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From: John Noreika
To: [redacted]
Cc: [redacted]
Subject: [EXTERNAL] Building a national consensus through an interface between our Public Service Commission, the Governor"s Climate Solutions Council and the U.S. Senate and House bipartisan Climate Solutions Caucuses
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John A. Noreika
[redacted], Belgrade MT 59714
Ph: [redacted]
Email: [redacted]

"All material in nature, the mountains and the streams and the air and we, are made of light which has been spent, and this crumpled mass called material casts a shadow, and this shadow belongs to light." - Louis I. Kahn

April 24, 2020

Dear Governor Bullock, Climate Solutions Council Members, the Public Service Commission and Critically Important Assigned Staff:

I have followed the Climate Solutions Council process intently for months. I deeply appreciate the extraordinary talent, hard work and vision that has gone into this process. I have read and studied the proposed Plan, most of the content of the White Papers and all 411 comments received through April 11th. With an abiding faith in reason, I remain optimistic a solution to the climate crisis is now evolving that will accelerate through 2035 to the end of this Century.

My feedback today is to offer specific additions to the Plan to get us out of the biggest economic collapse since the great depression and simultaneously address the existential threat of accelerating warming by rebuilding our energy economy.

Franklin D. Roosevelt, at his inauguration as 32nd President of the United States, at the height of the great depression, on Saturday, March 4, 1933, began with:

"So, first of all, let me assert my firm belief that the only thing we have to fear is...fear itself — nameless, unreasoning, unjustified terror which paralyzes needed efforts to convert retreat into advance."

This feedback is offered to help inform three, on-going, deliberative energy policy processes: the work of our Public Service Commission and that of the Governor's Climate Solutions Council in Montana, integrated with the U.S. Senate and House bipartisan Climate Solutions Caucuses.

Add a section at the end of the Introduction that helps ensure the Climate Solutions planning process remains top-of-mind through this election year and after.

On April 23rd the following was published an on Op-Ed in the Bozeman Chronicle: "Faith, Science, Climate Action Montana – a group of faith leaders, scientists, and doctors from across Montana – came together several years ago to discuss climate change and our moral obligations to families, neighbors, future generations, and vulnerable populations, and, fundamentally, to the life-supporting systems of our planet. We believe that the welfare of coming generations depends on our courage now. Or, as famed climate scientist and evangelical Christian Dr. Katherine Hayhoe recently said, "This crisis really brings home what matters to all of us. It's the health and safety of our friends, our family, our loved ones, our communities, our cities and our country. That's what the coronavirus pandemic threatens, and that's exactly what climate change does, too."

The communications strategy should parallel the top-of-mind approach as coverage on the coronavirus. Throughout this planning process, after the Plan is approved, and particularly over the years of implementation; offer the public a climate solutions score-card. I propose this consist of weekly news-releases to media outlets, newspapers, but particularly local TV and radio stations. In the form of public service announcements, arrange for airing at key local news and weather forecast times. Fund as needed through grants, gifts and as a last-resort, the state's budget. The information conveyed would include the latest monthly global temperature numbers from NASA, any key climate change data nationally and locally, and key updates the public needs to know on Plan implementation.

Add a section after the Introduction to dispel remaining doubts.

There actually are only a minor number of comments expressing complete denial of climate change. They include photo copies of the Global Warming Petition Project and related websites. Instead, there are several comments expressing skepticism about how such small amounts of

greenhouse gases can have such an extraordinary impact on our climate. Accordingly, as other commenters have suggested, summarize the current science that is the basis for the Plan in an expanded Introduction. Such skepticism is still articulated in the official positions of **all** the current PSC Commissioners and **all** the members of our Congressional Delegation.

Here is my best effort, offered as input to those on the Council far better qualified.

It integrates the views of Dr. Roy Spenser and those who support his positions, with those of Dr. James Hansen, and those who support his positions. Both are former renown NASA scientists. Dr. Spenser has a B.S. in atmospheric sciences and an M.S. and Ph.D. in meteorology. Dr. Hansen has a B.A. in Physics and Mathematics, an M.S. in Astronomy and a Ph.D. in Physics. Both have mid-western roots. Dr. Spenser received all of his higher education at the Universities of Michigan and Wisconsin while Dr. Hansen received all his at the University of Iowa. I believe Dr. Spenser and Dr. Hansen have extraordinary intellectual integrity. I believe the vast majority of persons of influence who support each side share a common aspiration: to find the best way to develop our energy resources and systems to improve the human condition and advance civilization. Accordingly, I have done my best to avoid insulting or inflammatory rhetoric.

The fundamental area of scientific consensus between Dr. Spencer and Dr. Hansen, and the rest of the scientific community, is that relatively minor amounts of greenhouse gases have an extraordinary impact on the climate system. Dr Spenser:

> Despite all its complexity, and the relative difficulty in demonstrating its existence, the greenhouse effect does indeed exist. Sometimes I'm asked how something occupying such a small fraction of the atmosphere (0.04%) can have such a significant effect. It's because each CO_2 molecule undergoes billions of collisions with other atmospheric molecules every second, which allows CO_2 to warm (or cool) all of the other molecules. So, if a CO_2 molecule temporarily warms (or cools) from the gain (or loss) of infrared energy, it communicates this change with the surrounding air molecules (mostly nitrogen and oxygen) that it collides with. This happens very rapidly, with the collisions happening at least 10,000 times faster than the time it takes for a temporarily "warmed" CO_2 molecule to lose its extra energy by radiating it away.
>
> The greenhouse effect does even more, something even most climate experts don't realize: **it creates weather.** Because the greenhouse effect both warms the surface and cools the upper atmosphere, it greatly destabilizes the atmosphere (makes the temperature fall off very strongly with height), causing warm air to rise and cold air to sink, creating clouds and precipitation and high and low pressure areas and wind. If the upper atmosphere could not cool from the loss of IR energy to outer space, these convective air currents (and thus "weather") would largely cease. Without the greenhouse effect, not only would the Earth be too cold to support life as we know it, but also weather as we know it would not exist. In short, the greenhouse effect is our friend, providing us not only warmth, but also precipitation and all other elements of weather.
>
> Given these facts, we can say that the warming influence of the greenhouse effect and the cooling influence of weather processes are continually fighting against each other in terms of their effect on surface temperature. The greenhouse effect is continuously trying to make the surface unbearably hot, and weather processes are continuously cooling the surface, "short-circuiting" most of that potential greenhouse warming. The heat absorbed by air at the surface is transported upward through convective air currents, which in turn causes cloud and precipitation systems to form.
>
> Why am I going into so much detail about the greenhouse effect? Partly because so many skeptics claim it does not exist. But I am also emphasizing it because I do not accept the premise that the greenhouse effect is a bad thing. The greenhouse effect, including its generation of weather, is probably necessary for life to exist on Earth. Of course, a large part of this process depends upon the existence of water, which helps cool the surface through evaporation and "short circuits" much of the 88 deg. C of potential greenhouse warming, reducing it to the observed 33 deg. C or so of surface warming.

The fundamental difference between Dr. Spenser's opinion and that of Dr. Hansen is the extent of observed warming that is the result of burning fossil fuels to power the advance of civilization. The question isn't whether there is a human influence on the natural greenhouse effect, but how much and how fast is it accelerating given the exploding demand for fossil fuel energy particularly in the developing world.

In her recent written statement Dr. Cathy Whitlock, Montana State University Regents Professor, lead author of the 2017 Montana Climate Assessment, and the first Montana scientist elected to the National Academy of Sciences, explained we have been able to determine the contributions of carbon dioxide, methane and other greenhouse gasses from all natural causes, before man had any measurable impact, by examining greenhouse gasses present in air bubbles trapped in Antarctica ice. Plants, obviously, are the primary means by which carbon dioxide is removed and oxygen released through photosynthesis, and at night only about half that carbon dioxide is then released through respiration. The primary way carbon dioxide is removed from the atmosphere is through carbon storage in plants, particularly forests.

Dr. Whitlock: "Current climate change exceeds anything that we have witnessed over the last 800,000 years. The physical geological evidence of past climate change during glacial-interglacial cycles is unmistakable on the landscapes upon which we built civilization. During glacial periods, so much land was covered in ice sheets that sea level was nearly 300 feet lower than today, which is in a warm interglacial period. These cycles have been initiated by variations in the amount of sunlight reaching earth over tens of thousands of years. Given where earth is in those cycles and short-term variations in sunspot activity, our climate should be cooling, but instead it is rapidly warming. Building on nearly two centuries of climate scientific work, and incorporating current analyses, there is a scientific consensus the global temperature increase is linked, with 99.99% certainty, to increased greenhouse gases (GHGs) in the atmosphere, chiefly due to burning fossil fuels to power civilization. From examining GHGs present in air bubbles trapped in Antarctica ice, we know this increase is unprecedented. Up until 200 years ago, concentrations of the major atmospheric GHG's, carbon dioxide (CO_2) and methane (CH_4), had not exceeded about 280 ppm and 790 ppb, respectively, for 800,000 years. CO_2 reached 407.4 ppm and continues to rise. Methane, which is a twenty-five times more powerful GHG, pound-for-pound, than CO_2, now exceeds 1,866 ppb. GHGs, like window glass, allow sunlight to pass through but reflect back heat. That's why the inside of your car heats up when the sun is out and the windows are closed. Open the windows, the heat escapes."

The variations in the amount of sunlight reaching earth over tens of thousands of years and the impact on climate referred to by Dr. Whitlock, are explained by Milankovitch theory. As I understand, over just the past 800,000 years (Earth's most recent history) this astronomical theory says orbital and axial variations of Earth have influenced the initiation of climate change in repeating 100,000-year cycles known as ice-ages. Within each ice age, we have been spending around 80% in a cold (glacial) period and 20% of the cycle in a warm (interglacial) period, depending on where we are in these cycle influences. The Earth's axis completes one full cycle of precession approximately every 26,000 years. At the same time, the elliptical orbit rotates more slowly. The combined effect of the two precessions leads to a 21,000-year period between the astronomical seasons and the orbit. In addition, the angle between Earth's rotational axis and the normal to the plane of its orbit (obliquity) oscillates between 22.1 and 24.5 degrees on a 41,000-year cycle. It is currently 23.44 degrees and decreasing. This leads to the conclusion, given where Earth is in its current cycle and short-term variations in sunspot activity, our climate should be cooling rather than warming.

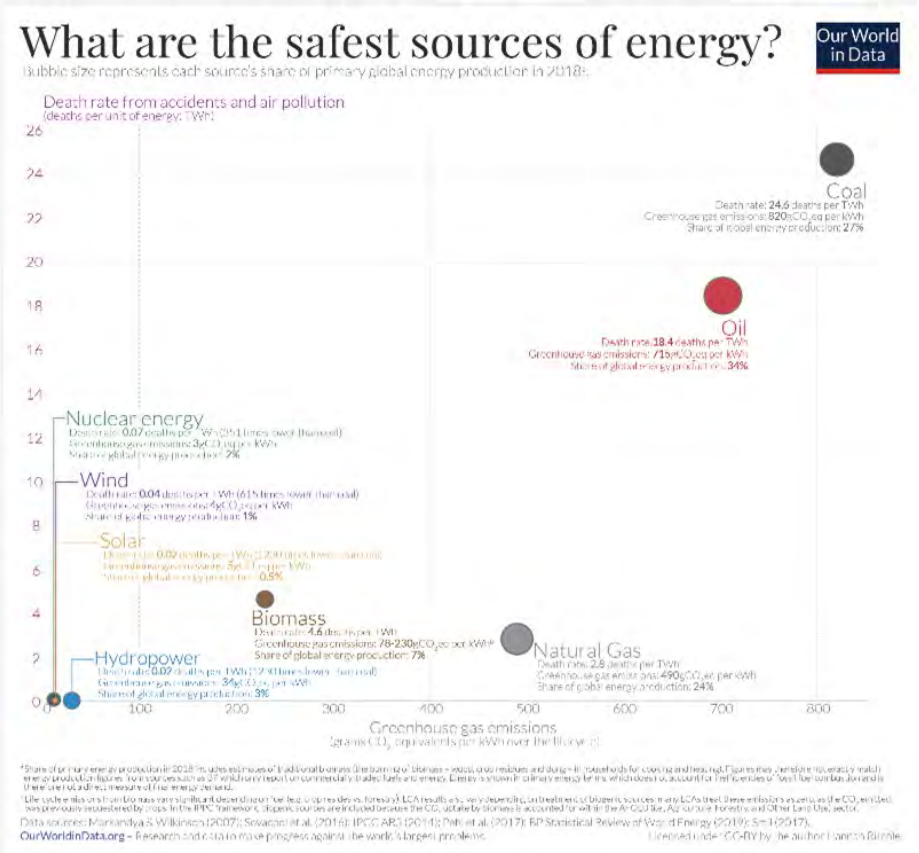
Applying that reasoning, on June 23, 1988, Dr. Hansen told a U.S. Senate committee he was 99 percent certain that the year's record temperatures were not the result of natural variation. It was the first time a lead scientist drew a connection between human activities, the growing concentration of atmospheric pollutants, and a warming climate. How could he have been able to predict, over thirty years ago, the accelerating rate of warming that is now occurring, and yet be so wrong about the cause?

As I understand, climate tipping-points loom; where several related climate processes would occur simultaneously and trigger the rapid collapse of our life-support systems. These are self-reinforcing feedback loops (chain reactions) like the release of natural gas, which is mostly CH_4, from melting permafrost on land and sub-sea permafrost under the Arctic Ocean. Since CH_4 is much more potent than CO_2 as a GHG, its release in large quantities traps heat above the permafrost surface, which then further speeds the melting of more permafrost, and so forth.

In his book Global Warming Skepticism for Busy People, Dr. Spenser considers just the impacts of CO_2 and not the combined impacts of all the major anthropomorphic greenhouse gases in his analysis. CO_2 is the main greenhouse gas, but the other GHGs have very strong warming effects, including nitrous oxide (N_2O), methane (CH_4), sulfur hexafluoride (SF_6), and two classes of compounds known as hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). To compare all the GHGs in common terms to CO_2, emissions are multiplied by their potential to produce CO_2-equivalent emissions.

My perspective is strongly biased by my life-experience. I have seen and had to deal with the health, environmental and economic damage of our dependence on fossil fuels all my life.
Dr. Spenser does not address ***any*** of the external costs of fossil fuel use borne by society. Consider: **Global death rates for all the major energy production methods:**

The infrastructure which delivers energy services can break down in an energy accident, sometimes causing much damage, and energy fatalities can occur, and with many systems often deaths will happen even when the systems are working as intended. Which is the safest way to make electricity between nuclear, wind, solar, coal, and gas? The following graph gives us the answer in number of deaths per tera-watt-hour of electricity produced.



All energy sources have negative effects. But they differ enormously in the size of those effects. That difference can be easily summed up: by all metrics, fossil fuels are the dirtiest and most dangerous, while nuclear and modern renewable energy sources are vastly safer and cleaner.

Dr. Spenser has concluded that solar and wind energy development cannot compete with fossil fuels, based on price, and their implementation leads to increased poverty. He does not discuss at all geothermal energy and a widening range of other carbon-free alternatives. The following analysis presents **the lifetime levelized cost of all the major methods of electricity production globally through 2019:**

The levelized cost of energy (LCOE) allows comparison of different methods of electricity generation on a consistent basis. The LCOE can also be regarded as the minimum constant price at which electricity must be sold in order to break-even over the lifetime of the project. This can be roughly calculated as the net-present-value of all costs over the lifetime of the asset divided by an appropriately discounted total of the energy output from the asset over that lifetime.

In explicit mathematical terms levelized cost of electricity (LCOE) is given by:

Defining Per-Unit Costs [edit]

Levelized cost of electricity [edit]

Main article: Levelized cost of energy

The levelized cost of energy (LCOE) is a measure of a power source that allows comparison of different methods of electricity generation on a consistent basis. The LCOE can also be regarded as the minimum constant price at which electricity must be sold in order to break even over the lifetime of the project. This can be roughly calculated as the net present value of all costs over the lifetime of the asset divided by an appropriately discounted total of the energy output from the asset over that lifetime.[1]

In explicit mathematical terms levelized cost of electricity (LCOE) is given by:

$$\mathrm{LCOE} = \frac{\text{sum of costs over lifetime}}{\text{sum of electrical energy produced over lifetime}} = \frac{\sum_{t=1}^{n} \frac{I_t + M_t + F_t}{(1+r)^t}}{\sum_{t=1}^{n} \frac{E_t}{(1+r)^t}}$$

- I_t : investment expenditures in the year t
- M_t : operations and maintenance expenditures in the year t
- F_t : fuel expenditures in the year t
- E_t : electrical energy generated in the year t
- r : discount rate
- n : expected lifetime of system or power station

Note: Some caution must be taken when using formulas for the levelized cost, as they often embody unseen assumptions, neglect effects like taxes, and may be specified in real or nominal levelized cost. For example, other versions of the above formula do not discount the electricity stream.[citation needed]

Typically the LCOE is calculated over the design lifetime of a plant, which is usually 20 to 40 years, and given in the units of currency per kilowatt-hour or megawatt-day, for example AUD/kWh or EUR/kWh or per megawatt-hour, for example AUD/MWh (as tabulated below).[2] However, care should be taken in comparing different LCOE studies and the sources of the information as the LCOE for a given energy source is highly dependent on the assumptions, financing terms and technological deployment analyzed.[2] In particular, assumption of capacity factor has significant impact on the calculation of LCOE. Thus, a key requirement for the analysis is a clear statement of the applicability of the analysis based on justified assumptions.[3]

Many scholars,[new/W] such as Paul Joskow, have described limits to the "levelized cost of electricity" metric for comparing new generating sources. In particular, LCOE ignores time effects associated with matching production to demand. This happens at two levels:

- Dispatchability, the ability of a generating system to come online, go offline, or ramp up or down, quickly as demand swings.
- The extent to which the availability profile matches or conflicts with the market demand profile.

Lazard's long standing Levelized Cost of Energy (LCOE) Report is widely considered the industry benchmark. First published in 2015, it is a collaboration of Lazard (a New York investment bank) with the energy consulting firm, Enovation.

Lazard (2019) [edit]

In November 2019 Lazard released their 2019 LCOE report[84][85]

Tech Type	Min ($/MWh)	Max ($/MWh)
Solar PV—Roof top Residential	151	242
Solar PV—Roof top C&I	75	154
Solar PV—Community	64	148
Solar PV—Crystalline Utility Scale	36	44
Solar PV—Thin Film Utility Scale	32	42
Solar Thermal Tower with Storage	126	156
Geothermal	69	112
Wind – Onshore	28	54
Wind – Offshore (Only Midpoint cost)	89	89
Gas Peaking	150	199
Nuclear	118	192
Coal	66	152
Gas Combined Cycle	44	68

Comparisons of life-cycle GHG emissions show coal, for instance, to be radically higher in terms of GHGs than any alternative. Accordingly, carbon captured coal is generally treated as a separate source rather than being averaged in with other coal.

In November, 2019, Lazard found: "onshore wind and utility-scale solar, which became cost-competitive with conventional generation several years ago on a new-build basis, continue to maintain competitiveness with the marginal cost of existing conventional generation technologies."

In October, 2019, Bloomberg New Energy Finance found that: "the price of wind and solar power continue to fall, with offshore wind posting the most impressive cost reductions and solar PV and onshore wind now as cheap as any other source of power in California, China and parts of Europe. As a result, fossil fuel power plants are being increasingly marginalized in a number of markets, a trend that is set to continue in years to come."

Dr. Spenser does not address at all **nuclear energy, which is a major source of CO2 free energy that is well developed, is not intermittent, is essential in the world, and is now playing a major role in the advance of civilization:**

From the prior LCOE analysis, Nuclear power economics look good for base-load generation against other zero-carbon alternatives when energy storage is added. However, that assumes that projects can be built on-time and on-budget. That has not always been true, and the

current new builds in Europe and the U.S. do not inspire confidence. In addition, society's concerns about waste and safety have often overridden the narrower economic perspective. The future contribution that nuclear power makes to expanding economic development, without harmful carbon emissions, hinges on whether the industry can make progress in controlling capital costs while addressing society's safety and waste disposal concerns.

There are 23 commercial nuclear power plants under construction in the world today. One is in the U.S. There are 60 commercially operating nuclear power plants with 98 nuclear reactors in 30 U.S. states. Of these, 36 have two or more reactors. About one-fifth of electricity in the U.S. comes from nuclear power. Many experts think there is an urgent need to determine what role nuclear power should play in feeding America's energy-hungry future.

In 2013, Southern Company, which is one of the largest publicly traded U.S. gas and electric utility companies, began construction of the Plant Vogtle units 3 and 4 in Georgia. They will be the first in the industry to use Westinghouse AP1000 advanced pressurized water reactor technology. This advanced technology allows nuclear cores to be cooled even in the absence of operator interventions or mechanical assistance. It is the only Generation III+ reactor to receive Design Certification from the U.S. Nuclear Regulatory Commission. Vogtle Units 3 and 4 will be the first new nuclear units built in the U.S. in thirty years. It wasn't long before the entire project was at risk of being shut down following the bankruptcy of Westinghouse, and now years behind schedule and billions of dollars over budget. This case, and one other that was canceled before construction started, evoke memories of the very bad experience with construction delays and cost overruns that plagued the U.S. industry from the 1970s. The Southern Company had a decent year in 2019, noting solid operating performance and good earnings. However, that wasn't the news most investors wanted to hear. The big story, again, was progress at the company's Vogtle nuclear construction project. The first nuclear fuel loads for Vogtle Unit 3 and Unit 4 have now been ordered, the first nuclear fuel order to be placed in more than 30 years in the U.S., with start-ups now realistic in 2021.

If that is achieved, the U.S. nuclear industry will have a solid accomplishment to resell nuclear power as a safe, zero-carbon, jobs producing alternative. Vogtle 3 and 4 is currently the largest construction project in the state of Georgia with more than 9,000 workers currently on site, and more than 800 permanent jobs available once the units begin operating.

Starting in 2000, the U.S. Department of Energy (DOE) funded research for the development of a small nuclear power plant that might be used in multiple applications. Idaho National Environment & Engineering Laboratory (INEEL) led the project with support from Oregon State University (OSU). At the same time, OSU was gaining international recognition for its work in the development of passive safety systems that use natural circulation to provide cooling for nuclear plants. OSU built and operated 1,000 MW and 600 MW nuclear steam supply system scale models to help the developer obtain United States Nuclear Regulatory Commission (NRC) Design Certification (DC) for those technologies.

When the DOE research project concluded in 2003, OSU scientists continued to pursue the design of a small nuclear plant that used natural circulation. Ultimately, the team at OSU built a one-third scale electrically-heated version of their plant as a test facility for this design. OSU granted NuScale Power exclusive rights to the nuclear power plant design, as well as the continued use of the test facility, through a technology transfer agreement completed in 2007. NuScale notified the NRC in February 2008 of its intent to pursue DC for its technology.

The Utah Associated Municipal Power Systems (UAMPS) (a political subdivision of the State of Utah that provides comprehensive wholesale electric-energy, transmission, and other energy services, on a nonprofit basis, to community-owned power systems located in Utah, California, Idaho, Nevada, New Mexico and Wyoming) will be the operator of the NuScale Small Modular Reactor (SMR) to be built on the nuclear reactor test site at the Idaho National Laboratory in eastern Idaho. UAMPS will be siting a NuScale 12-module plant, capable of generating 720 MWe, at that site. From my reading research, I conclude the NuScale SMR design probably won't be available for its first commercial application until 2026.

In his book, Dr. Spencer warns us about **the need to address poverty. I think he would be open to consider two opportunities, unprecedented in all human history, now within our grasp:**

First, we now have the know-how to eliminate extreme poverty and illiteracy, for the first time in human history. We can sustain and improve the human-condition for the entire population of 7.7 billion people, growing to 9.7 billion by 2050 and reaching zero-population-growth (ZPG) at 11 billion by 2100. The World Population Prospects 2019 highlights, published by the Population Division of the UN Department of Economic and Social Affairs, concluded that the world's population could reach its peak around the end of the current century. The report also confirmed that the world's population is growing older due to increasing life expectancy and falling fertility levels, and that the number of countries experiencing a reduction in population size is growing. The resulting changes in the size, composition and distribution of the world's population have important consequences for improving economic prosperity and social well-being while protecting the environment. The world's population continues to increase, but growth rates vary greatly across regions. The new population projections indicate that nine countries will make up more than half the projected growth of the global population between now and 2050: India, Nigeria, Pakistan, the Democratic Republic of the Congo, Ethiopia, the United Republic of Tanzania, Indonesia, Egypt and the United States of America (in descending order of the expected increase). Around 2027, India is projected to overtake China as the world's most populous country. The population of sub-Saharan Africa is projected to double by 2050 (99% increase). Regions that may experience lower rates of population growth between 2019 and 2050 include Oceania excluding Australia/New Zealand (56%), Northern Africa and Western Asia (46%), Australia/New Zealand (28%), Central and Southern Asia (25%), Latin America and the Caribbean (18%), Eastern and Southeastern Asia (3%), and Europe and Northern America (2%). China is expected to reach ZPG by 2030. China's population growth has slowed since the beginning

of this century. This was mostly the result of China's economic growth and increasing living standards.

Since 1970 I have been concerned about how to solve the population problem and how that is related to the availability of low-cost energy, particularly electricity. The utility gained from electricity is central to eliminating hunger and illiteracy. Modern civilization practices like those undertaken by China have led to ZPG. If the developed countries can decarbonize rapidly and help the underdeveloped ones electrify with much less dependence on fossil fuels, and much less environmental destruction; we could jump-start those economies to much higher standards of living, and get to global ZPG in this Century. We could then down size population if needed while ensuring reproductive freedom. But first we must get there, and It is in view given the exploding rate of progress in eliminating extreme poverty. I do not see another humane scenario. Do you?

The standard unit set used in our country in examining overall energy use is the "quad". The term "quad" is shorthand for 1 quadrillion (1,000,000,000,000,000) British thermal units. A Btu refers to the amount of energy required to elevate the temperature of one pound of water by one-degree Fahrenheit. But a more intuitive conversion is to think about a quad in terms of power plant-equivalent electricity generation. One quad is equivalent to about 11 gigawatts of electricity (over one year). How much is 11 gigawatts? It is the amount of electricity produced by about fifteen typical power plants, each generating 750 megawatts of electricity.

World energy consumption is projected to rise to 736 quads in 2040 from 575 quads in 2015, an increase of 28%, according to the latest 'International Energy Outlook 2017' from the U.S. Energy Information Administration (EIA). In recent years the U.S. as a whole consumed about 100 quads of energy each year. The EIA estimated that by 2030 the world would consume a total of 678 quads of energy, which represents a growth rate of about 1.5 percent per year in the context of global economic growth expected to be perhaps twice as great. Thus, the EIA scenario for future energy consumption factors in aggressive improvements in energy efficiency related to GDP growth. Consider that if demand were to increase by 2 percent annually to 2030 (instead of 1.5 percent), the world would need an additional 77 quads in 2030, for a total of 755 quads. To reach this level of total energy consumption would be the equivalent of adding more than 3,700 new power plants. The precise total amount of energy that the world needs in coming decades will be determined by how fast the global economy grows and the nature of that economy, including the global mix of activities (e.g., services versus manufacturing) and the efficiency with which those activities are conducted. It is essential to realize that under all plausible scenarios, in the coming decades the world is going to need vastly more energy. Meeting the increasing global demand will be facilitated by an increasing diversification of energy supply beyond coal, gas, and oil.

Following a decade of steady progress, the global electrification rate reached 89 percent and 153 million people gained access to electricity each year. However, the biggest challenge remains in the most remote areas globally, and in sub-Saharan Africa where 573 million people still live in the dark. To connect the poorest and hardest to reach households, off-grid solutions, including solar lighting, solar home systems, and increasingly micro grids, will be crucial. Globally, at least 34 million people in 2017 gained access to basic electricity services through off-grid technologies. Reliability and affordability are keys. This progress is profoundly advantaged by our ability to provide modern instantaneous telecommunications and electricity with minimal investment in wired infrastructure. The rest of the underdeveloped world will not have to transition from wired to wireless.

Given the current price of oil and natural gas, and available well-developed technologies, the prior Lazard LCOE analysis dictates that natural gas will dominate in those parts of the developing world where it is available or can be transported by secure pipe lines. Where it is not available coal may still dominate.

Worldwide, industrial emissions increased 0.6 percent in 2019, a considerably slower pace than the 1.5 percent increase seen in 2017 and the 2.1 percent rise in 2018. The U.S. and the European Union both managed to cut their carbon dioxide output last year, while India's emissions grew far more slowly than expected. Global emissions from coal declined by about 0.9 percent in 2019, although that drop was more than offset by strong growth in the use of oil and natural gas around the world. There are 458 coal-fired units being built worldwide today, and 903 if you include those in the pre-permitting or permit phase. However, China accounts for 131 giga-watts of that growth with a long history of over-building and underusing such plants. Many existing plants are under-utilized and many of the new ones may never be used.

The global public health policy response to the novel coronavirus pandemic has dramatically reshaped, overnight, energy use in the developed world. Reduced demand for oil, particularly in transportation, commercial and industrial sectors, has resulted in the rapid decarbonization of the highly developed economies. The collapse of global oil prices produces an unprecedented window-of-opportunity to use these low-cost fossil fuels to help jump-start the remaining underdeveloped economies of the world. As these economies develop, they will open vast consumer markets. This window-of-opportunity should be seized by American free enterprise to become the global leader in both fossil fuel exports, and renewable energy technology exports.

Second, we now have the know-how to arrest dramatic climate change while raising the standard of living for an entire generation who will do this work. Rebuilding with renewable energy no longer involves a trade-off between the economy and the environment. Advocates for decarbonization have, up to now, routinely suggested that action on climate change necessarily means economic sacrifice. We are far enough developed with alternative energy systems to finally free ourselves from the environmental degradation of our dependence on fossil fuels. The wealth-generating potential is limitless because rebuilding with renewable energy can power civilization to the end of time. By contrast, all investments in fossil fuels have limited wealth-generating potential because those that can be extracted/mined at the lowest cost are being developed and depleted rapidly now, leaving only finite amounts of reserves at increasingly high costs to develop. We will have to rebuild without fossil fuels in this century for no-other-reason than these reserves will be substantially depleted. If there is no-longer an

economic down-side, there is no reason to delay.

Free enterprise's response to this rebuilding in the past decade has been extraordinary. At the beginning of this decade the renewable energy sector was largely still in development. It is now becoming mature, and therefore cost competitive with traditional fossil-fuel based alternatives.

Over these ten years there have been dramatic advances in solar and wind technologies and associated major manufacturing and operating cost reductions. Berkshire Hathaway's MidAmerican Energy of Iowa, serving 780,000 customers, is poised to be the first investor owned utility to supply its customers with 100% renewable sourced energy. A $1 billion 690-megawatt solar farm, with at least 380 megawatts lithium-ion storage batteries should be under construction soon in the desert outside Las Vegas. It will be the largest in the U.S.

In the U.S. clean energy jobs, including zero-emission technology industries, renewables and nuclear, totaled 3.26 million in 2018 compared to 1.17 million fossil fuel jobs. Growing despite Trump administration's tariffs on solar panels and market uncertainty from the administration's inaction and planned rollbacks of energy efficiency and clean vehicles policies. Clean energy employers planned a 6 percent job growth for 2019. Yet, given China's plans, we clearly are underperforming in a major growth industry. By comparison, in 2018 China had 174,000 megawatts of cumulative installed solar capacity and the largest project at 1,547 megawatts. China's goal for 2050 is to reach 1,300,000 megawatts of solar capacity.

The auto industry is poised to go all electric. GM announced a $2.2 billion investment in Michigan and Ohio to retool partly-used or idle factories to build electric vehicles by 2021, including an electric pickup. GM's announced Vision: Making an all-electric future a reality. Ford announced a similar investment starting with an electric Ford 150 starting in 2022. The capital markets are betting on electric vehicles. Tesla, the electric vehicle and solar panel maker, had seen its stock jump to nearly $900 per share just prior to the crash. Tesla lost $862 million in 2019 but it turned a profit during the last two quarters of the year, including $105 million in quarterly earnings in its last posting. Among the positive news coming from the automaker: Tesla said it expects to exceed production of 500,000 vehicles this year at its factories in Fremont, California, and Shanghai. It appears to have worked the kinks out of making the Model 3 small car, the company's lowest-priced vehicle. And it announced it will start producing the Model Y, a small SUV with broad global appeal, sooner than expected.

Black Rock Capital Investments Corporation, the world's largest asset management investment firm, told its investors it would sell off investments in utility companies that get more than 25% of profits from coal fired electricity. Black Rock owns nearly 1/6th of NorthWestern Energy's shares. Wells Fargo recently released an update to its environmental policy that rules out funding for oil and gas projects in the Arctic region, including the Arctic National Wildlife Refuge. The release of this change to the bank's policy comes in the wake of similar announcements by Goldman Sachs and JPMorgan Chase, as well as more than a dozen other global banks.

Montana State University is moving a step further in reducing the use of fossil fuels on campus with the construction of another geothermal energy system as part of the Romney rebuilding. The system will also serve as a battery for storing heat from a "solar wall" going up on Romney Hall's south face. The geothermal system will serve the 47,000-square-foot building and cost $2.5 million. The university is calling the project "one of the biggest energy conservation projects in university history." The system will reduce MSU's associated carbon emissions by 1 million pounds per year. That's like planting roughly 10,000 carbon-sequestering trees, according to Dan Stevenson, associate vice president of University Services. The Jabs Hall geothermal system serves four buildings and has reduced MSU's energy costs by $130,000 annually since it was installed, according to MSU. Stevenson said the Romney system will reduce energy use by 40 to 60%.

Confidence in free enterprise's response was expressed in Representative Gianforte's recent letter to me: "I support market-based solutions that grow American jobs. America leads the world in energy production. We must also lead in energy innovation. Empowering the private sector to lead in innovation provides the best path forward to a sustainable economic future."

Clearly, we are not in the lead right now in energy innovation. Imagine how achieving that lead could produce opportunities for the simultaneous acceleration of innovation and economic growth on all three major carbon emission fronts: transportation, electricity, and Industrial; making it feasible to achieve carbon-neutrality in 2040 and to reach carbon-free in 2070. Synergy! Imagine how that level of growth could make it possible for us to put the brakes on run-away federal debt.

Seizing on these two opportunities, unprecedented in human history, will require effective international cooperation. But, while we must think globally, we must act locally. Ultimately each economic unit, down to individual households, must be empowered and incentivized to adapt to climate change and decarbonize personal economies. Each country, and cities and regions within countries, has a unique set of environmental issues to confront and manage, with an equally unique set of civilization structures. For example, in this country managing water shortages and droughts in the western states will likely dominate. In China and India local air pollution issues currently dominate. Generally, in each country, and, in many cases, in each region in a country, its current energy infrastructure is designed to provide the lowest cost and most abundant energy supply given the resources available. In France, which has little coal and oil resources, nuclear energy dominates. Therefore, this discussion will focus from here forward primarily on how to organize and plan for the rebuilding (and decarbonization) of the U.S., and particularly the Montana energy economy.

Add a section to the Plan that shows how rebuilding our energy economy can get us out of the biggest economic collapse since the great depression.

Sustained economic growth associated with this aggressive rebuilding offers the opportunity to lift-up an entire generation of Americans who are failing to see their standard of living improved in their life-times. It offers the potential to greatly reduce government dependency and entitlements. It offers the opportunity to get federal spending under control. Debt held by the public, a measure of national debt, was 78.9% of GDP in 2019, ranked the 43rd highest out of 207 countries. Income inequality ranked highest compared to other Western nations. GDP in 2019 was $21.4 trillion. The total federal debt was already at $23.6 trillion, with the portion owed the public at $16.9 trillion, and expected to explode by over $1 trillion this year, prior to the novel coronavirus crisis. The public portion was already projected to be 152% of GDP in 2048, greater than the highest ever when World War II ended. The annual trustee reports on the solvency of the Medicare and Social Security trust funds were just announced. Medicare will be insolvent in six years. Social Security benefits will have to be reduced by 21% effective in fifteen years. These projections were made before the coronavirus shutdown the economy. The decreases in pay role-tax collections associated with this economic collapse will accelerate the depletion of these trust funds in 2020 and, likely in 2021. **That debt is now going to grow to a much higher percentage of GDP because of deficit federal spending on the virus. It will now likely exceed $4 trillion and GDP will decrease this year and next. We will have use deficit spending to get us out of this depression. Once out, the only way forward will be to reduce that percentage back to sustainable levels, not through taxation, but through robust economic growth exceeding 4% per year in GDP. (The U.S. economy was on target to reach $22 trillion GDP prior to the crash.) If 4% was achieved and sustained, while deficit spending was contained adding under 2% to the public debt per year, the run-away debt would be contained and even reduced over time.**

Once out of this crisis in 2022, how can we create a powerful economic stimulus to achieve and sustain 4% GDP growth without raising taxes? It will depend in-large-measure on ensuring access to abundant, dependable, low-cost electricity while rebuilding for Montana and the Nation. Achieving and sustaining this level of growth will require leaving our low-productivity service economy jobs behind. Putting people back to work, strategically advantaged, better organized, better trained and much more productive for the unprecedented rebuilding task at-hand. **The term 'non-essential worker' would be rendered meaningless.**

2020 - Endorse a Canadian-form of EICDA and help build a political consensus to implement it by 2025.

The third most common set of coordinated responses are from persons who identify themselves as affiliated with the Citizens Climate Lobby (CCL). There are several persons responding who do not indicate such affiliation but none-the-less articulate strong support for the CCL position. In particular, I urge you to read and share David Atkins, Forester/Forest Ecologist, response #6-39. He is one of two responders who actually reprints the entire Plan and edits and comments extensively accordingly. His detailed analysis of how EICDA could be effective in many areas in implementation of this Plan is the best I have read. It could, in-large-measure, serve to complete section: 'CC. ROBUST AND FAIR FEDERAL CARBON FEE AND DIVIDEND LEGISLATION' of the White Paper: **GHG Committee -- Recommendations Still under Consideration but Needing Further Discussion and Revision**.

America's leading economists including Janet Yellen, Ben Bernanke, and Alan Greenspan, who have chaired both the Federal Reserve and the Council of Economic Advisers, 27 Nobel Laureate economists, 12 other former Chairs of the Council of Economic Advisers, and two former Treasury secretaries have endorsed a refunded carbon tax like H.R. 763, the Energy Innovation and Carbon Dividend Act (EnergyInnovationAct.org).

EICDA is revenue-neutral, with no impact on Social Security and Medicare. It offers the opportunity to get federal spending under control.

EICDA is market-based. It taxes fossil-fuel producers starting at $15 per metric ton for carbon dioxide and increases at $10 per year, or $15 if emissions targets aren't met. Methane is taxed similarly. The result is everything we purchase, from food to fuel, will have built-in to the price the appropriate amount of greenhouse gas emissions tax. There will be every-day reminders to purchase the item with the least greenhouse gas intensity because it will cost less. Under EICDA, a $100 CO2 tax increases the price of regular gasoline about $1 at the pump, producing a powerful incentive to invest in lower carbon vehicles.

EICDA makes it possible to minimize current and future regulations by creating powerful economic incentives to drive decentralized planning and creative solutions.

You don't have to go far to find an example of where an EICDA-type approach has been implemented with a dramatic economic up-side.

British Columbia announced it in February 2008 and it was implemented in July 2008 at a rate of C$10 per tonne of CO2, rising in C$5 annual increments to C$35/tonne. B.C. strengthened its carbon tax on April 1, 2019 raising the rate to $C40 per tonne. When B.C. first introduced its carbon tax, it was the first economy-wide price on carbon pollution in North America. Among explicit carbon prices, B.C.'s is still first on the continent. It is designed as a revenue-neutral tax, meaning that all carbon-tax proceeds collected by the government are returned in the form of income tax cuts and rebates.

Since introducing pollution pricing in 2008, per capita emissions in B.C. are down by 14%, while the economy has grown by 26%. B.C.'s carbon tax has reduced the use of gasoline and natural gas by 7% per person and spurred people to buy more fuel-efficient cars. The B.C. government has used some of the revenues to cut income taxes and, more recently, to cut health premiums and invest in green technologies.

Following British Columbia's 2008 lead, Canada enacted the federal Greenhouse Gas Pollution Pricing Act (GHGPPA), which passed in

December 2018. It is one of the most ambitious carbon pricing programs in the world.

Canada held a national election in October of 2019, and the opposition Conservatives vowed to repeal the tax if they took power. According to the National Post, the Conservative Party of Canada attempted to "make the carbon tax the single issue" of the 2019 federal election campaign. This argument did not succeed, as the Canadian voting public supported parties that also supported the carbon tax, leading CBC News to declare Canada's carbon tax to be "the big election winner" and "the only landslide victor" in this election.

The following discussion is informed primarily by the Montana Legislative Performance Audit of the Universal Systems Benefits Program and, in particular, the Montana Department of Environmental (DEQ) report updated for ETIC 2017-2018 titled 'Understanding Energy in Montana'. The DEQ report is an essential reference and planning tool to support this process going forward. Accordingly, it is attached and made part of this submission.

Following Canada's example, imagine implementing EICDA with the following key amendments:

- All revenues from the tax turned over to the individual states to administer and distribute based on metric tons of CO2 per capita rather than being equally distributed among all families equally regardless of income. Americans generate on average 16.5 metric tons of CO2 per year per person. We generate more CO2 per person than the average individuals in every other country. Montana's number: 30,900,000 metric tons / 1,062,000 persons = 29.1 metric tons per capita. It is much higher than the national average. I assumed that will be the case for all the major rural coal-electric-generating states. No less challenging will be defining the transitional role of Montana's oil production and extensive natural gas infrastructure. Such an approach would give states like Montana the money needed to phase out of coal quickly and restructure oil and gas industries without further economic damage. Once that is accomplished, states like Montana would then have much lower carbon footprints per capita, and the necessary extra money would shift to the states with the next biggest decarbonization problem.

- States having the power to determine how much of the dividend is distributed to families and how much is used for critical R&D and technical support from Montana's universities. For Montana, consider if dividends would go only to families with incomes under $75,000. That would increase the amount of money going to lower income families making it possible for them to finance or afford housing improvements, like weatherization, heating system upgrades, energy conservation, the transition out of the most inefficient mobile homes, etc. But for those with incomes of $75,000 and above, there would be a much more powerful incentive to decarbonize personal economies. It would advantage those who already have very small carbon footprints. In this respect, EICDA can be an effective wealth tax given that the U.S. currently ranks highest in income inequality compared to other Western nations.

- Sufficient funds from EICDA replacing the current charge to all Montana gas and electric customers to fund the Universal System Benefits Program (USB). It seems to me; the USB program has not resulted in a highly effective grass-roots energy innovation and conservation program. I previously lived in Wisconsin. Similar to Montana, Wisconsin has a charge. But in Wisconsin, it funds an independent non-profit think-tank and consumer assistance organization called 'Focus on Energy'. A general contractor, close friend of mine, built their office building, extensive passive and active solar, every gadget available to reduce energy consumption. I rebuilt a rundown 100+ year-old farm homestead into a zero-carbon footprint horse farm with their technical support. My electric bill ran less than $100 per year. In my town, Verona Wisconsin, EPIC electronic medical records (which provides the software to manage your medical record, if you use the Bozeman Health System) built a business campus that employs over 5,000 people with the largest array of geothermal and photovoltaic applications, at that time, in the mid-west starting with 'Focus on Energy'. Under Montana's USB program 'large customers' are completely self-regulated with no over-sight. Accordingly, an independent audit conducted in May 2014, found between 2007 and 2012 Montana electric and gas customers paid nearly $150 million to support this program but got a poor return, in terms of cost-benefit, in energy innovation or conservation.

Montana electric consumers are served by 31 distribution utilities: 2 investor-owned utilities, 25 rural electric cooperatives, 3 federal agencies, and 1 municipality. Two additional investor-owned utilities and four cooperatives based in other states serve a small number of Montana consumers. In 2015, investor-owned utilities were responsible for 48 percent of the electricity sales in Montana, cooperatives 29 percent, federal agencies 3 percent, and power-marketers 19 percent.

The NorthWestern Energy Electricity Supply Resource Procurement Plan only addresses the electricity production side, and we need a comprehensive solution that addresses the electric consumption side as well. To keep utility costs as low-as-possible, Northwestern Energy must show the impact of a comprehensive energy conservation program, like 'Focus on Energy' on demand projections. Comprehensive aggressive energy conservation is still the lowest cost way to keep electricity rates as-low-as possible.

In reviewing 411 comments received on the draft Climate Solutions Plan, by-far the greatest number are from Montana electric cooperative customers pleading for the freedom to define their own energy system futures through deregulation. Imagine how an expanded USB program incorporating technical support from our colleges and universities could empower entire coop memberships to innovate truly effective conservation and renewable energy microgrid applications.

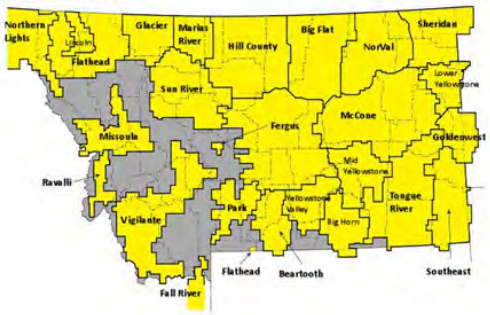
Member Co-ops

Co-op Information

- Beartooth (website)
- Big Flat (website)
- Big Horn (website)
- Fall River (website)
- Fergus (website)
- Flathead (website)
- Glacier (website)
- Goldenwest
- Hill County (website)
- Lincoln (website)
- Lower Yellowstone (website)
- Marias River (website)
- McCone (website)
- Mid-Yellowstone
- Missoula (website)
- Northern Lights (website)
- NorVal (website)
- Park (website)
- Ravalli (website)
- Sheridan (website)
- Southeast (website)
- Sun River (website)
- Tongue River (website)
- Vigilante (website)
- Yellowstone Valley (website)

Map

- pdf version with details



- Farmers and ranchers exempt from paying taxes for agricultural uses.

- Following Canada's example, key industries that face intense trade competition, like steel and chemicals, being exempt. Instead, they would participate in a separate program in which the dirtiest companies within each sector will either have to pay the government for their excess emissions or buy carbon credits awarded to the cleanest companies.

Before the crash, a macroeconomic analysis by a properly credentialed consulting firm showed 2.1 million jobs created in 10 years. GDP increased $70 billion-$85 billion after four years, and cumulatively $1.375 trillion in 20 years. EICDA will create jobs, not cost jobs. EICDA tax revenues peak in year 10, then decline as we build a carbon-free energy economy. That study needs to be redone now to determine if it could serve as the primary stimulus to get us out of this depression.

There is an extraordinary opportunity to help build a national consensus through an interface between our Public Service Commission, the Governor's Climate Solutions Council and the U.S. Senate and House bipartisan Climate Solutions Caucuses. Imagine how a deep bipartisan consensus, like that achieved to win World War II, which endures for the rest of this century, would advance this unprecedented undertaking.

The House Caucus is well established with 22 Republicans and 41 Democrats.

On November 6, 2019 Senator Mike Braun, R-Indiana, launched the Senate Caucus. The members now include Braun and Senators Chris Coons, D-Delaware; Debbie Stabenow, D-Michigan; Susan Collins, R-Maine; Tammy Baldwin, D-Wisconsin; Lisa Murkowski, R-Alaska; Jeanne Shaheen, D-New Hampshire; Mitt Romney, R-Utah; Angus King, I-Maine; Michael Bennet, D-Colorado; Rob Portman, R-Ohio; Jacky Rosen, D-Nevada; Marco Rubio, R-Florida; and Lindsey Graham, R-South Carolina.

Senator Marco Rubio: "Changes in our climate, such as the rise in sea levels, are measurable facts. Many communities in Florida are already dealing with the consequences of these changes and will have to adapt and mitigate against their impacts for decades to come." "I look forward to working with my colleagues to find real and responsible solutions in a bipartisan way." February 7, 2020.

Senator Lindsey Graham: "I believe climate change is real. I believe that we as Americans have the ability to come up with climate change solutions that can better our economy and our way of life." "The United States has long been a leader in innovation. Addressing climate change is an opportunity to put our knowledge and can-do spirit to work to protect the environment for our benefit today and for future generations." November 6, 2019.

2020 – 2070 Define the key elements in building the safest, lowest-cost, most reliable and abundant energy supply for Montana to achieve 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 for all other carbon emission fronts by 2040, and making it feasible to reach carbon-free by 2070.

The following is a scenario-plan with a time-line that presents a 'primitive' course to achieve these goals. Again, it is offered to help inform three, on-going, deliberative energy policy processes: the work of our Public Service Commission and that of the Governor's Climate Solutions Council in Montana, integrated with the U.S. Senate and House bipartisan Climate Solutions Caucuses. If those processes endure around a deep bipartisan leadership consensus, a Plan will emerge that achieves these goals. Given the extensive energy infrastructure that is in place, completely rebuilding Montana's energy economy is an incredibly complex undertaking. Much of the essential information that will be needed to produce a final Plan that produces the safest, lowest-cost, most reliable and abundant energy supply will require a detailed knowledge of the DEQ report 'Understanding Energy in Montana'.

To achieve the decarbonization goals, this scenario-plan dictates Montana is going to replace all its fossil fueled heating, industrial uses and transportation with electricity. Accordingly, Montana is going to need much, much, more electricity, going from an estimated 1,600 MW now to 5,000 MW by 2040 to meet the carbon-neutral goal, and that is just for in-state use. That number will be strategically influenced by aggressive improvements in energy efficiency related to GDP growth.

In 2015, Montana consumed an estimated 1,600 aMW or about 1,700 aMW, assuming 8 percent transmission line losses, and produced 3,322 aMW. The other half of Montana electricity production is exported west to Washington and Oregon via the Colstrip transmission lines. The Colstrip coal generation plant, the Glacier and Rimrock wind farms, and a few of the larger dams in northwestern Montana account for the vast majority of contracted Montana electricity exports. There are now less than 50 major generating facilities left in Montana.

In planning for the transition completely out of coal by 2035, a strategic question arises: Should Montana's energy economy continue to be geared to export?

The following discussion is based on answering: **YES!**

There is broad realization among those commenting on the Plan that baseload issues exist with expanded application of renewables and the phasing out of coal. According to Lazard, the 2019 levelized cost of electricity (LCOE) for combined cycle gas turbines, which are the most efficient at up to 60%, is the lowest cost option to replace coal, and that was before the complete collapse of oil prices. It is actually cheaper than coal. These turbines also produce 50 to 60% less CO2 emissions than coal. The coal-fired plants should be replaced with an adequate number of smaller scale combined cycle gas turbine generators. Block sizes offered by three major manufacturers (Alstom, General Electric and Siemens) can range anywhere from 50 MW to well over 1300 MW with costs approaching $670/kW. The existing transmission, rail and maintenance infrastructure, and available trained workers, particularly at Colstrip, should drive siting decisions. Capacity can then be tailored based on future export markets. A large base load natural gas plant running at high capacity (i.e. 500 MW base load plant) could use half as much natural gas as Montana consumes in a year. The Energy Information Administration (EIA) estimates in 2015, the U.S. had about 12 years of proven natural gas reserves based on current U.S. consumption and about 60 years of unproven reserves.

Build as few gas plants as possible by maximizing wind generation. According to Lazard's 2019 LCOE, onshore wind is now cheaper than combined cycle gas turbine generators. According to the DEQ report 'Understanding Energy in Montana', Montana's large geographic area and high plains with interspersed mountains and river valleys make it one of the highest ranked states for utility-scale wind generation potential in the U.S. The National Renewable Energy Laboratory (NREL) estimates 679,000 MW of wind generation potential at 80 meters above ground in the state, ranking Montana second in total wind energy production potential. Most of the state's best wind energy resource lies in the central and eastern areas of the state. Despite this potential, Montana's distance from large, population centers (energy loads) and its transmission constraints have resulted in the state developing a small fraction of its utility scale wind potential. Montana developed 695MW of installed wind energy capacity by 2016, ranking Montana 22nd in installed wind capacity among states. Wind energy accounted for nearly 7 percent of Montana's net electricity generation in 2015.

Given the current LCOE for onshore wind, against all other options, transmission costs now seem surmountable. Accordingly, wind has to be a major part of our immediate energy mix. Greatly expanding wind also opens up the opportunity to use excess energy for extensive application of pumped storage, given our topography. Also, for the electrolysis of Berkeley Pit water, and then burn the hydrogen in these combined cycle turbines. And have a zero-carbon option. GE says their combined cycle gas turbines can run on hydrogen.

Sequestration in forestry must be another key element to off-set part of the greenhouse emissions from gas generation. Imagine Montana with the high-tech jobs needed to support a comprehensive forest sequestration program, with intensive management of some forests to maximize the growth of trees and then harvesting exclusively for products like building materials where carbon is stored for centuries in buildings; for reforestation (replanting an area with trees) and afforestation (establishing a forest on land not previously forested) to lower emissions, and proforestation (growing existing forests to their ecological potential) as a more effective, immediate, and low-cost approach that could be mobilized across suitable forests of all types. We can simultaneously improve habitat, generate wood products, conduct smart planning and improve green building.

Steel and concrete construction accounts for 8% of global carbon emissions and it's non-renewable. The U.S. has gone from nearly 50% renewable building materials in year 1900 to less than 5% today. There are many benefits of mass timber construction including using small

diameter timber, which is a Montana natural renewable resource. We can Innovate with cross-laminated timber and create jobs in rural communities with the added benefit of a short construction time. The University of Montana is in the process of designing a new building for the WA Franke College of Forestry and Conservation, highlighting this circular economy of the future.

Wildfires are emerging as a problem and we will most certainly see more in the future. Montana has a legacy of innovation in fire science and we have an opportunity to lead. We need to change the composition and structure of our forests and reduce fuels. Rapid assessment of fuel conditions for western U.S. fire behavior, using LIDAR data fused with less expensive satellite remote sensing data to predict fuel attributes can be modified relatively simply. Models predict this. Now we need to validate these models. Fuel treatment design and effectiveness is another area where we have the opportunity to lead. Changes to the forests have a large impact on wildfires. Montana is applying fire to our own lands in the Blackfoot Valley to reduce fuels. There is a desire by many parties to treat lands across boundaries and this is an area where we may need legislative support for liability protections.

Carbon markets for forest management are a growth area for Montana. There is growing interest in cap and trade programs. Several Western states have developed executive orders to this end. With 24 million acres forest land in Montana; 24% private, 5% state, 4% tribal, 77% federal, this has huge potential. Landowners are constantly looking to diversify revenue streams. Carbon offset programs add value by diversifying income streams. The Lubrecht Experimental Forest Carbon Offset Project is demonstrating the value of forest lands and forest products to offset carbon emissions. Through the California Air Resources Board's (CARB) cap and trade program, carbon credits are issued for annual growth and for standing stocks. It's a multiyear process that requires quantification, verification and third-party certification. CARB projects carry a 100-year lifespan.

Lastly, we need to realize the potential of wood-based biomass energy. We know-how to process woody biomass. But, with respect to slash and tops that can't be used to make a solid wood product; we now see ways to reduce costs and improve efficiencies in recovery. Transportation is a big problem – a lack of clearance is an issue. Our trucks aren't very usable in forest conditions. However, the technology is coming along, such as Logset Corp., from Finland, offering hybrid technology. John Deere and Tesla are also getting into this market to lower emissions and operating costs.

Sequestration in Agriculture must be another key element to off-set part of the greenhouse emissions from gas generation. 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 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 CO2 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. The 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 MSU, 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 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.

Implementing EICDA will be a key element in two respects. First, providing the funds and incentives to restructure Montana's oil and gas industries without further economic damage. Second, providing the funds and incentives to decarbonize personal economies. EICDA revenues, nationwide, would peak in 2035 at $400 billion per year and then decline as we move toward a carbon-free economy.

Transitioning to nuclear energy is a key element. Nuclear energy is not mentioned extensively as an alternative. However, one comment included reference to a Resolution for the Montana Senate and Assembly to consider replacing the Colstrip coal-fired boilers with PRISM nuclear technology. It is a solution designed to use nuclear waste from regular reactors, mainly plutonium. It appears to be about ten years behind in development compared to NuScale SMR for commercial application. It may be a long-term solution to long-term storage of nuclear waste, which also addresses nuclear weapon proliferation. I think it would be impossible to evaluate the commercial economic feasibility of PRISM at this stage in the development-cycle. Where-as, if all goes well, we can go to Idaho in a few years and see NuScale SMR's pumping out electricity in a commercial application.

In 2050, replace all the fossil fueled electric power with nuclear energy. Remove all the remaining CO2 emissions by converting the remaining fossil-fueled space heating and transportation with electricity. Add an expanded mix of renewables with storage and carbon-sequestration to address industry and agriculture, to reach carbon-free by 2070. Looking at Lazard's current LCOE for nuclear, globally, it is about 2.6 to 2.8 times greater than combined cycle gas and wind. Those are today's prices. And we do not have the commercial rate for Nuscale SMR design, which likely will be available for its first commercial application in 2026. **Enough time, to develop the political leadership consensus needed**

#11a-01

to get nuclear approved by vote of Montana citizens, and get to construction before 2050.

Then in 2100 phase-out all nuclear and go to all renewables with storage and renewably-sourced hydrogen. Given its extensive forests and grass lands, Montana becomes a major carbon sink. We enter the 22nd Century with a vision of a geoengineered climate system and the human population at zero-population-growth.

That's it. It's a scenario-plan, meaning it is just one option intended to provide a basis for helping focus the discussion by Members of the Climate Solutions Council and the Commissioners of the PSC. And then perhaps as constructive and reasoned input to help build a national consensus through an interface between the PSC, the Governor's Climate Solutions Council and the U.S. Senate and House bipartisan Climate Solutions Caucuses. **Please urge Senators Tester and Daines, and Representative Gianforte, to join these Caucuses.**

I look forward to your reactions and consideration.

Regards,

John A. Noreika, Sr.

#11a-02

MONTANA PETROLEUM ASSOCIATION, INC.

[redacted]
Helena, MT 59624-1186

www.montanapetroleum.org
Telephone [redacted]

Alan Olson
Executive Director

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CHS Inc.

Tanner Egan, Vice President,
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Dave Linn, Vice President,
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Eric Linthicum
White Rock Oil & Gas, LLC

HJ Reed
Phillips 66

Greg Schnacke
Denbury Resources, Inc.

Tad True
True Oil LLC

April 23, 2020

Rebecca Harbage
Montana Climate Solutions Council
Montana Department of Environmental Quality
P.O. Box 200901
Helena, MT 59620-0901

Delivered Via Email to: ClimateCouncil@mt.gov

Dear Members of the Montana Climate Solutions Council:

The Montana Petroleum Association (MPA) appreciates the opportunity to have a seat on the Climate Solutions Council and provide comments. MPA is a non-profit trade association that represents over 200 members involved in producing, refining, and transporting petroleum products in Montana.

As you know, the larger Council was segmented into sub groups working on different aspects of this plan. Subgroups focused on their area of interest until the meeting in late February and had a limited opportunity to comment in detail on recommendations outside each group. Now that our members have had a chance to study the first draft, we offer the following comments.

MPA offers several overarching comments that apply to the overall process. The entire document is full of proposals that expand the need for increased government control and/or cost. It is MPA's belief that each recommendation should include a cost estimate along with a proposed funding source. Given the economic lessons the world is learning from the Covid-19 pandemic we are learning the importance of increased government cost in our decision making. Another overarching point is that all recommendations should be voluntary. Finally, we note the repeated use of the term, "across all ownership" while discussing recommendations that impact land use. MPA has strong views on protecting private property rights, whether they are surface or mineral properties. We will vigorously oppose any recommendations that diminish private property rights.

Specific Recommendation Comments;

1A. This recommendation and strategies should include a cost estimate along with a proposed funding source.

1B. Generally, agree but any further development or expansion needs a cost estimate along with a proposed funding source.

1C. Agree

1D. Generally, agree, but strategies that say "across all ownership boundaries" would require private property agreement. If it is mandatory, MPA opposes such strategies.

1E. Generally, agree, but any expanded program development above current levels requires a cost estimate along with a proposed funding source. MPA is not sure about the strategy that states, "identify and support funding strategies to address local business needs, particularly in the travel and tourism sectors, associated with extreme weather events". What does this statement mean, exactly? Any funding strategy above what are already used and in place need more information and cost estimates. The statement "particularly the travel and tourism" industry is troublesome. What is being suggested? As we are seeing with the CoVid-19 impact on America's economy, America's base industries are holding the economy somewhat together, while the travel and tourism industry is in dire condition. Picking certain industries over others needs much more clarity, and may or may not be wise.

1F. Voluntary efforts with private lands and business is key and is noted in these strategies.

1G. The all hands, all lands approach across ownership boundaries appears like private property could be impacted. MPA opposes any expansion of government control on any private lands unless the owner does so voluntarily. Further, MPA will oppose any tactics on State or Federal owned lands that impact the ability to access public and private minerals. MPA opposes any individual strategies included in this recommendation unless private land impact is entirely voluntary.

1H. The same statement made for recommendation 1G applies here. How will this be funded? MPA suggests funding with existing discretionary funding. MPA will not support a tax increase of any kind. And to the question asking if there is value to estimating costs and benefits, MPA believe a serious attempt should be made to estimate costs on all recommendations.

Section 2 Greenhouse gas reductions:

Many if not all these recommendations will ultimately increase the cost of housing and in some instances, utility bills. Housing costs in many areas of Montana are becoming a serious issue. We note that Senator Tester has held conferences in Missoula to address the rapidly increased housing costs. Many of those costs can be attributed to local rules and increased code requirements that extend far beyond safety, like the strategy suggestions in this section.

2A and 2B. These strategies will result in increased new housing costs which are affecting Montana communities statewide. There are no cost estimates and they are not voluntary.

2C. The idea of forcing a private business to use its cash resources to act like a bank and provide on bill financing potentially increasing costs to all rate payers is unacceptable. Unless such financing is voluntary on behalf of the utilities, MPA is opposed.

2D. Tiered pricing is another idea that may put additional financial pressure on low income households. With pressure to electrify residential customers (eliminate natural gas) this proposal could drastically increase winter home heating bills. The recommendation needs an estimate of costs not only for the utilities, but the ratepayers as well. Without making this pricing scheme voluntary and providing a cost estimate, MPA is opposed.

2E. The legislature will need cost estimates and need to identify a funding source.

2F. The Legislature is already tasked with USB review. Title 69-8-402, MCA requires the ETIC to "review the universal system benefits programs, and, if necessary, submit recommendations regarding these programs." Public utilities, cooperative utilities, and other large customers are required to submit an annual summary report of universal system benefits programs to the ETIC for review.

2G. No position

2H. Providing incentives requires a cost estimate, further it needs a funding source. As stated previously, amending building codes to require solar ready residential and commercial will result in increased housing costs in a State that is already suffering from high housing costs.

2I. It is interesting to note that the renewable energy sector feels that Montana's tax structure puts higher property taxes on renewable infrastructure. Centrally assessed industrial property has the same issues. Since the Legislative Finance Committee is spending considerable time over the interim studying Montana's tax structure, MPA feels this recommendation is no longer necessary.

2J. No position.

2K. No position.

2L. What does developing standards for low emission vehicles actually do? Given Montana is one of the least populated states and auto manufacturers already support these standards, we are unsure of the value of working on Montana standards. Further, low emission vehicles already have an incentive by underpaying their fair share of costs for Montana's transportation system. This recommendation is not necessary.

2M. The MPA strongly disagrees that it is the responsibility of the State to develop any kind of a business enterprise. MPA has already stated its opposition to mandated building codes and forcing the private sector to take actions that in this case increase costs to all Montana rate payers. Any electric vehicle analysis should be done on a voluntary basis, preferably by those that would directly benefit financially.

Requiring the Montana Department of Transportation to build charging stations at highway rest areas is questionable. As noted, there may be a conflict building commercial enterprises within the rights of way on Federal highways. MT DOT would have to identify an internal source of signage funding taking funding away from other projects.

There are noticeable investments on charging infrastructure across Montana by the private sector today. Requiring the MDT to build electrical charging stations at the rest areas could be contrary to Article VIII, section 6 of the Montana Constitution by diverting much needed highway construction funds to provide a private fuel source to vehicles.

MPA supports working with Montana electric utilities to explore electric vehicle infrastructure and the recommendation that these vehicles should contribute to highway infrastructure. At this time, all highway infrastructure is, to a significant extent, funded by user fees and electric vehicles should pay their fair share. Any suggested vehicle tax structure should continue to have as low a cost of administration as possible.

2N. Cost estimates and a funding source should be attached to this recommendation.

#11a-02

2O Support

2P. Support

2Q. While highly contested among stakeholders, some argue that higher rates for other customers will occur in some areas due to widely varying costs, rates, and power supply and delivery methods. We too have concerns regarding power quality concerns.

2R. The existing RPS has already exceeded the statutory mandate. We do not see any need to raise the existing requirement. The markets should dictate source. MPA believes that all hydro power should be counted as renewable power before any further increase in the RPS standard is considered. Any State mandate for a particular fuel source should be avoided.

Section 3. Innovation

MPA agrees that innovation has been a key factor in the recent unprecedented economic success of our Country. Again, our principles of providing cost estimates for strategies, identifying funding sources, and making them voluntary is key.

3A. Agree

3B,3C,3D,3E. Each of these ideas sound fine on the surface, but they all need some additional thought on what costs the group believes each idea would require, and who would bear those costs. In closing, we compliment the Council for the time put in and the tremendous amount of civil discussion between the Council members, the civility is greatly appreciated. We must insist that careful thought be given to potential costs involved and a lack of serious thought regarding the fiscal impacts to Montana's state budget by many of the strategies proposed.

Best regards,

David A. Galt
Montana Petroleum Association

#11a-03

TREASURE STATE
RESOURCES ASSOCIATION
OF MONTANA

[redacted]
Helena, MT 59624
[redacted]
treasurestateresources.org
Email: info@treasurestateresources.org

April 24, 2020

Rebecca Harbage
Director's Office
Montana Climate Solutions Council
Montana Department of Environmental Quality
P.O. Box 200901, Helena, MT 59620-0901
Delivered Via Email to: ClimateCouncil@mt.gov

Dear Members of the Montana Climate Solutions Council:

Thank you for the opportunity to comment on the recommendations you have developed in accordance with Governor Bullock's Executive Order 8-2019. We appreciate the work of the many volunteer Council members and the various state agencies who have supported the Council's work.

The Treasure State Resources Association (TSRA) represents a broad coalition of business and industry, agriculture, members of organized labor, motorized recreation and over twenty other membership organizations. Our mission is to promote the Montana Way of Life through responsible resource development. While Montana's economy has been expanding in terms of key contributors, we believe it remains anchored in those "traditional" industries that have demonstrated their very essential nature in this most recent COVID-19 pandemic. Our resource economy will adapt to changes that naturally evolve on the landscape and within the marketplace. What it cannot accommodate are changes that are "thrust upon it" by agendas set in other states. It is through that lens that we approach the Council's recommendations.

General Comments:

At the outset, we express reservations with the use of the word "plan" as it relates to the Council's work product. The Council has offered up recommendations or potential strategies aimed at addressing changes in the climate, but it has not offered a plan.

Use of the word plan suggests we've identified the need, looked at both benefits and costs, made decisions about how to most efficiently allocate limited resources, and outlined steps to execute a series of actions. As we've followed the work of the Council and the various committees, there has been little to no work done on

evaluating costs of implementing recommendations, quantifying the effect on jobs, or estimating the impact on tax revenue. Ultimately there is a need to pay for more staff, any new fiscal incentives, and implementation of new regulatory requirements.

There is nothing wrong with looking ahead at what changes might be coming, and offering potential strategies to address those, but we strongly encourage the Council not to leave the public with the impression that it has built a plan for Montana and create expectations that may not or cannot be met. No recommendation or strategy should be adopted that would burden Montana taxpayers with unsustainable expenditures or economic impacts.

Section 1: Preparing Montanans for Climate Change

Generally the recommendations in this section make sense for purposes of creating competencies across different agencies and levels of government to inform decision making. Recommendations 1A – 1C are logical, but are difficult to embrace without having an idea of costs associated with the key strategies and who will pay. At the very least, recognizing resources are limited, the Council should set priorities for the various strategies offered.

With regard to 1C, Strategy 7 "Explore opportunities to integrate adaptation planning to reduce greenhouse gas emissions...." we suggest adding the following language:

Montana's access to energy markets, rural geography, transmission infrastructure, generation portfolios and peak loads should also be considered.

Under 1D, Strategy 3 "Implement active management across ownerships..." we recommend clarifying that any actions taken on private property would be with the agreement and cooperation of the landowner and not be mandated or otherwise result in consequences deemed detrimental to the exercise of their property rights.

Relative to 1E we appreciate the role outdoor recreation and tourism play in our economy and our way of life. However, it seems disingenuous to single out one sector when the livelihoods of many Montanans can be impacted by actions taken to reduce emissions or impose added restrictions for purposes of adapting to potential changes in the natural environment. Some of those lie in industries identified in the Governor's recent COVID-19 directive as essential and can not only be impacted by extreme weather, but lack of predictability in terms of energy costs and reliability.

As noted earlier, we support reinforcing the health and resiliency of our landscape in general as long as there are no mandates imposed on private landowners, or added regulatory requirements for those who responsibly utilize forest and range lands to support Montana's economy.

Because it could lead to confusion, the language in 1G, Strategy 8 "Encouraging use of this information (climate effects on fish, wildlife....) ....**in project environmental reviews" should be removed as it could result in conditions being imposed on projects without statutory authority or clear guidance**.

Section 2: Strategies to Reduce Greenhouse Gas Emissions

The introduction to this section speaks to the use of modeling to lay out various scenarios to reduce emissions. Modeling data presented to the Council to date is a matter of great concern. The modeling assumptions and possible scenarios laid out do not align with the reality of the situation in Montana, such as calling for all light-duty vehicles to be fully electrified by 2035. If modeling is going to be used to inform the decisions of policymakers – decisions that impact the lives and livelihoods of all Montanans – it must be realistic.

Section 1 points to the importance of energy efficiency in reducing costs and the impacts of energy production. We don't disagree with the value of improving weatherization of existing homes as well as taking energy efficiency into account in the construction of new homes and commercial buildings.

However, the Council's discussion of this topic to date is missing some very important voices. Recommendation 2A speaks to building codes as "the easiest and most cost-effective way to help consumers and businesses save energy and money, make housing and energy more affordable..." How do we adopt new codes without driving up home costs in areas where affordability is already an issue? What information is needed from contractors and homebuilders before moving this recommendation forward?

We are also concerned that representatives from moderate and low income Montanans have not weighed in on what effect recommendations and strategies in this Section may have on the cost of housing. Increased construction costs may be mitigated by reducing household energy needs, but any benefit could just as easily be lost to overall increases in the cost of energy resulting from new mandates or restrictions imposed on energy production. The COVID-19 pandemic has highlighted just how vulnerable many of our Montana citizens are to economic changes. A look at the costs vs. benefits for the end user has to be a part of the conversation.

We encourage the Council to remove Recommendation 2F: Request a Legislative Study on the Universal System Benefits Program Funding Mechanism for Electric Customers. Concerns with this program have already been brought to the appropriate legislative committee and could be pursued at that committee's discretion were changes deemed necessary.

With regard to other recommendations under this Section, TSRA opposes any new mandates targeted at forcing changes that put the reliability and capacity of the electric grid in question and do not reflect what is practical and achievable. Montana's utilities are already responsive to changes in the market place and public concerns. NorthWestern Energy is committed to reducing the carbon intensity of their electric portfolio's generation and long-term power purchase agreements by 90% by 2045. Statewide, on average, more than 75% of the power purchased by local electric co-ops is carbon-free and that number is growing. Mandates usually suggest a "one-size-fits-all " approach that works contrary to the ability of folks closest to the ground to make decisions that work for their communities and customers.

Dispatchable and affordable fossil fuels must remain in the picture. Efforts to write them off by focusing all our attention on renewables would be shortsighted. The inherent unpredictability of weather combined with the lack of reliable, long-term energy storage poses a risk to both residents and to our economy. Renewables are part of the energy mix and will likely grow in their role as technology allows. But technology also has the capability to keep fossil fuels in the mix as well and we strongly agree with Recommendation 2P: Advance Efforts to Develop and Deploy Carbon Capture and Storage Technologies. We need them as part of our energy picture to ensure load stability moving forward.

Just today, the U.S. Department of Energy announced $131 million for CCUS technologies. To quote Under Secretary of Energy Mark Menzies, "Carbon capture, utilization and storage technologies are key to addressing global emissions issues, particularly important in developing nations, by making carbon-intensive production and generation cleaner than we ever thought possible."

Section 3: Capturing Innovation Opportunities in Montana's Response to Climate Change and Addressing the Needs of Workers and Communities in Transitions

We support the focus of this section on identifying opportunities for Montana to maintain and grow job opportunities, particularly in industries that pay well and support local communities. However, many of the strategies/recommendations will require new funding sources that have yet to be identified, making it difficult to evaluate the effectiveness.

#11a-03

In closing, we'd like to thank the Council members for their work. Kept in perspective, there are many recommendations that make sense and will likely evolve based on market conditions and technology alone. The fallout from COVID-19 is yet to be realized, but clearly all energy sectors have been impacted, as have the lives of all Montanans. As a work product, the Council's recommendations can serve as a useful exercise in promoting collaboration and gathering ideas that may be taken up by both public and private entities as opportunities present themselves. But now is not the time to add new mandates or programs that would challenge state and local budgets and jeopardize the stability of our energy infrastructure. Thank you for this opportunity to comment.

Sincerely,

Peggy Trenk
Executive Director
Treasure State Resources Association

#11a-04

From: Makenna Sellers
To: Climate Council
Subject: [EXTERNAL] Climate Solutions Council Public Comments, Northern Plains
Date: Friday, April 24, 2020 12:54:09 PM
Attachments:

Hello Rebecca,

Northern Plains has provided comments on Montana's Draft Climate Solutions Plan. Attached you will find public comment from 52 individuals as well as organizational comments from Northern Plains Resource Council.

Thank you and have a lovely Friday,

Makenna Sellers | Legislative Organizer

Northern Plains Resource Council
[redacted] | Helena, MT 59601
[redacted]
www.northernplains.org [northernplains.org]

Pronouns: She/her

Northern Plains Resource Council is a grassroots conservation and family agriculture group. We organize Montana citizens to protect our water quality, family farms and ranches, and unique quality of life.

#11a-04

NORTHERN PLAINS
RESOURCE COUNCIL

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

Council members and Governor Bullock,

Northern Plains Resource Council appreciates the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. Northern Plains Resource Council is a grassroots, conservation and family agriculture group founded in 1972. Since our founding, Northern Plains sought common-ground with our neighbors and our local and government officials to create policy that protects clean air and clean water in Montana. This plan aligns with that mission. Northern Plains fully supports the creation of a climate plan for the state of Montana, as it will provide the roadmap necessary to find bi-partisan and broad stakeholder solutions to addressing Montana's role in combatting the effects of a changing climate. Northern Plains thanks the council for your commitment to reducing the state's greenhouse gas emissions in a collaborative manner, and hope such collaboration will continue on all sides.

Northern Plains would like to offer our support and our recommended changes to the plan in the areas that match the scope of our program work: alternative energy, soil health, local food access, and communities living near oil & gas development or environmental cleanup sites. We've organized our comments in accordance to the content and structure of this plan.

1. **<u>Preparing Montanans for Climate Impacts</u>**

- Northern Plains fully supports the strategy to develop and coordinate a network of Climate Extension Specialists in recommendation 1B. We would encourage more robust funding for the Montana Climate Office and a stronger link between Climate Extension Specialists and field testing. Additionally, it is incredibly important to include tribal members, farmers, ranchers, and landscape managers in the network of Climate Extension Specialists.
- In recommendation 1C, consider adding a bullet point that reads: *"Encourage municipalities to incorporate soil specialists to develop strategies improving soil health in urban environments."*
- In recommendation 1F, consider bifurcating this recommendation so that water conservation and storage related to Montana's private working landscapes remains in section 1 (adaptation and preparing for impacts), whereas soil carbon storage and tillage moves to section 2 (reducing greenhouse gas emissions). We implore the council to tread lightly with the concept of land as a carbon sink.

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- Under the key strategies of 1F, consider adding a new bullet that reads: *"Support conservation planning with NRCS to help farmers and ranchers develop long term plans with technical service providers for soil health adaption."*
- In recommendation 1F, be sure to include soil health specialist opportunities for city landscapes and city parks to be more climate resilient. The city of Boulder, CO offers a menu of resources on this subject.
- In the key strategies bullet points of 1F, consider adding flooding to the list of issues to address when targeting Farm Bill programs that would support private working lands.
- Under recommendation 1H, consider adding a new bullet point that reads: *"Integrate assessments of natural systems, including but not limited to soil water holding capacity, cover crops, forests, etc., into adaptive water management plans."*
- Under recommendation 1H, consider adding a new bullet for monitoring statewide water quality and quantity prior to and after oil and gas development.

2. Strategies to Reduce Greenhouse Gas Emissions

- Northern Plains strongly supports the recommendations listed in 2B, especially the adoption of a Demand Response Standard and an Energy Storage Standard for the state's IOUs.
- Under recommendation 2C, Northern Plains is opposed to the loan-based model of on-bill financing. We would like to emphasize tariffed on-bill financing included in this plan.
- We are pleased to support all the strategies listed in recommendation 2D. Mechanisms that separate profits from energy consumption appeal to our organizational goals of clean, efficient, and affordable energy for all.
- In recommendation 2G, consider adding a strategy that addressed incentives for solar development with irrigators and producers. Consider addressing the issue of aggregate net metering, an important step for rural properties with multiple building structures and therefore multiple meters under one user/household.
- In recommendation 2O, we would like to point out that a federal reporting program already exists for facilities that produce more than 25,000 metric tons of CO_2 to annually report their emissions. Montana has 31 facilities that qualify and are required to report their emissions within this program, ranging from Sidney Sugars to the Billings City landfill.
- The remainder of our comments on recommendation 2O address two of the specific key strategies that fall under the oil and gas sector.
    - We have concerns with the strategy that reads "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." In general, language like "consider," "promote," and "work toward" when applied to policy is difficult to interpret and puts the staff charged with fulfilling the requests in a challenging situation. This language should be replaced.

We recommend instead that Montana develop and adopt state-level protections that limit the flaring, venting, and leaking of air pollution from the oil and gas industry. Federal packages intending to address flaring and venting from oil and gas infrastructure has consistently been repealed, re-instated, held up in the courts, or administratively stalled. Other Western states like Colorado have been better served by state-level standards that offer greater regulatory certainty and put all operators working within the state on equal footing.

Specifically, we recommend:

1. Prohibiting venting except in cases of emergency, and defining what qualifies as an emergency
2. Limiting routine flaring to 60 MCF (instead of 100 MCF) per day
3. Limiting the number of successive exemptions a specific well can be granted to flare beyond the daily limit.
4. Requiring operators to submit a detailed gas capture plan as part of their Application for a Permit to Drill (APD)
5. Developing and requiring a leak detection and repair (LDAR) program for oil and gas infrastructure within the state that includes semi-annual inspections at well sites and compressor stations. It is important to note that many of the federal regulations that required LDAR have ***since been eliminated or weakened***. This includes the New Source Performance Standards (NSPS).
6. Requiring replacement of high-bleed pneumatic controllers with low-bleed or no-bleed controls.
7. Requiring payment of royalties to mineral owners on flared, vented, or leaked gas.
8. Requiring implementation of best practices to minimize emissions during removal of liquids

The Montana Climate Solutions Council should investigate in more detail the Bureau of Land Management and Environmental Protection Agency's final rules around oil and gas air pollution from 2016, which have largely been repealed. While some components may apply more to federal authority, a robust amount of work was done around best practices and recommendations to limit emissions in the oil and gas industry.

- In the key strategy concerning orphaned wells, the council is correct in asserting that funding is a key barrier to plugging orphaned wells. The Council should advocate for a regular line item or more substantial funding package for the Board of Oil & Gas's Damage Mitigation Account at the Montana Legislature.

#11a-04

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The other key barrier to minimizing orphaned wells, many of which emit methane, are Montana's bonding regulations. A single well can bond for $10,000 and multiple wells can bond for $50,000. Plugging one well alone can cost upwards of $100,000 and far more, depending on what's needed. Low bond requirements invite operators without the appropriate cash flow or financial backing to do business in our state, and ultimately create the situation we currently face – thousands of orphaned wells across Montana, and a staff and board ill-equipped to plug them in a timely manner. We recommend the state initiates a comprehensive review of well bonding and a revision to bonding requirements through rule.

- Northern Plains strongly opposes any state money dedicated to the advancement of Carbon Capture and Storage Technologies (CCS) listed in recommendation 2P. Carbon Capture and Sequestration facilities have not proven to be a viable technology to significantly reduce greenhouse gas emissions or make coal economically competitive in the future. There is no evidence that CCS facilities are economically viable, even with the federal 45Q tax credits. While private investors can certainly continue to fund research efforts, CCS facilities should not receive public funding. Major utilities like PacifiCorps do not consider CCS a viable option before 2025. PacifiCorps lists their analysis in further detail within their most recently released IRP.[1] Factors contributing to this position include capital cost risk uncertainty, the availability of commercial sequestration (non-EOR) sites, uncertainty regarding long term liabilities for underground sequestration, and the availability of federal funding to support such projects. Moreover, there is scant evidence that CCS technology is viable at scale, making big public investments in CCS facilities extremely risky. There are many more failed CCS projects than successful projects. For example, the Kemper Plant in Mississippi went $4 billion over budget and never came online; it eventually topped $7 billion to construct and the Mississippi DOJ launched an investigation into the fact that this was one of the most expensive options to provide electricity to Mississippi ratepayers.[2]

- In recommendation 2Q, we kindly request that council identify what a new generation cap to replace the 50kW cap for distributed energy systems might be. Given the technology advancements and current cost of solar generation, Northern Plains supports a 250 kW cap. Such a number is appropriate for site agricultural users and large commercial/industrial users, both which can require far more than a 50 kW generating system to meet their needs.

In closing our comments for section 1 and section 2, the missing strategies that Northern Plains identifies relate to sourcing, promoting, and funding local food systems. Today, food travels between 1,500 and 2,500 miles from the farm to the consumer's table. Along with soil health and improved land management practices, building robust local food systems through increased

[1] PacifiCorps (2019, Oct 18). 2019 Integrated resource plan. Vol 1, p. 158. Retrieved from: https://www.pacificorp.com/content/dam/pcorp/documents/en/pacificorp/energy/integrated-resource-plan/2019_IRP_Volume_I.pdf
[2] https://arstechnica.com/tech-policy/2019/05/department-of-justice-opens-investigation-into-failed-carbon-capture-plant/

#11a-04

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RESOURCE COUNCIL

funding and support from the state can result in a large impact on climate change. Sustainably and locally-sourced foods reduce the carbon impact of food traveling thousands of miles to reach Montana. Choosing local food first is good for our health, our climate, and our communities.

3. **Capturing Innovations Opportunities in Montana's Response to Climate Change and Addressing the Needs of Workers and Communities in Transitions.**

- Northern Plains recommends rewriting 3D to read: "Balance support for existing industries in Montana that are responsive to the climate crisis with state efforts to recruit new industries that are equally responsive to the climate crisis, all while protecting and providing well-paid and just employment opportunities for workers."
- We also recommend editing the agriculture key strategy under recommendation 3D to read: "Agriculture—including efforts to increase water holding capacity of soil, species diversity, and productivity, secure financial incentives for regenerative practitioners, and others."

This draft plan represents an extensive amount of work completed by the Climate Solutions Council, and again we would like to thank the council for your efforts. One broad thing we noticed in reading this draft plan was the repetitive use of the word "resilience" without any definition or indication of scope. Northern Plains would support the council defining what building resilience might encompass in the final version of this plan.

Thank you for your consideration of our comments, and for creating such a promising plan for climate solutions in Montana.

Sincerely,

Jeanie Alderson, Chairperson Northern Plains Resource Council

[redacted]

Billings, MT 59101

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/31/2020

Dear Governor Bullock and members of the Climate Solutions Council:

Thank you for creating and serving on Montana Climate Solutions Council. I believe the Council is crucial to the future viability and well-being of our state.

Although some may think climate issues should be pushed to the back burner at this point in time, just the opposite is true. I have long believed that everything (including humans) are connected. It has been postulated by some scientists that the coronavirus has spread faster and further and is more contagious in part due to a warming climate. If this is even partly the case, it means future viruses could be even more dangerous and deadly worldwide. And it is certain, that those who contract the virus are more at risk for severe or deadly outcomes due to dirty and polluted air from our use of fossil fuels.

Therefore, I fully support the Council's recommendations to reduce greenhouse gas emissions in Montana. Absolutely, it is the time for innovative and creative problem solving, although having said that, there are technologies that are already in use that have proven to provide much of the energy we need at an affordable cost. We just have to put them into use on a wide scale.

There are also technologies waiting in the wings that with some attention and fine tuning will support cost-effective and reliable renewable energy, such as energy storage.

I would also like to see a recommendation added that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry. This is simply a no brainer and would have tremendous beneficial outcomes for the climate, the planet, and for Montanans' health.

And I would like to see a statewide effort to focus Montanans on the many, many benefits of eating locally grown and produced food. Not only would moving in this direction save energy, it would be an important economic boost to our state.

Thank you, and please include my comments in the official record.

Adela Awner

Sincerely,

Adela Awner
[redacted]
Billings, Montana 59102

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/13/2020

Council members and Governor,

Thanks for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I strongly support a comprehensive climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Lee Bartlett
[redacted]
Helena, Montana 59601

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/25/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Bruce Bender
[redacted]
Missoula, Montana 59801-5725

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/28/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Susann Beug
[redacted]
Red Lodge, Montana 59068

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/3/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Recommend enhancing our transportation system with interurban passenger rail lines, and promoting the creation of charging facilities for electric vehicles statewide.

Sincerely,

Daniel Biehl
[redacted]
GREAT FALLS, Montana 59405

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/26/2020

Council members and Governor,

As a member of Bozeman Citizens Climate Lobby, and a person deeply concerned about climate change, I want to thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Norman Bishop
[redacted]
Bozeman, Montana 59715

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/28/2020

Dear Council Members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan.

I am extremely happy to see this coming together and strongly support broad based action to respond to climate change and meet the needs of Montana communities. This is an excellent start and I commend the council for its hard work!

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

* Increase funding for building robust local food systems. Food that travels between 1,500 and 2,500 miles to reach our plates has an immense carbon impact. Montana agriculture, including small growers and processors, can partner will these efforts and build local food security to counter risks from climate change.

* Assist efforts to close open/abandoned gas and oil wells and eliminate bad practices like flaring, venting, and leaking of methane and other greenhouse gases (GHG).

* Eliminate public funding for Carbon Capture Sequestration (CCS) and invest in technologies that actually work. CCS facilities have not proven to be a viable technology and should not be publicly funded.

* Recommend increased grant and technical support to help local governments integrate climate goals into land use development and transportation planning and implement these initiatives (as well as emergency services).

* Recommend regional transportation boards to link state and local transportation planning to develop plans for reducing vehicle miles traveled.

* Recommend solid waste efficiency and wastewater efficiency projects. Less waste and more efficient treatment systems is another place to save GHG.

* Encourage all sectors to set interim goals and reassess every 3-5 years to address changing conditions and priorities as well as new and emerging technologies and improved data on what works.

#11a-04

Thank you again for all your efforts. Overall I am very happy with the draft as a whole and look forward to doing what I can to assist in assist these efforts and providing our kids with hope for a stable and vibrant future.

Sincerely,

Susann Bradford, MS, EDD
JD candidate 2021

Sincerely,

Susann Bradford
[redacted]
Missoula, Montana 59802

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/23/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. It would also help create more jobs.

· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

- Create a program to train Montana citizens in all aspects of business and home energy conservation and use of renewable energy. Graduates of a program could then be employed to help implement/utilize many aspects of Montana's Climate Solutions Plan by helping business and home owners who want to reduce their energy bills and carbon footprint. My personal experience in Missoula was that when we went to add solar, an energy efficient central heating and cooling system, insulation, radon mititgation, and water and electric conservation none of the contractors could/would help or advise us with the overall energy picture of our house. Thus we spent too much money with sub-optimal results.

- Support/endorse a national effort to reduce/eliminate fossil fuel CO2 emissions. Without a national plan we (US citizens) will not do enough on an individual basis to alter global warming. As we have seen with the COVID19 pandemic it takes federal and state leadership to address such a large problem. I believe (and many scientists and economists agree) the best method to convert the US to renewable/clean energy is through a carbon fee and dividend. The fee, which increases yearly, would be collected on all fossil fuels produced in the US or imported. The fee would be returned to all US

citizens thus encouraging them to use less fossil fuels and to use more renewable energy. Such a program would work hand in hand with the Montana Climate Solutions Plan.

Thank you again for the opportunity to comment on this most important plan. My kids and grandkids thank you too.

Paul Buck

Sincerely,

Paul Buck
[redacted]
Missoula, Montana 59803

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/20/2020

Council members and Governor,

Thanks for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in support of a climate plan for the state of Montana but I feel that we can do even more.

Establishing an energy storage standard and advancing energy efficiency tools are a must. Montana must shift away from traditional fossil fuel generation of electricity and invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To improve the plan, please add or revise the following components:

· Develop and implement regulations that significantly limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

Sincerely,

Tom Carlson
[redacted]
Missoula, Montana 59802

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/26/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Nancy Carrel
[redacted]
Birney, Montana 59012

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/23/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

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· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Patrick Certain
[redacted]
Billings, Montana 59102

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/26/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

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Sincerely,

Dan Cohn
[redacted]
Billings, Montana 59101

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/20/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

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· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Gregory Esteve
[redacted]
Lake Wales, Florida 33898

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/25/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

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· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Jack Exley
[redacted]
Red Lodge, Montana 59068-0954

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/23/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

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· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Marylis Filipovich
[redacted]
Helena, Montana 59601

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/25/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.
I especially want to see more renewable energy and storage, on community and home and business scales. Always, efficiency and conservation, in energy systems and also transportation, housing development, infill.
Good statewide broadband even in rural areas, could reduce travel! So what if it has to be subsidized? Roads and air travel are subsidized!

Sincerely,

Mary Fitzpatrick
[redacted]
Billings, Montana 59101

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/26/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions. Instead pursue carbon capture in the soil by promoting more reclamation at coal mines. The reestablishment of grasses on the mined land will help capture carbon in the plants and in the soil.

Sincerely,
Mark Fix

Sincerely,

Mark Fix
[redacted]
Miles City, Montana 59301

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/27/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana.

Congratulations on the work you have done to be proactive regarding climate change. The COVID-19 pandemic makes climate solutions even more essential!

Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change. I hope for a year round Farmers Market.

· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

•I support a carbon fee and dividend plan.

Sincerely,

Marya Grathwohl
[redacted]

#11a-04

Billings, Montana 59101

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/28/2020

Dear Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. It looks to be a comprehensive, thoughtful document, and I am in full support of a climate plan for the state of Montana. We need to work together to build healthy and prosperous communities for current and future generations, and the plan provides focus and accountability to achieve that end.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools such as current energy efficiency building codes, on-bill financing or other funding mechanisms like PACE, and decoupling. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Add a professional to the Building Codes Council with a background in energy modeling and building science.

- Build robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

- MDT fundamentally needs a new understanding of its mission--it is currently far too invested in perpetuating single-occupant vehicular traffic patterns. In addition to determining the design of highways between communities, MDT also determines how many of the major streets in our communities are developed, and they typically create conditions that are not conducive to a variety of modes of transit that have lower greenhouse gas emissions.

· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

- Distributed generation: we need a study of the costs and benefits that is not funded by NorthWestern Energy or other entities with a conflict of interest. They used a non-transparent, and the results from their study were conveniently self-serving and were fundamentally different from studies in other states that were commissioned by their public service commissions.

#11a-04

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Ed Gulick
[redacted]
Billings, Montana 59101

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/25/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Randy Hafer
[redacted]
Billings, Montana 59101

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/25/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

James Halfpenny
[redacted]
Gardiner, Montana 59030

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/20/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Helgaleena Healingline
[redacted]
Madison, Wisconsin 53716

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/26/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I suggest that we explore more green energy solutions such as solar and wind energy plus support new storage techniques and facilities like water reserviors.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

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· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Alan Hilden
[redacted]
Billings, Montana 59105

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/25/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

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· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Paul Kent
[redacted]
Helena, Montana 59604

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/25/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

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Sincerely,

Jon Kesler
[redacted]
Clancy, Montana 59634

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/23/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

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Sincerely,

Katherine Kolwicz
[redacted]
Missoula, Montana 59802

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/5/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

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Sincerely,

Jeffrey Kreidler
[redacted]
Billings, Montana 59101

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/25/2020

Council members and Governor,

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Sincerely,

Steven McArthur
[redacted]
Missoula, Montana 59804

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/26/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in support of a climate plan for the state of Montana.

I recommend that revision take into consideration the value of adding and protecting federal Wilderness on national public lands and similar preservation of state wildlands as important solutions that should be part of the plan.

Wilderness is a climate solution! Wilderness protects biodiversity by providing habitat for public wildlife and flora. Wilderness protects watersheds for people as well as the rest of nature. Wilderness stores carbon. Wilderness is part of our historical and cultural heritage. Wilderness provides alternative to mechanized recreation and to road-accessible recreation. Wilderness is an idea, an ideal, a value appreciated by even those unable to visit. Furthermore, Wilderness in no way diminishes the multiple uses of the vast other public lands in the region.

We have a Wilderness deficit in Montana, and the nation. As ecologist George Wuerthner explained, only 3.4 million acres out of the state's nearly 94 million acres are congressionally designated Wilderness. See Wuerthner's article "Montana's Wilderness Deficit," Missoulian, September 11, 2019, https://missoulian.com/opinion/columnists/montana-s-wilderness-deficit/article_d0218248-3eed-5ddb-a935-81a44532b4f5.html/.
Montana's wilderness deficit/.

Furthermore, the draft plan places too much emphasis on fighting fires. That is contrary to science. Consider the Sierra Club's policy, which could be adapted to state wildlands: "In areas included in or proposed for the National Wilderness Preservation System, fires should be managed primarily by the forces of nature. Minimal exceptions to this provision may occur where these areas contain ecosystems altered by previous fire suppression, or where they are too small or too close to human habitation to permit the ideal of natural fire regimes. Limited planned ignitions should be a management option only in those areas where there are dangerous fuel accumulations, with a resultant threat of catastrophic fires, or where they are needed to restore the natural ecosystem."

Sincerely,

Anne Millbrooke
[redacted]
Bozeman, Montana 59715

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/1/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

- Building robust local food systems also depends on our pollinators. Support legislation to ban the use and sale of neonicotinoid insecticides.

· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Catherine Nolan
[redacted]
Missoula, Montana 59803

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/26/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

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· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Mike O'Connell
[redacted]
Bozeman, Montana 59771

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/19/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Dustin Ogdin
[redacted]
Billings, Montana 59101

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/26/2020

Climate Change Council:

I have reviewed the draft Montana Climate Solutions Plan and was impressed to find many good recommendations as to how our carbon footprint can be diminished and climate change slowed. However, our insistence upon the use of private automobiles for nearly all of our transportation needs is a major contributor to the threat of climate change. The Plan discusses the possibilities of electric vehicles, ride sharing, and even the promotion of bicycle transportation to decrease the amount of fossil fuels burned. To my disappointment, I could find no discussion of the potential of mass transit for both local and intra-state travel. Buses, trains, and shuttles could remediate greatly, our carbon footprint. By combining the ever improving electric propulsion systems with the mass transit concept, even greater gains are possible.

Montana is in a unique position with its existing rail system which serves both the high-line of Montana as well as the more populated southern half, which is often referred to as the Hiawatha Route. These two routes merge near Williston, North Dakota and at Sandpoint, Idaho to form a continuous rail transportation loop around the state. Amtrak now serves the high-line with one passenger train per day, which is used extensively by locals for medically related travel, shopping trips, and family contact. The southern Hiawatha route is used only for freight.

Convenient, comfortable, and affordable passenger rail service around this entire loop, with connecting bus or shuttle service to population and business centers would entice countless businessmen and women, university students, families, and tourists to park their cars and hoop the train.

Smaller self-propelled commuter style passenger coaches would be ideal for this use. They are available with electric propulsion, but even if Montana relied on more conventional diesel-electric locomotives, there would be a very significant reduction in the burning of fossil fuels. On the east coast CSX freight trains claim that they can move 1 ton of material 500 miles on 1 gallon of diesel fuel. EPA claims that for every ton-mile, a truck emits about 3 times more nitrogen oxide and particulates than a locomotive does.

The greatest obstacle to mass transit systems in America is attitude. At the same time, it is hard to deny that a well used mass transit system across the State of Montana would greatly reduce pollution from internal combustion engines. The Montana Climate Solutions Plan would be remiss to ignore the opportunity to address mass transit systems including trains, buses, and shuttles.

Sincerely,

Paul Pacini
[redacted]
Helena, Montana 59601-5788

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/23/2020

Council members and Governor,

Montana needs a climate plan, as our state stands to be significantly affected by climate change -- and not for the good.

I support establishing an energy storage standard and advancing energy efficiency tools. Energy efficiency is extremely cost-effective.

To make the plan stronger, please consider the following:

- State support for local food systems would improve both the adaptation and pollution reduction sections of this plan. Supporting local food infrastructure will reduce the carbon impact of food traveling thousands of miles to reach Montana plates, and will benefit local economies statewide.

· Enforced limits on the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Walk away from proposals for Carbon Capture and Sequestration. Despite significant public investment, CCS has not proven to be a viable technology to reduce greenhouse gas pollution nor to make coal economically competitive. CCS is merely a distraction and should not receive public funding.

I appreciate the opportunity to comment on the Montana Climate Solutions Plan. Thank you for your work.

Sincerely,

Steve Paulson
[redacted]
Billings, Montana 59101

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/26/2020

Climate Change Council and Governor:

I have reviewed the draft Montana Climate Solutions Plan and was impressed to find many good recommendations as to how our carbon footprint can be diminished and climate change slowed. However, our insistence upon the use of private automobiles for nearly all of our transportation needs is a major contributor to the threat of climate change. The Plan discusses the possibilities of electric vehicles, ride sharing, and even the promotion of bicycle transportation to decrease the amount of fossil fuels burned. To my disappointment, I could find no discussion of the potential of mass transit for both local and intra-state travel. Buses, trains, and shuttles could remediate greatly, our carbon footprint. By combining the ever improving electric propulsion systems with the mass transit concept, even greater gains are possible.

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The greatest obstacle to mass transit systems in America is attitude. At the same time, it is hard to deny that a well used mass transit system across the State of Montana would greatly reduce pollution from internal combustion engines. The Montana Climate Solutions Plan would be remiss to ignore the opportunity to address mass transit systems including trains, buses, and shuttles.

Very Sincerely,

Becky Piske

Sincerely,

Becky Piske
[redacted]
Helena, Montana 59601-5788

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/24/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

I strongly support establishing an energy storage standard and advancing energy efficiency tools. Montana must invest in all cost-effective energy efficiency in order to meet carbon reduction goals at the lowest cost.

To make the plan stronger, please consider the following:

- Building robust local food systems through increased funding and support from the state would improve the adaptation and emissions reductions sections of this plan. Today, food travels between 1,500 and 2,500 miles to reach our plates. Supporting local food infrastructure can reduce the carbon impact of food traveling thousands of miles to reach Montana plates and build local food security amidst risks of systems disruption from climate change.

· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Doug Rand
[redacted]
Gallatin Gateway, MT, Montana 59730-9693

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/26/2020

Council members and Governor,

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· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry. This gas should be captured and used as a source of energy, if We are going to
vent this gas, do not waste the gas.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.
*End the ongoing program to control the weather via cirrus cloud enhancement and aerial dissemination of nano-particulates in the upper atmosphere. Eventually these fine metal oxides fall back to earth and create health hazards to humans and animals breathing the air and act as accelerants to fire as the fine particulate coats our land and vegetation.

Sincerely,

Douglas Rhodes
[redacted]

#11a-04

Whitefish, Montana 59937

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/25/2020

Council members and Governor,

We are commenting on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. John and I are in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

We commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

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Sincerely,

Gail Richardson
[redacted]
Bozeman, Montana 59715

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/1/2020

Council members and Governor,

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Sincerely,

Millie Robinson
[redacted]
Glendive, Montana 59330

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/3/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

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· Recommend that Montana limit the flaring, venting, and leaking of methane and other greenhouse gases from the oil and gas industry.

· Remove Carbon Capture Sequestration suggestions. Despite significant public investment, CCS facilities have not proven to be a viable technology to reduce greenhouse gas emissions nor make coal economically competitive. CCS facilities should not continue to receive public funding, and Montana should focus on more promising climate solutions.

Sincerely,

Rita Rozier
[redacted]
Livingston, Montana 59047

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/2/2020

Council members and Governor,

Thank you for the opportunity to comment on the Preliminary Recommendations and Key Questions of the Montana Climate Solutions Plan. I am in full support of a climate plan for the state of Montana. Together we can build healthy and prosperous communities not only for now, but for future generations.

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Sincerely,

Eric Saalborn
[redacted]
Belgrade, Montana 59714

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/23/2020

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I may not live in Montana, but I live on the same planet...

Sincerely,

Douglas Sedon
[redacted]
Jefferson, Maryland 21755

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/31/2020

Council members and Governor,

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Sincerely,

Makenna Sellers
[redacted]
Helena, Montana 59601

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/28/2020

Council members and Governor,

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Sincerely,

Heather Sheffield
[redacted]
Livingston, Montana 59047

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/23/2020

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Sincerely,

Wade Sikorski
[redacted]
Baker, Montana 59313-9631

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/25/2020

Dear Governor and Council members,

Last year I purchased a photovoltaic system for my home.

Yes, I am in total support of a climate plan for the state of Montana.

I commend this council for their dedication to mitigating and reducing Montana's greenhouse gas emissions through collaborative solutions, while encouraging innovation and creative problem-solving for adaptation.

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Thank you and best to us all.
Sincerely,
Rhett Smith

Sincerely,

Rhett Smith
[redacted]
RED LODGE, Montana 59068

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/23/2020

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Sincerely,

Hannah Specht
[redacted]
Missoula, Montana 59802

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/23/2020

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Sincerely,

Karen Stevenson
[redacted]
Miles City, Montana 59301

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/25/2020

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Sincerely,

Don Thompson
[redacted]
Cambridge, Massachusetts 2139

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

4/23/2020

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Sincerely,

Rachel Torres
[redacted]
Glendive, Montana 59330

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/25/2020

Council members and Governor,

I am in full support of a climate plan for the state of Montana!

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- Recommend that Montana support green transportation for citizens. Due to Montana's geographic size, we travel further for single trips than most other states in the nation. Providing support for electric transportation infrastructure will help reduce carbon emissions for these trips.

- Recommend that Montana support renewable energy creation. Solar panels, pumped hydro storage, hydropower, geothermal, and will all play an important role in our sustainable future.

Sincerely,

David Wahlstrom
[redacted]
White Sulphur Springs, Montana 59645

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/26/2020

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Sincerely,

Sayer Wickham
[redacted]
Bozeman, Montana 59715

#11a-04

Montana DEQ
c/o Rebecca Harbage/Director's Office
P.O. Box 200901
Helena, MT 59620-0901

3/25/2020

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Sincerely,

Susan Xanthopoulos
[redacted]
Dillon, Montana 59725

#11a-05

From: Kevin & Carol Jump
To: Climate Council
Subject: [EXTERNAL] Comments on climate actions
Date: Tuesday, March 31, 2020 4:44:32 PM
Attachments:

Dear members,

Thank you for taking the time to consider what is one of the most important issues facing the state of Montana and every person within whether they know it or not. We have but only a relatively short amount of time to substantially effect our energy needs from fossil fuels to more renewable based.

I am a forth generation Montanan, that have roots going back to the early homesteaders of the Grass Range country. We've been involved in Farming, Ranching, and the Timber industry since that time. My personal background has been in the Timber industry since I was a kid some sixty years ago. So I have a lifetime of experience of living and working in the woods. With that said, I've seen the good times and the bad times of our state's Timber Industry that was and is an extremely important part of our state economy, that is poised to be of great importance to adapt our economy and forest health to prepare for possible climate changes (that so many waste valuable time and money pointing fingers at what is unconfirmed causes).

With our governor proclaiming that Montana has over five million acres of high risk forests vulnerable to catastrophic wildfire that needs treatment, it is past time to focus on forest health as the most practical, economical and easiest way to reduce our carbon footprint. I urge you to consider these benefits in the goal to achieve once healthy forests.

*** Rural employment and economic development**
1. High paying jobs
2. Infrastructure investment

*** Forest and watershed improvement**
1. Clean water
2. Clean air
3. Habitat improvement
4. More quality recreational opportunities

*** Energy diversity and security**
1. Firm, renewable electricity
2. Renewable, drop in Biofuels

These benefits and more can be achieved by putting Biomass thermal energy on a level playing field with wind and solar.

By prioritizing Biomass thermal energy, it would give incentive to private business to build facilities to utilize Biomass (Forest, Agriculture residuals and landfill wood wastes) that are currently being burned or land filled, thus creating further air quality problems and reducing landfill capacity.

Also with this technology, it creates a by product of Biochar that has many uses best of all can be utilized as soil amendment for Ag with major water and nutrient retention thus rehabilitating thousands of acres of once unproductive land and also enhancing quality and quantity of crops on other land. And with its ability not to degrade, becoming a carbon sink retaining carbon in the soil for over a thousand years.

Unfortunately, the cost to bring our forests back to health has been on the shoulders of us tax payers, which results in the inability to treat many acres, creating a domino effect of millions of acres burned at the cost to the state. With the focus on the above mentioned info there is a true monetized value in achieving these benefits. There is multiple reports commissioned by USDA that took years to put together that does just that. I ask that that you review this info to understand that the accrued offsets from these benefits will be monumental in acreage treated in our forests.

I am not aware at the moment of current studies. But I have attached two older studies that are very easy to plug into conditions and forest types in Montana.

I agree with the comments made by Dave Atkins (see attached) and ask that you heavily weigh his comments.

I thank you for your time and consideration in helping the state address these important tasks. Should you have any questions or need any further information, please feel free to contact me.

Sincerely,

Kevin Jump, Owner/President
John Jump Trucking, Inc.
Phone: 406-249-1000

"Serving the timber industry since 1957."

DEQ Edit: References

Morris, G. 1999. The Value of the Benefits of U.S. Biomass Power. National Renewable Energy Lab. Golden, CO.

Nechodom, M., 2009. Biomass to energy: forest management for wildfire reduction, energy production, and other benefits. US Department of Agriculture, Forest Service, Pacific Southwest Research Station for California Energy Commission, Public Interest Energy Reserach (PIER) Program. CEC-500-2009-080, Albany, CA, pp.1-141.

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.~~MT DNRC will develop template codes and construction material and methods guidelines for cities and counties to consider adopting for development in the wildland urban interface and floodplain zones. Including sample landscaping guidelines and codes.
- 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.
- Prescribed burning across the landscape and in and around buildings is an essential tool for reducing wildfire risk. State law regarding liability needs to be changed in Montana to encourage landowners to do more of it. The governor will establish a task force from DRNC and the EQC to look at other states laws and develop proposed legislation to address this issue.
- 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, capture carbon and reduce energy consumption. The governors office will work with the EQC to evaluate the economic benefits of state investments to achieve this and draft legislation.

Commented [O1]: It is important in these documents to make clear that most of Montana urban areas are in the WUI. And these construction methods need to apply in most places. Paradise, Santa Rosa, CA Ft. MacMurray in Canada, Wenatchee, WA, Santa Barbara, CA have all demonstrated this is not just an issue on the fringe of town.

Commented [O2]: Statewide templates will help with consistency between cities and counties.Itwill save the local authorities time in researching these topics.

Commented [O3]: There are three levels of liability: Strict Liability, Negligence and Gross negligence. Montana applies a strict liability approach to planned burning which provides a significant barrier to using this vital tool. If we are going to have a resilient landscape and an adaptable built environment this needs to change. Numerous other states have laws reflecting this important difference. The governor should establish a task force to assess other states and develop proposed legislation in conjunction with the legislature's EQC.

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

#11a-05

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.
- Poor air quality from smoke in the summer from wildfires is a significant threat to every aspect of this topic. Harvesting trees and other mechanical treatments combined with planned burns can significantly reduce the amount of smoke produce from a wildfire.
- 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.

Commented [O4]: Who is responsible for doing this? If you don't identify which agency is responsible then it won't get done.

Commented [O5]: This is an item that has strong linkages to section 2 on GHG emission reductions. Proactive fuel reduction that includes harvest can help store carbon in long-lived products and can reduce the need for fossil carbon emissions for energy production. This is a strong synergy related to principle #5

#11a-05

- 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 AND PUBLIC 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 agriculture 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.
- Within one year MT Department of Ag and Extension will work with the USDA Agricultural Research Station, NRCS soil survey experts and MT University experts to identify which crop soils can benefit the most from additions of nutrient loaded biochar. This practice will help reduce the need for chemical fertilizers and increase water holding capacity which will buffer the farmers in drought conditions and increase production in normal or better moisture years, all while sequestering carbon for centuries.
- MT Department of Ag and Climate Office ~~P~~partner with USDA resources like the Climate Hubs, NRCS, USFS State and Private Forestry and Rural Development to ~~explore~~ accelerate adoption of farm-scale and regional on farm conservation and energy planning strategies. ~~and a~~Align state and federal funding programs to support producer-identified implementation priorities.
- ~~Explore opportunities~~MT DNRC, Dept of Ag partner with their counterpart USDA agencies, companies like Blue Forest Conservation and ngo's to establish pilot demonstration projects 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~~in the next two years. 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.
- Some MT forests are too dense with trees and need trees to be removed with fire or harvest or a combination of both. Some forests are understocked and could store more carbon if trees were planted and some forests are rapidly growing but are nearing an economic maturity. All these forests could benefit from a carbon storage payment system that can be part of a carbon fee and dividend policy. Management guidelines for additional carbon storage and resilience to fire, insects and disease needs to be published and shared with landowners/managers so that carbon pricing can be managed in a way that creates synergies between climate resilience, wood production and carbon capture and storage. A partnership between MT DNRC and Extension, UM College of Forestry, USFS Rocky Mountain Research scientists should be established to develop these guidelines in the next 12-18 months.

Commented [O6]: If we don't include public lands we will miss a huge opportunity for both adaptation and mitigation by using the trees that need to be removed to increase resilience.

Commented [O7]: We need more widespread adoption of these practices not just research. Research is important to help document carbon gains so that farmers, ranchers and forest landowners can get paid for additional carbon capture and storage. I think two different bullets separating the research and the straight-up adoption. We can use the existing state and federal extension programs to speed up adoption.

Commented [O8]: Existing research demonstrates the efficacy of this technique it needs to be expanded and the research extrapolated to the soil survey data across the state. This should also connect with the ability of landowners to get paid for carbon sequestration on their lands. It is a great synergistic effort benefiting adaptation and mitigation goals using innovative science and technology.

Commented [O9]: Having a price on fossil carbon and a rebate mechanism for CCS would move this quickly!

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- Target Farm Bill programs to private working lands that support drought, watershed and wildfire resilience needs.
- Develop a partnership between MT Department of Commerce, DNRC, USFS, Rural Development and private investors and philanthropy funds to ~~E~~expand operator and manufacturing capacity and diversification of uses of long and short-lived wood products (*see Chapter 3 for additional wood products innovation discussion*).
    - Wood fiber insulation
    - Engineered wood products that can replace carbon intensive steel, concrete and other materials for bridges, buildings etc;
    - Bio-refineries that can make jet fuel, biodiesel, clothing, adhesives, medications
    - Combined and heat and power systems at smaller scale than traditional utility dedicated power plants. Phoenix Energy as an example designs and installs downdraft gasification plants that can run generators and the heat is used for space or water heating in buildings or manufacturing processes. These distributed systems an reduce the need for as many new transmission lines and makes it easy to efficiently use the heat that most power plants waste.

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

Key Strategies:

- Continue to use the Cohesive Stategy partnerships between state, local and federal agencies to (Helena 360 project and Wildfire Adapted Missoula are good examples) address wildland fire risks through coordinating interagency planning and response, supporting wildfire-adapted communities, and building resilient landscapes through ~~active~~ planned broadcast or cutting and piling then burning or harvesting or combining these tools ~~forest management~~ to improve safety and protect communities across ownership boundaries. This will include managing wildfires when appropriate to accomplish these goals.
- Use ~~forest~~ planned ~~management~~ fire and harvesting to create or maintain forest 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~~absorb CO2 serving as natural carbon capture and storage systems ~~sinks~~.

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Commented [O10]: The Northwest pathways report mistakenly thinks all the biomass will go to biofuels production. I believe this is an error for several reasons: first it based its biomass estimates on the Billion Ton Study which assumed no biomass would come from forest lands 40% slopes or steeper because cable yarding equipment is not available, which is untrue for western Montana. It also doesn't take into account new tethered logging systems for steep slope using forwarder systems tied or tethered by a cable allowing them to safely operate on steep slopes; second it doesn't discuss the issues of biomass transport to central jet fuel processing plants; third we are currently burning in slash piles hundreds of thousands of tons of biomass that can rapidly used for heat and CHP applications. In addition the development of gasification chp's would be a precursor to jet fuel production. By gasifying the wood the gas could be piped to a central processing plant for production of jet fuel which would solve the transportation issue. CHP can serve as the intermediate use of biomass until the development of jet fuel manufacturing comes on line. Lastly electrical utilities need firm peaking power production especially in the winter. Combined heat and power production is very efficient and the need to heat in the winter matches the need for peak power in the winter. Biomass CHP can fill some of the peaking demand production in a fossil carbon free manner.

Commented [O11]: "active forest management" is to jargon/euphaism. We need to say what we mean – we are going to cut trees down and use them or we are going to burn them up periodically.

Commented [O12]: I think using the CCS phrase consistently will make it more understandable to the average reader.

- Maintain a diverse rangeland ecosystem that supports agriculture, recreation, wildlife and pollinators across all ownerships through coordination, flexible tools and conservation incentives.
- ~~Promote~~ Reward 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.
- Provide extension support for the adoption of agroforestry practices and permaculture that can support food production, carbon storage and improve water quality.
- 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~~cross boundary landscape scale prescribed burns and harvests to increase resilience to wildfire and insects and disease so that forests can continue to store carbon after the disturbances, provide desired watershed function and wildlife habitat which are essential to the Montana economy and way of life. Only by dramatically increasing the scale and pace of such treatments can we alter the extent and severity of these disturbances.
- 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~~ Enhancing wetland and stream function through restoring and protecting river ~~and stream~~ corridors, floodplains and wetlands to protect water quality and quantity as snowpack declines is essential. ~~and supporting related education efforts~~. Montana

Commented [O13]: The best way to "promote" this is to pay farmers for storing carbon in their soil. We need to support a carbon fee policy that provides rebates to CCS whether it is technological or natural storage or a combination of the two. Promote is too soft and vague

Commented [O14]: Silvopasture, riparian perennial plant communities grasses or woody shrubs like hazel nuts are techniques that can get more benefits from the same acres.

Commented [O15]: Too vague and not clearly tied to climate change goals.

Commented [O16]: Too weak and vague. We need actionable items and mechanisms to incentivize implementation.

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DEQ, DOA and DNRC will form a coalition of municipal watersheds and agricultural irrigation providers, NRCS and ngo's to adopt price increases which will provide funding to implement water conservation and nutrient management actions such as:

- More efficient irrigation systems;
- Beaver population augmentation and human constructed dams mimicking beavers to naturally store more water in the upper reaches of watersheds to sustain flow in later summer.
- Agroforestry practices such as riparian buffers growing perennial crops to help filter nutrients and sediment from streams while also providing shade to keep temperatures lower.
- Graywater use for irrigating yards and greenspace in urban/suburban areas.

- 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.

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Commented [O17]: See additions above. I think the more specific actionable items with responsibility assigned to an organization is important.

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? The universities are key for helping bring new technology and ideas to the table and provide studies to test and evaluate them. The state government through agencies and extension services can support the private sector with information and creating funding mechanisms to provide investments in new methods. They can serve as catalysts in the process. How should this work be funded? The state should consider a tax on fossil carbon to help fund these efforts. The tax would be assessed on the source of the problem and it helps provide a market incentive to use less of it.
- 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? Traditional ecological knowledge from the tribes is valuable in learning to adapt. One example is: Indians used fire as a tool to manage wildfires and the vegetation landscape to support their needs for food, safety, etc. Providing a better understanding of this to the general public, landowners and agencies should be part of the process of changing our current culture's relationship to fire and its use.
- 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? Develop working groups that include trade association groups and ngo's so that the business community, conservation groups are at the table for all of these discussions.
- 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? The linkage between using slash from forest management to create biochar which can be used to mitigate concentrated animal feeding nutrient pollution problems to provide a slow release no fossil carbon based fertilizer system, that stores captured carbon from the trees in the soil while it also increases soil water holding capacity is not explicitly identified. It is a proven technique but the development of the business supply chain does not exist to have it operate at scale. Where can recommendations be strengthened or prioritized to have the most impact? Many of the recommendations are worded very softly or vaguely such that it is not clear who is responsible for implementation and what time frame it is expected to be accomplished in. If we want this plan to make a difference people/organizations need to be accountable. 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?

Commented [O18]: Another example of how a Carbon Fee and Dividend would provide the market price signal to change behavior. It is also another example of where jobs would be created in rural settings. You won't have one largec chemical fertilizer plant, rather you will have many smaller distributed plants.

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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. The sooner and more aggressively we take action to reduce emissions the lower the economic impact will be. 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 and obligation to our citizens and their descendants 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.

Commented [O19]: Thank you for explicity stating this in the report it is a critically important framework to keep in mind as the governor considers policy options.

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.

Commented [O20]: I believe there is an overdependence in this modeling on electrification. Home water and space heating can also be achieved with passive solar. This used in combination with biomass are ways to provide heat without electricity. Passive solar/biomass hybrids are a relatively inexpensive heat source that can reduce peak demands, which is a significant issue with the massive electrification these models project. These alternatives also reduce the need for new transmission.

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:

I encourage the council to consider a consensus recommendation like the following:

Given the uncertainties described above related to the modeling and the unknowns around new technologies, uncertainty around predicting market responses we believe a foundational policy that puts an initially low but steadily rising price on fossil carbon is essential. This will create a market signal throughout the economy to change behavior of individuals, businesses and governments to invest in conservation and fossil carbon alternative forms of energy. Such a policy does not have to model the precise right scenarios, rather it allows the market price drive the investments by each entity to achieve their best outcome. We also believe providing the money back to people in the form of a dividend allows them the flexibility to invest their dividend as needed to meet their situation. It also provides a powerful signal to businesses to reduce their fossil carbon

Commented [O21]: There are extensive opportunities for distributed combined heat and power and/or district energy systems. Examples of these are extensive in Europe and there numerous in the US: St. Paul District Energy produces heat power and cooling, Montpelier, VT, downtown Seattle, and a couple dozen college campuses, such as the U of ID, Chadron State College in NE. These kinds of community scale distributed systems can reduce peak demand at the coldest times of the year. There is a significant opportunity to locate these kinds of systems at sawmills and other kinds of industrial sites. Utilities should be encouraged to invest in these types of systems. They are experts in delivering energy, have access to capital.

We also have over 50 existing geothermal sites around the state that could be used for energy development. In some cases it would need to be a biomass geothermal hybrid to achieve the temperatures needed to generate steam power.

Commented [O22]: This is an example of Box's point on modeling. I have reviewed the CETI preport and the Billion Ton Study it cites for considering the use of biomass. I see several problematic issues related to this bullet:

1. It doesn't explicity address the phenomenal increase in power generation and transmission that will be needed to both electrify the transportation sector and the heating sector.
2. The reliance on heat pumps in the Montana winter climate is problematic. Air to air heat pumps become very inefficient at low temperatures and need an alternative source of heat to the heat exchange mechanism. Often this is provided by electric resistance heat which is extremely inefficient.
3. The billion ton study is based on assumptions and a critical one is that the biomass from mountain slopes greater than 40% are unavailable based on the lack of logging systems to work on those slopes. First this is untrue in western MT as cable logging systems have been and continue to be used. It does not allow for the fact that new techniques like tethered logging can access this material and would be if the price was appropriate. The bottom line is there is probably close to double the amount of biomass than was estimated.
4. It assumes all the biomass should be saved for jet fuel and biodiesel production. This assumption ignores the transportation cost issues associated with biomass. These can be overcome.

Commented [O23]: Providing an low price at the beginning but steadily increasing for the next 30 years, does not provide an initial shock but then provides a predictable substantial price through time for them to base their planning on.

Commented [O24]: This kind of policy is a powerful incentive for many of the other recommendations to be implemented, from conservation to alternative energy production and agricultural and forestry CCS as well as technological CCS.

footprint to remain competitive.

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

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2A: MODERNIZE MONTANA BUILDING ENERGY CODES AND ADMINISTRATIVE PROCESSES TO REDUCE THE EMBODIED ENERGY CONTENT, PROMOTE ENERGY EFFICIENCY AND OTHER CLIMATE BENEFITS

Commented [O25]: To achieve the IPCC goal of staying under 1.5 degree increase, immediate short term gains are essential. Substituting materials ie wood for concrete and steel can have significant short term CO2 savings. This is something the state and local transportation departments could do immediately.

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.
- Direct the state department of transportation to assess the embodied energy/CO2 consequences of their construction, reconstruction and maintenance work for bridges, guardrails and signage. Develop template analyses for counties to use as they assess their roads and bridges. The cost of fossil carbon must be part of the economic analysis.
- Require all state buildings consider the economic cost of fossil carbon emissions when considering the governor's E.O. on the use of wood.

Commented [O26]: Who will do this by when?

Commented [O27]: Bridges made of wood and their designs are available in the US. http://www.woodcenter.org/

Commented [O28]: A Carbon Fee and Dividend would automatically enforce this idea.

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

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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:

Commented [O29]: Not all renewable sources of power are intermittent. Biomass, hydro and geothermal for example. Montana has access to all of these which can be developed for dispatchable base or peaking demand use. It doesn't have to be all storage. Storage is part of the mix but not the only option.
We have dozens if not hundreds of dams for water storage that do not have power generators on them ie Hyalite Canyon for Bozeman's water supply. They are potential additional sources of firm power generation at smaller scale. All three of these sources have the potential to reduce the need for new transmission lines.

- 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 solar or biomass thermal, 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. In addition the utility should be able to finance or lease solar and biomass thermal installations and provide a return on investment to their shareholders.
    - 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.

Commented [O30]: We need to have a business model that rewards utilities for the "negawatts" they achieve through conservation and renewable alternatives at the home or community scale.

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.

Commented [O31]: Is this available for alternative energy installations? Solar thermal? Biomass thermal? If not what needs to be changed to allow it?

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.
- Establish targets for the utilities to meet in reducing their fossil carbon delivery. Financing

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thermal solar/biomass thermal at the residential neighborhood or community scale should be part of the strategy to shave peak demand. The IOU's should be able to profit from these operations so they have an incentive to promote these programs.

Commented [O32]: Adding a price to fossil carbon will help accelerate adoption of these systems.

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, WIND, GEOTHERMAL AND BIOMASS POWER AND COMBINED HEAT AND POWER DEVELOPMENT AND ENACT POLICY TO ENABLE SHARED SOLAR FOR INVESTOR OWNED UTILITIES

Description: Community scale energy sources ~~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~~ energy sources provides access for individuals, households, and businesses that may not otherwise be able to install a distributed ~~generation~~ heat and power 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/geothermal, biomass thermal 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~~ district energy and cogeneration production systems programs.

2H: PROVIDE INCENTIVES FOR BIOMASS THERMAL, PASSIVE AND PV SOLAR-READY AND SOLAR-INTEGRATED DESIGN AND BUILDING

Commented [O33]: Rather than making tax breaks for a specific type of system that distorts markets; why don't we adopt a policy that incentivizes the whole array of renewables and conservation by putting a price on fossil carbon and rebating the money as a dividend to families?
Tax revenues will decline as we shift away from coal, oil and gas. We need renewable to pay their share.

Commented [O34]: This website https://biomassready.org/ provides access to a design guidebook to make community buildings ready to install biomass. Passive solar and biomass thermal are a great combination. It is far less expensive to incorporate these systems at the time of construction than to have to remodel to install in the future.

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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. Biomass Ready desing is available at https://biomassready.org/ to accomplish similar efficiencies as solar.

Key Strategies:

- The State of Montana should develop incentives that encourage biomass and 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 biomass and 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.

Commented [O35]: As stated before fossil fuels provide a substantial amount of tax revenue for MT, we will need to transition to other sources of revenue. Renewable energy production should be one of those sources. Instead of a tax cut the governor and legislature should endorse a fossil carbon fee and dividend. This will accomplish the goal of incentivizing renewable sources of energy but will not cost revenue to the state. The benefit of the Fee and Dividend is it internalizes the cost of fossil carbon into every product that uses it. This is a much more effective policy tool for accomplishing our goals

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 COMBINED HEAT AND POWER (COGENERATION) AT COMMUNITY AND INDUSTRIAL SCALES 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. The development of combined heat and power from biomass, geothermal and solar thermal and hybrids between them should also be developed. These smaller

Commented [O36]: Combined heat and power is the most efficient use of energy production. Our current system of dedicated power power plants waste a lot of heat energy to the atmosphere. When plants are located such that the heat is utilized the fuel used to produce to produce that heat is offset. Since heat is generally produced from natural gas, propane or fuel oil that means a significant CO2 savings. In a fossil C constrained world we need to extract as much useful energy from whatever source as we can. Therefore the PSC should have CHP as a high priority.

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scale systems at the community and industrial plant scale are very efficient compared to power only generation. In addition their synchronicity with severe cold period needs for heat and power allow for the ability to ramp production up for both. State incentives would help mitigate these costs.

Key Strategies:

- Encourage the Montana Public Service Commission to open a docket investigating energy storage, district combined heat and power: 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 and CHP 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.
- There is substantial sunk capital costs in Colstrip 4. It provides firm power to help balance the variability of wind and solar. One way to take advantage of that capital investment, provide dispatchable power needed and reduce the fossil carbon emissions is to use torrefied wood. This can be blended with coal and it could start out at 10% and increased over time to further reduce the fossil carbon emissions. This would be a good transition tool as the development of other energy storage is development and CHP.
- Montana has 8 sawmills that could each have a 20-25 MW combined heat and power plant established at it. This could provide 160-200 MW of firm, dispatchable renewable power to help balance wind and solar. A study was conducted ~10 years ago that examined this but it did not include the fossil carbon savings and thus it appeared that coal and natural gas were cheaper. In today's situation that is an error.

Commented [O37]: These systems have already been installed and proven in other locations including UM Western's campus (no power generation) during the mid-2000's, the fracking technology brought the price of oiland gas down making the biomass less economically competitive. However we have not been including the price of fossil carbons release into the market place. By including such a price these renewable sources o energy would be competitive again.

Commented [O38]: The CHP at this scale saves on the need for large transmission lines and can scale up production as the heat demand increases thus serving the peak demand of severely cold weather. The St. Paul Distrct Energy system provides cooling in the summer by producing and storing cool water at night to be used during the day to cool buildings, so it also shaves off the peak summer demand.

Commented [O39]: Creating these plants using gasification processes and gensets would allow for the potential piping of the wood gas to be piped to a biorefinery to produce jet fuel, biodiesel or other products needed. These systems provide options for the future that we don't fully see or understand at this time.

Commented [O40]: Torrefied wood is the result of pyrolysis that eliminates the water in wood, increases the btu content per pound and is hydrophobic allowing it to be handled and fed into a boiler generation system the same as coal. When Colstrip 4 is retired the torrefied wood could be diverted to a biorefinery to make jet fuel or biodiesel.

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

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- Using widely available methods, develop greenhouse gas emissions and sink estimates for key sectors of Montana's economy and land use. For example the USDA Forest Service Forest Inventory and Analysis program collects data across all forest ownerships that can monitor and measure the carbon storage.
- 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.

Commented [O41]: Federal Fee and dividend legislation should have a provision for rebating carbon fees when carbon sequestration practices are applied.

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.

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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)

Commented [O42]: Again the implementation of policy that puts a price on fossil carbon at the mine or well head is the quickest, easiest way to accomplish this. The EICDA has a provision that provides a carbon refund based on the number of tons of CO2 stored. In 10 years from enactment that would be $115/ton of refund. That is an incentive to develop and implement the technologlogical side of CCS and incentivize the biological CCS.

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, raised from fossil carbon sources, 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.

- Natural CCS can be some of the cheapest methods for mitigating fossil carbon emissions. There are multiple places and ways to have carbon benefits, from increased carbon in soil through the addition of biochar from slash instead of burning it, changed farming and grazing practices, to replacing steel and concrete with sustainably grown wood. These methods are all known and proven, the adoption could be rapidly accelerated if a payment mechanism was in place. A carbon fee and dividend that allowed for carbon refunds could provide the needed mechanism.

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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.

Commented [O43]: The point of this council is to reduce fossil carbon emissions in whatever way is most efficient and effective. If we can accomplish that by CCS of fossil fuel emissions that is just fine we are accomplishing the goal of staying under the 1/5 degree temperature change

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, biomass, geothermal 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.

Commented [O44]: The governor should work with the EQC and PSC to establish a team to analyze the appropriate rate structure.
I have solar panels and net meter. I am being subsidized by others since I am not paying for the transmissions ervice I still use. Howeversolar panels also help shave peak demand in the summer. Biomass power generation can shave peak demand in the winter. These watts are worth more than the flat rate at those times. Serious analysis is needed to determine the appropriate valuing of these distributed sources of energy including the avoided new transmission lines.

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.

Commented [O45]: This is a very cumbersome and potentially inefficient policy tool. The fights over what qualifies as renewable (historic hydro or not) whether biomass should be included, should nuclear be included as it is fossil carbon free, etc. The debate devolves into which form of energy you like or dislike. A policy that is technology neutral is more fair and less contentious. A fee and dividend applied with targeted reductions in atmospheric CO2 is much cleaner and then all the technologies can be considered and compete on the basis of cost and reliability the two elements the utilities are required by law to address. It incorporates the cost of fossil carbon thus providing a level plaing field. If CCS of fossil emissions is economical that will be part of the mix. Our goal is to limit climate change to 1.5 degrees of change NOT 100% renewable energy. This is a red herring that creates socio-political battles.

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.

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- 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? This statement is too narrow and presumes "beneficial electrification" is the answer instead of one of many answers. You have forgotten the George Box quote you included earlier about all models are wrong, but some are useful". The policies to implement should not presume the answer based on the modeling. There are significant opportunities for fossil carbon reduction outside of electricity. We need policies that incentivize reductions of fossil C emissions in a way that unleashes the power of entrepreneurs, market incentives, efficiency/conservation gains and CCS. We need policy that signals the release of fossil carbon in the long-run (next 30 years) is unacceptable. And in the short run the cost will steadily increase, at a rate that will drive the desired reduction. A Fee and Dividend can do that. The bill H.R. 763 starts out at $15/ton and goes up $10/ton/year provided it meets the targeted reductions, if it does not then the price goes up $15/ton per year. It starts out with little economic pain but it signals to every citizen, business, organization and government entity the price pain will get very large and you better figure out another way. The cost in 10 years would be $115-140/ton in 20 years $215-290/ton and in 30 years $315-440/ton, and it would be adjusted for inflation.
    - How should the Public Service Commission evaluate greenhouse gas impacts of decisions and rate-payer risks? Every decision should factor in the cost of fossil CO2 emissions that are currently externalized from the price of energy. Society is bearing the cost of climate change through wildfire fires, floods, drought, etc. It is being borne by taxpayers, individual businesses, farmers and ranchers, health care, etc. They must start internalizing the costs to the source: fossil carbon emissions.
    - What policies to further advance clean energy solutions should be considered for the unique business model facing the state's rural electric cooperatives? Fee and Dividend, see above. How can the state advance voluntary measures in coordination with electric co-ops? The co-op owners and customers are the same. With a fee and dividend they can absorb the initial cost increases through their dividend. The co-ops can make investments over time to reduce their fossil carbon intensity which will reduce the cost.
    - 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? Carbon Fee and Dividend affect every product or service that uses fossil carbon and therefore the incentive to reduce that affect is felt throughout the whole system and families and businesses will adjust. Cap and Trade systems are much more difficult to implement throughout the whole economy, require much more cost in administration and how to spend the fees from trading can easily be caught up in debates over "favorite" solutions. Fee and Dividend is not susceptible to similar problems.
    - How can Montana best lead on efforts to reduce greenhouse gas emissions? Investments in charging stations at rest stops, as suggested here are an excellent way to facilitate the transition away from fossil fuel transportation. Tax credits for gas stations to install charging stations would further expand the network. How should the state consider policy options and

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solutions in the context of potential Federal policy or policies? Federal policy is actively being developed as evidenced by multiple bills in the House and Senate. The establishment of a bipartisan Climate Solutions Caucus in the Senate last November involving 4 republicans, 3 democrats and an independent with the sole purpose of drafting legislation is significant. The governor, legislature, county commissioners, mayors and city councils should endorse and promote to our congressional staff the need for a fee and dividend policy as I have described elsewhere. It is vital to have CCS language that rewards both technical/industrial as well as natural methods.

- How should the state consider new technologies in planning for greenhouse gas mitigation like renewable hydrogen or modular nuclear? Montana should join/form a consortium with the other states, BPA, University expertise and US DOE in the Columbia River basin where we have an abundance of hydroelectric dams and the potential for abundant wind resources, the combination of which has great potential for electrolysis of water in off-peak demand times to generate H2 and O2 that can be used as energy storage, piped to locations for transportation use, etc. Adoption of a Fee and Dividend policy would send a signal to potential developers of such system to engage as they would have price predictability which is needed when considering large capital investments in new technology.
- 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? Montana is heavily dependent on tax revenue from fossil fuel extraction and use. Our goal in this plan is to substantially reduce its use to the point where the only use is in combination with CCS. We need to recognize tax credits make this situation worse. If there is a Carbon Fee and Dividend policy passed we should consider phasing out energy tax credits of all kinds. We should also consider a state carbon tax of $1-5/ton to cover the costs of research and development for climate change mitigation and adaptation; also financing infrastructure like charging stations at rest stops and to cover the cost of tax credits for gas stations that install charging stations and other needed infrastructure.

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

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Section I. Montana's Innovation Landscape

Responding to the impacts of climate change in Montana will require new technological approaches to agriculture, energy systems, forestry, 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.

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.

Commented [O46]: There is no discussion of how the innovation landscape helped make this happen.

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

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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

Commented [O47]: Does this include energy conservation practices? Deep energy retrofits where new or augmented windows in combination with wood fiber insulation in walls and ceilings can make existing homes, commercial buildings use less carbon and save considerable money in the long-run. Low cost fossil fuel and access to capital have been the major barriers. Bringing together the innovation landscape of businesses, utility and credit union loan programs along with a price on fossil C could create the right environment for this to move rapidly. It would create jobs and product demand for the new wood manufacturing plant planned for NW MT.

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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.
- Forestry - Mass timber construction and wood products innovation – including efforts to develop new structural construction materials, ~~and~~ products like wood-fiber insulation and wood gasification for combined heat and power as well as biochar production that can be used in agricultural applications.

Commented [O48]: It is important for you to know the CETI report relied upon the Billion Ton study which grossly underestimates the amount of biomass available in MT. An assumption applied in the analysis assumed no biomass was available from slopes greater than 40%. This is not true although the number of loggers working on those slopes is limited. The expansion of the current market in MT and an increase in biomass price changes the amount available dramatically. This is an example of why the George Box quote is so important to keep in mind. It also shows how important developing a market is so we can achieve the forest adaptation needs discussed in the early part of this report.

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

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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 some Montanans to negotiate, preparing for and making the transitions will also provide opportunities for others~~positive aspects~~ and we need to do our best to match these two sets of people together. Building the resilience and capacity of Montana's communities will focus on collecting and sharing information, supporting sustained and robust

Commented [O49]: I am going to push back on part of this narrative. Given climate change we will see the fossil fuel industry decline dramatically in the next 3 decades. However the forestry and wood products will see a dramtic resurgence. This is evidenced by the Mass Timber manufacturing boom that is occurring around the world. This will only accelerate. The demand for wood fiber as insulation materials, feedstocks for energy, both CHP and liquid fuels will grow substantially. The opportunity to grow more wood by extending rotations on corporate ownerships and affording to do forest stand improvements/hazard reduction treatments all point to a substantial increase of raw material and the need for skilled workers in the forest and in rural communities near the forests. Your statement here is too broad brushed. The new processing plants will be highly automated so the number of workers will be a fraction of the number needed 40 years ago but that is true of virtually everything. These new plants are going to produce secondary and tertiary products for use in the urban areas so much of the construction will be in the wood manufacturing plant instead of onsite in the urban location so we will see a migration of some of those urban jobs to more rural locations.

Commented [O50]: Infrastructure can be developed, planning and the development of social license can be changed and needs to be changed for the very reason of the risk to WUI which carries into the heart of most Montana cities. This council with the diversity of organizations represented can be an effective tool to help build the social license for taking actions that will help all Montanans in the long-run. We can't hold onto old ways of thinking from the '70's and 80's on forest management. The work done on National Forests over the past 25-30 years is dramatically different from earlier decades. We need to embrace the changes made and map out additional changes given the path the changing climate is mapping for us. Building resilience in the forest, capturing and storing or using biogenic carbon in the trees that need to be removed are compatible goals. Growing trees larger and longer can store more carbon AND make more wood available to a sustainable society.

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 and partnerships between technical colleges, businesses and labor 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~~fossil fuel sector~~s~~ 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.

Commented [O51]: This phrasing is problematic. Forestry and wood products are natural resources, water management for cities, agriculture and fisheries are natural resources, wildlife are natural resources, reducing fire risk is natural resource management. Do you mean we are transitioning away from fossil fuel extraction? Yes that is true. Mining will still be important look at the amount of copper and lithium that will be needed to do the amount of electrification this plan calls for in transportation, wind mills, solar panels and home heating. Where will that come from? Where are all the battery minerals going to come from? The US and Montana are foolish to think we are going to import all of that. We put our national security at huge risk by relying on China for all our batteries. We need to recognize the strategic importance of mining these minerals AND we need to make sure we mitigate the pollution that can be generated by these.

Commented [O52]: This is great, this council needs to acknowledge this as part of the communication efforts of the final report.

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? We need to be thinking of circular economies and how to make them work. This requires design and engineering rethinking, landfills and waste will become part of the past. Embodied energy will no longer be thrown away. Energy efficiency will be truly valued financially as the price of fossil carbon is internalized. Here are a few that should be focused onin the near term:
  - Wood products and construction - Engineered wood products that can make big wood out of small pieces, wood fiber insulation and manufacturing processes that make and ship house components including windows, rough electrical and plumbing, etc. MT and other wood rich states have the opportunity to capture a lot of employment and conservation of resources by reducing waste and gaining

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manufacturing efficiencies, but it needs private and public partnerships to move quickly.These technologies all exist but need the help of the innovative landscape to become a reality.

- Biorefineries – drop-in fuels and other refined products (adhesives, medicines, clothing fabric, bioplastics, etc) from wood and ag residues. Transitioning the refineries in Billings and Great Falls to using biomass as feedstocks will take time and investments of capital and training. Montana universities, departments of Commerce, Agriculture, Natural Resources and Conservation and Environmental Quality will need to be deeply involved.
- Chemical fertilizers need to be replaced with biologically based fertilizers. The production of biochar and its use in absorbing nutrients from animal and human waste require work in the logistics and infrastructure development. We currently spend millions on disposing of this "waste stream" without using the nutrients. This is a prime opportunity for the circular economy idea, but it needs the support of the innovation landscape. This helps both adaptation and mitigation goals.

- How can the Council better assess existing University capacity to deliver climate-relevant technology research? Convene a workshop(s) with industry, ag, forestry companies, agencies and federal research agencies (ARS, USFS, USGS, DOE, etc) invite philanthropic organizations with a climate change emphasis, also include investment banks and other investment companies. The purpose would be to list and prioritize sectors and topics within the sectors that need knowledge gaps filled. There should be annual meetings to report results and re-examine the priorities in case they need adjustment. The focus will be on supporting the whole supply chain. The council should consider having this a multi-state effort to capture synergies from combined resources. Idaho, OR and WA have similar combinations of mountainous forested areas and agricultural lands also similar wind, solar and hydro resources. Federal support would be easier to get if regional efforts are made.
- How can the Council best engage industry partners to form a shared innovation vision for Montana? See above.
- What is the right organizational structure that best delivers resources and capacity to communities? Organzing around groups of counties with similar resources, issues and topics to address, then it will be easy to bring in businesses that match that geography and topics Where does dedicated funding come from? A fossil carbon tax or the coal severance fund.
- 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? It is not clear what risks you are talking about. Do you mean the increased costs for firefighting? Health risks from more smoke pollution? The risks of more flooding? The declining revenue from farmers paying taxes when droughts occur? Or are you talking about the risk of declining revenue as coal, oil and gas production go down affecting the revenue stream to the state treasury?

For the first set of questions we should impose a tax on fossil C to set up a fund to cover emergency costs induced by climate change, and assistance to businesses impacting by climate change. For the second we need to diversify the tax base to get more from tourists visiting the state and using our infrastructure, We need to turn renewable energy into a tax revenue source.

- What is the role of tax policy in confronting climate change? As stated repeatedly, a carbon fee and dividend is the most effective way to promote implementation of the innovations that are out there. It will drive many of the mitigation measures and some of the adaptation measure this paper identifies. 1% of the fee could be used to help transition coal, oil and gas displaced workers.

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.

Commented [O53]: I agree the use of apprenticeships is critical to the success of transitioning workers and their families. If we are going to get people working in those areas to support the policies needed to avoid the catastrophic effects coming with climate change.
Requiring prevailing wages and opportunities for collective bargaining can assure workers their interests are properly considered.

DRAFT

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3/19/2020

Climate Solutions Council

Comments on Preliminary Plan

Dear Members,

Thank you for dedicating time away from your normal jobs to serve the people of Montana on this extremely important issue affecting every Montanan whether they realize it or not. We have a decade to bring about substantial changes to our use of fossil fuels and set our economy on a very different path. And then two more decades to fossil carbon neutrality and then drawing down the CO2 in the atmosphere by 2050. I have a deep background in Forest Ecology, Forest Management, Carbon Cycling and the role of forests and their products (including energy production) in climate change.

The current covid 19 pandemic is an important lesson for approaching climate change. "Everything we do before a pandemic will seem alarmist, everything we do after will seem inadequate." Michael Leavitt 2007 HHS Secretary. We are learning the truth of this statement as we are all severely restricted in where we go and what we do in response to covid 19. The same can be applied to climate change. The difference between the two is covid 19 plays out in days and weeks whereas climate change has taken decades. We are running out of time to make the changes for climate change to avoid catastrophic economic, environmental and social effects. This council is tasked with mapping out the path forward. You have to think big and bold and recommend dramatic actions that fit the scale of the problem in front of us, just as we are attempting to do with covid 19 in real time.

Forests in Montana, the US and internationally and their management are <u>extremely</u> important to achieving these changes. Their role in outdoor recreation, watershed benefits, wildlife habitat, carbon capture and storage in trees and short and long-lived products is substantial. Our forests can either be a negative carbon source further aggravating climate change through mega-fires and insect and disease epidemics or they can be a sink helping solve the problem.

Many of our forests are also in need of management to help them adapt to the new climate we have already started to experience, from the megafires to bark beetle outbreaks. These management needs provide opportunities for innovation to capture and use the biogenic carbon that has been stored in the overstocked forests. Federal forests must be part of these actions. The harvest and use of wood products are enmeshed in all three committees and thus it is important to tie them all together as stated in Guiding Principle #5 for Effective Adaptation. Many of my comments relate to forests and their role but not exclusively.

The reports and recommendations do not address embodied energy and CO2 content, which is the energy/CO2 needed to make a product. Some materials are very high such as concrete, steel, aluminum, glass, etc. Wood has a very low content by comparison because the sun's energy drives the creation of it. And in Montana our sawmills on average use 86% renewable energy, so the fossil carbon content is very low by comparison. Embodied energy is extremely important because all the CO2 released for a building or bridge is released at the time of construction, whereas the CO2 released by operations (heating, cooling and lighting) accumulate over time. Both are important to address but given the time frame the IPCC provides to avoid the 1.5 degree increase

we need to make as much of the change as possible that is front end loaded. By addressing both the embodied energy and operational/maintenance energy the built environment can become a carbon sink rather than a source. Please make this an explicit part of the recommendations.

In the attached are my comments embedded in your preliminary recommendations. I only comment on items that I thought had been missed, needed further articulation or I disagreed with. The portions without comment I find acceptable or don't know enough about to comment thoughtfully. There is some redundancy where topics overlap between the three sections, which I have left on purpose. I think it is important the document make explicit the interconnected nature of many of the recommendations.

My final contextual comment is that there is a policy tool that provides the fundamental carrot and stick for the vast majority of my comments and many of the recommendations in the preliminary plan. A national carbon fee and dividend that places a relatively low price on fossil carbon initially but steadily rises over the next three decades is essential to sending a clear signal throughout the whole economic chain of products and services for which it is used. The Governor's E.O. calls for fossil carbon neutrality by 2050 throughout the whole economy, to achieve that requires a mechanism that will penetrate the whole economy, a carbon fee can do that. To achieve equity for the citizens of Montana and the whole country, I recommend all the money collected be returned to citizens on a per capita basis, less administration costs and funds to cover displaced workers. The policy should include a border trade adjustment to protect American businesses and a rebate for carbon capture and storage through both technical and biological means. The dividend provides the funds to families to adapt their lifestyle to a low fossil carbon economy, by buying a low carbon vehicle or installing solar PV or heat collectors, insulating their house and replacing windows, etc. The dividend is flexible for families to choose the system that best fits their situation. A strong endorsement of a federal fossil carbon fee and dividend by this diverse group is needed to motivate our federal representatives in congress to pass legislation.

A key consideration is that society is already paying for the changing climate effects, by landowners, businesses, families, local, state and federal government agencies suffering the costs of drought, wildfire, detrimental health effects of smoke, cancelled recreation visits, etc; however the costs are external to the price of fossil carbon and thus there is no price signal sent to producers and consumers to change their behavior. Let's establish a market signal that will change behavior of every entity just described.

Here are a few examples of how behavior would change:

- How different would utilities whether Coops or NWE's 20 year plans be different if there was a steadily increasing price on fossil carbon for the next 30 years? They and their energy providers would have a very different set of costs to consider and would change their approach, including carbon capture and storage.
- Local and state government investments in buildings would be changed. The city of Missoula is finishing a new 3 storey library that fills and entire city block. It was built with concrete and steel which both have very large embodied energy/fossil carbon content. They did not use mass timber because apparently the cost was higher for wood. If a price on fossil carbon existed at the time of planning and design the structure it would likely have had a different outcome, as would most private construction projects.

- Individuals would make different choices for their transportation purchases if they knew the price of gasoline/diesel was going to go up steadily for the next 30 years.

Attached is a word version of the preliminary recommendations and questions with my comments, questions and suggestions embedded using tracking changes.

Submitted with respect and admiration for this most important task you are helping the state address. Please contact me if you have any questions related to my comments.

Sincerely,

David C. Atkins

[redacted]