

JANUARY 6, 2020
Public Availability Draft

The Utah Roadmap

Positive solutions on climate and air quality

Legislative Charge

At the request of the Utah Legislature, the Kem C. Gardner Policy Institute – with the assistance of a 37-person Technical Advisory Committee – prepared this Utah Roadmap to assist with legislative policymaking to improve air quality and address causes and impacts of a changing climate. The Utah Roadmap identifies areas of opportunity to further reduce air emissions and ensure a healthy, productive, and prosperous future for all Utahns.

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January 2020

Dear Legislators,

I am pleased to present *The Utah Roadmap: Positive solutions on climate and air quality*. The Kem C. Gardner Policy Institute at the University of Utah prepared this roadmap in response to a legislative request made during the 2019 General Legislative Session.

The roadmap includes input from technical experts from Utah's public research universities; federal, state, and local agencies; industry; health care; and nonprofit entities. I want to thank these contributors for lending their considerable expertise to this important topic.

I served as a political appointee at the Environmental Protection Agency during President George W. Bush's administration. It was there that I learned three maxims of air quality and a changing climate.

First, air pollution impacts human health and the surface temperature of the earth is rising. There are connections between the two and we can make progress by addressing both.

Second, human actions contribute to air pollution and the earth's rising temperature. It's important we act.

Third, there is a rapidly growing awareness for urgent action.

This report outlines a Utah approach on what to do next. It lays the groundwork to achieve positive solutions on air quality and a changing climate.

Utahns have a long and proud history of leading on challenging topics. Whether it is refugee resettlement, immigration reform, anti-discrimination statutes, quality growth, or religious freedom, Utahns find ways to listen, collaborate, address trade-offs, embrace markets, seek alignment, and act. It's what many call "The Utah Way."

If we apply this "Utah Way" to reduce air pollution and greenhouse gas emissions, our residents and planet will be healthier. We will be well prepared to compete internationally for a future Olympic bid. And, our economy will remain strong, especially with the support of Utah's thriving tech and renewable energy sectors.

It is in this spirit that we share The Utah Roadmap. Thank you for entrusting us with this difficult task.

Sincerely,



Natalie Gochnour
Associate Dean and Director
Kem C. Gardner Policy Institute
David Eccles School of Business

Recommendations in Brief

The Gardner Institute and Technical Advisory Committee reviewed past Utah-specific work on air quality and changing climate completed by Envision Utah and the 2007 Blue Ribbon Advisory Council. This previous analysis included over 200 policy options. After a six-month expert assessment, we prioritized 55 of these options as those with the greatest impact at the least cost. The Gardner Institute then selected seven strategies – or what we call mileposts – as the first areas of focus.

Cleaning Utah's air and reducing global greenhouse gas (GHG) emissions is a journey with many mileposts along the way. Utah will benefit if it adopts a clear Roadmap—a plan of action that protects our health, sustains economic development (particularly in Utah's growing tech sector), advances Utah's 2030/2034 Olympic bid, and supports struggling rural economies in transition.

The Kem C. Gardner Policy Institute and our Air Quality/Changing Climate Technical Advisory Committee present this roadmap as a guide to the Utah Legislature.

MILEPOST
1

Adopt emissions-reduction goals and measure results – We recommend the following emissions-reduction goals be adopted by resolution, or statute in 2020.

Reduce criteria pollutant air emissions below 2017 levels by 50% by 2050.

Reduce CO2 emissions statewide 25% below 2005 levels by 2025, 50% by 2030, and 80% by 2050.

MILEPOST
2

Lead by example – We recommend state government lead by example by converting to an all electric/compressed natural/renewable natural gas fleet where practical, adopt energy efficiency goals in state buildings, establish telework targets, provide additional funding for reforestation, and invest more in energy planning.

MILEPOST
3

Create a premier air quality/changing climate solutions laboratory – We recommend Utah establish and fund a premier state-level air quality/changing climate research solutions laboratory to improve the monitoring network, conduct research, advance new technologies, and convene entrepreneurs and experts to innovate.

MILEPOST
4

Accelerate quality growth efforts – We recommend the state accelerate progress to meet objectives of Wasatch Choice 2050 and other quality growth initiatives statewide that will provide more transportation choices, support housing options, preserve open space, improve energy efficiency in buildings, and link economic development with transportation and housing decisions.

MILEPOST
5

Position Utah as the market-based EV state – We recommend the state expand Utah's network of electric vehicle (EV) charging stations, incentivize electric vehicle/compressed natural gas/renewable natural gas use (particularly for older vehicles and large fleets), and involve Utah auto dealers in strategies to increase the zero-emissions vehicle supply.

MILEPOST
6

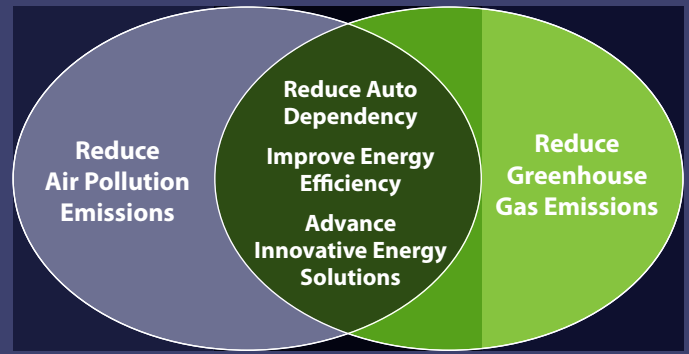
Provide economic transition assistance to rural communities – We recommend the state prioritize economic development investment and partnerships in energy-transition areas such as Carbon, Emery, Millard, Uintah, Duchesne, Sevier, and San Juan counties.

MILEPOST
7

Participate in national dialogue about market-based approaches to reduce carbon emissions – We recommend the state become a leader in national discussions about how to harness the power of market forces and new technologies to reduce carbon emissions in a way that protects health, sustains economic development, and offers other benefits to Utahns. Energy storage, research and development for energy technologies, revenue neutral/border adjusted carbon pricing, cap and trade, and other approaches may offer promising options for reducing emissions.

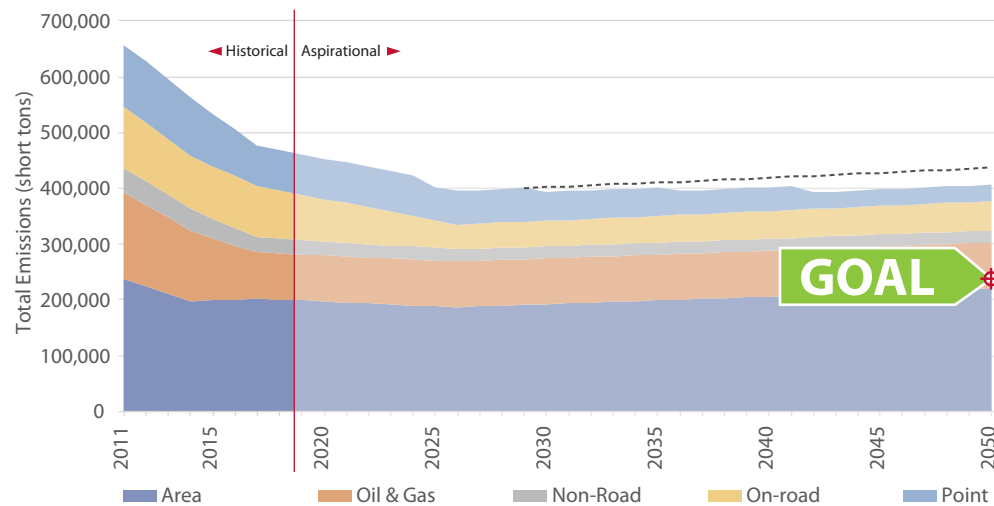
The air quality/changing climate connection

Reducing air emissions throughout Utah benefits both air quality and changing climate issues. Some emissions-reduction strategies, such as those in the center of the diagram, directly address this connection, improving air quality and the climate.



Utah's Air Emissions Baseline

Historical and Projected Air Pollutants (NOx, VOC, PM10, NH3, SO2)



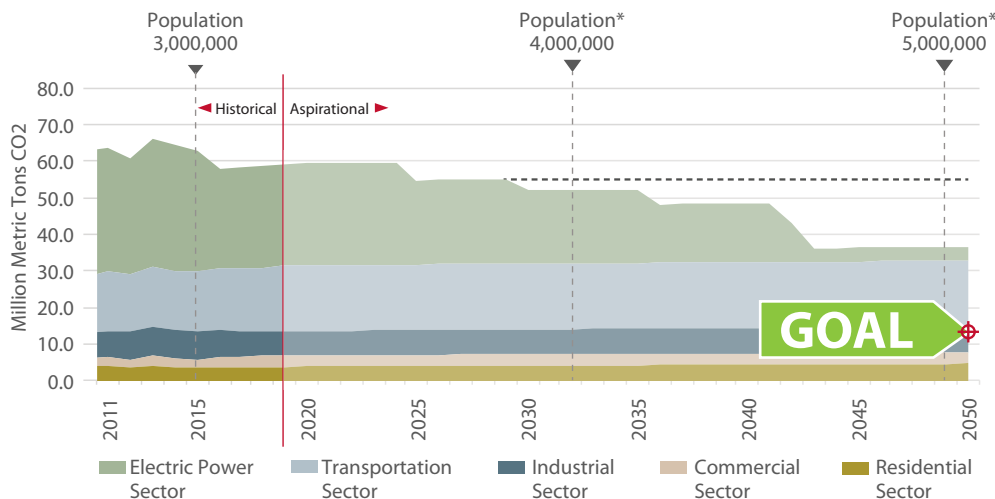
Source: Utah Department of Environmental Quality (historical), and Kem C. Gardner Policy Institute (aspirational)

94% of Utahns agree that good air quality is integral to their health and the health of their family.

Source: 2013 values study, Envision Utah

Utah's Carbon Dioxide Emissions Baseline

Historical and Projected Statewide CO2 Emissions



Source: US Energy Information Administration (EIA) based on the combustion of fossil fuel (historical), and Kem C. Gardner Policy Institute (aspirational)

* Projected

1. Potential scenario dates for the Bonanza (2030), Huntington (2036), and Hunter (2042) power plant closures are notional.
2. Closures of Huntington, Bonanza and Hunter power plants delayed beyond 2050.

What comes to mind is the sense of urgency to limit our carbon emissions so we can maintain a comfortable lifestyle and not lay waste to the earth.

University Student Body President in Utah

Challenges

Utah's population and economy have grown faster than most other states for over half a century. That trajectory – two million residents added between 1970 and 2018 – is projected to continue, with Utah reaching a population of four million by 2032 and five million by 2050.

Growth and the development that comes with it – more people, more buildings, more traffic, more economic activity – brings many challenges, as well as many opportunities for a prosperous future. A potential obstacle to Utah achieving its full economic potential, though, is the need for an even more ambitious, comprehensive and coordinated strategy to reduce air emissions, to improve air quality, and address changing climate causes and impacts.

Projected population and economic growth means that reducing Utah's air emissions – and the alphabet soup of pollutants and gases they contain – is more urgent than ever to ensure that quality of life in the Beehive State remains high.

Keeping up with the effects of growth won't be easy and difficult tradeoffs may be required. Some challenges, like Utah's series of high mountain valleys and plateaus, are significant and largely unchangeable; others can be managed with bold action and a willingness by more Utahns to embrace meaningful changes in their daily habits.

Why do we have poor air quality?

Utah's mountain valleys and high desert basins create significant air quality challenges. A rapidly growing population generates an airborne stew of pollutants. Atmosphere-warming chemicals mix with weather conditions and the state's topography and population growth to create a difficult reality. During winter months, temperature inversions can trap emissions in valleys for days or weeks, often reaching levels that can impact health, particularly among children and the elderly.

Health effects

Each breath Utahns take should be a healthy one. That's not the case now and we're paying high costs as a result, both personally and as a society. Research conducted at Utah's colleges and universities confirms that health conditions worsen because of air emissions, including child asthma, pre-term birth, pneumonia, miscarriage, heart disease, and brain health. Hospitals along the Wasatch Front see a 40% increase in emergency room visits when pollution ranks as unhealthy.

Pollution during inversions is easy to see, taste, and smell. But a growing part of Utah's complex, unhealthy mix of emissions comes from ground-level ozone, an invisible,

odorless and tasteless gas that affects the most-vulnerable residents throughout the entire year. Ozone concerns span much of the state, including less-populated areas like the Uintah Basin. Ozone can cause the muscles in individuals' airways to constrict, triggering wheezing and shortness of breath, aggravating existing cases of respiratory and cardiac conditions, and leading to new instances of asthma and other illnesses, particularly among Utah's children.

Economic effects

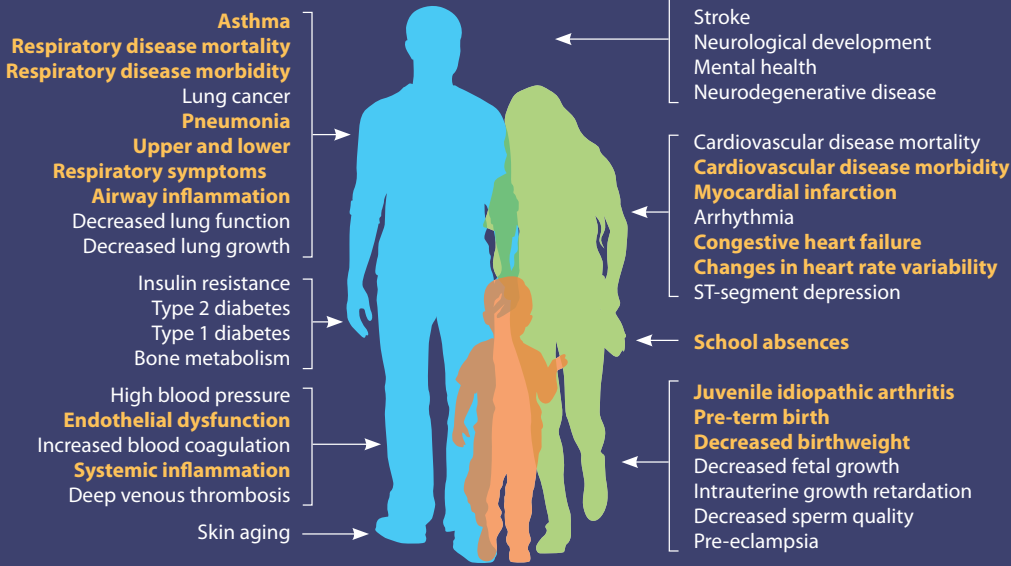
Utah's economy depends on maintaining a business-friendly environment with productive workers to thrive. Our future prosperity is directly tied to our ability to take meaningful, long-range action to combat poor air quality. In addition to millions of dollars spent annually to address emissions-related health conditions, resulting lost productivity creates a drag on the economy. And poor air quality is a growing and alarming obstacle to retaining current businesses and attracting new companies to Utah, particularly in the state's burgeoning technology sector, which depends on attracting highly educated talent.

Quality of life effects

Utahns feel a deep connection to the state's diverse outdoors, from snowy mountaintops to red rock canyons, from the briny waters of the Great Salt Lake to rivers filled with trout and rapids. Besides providing rest and relaxation from our busy lives, Utah's great outdoors serves as an economic engine that employs 110,000 residents and generates more than \$12 billion a year in spending by Utahns and visitors. Poor air quality discourages outdoor activity by residents and affects decisions by potential visitors about where to travel.

Health Effects of Air Emissions and Pollutants

Utah-based health studies highlighted in **yellow**



Source: Adapted from Thurston et al., 2017; Utah health studies included in additional reference list.

Ozone buildup is invisible and a danger year-round. Higher temperatures resulting from changing climate lead to greater ozone formation and more stagnant air. When a person inhales ozone, it is like a sunburn inside the lungs; it causes chest pain, coughing, shortness of breath, and throat irritation.

Pollution Components

	Air Pollutant	Greenhouse Gas
CH₄ (Methane) —A colorless, odorless gas that is the main constituent of natural gas; the primary sources are oil/gas production and wetland decomposition, but it also comes from landfills, coal mining, and burning fossil fuels; a principal atmosphere-warming gas	■	■
CO₂ (Carbon Dioxide) —A colorless, odorless gas produced by burning fossil fuels		■
CO (Carbon Monoxide) —A colorless, odorless gas produced from the incomplete combustion of fossil fuels	■	
CFCs (Fluorinated gases) —Highly reactive, colorless, odorless gases that are both man-made and naturally occurring		■
O₃ (Ozone) —A highly reactive gas composed of three oxygen atoms, both man-made and naturally occurring	■	■
N₂O (Nitrous Oxide) —A clear non-flammable gas that has 300 times the global warming power of CO ₂ ; the majority of the N ₂ O emissions are man-made		■
NO_x (Nitrogen Dioxide and Nitric Acid) —Gases from the combustion of fossil fuels; react in the atmosphere to form O ₃ , PM _{2.5} , and PM ₁₀	■	
Pb (Lead) —Elemental particulate coming primarily from leaded fuel	■	
PM_{2.5} —Particles with a diameter of 2.5 micrometers or less coming from dust, smoke and soot, or formed from chemical reactions in the atmosphere	■	
PM₁₀ —Particles with a diameter of 10 micrometers or less (includes PM _{2.5}) coming from dust, smoke and soot or formed from chemical reactions in the atmosphere	■	
SO_x (Sulfur Dioxide and other sulfur oxides) —Gases produced by burning fossil fuels containing sulfur; react in the atmosphere to form PM _{2.5} and PM ₁₀	■	
VOCs (Volatile Organic Compounds) —Gases containing carbon and hydrogen emitted into the air from products or processes; react in the atmosphere to form O ₃ , PM _{2.5} , and PM ₁₀	■	

Note: These pollution components contribute in different magnitudes to air and greenhouse gas emissions.

Source: Utah Department of Environmental Quality (UDEQ)

Utah and Our Changing Climate

Utah's climate is changing; over the past century, the state has warmed about 2° F. In Utah and throughout the western U.S., heat waves are becoming more common, snow is melting earlier in the spring, flash floods occur more frequently, and tinder-dry conditions contribute to more-frequent and more-severe wildfires.

CO₂ is a naturally occurring, essential element for life on Earth. CO₂ also has many industrial and commercial uses, and it's the build-up of CO₂ and other GHGs like methane in the atmosphere that contributes to the

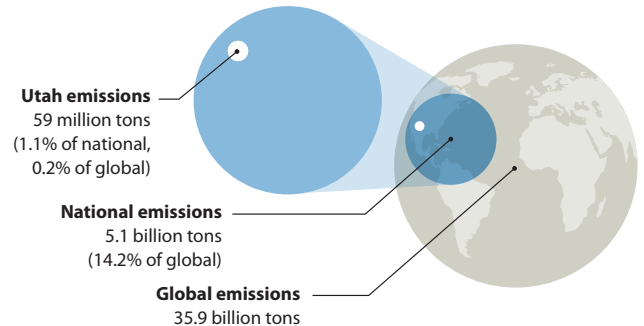
warming of the Earth's surface. Over the last 50 years, heat-trapping gases have warmed Earth's surface and lower reaches of the atmosphere by about 1° F; since the early 1900s, the globe's average temperature is up about 1.8° F. While these small changes may seem inconsequential, climatologists in Utah and elsewhere warn that the impacts are profound, ranging from extreme weather events to increased health risks.

Source: Compiled by the Kem C. Gardner Policy Institute from National Weather Service, Environmental Protection Agency data

Q: **What are Utah's CO₂ emissions and how do they compare to the nation and the world?**

A: In 2016, Utah emitted about 59 million tons of carbon dioxide, a primary greenhouse gas. National emissions for the same year total 5.1 billion tons. Utah's emissions represent 1.1% of the national CO₂ footprint. Global emissions total 35.9 billion tons. Utah represents about 0.2%, of the global CO₂ footprint.

Source: U.S. Energy Information Administration



Source: U.S. Energy Information Administration

Q: **What are Utah's per person CO₂ emissions?**

A: While Utah's overall CO₂ emissions are small on a national and global scale, our per capita emissions are higher than most states. Utah emits 19.3 metric tons per person annual, ranking 31st among states. The U.S. average is 16.0 metric tons.

Source: U.S. Energy Information Administration

Utah's per capita CO₂ emissions are higher than Idaho, Nevada, Colorado, Arizona, and California. New Mexico is the only Rocky Mountain state with higher per capita emissions.

Q: **How does coal affect Utah's emissions' profile?**

A: Utah's per capita CO₂ emissions are relatively high because of coal-fired electricity produced here and exported to other states. Measured by CO₂ emissions of different fuel types, Utah is nearly twice as reliant on coal as other states. Coal accounts for nearly half of Utah's carbon dioxide emissions, roughly double the national average. Utah's CO₂ emissions will decrease significantly in coming years as the state's coal-fired power plants are retired or converted to burn natural gas, which emits about half as much CO₂ as coal.

Source: U.S. Energy Information Administration

Future Coal-Fired Power Plant Changes

- Intermountain Power Plant (IPP) near Delta will switch to natural gas by 2025 and to hydrogen by 2045
- Bonanza Power Plant near Vernal is set to shut down by 2030
- Rocky Mountain Power has "notional" (tentative) plans to close two power plants in Emery County, Huntington (2036) and Hunter (2042)
- Rocky Mountain Power plans to close 16 of 24 coal units serving Utah customers by 2030, and 20 by 2038

Sources: Intermountain Power Agency, Sep. 12, 2019; Salt Lake Tribune, Oct. 7, 2015; Rocky Mountain Power 2019 Integrated Resource Plan; Deseret News, Jan 2, 2019

Effects of a Changing Climate on Utah

Health

- Impacts disproportionately affect children, the elderly, and those with chronic health conditions.
- Higher levels of dust, allergens, and other pollutants worsen respiratory diseases like asthma.
- Higher temperatures increase the range of disease-carrying insects and raise the rates of heat stroke and cardiovascular, respiratory, and kidney diseases.
- Water-borne infections can rise as temperatures rise.

Declining snowpack

- Snowpack in some places decreased nearly 80% between 1955 and 2013.
- Decreasing snowpack levels, combined with warmer spring weather, compromises Utah's water supply, 80% of which come from melting snowpack.

Warmer, drier conditions

- Forests are more susceptible to disease and pests, such as bark beetles, as drought reduces the ability of trees to defend themselves.
- Wildfires are more frequent, more intense and larger, affecting land, property, and human health.

- Heat stroke and dehydration are amplified in urban settings where paved surfaces store and reflect heat.
- Algae blooms are common.

Extreme weather events

- Flash floods are increasing, up six-fold over the past 20 years.
- Smoke from wildfires worsens air quality throughout the state.
- Winter storms are becoming less frequent, but more intense.
- Extreme events can damage public infrastructure, interrupt business, and affect agricultural production.

Sources: National Weather Service, Environmental Protection Agency, Natural Resources Conservation Center

Q: What has state government done to reduce greenhouse gas emissions?

A: The state of Utah has helped develop clean energy resources, promoted alternative fuel vehicles, and supported energy-efficient buildings and appliances. Former Gov. Huntsman convened a Blue Ribbon Commission on Climate Change in 2007. In 2019, the Utah Legislature requested this air quality and changing climate roadmap.

Sources: UCAIR, Utah Legislature

Q: How does air transportation at Utah's airports contribute to Utah's emissions?

A: In 2016, jet fuel consumption at Salt Lake City International Airport and six regional airports throughout the state (Canyonlands, Cedar City, Ogden, Provo, St. George, and Vernal) accounted for 2.7 million metric tons of CO₂ emissions. That's about 5% of Utah's total CO₂ emissions.

Source: U.S. Energy Information Administration

Q: Have other states adopted greenhouse gas reduction targets?

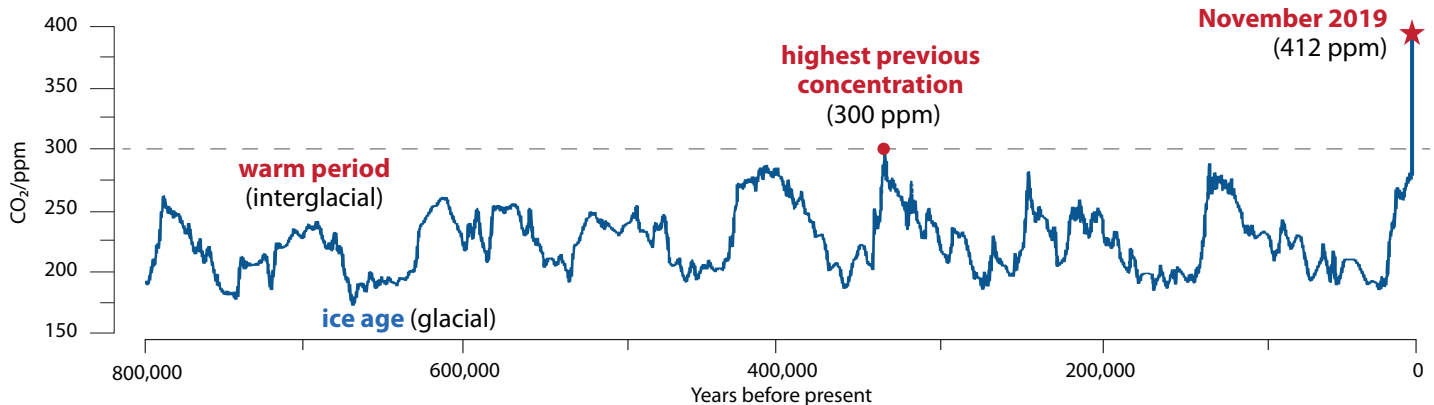
A: Twenty-four states have formulated their own greenhouse gas reduction targets by executive order or statute.

Source: Center for Climate and Energy Solutions

48% of Utahns say immediate action is required to address changing climate causes and impacts

Source: Dan Jones & Associates, Oct. 2019, Salt Lake Chamber

CO₂ concentrations during ice ages and warm periods for the past 800,000 years



Source: U.S. National Academies of Science, NASA

Opportunities

Successful efforts over the past several decades have reduced some types of air emissions by significant amounts. Vehicles are cleaner. Three of Utah's five oil refineries are investing millions of dollars and will soon begin producing cleaner-burning Tier 3 fuels. Residents have responded well to educational efforts and incentive programs that, among other things, encourage people to switch gas-powered lawnmowers and snowblowers for electric ones and wood-burning stoves with less-polluting heating sources.



Once-in-a-generation prospects – such as hosting the Olympic Winter Games for a second time, in 2030 or 2034 – offer enticing motivation to take decisive action to cut emissions and clear the air. “Sustainability,” along with “credibility” and “youth” are the three pillars of the International Olympic Committee’s agenda.

We’re fortunate that proactive efforts at the national, state, and local levels have made Utah’s air less polluted today than in the past. With a strong foundation of existing efforts and commitment from individuals and groups throughout the state, Utah is well-positioned to meet our air quality and changing climate challenges head-on and with vigor.

Why is reducing air emissions so important to Utah’s future?

The answer is simple: All Utahns deserve to breathe clean air, enjoy the splendors of Utah’s natural wonders, achieve their potential and contribute to society. Breathing polluted air, even for short periods, seriously affects the health of every Utahn. Impacts of Utah’s changing climate worsens matters, for example, by raising ozone levels, and increasing particulate air pollutants, such as PM2.5.

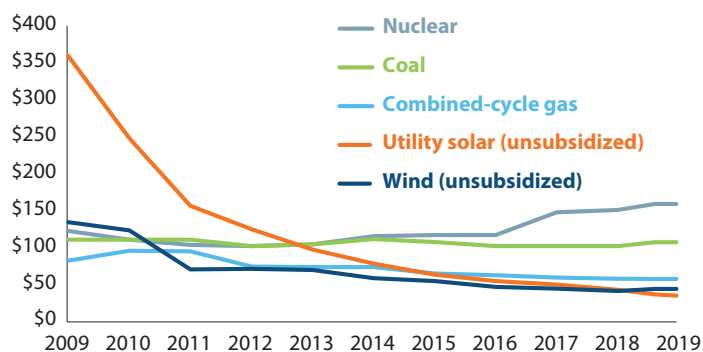
Utahns are rightfully proud of our state’s high quality of life and deeply committed to keeping it that way for future generations. The stakes are high, and our actions to reduce air pollution are crucially important to ensure a healthy and productive population, a prosperous and growing economy, and a beautiful and functional outdoor environment that serves multiple needs.

A gas-powered snowblower for one hour emits as much pollution as driving your car 287 miles.

Utah Department of Environmental Quality

Cost of Utility-Scale Solar Generation Sees Steep Decline over 11 Years

Levelized Cost of Electricity (LCOE) – \$/MWh



Note: LCOE shown is the mid-point of the range given by Lazard
Source: Lazard, Levelized Cost of Energy Analysis, Version 13.0

Healthier, happier & more-productive

Preventing illness generally costs less than treating it. Research conducted at Utah’s colleges and universities shows that even short-term exposure to air pollutants can cause and aggravate severe health conditions, costing the state and individuals millions of dollars a year. Reducing Utah’s emissions can pay big dividends with a healthier, happier, more-productive population, and significant cost savings to individuals, government, business, health systems, and the community as a whole.

The stakes are high and very real for current and future residents. Maternal exposure to fine particulate matter (PM2.5) during the first trimester, for example, can result in a higher risk of pre-term birth and increased healthcare costs of more than \$60,000 per pre-term infant. Costs to treat pneumonia at

Cleaner Tier 3 Fuels & Vehicles Cut Emissions

Utah's refineries—Chevron, Marathon, Silver Eagle, and Sinclair—are committed to sell Tier 3 fuels and have already invested

\$115+ Million Retooling

State post-production incentives are accelerating the change

Significant Reduction in sulfur content in fuels by 2030

Sources: Salt Lake Tribune, Nov, 26, 2019; Marathon Petroleum; Utah Clean Air (UCAIR)

Sales of

Cleaner Tier 3 Vehicles

phased in between 2017 and 2025

New vehicles using Tier 3 fuels emit

80% less pollution than older vehicles

Wasatch Front medical facilities can be lowered by \$1.5 million a year by reducing PM2.5, another study estimates.

In addition to healthcare cost savings and the quality of life boost that cutting emissions can offer, Utah may have a unique opportunity to leverage its research investments into a broader "solutions laboratory." Studies by Utah-based researchers on impacts of pollution on human health, in particular, provide a platform to build upon.

Wealthier, wiser, ready to compete

In addition to the benefits of a healthier Utah, there are further opportunities for the state to prosper as it acts to cut air emissions. Foremost is to defend Utah's commerce and industry, in partnership with the business community, followed by encouraging investment in efforts and technologies that cut emissions, raise energy efficiency, develop energy storage, convert waste to renewable natural gas, and improve crop yield while sequestering carbon.

Support & momentum

Utahns overwhelmingly support efforts to improve air quality and reduce emissions – it's been a top 3 concern for years in polls by news outlets, UCAIR, Envision Utah, and others. Residents recognize that clearing the air is a journey with many mileposts along the way. They have responded positively to calls for changing behaviors like driving less and taking transit more, buying low-emission vehicles, replacing old water heaters and other appliances with new, cleaner models, and becoming better educated about ways families can make a positive difference. Residents want to support additional, meaningful efforts to ensure the Utah of tomorrow is even more vibrant, welcoming, and productive than it is today.

"Reducing particulate matter, like PM2.5, from the air can prevent 76-112 cases of pneumonia per year. This can reduce direct medical facility costs by \$807,000 annually."

Salt Lake Tribune, Oct. 13, 2019

82% of Wasatch Front residents

*say the health effects
of poor air quality are highly
influential motivators to
make personal behavior
changes.*

Source: Lighthouse Research & Development, 2018, for UCAIR

Recommended Policy Options

Utah is headed in the right direction, with many efforts to reduce air emissions put in place over the past several decades. Looking down the road, projected population and economic growth, combined with persistent and evolving air quality and changing climate issues, mean we must remain committed to continually advancing our emissions-reduction efforts, and do so with determination.

The Gardner Institute was asked to provide legislators with policy options to further reduce air pollution, reduce emissions and address changing climate causes and impacts. From more than 55 policy options, seven key strategies—or what we call mileposts—rose to the top after a six-month expert assessment. Fifty-five additional

policy options were identified that provide greatest impact at lowest cost. We suggest these are the best next steps for Utah to pursue.

The Roadmap represents the best work of many disparate perspectives. Advisory Committee participants actively and diligently engaged in the process. Not all participants endorsed every suggested policy action in full, with differences of opinion primarily focused on wanting to encourage more-assertive actions and targets, or to prevent unintended consequences.

MILEPOST

1

Adopt emissions-reductions goals and measure results

Technical Advisory Committee members advocated for setting and measuring clear state-level goals, with specific targets for reducing emissions of air pollutants and greenhouse gases (GHGs). Targets offer tangible, easy-to-understand objectives against which progress can be monitored to demonstrate momentum and success. They also offer direction and certainty to the private sector to make long-term investments in a clean energy future.

Setting achievable targets requires a baseline against which progress can be measured. *Criteria air pollutants* are monitored by Utah's Division of Air Quality within limits set by the federal government, which serve as de facto targets. We also find it helpful to provide a numerical target of a 50% reduction from 2017 levels of criteria pollutants. *Carbon dioxide and other GHGs* are not monitored by Utah, although information can be assembled from other sources, such as the U.S. Energy Information Administration (EIA). Committee participants endorsed the following two goals:

Reduce criteria pollutant air emissions below 2017 levels by 50% by 2050.

Priority actions for consideration by policymakers:

- **Adopt a Utah-style changing climate action plan** – Develop and adopt a Utah approach to a changing climate action plan that matches Utah's unique circumstances and values. Twenty states and many counties, cities and towns in the U.S. and other countries have adopted plans that match their circumstances and values.
- **Evaluate more protective standards** – Analyze and determine if current standards for air pollutants are adequate, or if there are opportunities (within national guidelines) to strengthen limits to address Utah's unique topography and health and economic development needs.

Reduce CO2 emissions statewide 25% below 2005 levels by 2025, 50% by 2030, and 80% by 2050.

Select Utah Air Quality and Changing Climate Success Stories



LOCAL LEADERSHIP

Local leaders and municipalities have made great strides in committing to improving air quality. For example, in the past two years, Cottonwood Heights created code to address vehicle engine idling, created a Parks, Trails and Open Space Committee, and joined the sustainable energy resolution, with a goal to transition to 100 percent renewable energy for city operations by 2022, and for the city at large by 2030. Provo City is another great example, purchasing EVs, partnering with UTA to develop a free bus rapid transit system, securing a \$750,000 grant to install electric vehicle charging stations, and hiring their first sustainability coordinator for the city.



UTAH TRANSIT AUTHORITY (UTA)

UTA is helping clean the air by providing over 44 million transit trips per year. They are making efforts to move to a greener, more-sustainable model. The agency operates 54 electric-hybrid buses, three fully electric buses, 47 buses powered by natural gas, and a new electric autonomous shuttle. UTA plans to expand its green fleet in the future.



ROCKY MOUNTAIN POWER

Rocky Mountain Power plans to build more than 4,600 megawatts of new wind-generated electricity by 2038, more than 6,300 megawatts (3,000 MW in Utah) of new solar capacity by 2038, and more than 2,800 megawatts (635 MW in Utah) of new battery storage by 2038.

Sources: Utah Department of Transportation, Cottonwood Heights City, Provo City, Rocky Mountain Power



Lead by example

Legislators set air quality and changing climate policy that applies to all Utahns. Law-makers are also in the unique position of being able to take quick action to jumpstart statewide policies by “leading by example.”

Utah has a long history of leading by example in many areas, including efforts to reduce emissions, improve air quality, and boost energy-efficiency. Buying zero- and low-emission vehicles for state fleets, retrofitting older state buildings to be more energy-efficient, and encouraging teleworking, are just a few of the opportunities Utah currently employs.

In the 2019 General Session, legislators made history by appropriating a record-high \$29 million for air quality initiatives. About half of that amount will allow Utah to ramp up teleworking programs for state employees, add vehicle-charging stations at state buildings, and replace older vehicles. State leadership also includes funding statewide efforts to educate Utahns about air pollution and its efforts, suggest ways residents can take meaningful action, and motivate behavior change.

Priority actions for consideration by policymakers:

- **Zero- and low-emission vehicles** – Convert all state fleets to zero - and low-emissions vehicles as soon as possible. (Options include electric vehicles and those that run on compressed natural gas and renewable natural gas.)
- **Building efficiencies** – Adopt robust energy-efficiency goals for all state buildings
- **Telework** – Complement recent teleworking investments by establishing strong telework targets
- **Oil and gas leaks** – Develop and implement appropriate administrative rules to limit oil and gas leaks
- **Reforestation** – Provide additional funding for reforestation efforts
- **Energy planning** – Invest more in statewide energy planning
- **Educate and outreach** – Add resources to build on successful education and outreach efforts

MILEPOST
3

Create a premier air quality/ changing climate solutions laboratory

We recommend Utah establish and fund a premier state-level air quality/changing climate research solutions laboratory to improve the monitoring network, conduct research, advance new technologies, and convene entrepreneurs and experts to innovate.

Utah's colleges and universities produce leading-edge research on the formation and impacts of air pollution and atmosphere-warming gases. Local health and medical researchers are plowing new ground to understand how quickly and dramatically emissions can lead to and aggravate asthma and other respiratory conditions, premature births and low birth weights, diabetes, neurological disease, and other illnesses. The state's atmospheric scientists are working to unravel the complexities of how air emissions mix and combine when released into Utah's high mountain valleys, desert basins and red rock canyons. The state's long history of community-based, quality-growth planning efforts, the principles of which help improve air quality and reduce emissions, is nationally respected. Entrepreneurial Utahns are innovators in renewable energy and storage solutions, and the state's education efforts are successful at sharing information and motivating lasting behavior change.

Priority actions for consideration by policymakers:

- **Appoint a lead entity** – Utah's air quality and changing climate experts reside in multiple research settings, including colleges and universities, state and local agencies, non-profit entities, and the private sector. A lead entity is required to organize and convene this effort.
- **Set aside funding for an initial assessment and feasibility study** – An initial assessment will provide valuable "proof of concept" information to guide further funding and research. If the initial assessment is positive, Legislators can consider ongoing funding and leadership plan for the nation's premier state-level air quality/ changing climate research laboratory.
- **Convene experts** – Convene experts in air quality, atmospheric sciences, health and medicine, engineering, economics, education, public policy, and other disciplines to share insights and develop a work plan. Report annually to the Utah Legislature.

Select Utah Air Quality and Changing Climate Success Stories



SOLITUDE MOUNTAIN RESORT

Solitude ski resort will reward car-pooling and public transit by charging visitors for parking, the first Utah resort to do so. Parking fees fall as vehicle occupancy rises. Solitude's goal is to help cut air emissions, to improve air quality by reducing traffic congestion and the unnecessary idling it causes.



DOMINION ENERGY

Dominion Energy is partnering with Smithfield Foods to invest \$500 million over 10 years in renewable natural gas projects across the U.S., including Utah. When fully implemented, the effort will prevent more than 2.5 million metric tons of greenhouse gases from entering the atmosphere – equivalent to taking more than 500,000 cars off the road or planting over 50 million new trees. The partnership's renewable natural gas project in Milford, Utah, goes into operation in 2020 and will produce enough energy to power more than 3,000 Utah businesses.

Sources: Solitude Mountain Resort, Dominion Energy



Accelerate quality growth efforts

Utah is nationally recognized for its decades of careful planning for future population and economic growth to preserve its high quality of life. Statewide strategies successfully encourage communities to increase housing options, preserve open space, and provide transportation choices.

The Wasatch Choice 2050 Vision, crafted jointly with public and civic partners and recently adopted by the Wasatch Front Regional Council, outlines well-developed goals and strategies to accommodate population growth, maintaining a robust economy, improving air quality and ensuring high quality of life for all Utahns. The Wasatch Choice 2050 Vision

provides a practical path forward for communities along the Wasatch Front, and offers examples for other parts of Utah to coordinate state and local decision-making and investments in transportation, housing, economic development, open space, and other community needs.

In addition to a strong commitment to state and local planning and implementation efforts, it's essential to engage the general public and allow Utahns to be part of the solution. Utah's long-running air quality education and behavior change efforts, along with partnerships with energy providers, save consumers millions of dollars a year by lowering energy use, while also reducing emissions and improving air quality.

Priority actions for consideration by policymakers:

■ **Speed up implementation of Wasatch Choice 2050**

Vision – The Vision emphasizes ways that allow Utah to enhance quality of life, even as the state grows, through a shared, coordinated approach to transportation investments, development patterns, and economic opportunities. Key elements include:

- **Provide transportation choices** – Increase investment in transit and active transportation infrastructure and – as importantly – frequent and convenient bus and rail service that builds ridership and connects residents with opportunities.
- **Support housing options** – Enhance options for multifamily housing and job centers in proximity to transit and trails, so people have the choice to take transit, bike, or walk to work, school and other key destinations.
- **Preserve open space** – Weave parks and trails into the fabric of our communities to encourage a more active lifestyle, less driving, and better health.
- **Link economic development with transportation and housing decisions** – Encourage local governments to incorporate emissions-reduction strategies in community and economic development efforts and projects, including coordinating housing and job locations with transportation to enable shorter travel and more transit, biking, and walking.

■ **Encourage all Utah communities to customize and apply quality growth principles**

– Many Utah communities have adopted quality growth strategies or programs that are appropriate for their residents and needs. Other communities can adapt these best practices to guide their futures and enhance quality of life.

- **Improve energy efficiency in buildings** – Strengthen residential and commercial building standards, and incentivize their adoption, to reduce emissions, improve air quality, increase energy efficiency and lower costs for building owners, tenants, and residents.

- **Increase education, outreach and incentive programs** – Efforts to reach out to and educate Utahns about how they can participate in reducing emissions and improving air quality have been successful in motivating residents to change behaviors, like driving less, taking transit more often, and making energy-efficiency improvements at home. An increase in these investments can pay even greater dividends.

Make Utah the “market-based” electric vehicle (EV) state

About 2 percent, or 52,000, of the 2.6 million vehicles registered in Utah are fully electric, plugin electric, or hybrid gas/electric. Most are hybrids, although purchases of fully electric vehicles are growing at a quicker rate. Utah is involved with many EV-related efforts, including projects to reduce “range anxiety,” expanding the network of EV-charging stations throughout all areas of the state, and developing EV corridors along interstate highways in cooperation with neighboring states, utilities, and other agencies. State and many local agencies are also leaders in adopting EVs for their fleets; roughly 10 percent of state government’s fleet consists of hybrid or all-electric vehicles.

Until the end of 2016, Utah offered tax credits of up to \$1,500 for purchases of new clean fuel vehicles. A similar federal tax credit of up to \$7,500 is available for most EV models and is available until individual manufacturers reach federal targets. Utah is now studying the possibility of replacing the fuel tax with a fee based on vehicle-miles driven, one result of which may be a more transparent way for consumers to compare the costs and benefits of EVs with other vehicles. Utah’s electricity rates are among the nation’s lowest, offering further incentive to increase availability and adoption of EVs.

Utah auto dealers have much to offer as the state pursues a market-based strategy. The “push” and “pull” of regulations and incentives can be disruptive to existing businesses and entire

markets. By involving experts in the auto industry, unintended consequences can be avoided. It’s also critical that when the state commits to a course of action, it stays the course and provides long-term certainty to the market.

Priority actions for consideration by policymakers:

- **Expand EV network** – Complete expansion of Utah’s network of EV-charging stations to cover all communities, state highways, and scenic byways as quickly as possible.
- **Involve Utah auto dealers in strategies** – Involve Utah auto dealers in a strategy to increase the supply of low-emission vehicles, and particularly EVs, available to Utah consumers.
- **Target incentives** – Target incentives towards middle and low-income Utah households, replacement of vehicles 12 years or older, and home charging stations.
- **Lead by example in the public sector and large private fleets** – Accelerate the adoption of EVs among key public and private fleets with large impacts, including high mileage vehicles (e.g. taxis and ride-hailing services) and medium and heavy-duty vehicles (e.g. transit buses and garbage trucks).

Select Utah Air Quality and Changing Climate Success Stories



EV CHARGING INFRASTRUCTURE

In addition to a \$7 million matching grant from the state of Utah and a \$4 million matching grant from the U.S. Department of Energy, Rocky Mountain Power will invest \$10 million in electric vehicle charging stations. The goal is to connect Disneyland to Yellowstone National Park – and everything in between – with electric vehicle charging stations installed along interstate highways and places of business.



GOLDEN SPOKE TRAIL NETWORK

Encouraging use of active transportation, the Golden Spoke trail network consists of more than 100 miles of separated, connected, and paved multi-use trails stretching from Ogden to Provo. This network is the result of 30 years work and a collaborative effort of several municipal, county, regional, and state agencies along with private entities. It includes Ogden River Parkway, Denver & Rio Grande Western Rail Trail, Legacy Trail, Jordan River Trail, Murdock Canal Trail, and Provo River Parkway and is the longest network of continuous, multi-use trails west of the Mississippi River

Utah Department of Transportation, Utah Department of Environmental Quality,UCAIR, Wasatch Front Regional Council

MILEPOST

6

Provide transition assistance to impacted rural communities

Utah's economy was built and sustained for decades by mining the state's raw materials – precious metals like copper, silver and gold, and fuels like oil, gas and coal. Communities that grew up to support these industries have met various fates: some were absorbed into larger cities nearby, some became ghost towns, and the rest struggle to adapt to the rapidly changing energy market.

While it may seem to be a dichotomy, Utah has opportunities to balance its long-established “all of the above” energy-development strategy with efforts to assist communities to diversify their economies and expand the types and number of well-paying, family-sustaining jobs.

Some states have incorporated significant funding for community assistance to retire solid-fuel power plants earlier than utilities had planned – an action supported through securitization agreements by some members of the Technical Advisory Committee. Assistance efforts are funded in other ways, as well.

The Utah Coal Country Strike Team – created and managed by the Gardner Institute in mid-2019 to help communities in coal-rich Carbon and Emery counties diversify their economies and raise incomes by 10 percent – is supported with funds from state government, national foundations, and individuals.

Priority actions for consideration by policymakers:

- **Prioritize rural economic development in energy-dependent areas** – Focus economic development investment and partnerships in Carbon, Duchesne, Emery, Millard, San Juan, Sevier, and Uintah counties, building upon each community's competitive assets, such as close proximity to high-performing urban areas, transportation opportunities, institutions of higher learning, tourism attractions, and broadband access.
- **Provide training/scholarships** – Diversify rural economics by providing an array of information technology and other training opportunities, including scholarships and a pathway to jobs.
- **Invest in placemaking** – Rural Utah will become a more attractive place to invest as Main Streets, other thoroughfares, and tourism opportunities receive funding for improvements.
- **Invest in housing** – Housing stock revitalization will help make rural Utah a safer place to invest.
- **Capitalize on opportunity zones** – Utah's 19 federal opportunity zones in rural Utah provide a significant tax benefit and will help motivate investment in jobs and opportunities for local residents.

MILEPOST

7

Participate in the national dialogue about market-based approaches to reduce carbon emissions

We recommend the state actively participate in national discussions about how to harness the power of market forces and new technologies to reduce carbon emissions in a way that does not negatively impact Utahns. Market-based incentives for renewable energy, energy storage, enhanced energy efficiency, carbon capture utilization and storage, carbon pricing that is revenue-neutral and border-adjusted, cap-and-trade approaches, and other options may offer positive solutions for reducing emissions.

We encourage proposals that are simple and provide certainty. We also recognize the power of research, development, and innovation to make the distribution and transmission grid more efficient, enhance storage options, and bring down the cost of carbon-free generation sources. We acknowledge the value of organized markets that take advantage of the geographic and fuel diversity of carbon-free generation. We also acknowledge the value of maintaining affordable customer costs while decreasing carbon emissions.

Priority actions for consideration by policymakers:

- **Create a carbon policy committee** – The governor and Legislature may want to create a state-level policy committee to explore national approaches/local solutions for a market-based approach to reduce carbon emissions.
- **Engage with the Utah Congressional Delegation** – The governor and Legislature may want to engage with the Utah Congressional Delegation to explore how Utah could exert national leadership on this issue.
- **Incorporate into a Utah-style changing climate action plan** – Market-based approaches to reduce carbon emissions could be a major component of a Utah-style changing climate action plan.

Prioritized Strategies

MILEPOST
1 **Adopt emissions-reduction goals and measure results**

MILEPOST
2 **Lead by example**

MILEPOST
3 **Create a premier air quality/ changing climate solutions laboratory**

Markers along the path to cleaner air and reduced emissions

The Gardner Institute and Technical Advisory Committee reviewed past Utah-specific work on air quality and changing climate completed by Envision Utah and the 2007 Blue Ribbon Advisory Council. This previous analysis included over 200 policy options. After a six-month expert assessment, we prioritized 55 of these options as those with the greatest impact at the least cost. The Gardner Institute then selected seven strategies – or what we call mileposts – as the first areas of focus.

In addition, the multidisciplinary team of experts identified 55 policy options that provide the greatest impact at the lowest cost. We call these “markers” along the path to cleaner air. And while all of these markers are worthy of discussion, not all members of the Technical Advisory Committee agreed with every suggested marker. We provide all 55 here as a starting point along the path to cleaner air.

Together, these mileposts and markers, along with the policy discussions they inspire, provide positive solutions to address the health, economic, environmental and life quality impacts caused by air pollution and greenhouse gas emissions.

	Energy Supply	Agriculture & Forestry <i>(Biomass Management)</i>	
Direct State Action	<ul style="list-style-type: none"> Evaluate transmission constraints and solutions to integrate more electricity from low-carbon resources 	<ul style="list-style-type: none"> Provide funding for reforestation 	
Educate & Motivate	<ul style="list-style-type: none"> Create a fuel neutral energy savings standard for electric and gas utilities. 		
Incentivize	<ul style="list-style-type: none"> Implement securitization for early retirement of coal-fired power plants Provide transition support for communities whose work sector relies heavily on carbon-emitting generation Promote, incentivize clean distributed generation and storage Promote carbon capture and sequestration Create consumer incentives for reduced and energy efficient fuel use. Extend or increase consumer incentives for reducing fuel consumption, i.e. demand side management strategies Support national and regional initiatives to put an economy-wide price on greenhouse gas emissions through resolution or legislation. 	<ul style="list-style-type: none"> Provide incentives and training for agricultural soil sequestration 	
Regulate	<ul style="list-style-type: none"> Revise Utah’s existing renewable portfolio standard Support demand response and grid optimization Allow 3rd party power supply options outside regulated utilities Support renewable natural gas optimization and standards Upgrade control technology 	<ul style="list-style-type: none"> Develop policies that encourage compact development instead of sprawl into forests or agricultural lands. Enhance budget for fire management 	



Accelerate quality growth efforts



Provide economic transition assistance to rural communities



Position Utah as the market-based EV state



Participate in national dialogue about market-based approaches to reduce carbon emissions

Residential Commercial Industrial	Transportation and Land Use
<ul style="list-style-type: none"> • Adopt government lead-by-example energy efficiency goals • Develop administrative rule for leaks 	<ul style="list-style-type: none"> • Establish state agency lead-by-example teleworking targets
<ul style="list-style-type: none"> • Increase awareness of Commercial Property Assessed Clean Energy (C-PACE), a Utah program supporting installation of capital intensive energy equipment • Encourage enhanced Demand Side Management (DSM) • Encourage energy efficiency audits for small industrial and commercial facilities 	<ul style="list-style-type: none"> • Educate about air quality and emissions benefits of newer vehicles • Encourage carpooling (outreach) • Implement Wasatch Choice 2050 Vision approaches • Encourage teleworking in non-governmental sectors
<ul style="list-style-type: none"> • Incentivize collection of methane by charging royalties/ penalties for vented or flared methane • Provide industrial specialists for review and opportunity of improvements with small industrial/commercial facilities • Develop programs for deep-efficiency retrofit services for low-income families • Incentivize programs for home performance with Energy Star • Incentives and training for net zero builders and contractors • Promote zero-/low-emission heating and cooling tech • Encourage energy efficiency audits for small industrial and commercial facilities • Develop on-bill financing for Energy Efficiency • Promote combined heat and power 	<ul style="list-style-type: none"> • Develop new electric vehicle (EV) incentives • Create a statewide electric vehicle charging network (expand EV charger network) • Promote heavy duty vehicle & off road vehicle clean fuel alternatives to diesel • Incentivize purchase of latest vehicles in order to achieve lower emissions from Tier 3 fuels • Incentivize carpooling/ develop mechanisms that send appropriate price signals that address congestion, single occupant vehicles, etc. • Promote active transportation by increased funding of the Utah Outdoor Recreation Grant (UORG) and Utah's Unified Transportation Plan • Incentivize job centers & multi-family housing near transit • Encourage freight, rail, or pipeline transport rather than truck
<ul style="list-style-type: none"> • Utilize Utah Air Quality Board administrative rule-making authority to regulate oil and gas sector leaks and fugitive emissions • Adopt 2021 Residential and Commercial building codes • Enhance emissions inspection of industrial facilities • Use regulatory control to ensure adoption of best available control technologies (BACT) 	<ul style="list-style-type: none"> • Adopt a Zero Emission Vehicle Program (ZEV) • Regulate the adoption of latest vehicles in order to achieve lower emissions from Tier 3 fuels • Authorize additional transit-oriented development (TOD) • Reduce or eliminate transit fares for targeted populations • Increase transit funding • Improve first- and last-mile transit connections

Legislative Request and Input

The Utah Legislature took two actions that guided the work of the Air Quality/Changing Climate Technical Advisory Committee. In the 2018 General Session, the Utah Legislature passed House Concurrent Resolution 7, which, among other items, prioritized the state’s “understanding and use of sound science to address causes of a changing climate.” The resolution also seeks to find positive solutions.

In the 2019 General Session, legislators approved funding for a review of air quality and changing climate research, as itemized in Senate Bill 3:

The Legislature intends ... funding provided by this item be allocated as follows to the Kem C. Gardner Institute: ... (c) \$200,000, one-time, for the development of an air quality and climate research study to be delivered no later than December 13th, 2019.

In addition, the Gardner Institute, with support from the Senate President and Speaker of the House, hosted a facilitated discussion with legislators to seek guidance on how best to address legislative needs in preparing The Utah Roadmap.

“If we don’t think about Utah’s long-term future...who will?”

House Speaker Brad Wilson, Utah Legislature Policy Summit, September 17, 2019

Legislative Roundtable

On November 5, 2019, two Democrats and four Republicans (one senator and five representatives) attended a facilitated discussion at the State Capitol on The Utah Roadmap. The following themes emerged:

■ One-page summary

Legislators in attendance urged that the Roadmap include a succinct one-page summary document for quick reference, with additional material available for further detail.

■ High-impact options

Participants were hopeful the document would contain approximately five suggested “high-impact” options. Four key policy classification categories emerged during the discussion: *Direct State Action, Educate and Motivate, Incentivize, and Regulate.*

■ ROI and tradeoffs

Participants requested as much information as possible about the return-on-investment (ROI) and tradeoffs associated with policy options.

■ Rural impacts

Participants noted the importance of including specific rural area needs.

**CONCURRENT RESOLUTION ON ENVIRONMENTAL AND
ECONOMIC STEWARDSHIP**
2018 GENERAL SESSION
STATE OF UTAH

Chief Sponsor: Rebecca P. Edwards

Senate Sponsor: Todd Weiler

Be it resolved by the Legislature of the state of Utah, the Governor concurring therein:

WHEREAS, Utah has a tradition of supporting good stewardship of our land, air, and water;

WHEREAS, Utah is a leader in technological innovation, ingenuity in problem-solving, and working together to create solutions;

WHEREAS, preservation of Utah's economic longevity and role as a leader in fiscal responsibility depends on prudent management of natural resources;

WHEREAS, protection, conservation, and reasonable management of the natural environment are essential principles of responsible stewardship;

WHEREAS, Utah recognizes the inherent worth of our natural resources, in addition to their economic value, in their contribution to our identity and their role in inspiring creativity, strengthening families, and providing for future generations;

WHEREAS, the Department of Health has issued a report outlining the increased risk of extreme weather events, including wildfires, water scarcity, and flooding;

WHEREAS, the impacts of a changing climate may affect Utah citizens and impair productivity in key economic areas;

WHEREAS, any efforts to mitigate the risks of, prepare for, or otherwise address our changing climate and its effects should not constrain the economy nor its global competitiveness; and

WHEREAS, Utah recognizes that stewardship includes fostering and maintaining resilient ecosystems that have the capacity to adapt to our changing environment:

NOW, THEREFORE BE IT RESOLVED that the Legislature of the state of Utah, the Governor concurring therein, commits to working constructively, using our heritage of technological ingenuity, innovation, and leadership to create and support economically viable and broadly supported private and public solutions, including in rural communities.

BE IT FURTHER RESOLVED that we should prioritize our understanding and use of sound science to address causes of a changing climate and support innovation and environmental stewardship in order to realize positive solutions.

BE IT FURTHER RESOLVED that the Legislature and the Governor encourage individuals, corporations, and state agencies to reduce emissions through incentives and support of the growth in technologies and services that will enlarge our economy in a way that is both energy efficient and cost effective.

BE IT FURTHER RESOLVED that a copy of this resolution be sent to the members of Utah's congressional delegation.

Path to the Roadmap

The Gardner Institute used its Informed Decisions Research Process to prepare the Utah Roadmap. The process included convening the Technical Advisory Committee to identify and evaluate policy options to reduce emissions and improve air quality. The Advisory Committee underwent a collaborative process that relied on data and research, and feedback from roundtable discussions, focus groups, and public input to develop The Utah Roadmap.



Technical Advisory Committee

The Technical Advisory Committee developed the Utah Roadmap to provide legislators with positive solutions on climate and air quality. The committee included 37 individuals with technical expertise in applicable fields – atmospheric science, health and medicine, energy production, transportation and land use, economic development and other fields. They followed eight principles that guided their effort in developing the Roadmap.

Between August and December 2019, the Technical Advisory Committee met five times to help identify emissions-reduction strategies and assess their effectiveness, based on evaluation criteria. At the meetings, committee members identified emissions-reduction strategies and goals, assessed their effectiveness, and provided feedback on draft documents. The committee held additional working group meetings to assist with assessment of the policy options.

The Committee relied on data and research from the Utah Department of Environmental Quality, Utah Division of Air Quality, Utah's public and private universities, former Gov. Huntsman's 2006 Blue Ribbon Advisory Council on Climate Change, Envision Utah, national and international organizations, and other sources. Feedback from the public,

interest groups, businesses, and others was gathered through meetings, roundtable discussions, and focus groups as part of the process to develop the Roadmap. The three roundtable discussions included business and community leaders, legislators, and student body officers from colleges and universities throughout Utah. Three focus groups were held in Salt Lake City, Richfield, and Duchesne, to gather additional input. The Utah Roadmap will be available to the public for several weeks in January 2020 to allow interested individuals and organization to review the Roadmap and send along input and questions. The Gardner Institute will review and consider input as they finalize recommendations.

Evaluation Criteria

- Efficacy at reducing criteria air pollutants and precursors
- Efficacy at reducing greenhouse gases
- Regulatory feasibility and ease of implementation at state and local levels
- Policymaker and community support
- Health impacts
- Economic feasibility



Gardner Institute staff, consultants, and Technical Advisory Committee



The Utah Roadmap Guiding Principles

1. Respect for legislative role

We respect the decision-making role of the Utah Legislature and will ground our efforts in the Concurrent Resolution on Environmental Stewardship (H.C.R. 7), passed during the Legislature's 2018 General Session.

2. Build from past work

We will benefit from prior work completed under gubernatorial direction by Envision Utah and the 2007 Blue Ribbon Advisory Council and Stakeholder Working Group established under Governor Huntsman.

3. Data-driven

We will recommend potential intervention strategies that are data-driven and grounded in science.

4. Positive solutions

We recognize potential intervention strategies to reduce air emissions can help address both poor air quality and the causes of our changing climate. We

encourage taking immediate actions to address both of these critical issues and we specifically highlight air quality improvements because they inspire public consensus and urgency.

5. Seek broad acceptance

We acknowledge that potential intervention strategies will be easiest to implement and have the greatest degree of success if they are clearly understood and broadly accepted by Utah residents and policymakers.

6. Criteria-based assessment

We assess potential intervention strategies using criteria that reflect Legislative direction, including the degree of efficacy in reducing emissions and improving air quality, the ease of implementation at the state and local level, policymaker and community support, economic feasibility, health impacts, and regulatory feasibility.

7. Public input

We recognize our charge is a technical endeavor, not a decision-making endeavor that requires extensive public input. However, we value public input on our technical research and will engage focus groups to gather information and will release a draft roadmap for public comment before finalizing.

8. Diversity of opinion

We respect diversity of opinion and understand arriving at a set of intervention strategies may be difficult; if necessary, we will provide opportunity to incorporate differing viewpoints in our final roadmap.

Technical Advisory Committee

Nearly 40 individuals with technical expertise in applicable fields were assembled to help identify emissions-reduction strategies and assess their effectiveness, based on adopted evaluation criteria. These experts freely shared their time, knowledge, and experience through multiple working group and committee meetings. While all Advisory Committee participants actively and diligently took part in the process, not all endorsed every suggested policy action in full, with differences of opinion primarily focused on wanting to encourage more assertive actions and targets.

Participants also suggested that an ongoing process be established to track progress and periodically update emissions-reduction strategies. As one participant put it, *"This is a first step – a very positive first step – on a long journey. Success requires all of us, and everyone in Utah, to remain dedicated and committed to seeing these actions put in place."*

Participants

Tom Adams, Governor's Office of Outdoor Recreation
Scott Baird, Utah Department of Environmental Quality
Vicki Bennett/Tyler Poulson, Salt Lake City Department of Sustainability
Bryce Bird/Glade Sowards/Becky Close, Utah Division of Air Quality
Josh Brown/Jenny Esker, Rio Tinto
Andrea Brunelle, University of Utah, Geography Department
Thom Carter, UCAIR
Jon Cox/James Owen, Rocky Mountain Power
Brett Crable, Dominion Energy
Royal DeLegge/Michael Shea, Salt Lake County
Robert Gillies/Binod Pokharel, Utah State University
Andrew Gruber/Kip Billings, Wasatch Front Regional Council
Thomas Holst/Juliette Tennert, Kem C. Gardner Policy Institute
Benjamin Horne, Intermountain Healthcare

Ben Huot, Utah Department of Transportation
Liza Kasavana, University of Utah Health, College of Nursing
Kerry Kelly, University of Utah, Department of Chemical Engineering
Michelle Larsen/GJ LaBonty, Utah Transit Authority
Brian McInerney, National Weather Service
Shauna Mecham, Mountainland Association of Governments
Daniel Mendoza, University of Utah, Department of Atmospheric Sciences and Pulmonary Division
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Natalie Gochnour/Jennifer Robinson/Dianne Meppen/
Samantha Ball/Meredith King/Paul Springer,
Kem C. Gardner Policy Institute

Focus Groups

Rural, Urban, Industry, Legislative, and Youth Leadership

Dedicated to the lives, spirits, and public service of:

Dianne Nielson – 1948-2019

Executive Director, Utah Department of Environmental Quality, 1994-2007

Rick Sprott – 1946-2017

Executive Director, Utah Department of Environmental Quality, 2007-2009;
Director, Utah Division of Air Quality, 2000-2007

INFORMED DECISIONS™

