

# Montana Climate Solutions Council

Technology innovation FOR CLIMATE SOLUTIONS AND COMMUNITY Transitions Committee

## White Paper: Building Resilience to Prepare Montana's Communities and Economy for Transitions

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### Key Issue

Montana's economy and energy sectors are undergoing rapid transitions. These transitions result from a series of market, policy, and technology developments that are largely outside of Montana's direct control. Impacts on natural systems, infrastructure, and sectors of Montana's economy as a result of climate change will introduce new challenges and changes that Montana will need to respond to. The important point is that while transitions destabilize existing communities, businesses, and public institutions—requiring efforts to minimize negative impacts—**transitions also create opportunity for new, creative innovations, and systems to emerge.**

The Montana Climate Solutions 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. This committee has 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, and the economy prepare for and respond to change. The Montana Ready Communities Initiative defines resilience as the capacity of individuals, communities, and systems to survive, adapt, and grow amidst stressors and shocks.[1] A natural disaster, such as a fire or flood, is an example of a shock that can damage infrastructure, disrupt economies, and affect families and communities. For social and economic systems to be resilient, they must have the social, institutional, and other assets necessary to marshal a robust, rapid, and comprehensive response to natural disasters or economic disruptions such as a plant closure, rapid growth, or

land use change. These concepts and their relationship to academic work in Montana are further defined and explored below.

This committee also produced a white paper describing the process of innovation and the elements essential to developing new technologies and moving to commercialization and adoption. Taken together, these two white papers provide a framework for understanding and implementing strategies to achieve the Council's climate mitigation and adaptation goals.

First, this white paper draws on literature and the expertise of committee members to define transitions. Next, it describes key components of resilience. The white paper then summarizes the committee's discussions and outreach to identify key vulnerabilities and barriers that challenge the resilience of families, communities, and businesses in Montana. Additionally, this white paper draws on the experience of the Resources and Communities Research Group (RCRG) at Montana State University working with rural Montana communities. That work reveals linkages between concepts, real-world challenges, and opportunities that can identify and inform key stakeholders to engage in necessary efforts to make their communities more resilient. Recommendations focus not only on what needs to happen, but who can make it happen and the role of public policy and institutions.

This white paper has similarities with the Adaptation Committee's *Building Community Resilience to Climate Change* white paper but it also has a key distinction; the Adaptation Committee's paper has a strong and necessary focus on adaptation strategies that will limit harm from climate change. In contrast - as noted previously -this paper examines closely how impending transitions driven by climate change also create opportunity for new, creative innovations and systems to emerge. This emphasis on opportunity and creativity in the face of climate induced community transitions—and policy and economic responses to them--was influenced by the Technology Innovation white paper developed by this committee alongside this white paper.

## Defining Transitions

**Transitions** are defined most simply as a change 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.[2] 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 have reduced the number of high-wage, skilled jobs in traditional sectors. As a consequence, 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.

Regional energy transitions from coal to natural gas and renewable energy sources are being driven by cost competition among different fuels—a result of horizontal drilling and “fracking” that led to rapid oil and natural gas production gains[3] and rapid technology advancements in renewable sectors. And while Montana has its own 15% renewable portfolio standard (RPS), which has essentially been met by affected utilities, energy policy related to carbon emissions in Montana's neighboring states, such as the RPS's/clean energy standards adopted by Oregon and Washington, are affecting energy systems far more significantly inside Montana than its RPS has and are forcing transitions in coal-dependent communities. The Montana Climate Solutions Council is also seeking to initiate transitions in renewable energy generation, energy storage, and carbon capture to meet climate mitigation goals and capture economic opportunities from innovation. Transitions are occurring at multiple scales and will require Montana to understand and navigate the complex decision space that exists among local, state, and federal entities.

Although transitions will have negative impacts for Montanans to negotiate, preparing for transitions will also provide positive aspects. Building the resilience and capacity of Montana's communities will focus on collecting and sharing information; supporting sustained and robust planning, and prioritizing local economic development strategies . The committee is focused on the concept of resilience as a way to better understand Montana's vulnerabilities and risks and identify recommendations where public policy and institutions can act.

## Resilience

**Resilience** is defined by the Montana Ready Community Initiative as “the capacity of individuals, communities, and systems to survive, adapt, and grow amidst stressors and shocks.” Resilient communities develop the social capacity to respond to natural disasters and rebuild with an understanding of climate trends, such as increasing incidence of extreme weather events, and an embrace of energy conservation and a transition to renewable energy systems.

The Montana Ready Communities Initiative further defines acute shocks as high-impact, short-term events that may significantly affect basic services, public safety, or the environment. Examples include floods, drought, wildfires, cyber-attack, industrial facility closures, commodity price changes, and more. Chronic stressors are ongoing environmental, social, or economic issues that result in (or interact with) an inefficient system of community cooperation. Examples include poverty, shifting weather patterns and other climatic changes, a drug epidemic, social isolation, lack of affordable housing, or lack of long-term planning. Figure 1 provides a visualization of how acute shocks and chronic stressors differ in their time horizon (x axis) and impact on sustainable development (y axis).

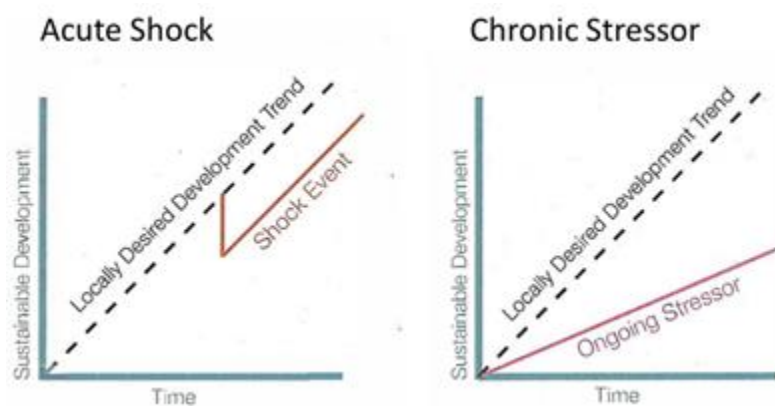


Figure 1: Acute shocks and chronic stressors

The Montana Ready Communities Initiative process for defining resilience was a transparent, participatory public process and brought together many elements of resilience. For example, some ecological systems are highly resilient; they are resistant to change and bounce back quickly from shocks. Despite that resilience, however, such ecological systems are not necessarily in a desirable state (e.g., a prairie grassland may recover quickly from fire, but the grasses that burned and grow back may be invasive).. From a community perspective, resilience is a normative concept: communities that are resilient have agency and capacity to meet their local goals and needs in response to change.[4] The idea of community resilience is most often discussed in the context of assessing and improving a community's capacity to respond to natural disasters. The Montana Ready Communities Initiative adapts and expands the concept of community resilience to include any potential shock to and stressors on a system, including economic and market transitions, long-term climate change, policy interventions, demographic change, and natural disasters.

This white paper uses the Montana Ready Community Initiative's definition of resilience for two reasons: first, the committee's charge is to leverage existing planning processes, partnerships, and capacity in Montana's public institutions and second, to make positive recommendations to help meet the Council's climate mitigation and adaptation goals. The Montana Ready Community Initiative is a relevant ongoing planning process that adds value to the Council's work.

As noted previously, we also draw on the research capacity and community partnerships at the Montana State University's Resources and Communities Research Group (RCRG). RCRG's work helps translate and ground the concept of community resilience with case studies. Such studies, combined with our own (see below), provide tangible lessons that will help the committee identify and forward recommendations to build the resilience of Montana's communities facing challenging transitions.

## Defining Montana's Capacity to Plan for Change

Based on assessments of community resilience in rural Montana, RCRG developed a simple framework for defining a community's ability to plan for shocks and transition its economy as a combination of: a) local vulnerabilities (e.g. limited planning capacity, overly-specialized economy, and overtaxed human capital), and b) exogenous (outside) policy and political barriers to transition (e.g. state limits on fiscal autonomy, complex and fragmented permitting and review processes, and ineffective federal and state assistance).[5] .

RCRG defines community resilience as local agency and self-organization in response to change. There is a planning gap where community resilience is limited by local vulnerabilities and blocked by outside barriers that constrain the autonomy and capacity of communities. It could also be adapted to show the positive local attributes and outside resources that expand local capacity and choice, and build resilience. Public policy and institutions can work to support community resilience by removing barriers and building capacity at the local level.

For example, Dr. Julia Haggerty has studied rural communities experiencing oil and natural gas boom and busts in Eastern Montana. Communities are vulnerable due to their small size, lack of planning capacity, and overtaxed social support systems. They also face a fragmented and complex regulatory environment that lacks clear policy and coordination, and ineffective fiscal policies that restrict their autonomy to manage volatile revenue streams and plan for energy transitions. Effective responses have emerged in some communities to gather and share information, prioritize local needs and goals, and to build networks across local, state, and regional institutions.

Understanding local vulnerabilities and outside barriers is a useful way to identify solutions that build local capacity and replace barriers with assistance and support. The Council identified vulnerabilities and barriers related to the committee's climate mitigation and adaptation goals.

### **Vulnerabilities**

*Social cost of space* describes the reality that providing services and infrastructure in rural Montana is relatively inefficient and expensive because of low population densities and vast distances to cover.

*Overtaxed human capital* describes the reality that high level of social/community bonds are stressed by having fewer people available to participate in volunteer and formal public and non-

profit roles. The same individuals are often tapped to serve on multiple community boards and leadership positions, which limits capacity to respond to economic and environmental change.

*Path dependence* describes economies overly reliant on a single economic sector. Communities dependent on infrastructure, tax structures, and workforce skills that are oriented around a single sector face greater risks from changing markets, policies, and environmental conditions. For example, communities dependent on natural resources or energy production face higher risks for workers and families when plants, mills, or mines close.

*Low planning capacity* exists in many Montana communities that have few or no professional planning staff and may have limited capacity to compete for planning grants and assistance.

*Climate-sensitive industry sectors* include economic activities dependent on stable and predictable climate and weather patterns, such as agriculture and tourism related to skiing and fishing. These sectors are particularly vulnerable to extreme weather events and long-term shifts in wildfire, precipitation, or temperature patterns.

*Uncertainty and limited data* hinder the ability of communities and businesses to anticipate change, identify solutions, and prioritize responses. One of the most important roles for local institutions in oil- and gas-impacted communities is to gather and share information.

**Barriers** are external forces that confuse, delay, frustrate, and otherwise challenge transition planning.

Existing infrastructure capacity in Montana is limited, reducing options for different economic activities. For example, renewable energy capacity is constrained by transmission capacity.

Fragmented industry ownership, particularly of energy facilities, removes planning authority and standing from the state of Montana, exposing the economy to markets and policies outside our control.

A lack of consensus and political will to address climate change result in a planning gap where no coherent and authoritative energy and climate policy exist. Communities are left on their own to plan for and negotiate solutions with state, regional, and federal entities.

A lack of funding and capacity at the state level to support and facilitate planning efforts is compounded by limited federal funds that can be overly prescribed (i.e., restricted in use). For example, federal workforce assistance often can be only accessed after workers have lost jobs, limiting the ability to plan for transitions and avoid acute impacts associated with unemployment.

Montana's tax structure is narrow, taxing some activities more highly than others and potentially limiting the ability of the state to continue to provide services as the economy continues to restructure. Local governments dependent on volatile revenue from natural resources are restricted from managing volatility and saving funds for unknown—but certain to arise—transition needs.

## Stakeholders

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

The recommendations below each focus on a strategy or action that can be taken to achieve a goal. Identifying what needs to happen *and* who can make it happen are critical to success. This section identifies key stakeholders the Council will need to engage to implement the recommendations identified in the next section.

Stakeholders are addressed as appropriate for each recommendation below.

## Recommendations

The most effective policies for building the resilience of Montana's communities, institutions and economy are those that directly address identified vulnerabilities or replace barriers with new capacity and opportunity. Each recommendation will describe what needs to happen, what vulnerability or barrier is addressed, and who needs to be engaged.

### 1. Adopt and support the Montana Ready Communities Initiative

Secure dedicated revenue to pursue the initiative. Also a need to think through organizational framework that allow staff to support communities. Communities must be resourced to collect and share information, maintain peer to peer learning across communities, identify and prioritize local needs, and implement strategies to build resilience. Communities that make planning a habit and have strong networks are better able to respond to shocks.

Questions: what is the right organizational structure that best delivers resources and capacity to communities? Where does dedicated funding come from?

Stakeholders: Montana Department of Commerce, Montana University Extension, local government (MACO, League of Cities and Towns).

Disseminate statewide the Montana Resiliency Toolkit developed from the Montana Ready Communities Initiative (MRCI).

The Montana Department of Commerce will work with the Climate Council to lead this effort that is currently underway as a component of the Montana Resiliency Framework developed by MRCI. The distribution of the toolkits will hopefully have a positive effect across Montana as communities use these tools to conduct resiliency planning. It is difficult to project whether this recommendation will have a high, medium, or low effectiveness or impact in addressing the issue inasmuch as it will be up to local

communities to put the toolkits to use. The cost of distributing the toolkits electronically and marketing its availability can be done in part by the Department of Commerce.

Create a statewide working group of tribes, cities, counties, and other entities across Montana that have adopted climate action plans.

Montana State University Extension and the National Center for Appropriate Technology would be logical partners to lead this working group through the Climate Smart Montana initiative now underway. NCAT's Energy Corps AmeriCorps program offers motivated, low-cost service members to boost organizational capacity and technical support for host communities seeking assistance with community engagement, resilience planning, and economic transition.

Stakeholders: local governments, tribes, other governmental units, and nonprofits

**2. Prepare Montana's workforce for opportunities in a changing economy and in sectors important to climate mitigation and adaptation**

Our committee is unable at this time to forward specific recommendations on Montana's workforce. We will continue to work with labor, state agencies, and other stakeholders to agree on and propose recommendations for public review.

Questions: is MT industry facing a labor shortage? What is the demand for skilled workers? Are there opportunities to increase wages or secure better benefits for the labor force as a result of the state's investments in the workforce?

Stakeholders: Department of Labor and Industry, Montana University System including community colleges, and key industry and labor partners

**3. Reform Montana fiscal policy to address economic transitions**

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



Questions:

Stakeholders: The state legislature is responsible for enacting or reforming state laws. The two interim committees (MARA and HJ 35 committees) should receive the Climate Council's recommendations and consultation on fiscal needs for adaptation and transition needs and goals.

#### **4. Begin a phased-in pricing structure for the greenhouse gas emissions-causing use and/or export of carbon-based fuels in Montana**

Carbon reduction: Carbon pricing charges emitters for the carbon they are emitting.

Putting a price on carbon provides a market incentive for users (from individuals to corporations to countries) to reduce their use of carbon-based fuels. Both the International Monetary Fund [1] and the Union of Concerned Scientists [2] state that carbon pricing is the most effective way to decrease the emission of carbon-based global warming gases. Likewise, The World Bank has stated [3]: a) "Pricing carbon is inevitable if we are to produce a package of effective and cost-efficient policies to support scaled up mitigation;" and b) "Businesses see that carbon pricing is the most efficient and cost effective means of reducing emissions, leading them to voice support for carbon pricing."

Carbon pricing generally takes place in one of two forms--via decreasing cap-and-trade market allowances, or via increasing carbon tax--as described below and in the accompanying diagram. Both tend to be phased in slowly to allow for market creation, understanding, and acceptance. The Council strongly recommends that Montana begin a carbon pricing program. Given the complexities involved in such a program, however, we do not attempt to select which of the two (or both, or the myriad of variations of each programs) the state should implement.

- Cap-and-trade programs (provide carbon quantity reduction certainty).--An emissions trading system (often described as "cap and trade") is generally targeted at major emitters (e.g., industry, power generators, fossil fuel producers). Under this program, the government both sets the annual emission limits and offers the permits (or allowances) for emitters. Given that the permits are limited in number they a) "cap" the covered jurisdiction's CO<sub>2</sub> equivalent output for a given year, and b) can be decreased year-by-year, thereby becoming more expensive and thus providing emitters greater incentive to reduce their carbon output (via, for example, increased energy efficiency or changing to alternative energy sources).
- Carbon tax (provide carbon price certainty).--Carbon taxes generally apply across the economy. According to the IMF [1] (*emphasis shown* comes from the IMF) :
  - "Carbon taxes are charges on the carbon content of fossil fuels. Their principal rationale is that they are generally an effective tool for meeting domestic emission mitigation commitments. Because these taxes increase the prices of fossil fuels, electricity, and general consumer products and lower prices for fuel

producers, they promote switching to lower-carbon fuels in power generation, conserving on energy use, and shifting to cleaner vehicles, among other things."

- "Carbon taxes also provide a clear incentive for redirecting energy investment toward low-carbon technologies like renewable power plants."
- "*Another important argument* for carbon taxes is that they could raise a significant amount of revenue, typically 1–2 percent of GDP for a \$35 a ton tax in 2030. Using this revenue productively to benefit a country's economy could help offset the harmful macroeconomic effects—reduced employment and investment—of higher energy prices."
- "*A third rationale for carbon taxes is that they can generate significant domestic environmental benefits*—for example, reductions in the number of people dying prematurely from exposure to local air pollution caused by fossil fuel combustion."
- "Finally, *carbon taxes are straightforward to administer*. Carbon charges can be integrated into existing road fuel excises, which are well established in most countries and among the easiest of taxes to collect, and applied to other petroleum products, coal, and natural gas. Another option is to integrate carbon charges into royalty regimes for extractive industries,

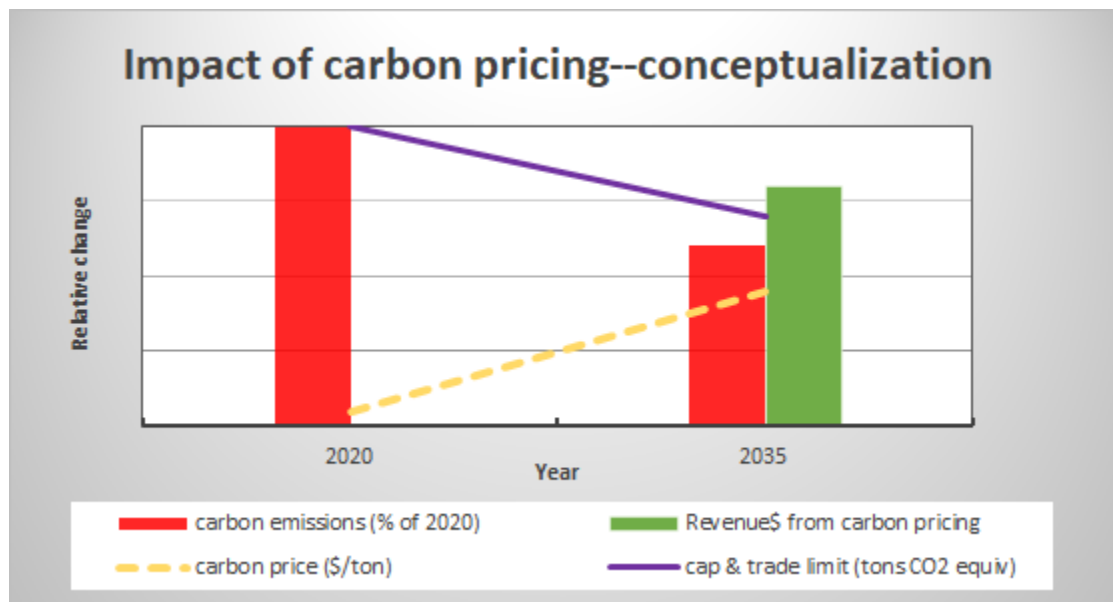


Figure 1. Carbon emissions (red boxes) can be decreased steadily by putting a price on carbon, either by increasing the price to use carbon each year ("carbon tax" -- yellow line) or by decreasing the amount of carbon major users in our state can emit ("cap & trade" system, purple line). Both carbon tax and cap & trade programs generate revenues (green box) that could be used to a) help communities in transition, and b) replace coal severance tax revenues.

Does carbon pricing actually work? Can it work in Montana? Carbon pricing is already decreasing carbon emissions in locations across the globe, with jurisdictions including countries (e.g., many in the European Union, Great Britain, Australia, China), regions (e.g., the ten US states working together in the Regional Greenhouse Gas Initiative cap and trade program), and at the state and provincial level (e.g., California, British Columbia). The World Bank records shows 58 countries and regions have carbon pricing initiatives [4]. According to a review article in the New York Times, "In Britain, the birthplace of the Industrial Revolution, greenhouse gas emissions have fallen to their lowest level since 1890. One key factor: A carbon tax that has prompted electric utilities to switch away from coal." [5]

An important point relative to the Governor Bullock's goals is that Montana can act as a state to implement carbon pricing, or could seek to join an existing regional program such as the Western Climate Initiative cap and trade program made up of California, Quebec, and Nova Scotia (see <http://www.wci-inc.org/index.php>). The latter might prove beneficial as market auctions for carbon trading are already operating. Another option would be for Montana to lead, or push for, the two dozen states of the US Climate Alliance, newly joined by Governor Bullock, to institute a major carbon-pricing program that would reach across a significant portion of the country.

Community transitions: Along with reducing Montana's climate footprint, Governor Bullock's core request, carbon pricing provides an enormous advantage for helping our state transition into a new, carbon-free economy. Programs that tax carbon and programs that create a marketplace for carbon (i.e., cap and trade) both create revenue that the state can use as it chooses. Those choices could include helping communities with climate-associated transitions such as worker retraining, health care revamping for care under increasing fires and air quality issues, agricultural changes to new crops be they for biofuels (e.g., camolina) or in reaction to changing weather (e.g., decreased late-summer water availability), creation of energy innovation centers or similar in the Montana University System, improved emergency response or remote medicine for rural communities, and more.

Questions: What form of carbon pricing would be easiest to implement: carbon taxes or cap-and-trade system? How fast can we drive down our state's emissions using carbon pricing? Could we, for example, derive 100% of the Governor's desired C-reduction goals by instituting carbon pricing alone? Similarly, is there any other single recommendation the Council can provide that has as much potential to change our state's carbon footprint as instituting a carbon pricing program? Can we use the revenues generated by carbon pricing to a) help communities transition to a new C-reduced economy, and b) replace the coal-severance tax savings pool the state enjoys? If so, how long can Montana count on the revenues from the carbon-pricing program and when they fall off, what will the state replace them with?

Stakeholders:

- *Implementation:* To decide on method of carbon pricing to institute and later set up the program(s) will require committees of the Montana Legislature, citizen advisory boards (including NGOs), state government staff and officials (from, for example, DEQ, Dept of Revenue), private industry. To join an ongoing cap and trade marketplace (or alternatively create one) will require negotiation with other regional entities (e.g., state of California to join the Western Climate Initiative). Creating a carbon-tax program will require searching out best practices from overseas countries who have implemented such taxes, or closer to home the province of British Columbia (ongoing) or state of Washington (ballot measure defeated).
- *Cost side:* For cap-and-trade program Montana industry with expectation of focus on major emitters. For carbon-tax all Montana citizens and businesses, though exemptions and/or allowances could be made (e.g., for emergency service providers).
- *Revenue side:* Regardless of source of revenues (i.e., from carbon tax and/or cap & trade program), dispersal of funds will require state Government fund management and dispersal. It's important to note that the revenues derived from carbon pricing can be focused toward meeting many goals ranging from alternative energy development to retraining worker for jobs in the new economy to helping people adapt to a changing climate (e.g., purchasing home insulation or air conditioning). Many across our state will be expected to petition for the funds including, for example, community leaders such as mayors and city commissions, Chamber of Commerce members, emergency providers, educators (extension service, school systems, Montana University System), agriculturalists, entrepreneurs, tourism operators, more.

**5. Invest in, encourage and incentivize development of affordable, energy efficient housing stock, including new construction and retrofitting of existing buildings, to reduce energy costs, cut carbon emissions. and strengthen resilience to climate impacts.**

Montana's changing economy is putting pressure on housing in rapidly growing cities that have become unaffordable to many workers, while rural communities are facing a shortage of safe, efficient, and affordable housing. Adaptation strategies and climate mitigation goals can be forwarded by a push to build new efficient, affordable housing and retrofit existing housing stock to decrease carbon emissions from the buildings, reduce water and energy bills, improve health and safety standards, and create thousands of new jobs in construction. Financing initiatives should be designed to encourage participation by tenants and owners of rental properties and multi-family housing. An energy efficiency resource standard (EERS) for Montana utilities should be designed to ensure that the benefits of energy efficiency are available to low-income residents while reducing the need for new electricity generation and natural gas procurement.

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[1] Montana Department of Commerce, Community Development Division. *Montana Ready Communities Initiative*. Helena, MT. Accessed December 20, 2019.  
<https://comdev.mt.gov/Programs/MontanaReadyCommunities>.

[2] (Martens & Rotmans, 2005: p. 1136).

[3] The term “shale revolution” refers to the combination of hydraulic fracturing and horizontal drilling that enabled the United States to significantly increase its production of oil and natural gas.

[4] Might be worth mentioning the national roundtable on community resilience:  
<https://sites.nationalacademies.org/PGA/resilientamerica/>

[5] Adapted from Julia Haggerty presentation The Third West in Transition: The Big Picture on Small Places to the National Academies of Sciences, Washington, D.C.