Technical Assistance to the State of New Mexico: Energy Policy Simulator

Summary Report

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About RMI

RMI is an independent nonprofit founded in 1982 that transforms global energy systems through market-driven solutions to align with a 1.5°C future and secure a clean, prosperous, zero-carbon future for all. We work in the world's most critical geographies and engage businesses, policymakers, communities, and NGOs to identify and scale energy system interventions that will cut greenhouse gas emissions at least 50 percent by 2030. RMI has offices in Basalt and Boulder, Colorado; New York City; Oakland, California; Washington, D.C.; and Beijing.

Table of Contents

Acronyms and Abbreviations

Acronym or Abbreviation	Definition
AEO	Annual Energy Outlook
BAU	Business As Usual
CAT	Climate Action Team
CCS	Carbon Capture and Sequestration
CCTF	Climate Change Task Force
CES	Clean Electricity Standard
DER	Distributed Energy Resources
DR	Distributed Renewables
E3	Energy and Environmental Economics, Inc
EIA	Energy Information Administration
EMNRD	New Mexico Energy, Minerals, and Natural Resources Department
EO	Executive Order
EV	Electric Vehicle
F-gas	Fluorinated Gases
GHG	Greenhouse Gas
HB	House Bill
HDV	Heavy Duty Vehicle
HFC	Hydrofluorocarbon
IECC	International Energy Conservation Code
LDV	Light Duty Vehicle
NM EPS	New Mexico Energy Policy Simulator
NMED	New Mexico Environment Department
NSPS	New Source Performance Standard
RPS	Renewable Portfolio Standard
SB	Senate Bill
VMT	Vehicle Miles Travelled
ZEV	Zero Emission Vehicle

Executive Summary

In 2019, Governor Lujan Grisham of New Mexico signed Executive Order (EO) 2019-003 on Addressing Climate Change and Energy Waste Prevention. As part of EO 2019-003, Gov. Lujan Grisham established a goal of reducing New Mexico's economywide emissions by 45% by 2030 from a 2005 baseline. Since then, the New Mexico Climate Change Task Force (CCTF) has been working to implement solutions across all sectors of New Mexico's economy to meet the state's goals.

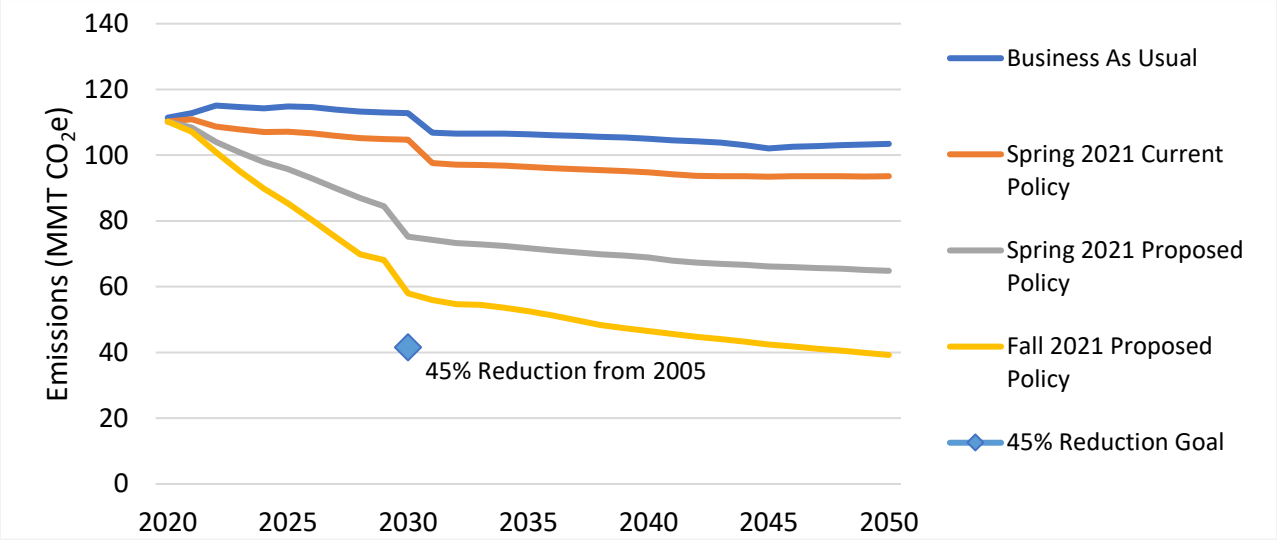
As part of its work in 2021 and early 2022, the CCTF is working towards releasing a new 5-year action plan for accelerating decarbonization in New Mexico. To support this effort, RMI has developed the New Mexico Energy Policy Simulator to analyze climate policy options available to the state. RMI also facilitated several workshops in summer 2021 to support the state in developing updated emissions reduction strategies.

In total, the CCTF and agency staff on Climate Action Teams (CAT) identified new strategies that, if implemented, could drive New Mexico closer to its goal of reducing emissions by 45% from 2005 by 2030. The most impactful incremental strategies are oil and gas industry fuel decarbonization and the accelerated impact of rules helping to mitigate oil and gas fugitive methane.

Other highly impactful strategies include the building out additional and accelerated wind and solar capacity to exceed current renewable electricity standard deployment, an enhanced transportation policy suite (addition of a Low Carbon Fuel Standard with further deployment of zero emission vehicles and vehicle miles traveled reduction), and electrification of space and water heating in existing buildings.

These strategies totaled an additional 17 million metric tons of carbon dioxide equivalent (MMT CO_2e) above the previous suite of proposed strategies (shown in Figure ES-1 as the Spring 2021 and Fall 2021 Proposed Policy scenarios).

Figure ES-1: *New Mexico GHG emissions (including land use) by scenario projected by the New Mexico EPS*



Source: New Mexico Energy Policy Simulator by RMI and Energy Innovation

During the course of the modeling and facilitation activities, RMI identified four key process recommendations for the CCTF to consider incorporating in its structure and processes:

(1) **Clarify the roles and responsibilities of the Climate Action Teams.** Agency staff serving on CATs are motivated to support New Mexico's clean energy transition but need additional support, starting with clarified roles and authority that empowers them to implement emissions reduction strategies identified during this process.
(2) **Develop sector-level decarbonization targets.** Sector-level targets help clarify the goal for teams that are focused on individual sectors and identify which sectors need to move faster than others to achieve the state's economywide goal.
(3) **Separate planning processes for the electricity sector and buildings.** The strategies needed to decarbonize these two sectors are very distinct and would benefit independent attention in New Mexico's planning process.
(4) **Fund a Grants Specialist to support access to forthcoming federal investments.** Accessing federal investment funds triggered by recent and future legislation presents a historic opportunity for New Mexico to upgrade its infrastructure in a climate-aligned way. Tapping the full potential of these funds in a coordinated way across state government will be a full-time job.

1 Introduction

In 2019, Governor Lujan Grisham of New Mexico signed Executive Order 2019-003 on Addressing Climate Change and Energy Waste Prevention. As part of EO 2019-003, Gov. Lujan Grisham established a goal of reducing New Mexico's economywide emissions by 45% by 2030 from a 2005 baseline.

Since 2018, the state of New Mexico has acted across all major sectors of the economy to build momentum for decarbonization. The administration knows there is much work left to be done and in EO 2019-003 also established an interagency Climate Change Task Force (CCTF) to drive continual progress towards New Mexico's ambitious goal. As part of its work in 2021 and early 2022, the CCTF is working towards releasing a new 5-year action plan for accelerating decarbonization in New Mexico.

To support the development of the 5-year action plan, CCTF (with support from the US Climate Alliance) engaged RMI to provide analysis and facilitation support. Since April 2021, RMI has worked closely with the CCTF and its nine smaller, interagency Climate Action Teams (CAT) to:

(1) Develop the New Mexico Energy Policy Simulator (NM EPS), which allows the state to analyze energy policy options and their impacts on emissions, the economy, and public health.

(2) Develop multiple policy scenarios within the NM EPS to estimate progress towards New Mexico's 45% emission reduction goal by 2030 based on policy that is currently in place as well as policies that are under development or proposed.

(3) Deliver three facilitated workshops with CCTF and CAT participants to evaluate and update the state's climate action goals. The findings of the workshop have been shared on multiple occasions with the CCTF leadership, CAT members, and the staff of Governor Lujan Grisham

Through this engagement, the CCTF has developed a new slate of climate action goals that deliver an additional 17 million metric tons of carbon dioxide equivalent (MMT CO_2e). Though there is much work to be done, these new goals represent significant progress towards identifying a comprehensive roadmap for New Mexico to meet its goal of reducing emissions by 45% by 2030 from 2005 levels.

This report comprises a summary of the work that RMI delivered over the course of this engagement, including some recommendations for the CCTF's consideration.

2 Energy Policy Simulator Modeling

2.1 About the EPS

The Energy Policy Simulator (EPS) is a is a free, non-partisan, open-source computer model that can estimate the impacts of climate and energy policies on emissions, cash flows, technology deployment, health impacts, and job creation. The EPS model is used as a screening tool for a variety of purposes, including by policymakers to explore climate policy options in the context of current policy and projected emissions. For example, the EPS model was used to assess the impact of climate policies for the U.S. House Select Committee on the Climate Crisis.[1] EPS users input climate policies and the model then analyzes interacting policy impacts to forecast environmental and economic outcomes. The model generates a variety of data outputs including greenhouse gas (GHG) emissions, criteria pollutant emissions, capital and operating cash flow changes, and macroeconomic changes to GDP and jobs.

The core of EPS modeling is a simplified version of the energy system modeling approach used in "pathways" modeling exercises such as the Deep Decarbonization Pathways Project.[2,3] This approach divides the energy system into key energy demand sectors and simulates transformation of the energy system over several decades. It follows the Intergovernmental Panel on Climate Change conventions for emissions reporting for states or nations, adding up direct emissions within jurisdiction boundaries, as well as imported electricity emissions where state greenhouse gas accounting includes imported emissions. This approach is known as "production emissions" accounting. The EPS does not include "consumption emissions" resulting from goods and services, including fuels and energy infrastructure, imported from outside the boundary, with the exception of electricity as noted above.

2.2 Scenario Design

Scenario analysis in the EPS starts with downscaled national projections and state-specific data when available, to develop a Business as Usual Scenario (BAU). The BAU Scenario includes projections of key determinants of energy demand by sector; electricity and other energy production; and non-energy emissions.

The BAU Scenario in the New Mexico EPS also includes "bankable" climate policies that were implemented as of 2018. The EPS model uses the BAU Scenario as the starting point from which to estimate impacts of policies. Users choose one or more policies which taken together form scenarios in the model. In New Mexico, RMI designed several scenarios to capture the progress New Mexico has made towards its decarbonization goals already as well as estimate the impacts of policies and goals that are under consideration by the New Mexico Climate Change Task Force. The BAU Scenario is described in greater detail in Section 2.3.

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[1] Hal Harvey, "Hal Harvey's Insights And Updates: Congressional Climate Plan Is A Bet Your Country Moment," Energy Innovation, 2020, https://energyinnovation.org/2020/07/28/hal-harveys-insights-and-updates-congressional-climate-plan-is-a-bet-your-country-moment/.

[2] For more information on Deep Decarbonization Pathways Project, see https://www.iddri.org/en/project/deep-decarbonization-pathways-project.

[3] A brief summary of methodology, data sources, and limitations is available at https://energyinnovation.org/wp-content/uploads/2021/02/Methodology-and-Data-Sources-for-the-Energy-Policy-Simulator.pdf.

2.2.1 Scenario Summary

This section summarizes RMI's approach to defining policy scenarios in the EPS. This approach is a result of RMI's detailed review of previous reports, studies, and climate action plans provided by the state Climate Change Task Force (CCTF) as well as ongoing discussions with members of the task force.

There are four economy-wide scenarios developed in consultation with the CCTF described below. In addition, there is an example downscaled US Nationally Determined Contribution scenario included with state EPS models (see Section 0).

1. **2018 Business As Usual Scenario: This scenario captures where the state was in 2018**. This scenario represents existing state and federal policies as of 2018, not including federal policies whose implementation was delayed under the Trump Administration. Note that the base year of the EPS model is 2020. The BAU Scenario is an estimate of what 2020 emissions would have been if not additional climate policy was implemented in New Mexico.
2. **Spring 2021 Current Policy Scenario**: **This scenario reflects "bankable" actions that have taken place since 2018**. Bankable climate policies are currently in place, legally enforceable, and their emissions impacts are quantifiable using rigorous, well-established methods. Planned power plant retirements, standards, and established regulations are typically included. Non-binding goals, pending rulemakings, utility resource plans, and some types of funding that are difficult to quantify in terms of emissions impact are typically not included.

   This scenario includes all new legislation, newly announced generating plant retirements, enforceable commitments, and regulations that are already in place, focusing on incremental state legislation. It does not include measures that are pending, under consideration, or have unknown impact.
3. **Spring 2021 Proposed Policy Scenario**: **This reflects the Current Policy Scenario plus any policies that have been proposed in previous climate action plans or other processes.** This can also be considered a *projected* policy scenario: it includes optimistically extrapolated current policies of unknown impact. It also includes some additional federal policies expected to be fully reinstated under the Biden Administration.
4. **Fall 2021 Proposed Policy Scenario: This scenario reflects the Spring 2021 Proposed Policy Scenario with additions based on July 2021 planning workshops** held with the New Mexico Climate Action Teams.

Table 1 below summarizes the major policies modeled in each scenario available in the New Mexico EPS.

***Table 1: Scenario Design**. This table summarizes major policies and actions modeled in the New Mexico EPS by scenario. Only measures incremental to the previous scenario are shown in each column, so each scenario builds on the ones before it. For full scenario implementation details, see Table 12 in Appendix.*

Sector	2018 BAU	Spring 2021 Current Policy	Spring 2021 Proposed Policy	Fall 2021 Proposed Policy
Buildings	• EIA projected energy efficiency including federal efficiency programs	• 2019 Updated utility energy efficiency targets • 2018 IECC building code for retrofits and new construction* • Low-income weatherization programs • Efficient lighting sales by 2030* • Sustainable building tax credit	*None (i.e. all major proposed policies are already in place, so they fall in the Current Policy scenario)*	• All-electric new building code by 2030 • Electrification of space and water heating in existing buildings, covering new sales by 2030 • Building performance standard targeting 33% reduction in fossil gas consumption by 2030 relative to 2005*
Transportation	• Federal fuel economy standards (Trump Admin rule) • Conventional ethanol blend in gasoline • Economic EV adoption	• Government procurement of ZEVs* • EV charging investments: local and federal programs	• Enhanced federal fuel economy standards (California compromise rule) • LDV ZEV Standards following CA Advanced Clean Cars rule • 15% LDV VMT reduction from 2015 levels by 2027 via land use & transportation portfolio, rising to 20% by 2030[4] • Greatly expanded EV charging investments	• LDV ZEV standards following anticipated CA Advanced Clean Cars II rule (100% sales by 2035) • 20% fuel carbon intensity reduction by 2030 • HDV ZEV standards following CA Advanced Clean Trucks rule (100% truck & bus sales by 2045) • 5% H_2 HDV sales by 2030, fueled with green H_2 • VMT reduction reaches 20% below BAU as an extrapolation from the 15% below 2015 by 2027 goal in Spring 2021 Proposed Policy Scenario

[4] State of New Mexico, "New Mexico Climate Strategy: Initial Recommendations and Status Update", 2019. https://www.climateaction.nm.gov/wp-content/uploads/2021/07/NMClimateChange_2019.pdf

Sector	2018 BAU	Spring 2021 Current Policy	Spring 2021 Proposed Policy	Fall 2021 Proposed Policy
Industry	• Calibrated to E3 for the start year (2020) for both combustion and non-combustion emissions • Combustion and energy production projections using growth trajectory from AEO	• Waste rule that reduces oil & gas flaring: up to 98% gas capture by 2026 (EMNRD portion)	• Federal fluorinated gas phase-out rule • Ozone precursor rules limiting fugitive CH_4: 60% reduced intensity by 2030 (NMED portion) • Oil & gas fuel efficiency according to federal NSPS and off-road diesel efficiency	• Accelerated implementation of oil & gas CH_4 rules achieve 40% reduction in operational intensity below 2018 by 2025 and 70% by 2028 • Remediation of abandoned infrastructure • Oil and gas industry fuel decarbonization standard of 50% lower CO_2 intensity by 2030.
Electricity	• 20% RPS by 2020 • Coal plant retirements: Four Corners on schedule in 2031; Escalante *not retired*	• Coal plant retirements: Escalante retired in 2020, San Juan in 2022 • SB 489 RPS trajectory: 50% by 2030 & 80% by 2040 • Solar + storage capacity to replace San Juan • SB 29 Rooftop solar tax credit	• Coal plant retirements: *retire Four Corners 1 year early in 2030 for bookkeeping*[5] • HB 233 Grid modernization roadmap: additional DR, storage • HB 50 Additional transmission	• Enable 80% clean energy in 2030 and 100% in 2040 through more rapid deployment of renewables and storage • Inform utility regulation changes allowing increased DER penetration
Agriculture & Land			• Reforestation, wildfire prevention, and forest management plans* • HB 204 Healthy Soil Program*[6]	• Additional land management practices to enhance carbon sequestration*

* These measures are not expected to be binding or are subsumed by other measures within the EPS analysis, so they are not modeled individually.

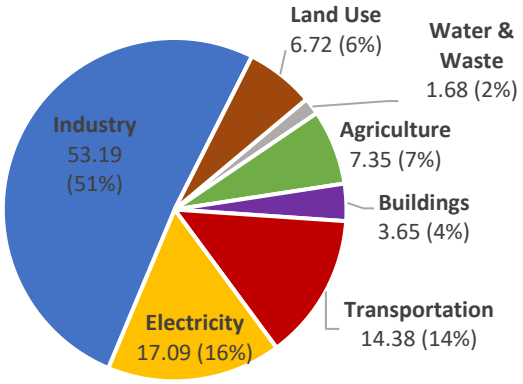
[5] Four Corners is not under state jurisdiction, so this is included for model bookkeeping to remove impact on evaluating the gap to the 2030 target.

[6] The EPS includes placeholder agriculture and land measures suitable for national analysis but not tailored to New Mexico's natural and working lands. The measures are included for convenience but not used as the basis for analysis by the Natural and Working Lands Climate Action Team.

2.3 2018 Business as Usual Scenario

RMI developed the BAU Scenario in close consultation with the New Mexico CCTF leadership team. In addition to downscaling standard national data sources to New Mexico (Section 0), we included direct benchmarking and some direct inputs from the recent state inventory and projections by Energy + Environmental Economics (E3) for the Center for the New Energy Economy at Colorado State University (CNEE): "New Mexico Greenhouse Gas Emissions Inventory and Forecast, 2020 (NM 2018 Inventory and Forecast)".[7]

Figure 1: *2020 GHG Emissions by Sector (including land use)*

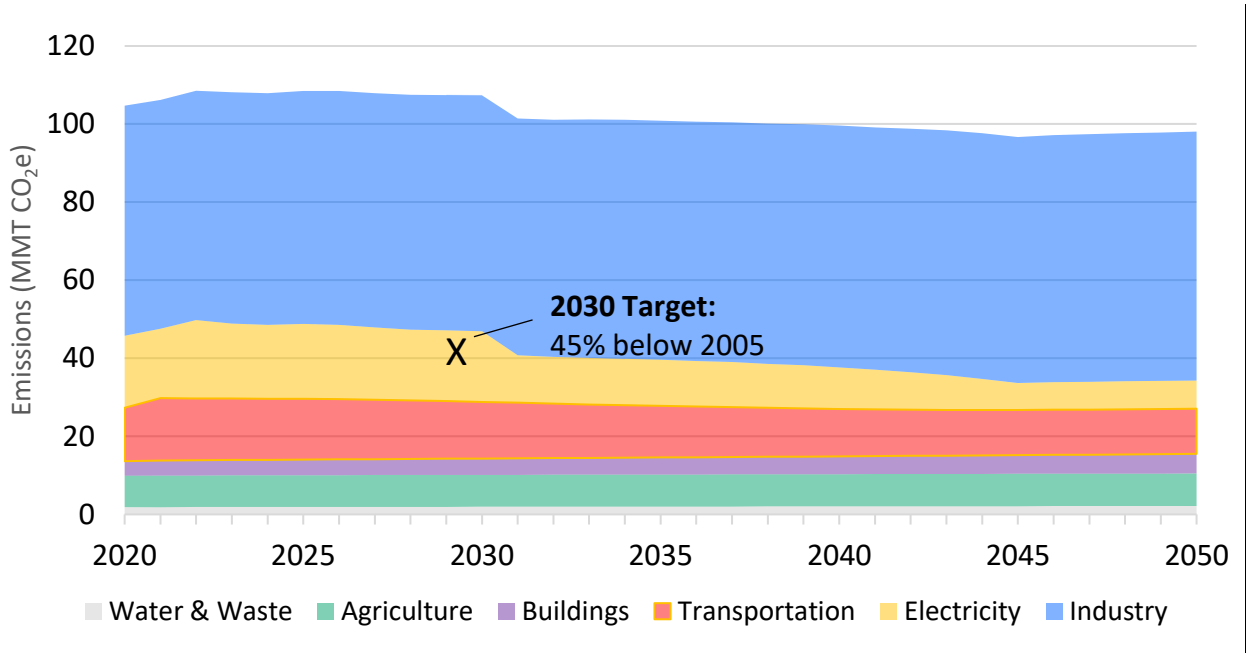


The BAU is chosen to represent pre-existing trends and state and federal policies present in 2018. This allows us to isolate the impacts of recent state policies since 2018. It would be different from, but comparable to, the NM 2018 Inventory and Forecast "Baseline" scenario. Starting year 2020 emissions were aligned with the NM 2018 Inventory and Forecast 2020 emissions, with small differences due to electricity sector scope (i.e., inclusion of Four Corners in the EPS), inclusion of a COVID-19 reduction in economic activity, and other differences in model implementation (see Appendix for more information).

One departure from the NM 2018 Inventory and Forecast was treatment of the oil and gas combustion CO_2 emissions trajectory. To be conservative and in consultation with the CCTF leadership team, projected growth was aligned with the downscaled national projection from the Annual Energy Outlook, resulting in a modest growth in oil and gas combustion CO_2 in the BAU, rather than using the aggressive reductions projected from the Western Regional Air Partnership analysis (See Appendix for more information).

[7] CNEE and E3, *New Mexico Greenhouse Gas Emissions Inventory and Forecast*, 2020. https://cnee.colostate.edu/wp-content/uploads/2021/01/New-Mexico-GHG-Inventory-and-Forecast-Report_2020-10-27_final.pdf

Figure 2: *New Mexico greenhouse gas emissions (including land use) by sector projected by the New Mexico Energy Policy Simulator in the 2018 Business as Usual scenario.*

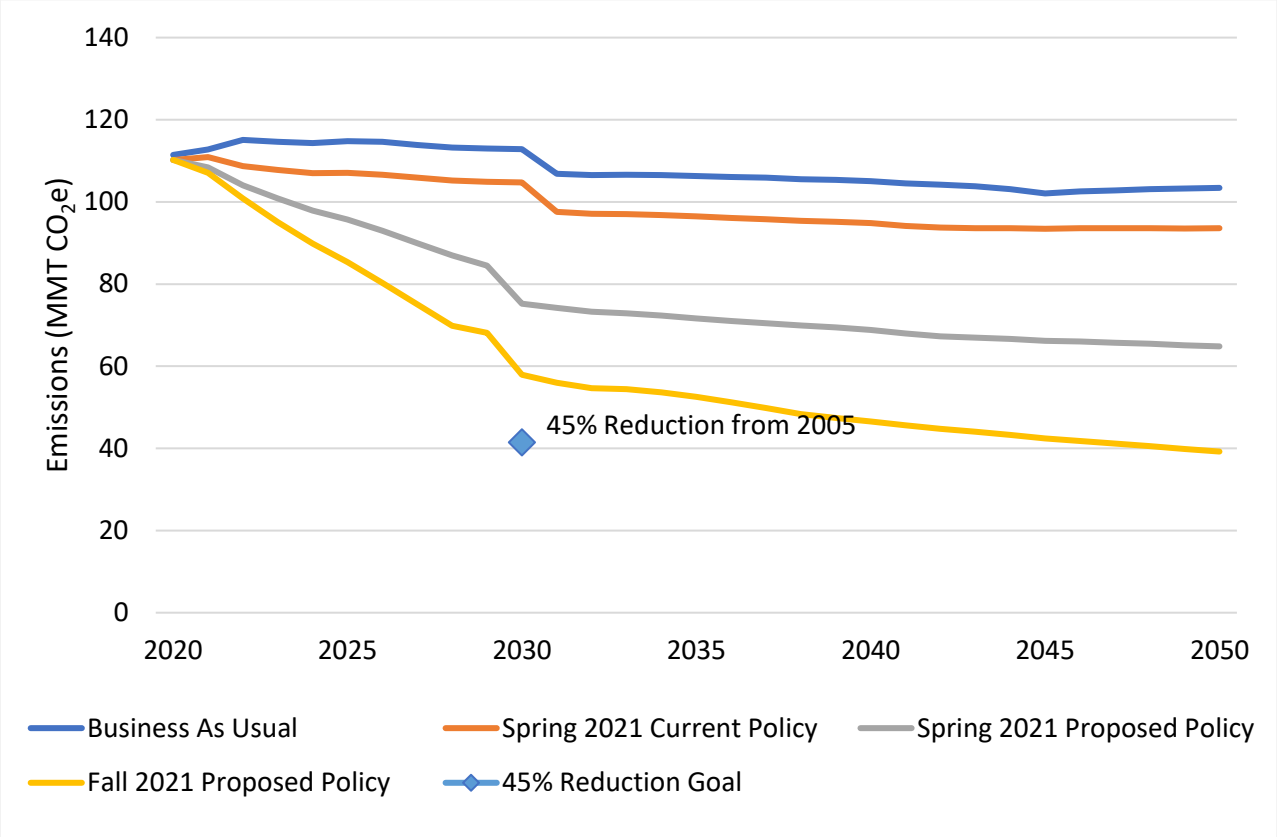


Source: New Mexico Energy Policy Simulator by RMI and Energy Innovation

2.4 Policy Scenarios

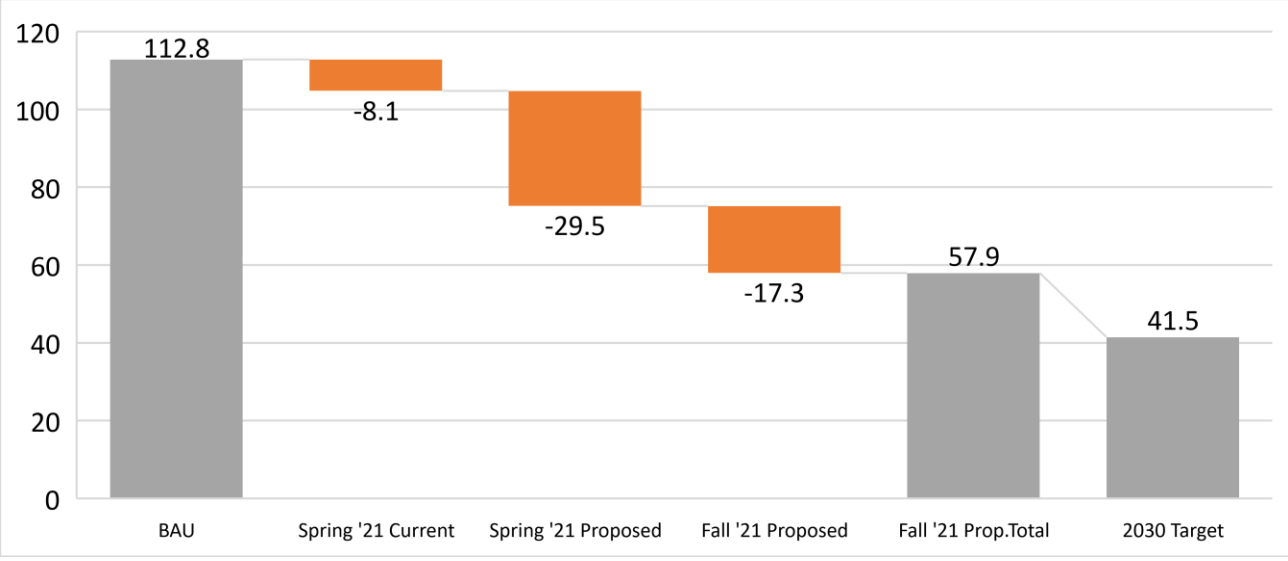
Economywide emissions in the three policy scenarios are shown in Figure 3. Each scenario builds on the one before it and reaches closer to the 2030 economywide target (Figure 3). Assuming that the most ambitious combination of proposed state climate action goals is achieved, we project that would lead to a 45% reduction from BAU in 2030, or 58 MMT. About 16 MMT additional reductions would be needed to meet the state's goal of 45% below 2005 emissions. We also project that achieving these state climate action goals would lead to net job increases, and that annual health and climate benefits would exceed 100 avoided premature deaths and $4 billion by 2030.

Figure 3: *New Mexico GHG emissions (including land use) by scenario projected by the New Mexico EPS*



Source: New Mexico Energy Policy Simulator by RMI and Energy Innovation

Figure 4: *New Mexico GHG emissions (including land use) in 2030 projected by the New Mexico EPS*



Source: New Mexico Energy Policy Simulator by RMI and Energy Innovation

Special Note Regarding Four Corners Power Plant

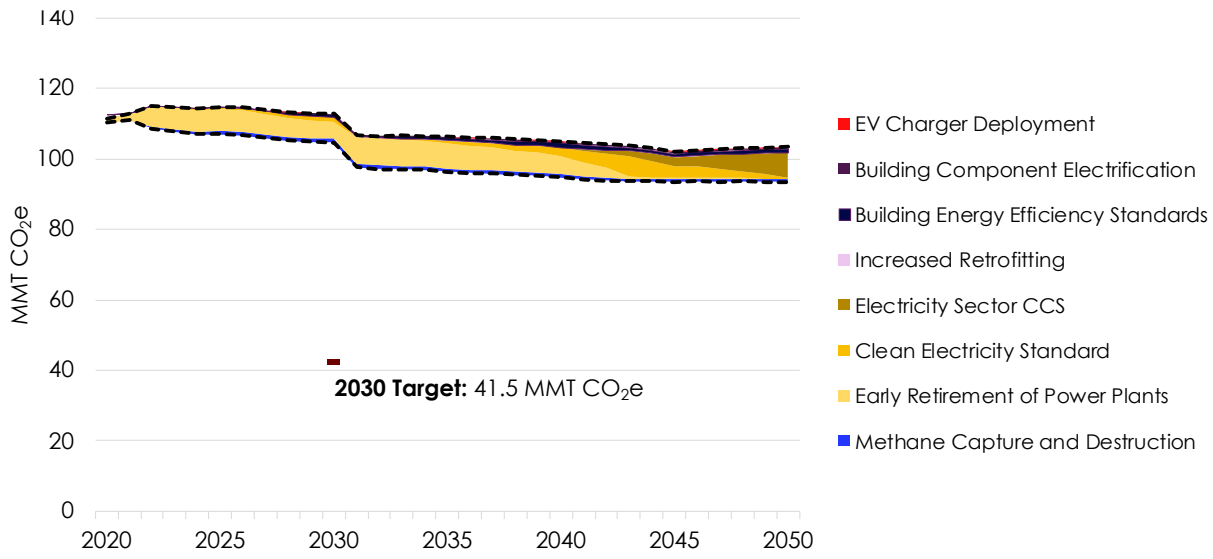
The New Mexico EPS includes generation and emissions from the Four Corners Power Plant because RMI and Energy Innovation wanted to maintain consistency across EPS models in other states, which in some cases include generation sources that are located on tribal lands, even though they are not under the jurisdiction of the state.

To balance our desire for consistency and New Mexico's modeling needs, we separated Four Corners into its own category of generation type so that it can be easily distinguished by model users. Additionally, in scenarios modeling New Mexico's current and proposed policies, we intentionally retire Four Corners one year earlier (in 2030 instead of its currently scheduled retirement in 2031) so that emissions from the plant do not impact New Mexico's projected emissions in 2030, which has been the focus of New Mexico's efforts and our modeling due to the state's 2030 decarbonization goal.

2.4.1 Spring 2021 Current Policy

The Spring 2021 Current Policy scenario incorporates bankable actions taken since 2018 (see Section 2.2.1 for a definition of "bankable actions"). It is distinct from, but comparable to, the NM 2018 Inventory and Forecast Reference Scenario. Based on the EPS analysis, the most impactful GHG reduction measures are the 2020 Escalante and anticipated 2022 San Juan coal plant retirements, along with the renewable energy standard contained in the Energy Transition Act (Senate Bill 489).

Figure 5: *Greenhouse gas "policy wedge" estimated by the New Mexico Energy Policy Simulator for the Spring 2021 Current Policy Scenario (including land use).*



Notes: *Building energy efficiency programs and the Sustainable Building Tax Credit are included in "Building Component Electrification" and "Building Energy Efficiency Standards." "Electricity Sector CCS" is a placeholder for eliminating remaining unabated electricity natural gas combustion as per the New Mexico Energy Transition Act.*

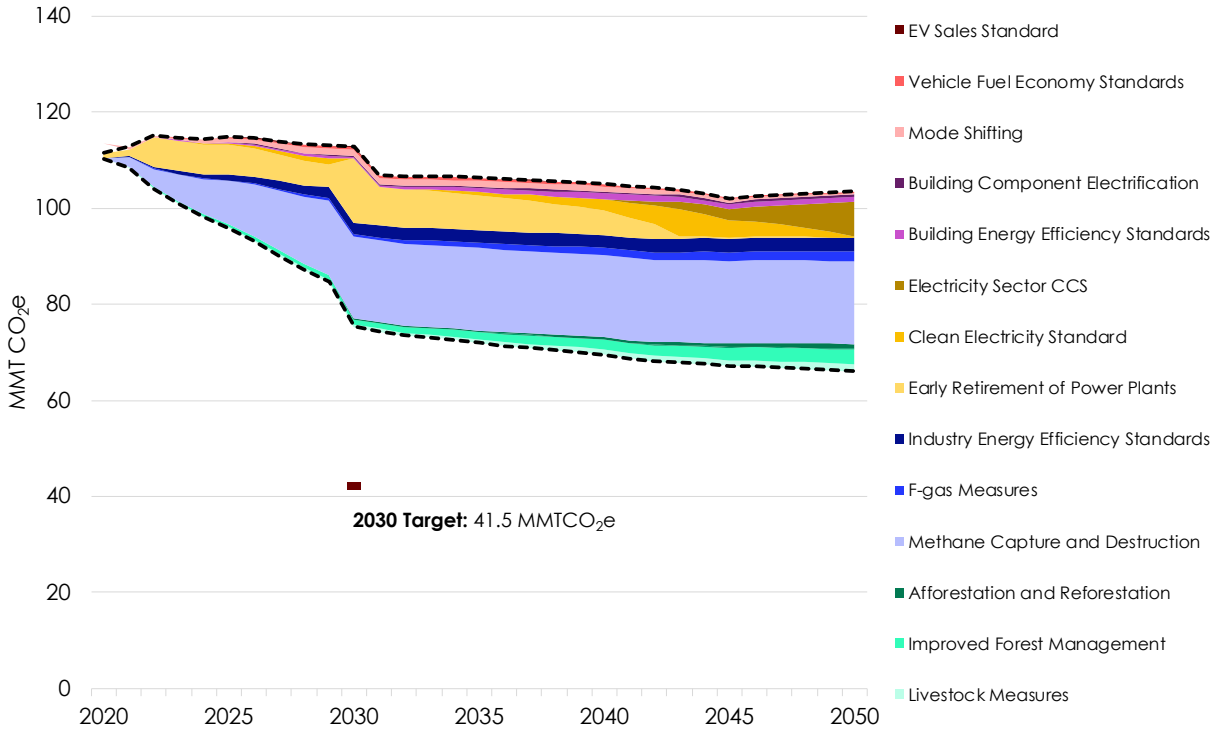
Source: *New Mexico Energy Policy Simulator by RMI and Energy Innovation*

2.4.2 Spring 2021 Proposed Policy

The Spring 2021 Proposed Policy Scenario includes additional proposed or projected policies from Governor Lujan Grisham's executive order, previous climate action plans, legislation, and regulations. Unlike the Spring 2021 Current Policy, which only includes policies with known bankable actions and their estimated impact, the Spring 2021 Proposed Policy Scenario extrapolates policies that are not yet in place. RMI estimated the maximum *potential* magnitude of proposed policies to illustrate a "best case scenario" and place a lower bound on the remaining emissions gap for achieving New Mexico's 2030 economywide target. Even if all proposed policies are implemented, real-world emissions reductions will vary based on a number of factors that are difficult to predict and may be lower than estimates in this scenario.

Based on the EPS analysis, the most impactful incremental policy is complete implementation of rules to mitigate fugitive methane from oil and gas production. Other key policies include measures to electrify light-duty vehicles while reducing vehicle miles traveled, and anticipated impacts of federal regulations to improve vehicle fuel efficiency, phase out fluorinated gases, and reduce energy consumption in the oil and gas sector.

Figure 6: *Greenhouse gas "policy wedge" estimated by the New Mexico Energy Policy Simulator for the Spring 2021 Proposed Policy Scenario (Including Land Use).*



Notes: *Building energy efficiency programs and the Sustainable Building Tax Credit are included in "Building Component Electrification" and "Building Energy Efficiency Standards." "Electricity Sector CCS" is a placeholder for eliminating remaining unabated electricity natural gas combustion as per the New Mexico Energy Transition Act. "Afforestation and Reforestation," "Improved Forest Management," and "Livestock Measures" are a placeholder for New Mexico's natural and working land policy suite. "Mode*

Shifting" refers to shifting transportation activity to lower-carbon modes from light-duty vehicles, including buses, trains, bicylces, and walking.

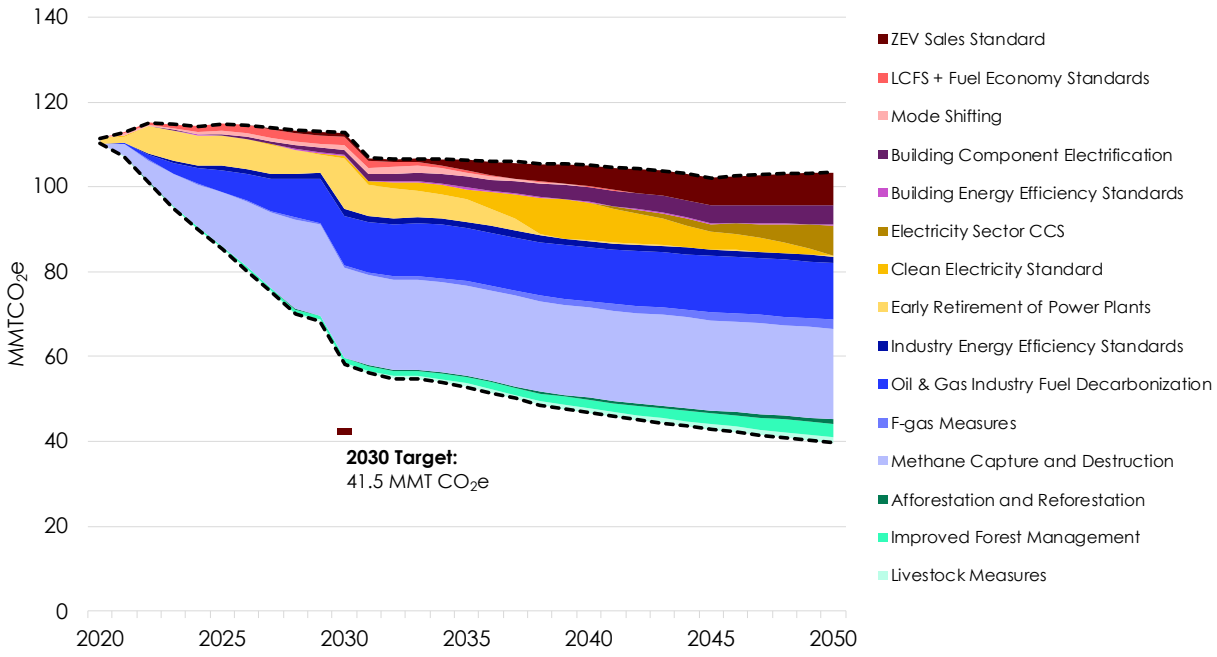
Source: New Mexico Energy Policy Simulator by RMI and Energy Innovation

2.4.3 Fall 2021 Proposed Policy

RMI conducted a series of workshops (see Section 3) with Climate Action Teams (CATs) and identified ways to strengthen CAT goals and extend the anticipated GHG reductions in the Spring 2021 Proposed Policy Scenario. RMI estimated the potential of these strengthened goals by applying additional measures to the EPS. This exercise should be considered exploratory, and in some cases the measures investigated here may differ from final adopted CAT goals.

The Fall 2021 Proposed Policy Scenario substantially narrows the gap to New Mexico's 2030 goal from about 34 million metric tons CO_2e (MMT CO_2e) to about 17 MMT. Based on the EPS analysis, the most impactful incremental measures are oil and gas industry fuel decarbonization and the accelerated impact of rules helping to mitigate oil and gas fugitive methane. Other highly impactful measures include additional wind and solar capacity buildout accelerated renewable electricity standard, an enhanced transportation policy suite (addition of a Low Carbon Fuel Standard with further deployment of zero emission vehicles and vehicle miles traveled reduction), and electrification of space and water heating in existing buildings. Note that additional renewable energy capacity is modeled in the EPS as a Clean Electricity Standard (see **Table 12** for more details).

Figure 7: *Greenhouse gas "policy wedge" estimated by the New Mexico Energy Policy Simulator for the Fall 2021 Proposed Policy Scenario (Including Land Use).*



Notes: *"Electricity Sector CCS" is a placeholder for eliminating remaining unabated electricity natural gas combustion as per the New Mexico Energy Transition Act. "Afforestation and Reforestation," "Cropland and Rice Measures," "Improved Forest Management," and "Livestock Measures" are a placeholder for*

New Mexico's natural and working land policy suite. "ZEV Sales Standard" combines modeled EV sales standard and hydrogen vehicle sales standard. "Oil & Gas Industry Fuel Decarbonization" is modeled as refining CCS and electrification of oil and gas extraction, but could represent any combination of CCS, electrification, decarbonized hydrogen, or biofuels.

Source: New Mexico Energy Policy Simulator by RMI and Energy Innovation

2.5 Carbon Pricing

2.5.1 Role of Carbon Pricing in Economywide Decarbonization

Carbon pricing (which include a variety of market mechanisms, including cap and trade, cap and invest, or a carbon tax) offers the possibility of efficient, market-driven greenhouse gas emissions reduction. Such market mechanisms are generally more effective in mature, competitive industries with existing options for decarbonization and in non-consumer facing industries such as the electricity and industrial activity. Consumer-facing industries (such as transportation) are generally less responsive to price changes.

Policymakers may consider deploying carbon pricing as a complement to direct regulations, rather than a substitute. They may serve as a backstop policy and raise revenue to support investments that achieve additional mitigation, resilience, or equity benefits and offset increased costs for low-income households. Policymakers may also consider policy designs that ensure increasing mitigation over time, whether through a price increase schedule (in the case of a carbon tax) or a steadily decreasing cap on emissions (in the case of a cap and invest or cap and trade policy).

2.5.2 Carbon Pricing Sensitivity Analysis in the EPS

In addition to the BAU and three policy scenarios, we conducted sensitivity analysis in the EPS to explore the potency of carbon pricing as a means to achieve overlapping or additional GHG reductions by 2030. Note that the treatment of carbon pricing in the EPS is simplified (represented as a carbon tax) and may not include all real-world mechanisms by which a carbon price would act to reduce emissions, nor market barriers to doing so.

We modeled carbon pricing as a tax in the EPS, increasing linearly from 2022 to 2030 and reaching either \$50 per ton (metric ton CO_2e) or \$100 per ton. The carbon pricing was added incremental to either the Spring 2021 Current Policy or the Fall 2021 Proposed Policy scenarios. To highlight the distinct role of carbon pricing by sector, we added the pricing individually to buildings, transportation, industry, and electricity sectors.

The impact of the policy in industrial (e.g. oil and gas) and energy supply sectors was higher than consumer-facing energy demand sectors, even as a proportion of remaining sector emissions. In addition, pricing overlapped substantially with other proposed policies, showing much greater impact incremental to the Spring 2021 Current Policy scenario than the Fall 2021 Proposed Policy scenario. In particular, much of the emission reductions projected to result from carbon pricing are associated with earlier coal plant retirement in electricity, and mitigation of oil and gas methane in industry; these actions are estimated to be achievable at less than \$50 per ton (by input assumption in the case of oil and gas methane, based on International Energy Agency estimates). Table 2 shows the results of the sensitivity analysis in emissions, while Table 3 shows results as a percentage reduction in 2030 emissions.

Given the simplified treatment of carbon pricing in the model and in the design of this sensitivity analysis, more analysis is needed to inform the design of a carbon pricing mechanism in New Mexico.

Table 2: Incremental Greenhouse Gas Reductions Projected from Carbon Pricing in the New Mexico Energy Policy Simulator (MMT CO_2e in 2030)

	Incremental to Spring 2021 Current Policy		Incremental to Fall 2021 Proposed Policy	
Sector	$50 by 2030	$100 by 2030	$50 by 2030	$100 by 2030
Buildings	0.2	0.5	0.1	0.3
Transportation	0.3	0.7	0.1	0.3
Industry	22.6	23.4	1.7	2.3
Electricity	7.8	8.6	2.1	3.5
Total (excluding land use)	**31.0**	**33.3**	**4.2**	**6.6**

Table 3: Incremental Greenhouse Gas Reductions Projected from Carbon Pricing in the New Mexico Energy Policy Simulator (% Reduction in Sector Emissions in 2030)

	Incremental to Spring 2021 Current Policy		Incremental to Fall 2021 Proposed Policy	
Sector	$50 by 2030	$100 by 2030	$50 by 2030	$100 by 2030
Buildings	6%	14%	5%	12%
Transportation	2%	5%	1%	3%
Industry	33%	34%	5%	7%
Electricity	68%	75%	40%	66%
Total (excluding land use)	**31%**	**34%**	**8%**	**12%**

3 Summary Outputs of Planning Workshops

As part of our engagement with the CCTF, RMI conducted three planning workshops with state agency staff from the task force's Climate Action Teams (CAT). The first two workshops, held on July 21st and July 23rd 2021 focused exclusively on supporting sector specific CATs—Clean and Efficient Electricity and Buildings; Transportation Decarbonization; Industrial and Oil & Gas Emissions; and Natural and Working Lands—in developing updated emissions reduction strategies for their sectors.

The third workshop, held on July 28th, 2021, invited membership from cross-cutting CATs to provide feedback and coaching on sector-specific goals as well as look for overlaps between sector CATs and their cross-cutting work. The cross-cutting CATs that participated are State Leadership, Economic Transition, and Cultural Heritage.

Overall, the workshops were attended by a total of 78 members of New Mexico agencies. The primary output of the workshops are updated emissions reduction strategies established by CATs. Most teams entered the workshops with strategies developed in 2020 as a starting point. RMI staff facilitated discussion to evaluate pre-existing goals and determine if they needed to be updated or potentially retired. Our primary tool for evaluating goals was the SMART Goal Framework (see Table 4).

Table 4. SMART Goal Framework

S	•**Specific:** Is your goal narrow enough to define a clear action plan for achieving it?
M	•**Measurable:** What does progress and success look like? What quantitative measures can you use to track progress?
A	•**Actionable:** Do you have capacity and authority to accomplish this goal within a reasonable timeframe?
R	•**Relevant:** Does this goal align with New Mexico's long-term objectives and values around decarbonization and climate change?
T	•**Timebound:** Does the goal have clear timebound milestones to support completing it?

Once teams identified their core list of emissions reduction strategies, RMI staff facilitated a process to start breaking each strategy down into a number of characteristics:

- **Implementing Actions.** More granular actions that define key next steps towards executing the strategy.
- **Resource Needs.** This includes staff requirements, grant funding, or revenue streams.
- **Pathways for Success.** This includes whether the strategy requires legislation, regulation, technical assistance, private sector participation, or other key dependencies for success.
- key stakeholders.

The following subsections provide a high-level summary of the emissions reduction strategies identified in the workshops. This information reflects the strategies as of early September 2021. Because they are a work in progress, this may differ from the most up-to-date work from each CAT. More details are available in the PowerPoint decks developed by CATs to share details of each strategy. Additionally, we

include details on how strategies map to modeling decisions in the EPS in an accompanying Excel workbook. See Appendix A (*Other Relevant Files*) for more detail.

The summary tables below provide high-level guidance for each strategy. CCTF and RMI worked together to assign ratings.

- **Priority.** Assigned a rating of Low, Medium, or High based on multiple factors, including emissions and economic impact; equity alignment; the strategy's role as an enabler of decarbonization in other sectors; and ease of implementation relative to impact.
- **Emissions Impact.** Assigned a rating of Low, Medium, or High based on direct emissions reductions. Where possible, we modeled these emissions reductions in the EPS. Note that some strategies are also described as "Enabling Actions" because they do not directly reduce emissions, but enable decarbonization through other means (e.g. transmission capacity and storage enable decarbonization through renewable energy)
- **Economic Impact.** Assigned a rating of Low, Medium, or High based on estimates of economic impact from EPS and available literature about job creation potential of clean energy policies. Note that economic impacts are often highly dependent on policy design and investments made to develop a skilled workforce that can take jobs created by a policy. Bottom line—more study is needed to better estimate the economic impacts of different policies under consideration.
- **Equity Alignment.** Assigned a rating of Poor, Good, or Strong based on the potential to design the policy proposal in a way that could address historical inequities or protect against future inequities.
- **Modeled in EPS?** Assigned a value of Yes or No based on whether emissions impacts are modeled in the EPS. Additional detail is available in an accompanying Excel workbook.

3.1 Clean and Efficient Electricity and Buildings

For the purposes of the planning workshops, the Clean and Efficient Electricity and Buildings CAT divided into two breakout groups to focus separately electricity and buildings.

3.1.1 Electricity

The electricity sector in New Mexico, which comprises 16% of 2020 economywide emissions, already enjoys a substantive policy framework for decarbonization thanks to the Energy Transition Act, which ensures that electricity sector generation from investor-owned utilities will be 50% carbon neutral by 2030 and 100% by 2045. The strategies outlined in Table 5 highlight additional opportunities to decrease emissions more rapidly, reaching close to 80% carbon neutrality by 2030. The strategies also target improving regional coordination and connectivity, which can improve grid resilience and open up more capacity for renewables development in New Mexico.

Table 5: *Electricity Sector Emissions Reduction Strategies*

#	Emission Reduction Strategy	Priority	Emissions Impact	Economic Impact	Equity Alignment	Modeled in EPS?
1	Promote development of 6 GW of new renewables and 1 GW/8 GWh of storage by 2026, with a target of 11 GW of total renewables operating by 2030 (7 GW solar, 4 GW wind)	**HIGH**	High	Medium	Good	Yes

#	Emission Reduction Strategy	Priority	Emissions Impact	Economic Impact	Equity Alignment	Modeled in EPS?
2	Deploy 6 GW transmission capacity by 2030 to connect new renewables to export hubs	HIGH	Enabling Action	High	--	No
3	Inform state policy and PRC decision-making related to distributed energy resources (DERs) integration and distribution system upgrades	HIGH	Enabling Action	Medium	Good	Yes
4	Advocate for New Mexico's interests in western states' dialogue around regional electricity coordination	MEDIUM	Enabling Action	Low	Good	No
5	Enable universal clean electricity access for all New Mexicans by 2030	MEDIUM	Low	Medium	Strong	No

3.1.2 Buildings

The buildings sector represented roughly 3.5% of economywide emissions in 2020. RMI facilitators supported the Buildings breakout group in establishing clear emissions reduction strategies to support beneficial electrification of building equipment and energy efficiency improvements through building performance standard. Additionally, the group identified two goals related to building codes. A voluntary stretch code would allow municipalities move faster than the state at large in decarbonizing the buildings sector and establishing a schedule for code updates would create certainty for industry while also ensuring steady improvements in the energy and emissions performance of new construction.

Table 6: *Building Sector Emissions Reduction Strategies*

#	Emission Reduction Strategy	Priority	Emissions Impact	Economic Impact	Equity Alignment	Modeled in EPS?
1	Provide incentives and financing that lead to a third of total fossil fuel homes electrifying space and water heating by 2030 compared to a 2005 baseline	HIGH	High	Medium	Good	Yes
2	Develop and incentivize the adoption of an all-electric, net-zero-carbon stretch code that is adopted by municipalities representing 50% of new Mexico's population by 2025	MEDIUM	Enabling Action	Medium	Good	Yes
3	Establish a building performance standard by 2023 that drives a 33% reduction in commercial and multifamily gas consumption by 2030	HIGH	Medium	Medium	Good	Yes

#	Emission Reduction Strategy	Priority	Emissions Impact	Economic Impact	Equity Alignment	Modeled in EPS?
4	Establish regular energy code updates and progress toward adopting a state base code that requires all new buildings to be all-electric by 2030	MEDIUM	Low	Medium	Good	No
5	Establish legislation that ensures an equitable transition of the gas infrastructure system, with steps to begin in 2023, clear benchmarks to be achieved throughout, and a focus on avoiding spiraling costs for remaining consumers	MEDIUM	Enabling Action	Low	Strong	No
6	Establish legislation requiring 100% fuel switching of gas space and water heating systems at end-of-life by 2023	LOW	High	Medium	Poor	Yes

3.2 Transportation Decarbonization

Transportation emissions comprise just over 12 percent (13 percent when excluding emissions from Four Corners Power Plant) of New Mexico's economywide emissions in 2020. RMI facilitators and the Transportation CAT drew on EPS modeling to develop emissions reduction strategies that were consistent with reducing transportation emissions at the pace and scale needed for New Mexico to hit its economywide decarbonization targets. Specifically, RMI used EPS to develop appropriate estimates of needed vehicle stocks for zero-emission vehicles, penetration of DC Fast Chargers, and reductions in vehicle miles traveled (VMT). Additionally, RMI and the Transportation CAT discussed the need to develop alternative revenue streams for transportation funding to supplement projected declines in gas tax revenues.

Table 7: *Transportation Sector Emissions Reduction Strategies*

#	Emission Reduction Strategy	Priority	Emissions Impact	Economic Impact	Equity Alignment	Modeled in EPS?
1	Achieve 20% reduction in fuel carbon intensity (CI) by 2030 via a Clean Fuel Standard (CFS)	HIGH	Medium	High	Medium	Yes
2	Reach 500,000 (~25%) zero-emission light-duty vehicles on the road by 2030	HIGH	High	Low	Medium	Yes
3	Reach 15,000 (~25%) zero emission medium- and heavy-duty trucks and buses on the road by 2030	MEDIUM/HIGH	Low	Low	Medium	Yes
4	Reach 2,000 DC Fast Charger (DCFC) stations in New Mexico by 2030 across public and private sector investments	HIGH	Enabling Action	Medium	Good	Yes

#	Emission Reduction Strategy	Priority	Emissions Impact	Economic Impact	Equity Alignment	Modeled in EPS?
5	Reduce light-duty vehicle miles traveled by 20% by 2030	HIGH	Medium	Medium	Strong	Yes
6	Replace or complement the gas tax with an alternative mechanism for funding road maintenance and construction by 2026	HIGH	Enabling Action	Low	Low	No

3.3 Industrial and Oil & Gas Emissions

Industrial and oil & gas emissions account for a majority of New Mexico's emissions footprint – representing roughly 53% of economy-wide emissions in 2020. Emissions from oil and gas extraction represent the vast majority of this total. To that end, RMI facilitators supporting this CAT focused on identifying abatement strategies that would dramatically and rapidly lower the emissions profile of the sector. The group identified a set of strategies, including turning to performance standards to reduce the operational intensity of oil & gas production, accelerating carbon capture deployment, remediating abandoned infrastructure, and catalyzing regional hydrogen markets. The level of ambition reflects the overall importance of the sector to the state's climate goals.

Table 8: *Industrial and Oil & Gas Sector Emissions Reduction Strategies*

#	Emission Reduction Strategy	Priority	Emissions Impact	Economic Impact	Equity Alignment	Modeled in EPS?
1	Reduce the operational intensity of methane and carbon from oil & gas production by 60% from a 2020 baseline by 2025	LOW	High	Medium	--	Yes
2	Vision Zero – Remediate all existing abandoned infrastructure by 2030 (half by 2025)	HIGH	Medium	Medium	Strong	No
3	Achieve 50% reduction of Industrial/O&G CO2 by 2030 (based on 2018 inventory) through carbon capture	HIGH	High	High	Medium	Yes
4	Create one hydrogen hub in New Mexico by 2028	HIGH	Medium	Medium	Medium	No

3.4 Natural and Working Lands

The Natural and Working Lands (NWL) CAT came into the planning workshops with more clearly defined emissions reduction strategies, largely laid out in their *2020 New Mexico Forest Action Plan*.[8] The workshops served as an opportunity to work in a facilitated space to break strategies down into more concrete action plans. Note that in consultation with the NWL CAT, RMI did not model any NWL emissions reduction strategies in the EPS due to limitations in the baseline data available that would

[8] https://www.emnrd.nm.gov/sfd/wp-content/uploads/sites/4/NMFAP_2020_v1-1_2021_03_12b_web.pdf

allow for a rigorous assessment of strategies in New Mexico's unique climate. Additionally, the EPS is not suitable for modeling strategies such as wildfire reduction and ecosystem restoration.

Table 9: *Natural and Working Lands Emissions Reduction Strategies*

#	Emission Reduction Strategy	Priority	Emissions Impact	Economic Impact	Equity Alignment	Modeled in EPS?
1	Undertake landscape-scale wildfire reduction and mitigation in high risk and high priority areas in forests and watersheds throughout New Mexico	**HIGH**	High	Medium	Strong	No
2	Undertake prescribed burning on private land	**HIGH**	High	Medium	Strong	No
3	Incorporate landscape-scale restoration that supports native plant communities, carbon storage, and drought mitigation on natural and working lands	**HIGH**	High	High	Strong	No
4	Support implementation of healthy soil practices and other best practices to improve long-term resilience on agricultural working lands	**MEDIUM**	Medium	Low	Good	No
5	Identify and implement strategies for the collection and use of carbon sequestration and emission data from natural and working lands to inform improved land management practice outcomes and to contribute to the ability for NM landowners to contribute to 30x30 E.O. goals and participate in future carbon market opportunities.	**HIGH**	Enabling Action	High	Strong	No

3.5 Cross-cutting Climate Action Teams

In addition to the three core planning workshops, RMI and CCTF staff met in a shorter format with each of the cross-cutting CATs—State Leadership, Economic Transition, and Cultural Heritage. The objective of these meetings was to provide an overview of our philosophy around the development of emissions reduction strategies and offer some feedback on how to align their goals with sector CAT activities.

4 Recommendations to the CCTF

The planning workshops summarized in the previous section are the outcome of significant collaboration between the CATs and RMI to identify sector-specific goals, milestones, and actions that New Mexico can take to reduce emissions in every sector of its economy. But executing on each of these goals will be a long journey for the state, the CCTF, and your agency partners on the Climate Action Teams.

To that end, RMI has developed overarching recommendations for the CCTF to consider. These recommendations seek to identify opportunities to clarify the task force's mission or invest in the capacity of the Task Force and implementing agencies.

4.1 Clarify the roles and responsibilities of the Climate Action Teams

During our interactions with the Climate Action Teams, we met many highly motivated civil servants committed to doing everything they could to get New Mexico on track to meet its climate goals. To better support this team, RMI recommends revisiting the mission and scope of the CATs to better clarify their role and their authority to act.

4.2 Develop sector-level decarbonization targets

Throughout our engagement with individual CATs, we noted a lack of clarity around what each sector is responsible for delivering to meet New Mexico's climate goals. In short, many teams wanted to know what their "piece of the pie" is.

Sector-level targets are important for several reasons. First, they clarify the goal for teams that are focused on individual sectors. Some sectors need to go further and move faster than others. For example, the decarbonizing the electricity sector is critical to decarbonizing other sectors through clean electrification. Because of this critical dependency, most modeling exercises (at any geographic level) find that electricity needs to be 80% zero-emissions by 2030.

RMI recommends forming a study group that is comprised of at least one representative from each key implementing agency to develop sector-level targets. Working with a technical partner, use existing modeling and best practices from other states or geographies to identify sector-specific targets at multiple points in time (every 5-10 years)

4.3 Separate Buildings and Electricity CATs

While buildings and the electricity sectors are inextricably linked through electrification of buildings, the policies and strategies for decarbonizing buildings are very distinct from decarbonizing the electricity grid. To that end, RMI recommends separating these sectors into individual CATs to allow each team to focus on the distinct strategies.

4.4 Fund a Grants Specialist role to support access to forthcoming federal investments

The federal government is poised to make historic investments in infrastructure and climate change solutions through a variety of new and existing programs. RMI recommends dedicating a full-time employee, or a significant portion of someone's time, to act as a resource to agencies to maximize access to federal funding opportunities.

Appendix A: EPS Technical Documentation and Scenario Implementation

Estimating Economy-wide Emissions in the 2018 Business as Usual Scenario

The US State Energy Policy Simulators (EPS) account for emissions produced in the following sectors: electricity generation, building energy consumption, industrial energy consumption, industrial process emissions, agriculture process emissions, land use change, and transportation.

Our primary national data sources are federal data sets from the Environmental Protection Agency (EPA), Energy Information Administration (EIA), and the National Renewable Energy Lab (NREL). We supplemented with state data from the inventory and Pathways report by Center for the New Energy Economy at Colorado State University (CNEE) and Energy + Environmental Economics (E3) ("NM 2018 Inventory and Forecast").[9] In some sectors, additional external data sources were used indirectly to benchmark or calibrate the emissions, including Rhodium Group's ClimateDeck.[10] The table below summarizes our data sources and methodology. These data are used directly to develop the Business as Usual (BAU) Scenario. The BAU Scenario is the model's foundation, capturing projected changes based on economic growth, technology and cost changes, and existing policy commitments.

Table 10: *Data Sources*

Sector	Subsectors	Source	Methodology	Benchmarking Sources for Comparisons
Electricity	In-state capacity and generation; out of state imports	For capacity and generation: EIA's Form 923 and EIA's Form 860 For imports/exports: EIA's State Electricity Profiles Table 10.	Include all utility-owned generation and capacity in-state, including power plants on tribal land. No scaling needed. Assumes all planned retirements *as of 2018* are completed on time. (Escalante and San Juan are retired in the 2021 Current Policy Scenario.)	EPA "State CO2 Emissions from Fossil Fuel Combustion 1990-2018" EIA State Electricity Profile (2019) Rhodium Group ClimateDeck (2020)

[9] CNEE and E3, *New Mexico Greenhouse Gas Emissions Inventory and Forecast*, 2020. https://cnee.colostate.edu/wp-content/uploads/2021/01/New-Mexico-GHG-Inventory-and-Forecast-Report_2020-10-27_final.pdf

[10] https://rhg.com/data_story/climate-deck/

Sector	Subsectors	Source	Methodology	Benchmarking Sources for Comparisons
			Imports and exports from start year are held constant.	
Building Energy Use	All energy use, all building components, residential and commercial buildings	NM 2018 Inventory	Take fuel-level consumption data for commercial/residential buildings directly from NM 2018 Inventory. Proportion to demand technologies based on NREL Electrification Futures Study. Assumes some equipment performance improvements over time, based on market data (described here)[11]	EIA "State Energy Data System" (2020) "State CO2 Emissions from Fossil Fuel Combustion", EPA State Inventory Tool Rhodium Group ClimateDeck (2020)
Industrial Energy Use	All fuel use for industrial sector, including oil & gas extraction and refining	NM 2018 Inventory EIA Annual Energy Outlook Crude Oil Production (Table 58, Gulf Coast Petroleum Administration for Defense District [PADD]) EIA State Energy Data Systems, Natural Gas Consumed as Refinery Fuel	Take fuel-level consumption data from NM 2018 Inventory. Proportion to industrial sectors based on industrial output multiplied by energy intensity. For oil and gas production: oil production is first benchmarked to WESTAR-WRAP for 2018, and then interpolated to 2020 based on historic national crude production. Then 2021-2050 projected based on growth trajectory from AEO.	NREL Electrification Futures and EIA's "State Energy Data Systems" EPA "State CO2 Emissions from Fossil Fuel Combustion 1990-2018" Climate TRACE, including state-specific data[12], for oil & gas emissions

[11] Efficiency improvements are derived from NREL electrification futures study Reference Case.

[12] Frances Reuland (RMI), personal communication, Sep 2021

Sector	Subsectors	Source	Methodology	Benchmarking Sources for Comparisons
			Assumes equipment performance improvements over time (described here)	
Industrial Process Emissions	Process Emissions	NM 2018 Inventory	Take data directly from NM 2018 Inventory, no scaling needed. Does not include implementation of the Kigali Amendment to the Montreal Protocol.	Climate TRACE, including state-specific data[13], for oil & gas emissions
Agriculture, Land Use and Forestry	Livestock emissions Natural carbon sinks and sources (LULUCF)	EPA "State Inventory and Projection Tool"	No scaling needed. EPA reports LULUCF emissions by state.	EPA "State CO2 Emissions from Fossil Fuel Combustion 1990-2018"
Transportation	All energy use, vehicle miles	EIA's State Energy Data Systems from 2019 Energy Information Association's Annual Energy Outlook tables on Energy Use (2021) NREL Electrification Futures Study - Reference Scenario	Use vehicle stock by type forecasts from NREL. Estimate miles traveled by vehicle type using total energy consumption from SEDS, average miles traveled nationally by vehicle type, and national vehicle stock fuel efficiency. 2021 AEO includes 2020 updated Corporate Average Fuel Economy Standards (CAFE)	EPA "State CO2 Emissions from Fossil Fuel Combustion 1990-2018" Rhodium "Taking Stock 2021: US Emissions Outlook Under Current Policy"

[13] Ibid.

Sector	Subsectors	Source	Methodology	Benchmarking Sources for Comparisons
			Includes federal EV subsidies and economic adoption of EVs[14]	

[14] Electric vehicle adoption in the BAU case is based on economic adoption modeled in the EPS, with more details available here: https://us.energypolicy.solutions/docs/transportation-sector-main.html. EPS transportation data, such as vehicle prices, is largely taken from EIA.

Table 11: *Comparison of NM EPS BAU GHG Emissions in 2020 by Sector (Including Land Use) with NM 2018 Inventory Baseline scenario*

MMT CO2e	Sector	EPS BAU Emissions in 2020	E3 Baseline Total Emissions in 2020
Combustion Emissions	Buildings	3.7	4.0
	Electricity Generation	18.4	12.1
	Within Jurisdiction	*12.1*	*12.1*
	Four Corners	*6.3*	*-*
	Transportation	13.7	15.8
	Total Industrial (Combustion)	21.8	23.0
	Oil and Gas	21.1	20.8
	Other Industrial	0.6	2.2
Non-Combustion Emissions	Total Industrial (Non-Comb.)	37.2	33.2
	Oil and Gas	*33.4*	*32.6*
	Other Industrial	*3.8*	*3.6*
	Ag, Water, & Waste	9.9	9.5
	LULUCF	6.7	6.1
Total	**Total**	**111.5**	**106.6**

Notes: *This table compares 2020 emissions in the EPS BAU Scenario and the E3 Baseline Scenario from the modeling conducted by E3 to support the 2018 Inventory.*

The 2018 Inventory electricity emissions do not include Four Corners coal plant. The EPS includes a 3.5% COVID-19 GDP dip in 2020, while 2018 Inventory includes no COVID-19 effects. The EPS BAU does not include the 2020 Escalante coal plant retirement; this is included in the 2021 Current Policy scenario, reducing electricity emissions by 0.3 MMT CO_2e. Modeled coal dispatch in the EPS is slightly lower than observed in 2020, and natural gas dispatch slightly higher. EPS oil and gas emissions are slightly lower in 2020 but persist higher than 2018 Inventory Baseline after the sharp decline assumed in that scenario by 2023.

Figure 8: *Comparison of NM EPS BAU Electricity Generation by type in 2020 with the 2021 Annual Energy Outlook*

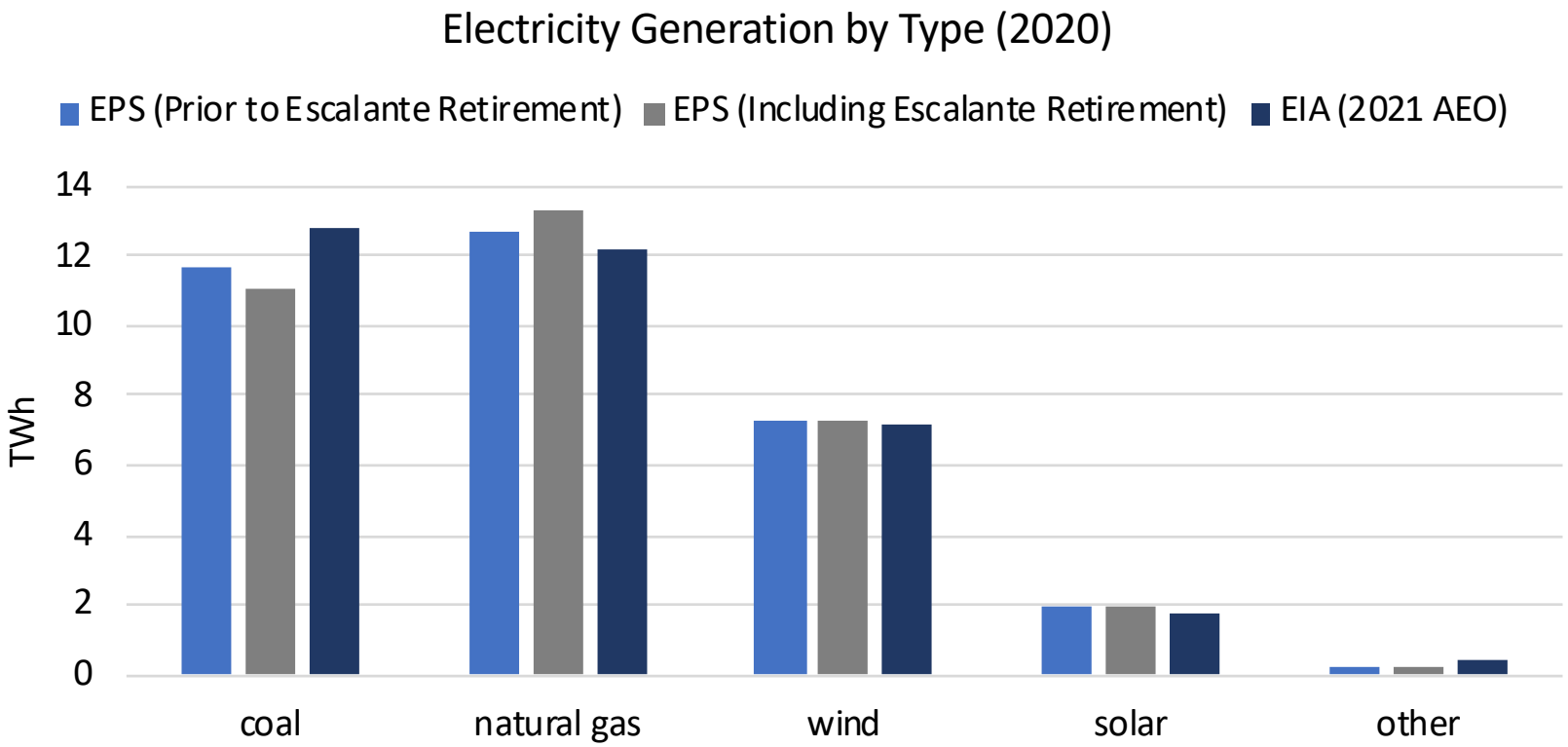
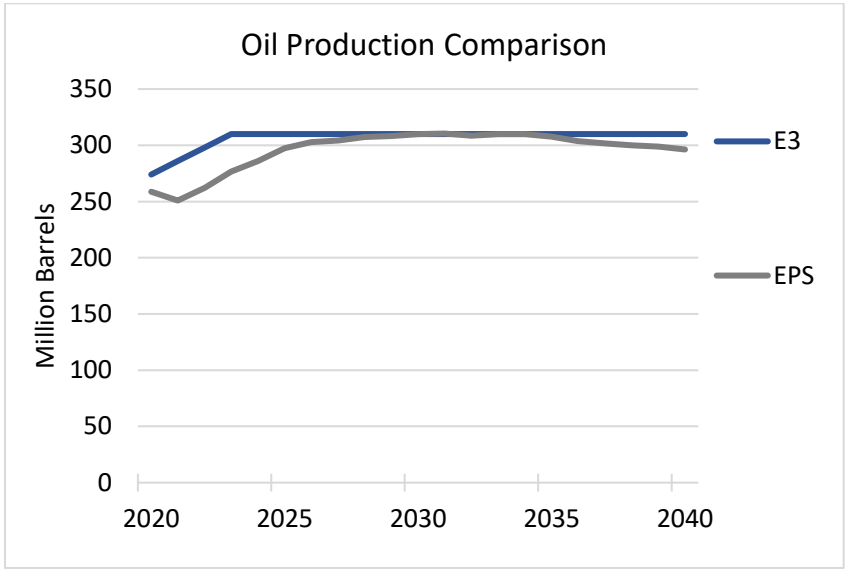
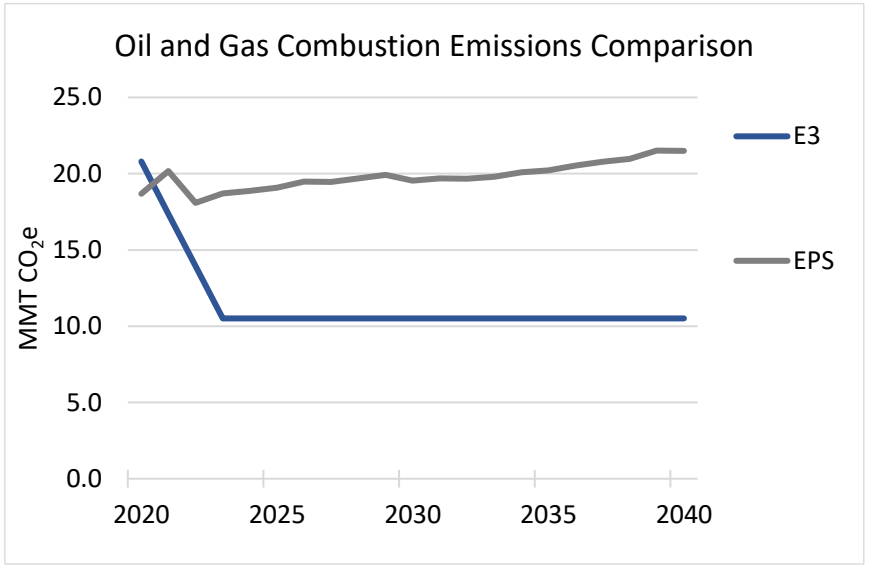
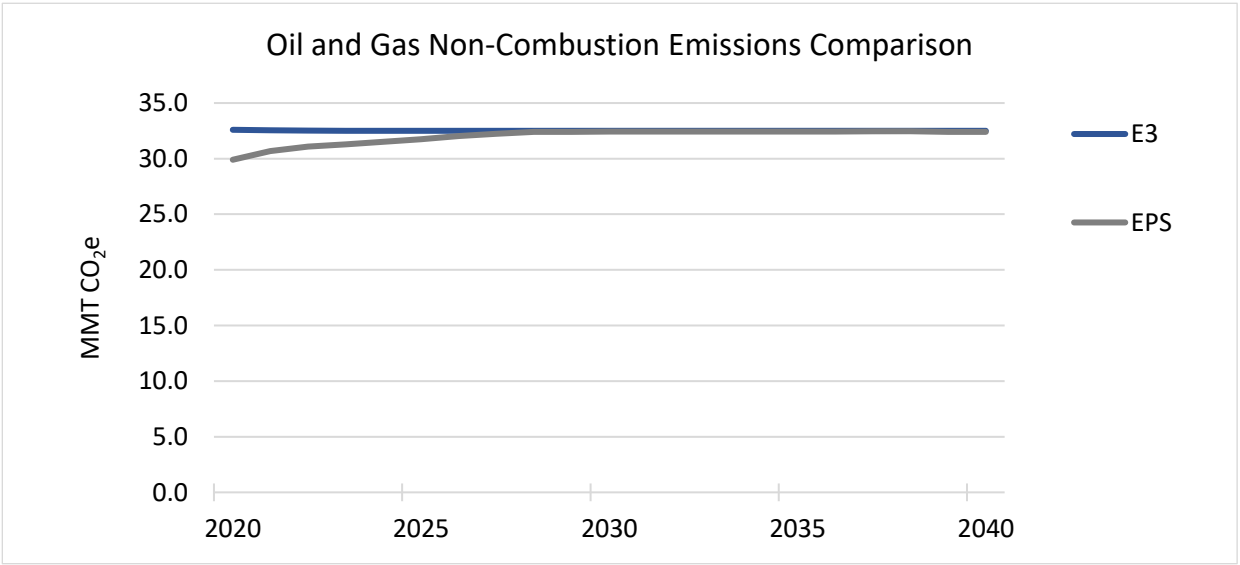


Figure 9: *Oil and Gas Emission and Production Comparison between EPS BAU and NM 2018 Inventory and Forecast: (a) Oil Production; (b) Oil and Gas Combustion Emissions; and (c) Oil and Gas Non-Combustion Emissions (additional discussion available in Section 2.3)*







Scenario Implementation Details

Table 12: *Scenario Implementation Details*

Sector	Strategy	Expressed as	BAU 2018	Spring 2021 Current Policy	Spring 2021 Proposed Policy	Fall 2021 Proposed Policy
Electricity	Coal retirements	MW retired	1540 MW in 2031 (Four Corners)	250 MW in 2020 (Escalante) + 850 MW in 2022 (San Juan) + 1540 MW in 2031 (Four Corners)	250 MW in 2020 (Escalante) + 850 MW in 2022 (San Juan) + 1540 MW in 2030 (Four Corners)	250 MW in 2020 (Escalante) + 850 MW in 2022 (San Juan) + 1540 MW in 2030 (Four Corners)
	Clean electricity	% Clean Energy Standard (CES)	20% by 2020	20% by 2020, 50% by 2030, 80% by 2040, and 100% by 2045[15]	20% by 2020, 50% by 2030, 80% by 2040, and 100% by 2045	20% by 2020, 80% by 2030, and 100% by 2040
	Renewable integration	Demand response (DR), storage, and transmission	*Downscaled projections from AEO*	4% of storage potential in 2022 (300 MW for San Juan replacement)	4% of storage potential in 2022 + 12% by 2030; 100% of DR potential by 2030; 10% increased transmission by 2040[16]	4% of storage potential in 2022 + 12% by 2030; 100% of DR potential by 2030; 10% increased transmission by 2040
	Distributed solar	Subsidy for distributed solar	None	10%	10%	Distributed solar increases to 5% of retail sales by 2030
Buildings	Energy efficiency	% energy reduction relative to BAU	--	15% by 2030[17]	15% by 2030	15% by 2030

[15] Displacement of remaining uncontrolled natural gas power used for occasional balancing and reliability is modelled as use of gas with CCS increasing to 100% by 2050. Solutions for the last 10% of clean electricity are uncertain and are not modelled in detail in the EPS.

[16] Assumed to account for grid modernization roadmap (HB 233) and increased transmission (via HB 50)

[17] Assumed to account for utility efficiency programs, efficient building code, and Sustainable Building Tax Credit

Sector	Strategy	Expressed as	BAU 2018	Spring 2021 Current Policy	Spring 2021 Proposed Policy	Fall 2021 Proposed Policy
Buildings (continued)	Energy efficiency	% of buildings retrofit	BAU building stock turnover	5% of buildings additionally retrofit by 2050[18]	5% of buildings additionally retrofit by 2050	5% of buildings additionally retrofit by 2050
	Building electrification	% electric fuel appliance switching sales[19]	--	10% by 2030[20]	10% by 2030	100% for space and water heating by 2030
Transportation	Fuel efficiency	Light duty vehicle (LDV) fuel economy	AEO 2021	Increased 15% by 2026 ("California Compromise")[21]	Increased 15% by 2026	Increased 15% by 2026
	Smart growth	% Passenger LDV vehicle miles travelled (VMT) reduction from BAU	--	None	20% by 2030[22]	20% by 2030
	Vehicle electrification	Number of new (DCFC) EV chargers	None	20 per 100,000 people by 2040[23]	140 per 100,000 by 2030[24]	140 per 100,000 by 2030

[18] Assumed to account for Sustainable Building Tax Credit: note this would be several-fold the historic uptake of low income weatherization programs.

[19] This is the percent of appliances which would have been fossil in BAU which are instead replaced by electric appliances, via natural replacement (at end of life) or new construction.

[20] Assumed to account for the Sustainable Building Tax Credit

[21] This represents 51 vs. 44 mpg for new cars.

[22] Extension of current state and regional planning and travel safety measures, specifically extrapolating the goal noted in the 2019 New Mexico Climate Strategy of 15% reduction below 2015 LDV VMT by 2027; reaching 20% would require a complete suite of land use and transportation policies.

[23] Although one-time public funding for charger installation in New Mexico from the Volkswagen Clean Air Act Civil Settlement is depleted, this is roughly in line with extrapolating the pace of installation projected in the 2020 New Mexico Climate Strategy report, which anticipated 70 future charging stations. Note that the EPS EV chargers represents the number of plugs, not the number of charging locations.

[24] Assumes new federal and state investment aligns with that in the US NDC scenario

Sector	Strategy	Expressed as	BAU 2018	Spring 2021 Current Policy	Spring 2021 Proposed Policy	Fall 2021 Proposed Policy
Transportation (continued)	Vehicle electrification	Zero emission vehicle (ZEV) sales standard for LDVs	None; sales reach 22% by 2030 from economic adoption	None	60% by 2035[25]	100% by 2035[26]
	Vehicle electrification	ZEV sales standard for HDVs	None	None	None	100% by 2045[27]
	Clean vehicle fuels	LCFS Carbon Intensity Reduction	--	0%	0%	20%
Industry	Fugitive methane abatement	% of potential abatement of oil and gas methane[28]	Flat emissions based on 2018 Inventory Baseline scenario	80% for methane currently vented by 2026[29]	80% for all methane leaks by 2030[30]	60% for all methane leaks by 2025 and 100% by 2028
	Energy efficiency	Oil & gas industries % reduction of fossil fuel consumption from BAU	--	None	10% by 2030[31]	10% by 2030

[25] Assumes LEV/ZEV standard aligned with California's Advanced Clean Cars 1, extrapolating currently modeled trajectory (e.g. "SB 350 scenario" in https://www.ethree.com/projects/deep-decarbonization-california-cec/)

[26] Assumes LEV/ZEV standard aligned with California's anticipated Advanced Clean Cars 2, following Executive Order N-79-20.

[27] Consistent with California's Advanced Clean Trucks rule, similar to implementation in the US NDC scenario.

[28] Potential is based on IEA Methane Tracker; 100% of potential equates to about 75% reduction of methane by 2030 below 2020 for the US as a whole.

[29] Conservatively accounts for the EMNRD rule, given existing uncertainties in measurement and projection.

[30] Accounts for the combination of EMNRD and NMED rules, allowing for uncertainties in measurement and projection.

[31] Assumed to account for federal NSPS and off-road diesel standards

Sector	Strategy	Expressed as	BAU 2018	Spring 2021 Current Policy	Spring 2021 Proposed Policy	Fall 2021 Proposed Policy
Industry (continued)	F-gas abatement	% of potential HFC reduction from BAU[32]	--	None	100% substitution potential by 2035 and recycling and destruction potential by 2050	100% substitution potential by 2035 and recycling and destruction potential by 2050
	Oil & gas fuel decarbonization	% of petroleum refining CO_2 captured	None	None	None	50% by 2030
	Oil & gas fuel decarbonization	% of oil & gas extraction electrified	None	None	None	50% by 2030
Agriculture and Land	All strategies (detailed in Natural and Working Lands goals, Section 3.4)	All EPS measures except for changes in diet	None	None	100% of potential by 2050	100% of potential by 2050

Incremental measures shown in brown.

Table 13: *Electricity retirements*

Scenario	Plant Name	Plant Type	Retirement Year	Capacity (MW)
BAU 2018	Questa Solar Facility	Solar	2019	1
	Cunningham (Generator 1)	Natural Gas Peaker	2019	71
	Rio Grande	Natural Gas Peaker	2022	91
	Cunningham (Generator 2)	Natural Gas Peaker	2025	183
BAU 2018	Maddox	Natural Gas Peaker	2025	71
	Four Corners	Coal	2031	1,540
Spring 2021 Current Policy	Quay County	Petroleum	2034	17
	Escalante	Coal	2020	257

[32] Potential HFC reduction in the EPS roughly matches that corresponding to the Kigali agreement and federal EPA draft rules based on December 2020 legislation

Spring 2021 Current Policy (Continued)	Cunningham (Generator 3 + 4)	Natural Gas Peaker	2040	109
	San Juan	Coal	2022	847
Both Proposed Policy Scenarios	Four Corners*	Coal	2030	1,540

*1 year early retirement included primarily for modelling simplicity, as the plant is not under New Mexico jurisdiction.

Example Climate Mitigation Scenario: US NDC Scenario

In addition to the scenarios that RMI designed for New Mexico, the EPS also contains a "US NDC Scenario." The US NDC Scenario was designed by Energy Innovation to result in an emissions pathway that meets the United States' Nationally Determined Contribution to decarbonization broadly consistent with limiting global warming to 1.5°C by 2100.[33] It is not intended to show the only pathway to meeting the United States' goals and is not representative of actual policy. This national scenario has been downscaled to each state, adjusting for differences in the state technology mix compared to the national technology mix. This policy scenario is illustrative and is meant to represent one set of policies that could be used to reduce emissions in line with a 1.5°C scenario.

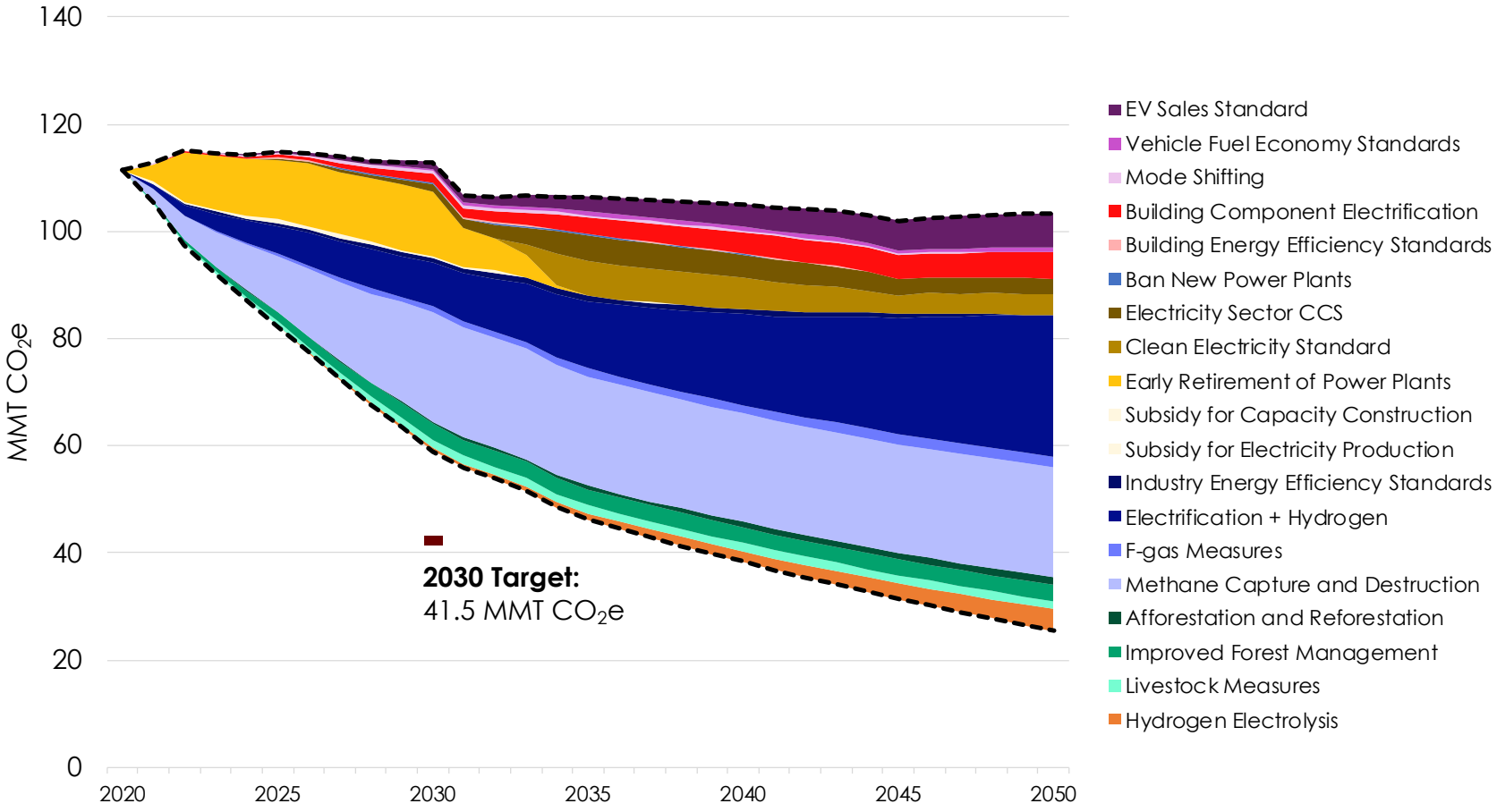
Table 14: *Policy Assumptions in the US NDC Scenario*

Sector	US NDC Scenario
Electricity	• Clean Electricity Standard of 80% by 2030, 100% by 2035 • Accelerate deployment of storage, transmission, and demand response • No new construction of coal and natural gas plants • Power plant retirements eliminate coal by 2030 • Electricity Sector CCS applied to remaining gas plants run for occasional balancing and reliability

[33] Energy Innovation, "A 1.5°C NDC For Climate Leadership By The United States", 2021. https://energyinnovation.org/publication/a-1-5-celsius-pathway-to-climate-leadership-for-the-united-states/

Sector	US NDC Scenario
Buildings	• 100% electric new appliances and buildings by 2030 ("building component electrification") • 15% of existing buildings are retrofit by 2050, in addition to natural turnover • Efficiency improvement with ambition extended to 2050, plus additional efficiency improvements for building heating equipment and appliances
On-Road Transportation	• 100% electric new light-duty vehicle, motorbike, and bus sales by 2035 • 100% electric new medium- and heavy-duty truck sales by 2045 • 60% improvement in fuel economy standards for internal combustion engine light-duty vehicles by 2035, as well as a 50% improvement for buses, a 50% improvement for medium- and heavy-duty freight vehicles, a 60% improvement for aircraft, and a 25% improvement for rail and ships • 20% light-duty vehicle miles traveled reduced or shifted from BAU by 2050 • 6.3% reduction in truck freight transport by 2050
Industry	• 100% achievement of cement clinker substitution by 2030 • 100% achievement of HFC emissions reductions from the Kigali Amendment to the Montreal Protocol • 14% improvement in industrial energy intensity/efficiency by 2050 • 100% by 2050 shift from fossil fuels to a mix of electricity and hydrogen, varying by industrial potential for each fuel type, by 2050 • 10% reduction in cement demand and 15% reduction in iron and steel demand from improved material efficiency policies by 2050 • 100% achievement of potential emissions reductions from methane capture and destruction in natural gas and oil, coal mining, water, and waste sectors by 2030 • 100% of hydrogen is produced via electrolysis by 2050 • 50% remaining industrial CO2 emissions captured and sequestered through CCS by 2050
Land use/ Agriculture	• 100% achievement of potential additional carbon uptake from afforestation/reforestation measures, improved forest management, cropland measures, and livestock measures (such as requiring anaerobic digesters) by 2030

Figure 10: *Greenhouse gas policy wedge estimated by the New Mexico Energy Policy Simulator in the US NDC Scenario (Including Land Use)*



Accompanying Files

In addition to this summary report, RMI submitted a final package of accompanying files as an attachment. These files include:

- A summary of the needs assessment survey conducted by our facilitation team prior to the Summer 2021 planning workshops
- PowerPoint files containing additional details for emissions reduction strategies by sector
- Multiple PowerPoint presentations from presentations given by RMI in the fall of 2021
- *New Mexico EPS Figures (for CCTF) 111421.xlsx* – An Excel workbook containing exported date from the New Mexico EPS to create figures used in presentations and reports.
- *Post-Workshop Proposed Policy Modeling 091021.xlsx* – An Excel workbook containing a detailed mapping of the emissions reduction strategies to our EPS modeling decisions, including where possible an explanation of why some strategies were not modeled.

About the Energy Policy Simulator

If you have questions about using the EPS, we recommend first watching our video series, available here.[34] For further information on the EPS, contact us at policy@energyinnovation.org. For more information on RMI analysis and our state advocacy support network contact us at USAnalysis@rmi.org.

The US EPS model is available for download online here.[35] And full documentation on methodology and assumptions are available online here.[36] The US state EPS models were developed as a partnership between Energy Innovation and RMI. RMI's work supporting the state of New Mexico is funded by the US Climate Alliance. RMI's development work related to the New Mexico EPS is supported by Bloomberg Philanthropies.

[34] https://us.energypolicy.solutions/docs/video-series.html

[35] https://us.energypolicy.solutions/docs/download.html

[36] https://us.energypolicy.solutions/docs/index.html