements function as well as the interplay between the elements; case studies focus on what is actually happening in Montana and can help assess why some projects succeed or fail; and case studies can help identify opportunities to adapt the innovation landscape and explain how new opportunities can be leveraged.

Case Study: Absaroka Energy's Gordon Butte Pumped Storage Project

> Absaroka Energy Expects to break ground soon on a closed loop pumped hydro energy storage project in Meagher County. The installed generation capacity will be 400 MW with estimated storage of 3400 MW-hrs. It will utilize 3 pairs of pumps and turbines to allow rapid switching (or simultaneous) pumping and generation. The rapid response combined with large power and energy capacity will mean the facility can be used for peaking, firming, frequency control, and a variety of other ancillary benefits that can allow utilization of a larger percentage of variable renewable energy in the state's power portfolio. This will be the largest pump storage facility in the US and the first built in approximately 40 years. It will also be one of the few utility scale storage facilities in the country.

Case Study: Montana's Photonics Cluster

> Photonics is to photons (light) as electronics is to electrons and is critical to lasers, sensors, measurements and automated vision, medical technologies, defense technologies and other sectors. The first photonics company in the Gallatin Valley was Orionics (fiber splicing equipment) in 1980 (ended operations in 1987) followed by Big Sky Laser in 1981, Toomay-Mathis and Associates (TMA, light scattering measurement) in 1984, ILX Lightwave (Diode laser and fiber optic equipment) in 1986, and Scientific Materials Corp (Laser Crystals) and Lattice Materials (infrared optical materials) both in 1989. Five of these six companies had connections to either Montana State University (MSU) or the Gallatin Valley. MSU faculty began collaborations with TMA, ILX, and Scientific Materials and in 1992 four MSU faculty members wrote a proposal to the National Science Foundation's Experimental Program to Stimulate Competitive Research (EPSCoR), that strengthened these collaborations. EPSCoR funding

coupled with institutional resources resulted in five additional faculty hires in photonics and the Optical Technology Center (OpTeC) received formal Board of Regents center status in 1995. There are now over 30 companies with about 600 employees in photonics in Montana, largely located in Gallatin County. Approximately 15 were spun out of MSU research and others were attracted by the desirable location, access to a strong research university, and availability of a high-quality workforce. Montana Photonics Industry Alliance formed in 2013. The Montana Photonics cluster is the fourth largest photonics cluster in the nation, the largest per capita, and a major contributor to the Montana economy.

Case Study: Hydrogen-based Storage of Renewable Energy

Converting waste water into a renewable energy battery system presents an emerging economic opportunity for several components of Montana's innovation landscape. Mitsubishi-Hitachi is in the early stages of a proposal to produce hydrogen gas in Montana, store it in Utah, and deploy new technologies to generate electricity for western utilities by burning 100 percent renewably sourced hydrogen. Montana's competitive advantage for this multi-state concept is to utilize treated waste water from the Berkeley Pit in Butte and potentially from Silver Lake as a water source for electrolysis that splits water molecules into hydrogen and oxygen. Electrolysis is an energy-intensive process that can be turned on and off to utilize excess renewable energy when the sun is shining, the wind is blowing, and electricity demand is relatively low. The Berkeley Pit is a scarce source of water in the western U.S. where many basins are closed to new water development and climate projections indicate increasing stress on water supplies.

Renewably sourced hydrogen potentially could serve as the foundation for a clean energy hydrogen economy that includes hydrogen fuel cell technology development and commercialization for transportation and other uses in addition to utility-scale production of electricity. This sector could create many jobs and businesses in wind and solar energy development, in construction, electrical trades, and engineering. Restoration job opportunities also may exist as treated water from the Berkeley Pit may also have beneficial in-stream uses, which may require a sophisticated balancing to accommodate both ecosystem restoration objectives and clean energy development. Combustion of H2, initially blended with fossil gas and eventually 100% H2, to generate electricity in Montana would produce water vapor that could be captured and put to beneficial use.

Case Study: Montana Emergent Technologies Commercialization of BioSqueeze, MSU's Well Sealing Technology

Montana Emergent Technologies (MET) is commercializing a technology developed by Montana State University's Energy Research Institute (ERI) and Center for Biofilm Engineering (CBE). This technology uses bacteria that catalyze formation of calcium carbonate (calcite, the same substance as "boiler scale") which can be used to plug small aperture seeps in wells (typically outside the production casing in the cement between the casing and the formation rock) that can cause methane emissions to the atmosphere. Because the bacteria and other required materials can be delivered in low viscosity water solutions, this method works well for small seeps that are difficult to seal by pumping cement which is higher viscosity. MSU developed this

technology at bench scale, tested it at an intermediate scale and performed four field pilots with MET involvement. MET is now commercializing in the DJ basin in Colorado and in 2019 has sealed nine wells owned by two different companies with a 100% success rate. These include 4 wells that were being plugged and abandoned, one of which the company spent in excess of $1M trying to remediate, and 5 active production wells.

Case Study: Emerging Markets for Climate Smart Agriculture

Heavy precipitation events, unusual seasonal weather patterns, and a trend of hotter, drier summers are driving growing interest in climate-resilient agriculture among farmers, consumers, food companies, and state and federal agencies. Institutional and venture investors, philanthropic foundations, and state governments are now stepping up to provide financial incentives for farmers and ranchers to adopt such practices, especially soil health practices that build and retain organic matter, maintain continuous cover, and minimize tillage and chemical disturbance. A marketplace has emerged to reward farmers for increasing and sequestering soil carbon. Market players include California's Climate Smart Agriculture program funded through the state's carbon cap-and-trade program and Indigo Agriculture, a start-up company funded by more than $850 million in venture capital, which aims to sequester one trillion tons of carbon dioxide from the atmosphere by incentivizing farmers to adopt regenerative agriculture practices.

Given its vast agricultural landscape and breadth of innovative farmers and ranchers, Montana is well positioned to tap into this emerging market for carbon-rich soils. Western Sustainability Exchange (WSE), a non-profit based in Livingston, is collaborating with Montana ranchers and state and national partners in a pilot project that does just that through its Montana Grasslands Carbon Initiative. Partners include Montana State University, NativeEnergy (a Vermont-based company that develops carbon projects and sells verified carbon offset credits), Soils for the Future (a soil science organization based at Syracuse University), and Xanterra Parks and Resorts (the country's largest park concession management company and Yellowstone and Glacier National Parks' primary concessionaire). The grasslands carbon program incentivizes ranchers to improve their grazing practices and thereby sequester large amounts of carbon. For doing so, ranchers will be compensated with carbon offset payments based on the additional amount of carbon they sequester each year. The sequestered carbon becomes the basis for verified carbon offset credits which NativeEnergy sells to companies committed to reducing their carbon footprint.

Preliminary Council Consensus Recommendations:

An important task of the Committee will be to conduct asset mapping that can identify real opportunities in Montana to leverage existing partnerships and opportunities into actual projects. One of the primary goals of the Committee work is to build a strategy around technology research, development, and commercialization.

Recommendations for technology innovation are required beyond the energy sector and across multiple geographies. The urban/rural divide is widening, and solutions are required for all types of communities,

particularly rural communities. Focusing on rural landscapes and communities may also provide unique opportunities to leverage resources, partnerships, and innovation that may be overlooked as most efforts and attention are typically focused on cities where investments theoretically return a higher "bang for the buck." Technology innovation in agriculture, timber, manufacturing, and other sectors are an important focus for the Committee.

3A: MONTANA, LED BY THE MONTANA SCIENCE AND TECHNOLOGY COMMITTEE AND THE OFFICE OF THE COMMISSIONER OF HIGHER EDUCATION, SHOULD IDENTIFY KEY OPPORTUNITIES FOR TECHNOLOGY-LED ECONOMIC DEVELOPMENT, PRIORITIZING AREAS THAT ASSIST WITH CLIMATE CHANGE TRANSITIONS AND MITIGATION

Key Strategies:

- Revise and update Montana's Science and Technology plan with a focus on industry linkage opportunities and opportunities to foster and sustain competitive industry/university collaborations in basic and applied research.
- Within identified areas of strength, charge and fund key networking organizations (i.e. industry organizations, university research centers, or state agencies) with regularly convening key university/industry/society players.
- Within the Montana University System, institute seed-granting opportunities and research capacity building efforts to grow the state's university expertise and competitiveness in each identified area of strength.

3B: THE MONTANA LEGISLATURE SHOULD INVEST IN INITIATIVES THAT BUILD UNIVERSITY/INDUSTRY/SOCIETY INNOVATION LINKAGES TO ADDRESS KEY MONTANA CHALLENGES, INCLUDING CLIMATE CHANGE

Key Strategies:

- Institute a state-funded grant program to further develop research capabilities and user facilities at Montana's public universities, with a goal of leveraging these facilities to grow innovative Montana-based technology development companies and clusters.
- Develop a recruitment and retention funding pool for strategic growth in research capabilities in key areas of state need.
- Appropriate further rounds of funding for the Montana Research and Economic Development Initiative to encourage applied research addressing Montana needs.
- Set aside a match-funding pool to increase Montana researcher's competitiveness when pursuing federal grant dollars.
- Develop / Identify and appropriately fund a research center or institute charged with networking and organizing university research and university/industry linkages statewide in the area of energy innovation. Key areas of focus based on Montana's industry and existing research

expertise may include biofuels, energy storage, transportation grid electrification, and energy related agricultural practices.

3C: IMPLEMENT THE RECOMMENDATIONS CONTAINED IN THE 2017 PROJECT REPORT -- THE MONTANA JOBS PROJECT, A GUIDE TO PHOTONICS AND ADVANCED ENERGY JOB CREATION

Key Strategy:

- Create a task force consisting of appropriate state agency personnel with representatives of the Montana University System and the Montana Photonics Industry Alliance (MPIA) to review *The Montana Jobs Project* report recommendations and advance them as deemed appropriate.

3D: CONTINUE THE STATE'S EFFORTS TO EVALUATE, EXPAND EXISTING AND RECRUIT NEW INDUSTRIES TO MONTANA THAT REDUCE CARBON EMISSIONS OR SEQUESTER CARBON WHILE PROVIDING WELL-PAYING JOBS AND INCREASING TAX BASE

Key Strategies:

The primary benefit of this recommendation is to leverage existing efforts and successes in sectors where Montana exhibits comparative and competitive advantages. The following are examples of existing efforts by the state to develop industries that will help address climate change. More work is required to identify additional industries and to evaluate their current needs relative to the innovation landscape.

- Advanced Energy Storage – including efforts to produce advanced batteries or battery components, pumped storage hydroelectric projects (case study noted previously) is designed to balance variable power and could firm over 2GW of renewable energy generation. Renewable hydrogen storage and energy generation project
- Agriculture – including efforts to develop agricultural practices / projects to increase soil carbon, efforts to facilitate the emerging market for carbon-rich soils, value added-processing, precision agriculture and others.
- Biofuels – including opportunities to produce aviation jet fuel or fuel for heavy duty truck transport from woody biomass.
- Mass timber construction and wood products innovation – including efforts to develop new structural construction materials and products like wood-fiber insulation.

Section II. Building Resilience to Prepare Montana's Communities, Economy and Workers for Transitions

Montana's economy and energy sectors are undergoing rapid transitions. These transitions result from a series of market, policy, and technology developments that are largely outside of Montana's direct control. Impacts on natural systems, infrastructure, and sectors of Montana's economy as a result of

climate change will introduce new challenges and changes that Montana will need to respond to. The important point is that while transitions destabilize existing communities, businesses, and public institutions— necessitating efforts to minimize negative impacts—*transitions also create opportunity for new, creative innovations, and systems to emerge.*

The Council was tasked by Governor Bullock's Executive Order 8-2019 with identifying strategies to prepare Montana's communities, economy, and natural systems for transitions associated with climate change. The Technology Innovation for Climate Solutions and Community Transitions Committee focused on resilience as a framework for assessing the existing capacity of Montana's public institutions (state agencies, political leaders, and the university system) to help families, communities, workers and the economy prepare for and respond to change.

Drawing from the literature and the expertise of Committee members, the Council has laid out a preliminary definition for transitions and the key components of resilience. Highlighted here are the Committee's early discussions and outreach to identify key vulnerabilities and barriers that challenge the resilience of families, communities, workers and businesses in Montana. Additionally, the Committee's framing draws on the experience of the Resources and Communities Research Group (RCRG) at Montana State University working with rural Montana communities.

Transitions are defined most simply as changes from one state to the next. Montana is already experiencing rapid and dramatic transitions in the state's energy markets and policy, economic geography, and economy. Rather than focus on a list of sectors or communities facing transition, the Committee has defined transitions as system changes that affect multiple things at the same time—families, communities, economic sectors, natural systems, or technology—and which occur at multiple scales, local to regional. Working with a focus on transitions in systems, the Committee can identify processes that explain how transitions happen in general, and how the state can prepare for ongoing transitions and for economic, demographic, and natural changes that are still uncertain or unknown.

For example, Montana and the U.S. are experiencing a structural economic transition away from manufacturing and natural resources sectors to services and innovation-related activities that began in the mid-1970s. The transition is driven by productivity gains in primary and secondary sectors and trade that has reduced the number of high-wage, skilled jobs in traditional sectors. Consequently, the state's economic geography has changed over the past several decades: today, most new growth is concentrated in the state's largest cities and many rural communities are falling behind. These economic and geographic changes interact with natural resources and climate related impacts on communities. For example, the forest industry has restructured and automated in ways that require fewer workers, affecting rural communities and labor. Existing infrastructure and planning systems limit the capacity of the industry to treat forests at higher risks of wildfire due to climate change, historic forestry practices, and greater risks due to development in the Wildland Urban Interface. These interlinked transitions will require coordinated planning and responses from public agencies, communities, labor, universities, and industry.

Although transitions will have negative impacts for Montanans to negotiate, preparing for transitions will also provide positive aspects. Building the resilience and capacity of Montana's communities will focus on collecting and sharing information, supporting sustained and robust planning, and prioritizing

local economic development strategies. The Committee is focused on the concept of resilience to better understand Montana's vulnerabilities and risks and identify recommendations where public policy and institutions can act.

Addressing vulnerabilities and removing barriers to increase Montana's resilience to climate change will require sustained and meaningful collaboration and partnerships among public institutions, business and labor organizations, non-profit and philanthropic organizations, and community leaders.

Efforts to plan for community transitions can be synergistic with climate adaptation planning. Partnerships, information, and capacity built in communities, state agencies, and other partners can be coordinated. The Council encourages readers to think about recommendations and key questions in the climate adaptation and community transition sections of this report to identify how they can be coordinated.

Preliminary Council Consensus Recommendations:

The most effective policies for building the resilience of Montana's communities, institutions and economy are those that directly address identified vulnerabilities or replace barriers with new capacity and opportunity.

3E: Adopt and support the Montana Ready Communities Initiative

Key Strategies:

- Explore dedicated funding to staff the initiative and offer capacity to communities. Communities must be resourced to collect and share information, maintain peer to peer learning across communities, identify and prioritize local needs, and implement strategies to build resilience. Communities that make planning a habit and have strong networks are better able to respond to shocks.
- Disseminate statewide the Montana Resiliency Toolkit developed from the Montana Ready Communities Initiative (MRCI). The Montana Department of Commerce will work with the Climate Solutions Council to lead this effort that is currently underway as a component of the Montana Resiliency Framework developed by MRCI. The distribution of the toolkits will hopefully have a positive effect across Montana as communities use these tools to conduct resiliency planning
- Determine how the Department of Commerce and MRCI can support the emerging network of tribes, local governments, and other entities or stake holders from across Montana that have adopted climate action plans through MSU Extension's Climate Smart Montana effort. Develop strategies to link communities or entities that have capacity and experience creating and implementing climate action plans with interested parties who may lack capacity or resources.

3F: Prepare Montana's workforce for opportunities in a changing economy and in sectors important to climate mitigation and adaptation

Key Strategy:

- Expand funding and capacity for apprenticeship programs that provide wage earning opportunities through periods of on-the-job training and transitions.

  [The Council looks forward to working with labor, state agencies, and other stakeholders to agree on and propose additional recommendations. Council members encourage readers to review the detailed questions below regarding workforce recommendations.]

3G: Reform Montana fiscal policy to address economic transitions

Key Strategies:

Montana's economy is transitioning away from natural resource sectors and toward services. The economic transition will have fiscal implications because of the state's existing tax structure that taxes natural resource sectors more highly than other economic activities (such as health care, the fastest growing employment sector in the state). See https://leg.mt.gov/content/Committees/Interim/2017-2018/Revenue-and-Transportation/Taxes-Changing-Economy/Meetings/Mar-2018/Exhibits/MontanaEconomyandTaxRevenue.pdf). Currently, two legislative interim Committees in the Montana legislature are studying and making recommendations for possible reforms to the state's tax structure. These reforms should include revenue and budget policies that help build resilience and support transition planning. For example, greater autonomy for local governments to manage volatile revenue and save for transition and adaptation needs, dedicated state and local resources to bolster and sustain adaptation and transition planning over time, and new revenue policies that broaden the tax base, address inequities and generate more sustainable and predictable revenue as the economy continues to restructure and grow.

Questions to guide partner and public feedback:

- What developing industries that address climate change in Montana would benefit from the dedicated research, development, and commercialization strategies identified by the innovation landscape?
- How can the Council better assess existing University capacity to deliver climate-relevant technology research?
- How can the Council best engage industry partners to form a shared innovation vision for Montana?
- What is the right organizational structure that best delivers resources and capacity to communities? Where does dedicated funding come from?
- How can the state consider and adopt new approaches that address the acute needs of workers in transition?
- How can climate policy address fiscal risks facing the state?

- What is the role of tax policy in confronting climate change?

Key question around workforce training and transition:

Addressing ongoing and future transitions in Montana's economy and communities must address the needs of the current and future workforce. Transitions displace existing workers and Montanan's just entering the workforce must be prepared for a different set of skill and education requirements associated with different types of jobs.

The Council seeks feedback on strategies the state can pursue related to preparing Montana's workforce for transitions. The Council began conversations but did not arrive at consensus recommendations. The Council will continue to engage with the public and partners to develop recommendations for consideration in the final report. Based on emerging knowledge and best practice, we want the conversation to focus on apprenticeships rather than retraining, including linking trade and skill training in schools and community colleges to apprenticeship programs. We also want feedback on possible recommendations related to securing prevailing wages for Montana workers and providing opportunity for collective bargaining.

We also seek feedback on strategies the state can pursue to achieve workforce goals. For example, should the state use its own spending and contracting authority to require workforce goals are met (e.g., required apprenticeship programs on major public projects), should the state directly fund trade and skill programs with apprenticeship opportunity and where should funds come from, or should the state mandate collective bargaining and prevailing wages in particular industries central to meeting the state's climate goals.

List of Recommendations: