The Utah Roadmap

Positive solutions on climate and air quality

TECHNICAL SUPPLEMENT

www.gardner.utah.edu/utahroadmap

February 19, 2020

Table of Contents

The Utah Roadmap

Positive solutions on climate and air quality

The Utah Legislature asked the Kem C. Gardner Policy Institute to prepare an air quality and changing climate roadmap to inform state decisions. With the assistance of a 37-person Technical Advisory Committee, the Gardner Institute prepared the document: The Utah Roadmap: Positive solutions on climate and air quality. This Technical Supplement provides further documentation of the process, research, public feedback, references, and other items used to create The Utah Roadmap. This supplement also includes the media coverage on The Utah Roadmap as of January 31, 2020.

The Gardner Institute thanks the Utah Legislature and the members of the Technical Advisory Committee for their support of this important research. Additional information about The Utah Roadmap can by found at www.gardner.utah.edu/utahroadmap.

Air Quality / Changing Climate Technical Advisory Team

Workbook 1

Meeting 1 of 4

August 1, 2019

INFORMED DECISIONS™

Agenda

August 1, 2019
8:30 – 10:30am
8:15-8:30am Check-In & Continental Breakfast

Welcome ..... Tom Holst, Gardner Institute

Director's Message ..... Natalie Gochnour, Gardner Institute

- About the Gardner Institute
- Purpose & Legislative Request
- Recommended Guiding Principles
- Desired Outcome/Deliverable

Advisory Team Process ..... Siobhan Locke, The Langdon Group

- Process Expectations & Mechanics
- Framing Interventions
    - Inside the Frame
    - Outside the Frame
- Setting Goals for Positive Air Quality & Changing Climate Interventions

Group Discussions of Goals ..... Siobhan Locke, The Langdon Group

Group One:	Vicki Bennett, Josh Brown, Royal Delegge, Ben Huot, Kerry Kelly, Hailey Klotz
Group Two:	Scott Baird, Tara McKee, Cheryl Pirozzi, Tyler Poulson, Matt Sibul, Sarah Wright
Group Three:	Bryce Bird, Brett Crable, Josh Craft, Andrew Gruber, Brian McInerney, Logan Mitchell
Group Four:	Kip Billings, Andrea Brunelle, Jim Ehleringer, Shauna Mecham, Binod Pokharel, Juliette Tennert , Brooke Tucker
Group Five:	Thom Carter, Benjamin Horne, Daniel Mendoza, Laura Nelson, James Owen

Report Out and Discussion of Each Group's Goals..... All
Next Steps and Schedule..... Tom Holst, Gardner Institute

Adjourn

Future Meetings *– August 22, September 19 and October 24, 2019*

All Meetings at 8:30 – 10:30 am at Gardner Institute

Purpose & Legislative Request

The Utah Legislature has taken two actions that guide the work of the Air Quality/Changing Climate Technical Advisory Team. 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.*

The Kem C. Gardner Policy Institute develops and shares economic, demographic, and public policy research that sheds light and helps people make *INFORMED DECISIONS™*.

We have convened a technical advisory team and contracted with facilitation and communications experts to help us guide a rigorous, effective, organized, and time-constrained technical process.

Information gathered during Technical Advisory Group sessions, including potential interventions, will be combined with other data and public feedback to develop an air quality/changing climate "roadmap" for use by legislators as they consider legislation in the 2020 General Session and beyond.

Enrolled Copy **H.C.R. 7**

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.

Air Quality / Changing Climate Guiding Principles

The following principles guide the Kem C. Gardner Policy Institute's efforts to develop a "roadmap" of potential ways to improve Utah's air quality and address our changing climate, as requested by the Utah Legislature and to be delivered by Dec. 13, 2019. We ask that Technical Advisory Team members review these recommended principles for discussion and concurrence at the Aug. 1 meeting.

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 2006 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. **Air quality emphasis**
   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.

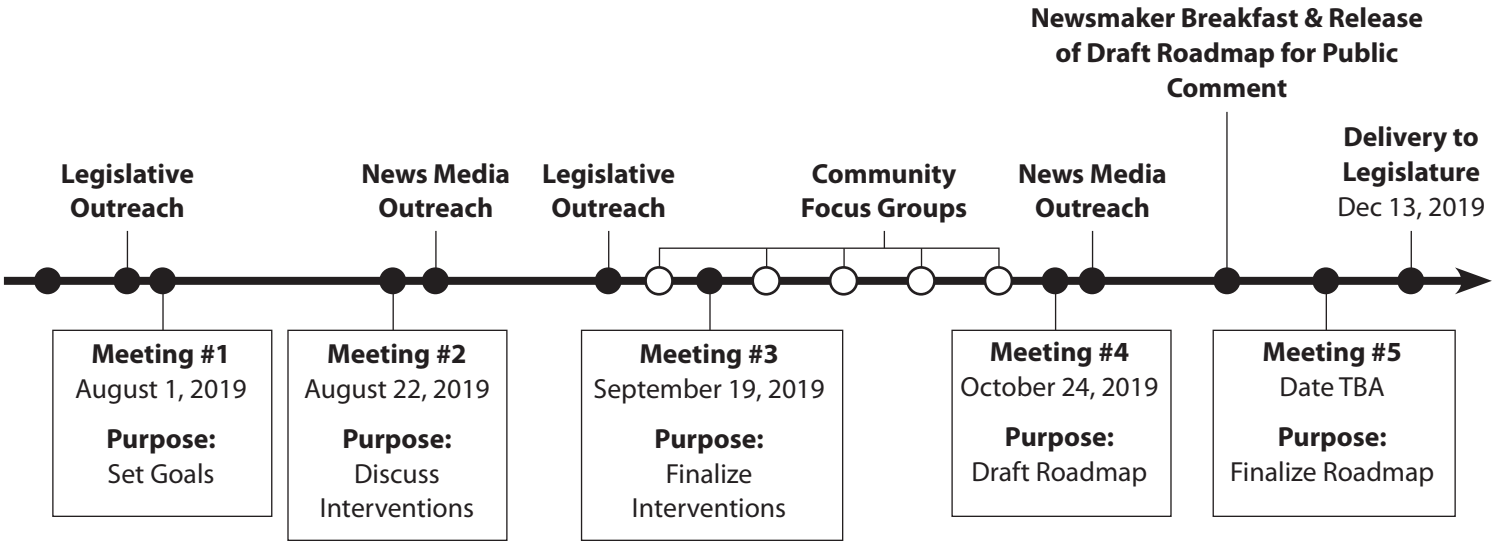
5. **Seek broad acceptance**
   We acknowledge that potential intervention strategies will be easiest to implement and have the greatest degree of success if they are clearly understood and broadly accepted by Utah residents and policymakers.

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.

Process Timeline



Notes

Goals for Positive Solutions

Setting goals for reducing air emissions that are both aspirational and achievable is key to this effort. Targets give us tangible objectives to aim for and they provide metrics to measure our progress. They can also provide residents and policymakers with a sense of urgency and encourage continued action to reach and surpass our desired outcomes.

At today's meeting, Technical Advisory Team members will identify goals for reducing air emissions through potential intervention strategies, which will be discussed at the Team's next meeting on August 22. Potential goals may include identifying percentage reductions for air emissions to be achieved by a future date, such as 2040 or 2050.

Goals may be broad or narrow in nature. A broad goal may involve setting metrics to achieve and maintain compliance with federal air quality and health standards, while a narrowly focused goal may set targets for decreasing air emissions from a specific source, such as wood-burning stoves.

Advisory Team Members' Suggested Goals

1. _____

_____

2. _____

_____

3. _____

_____

4. _____

_____

5. _____

_____

6. _____

_____

7. _____

_____

There is no preset limit on the number of goals that may be identified.

Technical Advisory Team Members

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
Logan Mitchell, University of Utah, Department of Atmospheric Sciences
Cheryl Pirozzi, University of Utah Health, Pulmonary Division
Brian Shiozawa, University of Utah Health
Brooke Tucker, Governor's Office of Energy Development
Sarah Wright/Josh Craft, Utah Clean Energy

Notes: 1) The Gardner Institute identified these members based on their experience and technical expertise in air quality and changing climate. Input from others is welcomed and encouraged to be made through Advisory Team members or Gardner Institute staff. 2) Updated to reflect final Technical Advisory Team composition.

Partners in the Community

The following individuals and entities help support the research mission of the Kem C. Gardner Policy Institute.

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Ivory Homes
Larry H. & Gail Miller Family Foundation
Mountain America Credit Union
Mitt and Ann Romney
Salt Lake City Corporation
Salt Lake County
University of Utah Health
Utah Governor's Office of Economic Development
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Ann Millner
Sterling Nielsen
Cristina Ortega
Jason Perry
Ray Pickup
Gary B. Porter
Taylor Randall
Jill Remington Love
Brad Rencher
Josh Romney
Charles W. Sorenson
James Lee Sorenson
Vicki Varela
Ruth V. Watkins
Ted Wilson

Ex Officio *(invited)*

Governor Gary Herbert
Speaker Brad Wilson
Senate President Stuart Adams
Representative Brian King
Senator Karen Mayne
Mayor Jenny Wilson
Mayor Jackie Biskupski

Kem C. Gardner Policy Institute Staff and Advisors

Leadership Team

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Jennifer Robinson, Associate Director
Shelley Kruger, Accounting and Finance Manager
Colleen Larson, Administrative Manager
Dianne Meppen, Director of Survey Research
Pamela S. Perlich, Director of Demographic Research
Juliette Tennert, Director of Economic and Public Policy Research
Nicholas Thiriot, Communications Director
James A. Wood, Ivory-Boyer Senior Fellow

Faculty Advisors

Matt Burbank, Faculty Advisor
Adam Meirowitz, Faculty Advisor

Senior Advisors

Jonathan Ball, Office of the Legislative Fiscal Analyst
Gary Cornia, Marriott School of Business
Theresa Foxley, EDCUtah
Dan Griffiths, Tanner LLC
Roger Hendrix, Hendrix Consulting
Joel Kotkin, Chapman University
Darin Mellott, CBRE
Chris Redgrave, Zions Bank
Bud Scruggs, Cynosure Group
Wesley Smith, Western Governors University

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Michael T. Hogue, Senior Research Statistician
Mike Hollingshaus, Demographer
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Meredith King, Research Coordinator
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Angela J. Oh, Senior Managing Economist
Levi Pace, Senior Research Economist
Joshua Spolsdoff, Research Economist
Paul Springer, Senior Graphic Designer
Laura Summers, Senior Health Care Analyst
Natalie Young, Research Analyst

Air Quality / Changing Climate Technical Advisory Team

Workbook 2

Meeting 2

August 22, 2019

Kem C. Gardner POLICY INSTITUTE
THE UNIVERSITY OF UTAH
DAVID ECCLES SCHOOL OF BUSINESS

INFORMED DECISIONS™

Agenda

August 22, 2019
8:30 – 10:30am

8 – 8:30am Check-In & Continental Breakfast

Larry & Gail Miller Family Town Hall Room / Kem C. Gardner Policy Institute
411 E. South Temple, Salt Lake City, Utah 84111

Welcome ..... Tom Holst, Gardner Institute
Director's Message ..... Natalie Gochnour, Gardner Institute

- Recent Media Outreach
- Guiding Principles
- Goal: *Reduce air emissions statewide 25% below 2005 levels by 2025, 50% by 2035 and 80% by 2050.*
- Expectations for Deliverable

Meeting #1 Recap & Plan for Today ..... Siobhan Locke, The Langdon Group

- Observations from First Meeting
- Agenda for Today's Workshop

Air Quality and GHG Emissions Baselines ..... Glade Sowards, Utah Division of Air Quality
Tom Holst, Gardner Institute

Intervention Strategies Screening Process ..... Siobhan Locke, The Langdon Group

- Multi-Step Screening
- Criteria & Ranking Process for Screening Effort
- Breakout Sessions
- Group Reports & Observations

Breakout Sessions ..... Siobhan Locke, The Langdon Group

Group One: *Cross-Cutting Strategies*
Group Two: *Energy Supply Strategies*
Group Three: *Transportation and Land Use Strategies*
Group Four: *Residential, Commercial, Industrial, Agricultural & Forestry Strategies*

Group Reports & Observations ..... All
Next Steps and Schedule ..... Tom Holst, Gardner Institute

Adjourn

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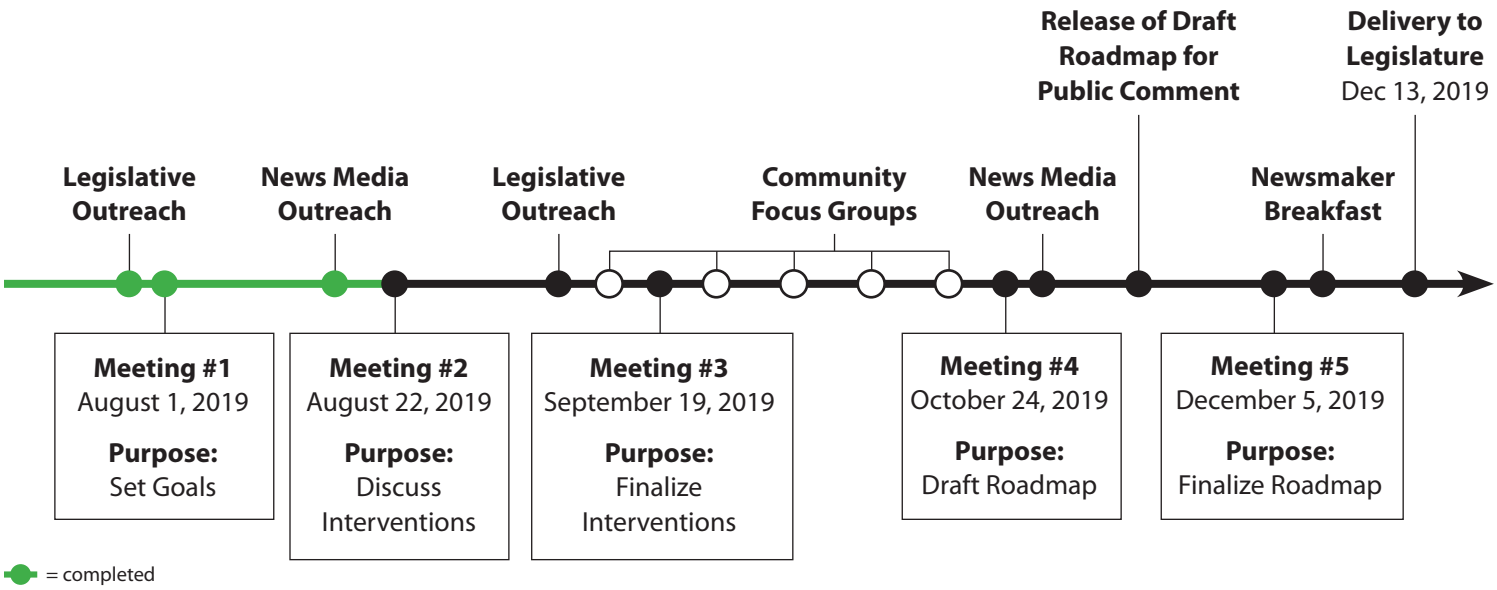
Process, Schedule, and Deliverable



Process and Schedule

To complete the task of preparing a roadmap of ways to reduce air emissions, Gardner Institute staff organized an internal team to outline a process and identify action steps. Tom Holst, senior energy analyst at the Gardner Institute, was tasked in mid-2019 with leading the effort. Initial steps included meeting with key technical experts in government agencies and nonprofit organizations to discuss the issues and gather data to create baselines of current and projected levels of air emissions and their individual components, such as particulate matter, ozone and carbon dioxide.

It's important to note that this effort is not conducting new research, but rather building on the work of previous studies, including the comprehensive report of then-Gov. Huntsman's 2007 Blue Ribbon Advisory Council on Climate Change.

The Gardner Institute engaged two consulting firms to help with the effort. Wilkinson Ferrari & Co., a Salt Lake City strategic communications firm, was retained to help manage the overall effort, prepare content for roadmap documents, and provide support for engaging the public, policymakers and the news media. The Langdon Group was engaged to facilitate meetings of the Technical Advisory Team, a group of about 30 experts from federal, state and local government agencies, as well as representatives of several interest groups.

Five meetings of the Technical Advisory Committee are planned. The first meeting focused on discussing the role of the committee and the desired outcomes of its work. A draft overarching goal, as well as several strategies for achieving it, resulted from the first meeting. The second and third meetings are devoted to identifying and discussing potential intervention strategies and their relative benefits and costs.

The draft roadmap document will be presented at the fourth advisory committee meeting in late October for review and discussion. A fifth committee meeting will be held in early December to review the final roadmap document before it is delivered to the state Legislature by Dec. 13, 2019.

While this is primarily a technical review process, members of the public are being engaged to provide feedback on potential intervention strategies. Five focus groups will be held in September and October 2019 along the Wasatch Front and other parts of the state. In addition to learning how a cross-section of residents react to potential interventions, we will seek opinions on which strategies are the most viable to implement and succeed. Members of the public will also have the opportunity to read and comment on the draft roadmap in November, when it will be posted on the Gardner Institute website.

Deliverable

The final roadmap document will outline the issues, set a baseline of air quality and greenhouse gas emissions, describe potential intervention strategies for reducing air emissions, and provide a recommended set of strategies for consideration by state legislators and other policymakers. The document will be concise and easily understandable by lay readers; technical data underpinning the roadmap will be compiled in appendices.

Air Quality & GHG Baselines

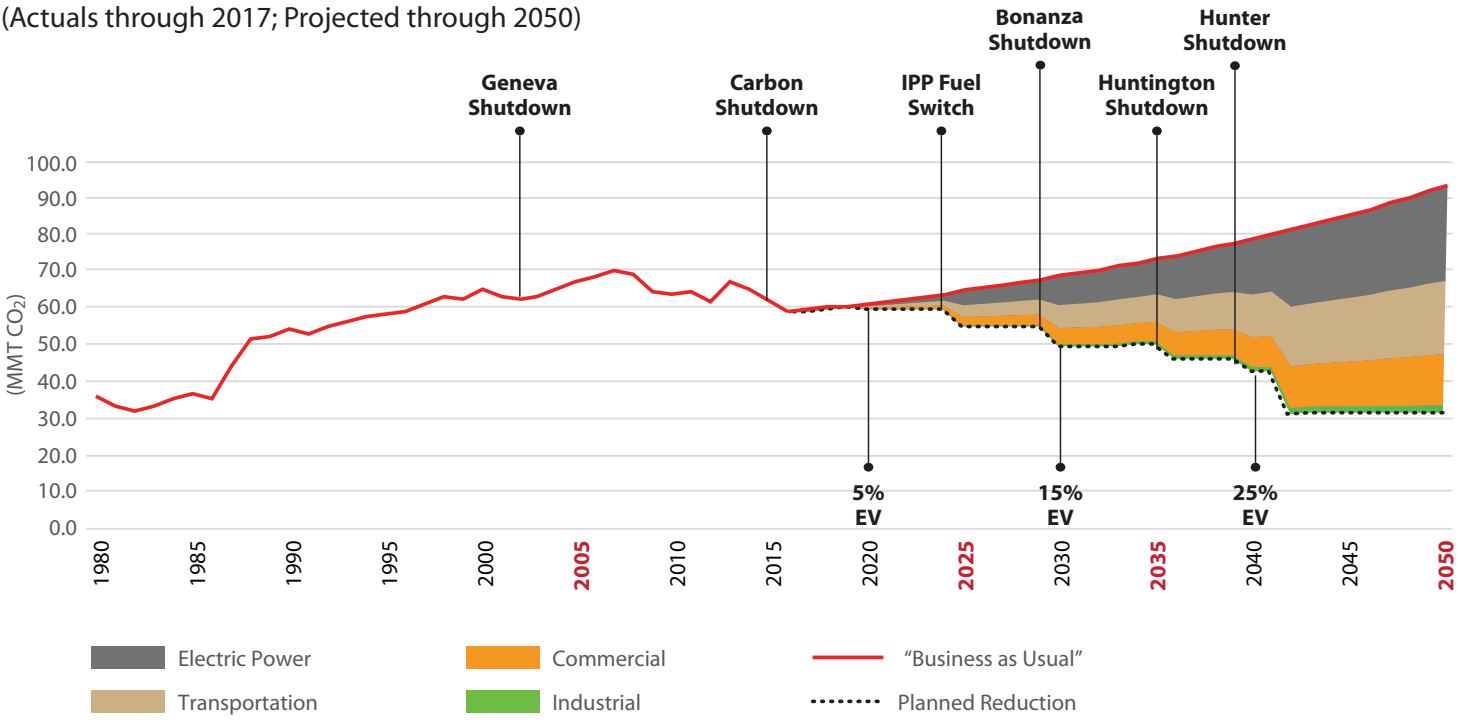
Having a solid baseline of data is critical to measuring the effectiveness of efforts to reduce Utah's air emissions. State agencies and others collect and analyze a wide range of data about criteria air pollutants that are regulated by federal and state governments. Some of these pollutants – SOx (sulfur oxides), NOx (nitrogen oxides), ozone and particulate matter (PM2.5) – are well-known to many Utahns, particularly along the Wasatch Front and several rural areas.

While air quality information is regularly collected and scrutinized by the Utah departments of environment quality and health, local health agencies, academics and others, detailed inventories of pollutants are not produced annually, creating data gaps that can hinder accurate analysis. Likewise, neither state nor most local agencies track levels of greenhouse gas emissions over time, making it impossible to develop a detailed state-level inventory.

Recognizing these caveats and limitations, experts from the Utah Division of Air Quality and Gardner Institute used the best-available data to chart current and projected levels of criteria air pollutants and greenhouse gases. The air pollution data was gathered primarily from the Utah Division of Air Quality's emissions inventory; greenhouse gas data was primarily extrapolated from federal Energy Information Agency figures, coupled with information and assumptions from other states' mitigation plans and available data about Utah's largest sources of carbon emissions – power plants fueled by coal or natural gas.

Utah CO2 emissions (million metric tons)

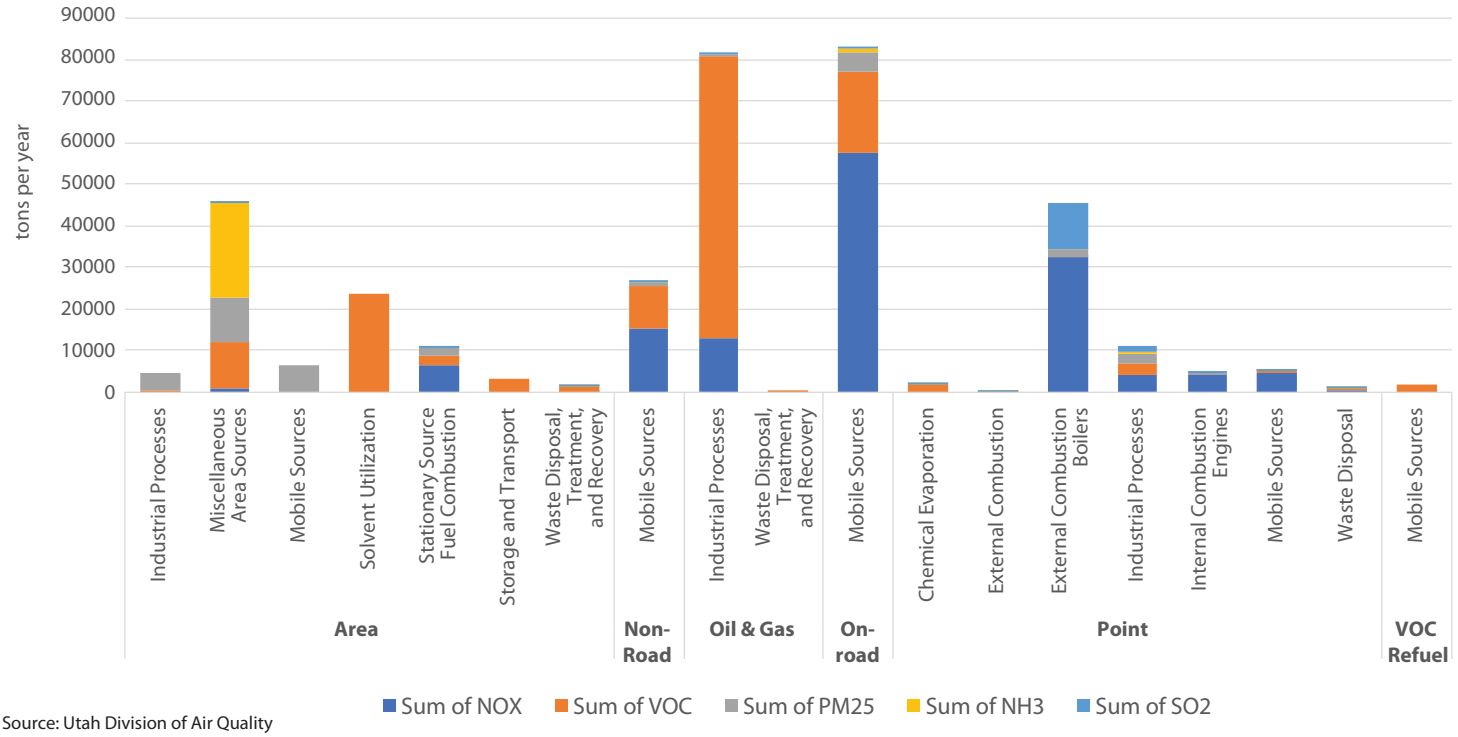
(Actuals through 2017; Projected through 2050)



Source: U.S. Energy Information Administration

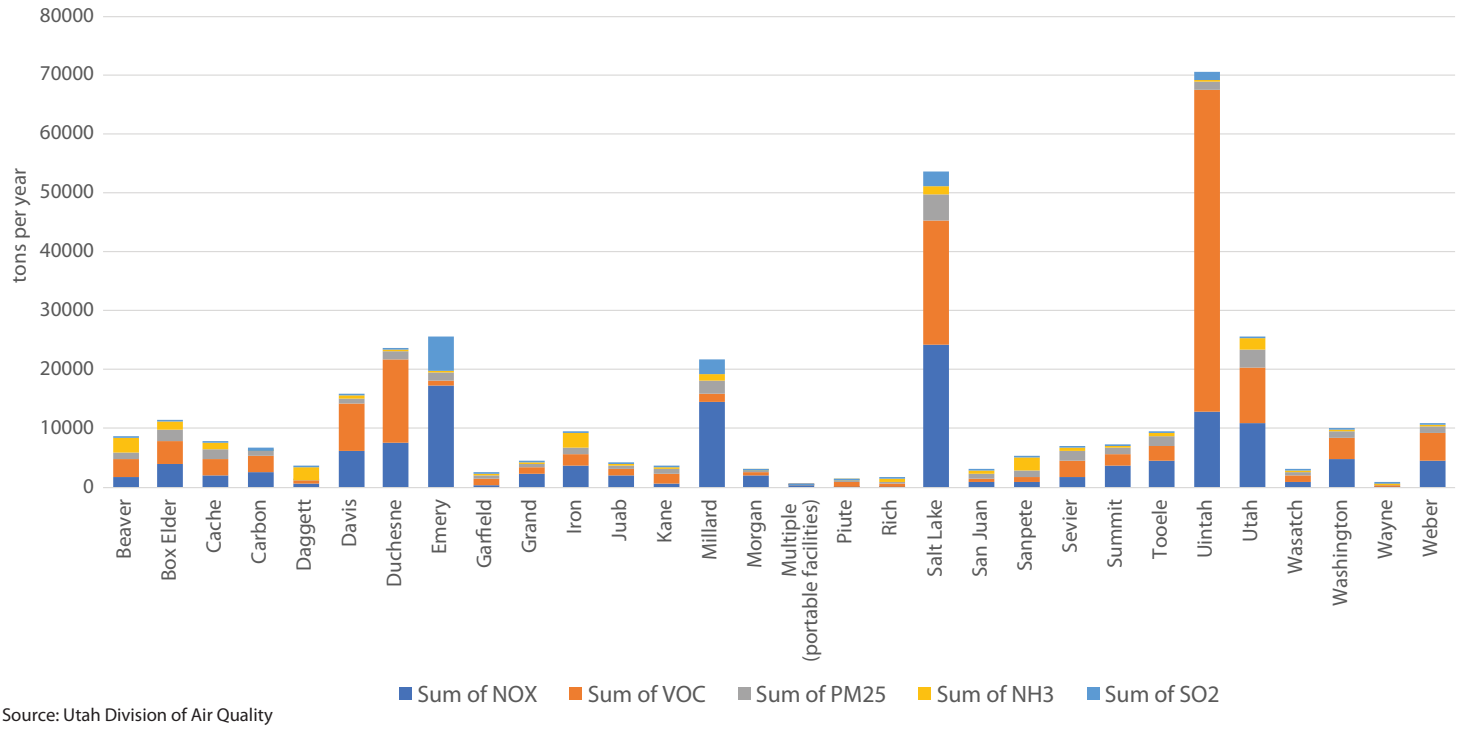
Air Quality & GHG Baselines

2017 Statewide Emissions by Source



Source: Utah Division of Air Quality

2017 Statewide Emissions by County



Source: Utah Division of Air Quality

Overarching Goal & Intervention Strategies

Overarching Goal

Reduce air emissions statewide 25% below 2005 levels by 2025, 50% by 2035 and 80% by 2050.

Setting a goal for reducing air emissions that is both aspirational and achievable is key to this effort. A clear target gives us a tangible objective to aim for so we can track effectiveness over time and measure our progress. Meaningful and aspirational goals can also instill in residents and policymakers a sense of urgency and encourage continued action to reach and surpass our desired outcomes.

During the first meeting of the Technical Advisory Team, members were divided into small groups to identify and discuss potential goals. Many suggested goals were broad in nature, while others homed in on specific sources of air pollutants and/or greenhouse gas emissions. Team members often intermingled goals with potential interventions to achieve them. Based on discussion at Meeting 1 of the Technical Advisory Team, the Gardner Institute recommends setting one straightforward and overarching goal that includes targets for reducing all air emissions – for both criteria air pollutants and greenhouse gasses – by certain future dates.

Advisory Team members suggested several potential dates and reduction percentages, with broad agreement on the targets for 2025 and 2050. Suggested dates for meeting the 50% target for emissions reductions differed slightly among committee members, with some preferring 2030 and others opting for 2035. Institute staff selected the 2035 date for the draft overarching goal to allow enough time to achieve the 50% target. Concurrence from the Technical Advisory Team about this choice will be sought at Meeting #2.

Intervention Strategies

Given the short timeframe for this process, the intervention strategies are based on existing data and previous study efforts. In particular, the 2007 report of the Blue Ribbon Advisory Council on Climate Change (BRAC) to then-Gov. Jon M. Huntsman Jr. offers a deep reservoir of data and recommendations to inform today's effort. While focused on addressing causes and impacts of our changing climate, many of the report's recommendations for reducing greenhouse gas emissions also limit release of criteria air pollutants, helping to improve air quality.

Institute staff developed an initial list of potential interventions – using the BRAC report and other sources such as roadmaps and plans from other states – to present to Technical Advisory Team members for feedback and analysis. Technical Advisory Team members were first asked to review the list and determine whether the potential interventions have promise and should be investigated further, or if they aren't viable or achievable and should be eliminated.

The Advisory Team will review and seek consensus on this shortened list of interventions at Meeting #2, at which they will begin analyzing potential solutions based on evaluation criteria in the group's statement of Guiding Principles.

Given the complexity of evaluating multiple strategies using multiple criteria, Advisory Team members will meet twice to consider potential strategies. Evaluations using the first three criteria will be made at Meeting #2; strategies will be weighed using the other three criteria at Meeting #3. The use of keypad polling at committee meetings will help simplify the complex evaluation process.

Evaluation Criteria for Assessing Potential Intervention Strategies

- 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

Technical Advisory Team Members

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
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Sarah Wright/Josh Craft, Utah Clean Energy

Notes: 1) The Gardner Institute identified these members based on their experience and technical expertise in air quality and changing climate. Input from others is welcomed and encouraged to be made through Advisory Team members or Gardner Institute staff. 2) Updated to reflect final Technical Advisory Team composition.

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Governor Gary Herbert
Speaker Brad Wilson
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Colleen Larson, Administrative Manager
Dianne Meppen, Director of Survey Research
Pamela S. Perlich, Director of Demographic Research
Juliette Tennert, Director of Economic and Public Policy Research
Nicholas Thiriot, Communications Director
James A. Wood, Ivory-Boyer Senior Fellow

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Dan Griffiths, Tanner LLC
Roger Hendrix, Hendrix Consulting
Joel Kotkin, Chapman University
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Chris Redgrave, Zions Bank
Bud Scruggs, Cynosure Group
Wesley Smith, Western Governors University

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Meredith King, Research Coordinator
Jennifer Leaver, Research Analyst
Angela J. Oh, Senior Managing Economist
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Joshua Spolsdoff, Research Economist
Paul Springer, Senior Graphic Designer
Laura Summers, Senior Health Care Analyst
Natalie Young, Research Analyst

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Air Quality / Changing Climate Technical Advisory Team

Workbook 3

Meeting 3

September 19, 2019

Kem C. Gardner POLICY INSTITUTE
THE UNIVERSITY OF UTAH
DAVID ECCLES SCHOOL OF BUSINESS

INFORMED DECISIONS™

Agenda

September 19, 2019
8:30 – 11:00am

Larry & Gail Miller Family Town Hall Room / Kem C. Gardner Policy Institute
411 E. South Temple, Salt Lake City, Utah 84111

Welcome ..... Tom Holst, Gardner Institute

Director's Message ..... Natalie Gochnour, Gardner Institute
- Legislative Update
- Expectations for Deliverable

Agenda & Process Review ..... Siobhan Locke, The Langdon Group
- Agenda for Today's Workshop
- Review of Overall Process

Economic Considerations ..... Juliette Tennert, Gardner Institute

Review of Meeting #2 & Subgroup Outcomes ..... Siobhan Locke, The Langdon Group
- Observations from Meeting #2
- Summary of Interventions & Tactics Criteria from Each Subgroup

Develop & Refine Implementation Choices ..... Siobhan Locke, The Langdon Group
- Explain Group Activity
- Move to Carriage House for Group Activity

Next Steps and Schedule ..... Tom Holst, Gardner Institute
- Sign Up for Analysis Working Groups
- Set Dates/Times for Working Group Meetings

Adjourn

Future Meetings *– October 24, and December 5, 2019*

All Meetings from 8:30 – 11am at the Gardner Institute

Purpose & Legislative Request

The Utah Legislature has taken two actions that guide the work of the Air Quality/Changing Climate Technical Advisory Team. 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.*

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Information gathered during Technical Advisory Group sessions, including potential interventions, will be combined with other data and public feedback to develop an air quality/changing climate "roadmap" for use by legislators as they consider legislation in the 2020 General Session and beyond.

Enrolled Copy **H.C.R. 7**

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.

Air Quality / Changing Climate Guiding Principles

The following principles guide the Kem C. Gardner Policy Institute's efforts to develop a "roadmap" of potential ways to improve Utah's air quality and address our changing climate, as requested by the Utah Legislature and to be delivered by Dec. 13, 2019.

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.

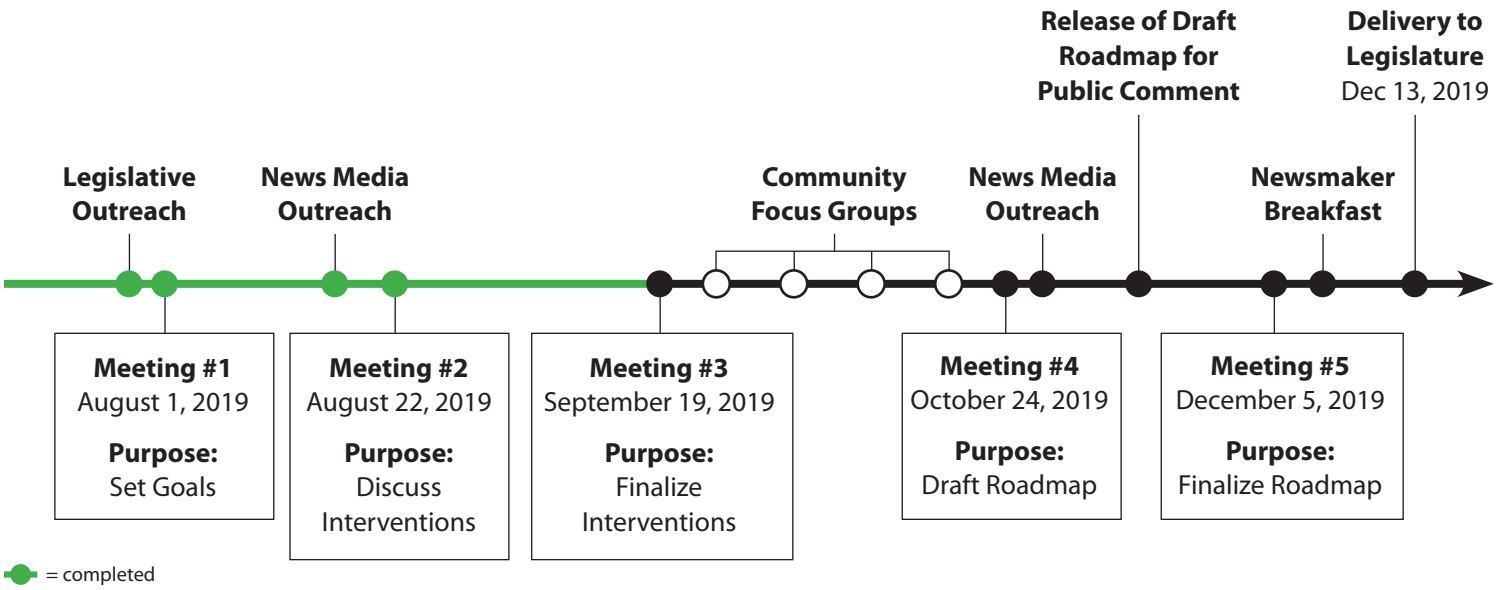
5. **Seek broad acceptance**
   We acknowledge that potential intervention strategies will be easiest to implement and have the greatest degree of success if they are clearly understood and broadly accepted by Utah residents and policymakers.

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.

Process, Schedule, and Deliverable



Process and Schedule

To complete the task of preparing a roadmap of ways to reduce air emissions, Gardner Institute staff organized an internal team to outline a process and identify action steps. Tom Holst, senior energy analyst at the Gardner Institute, was tasked in mid-2019 with leading the effort. Initial steps included meeting with key technical experts in government agencies and nonprofit organizations to discuss the issues and gather data to create baselines of current and projected levels of air emissions and their individual components, such as particulate matter, ozone and carbon dioxide.

It's important to note that this effort is not conducting new research, but rather building on the work of previous studies, including the comprehensive report of then-Gov. Huntsman's 2007 Blue Ribbon Advisory Council on Climate Change.

The Gardner Institute engaged two consulting firms to help with the effort. Wilkinson Ferrari & Co., a Salt Lake City strategic communications firm, was retained to help manage the overall effort, prepare content for roadmap documents, and provide support for engaging the public, policymakers and the news media. The Langdon Group was engaged to facilitate meetings of the Technical Advisory Team, a group of about 30 experts from federal, state and local government agencies, as well as academic experts.

Five meetings of the Technical Advisory Committee are planned. The first meeting focused on discussing the role of the committee and the desired outcomes of its work. A draft overarching goal, as well as several strategies for achieving it, resulted from the first meeting. The second and third meetings are devoted to identifying and discussing potential intervention strategies and their relative benefits and costs.

The draft roadmap document will be presented at the fourth advisory committee meeting in late October for review and discussion. A fifth committee meeting will be held in early December to review the final roadmap document before it is delivered to the state Legislature by Dec. 13, 2019.

While this is primarily a technical review process, members of the public are being engaged to provide feedback on potential intervention strategies. Focus groups will be held in September and October 2019 along the Wasatch Front and other parts of the state. In addition to learning how a cross-section of residents react to potential interventions, we will seek opinions on which strategies are the most viable to implement and succeed. Members of the public will also have the opportunity to read and comment on the draft roadmap in November, when it will be posted on the Gardner Institute website.

Deliverable

The final roadmap document will outline the issues, set a baseline of air quality and greenhouse gas emissions, describe potential intervention strategies for reducing air emissions, and provide a recommended set of strategies for consideration by state legislators and other policymakers. The document will be concise and easily understandable by lay readers; technical data underpinning the roadmap will be compiled in appendices.

Intervention Strategies, Tactics & Implementation Choices

Given the short timeframe for this process, it is based on reviewing existing data and previous study efforts. In particular, the 2007 report of the Blue Ribbon Advisory Council on Climate Change (BRAC) to then-Gov. Jon M. Huntsman Jr. offers a deep reservoir of data and recommendations to inform today's effort. While focused on addressing causes and impacts of our changing climate, some of the report's recommendations for reducing greenhouse gas emissions also limit release of criteria air pollutants, helping to improve air quality.

Institute staff developed an initial list of potential interventions – using the BRAC report and other sources such as roadmaps and plans from other states – to present to Technical Advisory Team members for feedback and analysis. Members were first asked to review the list and determine whether the potential interventions have promise and should be investigated further, or if they aren't viable or achievable and should be eliminated.

The Advisory Team reviewed and commented on this shortened list of interventions at Meeting #2, at which they began analyzing potential solutions based on evaluation criteria in the group's statement of Guiding Principles.

Plan for Meeting #3

Advisory Team members will continue their discussion of intervention strategies, tactics, and options at Meeting #3 on September 19. Following this meeting, small working groups of Advisory Team members will work to quantify costs and benefits of specific tactics considered to be most effective and achievable. The draft roadmap document will be prepared during this period and be presented for Advisory Team review at their Oct. 24 meeting, and for public review and comment after that.

Evaluation Criteria for Assessing Potential Intervention Strategies

- 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

The chart on page 5 is a visual snapshot of much of the project's work to date. Our overarching goal – reducing statewide emissions of criteria air pollutants and greenhouse gases – is listed at the top of the chart. Cross-cutting strategies, such as bolstering educational outreach and enhancing scientific information-gathering, underlie all efforts.

Please note that the second column on the chart has been added at the suggestion of DAQ to highlight the principal ways to reduce emissions – reduce pollution intensity of fuel, clean exhaust streams, reduce leaks, etc. Strategies and tactics are grouped accordingly.

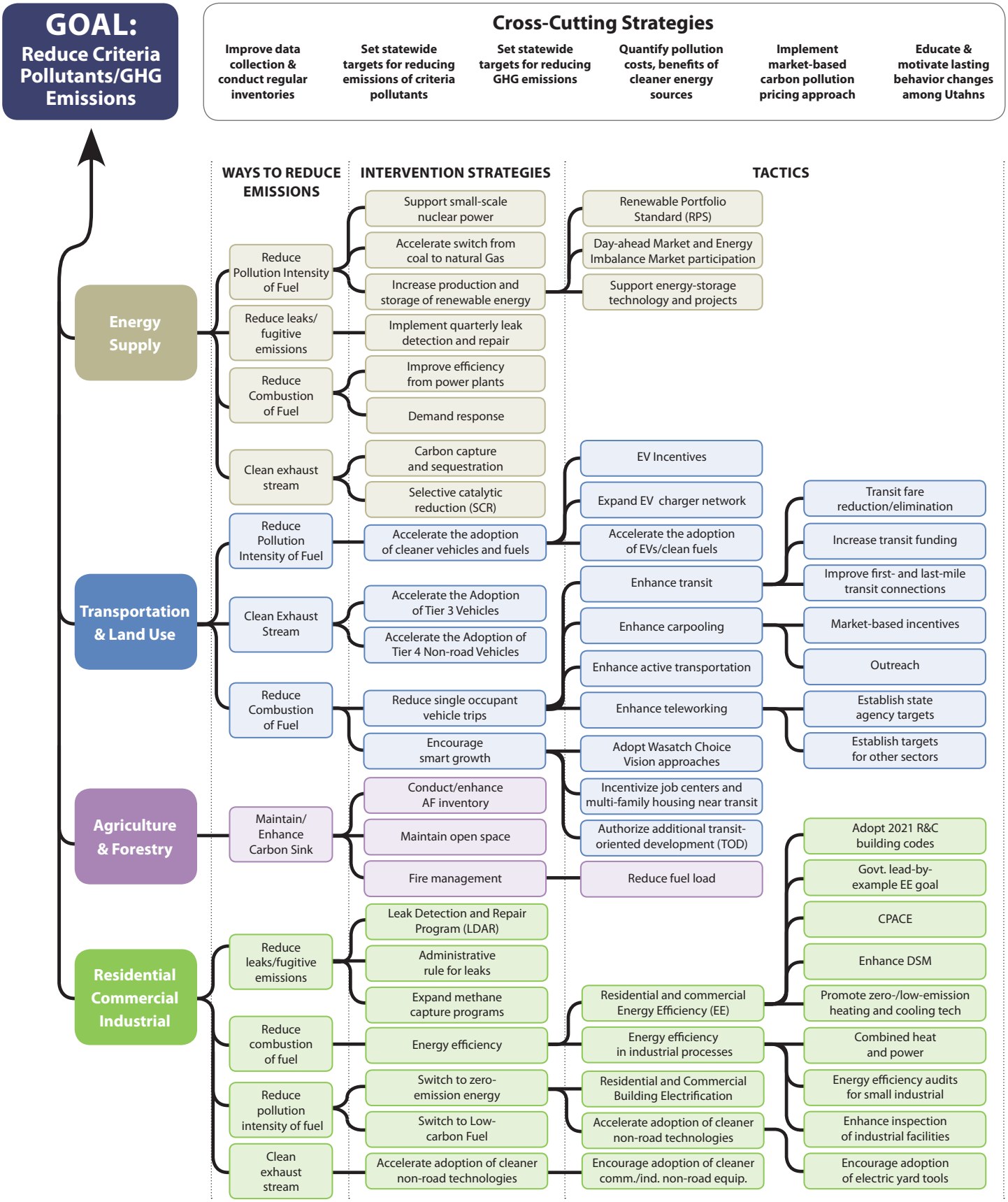
Four other areas of intervention strategies are listed on the left side of the chart – Energy Supply, Transportation & Land Use, Agriculture & Forestry, and Residential, Commercial & Industrial. Tactics discussed by the Advisory Team in previous meetings are displayed to the right of each category, which are color-coded for easy reference. Please note that the Agriculture & Forestry category was separated from the Residential, Commercial & Industrial category for clarity.

At Meeting #3, Team members will review the strategies and tactics in each area, adding, deleting and revising content as needed during an interactive exercise. In addition to refining strategies and tactics, Team members will also be asked to provide input on choices or options for implementing tactics.

Between Meeting #3 on September 19 and Meeting #4 on October 24, subgroups will meet to further quantify and analyze the potential benefits and impacts of tactics. Three subgroups are planned, one to look at health benefits and impacts, one for economic analysis and one to consider each tactic's efficacy at reducing emissions.

In the final roadmap document, the strategies and tactics suggested and vetted by the Technical Advisory Team will be complemented by qualitative information. Feedback from the public, interest groups, businesses and others, will be gathered through focus groups, one-on-one meetings and small-group discussions, in addition to input received from posting the draft roadmap for general review and comment.

Intervention Strategies, Tactics & Implementation Choices



Technical Advisory Team Members

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
Logan Mitchell, University of Utah, Department of Atmospheric Sciences
Cheryl Pirozzi, University of Utah Health, Pulmonary Division
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Air Quality / Changing Climate Technical Advisory Team

Workbook 4

Meeting 4

October 24, 2019

Kem C. Gardner
POLICY INSTITUTE
THE UNIVERSITY OF UTAH
DAVID ECCLES SCHOOL OF BUSINESS

INFORMED DECISIONS™

Agenda

October 24, 2019
8:30 – 11:00am

Larry & Gail Miller Family Town Hall Room / Kem C. Gardner Policy Institute
411 E. South Temple, Salt Lake City, Utah 84111

Welcome ..... Tom Holst

Director's Message ..... Natalie Gochnour
- Legislative Update

Agenda & Process Review ..... Siobhan Locke
- Overview of today's meeting
- Work since last Advisory Committee meeting (Sep. 19)
- Lessons learned from the process

Reports by Working Groups
- Emissions working group ..... Glade Sowards
- Economics working group ..... Juliette Tennert
- Health working group ..... Ben Horne/Logan Mitchell

Overview of Roadmap Contents ..... Natalie Gochnour, Brian Wilkinson

Group Discussion about Roadmap Contents

Next Steps and Schedule ..... Natalie Gochnour
- Release of draft report and public input process
- Next Advisory Committee Meeting – Dec 5th
- Review final draft roadmap

Adjourn

Final Meeting *– December 5, 2019*

8:00am Thank you breakfast

8:30–10:30am Meeting

Purpose & Legislative Request

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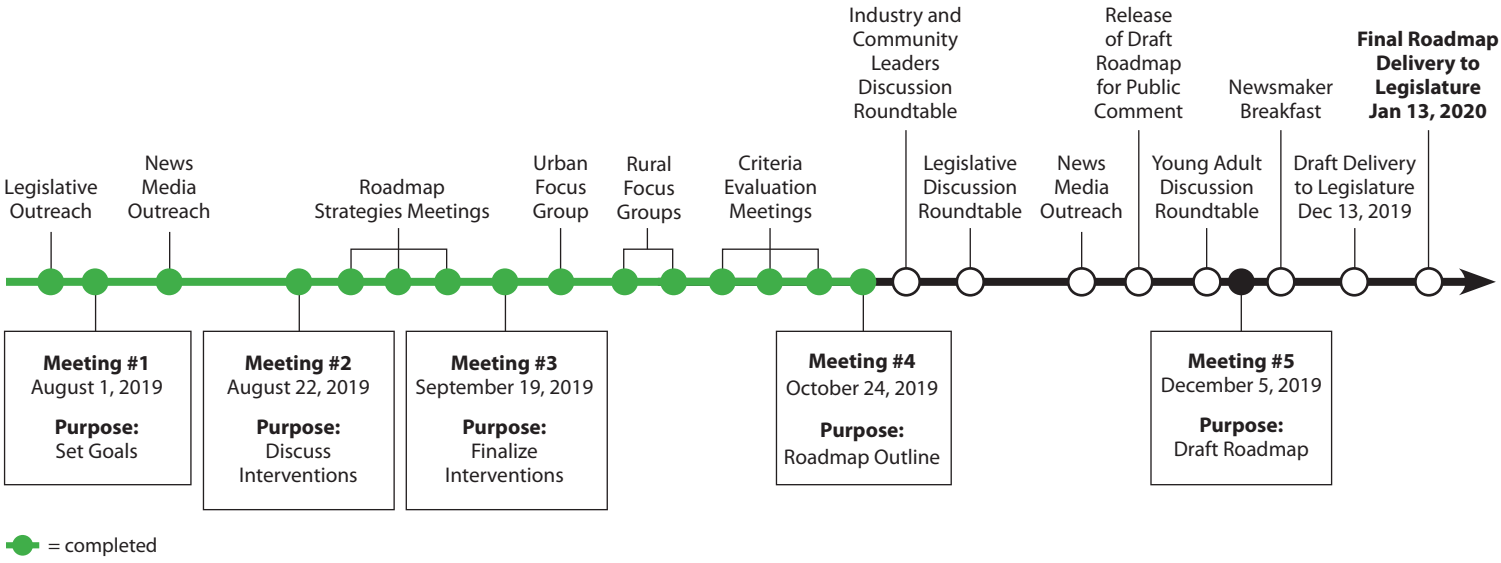
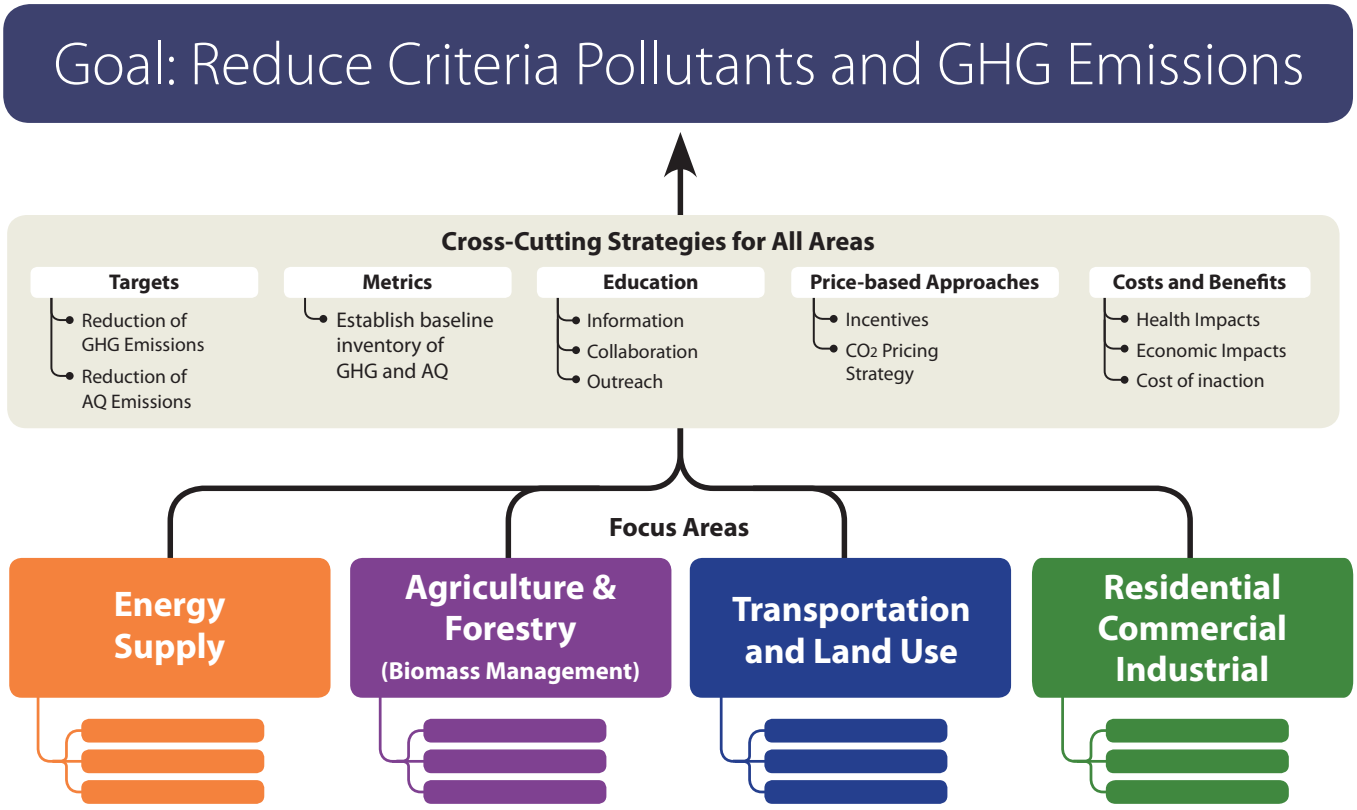
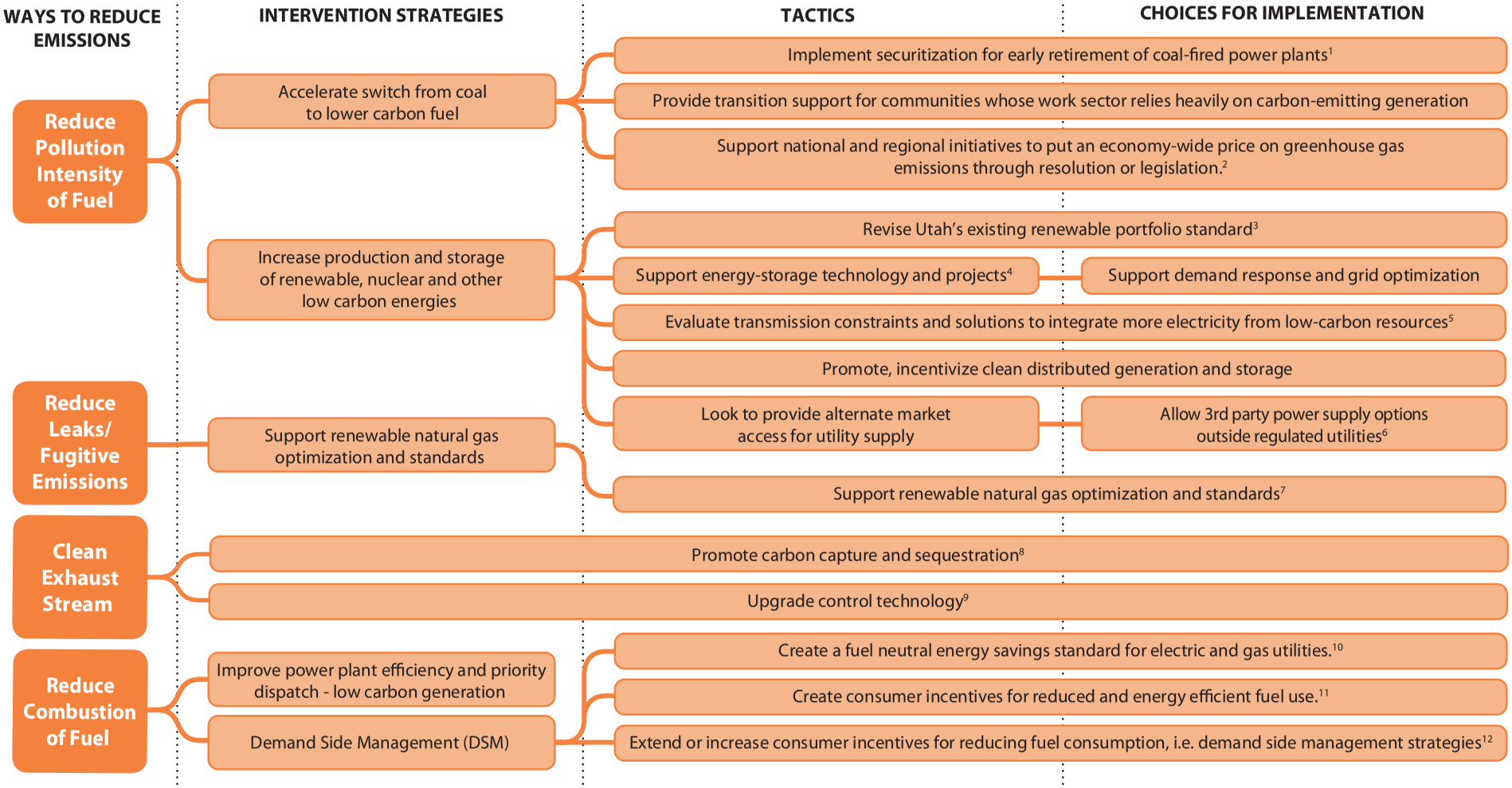
Timeline


Legislative Outreach
News Media Outreach
Roadmap Strategies Meetings
Urban Focus Group
Rural Focus Groups
Criteria Evaluation Meetings
Industry and Community Leaders Discussion Roundtable
Legislative Discussion Roundtable
News Media Outreach
Release of Draft Roadmap for Public Comment
Young Adult Discussion Roundtable
Newsmaker Breakfast
Draft Delivery to Legislature Dec 13, 2019
Final Roadmap Delivery to Legislature Jan 13, 2020
Meeting #1 August 1, 2019 Purpose: Set Goals
Meeting #2 August 22, 2019 Purpose: Discuss Interventions
Meeting #3 September 19, 2019 Purpose: Finalize Interventions
Meeting #4 October 24, 2019 Purpose: Roadmap Outline
Meeting #5 December 5, 2019 Purpose: Draft Roadmap
= completed

Intervention Strategies, Tactics & Implementation Choices



Energy Supply



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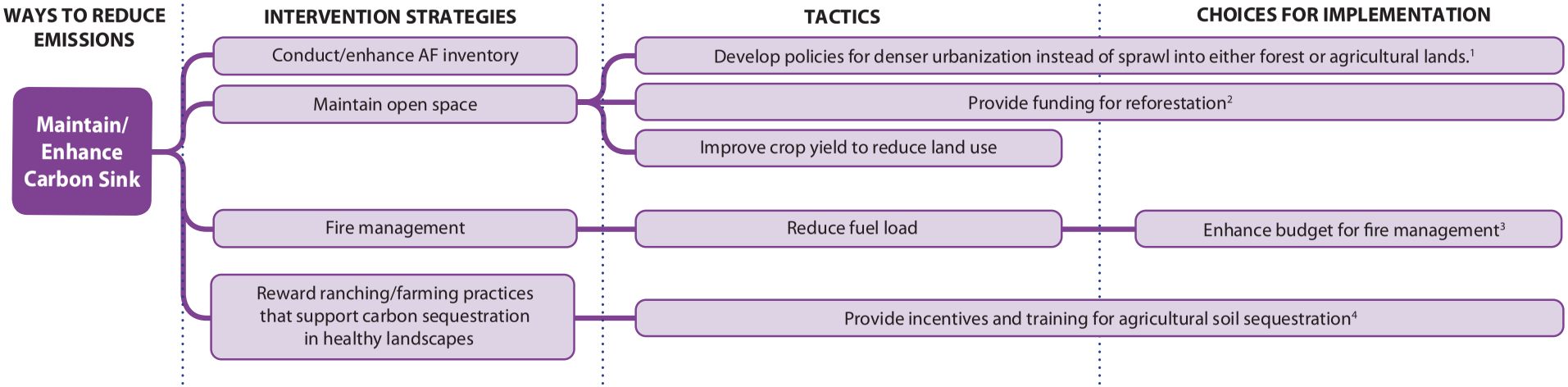
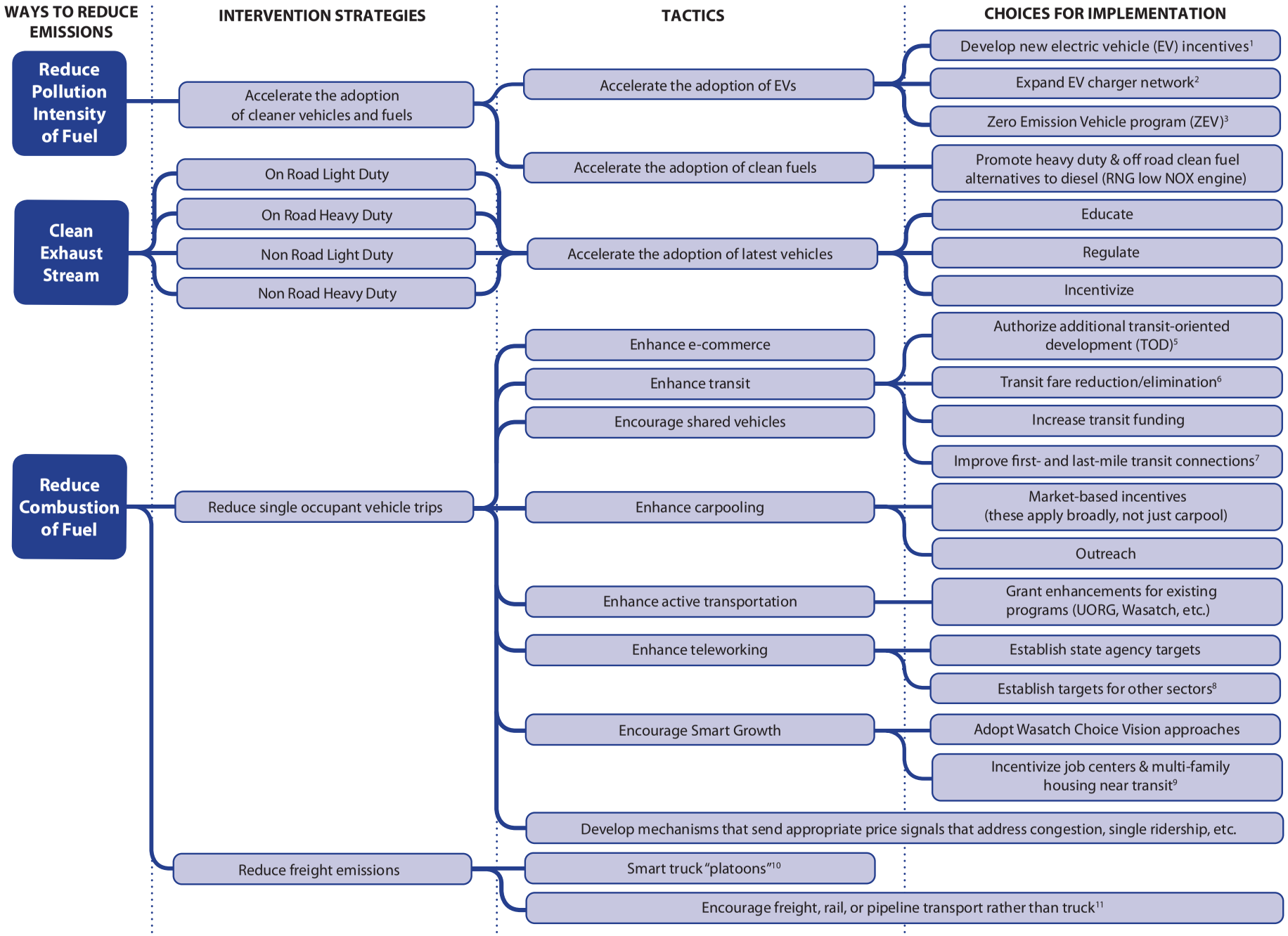
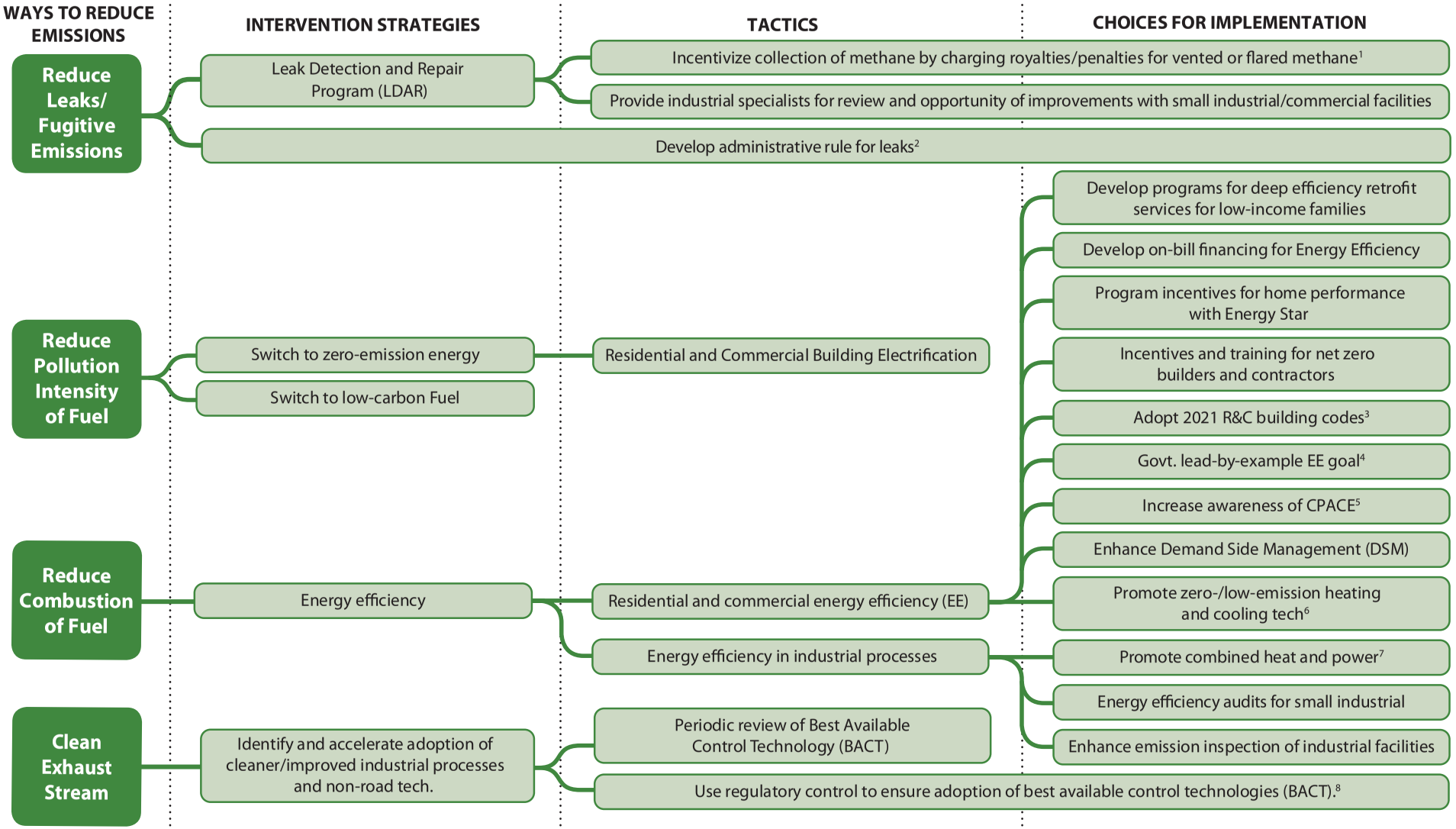


Transportation and Land Use



Residential Commercial Industrial



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Notes: 1) The Gardner Institute identified these members based on their experience and technical expertise in air quality and changing climate. Input from others is welcomed and encouraged to be made through Advisory Team members or Gardner Institute staff. 2) Updated to reflect final Technical Advisory Team composition.

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The Kem C. Gardner Policy Institute serves Utah by preparing independent, science-based economic, demographic and public policy research that helps the state prosper. Part of the David Eccles School of Business at the University, the Institute's staff and advisors are Utah's demographic experts, leaders on the Utah economy, and specialists on public policy and survey research. The Gardner Institute's mission is to serve the community as an honest broker of INFORMED RESEARCH, which guides INFORMED DISCUSSIONS, and leads to INFORMED DECISIONS™.

Air Quality and Changing Climate Technical Advisory Committee Meeting Summaries

Meeting 1 - August 1, 2019

The first meeting for the Air Quality and Changing Climate (AQCC) Technical Advisory Committee provided background on the purpose of the committee and the Legislative request outlined in H.C.R 7. Guiding Principles were proposed and reviewed with the committee to clarify the role of the AQCC committee and protocol in developing a roadmap of potential ways to improve Utah's air quality and address our changing climate. Upon establishing the Advisory Team's process expectations and process, the committee was divided into five groups to identify goals and/or targets for reducing air emissions. Goals identified provided tangible objectives that intervention strategies could be developed around and provided metrics to measure proposed interventions.

Meeting 2 – August 22, 2019

The Technical Committee reviewed adjustments to the guiding principles and how input was incorporated into a goal for the reduction of air emissions that addressed air quality and changing climate. Background information was presented on how criteria air pollutants and greenhouse gas emissions are currently tracked and how baseline measurements are developed. Committee members reviewed potential interventions using previous studies and plans from other states to determine whether potential interventions had promise or whether they were no longer viable or achievable. Sub-groups were formed to identify and develop intervention strategies in air emission sectors such as cross-cutting, energy supply, residential/commercial/industrial, and transportation/land use and agriculture/forestry.

Meeting 3 – September 19, 2019

Technical Advisory Committee Members convened to review expectations for the roadmap and reported on the work of subgroups in identifying and refining intervention strategies. Information was presented to the Committee on economic considerations in determining positive solutions to reduce air emissions. Sub group strategies were mapped out by sector, intervention strategies, tactics and choices for implementation when applicable. Committee members reviewed the strategies and tactics in each area, adding, deleting and revising content as needed during an interactive exercise. In addition to refining strategies and tactics, Team members will also be asked to provide input on choices or options for implementing tactics. Subgroups were established to further quantify and analyze the potential benefits and impacts of tactics in relation to health impacts and benefits, economic impact, and efficacy at reducing emissions.

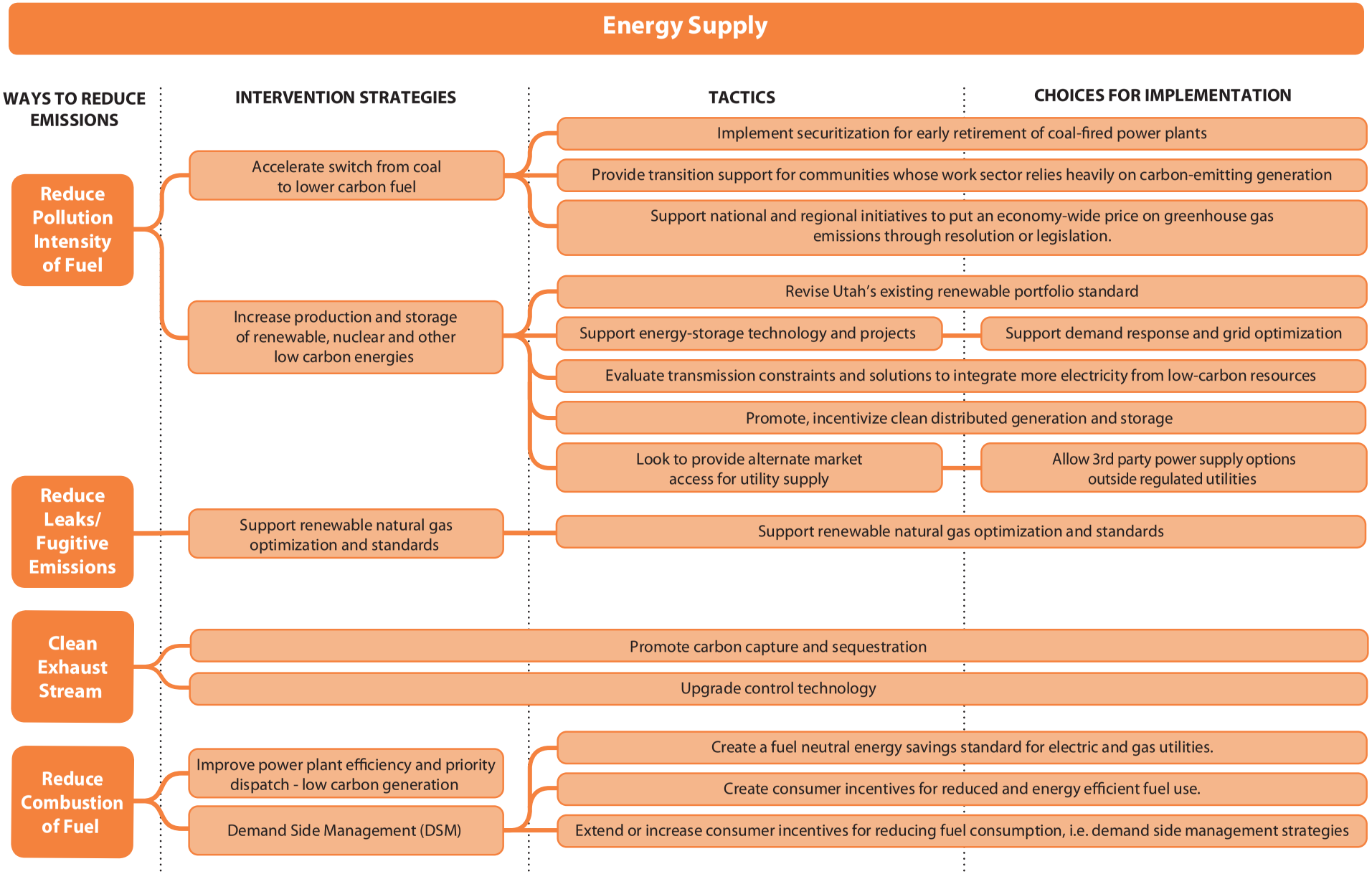
Meeting 4 – October 24, 2019

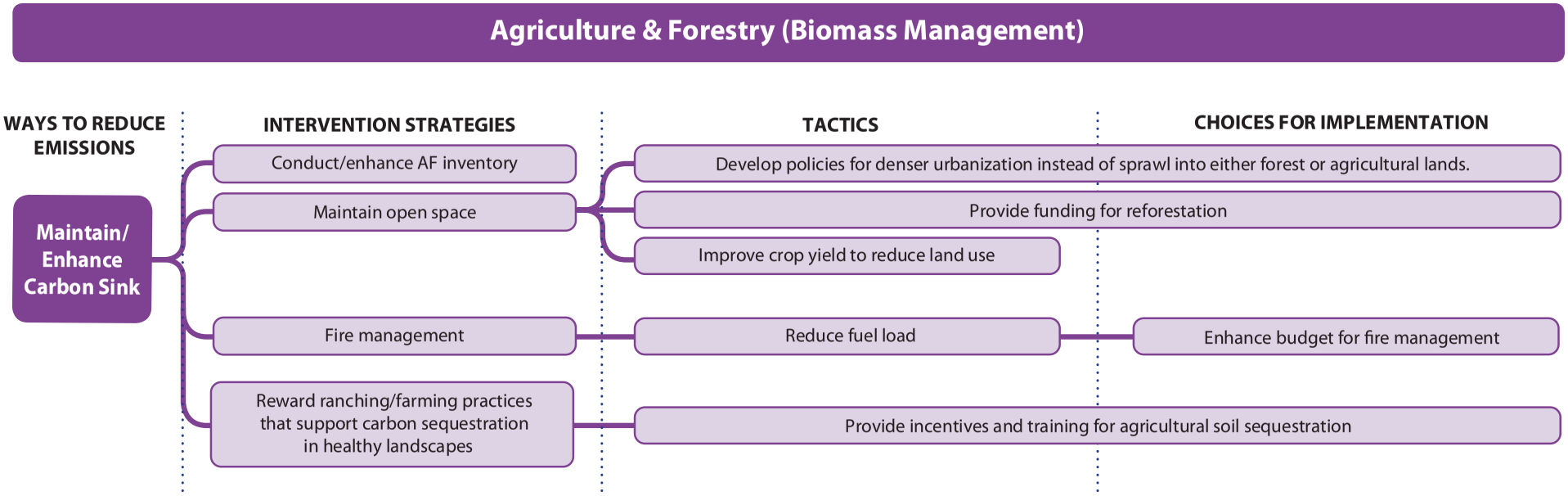
The Technical Advisory Committee sub groups reported on the considerations in representing health impact, economic impact, and emission impact related to intervention strategies and choices for implementation. Sub groups reported on the assessment of potential intervention strategies that reflected Legislative direction, including efficacy in reducing emissions and improving air quality, ease of implementation at the state and local level, economic and regulatory feasibility. Building from the sub group report, the Gardner Institute presented how Committee input would be incorporated into the structure of the roadmap and Committee members identified "must have" elements and messages to be included as the roadmap draft was developed.

Meeting 5 – December 5, 2019

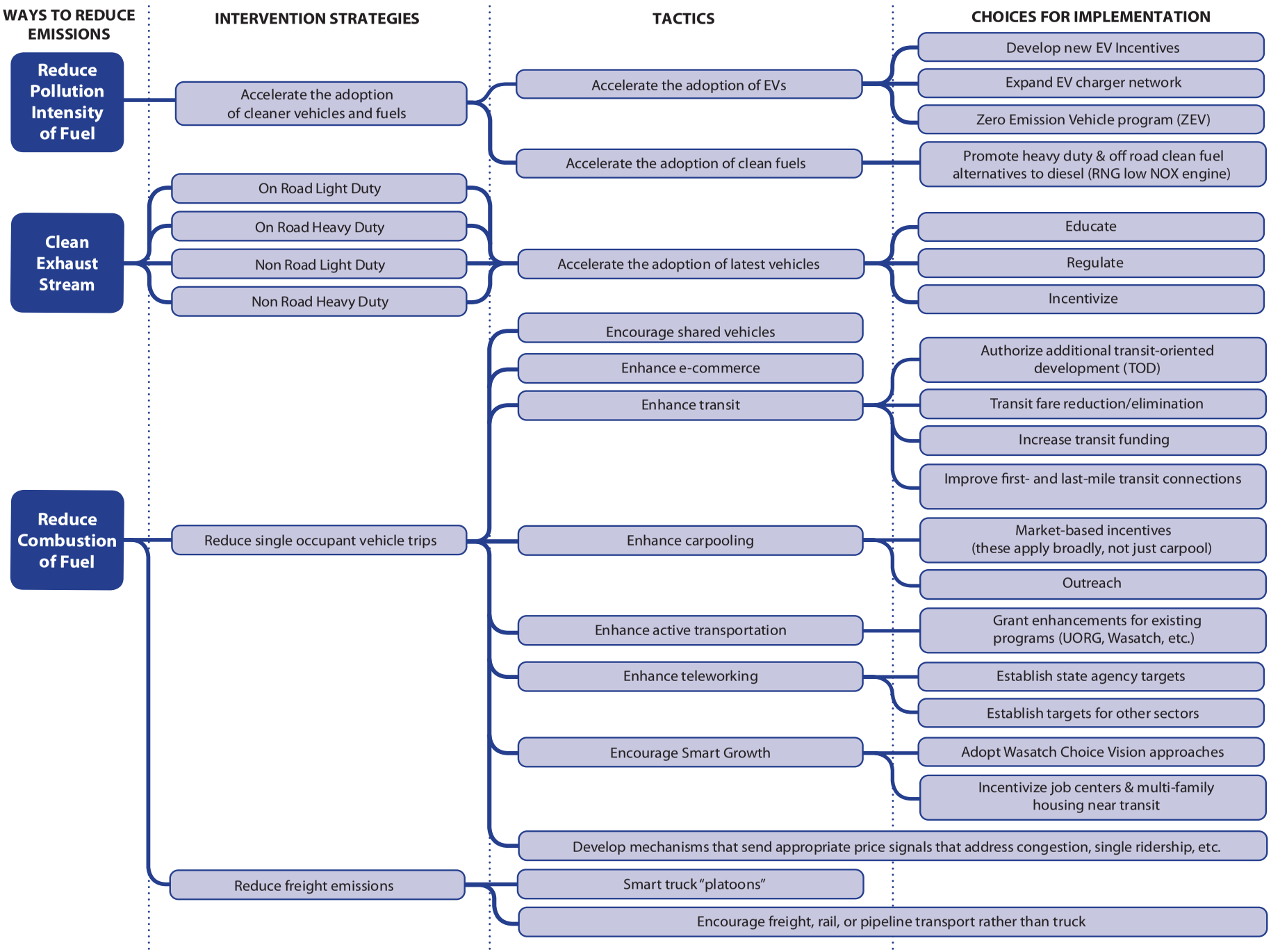
The Gardner Institute reviewed the draft roadmap with Advisory Committee members and the development process in identifying priority policy actions, providing background and education on the challenges and opportunities facing the state in addressing air quality and changing climate, and the summary of policy options and intervention strategies developed by the Committee. Committee members reviewed the draft and provided feedback on the draft content.

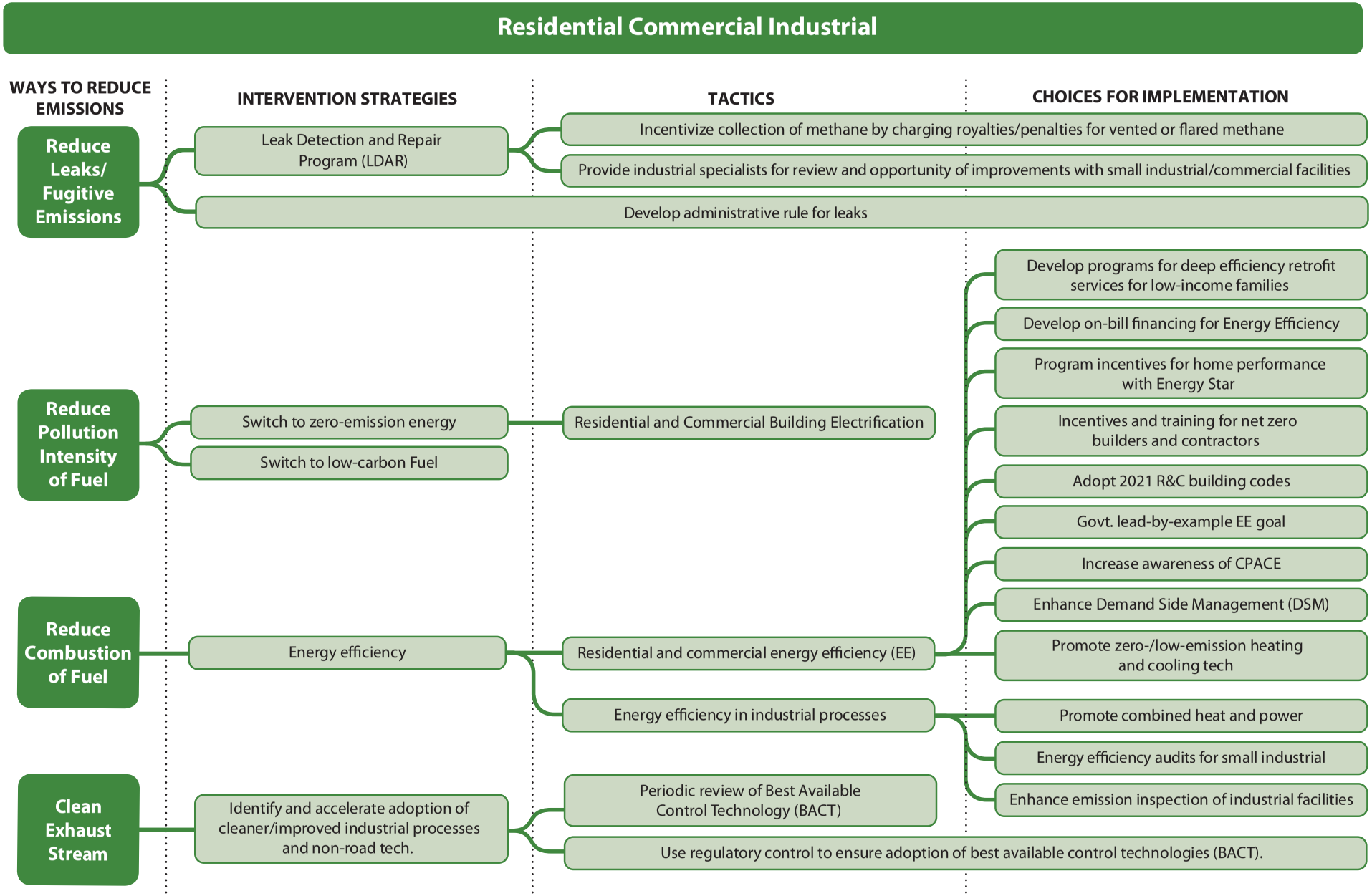
Intervention Strategies, Tactics & Implementation Choices




Agriculture & Forestry (Biomass Management)
WAYS TO REDUCE EMISSIONS
INTERVENTION STRATEGIES
TACTICS
CHOICES FOR IMPLEMENTATION
Maintain/ Enhance Carbon Sink
Conduct/enhance AF inventory
Maintain open space
Fire management
Reward ranching/farming practices that support carbon sequestration in healthy landscapes
Develop policies for denser urbanization instead of sprawl into either forest or agricultural lands.
Provide funding for reforestation
Improve crop yield to reduce land use
Reduce fuel load
Enhance budget for fire management
Provide incentives and training for agricultural soil sequestration

Transportation and Land Use




Residential Commercial Industrial
WAYS TO REDUCE EMISSIONS
INTERVENTION STRATEGIES
TACTICS
CHOICES FOR IMPLEMENTATION
Reduce Leaks/ Fugitive Emissions
Leak Detection and Repair Program (LDAR)
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 administrative rule for leaks
Reduce Pollution Intensity of Fuel
Switch to zero-emission energy
Switch to low-carbon Fuel
Residential and Commercial Building Electrification
Reduce Combustion of Fuel
Energy efficiency
Residential and commercial energy efficiency (EE)
Energy efficiency in industrial processes
Develop programs for deep efficiency retrofit services for low-income families
Develop on-bill financing for Energy Efficiency
Program incentives for home performance with Energy Star
Incentives and training for net zero builders and contractors
Adopt 2021 R&C building codes
Govt. lead-by-example EE goal
Increase awareness of CPACE
Enhance Demand Side Management (DSM)
Promote zero-/low-emission heating and cooling tech
Promote combined heat and power
Energy efficiency audits for small industrial
Enhance emission inspection of industrial facilities
Clean Exhaust Stream
Identify and accelerate adoption of cleaner/improved industrial processes and non-road tech.
Periodic review of Best Available Control Technology (BACT)
Use regulatory control to ensure adoption of best available control technologies (BACT).

Tactics Explanations

Current as of Nov 26, 2019

	Choices for Implementation	Description	References
ENERGY			
1	Promote generation and storage of clean distributed resources	Energy sharing enables electricity users to share surplus energy from rooftop solar and batteries with neighbors, and then get paid for the shared energy. Firms such as Uber and Airbnb give individuals economic incentives to provide ridesharing and rent out their houses, which realizes the optimization of resources through sharing excessive goods and services.	https://link.springer.com/article/10.1007/s40565-019-0518-5
2	Support demand response and electricity grid optimization.	Electricity grids are designed for constant, centralized power production. The grid is poorly equipped to handle variable power sources like wind and solar. Measures that introduce grid flexibility include: 1) Constant renewable energy (i.e. geothermal) 2) utility-scale storage (i.e. pumped hydro), and 3) demand-response tools (smart thermostats, smart appliances).	https://www.drawdown.org/solutions/electricity-generation/grid-flexibility
3	Allow 3rd party power supply options outside regulated utilities resulting in lower costs for consumers.	Deregulated electricity markets currently exist in thirteen states. Deregulation may allow more renewables into the energy mix. Oregon has unbundled electricity and billing from the services traditionally provided by a regulated utility, while metering, distribution, and other services remain with the utility. Regarding lower electricity costs, Utah has the tenth lowest electricity prices in the United States across all sectors (residential, commercial, industrial, and transportation).	https://www.electricchoice.com/map-deregulated-energy-markets/ https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_6_a
4	Utility and user incentives for building flexibility into the electricity grid.	Two promising technologies capable of enhancing the grid are: 1) Battery technology has potential to develop into economic utility-scale storage. 2) Pump storage projects store and generate energy by moving water between two reservoirs at different elevations.	https://www.hydro.org/policy/technology/pumped-storage/
5	Carbon Capture and Sequestration	Two divergent approaches for reducing greenhouse gases in the earth's atmosphere have emerged: First, replace fossil fuels with renewable energies such as solar, wind, and geothermal, which generate electricity without greenhouse gas emissions. Second, remove existing carbon dioxide from the atmosphere by carbon capture and sequestration (CCS) technology. Sequestration occurs when carbon dioxide is either deposited in underground reservoirs or rendered incapable of returning to the atmosphere.	
6	Upgrade Control Technology	One example of a control technology is selective catalytic reduction (SCR) which converts nitrous oxides, a criteria pollutant, into nitrogen and water. The positive feature of SCR is elimination of air quality pollutants. However, the cost of the technology may be cost-prohibitive on an industrial-scale application.	
7	Carbon Tax	A carbon tax is a fee on the carbon content of fossil fuels. A carbon tax would charge end users for externalities of fossil fuel usage, such as releasing heat-trapping carbon dioxide into the atmosphere or health impacts associated with air pollution.	
8	Securitization	Securitization is a loan refinancing instrument that addresses both the outstanding principal owed on a fossil fuel electricity generation plan and the interest rate. Securitization has the potential to lower costs for utility customers and encourage early retirement of coal or other fossil fuel power plants. Securitization may work because utilities tend to have a high costs. An investor-owned utility can raise money from shareholders and banks for a combined interest rate of about 8 to 9 percent. Securitization may substitute customer-backed or government-backed dollars for utility equity and debt, with interest rates closer to 3 or 4 percent.	https://ilsr.org/power-plant-securitization-coming-to-a-state-capitol-near-you/

	Choices for Implementation	Description	References
AGRICULTURE AND FORESTRY			
5	Enhance budget for fire management.	Forest fire prevention measures in Utah include decreasing fuel load by logging, thinning and reducing amount of fuel on the ground. Prevention measures are executed within the USDA's Forest Service budget. Under the "Shared Stewardship" inititiative, the State of Utah is invited to match dollar-for-dollar prevention measures undertaken by the USDA Forest Service.	https://climate-woodlands.extension.org/reducing-forest-fuel-loads-to-decrease-wildfire-risk/ https://www.capitalpress.com/nation_world/nation/bill-offers-hope-for-forest-fuel-reduction/article_7bb78db9-d6ba-5fb3-8748-85ecd5c33b46.html
RESIDENTIAL, COMMERCIAL, INDUSTRIAL			
6	Incentivize collection of methane by charging penalities for vented or flared methane	Oil and gas facilities are largest industrial source of methane in the USA. In Utah, an estimated 33,000 tons of methane are released annually in the Uintah Basin. Methane is a potent driver of climate change with a warming potential 36 times greater than carbon dioxide.	EDF letter to Sheila Vance dated 15 November 2017
7	Provide industrial specialist for review and opportunity improvements with small industrial/commercial facilities.	The University of Utah Industrial Assessment Center (UU-IAC) provides free energy, productivity, and waste assessments to small and medium sized industrial facilities through funding provided by the US Department of Energy. Kody Powell is the program coordinator.	https://iac.university/center/UU
8	Develop programs for deep efficiency retrofit services for low-income families.	A deep energy retrofit is a whole-building analysis and construction process that aims at achieving on-site energy use minimization by 50% or more compared to the baseline energy use (calculated using utility bills analysis) making use of existing technologies, materials and construction practices.	https://en.wikipedia.org/wiki/Deep_energy_retrofit
9	Develop On-Bill Financing (OBF) for Energy Efficiency improvements	On-bill lending is a method of financing energy efficiency improvements using the utility bill as the repayment vehicle. On-bill lending has been in use for more than 30 years as a means to increase the uptake in clean energy improvements. This method is sometimes applied to distributed clean energy implementation.	https://aceee.org/sector/state-policy/toolkit/on-bill-financing
10	Program incentives for home performance with Energy Star	ENERGY STAR offers whole-house solutions to high energy bills. The program is managed by a local sponsor that recruits home improvement contractors who are qualified to perform comprehensive home assessments. The assessment includes 1) the heating and cooling systems, 2) windows, 3) insulation, 4) flow of air into and out of the house, and 5) a safety check of gas appliances.	https://www.energystar.gov/index.cfm?c=home_improvement.hpwes_sponsors_about
11	Incentives and training for net zero builders and contractors	Net Zero Energy homes cost less to own, however the up-front investment for the materials and labor are a financial challenge. Many utilities as well as the federal government offer financial incentives. Many states have matched the federal incentives such as: 1) 30% Residential Renewable Energy Tax Credit. 2) Residential Energy Efficiency Tax Credit. Training opportunities for net zero builders and contractors exist with organizations like the Northeast Sustainable Energy Association (NESEA).	https://zeroenergyproject.org/build/loan-programs-incentives-tax-credits-energy-efficiency/ https://www.builderonline.com/building/building-science/new-course-offers-net-zero-training_o
12	Adopt 2021 Residential and Commercial Building Codes	Utah's current residential building code is the 2015 International Energy Conservation Code (IECC) with amendments; the commercial building code is 2018 IECC with amendments. A goal of an energy code is to conserve energy. Commercial buildings and residential households in the United States consume nearly 50% of the nation's total primary energy, 70% of the nation's electricity, and account for one-third of the nation's greenhouse emissions. Adopt\ the 2021 residential and commercial building codes would assure Utah of utilizing best available industry practices.	https://www.energycodes.gov/adoption/states/utah https://www.iccsafe.org/products-and-services/i-codes/2018-i-codes/iecc/ https://www.energycodes.gov/resource-center/ACE/adoption/step1
13	State Government leads by example on Energy Efficiency goals.	State governments can advance energy-efficient technologies and practices in the marketplace by promoting energy efficiency in their own everyday operations, a practice known as "Leading by Example" (LBE). Taking actions to improve the energy efficiency of government-owned and -leased facilities and fleets can accrue multiple benefits for both the government and the people it serves.	https://aceee.org/sector/state-policy/toolkit/lbe

	Choices for Implementation	Description	References
14	Commercial Property Assessed Clean Energy (CPACE)	C-PACE is a financing tool administered by the Governor's Office of Energy Development. Financing is available for energy efficiency and renewable energy measures on either new or existing commercial properties. C-PACE financing is capped at 20 percent of a project's total eligible construction cost and is contingent upon the project exceeding existing energy code by five percent.	https://energy.utah.gov/tax-credits-financing/energy-efficiency-financing/
15	Enhance Demand Side Management (Energy Efficiency)	Demand-side management (DSM) programs are designed to encourage consumers to modify their level and pattern of electricity usage. Demand-side management programs lower electricity demand, avoiding the cost of building new generators and transmission lines, saving customers money, and lowering pollution from electric generators.	https://www.eia.gov/todayinenergy/detail.php?id=38872
16	Promote zero / low emission heating and cooling technology.	Heat pumps use renewable energy from their surroundings (ambient air, water or ground) and "high-grade" energy, e.g. electricity or gas, to raise the temperature for heating or to lower it for cooling. The heat pump cycle can be used for space heating or cooling.	https://www.energy.gov/eere/buildings/downloads/experimental-envelope-fabrication-process-integrated-zero-energy-ready
17	Combined Heat & Power	CHP is an energy efficient technology that generates electricity and captures the heat that would otherwise be wasted to provide useful thermal energy—such as steam or hot water—that can be used for space heating, cooling, domestic hot water and industrial processes.	https://www.epa.gov/chp/what-chp
18	Energy efficiency audits for small industrial	Demand-side management (DSM) programs are designed to encourage consumers to modify their level and pattern of electricity usage. Demand-side management programs lower electricity demand, avoiding the cost of building new generators and transmission lines.	
19	Enhance Inspection of industrial facilities	Identifying and remediating leaks and fugitive emissions sources reduces the carbon footprint of the industrial sector.	
TRANSPORTATION AND LAND USE			
20	Develop state-sponsored EV incentives	Current EV incentives include: Federal Tax Credits: The amount of the credit is based on the battery capacity of the car, with a cap of $7,500. The battery capacity of the car must be at least 5 kilowatt-hours (kWh), for which you receive a credit of $2,500. An additional $417 is added to the credit for each additional kilowatt-hour of battery capacity up to the $7,500 cap. Rocky Mountain Power EV incentive: Rocky Mountain Power is offering EV charging incentives, and an EV time of use (TOU) rate	https://utahev.org/ev-101/incentives
21	Expand EV charger network	An ongoing build-out of the national EV-charging network should help reduce consumer fear of running out of charge, known as range anxiety, a potential barrier for consumers converting to plug-in electric vehicles.	https://www.consumerreports.org/hybrids-evs/electric-car-charging-network-is-expanding/
22	Utah becomes a Zero Emission Vehicle State	In August 2019, Colorado became the tenth state to adopt Zero Emission Vehicle (ZEV) standards for cars and trucks – a move that will provide crucial climate, public health and economic benefits for its citizens. Benefits of the program include: > Reduction of 2.7MM metric tons of greenhouse gas emissions > Savings of $5,000 over the course of EV ownership (versus an internal combustion engine)	https://www.edf.org/media/colorado-becomes-first-state-central-us-adopt-zero-emission-vehicle-standards
23	Focus on heavy duty & nonroad vehicle clean fuel alternatives to diesel	Heavy duty vehicles and non road vehicles are a significant source of pollution. Compared to vehicles fueled by motor gasoline, heavy duty diesel-fueled vehicles have higher emissions of NOX and much high emissions of PM2.5. Non road vehicles emit PM2.5 at much high rates than on road vehicles. Examples of non road vehicles include lawn mowers, yard tools, snowmobiles, ATV's, forklifts, recreational boats, and locomotives such as freight swtichers. Potential heavy duty and non road vehicle clean fuel alternates include hydrogen and carbon neutral alternative fuels (biofuels, biodiesel, bioethanol, etc.)	http://www.air-quality.org.uk/26.php https://www.epa.gov/regulations-emissions-vehicles-and-engines/regulations-emissions-nonroad-vehicles-and-engines
24	Educate (to accelerate the adoption of latest vehicles)	Education about emission reductions by means of buying a new vehicle.	
25	Regulate (to accelerate the adoption of latest vehicles)	Regulation may include disallowing older vehicles (i.e. pre-Tier 3) on the road.	
26	Incentivize (to accelerate the adoption of latest vehicles)	Incentives prod consumers to make environmentally correct choices. For example, a cash-for-clunkers program.	
27	Authorize additional transit-oriented (TOD) development	A TOD intiative would reduces per capital GHG emissions by one-half versus a single occupant vehicle trip according to US Department of Transportation data.	https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/

	Choices for Implementation	Description	References
28	Reduction / elimination of transit fares	Incentivizes increased use of mass transit within Utah.	
29	Increase mass transit funding	Larger mass transit system may reduce single occupant vehicle trips.	
30	Improve first- and last-mile transit connections.	Promote use of mass transit in areas distant from a mass transit station. Examples of first and last mile solutions may include bus transit, van pool, etc.	
31	Market-based incentives (for reducing single occupant vehicle trips).	High Occupancy Vehicle (HOV) lanes.	
32	Outreach (for reducing single occupant vehicle trips).	Carpooling.	
33	Grant enhancements to promote active transportation by increased funding of the Utah Outdoor Recreation Grant (UORG) and the Wasatch Front Regional Council's Regional Transportation Plan (RTP).	Active transportation (biking, walking) improves air quality and enhances quality of life. Active transportation's trails and bike lanes may provide first and land mile connection to mass transit.	https://business.utah.gov/uorg/ https://wfrc.org/programs/active-transportation/
34	Establish Utah state agency targets for teleworking	Teleworking is a work flexibility arrangement under which an employee may perform duties and responsibilities from an approved worksite other than the normal workplace location. Eliminating or cutting back on daily commutes reduces pollution and greenhouse gas emissions.	https://www.workflexibility.org/5-benefits-of-telecommuting-for-employers-and-employees/
35	Establish targets for teleworking in non-governmental sectors.	Teleworking is a work flexibility arrangement under which an employee may perform duties and responsibilities from an approved worksite other than the normal workplace location. Eliminating or cutting back on daily commutes reduces pollution and greenhouse gas emissions.	
36	Adopt Wasatch Choice Vision approaches	Through workshops and open houses, members of the public may express preferences for transportation and land use in their communities. Input from the public informs development of regional growth principles adopted by elected officials and guides transportation and land use decisions in Wasatch Front communities. Results from the public process are used to create regional transportation and land use scenarios that led to the creation of a regional vision. Scenarios are tested by using the CentreSim forecasting model. Wasatch Choice Vision considers how growth, transportation, and open space can be shaped for the next few decades to have outstanding positive impacts on the life of residents in the Greater Wasatch Area.	https://journals.sagepub.com/doi/pdf/10.3141/1994-19
37	Incentivize job centers & multi-family housing near transit nodes.	A transit node is a place in a city where people and transportation routes congregate and converge ,creating a transit-oriented, pedestrian-friendly areas where high concentrations and a wide-variety of residential, employment, retail and other uses are located.	
ENERGY			
38	Implement securitization for early retirement of coal-fired power plants	Securitization is a loan refinancing instrument that addresses both the outstanding principal owed on a fossil fuel electricity generation plan and the interest rate. Securitization has the potential to lower costs for utility customers and encourage early retirement of coal or other fossil fuel power plants. Securitization may work because utilities tend to have a high costs. An investor-owned utility can raise money from shareholders and banks for a combined interest rate of about 8 to 9 percent. Securitization may substitute customer-backed or government-backed dollars for utility equity and debt, with interest rates closer to 3 or 4 percent.	https://ilsr.org/power-plant-securitization-coming-to-a-state-capitol-near-you/
39	Provide transition support for communities whose work sector relies heavily on carbon-emitting generation	The advent of relatively low natural gas and renewable energy generation and storage prices has reduced the competitiveness of coal-fired electric generation. Coal mining and coal-fired electric generation operations are the central economic activity in some of Utah's rural communities. As mining operations ramp down production and coal-fired generators begin closing, economic development and diversification efforts will be needed to ensure a viable future for these communities. This intervention aims to address the adverse effects of the ongoing transition away from coal-fired electricity generation. The Kem C. Gardner Institute is already working in this area with its Coal Country Strike Team, which targets four interventions to aid economically distressed communities: 1. create a Silicon Slopes Eastern Hub to complement Utah's rapidly expanding tech sector; 2. build a tourism infrastructure; 3. revitalize housing stock to increase wealth and create a more attractive community; and 4. establish customized economic incentives to spur development.	

	Choices for Implementation	Description	References
40	Revise Utah's existing renewable portfolio standard.	A "renewable portfolio standard" is a performance standard for electricity providers or utilities that requires a certain portion of their annual delivered electricity to come from a certain set of energy generating resources, usually renewable energy but Utah could include other zero emission resources such as carbon capture and sequestration, etc.. New Mexico, for example, calls for its investor-owned utilities to achieve 50% of electricity sales come from renewable sources by 2030 and 100% carbon free electricity resources by 2045.	https://www.governor.state.nm.us/2019/03/22/governor-signs-landmark-energy-legislation-establishing-new-mexico-as-a-national-leader-in-renewable-transition-efforts
41	Evaluate transmission constraints and solutions to integrate more electricity from low-carbon resources.	Evaluated solutions may include: 1) transmission buildout, 2) upgrades to existing transmission, 3) non-wires solutions, and 4) contractual changes to increase the capacity that the lines can carry. Last year the legislature allocated resources for an initial study. The recommendation could be to evaluate the findings of the study when completed and develop a plan for next steps.	
42	Support renewable natural gas optimization and standards.	Remove barriers to renewable natural gas (RNG) development and expand opportunities to develop RNG from waste methane.	
43	Promote Carbon Capture and Sequestration Technology	Two divergent approaches for reducing greenhouse gases in the earth's atmosphere have emerged: First, replace fossil fuels with renewable energies such as solar, wind, and geothermal, which generate electricity without greenhouse gas emissions. Second, remove existing carbon dioxide from the atmosphere by carbon capture and sequestration (CCS) technology. Carbon capture and sequestration occurs when carbon dioxide is either deposited in underground reservoirs or rendered incapable of returning to the atmosphere.	
44	Upgrade Control Technology	One example of a control technology is selective catalytic reduction (SCR) which converts nitrous oxides, a criteria pollutant, into nitrogen and water. The positive feature of SCR is elimination of air quality pollutants. However, the cost of the technology may be cost-prohibitive on an industrial-scale application.	
45	Create a fuel neutral energy savings standard for electric and gas utilities.	Many states have a performance standard for their utilities requiring each to achieve a certain amount of energy and/or peak demand savings through their energy efficiency programs on behalf of their customers on an annual or multiyear basis. The state public utility commission usually has a role in approving the actual programs. Colorado, for example, requires its investor-owned electric utilities to achieve at least 5% in energy savings and 5% in peak demand savings by 2028.	database.aceee.org/state/energy-efficiency-resource-standards
46	Create consumer incentives for reduced and energy efficient fuel use.	Provide state incentives or programs to individuals or businesses for investments in efficient equipment or retrofits.	
47	Support national and regional initiatives to put an economy-wide price on greenhouse gas emissions through resolution or legislation.	Carbon pricing is a market-based mechanism that puts a price on emissions of carbon and other greenhouse gas emissions in order to incentivize emissions reductions by individuals and businesses. A price on carbon brings the external costs associated with carbon pollution and the impacts of climate change into the economics for the producer and end user. Therefore, the pricing will send market signals that select for lower carbon solutions without dictating a specific solution. Some of the policies being considered nationally include provisions that the revenues be rebated to individuals or used to investment in new low emissions energy projects, provide revenues for communities in transition and research or to reduce other taxes.	
TRANSPORTATION AND LAND USE			
48	Develop mechanisms that send appropriate price signals that address congestion, single ridership, etc.	Mechanisms may fall under the umbrella of congestion pricing. One approach is a "VMT tax", which is a registration fee based on miles traveled instead of a fuel tax (or maybe in addition to a reduced fuel tax) based on gallons of gasoline or diesel fuel purchased. A VMT tax captures transportation costs from alternative fuels such as CNG and electric, keeps revenues stable from vehicles using traditional fuels with improving fuel economy, but may sacrifice revenues from interstate vehicles if not implemented properly. Another aspect of "congestion pricing" are the "HOT lanes" which charge a varying rate depending on increased congestion at certain times of day. HOT lanes are currently free to carpools and some alternative fuel vehicles. A third aspect is road tolling as a strategy ; high occupancy vehicles (job) don't pay tolls, or pay reduced tolls, which discourages single occupant driving	

	Choices for Implementation	Description	References
49	Encourage freight, rail, or pipeline transport instead of truck.	This intervention aims to reduce emissions by reducing the fuel used in the shipment of freight. Specifically, this intervention seeks to encourage/promote the switching of product/freight delivery from trucks to either pipelines or rail, which require less energy per unit of product delivered. The proposed intervention is agnostic as to the mechanism for promoting such a switch, but could include regulations, incentives, and/or educational/awareness/assistance efforts.	
	Residential, Commercial, Industrial		
50	Develop administrative rule for leaks	This intervention would utilize the Utah Air Quality Board's administrative rulemaking authority to regulate the oil and gas exploration and development sector to reduce leaks and other fugitive emissions. The Utah Division of Air Quality is currently in the process of improving its emissions inventory of this sector and is working with its compliance and permitting Sections to identify potential areas for further rulemaking. Utah only has jurisdiction of 20-25% of emissions in the Uinta Basin, however, so any future rulemaking will need to occur in coordination with EPA, which has jurisdiction on the remaining portion of the inventory.	
51	Use regulatory control to ensure adoption of best available control technologies (BACT).	This intervention would utilize the Utah Air Quality Board's regulatory authority to ensure that best available control technologies (BACTs) are used at new emissions sources and to establish new administrative rules, where appropriate, to require low-emitting technologies that have become technologically and economically viable. An example of potential future rulemaking might include adopting an ultra-low NOX requirement for new commercial and industrial boilers.	
AGRICULTURE AND FORESTRY			
52	Develop policies for denser urbanization instead of sprawl into either forest or agricultural lands.	This intervention aims to limit the loss of forests and agricultural lands to urbanization through incentivizing more compact, infill (re)development, eliminating barriers to denser development, and/or requiring alternatives to single-family, large-lot development.	
53	Provide funding for reforestation	This intervention aims to provide more funding for reforestation initiatives on State lands and/or support funding for reforestation on federal lands in a bid to sequester carbon. Because forests are both a sink and source for carbon emissions, such an intervention would need to be carefully balanced with forest fire management strategies and funding to ensure a net carbon sequestration benefit.	
54	Provide incentives and training for agricultural soil sequestration	According to Columbia University, "The Earth's soils contain about 2,500 gigatons of carbon… more than three times the amount of carbon in the atmosphere and four times the amount stored in all living plants and animals." This intervention aims to improve soil carbon sequestration through incentives and training to promote crop rotation/diversification, reduced tilling, rotational grazing, and improved manure/compost practices.	

The Utah Roadmap Focus Groups

URBAN, GENERAL PUBLIC
October 3, 2019, 6:00 p.m.
Monson Center, Salt Lake City

Methodology

The Gardner Policy Institute contracted with Lighthouse Research and Development to recruit adult registered voters from a variety of income levels who were knowledgeable about current events. Ten of the twelve people recruited attended. Each received a participation stipend, and those traveling from outside the area of Salt Lake City and south Davis County received an additional stipend to cover the expense of gas. Participants were served dinner. A facilitator and note taker attended the session and participant used sticks numbered 1-5 on several questions to register their level of support for specific actions or initiatives.

Overview

Five women and five men from across the Wasatch Front attended the focus group (including residents from Salt Lake, Tooele, Utah, Davis, and Summit counties). Seven indicated air quality was one of their top ten policy concerns, and four indicated climate change was one of their top ten concerns. Two participants indicated these issues were in their top three policy concerns. Participants were concerned about poor air quality and generally open to initiatives to improve it, although support varied based upon factors such as cost and individual circumstance.

Themes

Concerned about the health of children and future generations. Participants mentioned improving air quality for kids and future generations. One discussed concerns about the number of red flag school recess days in Lehi.

Health issues can lead to personal change. One participant had moved his residence and business to Park City because of his daughter's severe asthma attacks in Salt Lake City.

Changes in behavior are appealing if cost is not an issue. Most supported getting a lower emission vehicle, trading in lawnmowers, and retrofitting house to be more energy efficient if cost was not an issue.

Several changes are appealing with supporting infrastructure. Several participants were knowledgeable about the possibility of using electric cars but knew how they would limit drivable distance. They noted how few places there are to charge cars and that road trips beyond the Wasatch Front would be impossible because of lack of charging stations. One participant suggested a car share program like those in other cities. Multiple participants noted the problem of idling at school drop off and pick up and lamented the lack of sidewalk and bike lanes that prevent children from walking or biking to school safely. Additionally, participants noted safety concerns for bikers due to a lack of designated bike lanes in many areas.

Inconsistent government efforts decrease enthusiasm for change. Examples included a Redwood Road bike lane was changed back into a normal lane and decreased the safety of biking, and solar rebates that were discontinued.

Recognition that money matters - Increasing the cost of poor habits and providing incentives or subsidizing good habits influences behavior. One participant noted the need for funding to retrofit buildings, another lamented subsidies and resigned leases for a polluting energy industry.

Transportation-related interventions generally well received. Improving transit convenience; increasing transit frequency; reducing transit fares; and establishing state teleworking targets all received positive ratings from the majority of the group.

Building-related interventions received mixed feedback. The majority of participants gave positive ratings to encouraging better building codes and smart growth policies while market incentives were on balance more neutrally rated.

UNIVERSITY/COLLEGE STUDENT BODY OFFICERS
December 6, 2019, 12:00 p.m.
Student Life and Wellness Building, UVU, Orem

Methodology

The Gardner Policy Institute contacted the ASUU President and inquired if student body officers from colleges and universities throughout Utah would be interested in participating in an air quality and changing climate focus group for the Utah Road Map project. The officers agreed to have the discussion as part of a normally scheduled meeting. A facilitator and note taker attended the session.

Overview

Twelve students attended the focus group. The majority of participants thought both air quality and changing climate were important issues and supported taking immediate action to address the problems. Participant views were not partisan but did reflect the reality that poor air quality is less noticeable and consequently feels less urgent in rural areas. Nonetheless, even those participants who did not think of these issues as frequent personal concerns supported policy changes to address the problems.

Themes

Concerned about the implications for children and future generations. Although two participants indicated they did not think about air quality and chancing climate very often, the others said both issues were a concern to them, and several indicated air quality and changing climate were among their top concerns: "my friends and I don't want children because they would be living in an apocalypse and I don't want to think that way." One participant noted that even if all of the factories were shut down, there would still be a crisis, so people needed to learn how to support each other through the crisis.

Support affordable, accessible, and electric transit – including Frontrunner on Sundays. Participants praised existing transit but indicated that even in close proximity to transit systems, more frequent schedules are needed. Participants suggested increasing the amount of electric transit and making Frontrunner available on Sundays.

Would like more health care examples as well as some examples of the impact of climate change. A participant with background in health care and suggested including information about miscarriages and complications with childbirth. Others agreed that health care examples were helpful in illustrating the importance of the problem (and similar examples for climate change would be useful too).

Rural areas are important - need to provide training and support to coal industry employees as those jobs disappear and to prevent air pollution in currently pristine areas. Rural participants said that although they didn't think about these problems as much during the course of their everyday life, they wanted rural areas to be included in the Road Map, including education and training for those in the coal industry and recommendations to protect the air and climate they currently enjoy.

LEGISLATORS
November 5, 2019, 1:30-2:30 p.m.
Capitol, Salt Lake City

Methodology

The Gardner Policy Institute reached out to Senate and House leaders to assemble a group of legislators to discuss Roadmap deliverables. Legislative leaders extended invitations and five legislators attended: two Democrats and three Republicans; one Senator and four Representatives. A facilitator and two note-takers attended the session, as well as an analyst to answer technical questions, and Gardner Institute Director Natalie Gochnour, to introduce the Road Map process and ask follow up questions.

Overview

Legislators in attendance urged that the Road Map be a succinct one-page summary document for quick reference with additional material available for further detail. Participants were hopeful the document would contain no more than five suggested high impact options. Four key policy classification categories emerged during the discussion: education, incentives, investment, and regulation. Participants requested as much information as possible about the ROI and trade-offs associated with each policy option. Several in the group asked for a focus on "bang-for-the-buck," while one asked for "low-hanging-fruit" ideas. Participants noted the importance of including specific rural area needs because of the perception that people working on these issues don't care about rural areas. Recognizing the difficulty of this process, one participant noted the importance of maintaining a transparent process and of clearly stating research limitations to legislators' in order to gain their acceptance of Road Map ideas.

Themes

- Our road map should be "phased." List the five most impactful things the state should do first. Then follow with the next set of items. In this way we provide something meaningful they can act on. It's also consistent with the roadmap metaphor to go the first mile, then the next. It also signals a directional change rather than focusing on the finish line. They used the term…" give us a starting place."
- They mentioned the terms "tradeoffs" and "ROI" several times. While we didn't measure the costs and benefits of each intervention, we did glean from our technical team and outreach discussions which items provide the biggest "bang for the buck" (a term that you have used and that they used as well). I think our first couple of phases should specifically mention that the suggested items were filtered through a lens of maximizing the ROI and minimizing undesirable tradeoffs. *A couple of participants shared stories about failed opportunities due to inability to understand trade offs and costs associated with air quality policy proposals.*
- They suggested that we turn every intervention into something that can be acted upon. Not sure what this means, but let's think through it.
- Sen. Harrison mentioned that the Gardner Institute is a "bridgebuilder that takes politics out of the mix." I thought that was helpful way to think of our role. Maybe there's something there since bridges are part of roads/roadmap.
- They provided helpful insights on urban-rural issues. I left thinking we definitely need to include an intervention that makes energy-dependent economies a priority for economic development transition funds. It's also important that we highlight agriculture. We may want to consider a meeting with the Farm Bureau/Dept. of Ag (both state and federal).
- One legislator said, "I've never seen a solution that costs less than prevention." I thought that was spot on.
- Rep. Spendlove opined that everything we are talking about can be lumped into education (easiest), incentives (harder), and regulation (most difficult). I would add "investment" to this list.
- They all stressed that we need to get the roadmap down to a one-page summary that is not too dense.
- They seemed to like the title. *Questioned whether the word "positive" needed to be included.*
- *Liked idea of having something ready and vetted before legislative session when time is so limited.*
- *Participants seemed to have a greater understanding of the complexity of creating Roadmap by the end of the discussion. Mentioned that as long as roadmap is based on a transparent process and states research limitations, people will be accepting.*

INDUSTRY/ENVIRONMENTAL/HEALTH
October 31, 2019, 8:30-10:00 a.m.
Monson Center, Salt Lake City

Methodology

The Gardner Policy Institute invited a diverse group of representatives from 24 energy sector, environmental, and health organizations to provide their perspectives on air quality and green house gas policy interventions identified at this juncture of the Road Map process. Nine people attended to represent their organization. Two additional people were brought by their group representative, and they were asked to observe the discussion. A facilitator and two note-takers attended the session, as well as an analyst to answer technical questions, and Gardner Institute Director Natalie Gochnour, to introduce the Road Map process.

Overview

Participants discussed a range of intervention alternatives to address air quality and changing climate - including greater use of nuclear and renewable energy sources such as solar and RNG. Participants noted the need for investment in greater storage capacity for renewable energy, particularly with regard to solar. At more than one point in the discussion, participants noted the need for collaboration: among different entities within Utah; among states and entities in the mountain state region; and with federal delegates from the region. One participant noted the importance of keeping social equity in mind as policies are enacted – especially in terms of retrofitting old buildings and creating new housing options for those living in lower income areas. Although several groups with expertise in the health effects associated with poor air quality and GHG were invited to participate in the focus group, only one attended – consequently discussion focused on reducing emissions but did not grapple with health effects.

Themes

Carbon free power projects – both renewables and nuclear – are in the works. A couple of participants argued that interventions should not tell utilities where to source energy.

Need to invest in energy storage for renewables, especially solar. Several participants noted an important need for economic incentives for storage.

Incentives for renewable energy makes it a market-based choice rather than a political choice. Example of how people will purchase solar panels if the incentives are right even if they don't understand details of changing climate.

Need information on the relative costs and benefits of various choices.

Consider allowing power purchase agreements. Participants discussed a green certificate issued by Rocky Mountain to Rio Tinto and Silicon Slopes' interest in using renewable energy.

Consider the local perspective. Participants discussed the importance of local perspective in terms of: allowing communities to decide they want to establish renewable energy use goals; considering community preferences in smart growth planning; and establishing renewable sources such as wind turbines that impact community appearance and experience.

Need for collaboration and leadership. Several participants noted the importance of collaboration among states in our region – suggesting Utah could take a leadership role.

Involve federal delegation. Some necessary changes need to be made legislatively at a federal level.

Consider rural needs as well as those of people in lower SES areas. Be sure to have solutions that address the whole state, and that address the east and west sides of the Wasatch Front. For instance, there is a need for retrofitting old buildings and creating new housing options for those living in lower income areas.

Preservation of open space. It is important to preserve natural land that is available due to more efficient crop use – typically it is developed. Support open space and trees.

Better wood burning stove replacement plans needed. UCAIR has limited replacements that go quickly – there is more demand for replacement.

Support information campaigns – The public needs to better understand how their actions can contribute to poor air quality. Participants suggested the importance of education campaigns centered on changes such as encouraging purchase of tier 3 fuel vehicles and replacing woodburning stoves and gas-powered lawnmowers with less polluting alternatives.

RURAL (DUCHESNE LOCATION – MULTI-COUNTY PARTICIPANTS), GENERAL PUBLIC
October 12, 2019, 11:00-12:30 p.m.
Duchesne County Centennial Event Center

Methodology

The Gardner Policy Institute contracted with Lighthouse Research and Development to recruit adult registered voters who: lived in counties within a one-and-a half hour drive of Duchesne; were knowledgeable about current events; and represented a variety of income levels. Each received a participation stipend, and those traveling from outside the area received an additional stipend to cover the expense of gas. Participants were served lunch. A facilitator and notetaker attended the session and participants used sticks number 1-5 on several questions to register their level of support for specific actions or initiatives.

Overview

Four participants from Emery, Duchesne, and Carbon (2) counties attended the group session. No participant said air quality was an issue of concern to them. While one participant indicated that climate change was on their top ten list, no one said it was a top-three issue of concern.

Themes

Distrust of government and 'experts.' Participants talked about their distrust of government especially at the federal level. They question who the 'experts' are who talk about climate change and air quality issues. Some felt that the experts discussing these issues were making money with their research, including health experts and those from colleges. One mentioned that to understand what is best for rural areas of Utah, we should talk to farmers and ranchers who live in the area.

No sound science on air pollution and climate change. The notion that climate change has always been happening and that the current air quality is better than 200 years ago, was important to respondents in the group.

Happy with air quality in own area but aware of poor air quality along Wasatch Front. Participants discussed their satisfaction with the quality of air in their own area and how it differs from the poor air along the Wasatch Front.

Power plants are clean – they are not polluters of air or water. Those living in areas near power plants contended the plants do not pollute air or water and are frustrated that experts and those from other areas of the state do not understand how clean the plants are because of the scrubber system.

State and federal government are not answer to problem. For most, their strong dislike of government encourages the idea that people, not government, should come up with solutions themselves. Most expressed opposition to any laws that force citizens to do things. Participants preferred tax breaks to tax refunds. Participants believe it is important that government not overreach when it comes to air quality and that local government is preferable because it is closer to the people and understands local issues.

Want better efforts to manage forest and wildfires. Several participants mentioned the need for better management of the area forests and more local control. Two participants supported increased logging to help with overgrowth and wildfire control in the area.

Would make changes if affordable and practical. All of the participants were willing to make changes to more efficient vehicles, yard equipment, and housing insulation, noting they wouldn't make the changes in order to produce lower emissions or for cleaner air, but rather because the item in question was affordable and met their needs. In general, participants would not replace personal vehicles, etc. unless they needed replacement.

RURAL (RICHFIELD LOCATION, MULTI-COUNTY PARTICIPANTS), GENERAL PUBLIC
October 10, 2019, 6:00 p.m.
Washburn Building, Snow College, Richfield

Methodology

The Kem C. Gardner Policy Institute contracted with Lighthouse Research and Development to recruit adult registered voters who: lived in counties within a one-and-a-half hour drive of Richfield; were knowledgeable about current events; and represented a variety of income levels. Each received a participation stipend, and those traveling from outside the area received an additional stipend to cover the expense of gas. Participants were served dinner. A facilitator and note taker attended the session and participant used sticks numbered 1-5 on several questions to register their level of support for specific actions or initiatives.

Overview

Three women and two men from Emery, San Pete (2), Sevier, and Millard counties attended the focus group. Participants had complex ways of thinking about changing climate and improving air quality that did not reflect strictly partisan or ideological views. Three indicated air quality was one of their top ten policy concerns, and two indicated climate change was one of their top ten concerns. None indicated these issues were among their top three policy concerns. Participants were concerned about poor air quality, and to a lesser extent climate change, but noted that the observable evidence of these problems was more hidden in rural areas than in urban areas and allowed people to focus on other issues. Participants were open to some initiatives and personal changes to improve air quality and address climate change, but emphasized their rural perspective.

Themes

Concerned about the health of children and future generations. Although participants discussed the importance of improving air quality for the health of kids and future generations, they also noted the difficulty of keeping these things in mind when the air looks clear and climate-related events such as hurricanes and fires aren't present in the rural areas where they live. Participants described the ugly air visible on recent trips to Fillmore and Nephi as both concerning and surprising. Some participants suggested it is a matter of time before these problems reach rural areas.

Suspicious that businesses and the government only offer incentives and programs that financially benefit them, and that energy-saving reforms are incentivized before they are ready. Examples include a woman who gradually replaced her incandescent bulbs with $10 CFL bulbs to reduce energy use in her home only to find that LED bulbs had become a better choice; and a participant who explained that unless solar panel owners have expensive battery storage, most will not use the energy they capture during the day.

No place to charge electric cars, but a shared work shuttle between towns, a once-a-day bus schedule, hybrid cars, or the extension of Front Runner to Spanish Fork would be useful. Participants had a number of suggestions to reduce vehicle miles, and they reflected the unique needs of rural communities. One participant noted it is commonplace for members of a single residence to work in different towns because of job location. Consequently, he suggested it would not make sense for them to move closer to one person's work, but it would be helpful to have a work shuttle drive between towns each day and drop passengers off at major employers. Participants also noted many people in rural communities do not have driver's licenses and rely on family and friends to drive places – they suggested these folks would plan their day around a limited bus schedule. Hybrid cars were lauded for their great gas mileage unlike fully electric vehicles that needed charging stations. Finally, participants noted that rural residents regularly visit the Wasatch Front - if they have to drive all the way to Provo before encountering transit, they may as well drive the whole way, but if there was a Front Runner extension to Spanish Fork, they would use it.

Important to prioritize increased investment in solar storage and then provide incentives for panels. One participant had background as a solar panel salesperson and explained the need for increased battery storage (as well as the pros and cons of different types of batteries) in order to store the solar energy captured during the day for use during peak evening hours. The group supported solar panel incentives if investment in adequate storage occurred first.

Participants agree education is important, particularly in rural areas. Participants suggested that people in their communities don't understand the details of air quality and its impact on people.

Participants mixed on changes to homes to reduce emissions and improve air quality. Participants liked the idea of saving money by retro-fitting their house to be more energy efficient but thought it was unlikely most people in rural areas would change whether they used a burning stove or changed from natural gas to electric in order to reduce emissions.

Jobs are important - Need to provide training and support to coal industry employees as those jobs disappear. Although participants supported current policies supporting the coal industry, they noted that the long-term projected decline in coal jobs will require employee education and retraining in order to maintain healthy communities.

Participants support changes that allow them more independence. Participants were supportive of options that allow them to be more independent or "off the grid" such as energy storage, rain water collection for their gardens, or renewable energies. Their distrust of government and large government entities drives this support.

Methodology for Criteria Evaluation Working Groups & Outcomes

Members from the Technical Advisory Committee self-selected to attend interim meetings focused on either economics, emissions, or health criteria used to evaluate the 54 interventions for the Utah Roadmap. Evaluations were based on criteria found in the guiding principles for the Technical Advisory Committee.

Members attending the economics and emissions subgroups evaluated whether each marker had a strong (green), neutral (yellow), or no effect (red) on each of the following criteria. The summary of the evaluations is displayed in the Outcomes document.

- ✓ Criteria for Economics subgroup evaluation:
    1. Price-based initiative
    2. Diffused costs
    3. Potential for short-term (<10 years) economic growth
    4. Potential for long-term (>10 years) economic growth
    5. Simplicity for economic agent
    6. Administrative simplicity
- ✓ Criteria for Emissions subgroup evaluation:
    1. Efficacy in reducing criteria pollutants
    2. Efficacy in reducing greenhouse gas emissions
    3. Regulatory feasibility
    4. Ease of implementation
    5. Short-term efficacy (< 10 years) in reducing emissions
    6. Long-term efficacy (> 10 years) in reducing emissions
- ✓ The health impacts group advised that judging each intervention on health-related criteria would not be productive as any suggested solution would improve health to varying degrees; the subgroup members provided health impact studies specifically related to air quality and changing climate to inform The Utah Roadmap.

Criteria Evaluation Meetings Outcomes

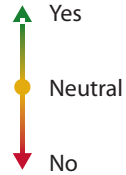
Key

Intervention

		Emissions Evaluation Group						Economics Evaluation Group					
		AQ Efficacy	GHG Efficacy	Reg Feasibility	Ease of Implement	ST Impact	LT Impact	Market based	Diffused Costs	ST growth	LT growth	Economic Agent	Admin Simplicity
1	Promote generation and storage of clean distributed resources	▲	▲▲	▲	▼	▲	▲▲	▲▲	▲	▲	▲▲	▲	▼▼
2	Support demand response and grid optimization	▲▲	▲▲	▼	▼▼	▼	▲▲	▲▲	▲▲	▲	▲▲	▲▲	●
3	Allow 3rd party power supply option outside regulated utilities	▼	▼	▼▼	▼▼	▼▼	▼	▲▲	▲	●	▲	▼	▼▼
4	Utility and user incentives for building flexibility into the electricity grid.	▲	▲▲	●	▼	▼	▲▲	▲▲	▲▲	▲	▲▲	▲	▲
5	Enhance budget for forest fire management	▲	▲	▲▲	▲	▲	▲▲	▼▼	▲	▲	▲	▲▲	▲▲
6	Incentivize collection of methane by charging penalties for vented or flared methane	▲	▲▲	▼	●	▲▲	▲▲	▲▲	▲	▼	▲▲	▲▲	▼
7	Provide industrial specialist for review and opportunity improvements with small industrial/commercial facilities.	▲▲	▲▲	▲▲	▲	▲▲	▲▲		▲▲	▲	▲▲	▲▲	●
8	Develop programs for deep efficiency retrofit services for low-income families.	▲▲	▲▲	▲▲	▼	▲	▲▲	▲	▲	▲▲	▲▲	▲	▼▼
9	Develop On-Bill Financing (OBF) for Energy Efficiency improvements	▲▲	▲▲	▲▲	▲	▲	▲▲	▲▲	▲	▲	▲▲	▲	▼▼
10	Program incentives for home performance with Energy Star	▲▲	▲▲	▲▲	▲▲	▲	▲▲	▲▲	▲▲	▲▲	▲▲	▲▲	●
11	Incentives and training for net zero builders and contractors	▲▲	▲▲	▲▲	▲	●	▲▲	▲▲	▲▲	▲	▲▲	▲	▼
12	Adopt 2021 Residential and Commercial Building Codes	▲▲	▲▲	▼	▼	▲	▲▲	▼▼	▼	▼▼	▲▲	▲	▲
13	State Government leads by example on Energy Efficiency goals.	▲▲	▲▲	▲▲	▲▲	▲	▲	▼▼	▲▲	▲	▲▲	▲▲	▲▲
14	Commercial Property Assessed Clean Energy (C-PACE)	▲▲	▲▲	▲▲	▲▲	▲	▲▲	▲▲	▲▲	▼	▲	▲	▲
15	Enhance Demand Side Management (DSM)	▲▲	▲▲	▲	▲	▲	▲▲	▲	▲	▲	▲▲	▲	▲
16	Promote zero / low emission heating and cooling technology.	▲▲	▲▲	▲	▲	▲	▲▲	▲	▲▲	▲	▲▲	▲▲	▲
17	Combined Heat & Power	▲	▲▲	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
18	Energy efficiency audits for small industrial businesses	▲▲	▲▲	▲▲	▲▲	▲▲	▲▲	▲	▲	▲	▲▲	▲	▲
19	Enhance emissions inspection of industrial facilities	▲▲	▲	▲	▲	▲	▲▲	▲	▼	▼	▲▲	▲	▲
20	Develop state-sponsored EV incentives	▲▲	▲▲	▲▲	▲	▲	▲▲	▲▲	▲	▲▲	▲▲	▲▲	▲
21	Expand EV charger network	▲▲	▲▲	▲	▲	▲▲	▲▲	▲▲	▲▲	▲▲	▲▲	▲▲	▲
22	Zero Emission Vehicle State (ZEV)	▲▲	▲▲	▼▼	▼▼	●	▲▲	▼▼	▲	●	▲▲	▲▲	▲
23	Focus on heavy duty & nonroad vehicle clean fuel alternatives to diesel	●	▲	▼	▼▼	▲	▲	▲	▲	●	▲▲	▲	▼▼
24	Educate (to accelerate the adoption of latest vehicles)	▲▲	▲	▲	▲	▲	▲▲	▲▲	▲▲	▲	▲▲	▲▲	▲
25	Regulate (to accelerate the adoption of latest vehicles)	▲	▼	▼▼	▼▼	▼▼	●	▼▼	▼	▼	▲	▼	▼▼
26	Incentivize (to accelerate the adoption of latest vehicles)	▲▲	▲	▲	▲	▲	▲▲	▲▲	▲▲	▲	▲▲	▲▲	●
27	Authorize additional transit-oriented development	▲▲	▲▲	▲	▲	▲	▲▲	▲	▲▲	▲▲	▲▲	▲	▲
28	Transit fare reduction / elimination	▼	▼	●	▲	▼▼	▼	▲▲	▲▲	▲	▲▲	▲▲	▲▲

Intervention

Key



	Intervention	Emissions Evaluation Group						Economics Evaluation Group					
		AQ Efficacy	GHG Efficacy	Reg Feasibility	Ease of Implement	ST Impact	LT Impact	Market based	Diffused Costs	ST growth	LT growth	Economic Agent	Admin Simplicity
29	Increase Transit Funding	▲	▲▲	▲▲	▲▲	▲	▲▲	▲	▲▲	▲	▲▲	▲▲	▲▲
30	Improve first and last-mile transit connections	▲▲	▲▲	▲▲	▲▲	▲▲	▲▲	▲	▲▲	▲	▲▲	▲▲	▼
31	Promote HOV lanes (market-based)	▲▲	▲▲	▲▲	▲▲	▲▲	▲▲	▲▲	▲▲	▼	▲	▲▲	●
32	Enhance carpooling	▲▲	▲▲	▲▲	▲▲	▲▲	▲▲	▲	▲▲	▼▼	●	▲▲	▲
33	Enhancements for Active Transport	▲▲	▲▲	▲▲	▲▲	▲▲	▲▲	▲	▲▲	▲	▲▲	▲▲	▲
34	Enhance teleworking - set state agency targets	▲	▲	▲▲	▲	▲	▲▲	▼	▲	▲	▲	▲▲	▼▼
35	Enhance teleworking - set targets for private sectors	▲▲	▲▲	▲	▼	▲	▲▲	▲▲	▲▲	▲	▲▲	▼	▼▼
36	Adopt Wasatch Choice Vision approaches	▲▲	▲▲	▲▲	●	▲	▲▲	▲▲	▲▲	▲	▲▲	▲▲	▼
37	Incentivize job centers & multi family housing near transit	▲▲	▲▲	▲▲	▲	▲	▲▲	▲▲	▲▲	▲▲	▲▲	▲▲	▲
38	Implement securitization for early retirement of coal-fired power plants	▲▲	▲▲	●	▼▼	●	▲▲	▲	▲▲	●	▲▲	▼	▼▼
39	Provide transition support for communities whose work sector relies heavily on carbon-emitting energy sources	▼▼	▼▼	●	▼▼	▼	●	▼▼	▲▲	●	▲▲	▲▲	▼
40	Revise Utah's existing renewable portfolio standard.	▲	▲	▲	●	●	▲	▼▼	▼	▼▼	●	▼	▼▼
41	Evaluate transmission constraints and solutions to integrate more electricity from low-carbon resources.	▲▲	▲▲	▼▼	▼▼	▼	▲▲	●	▲▲	▲	▲▲	●	●
42	Support renewable natural gas optimization and standards.	●	▲	▼	▼▼	▼▼	▲	●	▲▲	▲	▲▲	●	●
43	Promote Carbon Capture and Sequestration Technology	▼▼	▲▲	▼▼	▼▼	▼▼	▲	▼	●	▼	▲▲	▲	●
44	Upgrade Control Technology	▲▲	●	●	▼▼	▲	▲▲	▼▼	▼	●	▲	▲	●
45	Create a fuel neutral energy savings standard for electric and gas utilities.	▲	▲▲	●	▲	▲	▲	▲	●	▲	▲	▲	●
46	Create consumer incentives for reduced and energy efficient fuel use.	▲	▲	●	▲	▲	▲	▲	▲	▲	▲▲	▲	▼
47	Support national and regional initiatives to put an economy-wide price on greenhouse gas emissions through resolution or legislation.	▼	▲▲	▼▼	▲	▲	▲▲	▲	▲	▼▼	▲	▲▲	●
48	Develop mechanisms that send appropriate price signals that address congestion, single ridership, etc.	▲▲	▲▲	▲	▼▼	▲	▲▲	▲▲	▲▲	▲	▲▲	▲▲	▼
49	Encourage freight, rail, or pipeline transport instead of truck.	▲	▲	▼▼	▼▼	▲	▲▲	▲▲	▲	▲	▲▲	▲	▲
50	Develop administrative rule for leaks	▲▲	▲▲	▼▼	▼▼	▲▲	▲▲	▼	▼▼	▼▼	▲	▲	▼
51	Use regulatory control to ensure adoption of best available control technologies (BACT).	▲▲	▲▲	▲	▼▼	▲▲	▲▲	▼▼	▼▼	▼▼	▲▲	▲▲	▼
52	Develop policies for denser urbanization instead of sprawl into either forest or agricultural lands.	▲	▲	▼	▼	▼	●	▲▲	●	▲▲	▲▲	▲▲	▲
53	Provide funding for reforestation	▼	▲	▲	▲	▼	▲	▼▼	▲▲	▲	▲▲	▲▲	▲
54	Provide incentives and training for agricultural soil sequestration	▼	▲	▲	▲	▼▼	▲	▲▲	▲▲	▲	▲	●	▼▼

Photo Documentation

Natalie Gochnour presenting Guiding Principles, August 1, 2019

Advisory Committee members providing input on implementation tactics, September 19, 2019

Advisory Committee members review evaluation criteria, September 19, 2019

Brian Wilkinson presenting Roadmap outline, October 24, 2019

Advisory Committee members review interventions, October 24, 2019

Gardner Institute staff, consultants, and Technical Advisory Committee, December 5, 2019

Public Feedback Summary

The Gardner Institute released a draft Roadmap on January 6, 2020 and accepted public feedback for three weeks. Approximately 405 people/entities commented, including 172 unique comments. Each piece of feedback was reviewed and considered carefully. Feedback came from all across the state, including Logan, Bountiful, Salt Lake City, Draper, Ogden, Park City, St. George, Eden, Ivins, and Provo. General public responded to the Roadmap as well as elected officials, representatives of city offices, health experts, meteorologists, university professors, environmental entities, and ski resort representatives.

Overall, responses were appreciative of the Utah Legislature funding this process and making air quality and the changing climate a priority. Responses included support for The Utah Roadmap and urging the Utah Legislature to use the roadmap for future legislation.

"I wanted to thank the Gardner institute for creating this roadmap and lend my strong support for its vision. This roadmap intends to build bridges (as opposed to create wedges), let Utah continue to grow economically, lead to clean air for all of Utah, and will secure economic stability for both rural and urban areas. This roadmap allows Utah to be a leader in both greenhouse gas reductions, improved air quality, while adopting a governing style that is economically viable and not overly burdensome. I strongly urge the Utah state legislation adopt this roadmap in their 2020 legislative session."

"I am impressed and encouraged by your effort and I commend the legislature, the Gardener Institute and the various entities and people represented on the technical advisory committee for your work on this."

Several responses suggested the need for a stronger sense of urgency acting on the challenge.

"We need to be bold and move quickly if we are going to make a difference on this issue."

"In general, the recommendations made in this report are good, solid recommendations, are well thought out and presented with factual information. However, with the urgency of the issues of air quality and climate change, they are not bold enough to timely address these issues."

Feedback included support for specific Mileposts in the Roadmap.

"I am particularly interested in and excited about Milepost 5 – becoming a market-based EV state. Could you imagine how quiet the roads will be 50 years in the future when everything is electric?"

"Milepost 6 is particularly crucial. We owe a debt of gratitude to our rural communities and we will not make rapid progress on reducing emissions if we leave them behind."

"Pricing our pollution is a key step in getting people to consume more wisely. This can happen without damaging our economy and using market based principles to significantly reduce our climate impact."

Several minor technical suggestions were made. They were reviewed by technical experts and included in the roadmap where appropriate.

"More could be said about the projected effects of climate change on Utah's economy. The entire ski industry is at risk, for example."

"Air pollution is caused by the particles of dust in the air as a result of the decreasing water levels in our lakes."

Select Public Feedback

The Gardner Institute selected the following comments in their entirety as an example of the breadth and depth of comments received.

First of all - well done to everyone involved with the Roadmap. It's an incredible job of managing both the science and the politics of clean air and climate change. Utahns do, indeed, have a proud history of leading on the country's most challenging topics. I am confident that we can do it here as well with the Roadmap as the guide.

All seven mileposts are great.

Milepost 6 is particularly crucial. We owe a debt of gratitude to our rural communities and we will not make rapid progress on reducing emissions if we leave them behind.

Milepost 7 is also crucial. I would wish for stronger language supporting revenue-neutral carbon pricing at the federal level. The largest public statement of economists in history makes a call for carbon pricing with revenues distributed as dividends. That policy offers "the most cost-effective lever to reduce carbon emissions at the scale and speed that is necessary."

I am an EV driver and I am thrilled to see milepost 5. We will both clean the air, cut greenhouse gas emissions, and position ourselves best as a technology leader by accelerating the transition to electric vehicles.

I would love to see the state lead the country in creating a premier air quality / changing climate laboratory. We already have some of the nation's leaders on particulate pollution epidemiology and in ozone chemistry. It's time that we recognize and support that research.

And - none of this would matter without the bold statement made in milepost 1. We have to have emissions goals. We have to measure progress towards them, and we have to adopt policies that get us there. Thank you!

On page 3 - others have mentioned this as well, but the graphs are hard to read. The "historical" side makes sense, but the "aspirational" side has a lot of information that isn't explained. Perhaps call it "future" instead to eliminate one point of confusion. Having the "goal" clearly identified is good. What do the dashed lines represent? Notes 1 and 2 don't reference anything.

On page 7 - more could be said about the projected effects of climate change on Utah's economy. The entire ski industry is at risk, for example.

Thank you and job well done!

Tom Moyer
Pinebrook, UT

On behalf of Snowbird, we support the development of the January 6, 2020 Utah Roadmap to research and promote positive solutions on climate and air quality.

The emissions-reduction goals and milestones presented in the Roadmap strongly correlate with Snowbird's Sustainable Slopes goals, and our work to be a leader with the National Ski Area Association's Climate Challenge. As suggested in the milestones, we plan to continue to adopt emissions-reduction goals and measure results, expand our electric vehicle fleet and natural and renewable natural gas use over coal, participate in dialogue on approaches to reduce carbon emissions, and lead by example.

We appreciate the effort the foresight and initiation by the Utah Legislature, the Kem C. Gardner Policy Institute, and Technical Advisory Committee, to prepare the Utah Roadmap to assist with legislative policy making to improve air quality and address causes and impacts of a changing climate.

Hilary Arens
Director of Sustainability & Water Resources
Snowbird

Dear Gardner Institute,

I have read "The Utah Roadmap: Positive Solutions on Climate and Air Quality" and am encouraged to see recommendations for the Utah legislature to lead by example and recognize its responsibility to set state-wide air quality and climate goals. However, I do not think that the report does a sufficient job of conveying the extreme urgency of our situation, and the real economic costs of inaction.

-The report lacks a sense of urgency and an acknowledgement of the severe consequences of inaction to our ecosystems, quality of life, and economy.

-The report uplifts efforts by private business and local government to address climate change, but fails to acknowledge that the success of local leadership is happening in spite of a lack of state-wide leadership, not because of it. Action that is desperately needed on electric vehicle incentives, on air quality standards, on emissions reduction goals, can only be taken by the Utah State Legislature, and should be highlighted as such.

-The technical advisory committee and report staff lacked representation and input from communities of color, Indigenous leadership, and vulnerable populations already impacted by Utah's poor air quality and lack of action on climate change.

I recognize the time constraints of delivering a comprehensive climate and air quality report in six months, and urge the Gardner Institute and the Utah State Legislature to continue to invest in research and implementation of air quality and climate solutions, and to do so in a way that facilitates democratic participation in the process and outcomes.

Since the last major effort to engage in a state-wide discussion on climate change happened over a decade ago, Utah has made very little progress on addressing root causes of the climate crisis. Now in 2020, we do not have the luxury of delay. Every reputable authority on climate science agrees that we must make drastic progress in cutting greenhouse gas emissions by 2030, or we will be sentencing the planet and future generations to the devastating effects of runaway global temperature rise. Utah prides itself on being an incubator of innovation, and yet to this point the State has failed to address the most pervasive and dangerous crisis our species has ever faced.

The Utah Roadmap needs to convey the reality of our situation and emphasize the urgent need for collaborative, coordinated action at every level of government, but most importantly the need for State-led leadership, which has to-date, been lacking.

Sincerely,
Kimberly Vincent
Sierra Club

Dear Ms. Gochnour:

We are writing to thank you, your team, and the technical advisory committee for your excellent work on The Utah Roadmap – Positive Solutions on Climate and Air Quality. The final result is a concise, compelling, and valuable tool for Utah policymakers and leaders to utilize in order to create solutions to our air quality and climate change challenges. Above all, we appreciate that your cover letter acknowledges the rapidly growing awareness of the urgency for action on these issues.

As businesses and community leaders, we understand the risks we face from unchecked climate change, as well as the immediate impacts of poor air quality. The Roadmap represents a critical first step in addressing these challenges in a way that will not only protect our economy and quality of life but will also drive new economic opportunities for our communities. Specifically, we strongly support the emission reduction goals outlined in Milepost 1 of The Roadmap. It is our hope that Utah policymakers will work together to develop a concrete plan and to support state and national policy to meet these emissions reduction goals. We also appreciate and endorse the commitment to provide support for Utah's energy-producing communities during our energy transition, as discussed in Milepost 6. As we decarbonize our economy and clean our air, it is critical that our energy-producing communities can adapt and thrive.

Please consider us a resource as you move forward on solutions to one of the greatest challenges of our time, climate change. Utah is creating a legacy to be proud of, and one that will greatly benefit our children and grandchildren.

Sincerely,

Robert Adler
University Distinguished Law Professor,
University of Utah School of Law

Don Albrecht, Ph.D.
Executive Director, Western Rural
Development Center

Scott Anderson
President, Zions Bank

Mayor Andy Beerman, Park City
Park City Government

Jeff Bishop
CEO, Key Capture Energy

Marc Cameron
Managing Director, Rio Tinto Kennecott

Judy Dorsey
President and Principal Engineer, Brendle
Group

Tim Dee
Director and Co-Chair,
Lawrence T. and Janet T. Dee Foundation

Becky Edwards
Former State Representative and
Utah Clean Energy Board Member

Dave Fields
President and General Manager,
Snowbird Ski & Summer Resort

Christian Gardner
President, Gardner Company

George Handley, Ph.D.
Provo City Council, District 2

Dennis Haslam
DH Consulting & Investments

Jamey Johnson
Solar Engineering Sales Manager,
Vector Solar Energy

Linda Leckman
Retired Vice President,
Intermountain Health Care

Tom Love
President, Love Communications

Mayor Erin Mendenhall, Salt Lake City
Office of the Mayor

Peter Metcalf
Founder & CEO Emeritus,
Black Diamond Equipment

Greg Miller
Board of Directors, Larry H. Miller
Group of Companies

Mark Richards
Senior Vice President, Intermountain
Wind and Solar

Jeff Robison, MD
Assistant Professor of Pediatrics,
University of Utah and Primary
Children's Hospital
Utah Clean Energy Board

Virinder Singh
Vice President, Regulatory &
Legislative Affairs,
EDF Renewable Energy

Todd Stevens
Managing Director, Renewable
Tech Ventures and
Utah Clean Energy Board

Glen Watkins
Partner, Jones Waldo and Chair,
Utah Clean Energy Board

President Ruth Watkins, Ph.D.
University of Utah

Claire Wang
2019 Rhodes Scholar and 2018
Truman Scholar

Alan Westenskow
Director, Business Development,
Proterra Electric Buses

Sarah Wright
Executive Director, Utah Clean Energy

CC: Governor Gary Herbert
Speaker Brad Wilson
Senate President Stuart Adams
Senator Mike Lee
Senator Mitt Romney
Congressman Rob Bishop
Congressman Chris Stewart
Congressman John Curtis
Congressman Ben McAdams

Dear Dr. Gochnour and fellow members of the Technical Advisory Committee,

Thank you for this opportunity to comment on the Utah Roadmap report. Our comments are copied below and attached as a PDF.

Members of the all-volunteer Capitol Hill Action Group's (CHAG) Environment Committee appreciate the research and analysis that led to this fine assessment of air quality and climate change-related challenges Utahns now face. Our neighborhood group, now numbering four dozen Salt Lake City residents, is acutely aware of the health, environmental and social issues that underlie the Utah Roadmap's suggested solutions for issues affecting not only the Wasatch Front, but the entire State of Utah.

We are also encouraged that Utah legislators recognized the need for "Positive Solutions on Climate and Air Quality" and, in 2019, funded the Utah Roadmap study. CHAG members are hopeful that they will take to heart --and to enabling legislation-- the recommendations of your august technical advisory committee.

CHAG Environment Committee members offer our general endorsement of all seven strategic categories ["mileposts"] you have identified. They provide baseline goals and a framework for continued discussion of specific objectives and their timely, effective implementation. You have now begun that discussion by soliciting public comments that will be shared with the Utah Roadmap report to the 2020 Utah Legislature. What follows is our set of suggestions for strengthening your recommendations to state policy makers.

Milepost 1 calls for adoption of emissions-reduction goals and measurable results. We agree with your goals, but not with your timeline, which will allow damaging air quality and climate change conditions to intensify unnecessarily and perhaps irreversibly. In short, a more realistic timeframe is essential.

We call on community leaders to heed the warnings that have emerged from a consensus of climate scientists worldwide. 2050 is too late for a 50% reduction in criteria air pollutants and 80% reduction of CO2 emissions. Twenty-four Utah cities and counties have pledged to achieve net-100% renewable energy by 2030. They are leading by example, and so should the state. 2030 should be the target, not 2050.

You note that Utah has a higher per-capita carbon dioxide emissions rate because we are so reliant on coal for electricity generation. And while Rocky Mountain Power/PacifiCorp will shut down many of its uneconomical coal-fired power plants, current IRP plans would keep some of these greenhouse gas emitters running in Utah until 2042. That prospect should be rejected and, using tools such as securitization and greater investments in clean energy, storage, and efficiency, all coal-fired power plants in PacifiCorp's system should be shuttered by 2030.

As these coal powered plants are being shut down, the measurement of Utah's full carbon dioxide footprint should include emissions that are being shifted elsewhere by the export of Utah coal to other states and countries. Utah should take responsibility for pollution its product causes elsewhere and for the emissions generated transporting Utah coal to distant customers. Utah coal is dirtier than advertised when it reaches Japan, for example.

Energy regulators, such as the Public Service Commission, should be directed to consider all social and environmental costs of carbon as utility rates are set to reflect the true costs of continued reliance on coal and other fossil fuels. The "polluter pays" principle should be applied comprehensively, and sustainable energy usage should be incentivized in order to achieve the Milepost 1 goals.

Inasmuch as motor vehicles are a significant source of air pollution, owners of private vehicles vintage 2003 or older should be offered incentives to replace those vehicles with less polluting newer models. Utah lawmakers should ignore the recently weakened federal corporate average fuel economy standards and require automobile emission standards similar to the toughest set by any state. The assumption should be that federal environmental standards weakened by the current national executive will be subsequently restored.

Milepost 2's call to lead is exemplified by the two dozen municipal and county governments that assumed responsible for a clean energy future by signing on to H.B. 411's Community Renewable Energy Program.

Lest we forget, the Utah Legislature helped make this possible as did some forward-thinking individuals at Rocky Mountain Power. At the same time, however, the Governor's "all of the above" energy strategy undermines solutions offered by the Utah Roadmap endeavor and recommendations because it perpetuates an energy mix biased toward, and tainted by, heavy reliance on energy from the dirtiest fuel source: coal.

CHAG members believe that leadership from Utah's executive and legislative branches requires: ~ an overhaul of the annual Governor's Energy Summit program in order to feature a new, bold and urgent focus on air quality, climate change, and sustainable development; ~ a seriously significant reduction in the extraction and consumption of fossil fuels, and an increased focus on solar and wind power, energy storage, and energy efficiency; ~ the development of a fresh curriculum for K-12 students that promotes the value and benefits of alternate and sustainable energy sources; ~ the expansion of degree courses at the college and university levels for sustainable energy studies; and, ~ restructuring of the Utah Office of Energy Development so that advocacy for renewable energy, storage, and efficiency will replace fossil fuels as the agency's dominant driving force.

We were disappointed that the Technical Advisory Committee did not include K-12 educators. For our children to realize a sustainable future --their future-- they should be engaged now. On this point, we also call for the Board of the School Institutional Trust Lands Administration (SITLA) to be restructured so that educators are included and the number of oil, gas, and mining industry representatives reduced.

We whole-heartedly endorse the creation of an air quality / changing climate laboratory --or laboratories-- to research and develop innovative technologies for establishing new energy and transportation paths forward that will reduce resource consumption and associated pollution. Milestone 3 efforts should, however, be vetted for legitimacy in advance of significant funding. For example, there should be no more funds wasted chasing the chimera of "clean" coal.

With regard to Milestone 4, the CHAG Environment Committee feels that quality growth standards and efforts should indeed extend beyond the Wasatch Front. We are mindful that growth for the sake of growth is the mission of cancer cells, not sustainable development-minded urban and rural planners. Utah's strategic vision should be broad and broadly shared with the public, with honest opportunities for public input at every stage of research, design, and development.

A process that should NOT be replicated is the Inland Port and Utah Inland Port Authority debacle that is still unfolding in Salt Lake County and in counties jockeying for position in the proposed "satellite ports" system. Any new statewide growth plan should be led by a legitimate process that brings all stakeholders together for planning and decision making that is transparent, environmentally and economically sound, and accessible to the public. The Utah Inland Port Authority as currently structured and mandated is inadequate to the task.

Milestone 5 is a laudable goal that the Utah Legislature should embrace. One of the first steps should be to repeal the new registration penalties for electric vehicles (EVs) and hybrids. Disincentives for EV ownership will discourage the same. More EVs mean cleaner air in areas, such as the Salt Lake Valley, too often in noncompliance with regulatory standards. Municipal and state vehicle fleets and the Utah Transit Authority should lead by example with the expeditious conversion of their vehicles to natural gas and then to electric power.

Like the Wasatch Front, rural Utah is experiencing significant challenges of transition, some of which are culturally existential.

Milestone 6 rightly calls for economic development through partnerships that facilitate transition away from continued dependence on the declining fossil fuels industry. Concerted efforts through entities such as the Utah Coal Country Strike Team merit expanded state financial assistance.

Care must be taken, however, to ensure that taxpayer dollars are invested wisely to ensure long-term economic benefits and stability for families to enjoy decent standards of living in communities they've known for generations. Monies to achieve future sustainability should not be squandered subsidizing short-term gains by fossil fuel profiteers, as was done when the Community Impact Fund Board set aside $53 million to invest in a West Coast coal export facility to enhance profits for Wolverine Fuels. Utah legislators should insist that government funded entities like the CIB honor their mandate to serve the public.

In order to engage in the national dialogue on market-based carbon emission reductions, as indicated by Milestone 7, we feel that the governor and legislature should create a Carbon Policy Committee. The membership of that committee should include representatives from recognized civic groups as well as from industry and government agencies. In the pursuit of market-based solutions, the substantial annual direct and indirect subsidies to the fossil fuel industry should either be equalized across all energy resource sectors or eliminated. All carbon products should be factored, including those exported from Utah.

Utah's federal legislators should be offered tangible state-level legislative and executive support when they acknowledge the climate change crisis and take actions to implement much-needed solutions. We were very favorably impressed and encouraged when Senator Mitt Romney raised the standard of service by joining the Bipartisan Climate Solutions Caucus. Utah legislators have shown promise in this regard through actions of the Clean Air Caucus. And in 2018, they honored the existential pleas of Utah youth by adopting the student-generated Resolution on Environmental and Economic Stewardship (H.C.R. 007).

More can and must be done.

Thank you for incorporating the comments of CHAG's Environment Committee, acting on behalf of the CHAG general membership, into the body of public feedback that will accompany your presentation of the Utah Roadmap to Utah state legislators on January 31. We hope that legislators will appreciate the fruits of your first effort and resolve to fund your continued research and analysis for the public good.

From the Capitol Hill Action Group's Environment Committee, comprised of:

Susan Corth	Ken Kraus	David Scheer
Stan Holmes	Wayne Martinson	Kathy Wilson

Natalie,

I applaud you and your team's work, with regard to air quality improvements in Utah. I certainly agree that all "Utahns deserve to breathe clean air."

On the flip side, I also have several concerns about the completeness, accuracy, and logic associated with the roadmap's climate "connections" to air quality.

Attached are my six concerns about the roadmap. For each, I provide justifications, including source citations that are the scientific basis for my concerns, as well as specific recommendations for resolution of those concerns.

Bottom Line: My position on your roadmap is that it should be about Utah air quality only, not global climate and carbon dioxide emission non-problems.

I am a semi-retired, applied atmospheric physicist (B.S. and M.S. degrees) and meteorologist with 50 years of experience.

Early on, I served as a meteorologist with the U.S. Navy Hurricane Hunters during the 1969 hurricane season (Project Stormfury) and a research meteorologist with the U.S. Navy Weather Research Facility.

The following forty-six years were as an applied scientist with the U.S. Army and Northrop Grumman Corporation, respectively. Highlights included radioactive fallout prediction; remote (laser radar) sensing of airborne pollutants; the research, development, and production of laser-based countermeasures against infrared (heat-seeking) missiles; as well as the physics, engineering, safety, and security of missiles and reentry vehicles.

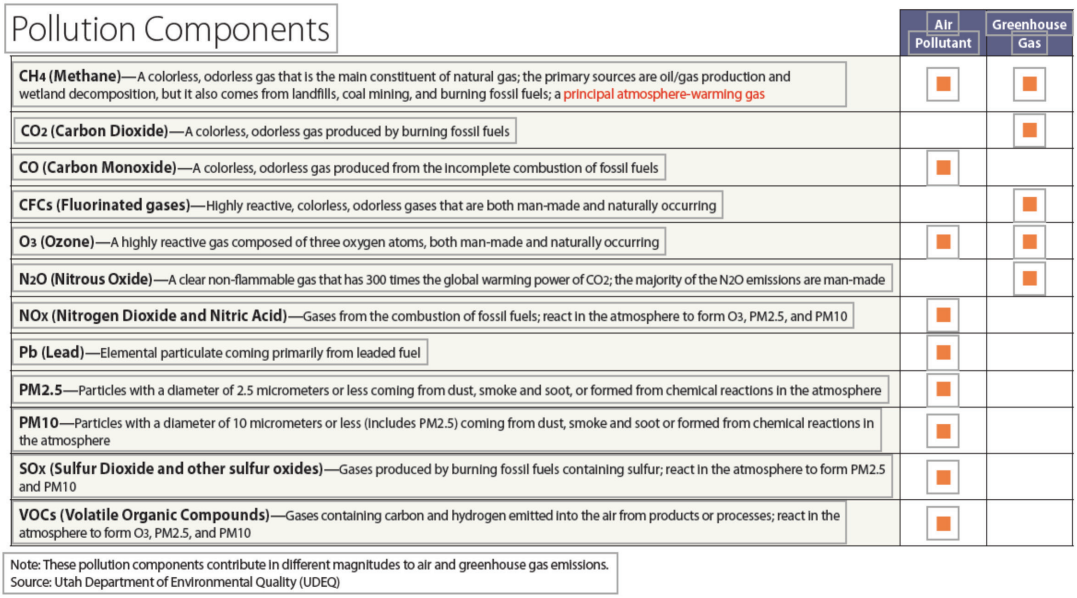
My entire life, from childhood on, has been about what is happening in the air.

Please let me know that you have received my detailed feed back via email attachments (below), and snail mail, as well as your take on what I have said.

Thank you for considering my concerns.

Sincerely,
William M. Pekny
Midway, Utah

1. **<u>Area of Concern:</u>** The "Pollution Components" table on page 5 has errors in it, as currently stated.



Pollution Components	Air Pollutant	Greenhouse Gas
CH_4 (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	■	■
CO_2 (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		■
O_3 (Ozone)—A highly reactive gas composed of three oxygen atoms, both man-made and naturally occurring	■	■
N_2O (Nitrous Oxide)—A clear non-flammable gas that has 300 times the global warming power of CO_2; the majority of the N_2O emissions are man-made		■
NOx (Nitrogen Dioxide and Nitric Acid)—Gases from the combustion of fossil fuels; react in the atmosphere to form O_3, PM2.5, and PM10	■	
Pb (Lead)—Elemental particulate coming primarily from leaded fuel	■	
PM2.5—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 PM2.5) coming from dust, smoke and soot or formed from chemical reactions in the atmosphere	■	
SOx (Sulfur Dioxide and other sulfur oxides)—Gases produced by burning fossil fuels containing sulfur; react in the atmosphere to form PM2.5 and PM10	■	
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, PM2.5, and PM10	■	

Note: These pollution components contribute in different magnitudes to air and greenhouse gas emissions.
Source: Utah Department of Environmental Quality (UDEQ)

This table is missing water (H_2O) vapor, which is the dominant greenhouse gas (GHG) in our air.

This table also should include rows for the other principal gases (N_2, O_2, Ar, and H_2O) that are the primary constituents of our air as a whole. [1]

Add a column that contains the mixing ratios (aka concentrations) [1] of each of the air components.

Remove the note pertaining to methane (CH_4) that says: " . . . a principal atmosphere warming gas." It is not. [2]

Remove the note at the bottom of the table that says: "These pollution components contribute in different magnitudes to air and greenhouse gas emissions." Replace the note as follows: "Of the GHG constituents in this table, water vapor is the dominant contributor to warming at the Earth's surface. The other GHGs have a miniscule effect [3] [4] on warming."

<u>Justification:</u> The inclusion of water vapor, the other principal gases, and their respective concentrations is crucial to the proper understanding of any relationship of the constituents to global warming as well as pollution.

Besides energy, the process of fossil fuel combustion spawns multiple byproducts. Several of the byproducts are pollutants or pollutant generators, including CO, NOx, SOx, and VOCs. These are the pollutants that affect human health and the aesthetics of our planet.

Combustion byproducts also include several GHGs (H_2O, CO_2, $N2O$, CH_4, and O_3), which have the potential, in sufficient magnitudes, to warm the atmosphere. However, due to water vapor's abundance in the air and spectral absorption

properties, relative to the other GHGs, only H_2O provides the dominant warming potential (95%). The warming potential of CO_2 (3.6%) and the remaining GHGs (1.4%, collectively) are very low, in comparison to water vapor. [4] [5] [6] There is no evidence that additional CO_2 in the air causes additional warming. [7]

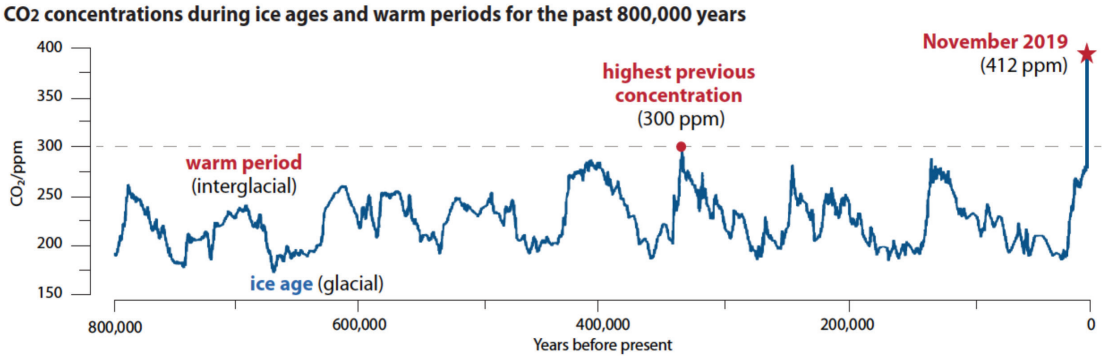
Water vapor clearly is the dominant warming gas in our air, simply because water covers 71% [8] of the Earth's surface and, on average, clouds cover approximately 67% [9] of the Earth's surface at any given time. As a result of the abundant presence of H_2O and the warming of air, land, and water by the sun, we enjoy a comfortable average global temperature, currently at about 59°F. Without CO_2 and the other minor GHGs, the Earth's average temperature would still be at least 56°F. However, without any water vapor in the air, the Earth's surface temperature would be a very icy 0°F. [10]

In summary, water vapor is the overwhelming GHG that keeps us comfortably warm. None of the other greenhouse gases, including steadily increasing CO_2, are sufficiently abundant or spectrally strong enough to significantly contribute to global warming. Similarly, there is no connection between CO_2 and any of the pollutants. CO_2 is a colorless, odorless gas that is not a health or aesthetic hazard. And, it neither chemically nor thermally reacts with any air pollutants.

Recommendation: Remove and replace the current table on page 5 of the roadmap with the following table.

Typical Composition of Air at Sea Level					
Air Constituents	Symbol	Mixing Ratio (PPM)	Principal Gas	Greenhouse Gas	Air Pollutant
Nitrogen	N_2	770,621	x		
Oxygen	O_2	206,719	x		
Argon	Ar	9,218	x		
Trace	Ne, He, Kr, Xe, etc.	25	x		
Water Vapor	H_20	13,000	x	x	
Carbon Dioxide	CO_2	407	x	x	
Nitrous Oxide	N_2O	0.05		x	
Methane	CH_4	2		x	x
Tropospheric Ozone	O_3	0.08		x	x
Carbon Monoxide	CO	9			x
Chloro-Fluoro-Carbon	CFC	0.002			x
Nitrogen Oxides	NOx	0.10			x
Sulfur Oxides	SOx	0.08			x
Volatile-Organic-Compound	VOC	0.01			x
Lead	Pb				x
Particulate Matter (<2.5µm diameter)	PM2.5				x
Particulate Matter (<10µm diameter)	PM10				x
Total (less Pb, PM2.5 and PM10 particulate matter):		1,000,000			

2. **Area of Concern:** The graph (below) of CO_2 history on page 7 of the roadmap, while correctly accounting for the last 800,000 years of CO_2 data, is conspicuously incomplete. This graph also has misleading labels (in red) associated with it.



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

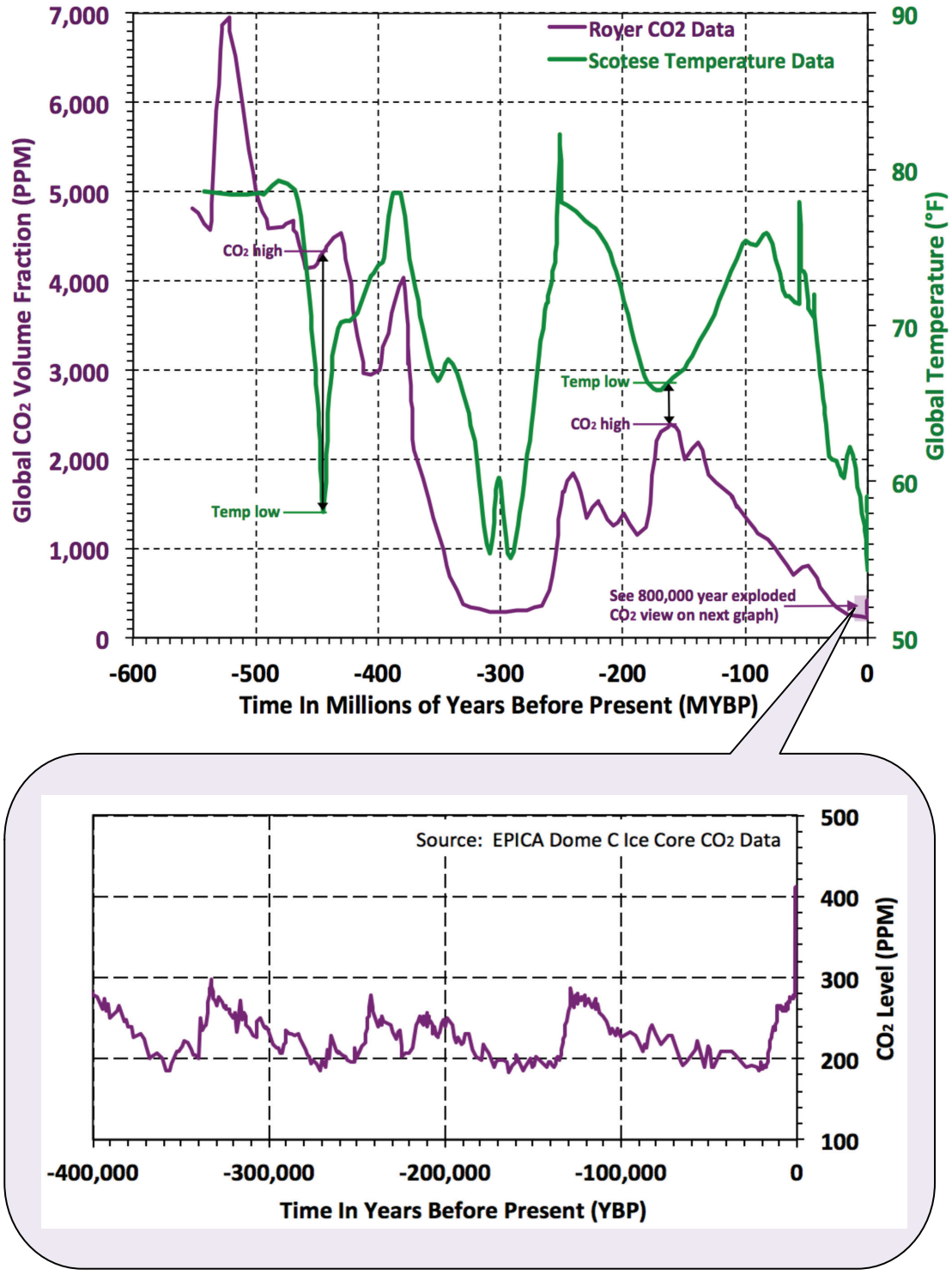
Justification: Specifically, one note on the above graph is incorrectly labeled as being the "highest previous concentration (of CO_2)." To a reader of the graph, this suggests that 300 ppm is the highest previous reading ever, which is not the case. The graph further suggests that the current level of CO_2, at 412 ppm, is higher than ever, and is alarming at best and a runaway, out of control crisis condition at worst.

The other notes—"warm period (interglacial)" and "ice age (glacial)"—are incomplete. There are actually nine warm periods shown on this graph, including the present warm period in which we now reside. And, there are eight distinct ice ages shown on this graph. All should be labeled either on the graph, or in words surrounding the graph. Neither is done.

All of the notes on this graph are **way** out of context within the full and highly important, 560-million-year, big-picture account of CO_2 history. [11] In fact, the above graph represents a mere fifteen one thousandths (0.0015) of the total CO_2 historical evidence available from geological accounts.

A graph that looks backward in time for 560 million years would present a much clearer, complete, and **different** big picture of CO_2 history. And, doing so is absolutely essential in order to correctly understand the cyclic, highly stable, and life sustaining state of our current climate.

Recommendation: Remove the current 800,000-year graph and replace it with the following two graphs and the associated words that explain them.



The top graph of the two above is the 560-million year graph of CO_2 history (purple curve), as well as temperature history (green curve) overlaid on it for comparison. This data is mostly from geological data. [11]

The bottom graph of the pair is an exploded view of the most recent 400,000 years of CO_2 history in the right-hand corner in the top graph of the pair. This data is mostly from ice core data. [12]

The top graph illustrates the much fuller context of CO_2 history, namely that present day CO_2 levels are near to all time low concentrations, not doomsday high concentrations imagined by the bottom graph of the pair. Furthermore, increasing CO_2 is a good thing, not a bad thing. Satellites have unmistakably demonstrated over the past forty years that our planet is greening. [13] As a result, crop yields are up—a much-needed condition to support our rapidly growing population.

The top graph also debunks the popular myth that rising CO_2 causes rising temperatures. Note what's happening in the timeframes of approximately 165 and 440 million years ago, in the graph. In both cases, temperatures are at relative low values, whereas CO_2 levels are at relative high values. These two situations demonstrate that CO_2 levels were much higher than today, at the same time that temperatures were quite low. These examples again show that rising CO_2 does **not** result in warming temperature. Modern-day empirical evidence confirms this, as well—temperature changes occur a full nine to twelve months ahead of corresponding changes in CO_2.

Finally, here is a real, everyday life example that temperature drives CO_2, and not the other way around—carbonated beverages. If you open a can of diet coke and leave it sitting in the sun, what happens? The sun warms the drink, which drives the carbon dioxide out of the drink and into the air. It goes flat. And, it does so quite quickly, I might add.

3. **Area of Concern:** Roadmap wording incorrectly suggests that reducing CO_2 emissions is a **good** idea. In fact, it is a very bad idea.

   Justification: As I have demonstrated above, attempting to control CO_2 will neither lower our warming, nor prevent further warming. A failed policy to lower it will cost everything and accomplish nothing.

   Water, the sun, planetary motion and inertia, and tectonic motion are the sources and forces that control our climate; not CO_2. What CO_2 does, is provide food and the oxygen component of the air we breathe via the photosynthesis process. It is an airborne fertilizer and the gas of life. We need more of it, not less.

   Recommendation: Devote precious funding resources to reduce pollution, instead. Don't throw the baby (CO_2) out with the bathwater (pollution).

   Also, clearly define "carbon emissions" upfront as being elemental carbon, carbon monoxide, hydrocarbons, and other carbon pollutants. Remove carbon dioxide from the mix. This is important because CO_2 is fertilizer for food and fundamental source of oxygen, not a pollutant. Unfortunately, the single, most common, classical, and current connotation that is connected to the term

"carbon emission" is **pollution**. So, disconnect CO_2 from the term carbon emission.

4. **Area of Concern:** A plot on page 8 of the roadmap indicates that renewable energy, and specifically wind and solar power, are better than fossil fuels and nuclear power, from a cost standpoint. I don't know all the subtleties of "Levelized Cost of Electricity." But, I do know that from a cradle-to-grave (lifecycle) delivered cost standpoint, wind and solar power are still nowhere near as cheap as traditional sources of energy, [14] including coal, fossil fuels, hydro, and nuclear energy.

   Justification: Wind and solar have the perpetual problem of being intermittent sources of electricity. And, large (city) scale storage batteries are not feasible if outages last more than a few hours. Ask Australia! Furthermore, transmission costs for solar and wind power far exceed transmission costs for traditional sources of energy, partly because of both their isolation and intermittency.

   Recommendation: Promote all sources of energy, not just renewables. And, in tandem, continue to pursue ways to reduce the pollutants within the traditional sources.

   Also, recognize that electric vehicles (EVs) are still extremely expensive, and the EV charging stations that provide the electricity for the EVs are typically fossil fuel powered, and consume almost as much fossil fuel as the cars themselves. [15]

5. **Area of Concern:** I find it hard to believe that the giant copper pit, which can be seen from outer space, isn't a contributor to at least dust pollution in the valley. Yet, I find no mention of it in your report.

   Recommendation: Consider the copper pit for inclusion in your roadmap.

6. **Area of Concern:** Dust is a serious concern in Utah. The dry lakebed areas of the Great Salt Lake are a major contributor to dust pollution.

   Recommendation: Consider a plan to divert or redirect water to the dry portions of the lake.

[1] Engineering ToolBox (2003). *Air—Composition and Molecular Weight*. Retrieved from: https://www.engineeringtoolbox.com/air-composition-d_212.html

[2] M. Hieb (2011). "Global Warming: A closer look at the numbers." *Geocraft*. Retrieved from: https://www.geocraft.com/WVFossils/greenhouse_data.html

[3] T. Patterson (2005). "The Geologic Record and Climate Change." *Technology-Commerce-Society Daily*. January 5, 2005. Retrieved from: https://www.geocraft.com/WVFossils/Reference_Docs/The_Geologic_Record_and_Climate_Change.pdf

[4] P. Michaels (1998). "Global Deception: The Exaggeration of the Global Warming Threat." *Center for the Study of American Business*, Policy Study Number 146. Washington University, St. Louis, Missouri. June 1998. Pp. 7-8. Retrieved from: https://www.geocraft.com/WVFossils/Reference_Docs/PMichaels_Jun98.pdf

[5] L. Rothman, et al (2004). "The HITRAN molecular spectroscopic database." *Journal of Quantitative Spectroscopy & Radiative Transfer* 96: 139-204.

[6] S. Freidenreich and V. Ramaswamy, "Solar Radiation Absorption by Carbon Dioxide, Overlap with Water, and a Parameterization for General Circulation Models," *Journal of Geophysical Research* 98 (1993): 7255-7264.

[7] A. MacRae (2019). "CO2, global warming, climate and energy." *Watts Up With That*. June 15, 2019. Retrieved from: https://wattsupwiththat.com/2019/06/15/co2-global-warming-climate-and-energy-2/

[8] H. Perlman (2016). "How much water is there on, in, and above the Earth." *U.S. Geological Survey.* Reston, VA. December 2, 2016. Retrieved from: https://water.usgs.gov/edu/earthhowmuch and https://water.usgs.gov/edu/earthwherewater.html

[9] M. King, et al (2013). "Spatial and Temporal Distribution of Clouds Observed by MODIS Onboard the Terra and Aqua Satellites." *Transactions on Geoscience and Remote Sensing,* 51 (7), 3826-3852. January 28, 2013. Retrieved from: https://earthobservatory.nasa.gov/images/85843/cloudy-earth

[10] K. R. Lang (2010). "Heating by the greenhouse effect—tutorial." Tufts Univ. Retrieved from: http://ase.tufts.edu/cosmos/view_chapter.asp?id=21&page=1

[11] C. R. Scotese (2015). *Phanerozoic Temperature Curve.* PALEOMAP Project. Evanston, IL Retrieved from: https://www.academia.edu/12114306/Phanerozoic_Global_Temperature_Curve

[12] J. Jouzel, et al (2007). "EPICA Dome C Ice Core 800 KYr Deuterium Data and Temperature Estimates." *NOAA/NCDC Paleoclimatology Program*. Boulder CO. Retrieved from: ftp://ftp.ncdc.noaa.gov/pub/data/paleo/icecore/antarctica/epica_domec/edc3deuttemp2007.txt

[13] Z. Zhu, et al (2016). "Greening of the Earth and its drivers." *Nature Climate Change*. **6**. 791-795. April 25, 2016. Retrieved from: https://www.nasa.gov/feature/goddard/2016/carbon-dioxide-fertilization-greening-earth

[14] U.S. Energy Information Administration (2015). "Annual Energy Outlook 2019." Retrieved from: https://www.eia.gov/outlooks/aeo/

[15] R. Schreiber (2019). "Tesla Factory Store Uses Diesel Generators to Recharge Slow-moving Model-3 Inventory." March 24, 2019. Retrieved from: https://wattsupwiththat.com/2019/03/14/tesla-factory-store-uses-diesel-generators-to-recharge-slow-moving-model-3-inventory/

LEAGUE OF WOMEN VOTERS® OF UTAH

100 Years of Making Democracy Work

Natalie Gochnour
Director
Kem C. Gardner Policy Institute
University of Utah

Dear Ms. Gochnour,

The League of Women Voters of Utah welcomes the Gardner Institute Report "The Utah Roadmap: Positive Solutions on Climate and Air Quality" as a great first step towards increasing the economic well-being and health of all Utahns while addressing the double threats of air pollution and the changing climate. We are grateful to the Utah Legislature for commissioning and funding the study and to the experts and stakeholders who worked together in a short time frame to complete the study.

The LWV is a nonpartisan, nonprofit, grassroots consensus-driven organization, that strives for government representative of all for the benefit of all. We have long worked for clean air across the nation, and in 2019 we decided to advocate for solutions to the serious threat of the changing climate, which has intensified the kind of drought, wildfires and dwindling snowpack we have seen in Utah in recent years. Therefore, we will support the goals and many of the specific proposals in the Gardner Roadmap, which align with our commitment to energy conservation, air pollution controls, building resilience and promotion of renewable resources.

We respectfully request an extension of the time for public comment. The Roadmap needs a few more weeks to become better known to the public and to give them ample time to respond on a topic vital to their well-being. Please extend the deadline.

We look forward to working with our state legislators to achieve positive solutions on climate and air quality.

Best regards,

Catherine Weller
Vickie Samuelson
Co-Presidents
The League of Women Voters of Utah

230 West 200 South, Suite 2114 | Salt Lake City, UT 84101 | Phone 801-272-8683 / lwvutah.org

UAMPS
Utah Associated Municipal Power Systems

SMARTENERGY

January 27, 2020

Kem Gardner Institute
c/o Natalie Gochnour
Associate Dean and Director
Kem C. Gardner Policy Institute
411 East South Temple
Salt Lake City, Utah 84111

Re: The Utah Roadmap: Positive solutions on climate and air quality

Filed via email: natalie.gochnour@eccles.utah.edu

Dear Kem Gardner Institute:

Summary:

Utah Associated Municipal Power Systems ("UAMPS") submits these comments in order to share its insight and expertise on some of the "mileposts" presented in "The Utah Roadmap: Positive solutions on climate and air quality" (the "Roadmap"). As a consortium of publicly-owned utilities, UAMPS will highlight critical factors for Utah legislators to consider when evaluating energy sector-specific policies.

About UAMPS:

UAMPS is a political subdivision of the State of Utah headquartered in Salt Lake City, whose membership consists of 46 municipal and other community-owned electric utilities located in Utah, Idaho, Nevada, New Mexico, Wyoming, and California. Most UAMPS members own and operate a local electric utility system that provides integrated retail electric service to residential, commercial, and industrial customers. UAMPS partners with its members to ensure that electricity is affordable and reliable.

UAMPS currently manages 17 separate projects that provide power supply, transmission, and other services to participating members. In addition to owning interests in or directly operating power plants and other sources of electrical power, UAMPS and its members regularly purchase power off the grid, and are, therefore, sensitive to market and regulatory forces that impact electricity affordability and reliability.

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F: 801-561-2687
www.uamps.com

UAMPS Interest in the Roadmap:

UAMPS recognizes the Utah Legislature's interest in the "development of an air quality and climate research study"[1] and is pleased to share how UAMPS members have already taken meaningful steps toward decarbonization through the development of the UAMPS Carbon Free Power Project (the "CFPP"). The CFPP consists of three components: (1) Small Modular Reactor (SMR) advanced nuclear technology; (2) supporting distributed generation; and (3) enhancing energy efficiency. UAMPS formally launched the CFPP in 2015 as part of its long-term strategy to reduce carbon emissions and replace aging coal-fired plants with a non-fossil fuel, and medium-sized, flexible power generating source. Perhaps the most notable component to the CFPP is the SMR advanced nuclear plant that UAMPS is developing.

The CFPP calls for constructing an SMR advanced nuclear power plant on U.S. Department of Energy (DOE) land located at the Idaho National Laboratory (INL). The total size of the site would be approximately 34.5 acres, and it would house 12, 60-megawatt modules that could generate 720 megawatts of dispatchable carbon-free electricity. The SMR technology that UAMPS has selected is being developed by NuScale Power based out of Corvallis, Oregon. NuScale's design certification application (DCA) is moving forward on time. When the SMR advanced nuclear power plant comes online, UAMPS estimates that 75% of the energy procured by its members will be carbon-free.

Milepost 3: Create a premier air quality/changing climate solutions laboratory:

UAMPS closely collaborates with INL and sees other opportunities for the State of Utah to further collaborate across state lines with the State of Idaho. The Governor of Idaho's Leadership in Nuclear Energy Commission (the "LINE Commission") meets regularly to advise the Governor on "policies and actions of the State of Idaho to support and enhance the long-term viability and mission of the Idaho National Laboratory and other nuclear industries in Idaho."[2] Last October, UAMPS worked with INL, to facilitate a conversation at the LINE Commission meeting with Idaho Governor Little's Office, Governor Herbert's Office, Zions Bank CEO Scott Anderson, the University of Utah, EDC Utah, the Governor's Office of Energy Development, Boise State University, the Center for Advanced Energy Studies (CAES) and many other local, state, and federal policy makers to discuss how Utah and Idaho could better collaborate on energy projects and research. UAMPS continues to work closely with these partners in developing the CFPP and sees opportunities to further collaborate with INL, universities in both states, and legislators in order to research climate change and develop solutions that work for Utah. UAMPS looks forward to collaborating with legislators on this important topic.

[1] Sen. Bill 3 Appropriations Adjustments, 2019 Gen. Sess. (Utah. 2019).
[2] Idaho Governor's Leadership in Nuclear Energy Commission ("LINE Commission") mission, *available at:* https://line.idaho.gov/ (accessed Jan. 23, 2020).

Milepost 4: Accelerate quality growth efforts:

Representing both rural and urban municipal governments throughout Utah, UAMPS believes that the decisions that Utah legislators make in regard to addressing Utah's long-term growth must involve input from local officials. Whether that is zoning ordinances, building efficiency codes, or other measures, UAMPS can provide critical insight on addressing these important issues.

Milepost 5: Make Utah the "market-based" electric vehicle (EV) state:

UAMPS applauds the vision contained in Governor Herbert's 2018 "State of Utah Electric Vehicle Master Plan"[3] (the "Electric Vehicle Master Plan") and welcome any interest legislators may have in the electrification of the transportation sector. PM 2.5 is the main cause of Utah's wintertime inversion and approximately 48% of PM 2.5 emissions come from mobile emission sources.[4] Utah leaders are realizing the progress that Utah can make from the integration of Tier III fuel, and the electrification of Utah's transportation sector can further that progress.

UAMPS has had numerous conversations with state officials on ways UAMPS can assist the State in achieving the objectives of the Electric Vehicle Master Plan and the 2019 Regional Electric Vehicle Plan for the West Memorandum of Understanding (the "REV West Plan MOU") to which the Utah was a signatory. Specifically, the REV West Plan MOU seeks to "accelerate, through state leadership and coordination, the installation of an interconnected network of electric vehicle charging infrastructure throughout [the West]."[5] UAMPS is uniquely situated to help Utah achieve the goals of the REV West Plan MOU because of its membership in western states, and the its members in Utah are in critical locations for EV travel throughout rural Utah.

As the Utah Legislature considers ways in which it may facilitate the electrification of the transportation sector, UAMPS believes that electric utilities should be part of the decision-making process regarding critical EV infrastructure. As Figure 1 illustrates, EVs sales are anticipated to increase nationwide, and as represented in Figure 2, that increase in demand will necessarily lead to an increase in electricity consumption. Managing this growth in electricity demand will require a very collaborative approach and UAMPS stands ready to have those conversations with legislators.

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[3] State of Utah Electric Vehicle Master Plan, 2018 *available at:* https://energy.utah.gov/wp-content/uploads/2019/07/State-of-Utah-EV-MasterL.pdf (accessed Jan. 23, 2020).
[4] Utah Department of Environmental Quality (DEQ) Understanding Utah's air quality: PM 2.5, *available at:* https://deq.utah.gov/communication/news/featured/understanding-utahs-air-quality (accessed Jan. 23, 2020).
[5] Memorandum of Understanding Between Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah and Wyoming, "REV West Plan" *available at:* https://www.naseo.org/Data/Sites/1/revwest_mou_2019_final.pdf (accessed Jan. 23, 2020).

Figure 1: Projected national sales growth in EVs[6]

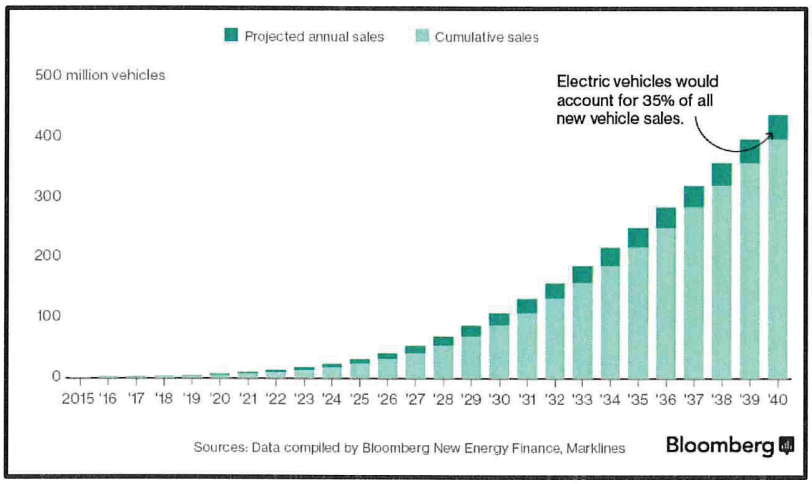
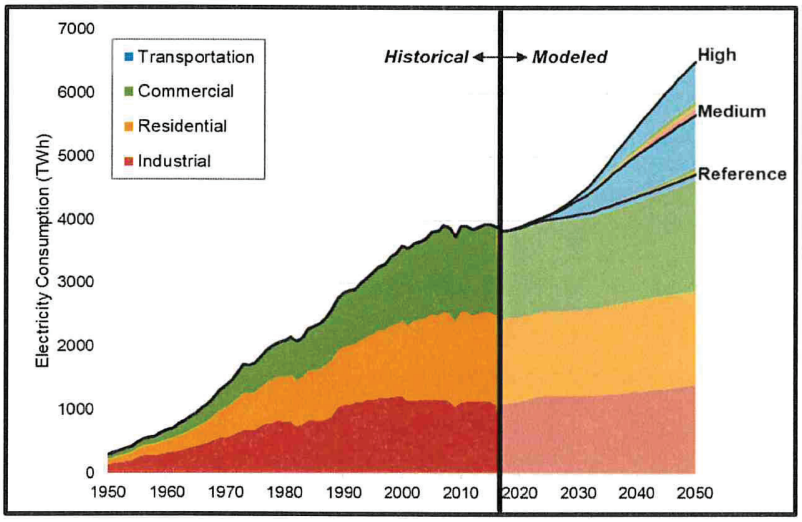


Figure 2: Projected growth in electricity demand[7]



[6] Randall, T., Bloomberg, Here's How Electric Cars Will Cause the Next Oil Crisis, *available at:* https://www.bloomberg.com/features/2016-ev-oil-crisis/ (accessed Jan. 23, 2020).
[7] Mai, T. et al., National Renewable Energy Laboratory (NREL), Electrification Futures Study: Scenarios of Electric Technology Adoption and Power Consumption for the United States, at xiv (2018).

Milepost 6: Provide transition assistance to impacted rural communities:

With projects and members throughout rural Utah, UAMPS understands the impact that transitions within the energy sector can have on rural communities. The SMR advanced nuclear plant that UAMPS is pursuing could be built on top of a brownfield site where a coal fired-power plant once sat. Aside from being an ideal location for access to existing transmission and water, these plants could maintain the economic base of a rural community. A study performed by the Idaho Policy Institute at Boise State University, and the McClure Center for Public Policy Research at the University of Idaho examined the economic impact that an SMR advanced nuclear power plant would have on the local economy. Such a project would generate an estimated 1,200 construction jobs and 360 plant jobs with an average salary of $104,000. Further, only 20% of the jobs at such a facility require more than a high school diploma.[8] Those presently working at a coal-fired plant could be retrained to work at the SMR facility and those in rural high schools could remain in rural Utah. UAMPS looks forward to working with legislators to address ways in which energy projects like the CFPP can provide a promising economic future for rural Utah.

Milepost 7: Participate in the national dialogue about market-based approaches to reduce carbon emissions:

For years now, UAMPS has stood out as an organization that is taking action at a local level to reduce carbon emissions and has been called upon to share its strategies on deep decarbonization with other utilities throughout the country. The CFPP has bipartisan and bicameral support in Congress, and recently UAMPS CEO Doug Hunter met with staff from the House Committee on Energy and Commerce to discuss ways in which the United States could reduce carbon emissions from the electric sector through advanced nuclear reactor technology. Even the International Atomic Energy Agency (IAEA) highlighted UAMPS' CFPP in a recent video discussing international nuclear energy projects.[9] UAMPS looks forward to sharing some of its expertise in developing a project of such local, national and international consequence with Utah legislators.

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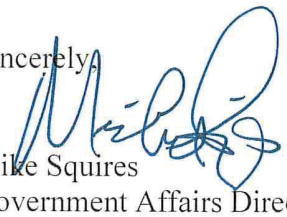
[8] Black, G. et al., Regional Impact Report: Construction and Operation of a Small Modular Reactor Electric Power Generation Facility at the Idaho National Laboratory Site, Butte County, Idaho (Sept. 28, 2018).
[9] International Atomic Energy Agency (IAEA), The Road to a Carbon Free Future, *available at:* https://www.youtube.com/watch?v=7ravKXD4iqQ (accessed Jan. 23, 2020).

Conclusion:

For several years, local leaders throughout the UAMPS membership have been discussing ways in which they can achieve decarbonization absent a state or federal mandate to do so. UAMPS looks forward to discussing the ideas contained within the Roadmap with legislators and developing solutions the "Utah Way" that work for everyone. Please feel free to contact UAMPS with any other inquiries related to these comments.

Sincerely,



Mike Squires
Government Affairs Director
Utah Associated Municipal Power Systems
msquires@uamps.com
(385) 222-5437

W A S A T C H

Clean Air Coalition

January 23, 2020

Dear Natalie Gochnour, Kem C. Gardner Institute and Technical Advisory Committee,

Thank you for the opportunity to provide public feedback on The Utah Road Map: Positive solutions on climate and air quality.

I felt very grateful last March when I learned that the 2019 Legislature funded a Utah effort for the "development of an air quality and climate research study" by the Kem C. Gardner Institute.

The year before, I was thrilled when I when H.C.R. 7 Concurrent Resolution on Environmental and Economic Stewardship was passed by the Legislature and signed by Gov Herbert in 2018.

As an individual who has working for clean air and climate mitigation over decades, I have been anticipating the release of the Roadmap. Like many in the advocate community, I'm pleased with the thoughtfulness & fine tuning the Technical Advisory Committee and the Institute brought to this process. It carries us further along the road we must go. The Roadmap's release and media reports about it have prompted new discussions & hope.

The Roadmap's seven mileposts build on earlier Utah work and studies, gives a good framework to guide Utah's continuing efforts to clean our air & stabilize our changing climate.

The Deseret News January 7, 2020 editorial in support of the Roadmap is one indicator that even conservative institutions & individuals are increasingly aware of the hazards of our current CO2 path. The decision of 24 Utah municipalities to sign up for the HB 411 Community Renewable Energy process also points to a growing appetite in Utah to assume leadership in reducing criteria and GHG emissions, for our own health, and the health of our future generations.

As Terry Tempest Williams said, "The eyes of the future are looking back at us, and they are praying that we might see beyond our own time."

Thank you for your work producing this Roadmap, and for the opportunity to provide public feedback.

Peace,
Kathy Van Dame, Policy Coordinator
Wasatch Clean Air Coalition
1148 East 6600 South
Salt Lake City, Utah 84121
(801)261-5989 dvd.kvd@juno.com

Media Coverage as of February 19, 2020

Hyperlinks to articles are provided, although most news outlets let them expire after a certain period. PDFs of articles are also attached; article numbers correspond to PDF names. Broadcast stories are noted with a "B."

Articles with mentions of the Kem C Gardner Institute Air Quality – Changing Climate Advisory Committee:

Red-State Utah embraces plan to tackle climate crisis in surprising shift
The Guardian | February 19 2020
In a move to protect its ski slopes and growing economy, Utah – one of the reddest states in the nation – has just created a long-term plan to address the climate crisis. At the request of the Republican-dominated state legislature, a University of Utah economic thinktank produced the plan to reduce emissions affecting both the local air quality and the global climate.

Scott Williams: A Turning Point for Utah's Air Quality
Salt Lake Tribune | February 15 2020
Two other game-changing proposals are also in the mix this session. Gov. Gary Herbert's proposal to appropriate $100 million to clean air initiatives would fund the statewide electric vehicle charging infrastructure and improvements in public transportation. The other transformative proposal is HCR011, committing the state to adopting The Utah Roadmap, the result of a year long study by the Kem C. Gardner Policy Institute at the University of Utah's Eccles School of Business.

Lawmakers Review 'Utah Roadmap': Suggestions to Improve Air Quality, Climate
Utah News Connection | February 4 2020
As lawmakers returned to the Capitol this week, they found copies of The Utah Roadmap, a paper aimed at developing policies — or mileposts — to improve air quality and address changing climate. One of the plan's main objectives is to reduce pollutant emissions by 50% and carbon emissions by 80%. Sarah Wright with Utah Clean Energy, an adviser on the project, said curtailing emissions is critical to reducing the choking brown cloud that hits the Salt Lake Valley every winter.

Roadmap' Poses Utah Policy Solutions on Air Quality, Climate Change
Public News Service | February 4 2020
Could members of the conservative Utah Legislature be considering a plan to deal with climate change? The answer is a definite "maybe." As lawmakers returned to the Capitol this week, they found copies of The Utah Roadmap, a paper aimed at developing policies to improve air quality and address changing climate. The document was developed by a University of Utah think tank and contains several strategies - or mileposts - for tackling climate issues over the coming decades.

Salt Lake City's air quality is nation's 7th worst among large metro areas
The Salt Lake Tribune | January 28 2020
Topping the air quality wish list are $100 million in appropriations proposed by Gov. Gary Herbert and incentives aimed at renewable energy, energy storage technologies and replacing polluting vehicles. Some of these investments are part of the air quality "Road Map" released last month by the Kem C. Gardner Institute, a University of Utah economics think tank. The seven-point strategy calls for cutting carbon emissions 80% below 2005 levels by 2050.

New money for air quality? Why there's a quandary at the Utah Legislature
Deseret News | January 28 2020
Last year, like this year, Herbert asked for $100 million to combat the state's pollution woes, which often put Utah among the worst of the worst when it comes to days that exceed federal clean air standards for pollutants like ozone and PM2.5. Advocates want the state Legislature to take the recommendations from the Utah Road Map released earlier this year by the Kem C. Gardner Institute at the University of Utah and endorse them via a resolution by Rep. Joel Briscoe, D-Salt Lake City.

Utah Has a Roadmap To Act On Climate. Does It Go Far Enough?
KUER | Tuesday 21 January 2020
Earlier this month, Utah researchers unveiled their plan to help the state fight climate change. They called it the Utah Roadmap and laid out seven key "mileposts" the state should pass to improve air quality and address the impacts of climate change. The roadmap is a clear message that the environmental threat is growing, especially in a politically conservative state like Utah. But for one local academic, it doesn't go nearly far enough to address the seismic shifts needed to avert the most serious impacts of climate change.

How Utah may have found a model for bipartisan action on climate change
The Salt Lake Tribune | Tuesday 21 January 2020
When Utah lawmakers start their legislative session next week, they'll have a road map waiting for them that could become one of the nation's most aggressive climate action plans in a Republican-led state — and potentially a path forward for other conservative states looking to reduce greenhouse gas emissions. That the proposal even exists signals a major shift in thinking in a state where legislators for years have publicly questioned — and sometimes ridiculed — climate science.

Alternative fuels, charging stations and market-based solutions: What Utah is doing to improve air quality
Daily Herald | Sunday 19 January 2020
Residents of Utah and Salt Lake valleys who have been outside during the winter months have likely noticed Utah has an air quality problem. In Utah County and elsewhere in the state, air quality in winter months can reach "unhealthy" and "hazardous" levels on the Air Quality Index. This poses a threat particularly to young children, older adults and people with respiratory problems. At one point in December, Tooele County had the second worst air quality in the entire country.

Tribune Editorial: Time is wasting on climate change, Utah

The Salt Lake Tribune | Saturday 18 January 2020

It's been 10 years — and about a half degree Fahrenheit — since the Utah Legislature passed HJR12, "Climate Change Joint Resolution." The resolution, a reaction to the Obama administration's call to regulate carbon, carried no power of law, but it was intended as a clear signal of where Utah stood.

Letters to the editor: Jan. 18 – Climate change costs are evident

The Spectrum | Saturday 18 January 2020

Sad to read the negative letter about the costs of technology to avert climate disaster. So many low-tech methods to cut carbon emissions exist. Utah is ideally suited to passive solar designs in new construction. An effortless cost savings to reduce emissions is to stop vehicle idling which wastes fuel, pollutes the air and harms the engine. Because flying is so carbon intensive, fly less and buy carbon offsets when you do fly.

In our opinion: Stewardshp and innovation should fight off climate change effects

Deseret News | Saturday 18 January 2020

Scientists say 2019 was the second-hottest year on record for the surface of planet Earth, dating at least to when modern record-keeping began in 1880. But the hottest year on record was 2016, and the past five years have been the warmest of the last 140.

Letter: A carbon tax is the conservative remedy

The Salt Lake Tribune | Monday 13 January 2020

Thanks to the Kem Gardner Policy Institute, we are finally seeing some serious proposals to address air pollution and climate disruption. The proposed research laboratory could promote innovative market-based strategies for addressing these critical problems affecting our health and long-term well-being.

Thom Carter and Andrew Gruber: Infrastrucutre is at the core of long-term air-quality success

The Salt Lake Tribune | Friday 10 January 2020

Take the train. Be idle free. Burn less wood. Carpool. Turn down your thermostat. You've likely heard one or all of these tips during our infamous inversion seasons. Each is a call to action to make a difference in our air quality. Hopefully you accepted such invitations and have become part of the solution. If each of us takes one small action to reduce our personal emissions, it makes a big difference when taken together across our communities.

Utah's Roadmap To Cleaner Air

KUER | Wednesday 8 January 2020

As Utah confronts the accelerating risks of climate change, the state now has a plan for action. Led by the Kem C. Gardner Policy Institute, a team of researchers, lawmakers and industry experts recently unveiled what they've dubbed the Utah Roadmap, a set of recommendations intended to help the state improve air quality and address the impacts of climate change over the next 30 years.

So, why is the cost of gas rising so much?

Deseret News | Wednesday 8 January 2020

Why is the state of Utah loading the price of gasoline with so many taxes? If you didn't know this is coming, you soon will. The newly passed tax reform law will, for the first time, apply sales taxes to gasoline which, when the law takes full effect later this spring, could add as much as 11 cents to each gallon purchased. And the State Tax Commission, using a formula set forth in state law, announced that the regular gas tax also would go up by 1.1 cents per gallon, to a total of 31.1 cents, in the new year.

Utah think tank says state should cut CO2 emissions 80% by 2050

The Salt Lake Tribune | Tuesday 7 Janaury 2020

Utah should strive to slash air pollution by half and carbon dioxide emissions by 80% in coming decades, a goal that would demand commitment from government leaders, industry and each state resident, the Kem C. Gardner Policy Institute argues. The University of Utah think tank on Monday published a draft road map for cleaning up the air and confronting climate change in the state. What's at stake is the health of Utahns, the welfare of the state's economy and the viability of a 2030 or 2034 Olympic bid, according to the institute.

In our opinion: Utah should pay attention to Australia's wildfires

Deseret News | Tuesday 7 Janaury 2020

Utahns should pay considerable attention to the wildfires in Australia; not just because of their tragic nature, which is considerable and worthy of prayers, contributions and any other appropriate help, but because similar things could happen here. As the devastating fires in Paradise, California, showed in 2018, the Western United States is not immune from such disasters, and the chances they might occur seem to be growing as climate change leads to warmer temperatures and more sustained and severe droughts.

13 Legislature seeks road map for air quality policy

FOX 13 | Tuesday 7 January 2020

The Utah Legislature is preparing policies dealing with air quality. To assist in this effort, the Kem C. Gardner Policy Institute with the University of Utah prepared a road map for the effort. The result is called the Utah Roadmap.

B FOX 13 News at 5:30 PM

FOX 13 | Tuesday 7 January 2020

You can call it a road map to improving utah's air quality. but kimsey gardner policy institute released draft report outlining 55 five long term strategies you. utah can work on over the next 20 to 30 years. Some of the notable ones include reducing co2 emissions statewide by 80 percent slashing air pollution, promoting the use of electric vehicles by adding charging stations and incentivizing the use of electric vehicles. we are still dependent on more inventions in our private industry. coming up with more cheap way of doing things but we're on a road that moves that direction. but we do have a long ways to go. representative ward says another piece of the road map was put in place last legislative session. lawmakers approved six million electric vehicle recharging

B KSL Radio at 2:30 PM

KSL Radio | Tuesday 7 January 2020

Policy Institute has announced 7 recommendations for the state on how to tackle air quality problems state Senator Todd Weiler says some good ideas presented but it's important to note that things are improving annual emissions have actually gone down significantly from being even as the population has grown by almost two million people some of the recommendations provided were to encourage electric cars provide assistance to rural communities and work toward adopting a national carbon pricing plan

B KSL Radio at 1:20 PM

KSL Radio | Tuesday 7 January 2020

third the can see Gardner policy instituted the EU's announcing 7 recommendations for the state on tackling air quality issues some of the suggestions include encouraging electric cars adopting a national carbon pricing plan and assisting rural communities.

B KSL 5 News at Noon

KSL 5 | Tuesday 7 January 2020

Researchers have unveiled an air quality study commissioned by the utah state legislature. and unlike previous studies -- lawmakers asked the gardner institute to provide specific recommendations for action. the first recommendation: reduce pollutants by 50- percent by 2050. the second: reduce carbon dioxide emissions by 80-percent in the same time. salt lake city's new mayor -- erin mendenhall -- who just took the oath of office yesterday-- echoed these objectives in her first speech as mayor. slc mayor erin mendenhall "starting today, it will be the policy of salt lake city government to ensure the impact on our air quality is a consideration in every choice we make." the gardner institute says the goals will help guide utah's future by protecting human health, supporting the economy and directing the state's sustainability efforts, as we prepare for another olympic bid.

B KSL Radio at 11 AM

KSL Radio | Tuesday 7 January 2020

Recommendations for the state on how to tackle air quality problems state Senator Todd Weiler says some good ideas were presented but it's important to note things are already improving annual emissions rates have actually gone down significantly from 2002 even have our population has grown by almost a million people some recommendations encourage electric cars provide assistance to rural communities and working toward adopting a national carbon pricing plan there's a new development in the case of missing.

B KSL Radio at 10:40 AM

KSL Radio | Tuesday 7 January 2020

With us he's live on the line right now she's with the can see Gardner policy Institute at the University of utah she's the director there good morning Natalie morning great to join you this morning we appreciate you being on with on the air with us this morning as we're talking about air quality know what's Andy no one really specifically around of the gates talk about this car issue because everybody is listening right now probably drive around in the car how could we tackle this in their own homes when it comes to our cars well primary recommendation that came from about 37 technical experts who were engaged in a six-month process to look at this question it's a cycle first date and that goal is to reduce emissions by 50% but 2050 happen all want will take some time but if we own it the problem and make it a priority.

B KSL 5 News at 6 AM

KSL 5 | Tuesday 7 January 2020

Natalie gochnour, director gardner institute"air quality and changing climate actually have a connection." researchers have unveiled an air quality study commissioned by the utah state legislature. and unlike previous studies -- lawmakers asked the gardner institute to provide specific recommendations for action. the first recommendation: reduce pollutants by 50- percent by 2050. the second: reduce carbon dioxide emissions by 80-percent in the same time. salt lake city's new mayor -- erin mendenhall -- who just took the oath of office yesterday-- echoed these objectives in her first speech as mayor. slc mayor erin mendenhall "starting today, it will be the policy of salt lake city government to ensure the impact on our air quality is a consideration in every choice we make." the gardner institute says the goals will help guide utah's future by protecting human health, supporting the economy and directing the state's sustainability efforts, as we prepare for another olympic bid.

B KSL 5 News at 4:30 AM

KSL 5 | Tuesday 7 January 2020

Researchers have unveiled an air quality study commissioned by the utah state legislature. and unlike previous studies -- lawmakers asked the gardner institute to provide specific recommendations for action. the first recommendation: reduce pollutants by 50- percent by 2050. the second: reduce carbon dioxide emissions by 80-percent in the same time. salt lake city's new mayor -- erin mendenhall -- who just took the oath of office yesterday-- echoed these objectives in her first speech as mayor. slc mayor erin mendenhall "starting today, it will be the policy of salt lake city government to ensure the impact on our air quality is a consideration in every choice we make." the gardner institute says the goals will help guide utah's future by protecting human health, supporting the economy and directing the state's sustainability efforts, as we prepare for another olympic bid.

Want to solve Utah's air quality problem? Now there's a roadmap for that

Deseret News | Monday 6 January 2020

Researchers released a set of seven recommendations Monday meant to guide Utah's legislators in addressing the state's climate and air quality concerns. Those recommendations include reducing air pollution emissions by 50% and carbon emissions by 80% by 2050. "If Utah acts on this, we would be the first red state to do so," said Natalie Gochnour, director of the Kem C. Gardner Policy Institute at the University of Utah.

B KSL 5 News at 6 PM

KSL 5 | Monday 6 January 2020

Researchers unveiled an -air quality study commissioned by the utah state legislature. and unlike previous studies conducted by the gardner institute -- lawmakers asked them to provide specific - recommendations for action. the first recommendation: reduce pollutants by 50- percent by 2050. the second: reduce carbon dioxide emissions by 80-percent in the same time. salt lake city's new mayor -- erin mendenhall -- who took the oath of office this morning -- echoed these objectives in her first speech as mayor. slc mayor erin mendenhall "starting today, it will be the policy of salt lake city government to ensure the impact on our air quality is a consideration in every choice we make." the gardner institute says the goals will help guide utah's future by protecting human health, supporting the economy and directing the state's sustainability efforts, as we prepare for another -olympic bid. now that we know these huge goals, we will have to find how to accomplish them.

Tribune Editorial: It's almost inversion season. Are we going to get the same old soot?

The Salt Lake Tribune | Saturday 23 November 2019

It's almost inversion season. Time for thoughts and prayers. In what is now an annual tradition, the pollution-prone season of December and January will spark the usual pronunciations from all quarters: Our air is hurting us, and it must be improved. And, just as predictably, the people in charge will wholeheartedly agree, and then proceed to avoid significant advances.

What needs to happen to clean Utah's air?

Deseret News | Saturday 23 November 2019

A technical team of nearly 40 members is probing the best science-based solutions for cutting Utah's air pollution so those recommendations can be delivered to Utah lawmakers in mid-December. The Kem C. Gardner Policy Institute at the University of Utah was tasked by the Utah Legislature to look at the problem for a roadmap of possible legislative solutions for the next several years.

What needs to happen to clean Utah's air?

KSL News | Monday 12 August 2019

A technical team of nearly 40 members is probing the best science-based solutions for cutting Utah's air pollution so those recommendations can be delivered to Utah lawmakers in mid-December. The Kem C. Gardner Policy Institute at the University of Utah was tasked by the Utah Legislature to look at the problem for a roadmap of possible legislative solutions for the next several years.

Climate change remains a divisive issue in the Utah Legislature. So why did lawmakers put away $200K to study it?

The Salt Lake Tribune | Monday 17 June 2019

Earlier this year, Utah Rep. Ray Ward presented a wildfire prevention resolution that drew a straight line between human carbon dioxide emissions and the blazes that consumed about 400 structures and hundreds of thousands of acres in 2018. Greenhouse gases, his resolution said, are heating up the planet, which causes hotter, drier summers in Utah, which, in turn, increases the risk that a spark will land on parched terrain and burst into flames.

The Guardian

Red-state Utah embraces plan to tackle climate crisis in surprising shift

The Guardian | February 19 2020

Utah aims to reduce emissions over air quality concerns as other red states are also starting to tackle global heating

In a move to protect its ski slopes and growing economy, Utah – one of the reddest states in the nation – has just created a long-term plan to address the climate crisis.

And in a surprising turnaround, some of the state's conservative leaders are welcoming it.

"If we don't think about Utah's long-term future, who will?" Republican state house speaker Brad Wilson said at a recent focus group to discuss the proposals.

At the request of the Republican-dominated state legislature, a University of Utah economic thinktank produced the plan to reduce emissions affecting both the local air quality and the global climate.

Project lead Thomas Holst, an energy analyst, never expected to be at the helm of an effort like this. A few years ago, the Utah legislature passed a resolution urging the EPA to "cease its carbon dioxide reduction policies, programs, and regulations until climate data and global warming science are substantiated".

But now the perspectives of some state lawmakers – and of Holst, who spent most of his career in the oil and gas industry – have shifted.

"The economist Adam Smith talked about an invisible hand that guides the economy, and in this particular case, the cost of renewable energy, whether it's wind or solar, has gone down so rapidly and made itself so market efficient versus fossil fuels, that there is a change, and the change can't be ignored," Holst said. "So now is the opportunity for a state like Utah which is rich in both renewables as well as fossil fuels to embrace that change and get out ahead of it."

Other red states and municipalities are slowly starting to address global heating. After banning the words "climate change" from state environmental agencies, Florida now has a chief resilience officer tasked with preparing for sea level rise. After a year of disastrous flooding, Nebraska lawmakers advanced a bill to develop a climate change plan for a full legislative debate.

Utah prides itself on being business friendly – and it has a rapidly growing tech sector concerned about environmental issues, as well as booming tourist economy that revolves around the ski industry and public lands.

The Utah plan, known as the Utah Roadmap, began, like a number of recent environmental initiatives, with young people clamoring for action. High school students drafted a resolution that recognized the impacts of the climate crisis and encouraged emissions reductions, and persuaded two Republican lawmakers to sponsor it. Environmental advocates say it was the first measure of its kind to pass in a red state. The legislature followed up with state money for experts to provide policy recommendations.

Another factor that has primed Utah leaders to address the climate crisis is the state's unique air quality issues. The majority of the population lives in mountain valleys where in winter, temperature inversions can trap air pollutants, often reaching levels that impact health, particularly among children and the elderly.

"It cuts across political lines. [Clean air] is not a partisan issue in our state," said Utah speaker Wilson. He said there is not the same kind of consensus on climate change in the legislature, but "there is absolutely overlap between air quality concerns we have and reducing greenhouse gas emissions".

Natalie Gochnour, the head of the economic policy institute that drafted the Utah Roadmap, said its proponents managed to turn a hyper-partisan issue into a shared priority by emphasizing the local impacts of the climate crisis. Research suggests that framing policy around economic benefits and sustainability allows local leaders to respond to climate change without getting caught up in political divisions.

"That tends to pull some of the politics out of it – not for everybody – but for many. I think enough to create momentum on Capitol Hill," Gochnour said.

Clean air concerns are also the reason officials are pushing Utah gas refineries to produce cleaner gasoline, and when the Trump administration announced plans to roll back clean car standards, Utah's bipartisan clean air caucus held a press conference urging Congress to resist the move.

Holst, the roadmap project lead, acknowledged that blue coastal states have taken the initiative on ameliorating climate change, but he sees potential for Utah. "Is there an opportunity for a red state to take a leadership role? We believe that there is. And by composing a road map, by encouraging our legislative leaders to embrace this, we believe that there can be a change, and that Utah will be willing to take a leadership role," he said.

Utah's per capita carbon emissions are higher than most states, in part because it's nearly twice as reliant on coal, but utilities serving Utah customers plan to close many of their coal power plants by 2030, converting to wind, solar, natural gas, and possibly hydrogen. Republican state lawmaker Melissa Garff Ballard has an ambitious plan to make Utah a source of hydrogen power serving the western US.

Among the Utah Roadmap's top priorities is to reduce CO2 emissions by half over the next decade – a challenge for a state with a growing population. The plan suggests focusing on energy-efficient buildings and clean transportation options. It recommends expanding Utah's network of charging stations, incentivizing the purchase of electric vehicles, and involving auto dealers in strategies to increase the zero-emissions vehicle supply.

Business leaders have told Holst they are drafting a document that would pledge to move forward with the Utah Roadmap's recommendations.

"What I'm interested in is a viable future for the state of Utah," Republican state representative Stephen Handy said. "There are still a number of Utah legislators who don't want to look at the science that's very obvious on climate change, but we've come a long way."

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NPR Utah

Utah's Has a Roadmap to Act On Climate. Does It Go Far Enough?
By Jon Reed January 21, 2020

Earlier this month, Utah researchers unveiled their plan to help the state fight climate change. They called it the Utah Roadmap and laid out seven key "mileposts" the state should pass to improve air quality and address the impacts of climate change.

The roadmap is a clear message that the environmental threat is growing, especially in a politically conservative state like Utah. But for one local academic, it doesn't go nearly far enough to address the seismic shifts needed to avert the most serious impacts of climate change.

Robert Davies, a Utah State University physics professor who focuses on science communication around global environmental change and sustainability, said humans are on a collision course with disaster. And the kinds of changes needed are transformational, not incremental.

"Our current food, energy and economic systems are utterly unsustainable," he said. "They will collapse within several decades on their current trajectory. The physics on this is pretty damn clear."

Take transportation, for example. The roadmap recommends statewide incentives to get more electric vehicles on the road. But even replacing every gas car with an electric one would not be enough, Davies said. Instead, the state would need to vastly expand its public transportation network to get people out of cars altogether.

While many of the necessary transformations are outside any one person's control, they also come down to the individual. That means dramatically cutting down on consumption — everything from air travel to eating meat.

The good news is that the United States has made dramatic shifts before. Davies pointed to the collective effort made during World War II. The entire country chipped in, rationing everything from sugar to gasoline.

"We didn't just say that we can continue to live our lives as we usually do," he said. "There was serious belt tightening."

It's also becoming much more difficult to deny the effects of climate change, he said, as large swathes of Australia burn and Puerto Rico lies in ruins after Hurricane Maria. And while there's no one event like

the attack on Pearl Harbor to help mobilize the public, it's becoming clearer that climate change is having tangible effects on the planet.

Still, he said understands that the researchers involved in the roadmap were in a difficult spot. Climate change, despite the urgency needed, is still politically and economically sensitive.

"In an emergency, you have to always keep your eye on what's necessary," Davies said. "The trick then is making what's necessary politically feasible. So if this report is a step in making what's necessary politically feasible, then great. If people view it as we've done our thing and that's it, then it's not enough."

The Salt Lake Tribune

How Utah may have found a model forbipartisan action on climate change

By Judy Fahys January 21, 2020

Earlier this year, Utah Rep. Ray Ward presented a wildfire prevention resolution that drew a straight line between human carbon dioxide emissions and the blazes that consumed about 400 structures and hundreds of thousands of acres in 2018.

Greenhouse gases, his resolution said, are heating up the planet, which causes hotter, drier summers in Utah, which, in turn, increases the risk that a spark will land on parched terrain and burst into flames.

For many of his colleagues, the climate change wording tainted an otherwise laudable measure. It raised "complicated and difficult questions of causation" and seemed "tangential" to the overall resolution on reducing wildfire damage, Rep. Tim Hawkes said. Later, he explained he was trying to save Ward's measure by deleting deal-breaking language.

"Climate change remains a hotly contested and highly divisive issue in the Legislature," Hawkes, a Centerville Republican, said in an interview last week. "His bill would likely have failed if it had moved on with that language intact."

Yet, even as state lawmakers shied away from Ward's explicit description of global warming last session, they quietly socked away $200,000 to study the issue further.

Ward, R-Bountiful, said those two decisions aren't inconsistent — in fact, he said, asking for data from the trusted Kem C. Gardner Policy Institute could be an important step in building confidence for future climate action.

"I don't think there is any one single thing that by itself would change a bunch of legislators' minds," the physician said. "But I do think that a bunch of little, tiny things over and over again ... I do think it all adds up."

The University of Utah institute will likely begin the study sometime in July, when the state releases funding for the review, and is scheduled to report back to the Legislature by mid-December.

House Speaker Brad Wilson said there's no particular agenda behind the research and that lawmakers just want some Utah-specific data on air quality and climate change.

"Once we get good information," the Kaysville Republican said, "we can start to discuss policy decisions that could help us manage the state's growth."

The Legislature has formally recognized the existence of climate change with the 2018 passage of a resolution mentioning the global trend and its connection to increased risk of wildfires, water scarcity, flooding and extreme weather events.

But dozens of Republican lawmakers voted against it, with former Rep. Mike Noel arguing that the "whole issue of climate change has been used by organizations to fool people." Noel, R-Kanab, also said carbon dioxide is not a pollutant because it feeds plants.

Despite broad scientific agreement that human activity is driving planetary temperatures upward, global warming has become a partisan fault line in U.S. politics. Benjamin Abbott, an assistant professor of ecosystem ecology at Brigham Young University, said he was still unpleasantly surprised to watch these political forces drive the conversation on Ward's resolution earlier this year.

Abbott, who headed to Capitol Hill in February to testify in support of the measure, said Utah is especially sensitive to climate change because of its elevation and geographic location. Mega-fires, invasive species, loss of snowpack and droughts of increasing severity all could be in store for the state if the warming trend continues, Abbott said in a phone interview.

However, scientific data didn't seem to carry much weight with lawmakers during the February committee meeting, he said.

"It was very clear the committee had already made up their minds, not based on scientific evidence, but on political positions," he said. "In my field, if you bring evidence to the table, that's what brings you credibility,. And I was assuming that the same paradigm held in the political realm."

While that's discouraging to Abbott, his experience hasn't been totally negative; state lawmakers have been willing to parse through the issue in lengthy private conversations, the type of open communication that he believes is central to progress.

Wilson said he personally believes in climate change, but "what percent of its changes are due to man- made effects is up for debate." Hawkes said he accepts that the Earth is warming and that "human activity is playing an important role in that warming." Beyond that, Hawkes said, consensus begins to break down, especially when the conversation turns to finding solutions.

Natalie Gochnour, who directs the Gardner Institute, said the forthcoming study will consider the current body of research on air quality and climate change in Utah and examine the effects on state residents and industries.

"I definitely anticipate that we will be putting forward to the Legislature potential strategies that could help with air quality and a changing climate," she said.

Those could involve anything from incentives for eco-friendly behavior to new and emerging technologies, Gochnour said.

Some have suggested a carbon tax could go a long way toward lowering emissions in the state. One of them, a Salt Lake City economist named Yoram Bauman, is leading a campaign to put a carbon tax question on the ballot next year.

The Clean the Darn Air campaign for the carbon tax initiative is about to enter its signature-gathering phase and will focus mostly on air pollution, which Utahns see and feel with every winter inversion, according to Bauman. But a tax could also significantly cut greenhouse emissions, he said.

"It's the single most important thing we can do to tackle climate change," he said. "It's a market-based approach."

State policymakers have not warmed to the carbon tax concept; Democratic Rep. Joel Briscoe's legislation on a fossil fuels tax, for example, didn't budge out of committee last session.

Wilson said he hasn't seen Bauman's carbon tax proposal but is generally cautious about levying new taxes and believes that the

"market is going to come up with better solutions." Hawkes similarly said he doubts legislators would be up for a carbon tax, given their fears about harming jobs and the economy.

Bauman contends that a carbon tax does allow the free market to operate unimpeded; it would simply require consumers to pay for the pollution generated by their energy use.

Daily Herald

Alternative fuels, charging stations andmarket-based solutions: What Utah is doingto improve air quality

By Connor Richards and Genelle Pugmire January 21, 2020

Residents of Utah and Salt Lake valleys who have been outside during the winter months have likely noticed Utah has an air quality problem.

In Utah County and elsewhere in the state, air quality in winter months can reach "unhealthy" and "hazardous" levels on the Air Quality Index. This poses a threat particularly to young children, older adults and people with respiratory problems. At one point in December, Tooele County had the second worst air quality in the entire country.

According to a 2019 poll from Dan Jones and Associates and the Salt Lake Chamber, 48% of Utahns say immediate action is required to address the impacts of climate change.

With concerns about air quality mounting in Utah and elsewhere in the country, lawmakers and government officials have been forced to come up with solutions to help Utahns breathe easier.

Statewide efforts

The state has introduced a number of initiatives in the past decade to address poor air quality in the state.

In October 2013, Gov. Gary Herbert announced the creation of a "Clean Air Action Team" comprised of politicians, business leaders and researchers to "recommend practical and effective strategies to improve Utah's air quality."

In May 2018, Herbert put together an "Energy Action Plan Through 2020" highlighting goals the state can set to address environmental concerns. One of the goals was to increase public awareness of transportation options and to make public transit cleaner.

During a Nov. 4 event at the Utah State Capitol celebrating the state's 11th Alternative Fuels Awareness month, Utah Transit Authority executive director Carolyn Gonot said UTA has reduced emissions from its bus fleet by more than three quarters since 2008 by switching to fully electric and electric-hybrid buses.

As of November, the public transit company operates 54 electric-hybrid buses, three fully electric buses and 47 natural gas-powered buses, according to Gonot.

The governor released his budget recommendations for 2021 on Jan. 8. One of his recommendations includes $100 million "for specific and scalable projects that will help improve Utah's air quality."

With Herbert's goal of reducing per capita emissions 25% by 2026 in mind, $34 million would go toward public transit and $66 million would be spent on electric vehicle infrastructure, including charging stations for electric cars.

Herbert requested the same amount of spending for air quality initiatives last year, but the legislature only appropriated $28 million. During a keynote address at a Utah Valley Chamber of Commerce event on Jan. 10, the governor said this was still significantly more than the state had ever allotted toward improving air quality.

At the event, Herbert spoke about the importance of investing in Tier 3 fuels, which have lower sulfur content and burn cleaner than other forms of gasoline, according to the United States Environmental Protection Agency.

By investing in ways to make public transit "convenient and accessible," commuters throughout the state will be more likely to take a train or bus to work than drive their cars, Herbert said. And building electric vehicle infrastructure will make it more likely that those who do drive to work will buy a cleaner- running vehicle.

"That could be a real game-changer," Herbert said about building more charging stations and other infrastructure.

Air quality roadmap

During the 2019 legislative session, lawmakers asked that a roadmap of ways to address air quality and climate change be put together to give them a better sense of what policies should be put in place.

In January, the Kem C. Gardner Policy Institute at the University of Utah fulfilled that request by releasing a roadmap with seven recommendations for improving air quality in the state.

According to Director Natalie Gochnour, who served as a political appointee for the Environmental Protection Agency during the presidency of George W. Bush, the roadmap was put together with input from a 37-person advisory committee consisting of university researchers, government agency officials, health care workers and nonprofit officials.

Citing a "rapidly growing awareness for urgent action" when it comes to combating environmental issues, Gochnour wrote in a letter to state legislators that the roadmap "lays the groundwork to achieve positive solutions on air quality and a changing climate."

The first recommendation is that emissions-reduction goals be adopted by resolution or statute in 2020. Specifically, the report recommends legislators mandate that Utah "reduce CO2 emissions statewide 25% below 2005 levels by 2025, 50% by 2030, and 80% by 2050" and "reduce criteria pollutant air emissions below 2017 levels by 50% by 2050."

The report also recommends legislators "lead by example" by passing policy to convert all state vehicle fleets to zero and low-emission vehicles, implementing energy-efficiency goals for government buildings, developing "appropriate administrative rules to limit oil and gas leaks," funding reforestation efforts and investing in statewide energy planning.

Further research into environmental concerns could be done by establishing and funding "a premier state-level air quality/changing climate research solutions laboratory," the report said. Part of this would involve setting aside funding "for an initial assessment and feasibility study" to guide further funding and research. This laboratory would report to the legislature once a year.

Lawmakers should diligently plan for population growth that the state expects to see in the coming decades, the report said. Things

they should pay attention to when considering growth include public transportation options, building multifamily housing and job centers near transit, preserving open space and encouraging "local governments to incorporate emissions-reduction strategies in community and economic development efforts and projects."

The fifth recommendation is for lawmakers to help "make Utah the 'market-based' electric vehicle (EV) state" by expanding charging stations "to cover all communities, state highways, and scenic byways as quickly as possible" and involving auto dealers in strategies to increase the supply of electric and hybrid vehicles.

The state should provide support for rural communities whose economies have been centered around oil, gas and coal for decades, the report said. Lawmakers can do this by prioritizing economic development in Carbon, Duchesne, Emery, Millard, San Juan, Sevier and Uintah counties and investing in housing to revitalize these communities.

The final recommendation is for the legislature to "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." One step toward this would be creating a carbon policy committee to explore national approaches to reducing carbon emissions in an economically viable way, as well as through working with Utah's Congressional delegation on environmental issues.

Air quality in the Provo area

In the 1800s, Provo's air was polluted by the numerous coal fires in resident's homes during the winter. Black smoke puffed from chimneys and filled the air. In the mid-nineteen hundreds Geneva Steel added PM 10 particulates to the air causing bad air quality and ugly winter inversions. Now vehicles have taken over with PM 2.5 particulates polluting the air.

Provo, its dynamic bowl shaped valley and its major population growth gave up 10 days to bad air quality last year. Those 10 days, or a least the worst of those days, put Provo in the air quality spotlight nationally with accusations of having the worst air in the U.S.

"Provo having the worst air in the country is one of those myths that just won't die," said Andrea Jensen, Utah County Health Department's Asthma Program coordinator and Certified Asthma Educator.

Jensen should know. Of the four people in her household in Orem, three of them have asthma. If they have a yellow day, they are inside by their inhalers and air purifiers.

She said that PM 2.5 particles can come from more than just car exhaust or gas-powered lawn mowers. One of her children was taken to Utah Valley Hospital's Intensive Care Unit from inhaling particulates floating in the air from a forest fire.

"They nearly died," Jensen said. "We saw a fire and we panicked. I grabbed the kids and left for St. George. I have PTSD from fires."

Jensen said the PM 2.5 particulates are microscopic but have rough edges that can scrape the airways and cause severe damage.

That is why the DEQ annual report for 2019 showing that after years of non-compliance, the Provo area and all of the Wasatch Front is in compliance with federal PM 2.5 standards for pollution was a cause for celebration in the Jensen family.

Provo Mayor Michelle Kaufusi couldn't be happier about the news and believes the implementation of the city's air quality tool kit, riding public transportation, walking and biking more shows residents care about the air they breathe and the environment in which they live.

"We've been a leader in the valley and state," Kaufusi said. "Per person, we're one of the cleanest cities in the nation on CO2 emissions from driving."

Kaufusi said she was giving a presentation in Salt Lake City and a person stepped up to her and offered to fund 20 electric car charging stations around the city with no taxpayer expense.

One charging station costs between $1,200 and $2,000.

The Provo area, including Orem, with the introduction of the Utah Transit Authority's UVX bus route, is seeing fewer car trips with more than 14,000 boardings per day.

Utah Valley University attributes UVX for freeing up 600 parking spaces on campus. Brigham Young University is reporting about the same.

The new Zagster Scooters that are used between Provo and Orem have replaced about 28,503 car trips and 15,107 miles of driving, preventing 3,104 tons of CO2 emissions, according to Kaufusi.

Isaac Paxman, Provo's deputy mayor gave a nod to Provo being a Tree City USA. Orem and Springville are also Tree Cities.

"We've been a certified Tree City for 35 years," Paxman said. "We have 30,000 trees managed by Provo (does not include private properties)."

Kaufusi is also proud to say that Provo residents walk and bike more than any other city in the state -- 15% walking, 3% biking, according to the 2012 U.S. Census information.

Kaufusi also reports that Provo Power has a goal of 50% renewable energy by 2030. With the help of energy partner Utah Municipal Power Agency (UMPA), a 560-acre, 80-megawatt solar farm is being built in Mona, San Pete County.

Provo resident Ned Hill is chairman of the Utah Valley Chamber of Commerce Air Quality Task Force. Residents from Provo, Orem, Lehi, American Fork, Spanish Fork, Nephi, Eagle Mountain, Vineyard and BYU students complete the task force.

"We meet every month," Hill said. "The job of the task force is to get information out and to educate."

One of the greatest changes Hill said he has seen in residents is just accepting the fact there is climate change happening. That acceptance has happened quickly.

"Two years ago I was in a meeting where the keynote speaker said climate change was a hoax," Hill said. "The next year I heard a climate change specialist from Utah State University. Things changed. Now the Board of Provo Power (on which Hill sits) realizes climate change is real. The tide is shifting."

Gov. Herbert asking for more hybrid vehicles in his 2020-2021 budget and charging stations to be on the road is a positive. But for some, a hybrid car may be out of their financial reach. Purchasing Tier 3 gasoline will compensate for the time being. It keeps a car's catalytic converter clean.

"50% of our pollution is from vehicles," Hill said.

Sue Grassley, of Springville, said it was a choice when her husband Tom purchased his Tesla electric hybrid car. Their son Troy purchased a Ford Fusion energy car.

While they believe they are contributing to better air, Troy is more skeptical on the amount of help it's doing.

"I doesn't help as much as using public transportation," Troy Grassley said. "Electric cars are expensive and their tires are still on the road (polluting). Tesla is still a car after all."

Grassley said the state can't keep making Interstate 15 wider for all the cars. Something else will have to be done.

Kaufusi suggests residents drive less and defer to active transportation like biking or walking, carpooling and be idle free. She also suggests residents share information on what they know with others concerning better air quality.

Provo offers suggestions on its clean air tool kit online at https://provocleanair.org.

Orem is also reaping the benefits of the UVX line and is anticipating the next line will dissect the city as it comes from 500 West in Provo and makes its way through Orem, Lindon, Pleasant Grove and American Fork to Lehi.

Vineyard is building walkable, bike-able and tree-lined streets in its modern downtown. Charging stations and a FrontRunner station will be available and buildings are anticipated to be state of the art LEED compliant.

The Salt Lake Tribune

Tribune Editorial: Time is wasting on climatechange, Utah
By The Salt Lake Tribune Editorial Board January 18, 2020

"WHEREAS, the 'hockey stick' global warming assertion has been discredited and climate alarmists' carbon dioxide-related global warming hypothesis is unable to account for the current downturn in global temperatures … "

"WHEREAS, emails and other communications between climate researchers around the globe, referred to as 'Climategate,' indicate a well organized and ongoing effort to manipulate global temperature data in order to produce a global warming outcome … "

— from House Joint Resolution 12

It's been 10 years — and about a half degree Fahrenheit — since the Utah Legislature passed HJR12, "Climate Change Joint Resolution."

The resolution, a reaction to the Obama administration's call to regulate carbon, carried no power of law, but it was intended as a clear signal of where Utah stood. It also was complete bunk.

Industry lobbyists delivered the smoke and mirrors, and Republican legislators — many of whom are still in office — bought it eagerly and unquestioningly. The vote was along party lines. Gary Herbert — in his first legislative session as governor — signed it.

Call it the lost decade. Everything mocked by HJR12 has been substantiated in the intervening years. The deniers have gone quieter, but there has been no state government effort to address carbon production. In fact, efforts more often have gone the other way, like looking for ways to extend our footprint by exporting coal or building railways to oilcountry.

And now it's not even about being able to stop climate change. That window has closed. It's about limiting the devastation, devastation that is already visible across the planet on a daily basis.

Now comes the University of Utah's Gardner Institute with its climate-change-dominated "road map" for legislators. Ready or not, Utah's leaders are being told in no uncertain terms that climate change is real and human fossil fuel consumption is mainly responsible.

The road map sets the goal of cutting Utah's carbon footprint by a quarter in five years, half in 10 years and 80 percent in 30 years.

Aggressive, but even those are political numbers. In reality, if in 30 years the entire planet is still burning even 20 percent of the carbon it is now, we'll be living in a Mad Max world of firestorms, mass migrations and species die-offs.

What's the real target? California law is already at 100 percent reduction (no energy from fossil fuels) by 2045, and now it's looking at moving that to 2030.

And Gardner makes it clear: Because of our coal-fired power plants and urban sprawl, we're among the fatter footprints in a country that is the carbon-per-capita leader among major nations. We're 0.04% of the world's population, but we're 0.2% of its carbon production.

That means Utahns — more than most people on earth — are causing the oceans to rise and the forests to burn.

We also are — more than most — in a better position to change. We have abundant wind, sun and geothermal assets, and we have enough resilience in the economy to get there without financial collapse.

The Gardner report calls for accelerating closure of the coal plants and making the state a leader in electric vehicle adaptation. It also pushes smart growth (higher density near transportation) and cleaner buildings.

The most important ask is Gardner's seventh bullet point: "Participate in national discussions about market-based approaches to limiting carbon emissions."

Ultimately, any approach to carbon has to have national and international scale. It's only through cooperation that we will solve this. And cooperation will require a common acceptance of science.

A word of caution: We are not going to simply innovate our way out of this. The Gardner Institute has done an A+ job of informing, but if this report has a flaw, it is the promise of a seamless, technology-driven path. We have many reasons for optimism, but this will take sacrifice, particularly for those who can't or won't adapt.

This is about the near future, the world of our children and grandchildren. They can run, but they can't hide. It's not too late to make a difference, but we don't have another 10 years.

The Spectrum.

Letters to the editor: Jan. 18 – Climatechange costs are evident
By Jean M. Lown, St. George January 18, 2020

Sad to read the negative letter about the costs of technology to avert climate disaster. So many low-tech methods to cut carbon emissions exist. Utah is ideally suited to passive solar designs in new construction. An effortless cost savings to reduce emissions is to stop vehicle idling which wastes fuel, pollutes the air and harms the engine. Because flying is so carbon intensive, fly less and buy carbon offsets when you do fly.

At the request of the Utah Legislature, The University of Utah Kem Gardner Policy Institute just released The Utah Roadmap: Positive Solutions on Climate and Air Quality with 55 strategies to reduce air pollution and address climate change: https://gardner.utah.edu/utahroadmap/. "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."

Educate yourself, embrace the future and take action.

Deseret News.

In our opinion: Stewardship and innovationshould fight off climate change effects
By Deseret News Editorial Board January 18, 2020

Scientists say 2019 was the second-hottest year on record for the surface of planet Earth, dating at least to when modern record-keeping began in 1880.

But the hottest year on record was 2016, and the past five years have been the warmest of the last 140.

Two independent analyses, by NASA and the National Oceanic and Atmospheric Administration, reached this conclusion, with a NASA official noting, "Every decade since the 1960s clearly has been warmer than the one before." Given variations in measuring capabilities through the years, NASA said its data is accurate to within 0.1 degrees Fahrenheit, or a 95% level of certainty.

The warming trend is hard to deny, and this change has manifested itself in various ways, from prolonged droughts in the interior Western United States to intensified storms and catastrophic fires in various places. These studies were released about the same time the journal Advances in Atmospheric Sciences was publishing a study that compared the amount of heat placed into the oceans by human activity since 1950 to the equivalent of more than 3 billion atomic bombs.

And yet it makes little sense to attack this problem with government-imposed restrictions that harm economic activity and stifle innovation. Spurring innovation in the private sector would do more, quicker, than anything else.

Nearly two years ago, CEOs representing 13 U.S. and global Fortune 500 companies or their subsidiaries, and four environmental groups, joined in calling for a carbon pricing policy of some sort to reduce emissions as cheaply as possible.

As reported by the World Resources Institute, their statement urged Congress to find solutions that support the economy's competitiveness and that could be applied fairly.

A carbon tax would be applied to the act of burning carbon-based fuels such as oil, coal or gas. Under some plans, the government could issue a permit or certificate allowing a company to burn a certain amount, and these could be bought or sold on the open market. Buyers and sellers could form an exchange for this purpose. Companies with such permits would have an economic incentive to emit less and to profit from the sale of their certificates, which would, in turn, give them an incentive to be more innovative.

The United States, according to a report from the global risk-assessment and consulting firm Verisk Maplecroft, has 4% of the world's population, yet generates 12% of the planet's garbage. Trash ends up decomposing, creating methane gas and carbon dioxide. Clearly, there is much room for improvement.

We know "global climate change" — the words themselves — have been used as political weapons. Enough of that. It's time for both the public and private sector to work together to find solutions born from proper land stewardship and innovation. Those are two principles long associated with the ability of Utahns to draw water from a desert and build one of the nation's great economies through hard work and innovation.

The Salt Lake Tribune

Letter: A carbon tax is the conservativeremedy
By Jean M. Lown January 13, 2020

Thanks to the Kem Gardner Policy Institute, we are finally seeing some serious proposals to address air pollution and climate disruption. The proposed research laboratory could promote innovative market-based strategies for addressing these critical problems affecting our health and long-term well-being.

For the majority of U.S. emissions, research shows a carbon tax is a more effective, efficient and fair way to reduce carbon pollution than regulations. We need our state legislators to support Rep. Joel Briscoe's proposed carbon tax. Urge our U.S. Congress members to vote for the bipartisan HR763, Energy Innovation and Carbon Dividend Act. A carbon tax is the conservative way to address both air pollution and climate disruption.

The Salt Lake Tribune

Thom Carter and Andrew Gruber:Infrastructure is at the core of long-term airquality success

By Thom Carter and Andrew Gruber January 10, 2020

Take the train. Be idle free. Burn less wood. Carpool. Turn down your thermostat.

You've likely heard one or all of these tips during our infamous inversion seasons. Each is a call to action to make a difference in our air quality. Hopefully you accepted such invitations and have become part of the solution. If each of us takes one small action to reduce our personal emissions, it makes a big difference when taken together across our communities.

But it's not just about our choices as individuals. The way that we grow and build our communities and infrastructure matters to air quality too. For example, if housing is developed near a transit line, a trail or a job center, people will be more likely to leave their car home and commute by taking the train, bus, bike or scooter. If electric vehicle (EV) charging stations are installed in convenient locations across our state, more people will choose to use EVs, which have the potential to cut emissions drastically.

While individual actions will always be the foundation of improving our air, we must work together as communities — including business, government, and other groups — to bring about big, regional change that will support the individual behavior change needed to clear our air.

Gov. Gary Herbert's new budget proposal includes $100 million to make these types of big changes that will improve air quality. Of that amount, $66 million is for "a comprehensive DC fast charger installation plan to broaden electric car infrastructure in all parts of the state." This funding could accelerate fleet changeover and make a big dent in our mobile emissions, which represent the largest share of our pollution each winter.

The governor is also proposing $34 million for making public transit a more convenient option for more commuters. Increasing the state's commitment to transit and working with community leaders to promote a pattern of transit-oriented regional centers will help residents easily access daily activities with a walk, bike ride, transit trip or shorter drive.

This approach to growth fits with the Wasatch Choice 2050 Vision for the future along the Wasatch Front, adopted last year. It provides a blueprint for growth that plans for transportation facilities, housing and economic development together in a way that enhances our quality of life. There are similar plans across the state, meant to make the trips we take — from home to work to school to shopping — shorter, or to provide choices in how we make them.

Recently the Kem C. Gardner Policy Institute released The Utah Roadmap, offering "positive solutions on climate and air quality." One of the recommendations was to accelerate quality growth efforts like the Wasatch Choice 2050 to "provide more transportation choices, support housing options, preserve open space, improve energy efficiency in buildings, and link economic development with transportation and housing decisions."

Our organizations — the Utah Clean Air Partnership (UCAIR) and Wasatch Front Regional Council (WFRC) — are interested in positive change. UCAIR's mission and message promote behavior change at an individual level, while the plans and strategies created by WFRC and its partners are meant to make that individual change easier through quality community planning. We applaud the leadership of Governor Herbert and the Gardner Policy Institute for supporting the clean air effort, and we invite you to join the cause. Choose to make one change today, and support planning in your community that will make further change tomorrow possible.

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NPR Utah

Utah's Roadmap to Cleaner Air

By Jon Reed January 8, 2020

As Utah confronts the accelerating risks of climate change, the state now has a plan for action.

Led by the Kem C. Gardner Policy Institute, a team of researchers, lawmakers and industry experts recently unveiled what they've dubbed the Utah Roadmap, a set of recommendations intended to help the state improve air quality and address the impacts of climate change over the next 30 years.

The report laid out seven "mileposts" to get there, starting by formally adopting two major goals: cutting pollution emissions by 50% and carbon emissions by 80% by 2050. Other markers include expanding state incentives to put more electric vehicles on the road and making faster progress towards the Wasatch Choice 2050, a sustainability plan to address the state's rapid populationgrowth.

But each recommendation is just that. The roadmap is intended more as a loose guide for state lawmakers rather than a set of specific policies.

"There's some squishy things here," said Utah Rep. Steve Handy, R-Layton. "It's going to require some drilling down. But I think that we have kind of a starting point."

Take the third milepost, for instance. The report suggests the state create a climate solutions-focused laboratory to conduct research, improve environmental monitoring and spur innovation.

It's one of the most interesting proposals, Handy said, though it's not clear how it would work or where it would be.

"I think you start with an appropriation," he said. "You get some money, a couple million bucks perhaps,

and you hire some people to put the thing together."

Climate change has already hit Utah. The state has warmed 2 degrees over the last century, according to the roadmap. The report's authors said a course of action is critical not only to fighting harmful health effects that climate change brings — air pollution alone impacts child asthma, heart disease, and brain health — it's essential for maintaining Utah's strong economy.

"For me it's not a binary issue," said state Rep. Joel Briscoe, D-Salt Lake City. "The national parks, the

recreation areas — you cannot take those out of why people come here to do business."

It's a consideration that will also require legislators take a deeper look at some of the state's major

development projects, such as the inland port, Briscoe said.

Royal DeLegge agreed that the report is a critical first step for the state. He is the environmental health director of the Salt Lake County Health Department and was part of the roadmap's advisory committee. He said while the plan's goals don't match more ambitious ones set by several local governments within the state to reduce emissions by 2030, progress is slower at the state level.

"That is the trend across the country," he said. "You have to get people on board with the acknowledgement that this is an issue we must address. And then as time goes on, we can ramp up to meet more realistic goals."

The report will be open for public comment until Jan. 27. A final version will be presented to the Legislature at the end of the month.

So, why is the cost of gas rising so much?
By Jay Evensen January 8, 2020

Why is the state of Utah loading the price of gasoline with so many taxes?

If you didn't know this is coming, you soon will.

The newly passed tax reform law will, for the first time, apply sales taxes to gasoline which, when the law takes full effect later this spring, could add as much as 11 cents to each gallon purchased. And the State Tax Commission, using a formula set forth in state law, announced that the regular gas tax also would go up by 1.1 cents per gallon, to a total of 31.1 cents, in the new year.

Add all of this to the federal gas tax of 18.3 cents, and Utah drivers will be paying roughly 60.4 cents per gallon in taxes alone.

At current prices, this means the actual cost of gasoline, without taxes, is less than $2 a gallon. But you will never know this.

I ask why this is happening because, as time goes on, gasoline-powered cars are becoming more fuel efficient and more people are buying cars fueled by natural gas, electricity or a hybrid combination.

In other words, the state is piling more taxes onto something people are using less of, unless they are poor. Low-income people tend to drive older cars that use a lot of gas.

I thought about this the other day as I sat through an editorial board meeting with representatives of the Kem C. Gardner Policy Institute and a 37-member committee commissioned by state lawmakers to recommend ways to help air quality and deal with climate change.

Their findings included recommendations that the state find ways to become "the market-based EV

(electric vehicle) state." This would involve finding ways to expand the network of charging stations and to use financial incentives to get companies to switch to alternative-fuel vehicles and auto dealerships to begin offering more of them to customers.

In other words, find ways to make the gas tax even less efficient when it comes to funding road repairs. So why, really, are lawmakers piling on the gas taxes?

The answer likely is simple: They know the world of transportation is changing. It just hasn't changed that much yet. The Gardner Institute says only about 2% of the 2.6 million registered vehicles in the state are electric, either hybrid or otherwise. That doesn't even qualify as a dent, yet.

In the meantime, taxing gasoline raises money the state uses to fund highway needs, even if the benefit is temporary, and relieves some of the burden from the general fund. The sales tax on gas could raise up to $275 million a year right now, but Senate President Stuart Adams told the Deseret News it was "probably at best a temporary solution."

You also might not know the state already is tinkering with alternatives. Owners of electric and hybrid vehicles already pay between $15 and $90 more to register than do owners of gas vehicles. As of New Year's Day, they can opt into a program that charges them by miles driven, instead. A simple device that plugs into a car's data port will keep track.

Is this the answer to funding roads in the future? Maybe, but some people might not want a government device tracking their whereabouts. Future drivers might be asked instead to pay a lump sum when they reregister their cars, based on the difference in their odometer readings since the last time they registered.

But that means they might be charged for miles that might have been driven in another state, which didn't really impact the roads here.

Perhaps the answer lies in a modest mileage fee plus more aggressive variable tolls on major highways, charged automatically through transponders installed at the time of registration. At least then, drivers would have the option of using alternative, non-tolled roads to save money, if they have time.

Admittedly, lawmakers are walking a bit of a tightrope. They want owners of alternative-fuel vehicles to pay their fair share for road costs, but not so much as to ruin the incentive to buy such vehicles in the first place.

That's understandable. But it's also true that piling more taxes onto the price of gas makes it difficult to move away from those taxes later, as the percentage of alternative-fueled vehicles increases.

Utahns might feel better if lawmakers set a benchmark — once the market share of electric vehicles reaches 10%, say, gas taxes disappear and everyone moves to a combination of miles-driven taxes and toll roads.

Otherwise, it looks as if lawmakers are just trying to suck blood from a turnip until someone comes up with a better idea. Without a firm benchmark, those ideas may take a while.

The Salt Lake Tribune

Utah think tank says state should cut CO2emissions 80% by 2050

By Bethany Rodgers January 7, 2020

Utah should strive to slash air pollution by half and carbon dioxide emissions by 80% in coming decades, a goal that would demand commitment from government leaders, industry and each state resident, the Kem C. Gardner Policy Institute argues.

The University of Utah think tank on Monday published a draft road map for cleaning up the air and confronting climate change in the state. What's at stake is the health of Utahns, the welfare of the state's economy and the viability of a 2030 or 2034 Olympic bid, according to the institute.

"It would be a really big step for a conservative red state like Utah to lead on," Natalie Gochnour, who directs the policy institute, said during a Monday editorial board meeting at The Salt Lake Tribune offices.

Gochnour acknowledged that climate change is still a sensitive topic in the conservative state Legislature which is why the report focuses on market-based changes and "positive solutions" and highlights strides the state has already taken. For instance, Dominion Energy is helping invest $500 million over the next decade in renewable natural gas projects nationwide, according to thereport.

The draft report, prepared over the past six months at the Legislature's request, outlines 55 strategies that call for everything from reducing tailpipe emissions to discouraging sprawling development. The state should incentivize electric vehicles, lead the way on teleworking, promote the early retirement of coal-fired plants and adopt updated building codes, according to the report.

The report builds on analysis by a 2007 Blue Ribbon Advisory Council on Climate Change convened by former Gov. Jon Huntsman and reflects the Legislature's 2018 resolution recognizing "the impacts of a changing climate." Input for the current study also came from a panel of 37 technical experts, including representatives from the state's largest health networks; advocacy groups; federal, state and local officials; Rocky Mountain Power; Rio Tinto and Dominion Energy.

State lawmakers last year allocated $200,000 to the study, which will be finalized and submitted to the Legislature later this month.

The seven overarching goals contained in the report are:

- Adopting a 2050 goal of reducing 2017 criteria pollutant levels by 50% and reducing 2005 carbon dioxide emissions by80%.
- Setting an example in state government by converting to electric, compressed natural gas and renewable natural gas fleets, adopting energy efficiency goals in state buildings, prioritizing teleworking and investing in reforestationefforts.
- Establishing a state-level air quality and climate change research laboratory that would focus on monitoring, research andinnovation.
- Progressing more quickly on "quality growth initiatives" by preserving open space,improving building energy efficiency and establishing more transportation options.
- Promoting the use of electric vehicles by adding charging stations, incentivizing the use of electric vehicles and recruiting Utah's auto dealers to help increase the zero-emissions vehicle supply.
- Helping rural communities transition to a new, diversified economy as coal-fired power plants shut down.
- Engaging in the national-level conversation about reducing carbonemissions.

That last goal was the subject of significant debate within the group preparing the report, Gochnour said.

"But the idea is that we think you should act on a national basis, not a state basis, on carbon emissions," she said.

The team hasn't spoken with members of Utah's congressional delegation about this goal, but Gochnour noted that U.S. Sen. Mitt Romney, R-Utah, is already engaging in discussions about climatechange.

The 80% emissions target was formulated based on discussions with industry and community leaders, experts and legislators, Gardner Institute representatives said. While the report does not attempt to estimate the cost of implementing its recommendations, Gochnour said the price tag will be one of the hurdles to meeting the air quality goals. The state's continued growth will also present achallenge;

Utah's population is expected to increase by 1.5 million by 2050 over the current 3.2 million.

"These are very much stretch goals," Gouchnor said of the report recommendations. "If you do it on a per-capita basis — unbelievable reductions."

But the potential consequences of inaction are wide-ranging, the institute states.

Winter inversions and other air quality problems have an adverse impact on the economy, making it more difficult to attract and retain businesses, according to the report. There also are serious health risks. Ground-level ozone from emissions can aggravate respiratory and cardiac conditions, and air pollution is linked to a wide variety of problems from decreased birth weight to congestive heart failure.

State Rep. Ray Ward, a physician, called the report a "big step in the right direction" and said he appreciates that it doesn't create false choices between improving air quality and growing the economy.

"In the end, I think there is a pathway forward that makes these things better and still leads to a vibrant economy," said the Bountiful Republican.

Ward said he's already planning on running a bill this session to update the state's renewable energy goals. Other bills could come out of the Gardner report recommendations, but other parts of the document could be implemented through state policy changes or simply spark community conversations, Ward said.

Deseret News

In our opinion: Utah should pay attention toAustralia's wildfires
By Deseret News Editorial Board January 7, 2020

Utahns should pay considerable attention to the wildfires in Australia; not just because of their tragic nature, which is considerable and worthy of prayers, contributions and any other appropriate help, but because similar things could happen here.

As the devastating fires in Paradise, California, showed in 2018, the Western United States is not immune from such disasters, and the chances they might occur seem to be growing as climate change leads to warmer temperatures and more sustained and severe droughts.

The Australian fires, which as of Monday had engulfed 14.7 million acres and killed at least 25 people and perhaps a half billion animals, have been exacerbated by such conditions.

Utah currently is experiencing healthy water conditions, with snowpack levels above average statewide. That may give people a false sense of security. Droughts have been common here in recent years. In 2018, sparse rainfall resulted in wildfires that destroyed 370 structures.

"Generally, over the last few decades, we've been seeing a number of national trends," a spokeswoman for the National Interagency Fire Center told the Deseret News back then. "That is longer fire seasons — fire seasons starting earlier in the spring, lasting longer into the fall."

Despite the current relatively wet season, that hasn't changed.

The Verisk state risk report for 2019 said 14% of Utah's housing stock is located in areas with a moderate risk for wildfires, while another 14% is in areas with high to extreme risks.

Utah also is experiencing steady population growth. The Kem C. Gardner Policy Institute at the University of Utah just released figures showing Utah led all states in growth during the previous decade, increasing by 442,000 people, or 16%, since 2010. And while the state still is only the 30th most populous among the 50 states, that steady growth means more and more people will build homes in areas susceptible to wildfires.

That same Gardner Institute, with the help of a 37-member technical advisory committee, just released a study the state Legislature commissioned on ways to improve the state's air quality and mitigate the impacts of climate change.

The study said Utah's average temperature has increased by about 2 degrees Fahrenheit over the past 100 years. In some parts of the state, the snowpack decreased almost 80% between 1955 and 2013.

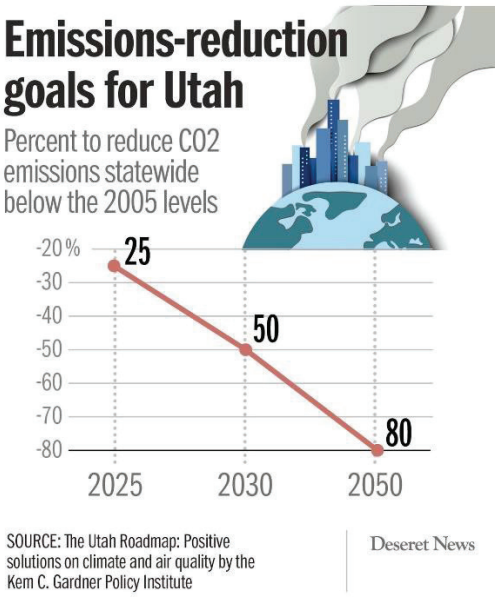
Because of this, forests are more susceptible to diseases and pests, which helps wildfires to become more frequent and destructive.

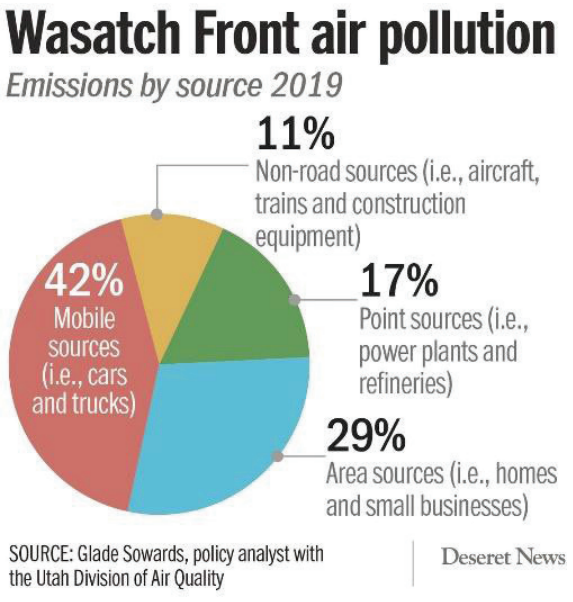
The committee is forwarding seven recommendations to the Legislature. Many of these focus on ways to spur market-based solutions to air quality. Some, however, ask the state to invest more by establishing an "air quality/changing climate solutions laboratory," and to expand the infrastructure needed to accommodate more electric vehicles. Another is to convert all state vehicles to alternative fuels.

The main recommendation, however, is to adopt an emissions-reduction goal that would reduce carbon dioxide emissions statewide by 50% between now and 2030, the year Utah hopes to once more host the Winter Olympics. Other pollutants are to be reduced 50% from 2017 levels by 2050.

A changing climate, pollution, health impacts and wildfire dangers are interrelated. If state lawmakers take these recommendations seriously, if vulnerable homeowners do more to protect their property from fires, and if state and federal land management agencies do more to better manage forests and undergrowth, Utah could do a lot to keep a lid on wildfires.

That would save lives and property, while ensuring the state continues to grow and thrive.





FOX 13 KSTU SALT LAKE CITY

Legislature seeks road map for air qualitypolicy

By Staff January 7,2020

The Utah Legislature is preparing policies dealing with air quality.

To assist in this effort, the Kem C. Gardner Policy Institute with the University of Utah prepared a road map for the effort.

The result is called the Utah Roadmap.

Technical experts participated in preparing the Utah Roadmap. The policy institute received input from various governmental and health care groups.

Green energy

The roadmap advocates for greener vehicles for governmental and personal use. State government should convert to using cleaner-fuel fleets, the policy institutesays.

Residents should have greater access to electric charging stations in the state, according to the roadmap.

The institute emphasized that economic assistance should be offered to rural communities in making the transition to greener energy.

Environmental pioneers

The policy institute recommends Utah lead the national conversation on reducing emissions.

The air emissions goal for Utah is less than a third of 2011 levels and less than half of the current output.

The carbon dioxide emissions would be cut from about 60 million metric tons to just more than 10 million metric tons, under the goals set in the roadmap.

This decrease in carbon dioxide emissions would occur at the same time that the state population is estimated to grow from 3.1 million to 5 million residents.

Under the plan, the carbon dioxide emissions would be cut the most dramatically within the electric power sector.

Unhealthy air quality

Air emissions and pollutants effect, but not limited to, asthma, respiratory disease, decreased lung function, diabetes, high blood pressure, and heart disease.

Many of the effects of these pollutants on health have been the subject of Utah-based studies.

The Gardner Institute is accepting feedback on this major undertaking. Respondents can send an email to utahroadmap@utah.edu.

Deseret News

Want to solve Utah's air quality problem? Now there's a roadmap for that

By Erica Evans January 6, 2020

Researchers released a set of seven recommendations Monday meant to guide Utah's legislators in addressing the state's climate and air quality concerns. Those recommendations include reducing air pollution emissions by 50% and carbon emissions by 80% by 2050.

"If Utah acts on this, we would be the first red state to do so," said Natalie Gochnour, director of the Kem C. Gardner Policy Institute at the University of Utah.

Last year, the Utah Legislature gave the Gardner Institute $200,000 to complete a six-month study of climate and air quality and tasked the organization with proposing science-based solutions.

"There was a real interest in having a trusted entity bring together a diverse group of experts to give us

good counsel," Gochnour said Monday in a meeting with the Deseret News and KSL editorial boards. Those experts included economists as well as representatives from the energy sector, health industry, academia and government agencies.

The report, called "The Utah Roadmap," will be available for public comment on the Gardner Institute website until Jan. 27, after which it will be finalized and presented to the Legislature.

Other recommendations from "The Utah Roadmap" include having the government lead by example with low-emissions buildings and vehicles and creating a climate solutions laboratory where scientists can explore the latest technologies and innovations in air quality control.

"We should have the best monitoring network in the country here in Utah, and we should have some of the most cutting-edge research on air quality coming out," said Gochnour.

The suggestions are directed at legislators, but the goal of reducing air pollution by 50% was made with individuals in mind, according to Gochnour. She said every Utahn should think about how they can cut their personal emissions in half by driving less or making their homes more energy efficient, for example.

The Utah Roadmap: Positive solutions on climate and air quality by the Kem C. Gardner Policy Institute

All of the Gardner Institute's proposed actions will simultaneously reduce air pollutants that are harmful to human health — like particulate matter, ozone and nitrogen oxides — as well as cut carbon emissions, which contribute to a warming climate, said Glade Sowards, policy analyst with the Utah Division of Air Quality.

While Gochnour says there is "no consensus" on Capitol Hill in terms of how to address climate change, scientists agree reducing carbon emissions is essential to guard against potential wildfires, shrinking snowpack levels and extreme weather.

Utah's total carbon output is small on a global scale, but per capita emissions are higher than most states, "The Utah Roadmap" report says. One of the reasons is that Utah is highly reliant on coal. With plans to retire existing plants or convert them to natural gas, that will

change, Sowards said. But more action will be required to meet the Gardner Institute's reduction goals, especially in terms of air quality.

Sowards worked on projections for the study that show Utah's air quality will continue to improve until about 2025 with planned improvements including Tier 3 fuel, or gasoline with lower sulfur content. Without additional action, Utah's air quality will become stagnant after 2025 as the benefits of coal-fired power plant closures across the state will be offset by population growth, according to Sowards.

And if for some reason the power plants don't close as planned, Utah's air quality could start to get worse, Sowards said.

"The timing is right for the state to act," said Gochnour. "I feel like there are lot of things pointing in the right direction, at the top of the list would be what we are seeing in technology and new opportunities in the energy sector."

Gochnour also hopes that a potential 2030 Olympic bid will motivate Utah legislators to take action. The 2002 Olympics provided a target for improving Utah's infrastructure, including the creation of TRAX, Utah's light rail system. The new Olympic bid could do the same toward motivating toward clean air solutions.

The final recommendations from the Gardner Institute include adapting to population growth with more public transportation, energy-efficient housing options and the preservation of open space, encouraging the adoption of electric cars, providing economic development assistance to rural communities as they face energy-transition, and working toward the adoption of a national carbon pricing plan.

Glade Sowards, policy analyst with the Utah Division of Air Quality

Such changes will not be free, however. While the Gardner Institute did not include a cost calculation in its report, Gochnour predicts that economic investment on par with the $29 million the Legislature designated toward air quality last year will be necessary to achieve the roadmap goals.

"I think they did a public service to the state of Utah to delve into this subject in a very short amount of time and to wrestle with some very complex issues," Rep. Joel Briscoe, D-Salt Lake City, said of the Gardner Institute. "I look forward to having a broader dialogue with Utahns of all persuasions and legislators about these recommendations."

The Salt Lake Tribune

Tribune Editorial: It's almost inversion season. Are we going to get the same oldsoot?

By The Salt Lake Tribune Editorial Board November 23, 2019

Earlier this year, Utah Rep. Ray Ward presented a wildfire prevention resolution that drew a straight line between human carbon dioxide emissions and the blazes that consumed about 400 structures and hundreds of thousands of acres in 2018.

Greenhouse gases, his resolution said, are heating up the planet, which causes hotter, drier summers in Utah, which, in turn, increases the risk that a spark will land on parched terrain and burst into flames.

For many of his colleagues, the climate change wording tainted an otherwise laudable measure. It raised "complicated and difficult questions of causation" and seemed "tangential" to the overall resolution on reducing wildfire damage, Rep. Tim Hawkes said. Later, he explained he was trying to save Ward's measure by deleting deal-breaking language.

"Climate change remains a hotly contested and highly divisive issue in the Legislature," Hawkes, a Centerville Republican, said in an interview last week. "His bill would likely have failed if it had moved on with that language intact."

Yet, even as state lawmakers shied away from Ward's explicit description of global warming last session, they quietly socked away $200,000 to study the issue further.

Ward, R-Bountiful, said those two decisions aren't inconsistent — in fact, he said, asking for data from the trusted Kem C. Gardner Policy Institute could be an important step in building confidence for future climate action.

"I don't think there is any one single thing that by itself would change a bunch of legislators' minds," the physician said. "But I do think that a bunch of little, tiny things over and over again ... I do think it all adds up."

The University of Utah institute will likely begin the study sometime in July, when the state releases funding for the review, and is scheduled to report back to the Legislature by mid-December.

House Speaker Brad Wilson said there's no particular agenda behind the research and that lawmakers just want some Utah-specific data on air quality and climate change.

"Once we get good information," the Kaysville Republican said, "we can start to discuss policy decisions that could help us manage the state's growth."

The Legislature has formally recognized the existence of climate change with the 2018 passage of a resolution mentioning the global trend and its connection to increased risk of wildfires, water scarcity, flooding and extreme weather events.

But dozens of Republican lawmakers voted against it, with former Rep. Mike Noel arguing that the "whole issue of climate change has been used by organizations to fool people." Noel, R-Kanab, also said carbon dioxide is not a pollutant because it feeds plants.

Despite broad scientific agreement that human activity is driving planetary temperatures upward, global warming has become a partisan fault line in U.S. politics. Benjamin Abbott, an assistant professor of ecosystem ecology at Brigham Young University, said he was still unpleasantly surprised to watch these political forces drive the conversation on Ward's resolution earlier this year.

Abbott, who headed to Capitol Hill in February to testify in support of the measure, said Utah is especially sensitive to climate change because of its elevation and geographic location. Mega-fires, invasive species, loss of snowpack and droughts of increasing severity all could be in store for the state if the warming trend continues, Abbott said in a phone interview.

However, scientific data didn't seem to carry much weight with lawmakers during the February committee meeting, he said.

"It was very clear the committee had already made up their minds, not based on scientific evidence, but on political positions," he said. "In my field, if you bring evidence to the table, that's what brings you credibility, And I was assuming that the same paradigm held in the political realm."

While that's discouraging to Abbott, his experience hasn't been totally negative; state lawmakers have been willing to parse through the issue in lengthy private conversations, the type of open communication that he believes is central to progress.

Wilson said he personally believes in climate change, but "what percent of its changes are due to man- made effects is up for debate." Hawkes said he accepts that the Earth is warming and that "human activity is playing an important role in that warming." Beyond that, Hawkes said, consensus begins to break down, especially when the conversation turns to finding solutions.

Natalie Gochnour, who directs the Gardner Institute, said the forthcoming study will consider the current body of research on air quality and climate change in Utah and examine the effects on state residents and industries.

"I definitely anticipate that we will be putting forward to the Legislature potential strategies that could help with air quality and a changing climate," she said.

Those could involve anything from incentives for eco-friendly behavior to new and emerging technologies, Gochnour said.

Some have suggested a carbon tax could go a long way toward lowering emissions in the state. One of them, a Salt Lake City economist named Yoram Bauman, is leading a campaign to put a carbon tax question on the ballot next year.

The Clean the Darn Air campaign for the carbon tax initiative is about to enter its signature-gathering phase and will focus mostly on air pollution, which Utahns see and feel with every winter inversion, according to Bauman. But a tax could also significantly cut greenhouse emissions, he said.

"It's the single most important thing we can do to tackle climate change," he said. "It's a market-based approach."

State policymakers have not warmed to the carbon tax concept; Democratic Rep. Joel Briscoe's legislation on a fossil fuels tax, for example, didn't budge out of committee last session.

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Bauman contends that a carbon tax does allow the free market to operate unimpeded; it would simply require consumers to pay for the pollution generated by their energy use.

What needs to happen to clean Utah's air?
By Amy Joi O'Donoghue August 12, 2019

A technical team of nearly 40 members is probing the best science-based solutions for cutting Utah's air

pollution so those recommendations can be delivered to Utah lawmakers in mid-December.

The Kem C. Gardner Policy Institute at the University of Utah was tasked by the Utah Legislature to look at the problem for a roadmap of possible legislative solutions for the next several years.

Natalie Gochnour, institute director and associate dean in the university's David Eccles School of Business, met Monday with the Deseret News editorial board to explain the process and the timeline in play for coming up with ways to address pollution problems and the challenge of a changing climate.

The technical team's research will build on a large volume of work already done in 2007 under then-Gov. Jon Huntsman Jr.

"We have an advantage because air quality is present, it is understood and it is an urgent problem," she said.

Technical team members come from a wide variety of disciplines, including state agencies, universities, the utility sector, clean energy organizations, hospitals and the transportation sector.

"Our role is to be objective and nonpartisan," Gochnoursaid.

The group is using HCR 7, passed in the 2018, as itsblueprint.

The resolution, sponsored by Rep. Becky Edwards, R-North Ogden and Sen. Todd Weiler, R-Woods Cross, recognizes that "stewardship includes fostering and maintaining resilient ecosystems that have the capacity to adapt to our changing environment."

It also calls on emission reductions through incentives and support for growth technologies and services that will enlarge Utah's economy in an energy-efficient and cost-effective way.

The recommendations could serve as a "climate action," plan of sorts that 20 other states have adopted across the country.

"The most important thing we can do is provide the Legislature with information they can trust and information that is verified," said Tom Holst, senior energy analyst with the institute.

Gochnour said the goal is to come up with recommendations that could deliver a certain percentage in emissions reduction by a particular year.

Because the research is in its infancy, Gochnour said those numbers have not yet been defined.

Although the study effort will include a review of best practices in other states in the pollution reduction arena, consultant Brian Wilkinson said that local science-based approaches will be critical.

"They're going to be looking at what can the Utah Legislature can focus on that will work for Utah," he said.

The study is being funded by a $200,000 appropriation from lawmakers but Gochnour said additional money is also being sought.

A draft of the recommendations will be released in November for public comment, with the final version due Dec. 13.

Gochnour said the greatest challenge is the abbreviated timeframe the team has to follow.

Experts are grappling with tamping emissions further due to the ongoing health impacts, Utah's efforts to land the 2030 Olympics and a strong chorus from the tech sector that more action on air quality and a changing climate is essential for greater recruitment success, Gochnour added.

Across the Wasatch Front, emissions are down. From 2002 to 2017, state statistics show per capita emissions declined by 49%, despite spiraing population growth.

Pollution continues to plague the Wasatch Front, however.

The 2019 emissions inventory shows mobile sources, or tailpipes, as the primary culprit for PM2.5, contributing 42%, followed by area sources such as small businesses and homes at 29%, point sources or larger industry at 17% and nonroad, such as construction, at 12%.

KSL.com

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The Salt Lake Tribune

Climate change remains a divisive issue inthe Utah Legislature. So why did lawmakersput away $200K to study it?
By Bethany Rodgers June 17, 2019

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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
Logan Mitchell, University of Utah, Department of Atmospheric Sciences
Cheryl Pirozzi, University of Utah Health, Pulmonary Division
Brian Shiozawa, University of Utah Health
Brooke Tucker, Governor's Office of Energy Development
Sarah Wright/Josh Craft, Utah Clean Energy

Consultants and Staff

Brian Wilkinson/Kirsten Dodge, Wilkinson Ferrari & Co.
Siobhan Locke/Dianne Olson, The Langdon Group
Natalie Gochnour/Jennifer Robinson/Dianne Meppen/Samantha Ball/Meredith King/Andrea Brandley/Marin Christensen/ 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