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El Paso Climate Charter Economic Impact Assessment

For: The El Paso Chamber of Commerce

From: Points Consulting

Date: January 31st, 2023

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Contents

I. Executive Summary

As the old adage goes, there are no solutions in economics that do not require tradeoffs. However desirable are the end goals of the Climate Charter, the degree and pace of change required would come at a dire cost to El Paso's citizens. It is important to emphasize that the Climate Charter is not proposing a gradual tapering off of carbon emissions, sometimes referred to as decarbonization or net zero emissions, but rather a full-scale abolishment of fossil fuel-based energy. To replace forecasted energy demand for residential and commercial customers, 2,700 megawatts (MW) of solar power would need to be installed between 2023 and 2045, along with the requisite capacity for battery storage, which is not factored into this analysis. For El Paso to move at that pace, it would need to multiply recent year's solar installation by 13 times and maintain that pace for twenty consecutive years. Taking the more likely assumption that the community is not able to fully replace its fossil fuel consumption, their economic consequences would be multifaceted and substantial. By taking each platform of the Climate Charter, determining their direct effects, and then running those through an economic multipliers model, we are able to estimate the full economic impact.

Bottom line impacts are all negative. By 2030: -170K jobs, -$7.9B in earnings, and -$28.2B in output. By 2045: -198K jobs, -$9.2B in earnings, and -$32.8B in output. In short, El Paso County's economy would decrease by -40.8% in the long run. An average household in El Paso would suffer a loss of -$38.8K from their already low $51K in annual income.

The most significant negative effects include:

- -$3.7B in electrification costs as households and businesses exchange natural gas devices and appliances with those suited for electric use
- -$2.3B loss in economic output for energy-related industries by 2045, most notably, refineries -$1.2B, utilities companies -$863.7M, and natural gas companies -$239.7M
- Taxpayers would absorb -$193.0M in additional wages and salaries, and -$2.1M in lost productivity due to redirected staff time and energy
- -$5.2B loss in output in all other industries that would not be able to sustain typical business operations due to a -72% loss in energy availability in the El Paso area, mostly, jobs in high energy-consuming industries such as manufacturing.

As the Climate Charter predicts, there would also be some corresponding increases in economic growth including the advent of roughly 628 green jobs, which would primarily be among photovoltaic panel installation and maintenance positions. There would also be three jobs added within local government due to increased focus on climate impacts.

Beyond these quantitative figures, there are additional factors that would come into play, most of which would create friction with economic growth, such as business closures in the city due a lack of compliance, and the potential for more bureaucracy within the local government which could stunt growth, among others. That said, the Climate Charter could also produce some positive ancillary benefits, for example: the generation of new green jobs, the potential to attract federal grant funding, and slowing the environmental deterioration of natural resources.

II. Introduction

The authors and sponsors of this report are not seeking to persuade voters either for or against the El Paso Climate Charter policy. We are interested in one particular facet of the issue which has not been broadly discussed, namely, the economic ramifications of the Climate Charter over the next 22-years (2023-2045). The authors of this report are not environmental or climate scientists but economists and statisticians. ***As with any good public policy decision, socioeconomic concerns should be weighed along with other issues affecting the public.*** In that spirit, take this opportunity to inform and deepen your perspective on this issue when preparing your vote on the Climate Charter this Spring.

Beyond the executive summary and introduction, this report is organized as follows:

- Chapter III: Economic Impacts & Consequences
    - Quantifiable Negative Effects
    - Benefits of Transitioning to Renewable Energy
    - Additional Issues Effecting Economic Feasibility
- Chapter IV: Regional Energy Industry Background
    - Regional Greenhouse Gas Emissions
    - Emissions Comparison between Texas and El Paso County
    - Economic Characteristics of Energy Industries in the El Paso Area
    - Outline of Key Players
- Appendix A: Topical Literature Review
- Appendix B: EPE Fair Market Value Estimation Methodology
- Endnotes

The conceptual background and Climate Charter background sections which follow are a summarization of material that is largely in the public domain. We are seeking to frame and clarify the topic before addressing economic impacts. Readers already familiar with the background can skip to Chapter III: Economic Impacts & Consequences.

Conceptual Background

The conversation around energy and climate change has become so politicized that it is worth reviewing some fundamental points to begin this study. Human civilization requires energy, in much the same way that human bodies require calories in order to sustain life. Adults require a daily intake of roughly 2,000 calories to sustain their given level of health, and Americans currently require about 12.38 kilowatt hours (kWh) or energy per day to sustain their current quality of life.[1] As human beings grow up, they typically require an even larger intake of calories. Likewise, for economies to grow, they also must utilize a higher amount of energy. Since the period of urbanization and industrialization, our demand for energy has outstripped the availability of natural energy sources, such as the sun. ***Fossil fuels have enabled first-world countries to exceed sustenance living and achieve unprecedented levels of wealth and prosperity.*** As a relatively large country, it is not surprising that America is a large energy user, but the US is not the only country to have taken this path. Other developed countries across the globe have a similar relationship between GDP and energy consumption including Canada, Australia, South Korea, and Russia, to name a few.[2] Perhaps even more interestingly, the United States has greatly reduced the ratio of consumption to GDP over the past thirty years; in other words, it is producing more with less.

That is not the end of the story, however. As all global leaders have learned over the past 200 years, ***our choices about how to produce and consume energy come with what economists call "externalities," that is to say, consequences that affect other things that we care about, both now and in the future.*** Among these externalities are the generation of greenhouse gases (GhGs) and other pollutants, which are affecting our global climate to some degree.

Herein lies the fundamental tension on climate issues. How should we weigh our socioeconomic needs against longer-term issues? That decision lies with each individual voter, for whom we hope to present an economic impact assessment about the socioeconomic benefits and consequences that could result from the Climate Charter. Too often, discussions about clean energy and GhG reductions seek to advocate green energy without awareness of the fundamental challenge of how to replace current levels of fossil fuel production. Many entities in and around El Paso are pursuing alternative forms of energy but, ***as we hope to show via this study, it will be impossible to meet the terms of the El Paso Climate Charter without a significant increase in economic costs and a dramatic reduction of how and when energy is consumed.***

This brief summary highlights just a few of the fundamental conflicts on the topic of climate change and economic development. These questions cannot be fully answered within this report but should be in the back of each voter's mind as they read. To summarize:

- *How much should we expect energy technology to continue developing to allow developed countries to continue reducing consumption without sacrificing quality of life?*
- *At what speed can we expect those technological developments to happen?*

- *Will command-and-control policies (such as forcing the use of renewable energy) cause those technologies to develop faster or just cause us to forcibly reduce economic output?*
- *What level of tradeoff to quality of life and the economy is acceptable in order to reduce energy consumption?*
- *How do we ensure equitable treatment to developing countries, cities, and households that generally require a higher level of consumption in order to increase their wealth?*
- *Which decision makers get to decide the right level of energy consumption?*

El Paso Climate Charter Goals & Background

The stated goals of the El Paso Climate Charter are to: reduce the City of El Paso's contributions to climate change; invest in an environmentally sustainable future; and advance the cause of climate justice.[3] To further elaborate, ***the Charter's main focus is increasing solar energy, water conservation, creation of climate jobs, achieving 80% clean and renewable energy use by 2030, expanding to 100% by 2045***.

For national context, the clean energy stipulations of the Climate Charter on their face ***appear similar to those enacted in California over the past decade but actually exceed those regulatory standards on many fronts.*** For example, California's latest legislation (SB 1020) that was voted into law in 2022, includes loaded terms such as "zero carbon" and "carbon neutral.[4]" These concepts allow space for practices such as carbon abatement to offset the continued use of fossil fuels and the continued use of low-emission energy, such as geothermal and nuclear. The goals and policies enshrined by the California legislature are, in fact, quite similar to those self-imposed by El Paso Electric in 2021, such as 80% carbon-free energy by 2035 and the pursuit of 100% decarbonization by 2045.No such concessions are present in the Climate Charter, however, which maintains an uncompromising anti-fossil fuel position.

As of July 2022, Ground Game Texas obtained enough signatures (39,000+) in order to get a Climate Charter on the ballot in the May 2023 election. Per Texas state law, El Paso is a home rule city, allowing the City to pass regulation if not in violation of state and federal law.[5] A charter is like a local constitution, as it lays out city policies on how it must operate. Upon over 50% of voters supporting an amendment, the City's existing charter can be changed. The proposal is considered an "initiated charter amendment", which seeks to update the City of El Paso's current charter with new climate policies.

Importantly, ***the Charter does not permit any form of carbon-neutral outcome, wherein energy companies can offset carbon emissions. Quite simply, these thresholds would apply to all energy produced that is consumed within the City of El Paso.***[6] No details are provided in the Charter document on the topic of funding the additional roles and responsibilities to be created by the Charter. The suggestion seems to be that the Charter would generate new jobs and tax revenue due to retraining and infrastructure development. Of course, unless these changes are paid for by households themselves, they will need to be

funded by an external source, such as property taxes, excise taxes, or state/federal grants.[7]

Differentiation of Climate Charter from Proposition C

In November 2022, the City of El Paso put forward a $272 million bond package, split amongst three propositions. Proposition C allotted $5 million into a climate and urban energy plan to study and reduce the impact of climate change. A simple public majority was required to approve the proposition, which succeeded with a 50.6% majority vote. The close timing and similar nature of Proposition C to the Charter may be confusing to some voters. However, **the goal of Proposition C was to fund a comprehensive Climate Action Plan for the City while the Charter has more specific policy aims as elaborated below.**

Function & Purpose of Climate Director & Department

The Charter would create a new climate department within the City, which would lead the City in reaching its climate impact goals. A Climate Director appointed by the City would be a paid City employee and report directly to City Council. On this point it is important to note that El Paso is a "council-manager" form of government. The City Manager currently oversees all city functions, such as Police, Parks & Recreation, Public Transportation, etc.[8] ***The Climate Director would be an exception to that rule in that this staff person would report directly to City Council, rather than via the City Manager.***

The Director would be supported by a nine-person Climate Commission which would oversee the implementation and fulfillment of the City's Climate policies. The City Council and Mayor would each nominate people for the Commission who, once accepted, would serve three-year terms. Commission member selection would be granted with preference to community members or those who represent communities "who have been negatively impacted by climate change" and, similar to the Director, can have no prior experience in the fossil fuel industry. The Commission would elect a Chairman and Vice-Chairman for one year-terms. The function of this Commission seems fairly in line with a variety of boards and commissions operating with volunteers under the City's current structure, with the exception that other Commissions report directly to the City Manager rather than interfacing with a different appointed City staff member.

Role of Climate Director

The Director would lead the department on multiple dimensions of climate initiatives as summarized below. Much of the Charter is written with few qualifications and limited clarity. In various places, we comment on these ambiguities and the potential difficulties resulting from them. The Director would:

- Provide an annual report to City Council on the City's progress toward climate goals. Interestingly, this responsibility extends beyond the City's actions to also include "all emissions generated within the City limits." This task would be almost certainly large enough require the assistance of additional staff members beyond the Director.
- Provide City Council with a climate impact position prior to "*any* City Council vote affecting the City's Climate Policy." Given the comprehensiveness of this statement and the presence of the word any, one is left to speculate on whether any aspects of City government would be considered outside the purview of this task.
- Ensure that any new funding due to taxes, grants, or contracts would be used to "create climate jobs" and training programs when consistent with funding requirements.
- Transitioning current City employees to climate-related work. The emphasis of this role would not be to eliminate roles, but rather to find new positions with equal or superior pay and benefits.
- Create a Solar Power Generation Plan, focused on internal capacity to generate energy for the City via solar power.
- Serve as the City's representative with state and federal regulatory agencies.[9] It is worth mentioning on this point, that utilities and energy generators operating in and around El Paso are already directly interacting with all of these agencies, without the involvement of any City officials.

Role of City Manager and Other City Staff

Several changes in procedure would be required by existing City staff and Departments as well. Many of these tasks would be the direct responsibility of the City Manager. In the first year of implementation, the City Manager and Climate Director would produce a plan for the City to achieve its renewable energy goals. Following the first year the City Manager, in collaboration with the Director, would be required to submit an annual Climate Disaster Mitigation and Preparedness plan, which would address water, electricity, and extreme weather issues. The City Manager would also adopt and implement a policy that provides a preference for contractors who advance the City's climate policy. Certainly, the terms of this policy would be tightened up prior to implementation but ***introducing a new factor to city contracting decisions runs cost and performance risks, not to mention the potential for political favoritism.***

Additional aspects of the Charter are not assigned to any specific individual but would presumably be shared across multiple staff and departments. The City undertakes the task of developing infrastructure to withstand "extreme weather conditions," a task that would mostly fall to the Public Works and Engineering departments but require considerable funding to

execute. Lastly, as previously noted, ***given that all ongoing and new business conducted by the City would require a climate impact consideration, all City staff would need to commit more of their finite time toward calculating and reporting on these metrics.***

Additional Key Goals

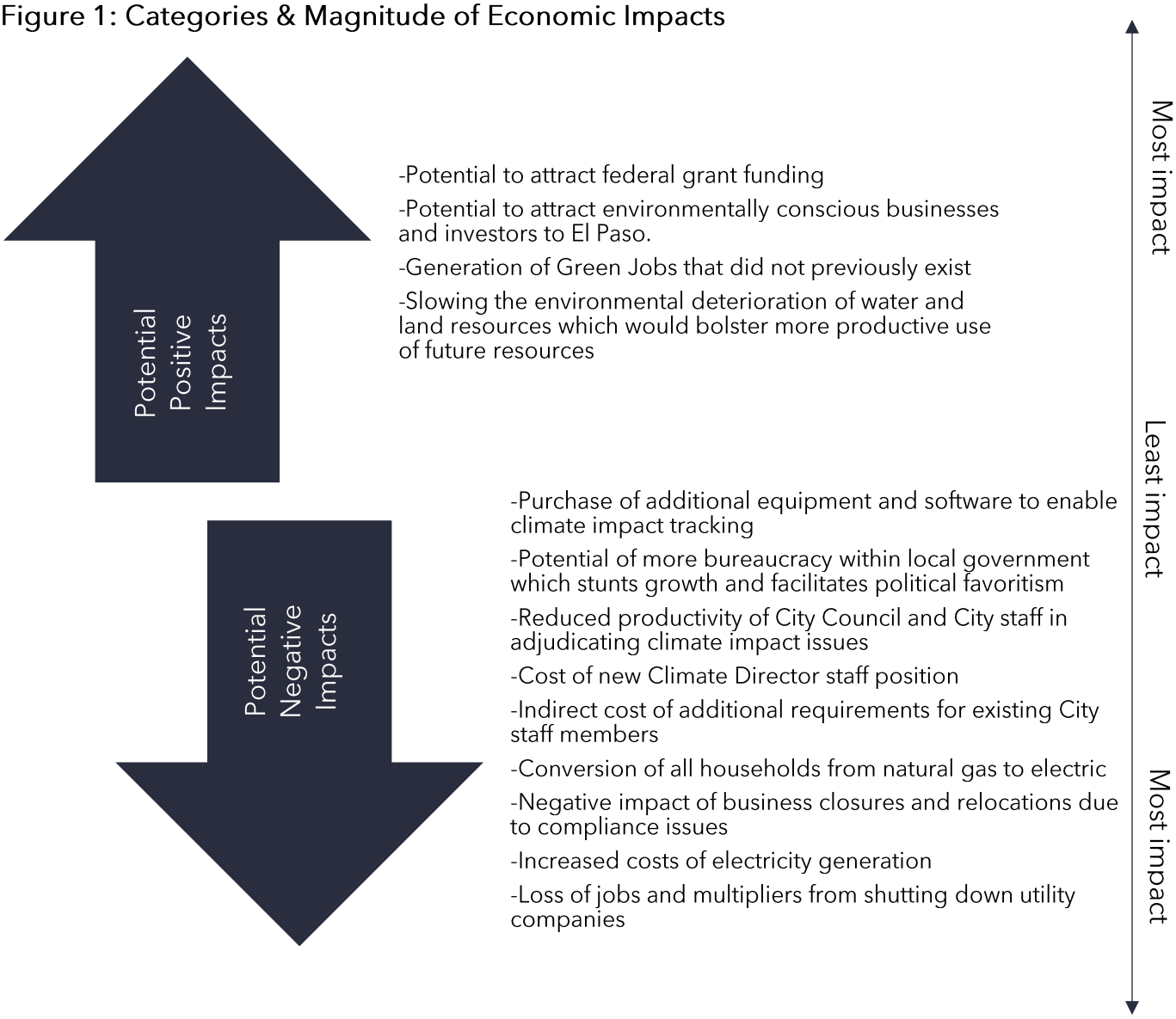
Other ancillary aims of the Charter include exploring the feasibility of bringing El Paso Electric (EPE), a privately owned company that has never been owned by the City, under the umbrella of municipal ownership. The City would also prohibit the sale or transfer of City water for any fossil fuel industry activities. As noted in Chapter III, ***this would have the effect of hamstringing and perhaps ceasing the operation of multiple energy and utility players in the El Paso area.***

The Charter is also seeking climate justice, meaning: "ensuring that historically underserved communities do not bear a disproportionate share of the negative impacts of climate change, while at the same time investing in those same communities as part of the work to respond to climate change, mitigate its impacts, and build an environmentally sustainable society." Though a noble goal on paper, as explained in Chapter V, an unfortunate consequence of environmental policy at the international level is the stunting of economic growth for developing countries that do not have the economic bandwidth to focus on generating renewable energy.

III. Economic Impacts & Consequences

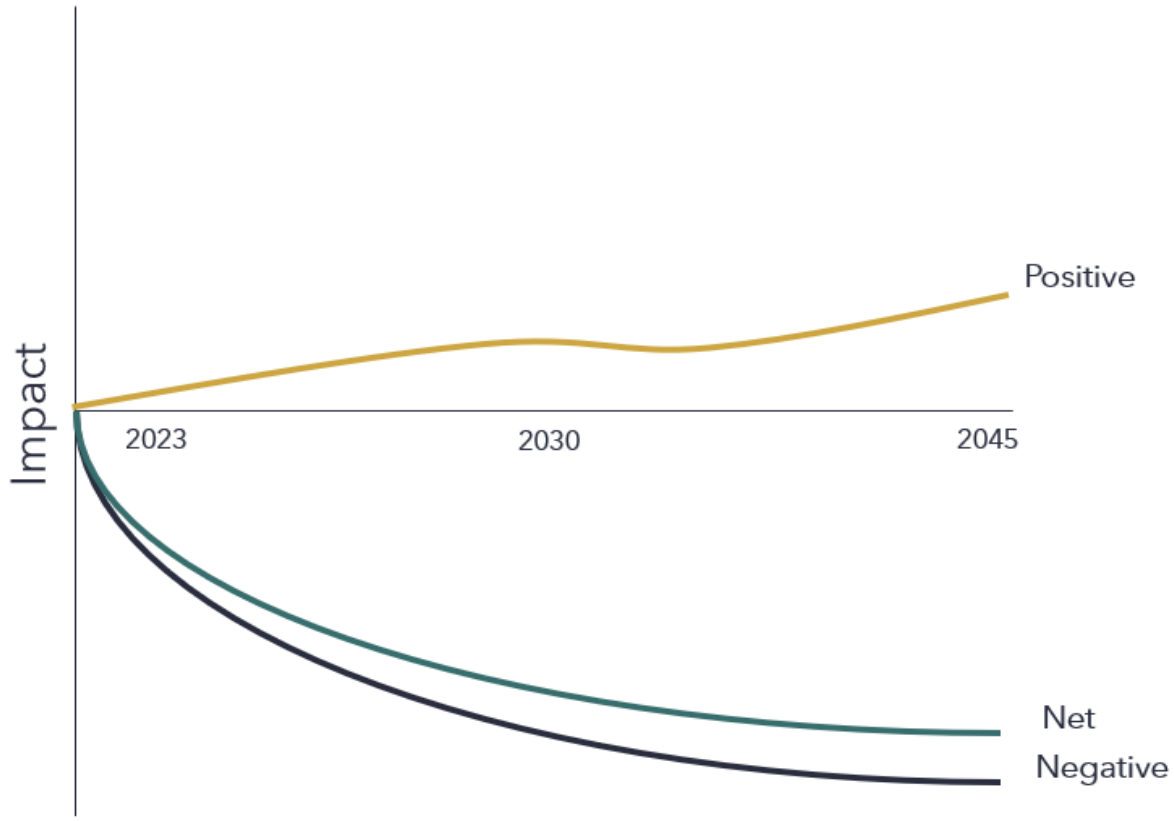
The consulting company arrived at the following list of economic impacts and consequences of the Climate Charter. We developed this list after reviewing the proposed legislation, regional socioeconomic data, background information about regional utilities and energy companies, and conducting a literature review of other locations in the United States and internationally facing similar circumstances. Wherever possible, we sought to quantify impacts in terms of real economic metrics, such as jobs, earnings, and tax revenues. In some situations, suggesting a quantitative conclusion would be virtually impossible to do accurately so we treat these concepts qualitatively.

Figure 1: Categories & Magnitude of Economic Impacts



The El Paso Climate Charter would have some short-term impacts while others would be spread out over time. Table 1 expresses those impacts in terms of metrics such as jobs, earnings, gross regional product (GRP), and tax revenue for a 15-year period between 2030 and 2045. In reality, some impacts would initiate immediately, but for the most part they would take several years to take full effect. Figure 2 serves as an infographic tool for understanding these changes over time. No scale is provided on the y-axis because the shape of the chart is similar regardless of the metric being used. Both positive and negative effects would initiate almost immediately, but most of those impacts would grow and hit their apex near 2030 or 2045. ***Notably, in spite of some of the positive effects, such as green job creation, the net impact is significantly negative.*** Rather than guess on the timing of specific changes, we look out to 2030 to a point at which we are confident that some of the more substantial and structural changes to the economy will have occurred. The terminal year, 2045, is highlighted because it is the date at which the Climate Charter would mandate 100% renewable energy for use within the City.

Figure 2: Conceptual Economic Impact Timeline



Source: Points Consulting, 2022

Overall Economic Impacts in 2030 and 2045

Each of the topics addressed in the following narrative are backed up by unique research and direct input effects, as summarized within this chapter. Tables 1 through 3 detail these effects by economic sector, as well as the total economic impacts for the Climate Charter emissions-reduction goal years of 2030 and 2045.

Table 1 shows that the ***economy-wide impact for jobs in El Paso County in 2030 would be a reduction of 38.3% in 2030, and 44.7% in 2045 when compared to the County's 2021 levels.*** The region would also experience devastating economic losses to its labor income and GDP levels. PC's estimates show that ***earnings will shrink 31.3% in 2030, dropping further in 2045 by 36.4%. GDP will likely decrease 52.7% in 2030, and 61.3% in 2045***, which is the largest expected reduction out of the economic indicators shown; a decrease of more than half of the County's 2021 level of production.

Table 1: Summary Economic Impacts to El Paso in 2030 and 2045

	2030	2045
Jobs	(170,000)	(198,000)
Earnings	($7,890,399,000)	($9,177,028,000)
GDP	($13,303,440,000)	($15,469,812,000)

Source: Points Consulting, 2022, using IMPLAN

By 2030, refineries and households would be the industries most negatively affected, as shown in Table 2. Refineries stand to lose almost a billion dollars in output, while households would lose close to approximately $3.5 billion in earnings, a loss greater than any single industry. The utilities sector would lose almost 600 jobs, but the city would lose more than double that, with a decrease of almost 2,000 jobs.

Table 2: Detailed Economic Impacts to El Paso in 2030

	Output	Earnings	Jobs
Total	($28,219,482,000)	($7,890,399,000)	(170,494)
Utilities	($737,749,000)	($18,400,000)	(580)
Refineries	($996,648,000)	($6,155,000)	(104)
Natural Gas Companies	($205,517,000)	($8,707,000)	(184)
City Government	($645,666,000)	($82,505,000)	(1,847)
Households	--	($3,452,646,000)	--
All Other Industries	($25,633,901,000)	($4,437,753,000)	(167,779)

Source: Points Consulting, 2022, using IMPLAN

The negative economic consequences in 2045 would be just as severe, as the economic decline would continue to be driven by the tightening of the Charter's restrictions. Close to 200K jobs would be lost across all industries. Households would bear a great deal of the loss in earnings, with around $4B lost. Refineries would lose more than a billion dollars, with a $1.16B loss—the most significant loss in output out of all of the fossil fuel sectors. Also, important to note is the almost $30B in output lost by all other industries.

Table 3: Detailed Economic Impacts to El Paso in 2045

	Output	Earnings	Jobs
Total	($32,830,612,000)	($9,177,028,000)	(198,000)
Utilities	($863,738,000)	($104,164,000)	(679)
Refineries	($1,160,419,000)	($30,270,000)	(121)
Natural Gas Companies	($239,780,000)	($36,273,000)	(215)
City Government	($750,707,000)	($192,912,000)	(2,000)
Households	--	($4,011,789,000)	--
All Other Industries	($29,815,964,000)	($5,165,239,000)	(195,000)

Source: Points Consulting, 2022, using IMPLAN

Background of Quantifiable Economic Impacts

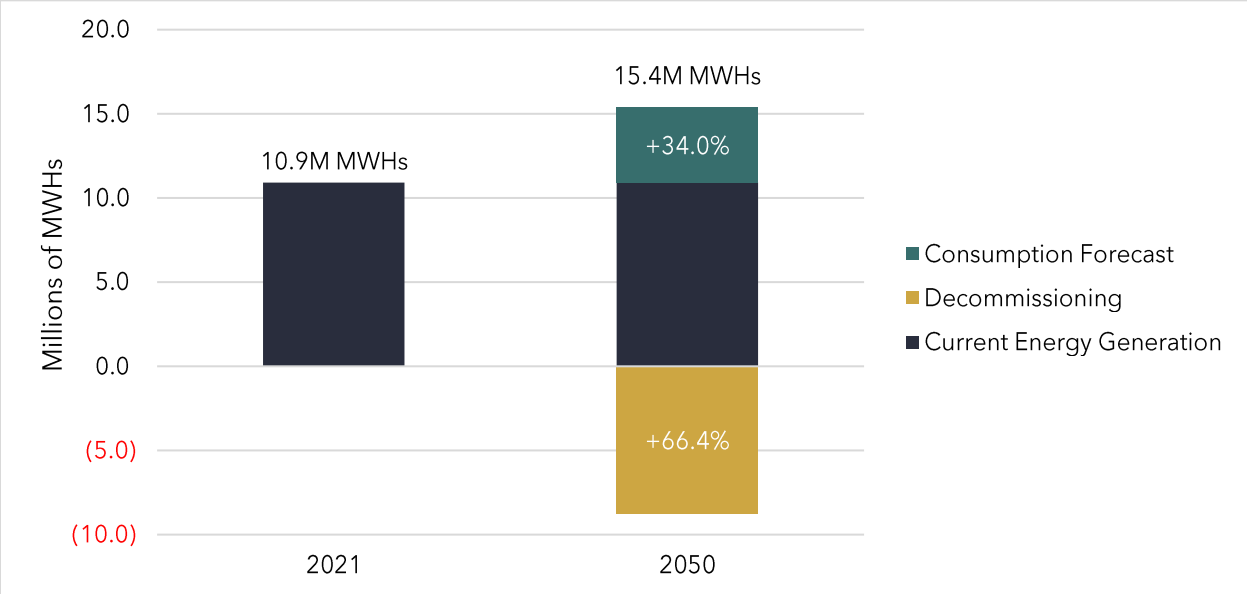
All impacts that can be estimated quantitatively are outlined in the following narrative, starting with the most impactful and ending with the least impactful.

Decreased Energy Production & Downstream Effects

In the world of economics, rarely do we face benefits without some form of trade-off to achieve that benefit. As we outline in this section, it seems far-fetched for the El Paso economy to sustain, let alone grow, under the directives of the Climate Charter. As industry and population expands there's an ongoing need for utility companies to increase their capacity in order to serve that population. Simply keeping up with that growth requires enormous, continuous, and long-term investments in capital-intensive facilities. To put the population and capacity needs into perspective, EPE's average megawatt hours (MWh) per person has increased from 2.96 to 3.33 from 2010 to 2019.[10] Meanwhile, EPE is experiencing a year-over-year customer base growth rate of 2%.[11] Therefore, demand is increasing on two fronts, including net population growth and increased consumption per capita. [12]Returning to our original metaphor, it would appear that El Paso's economy is still in a "growth" phase rather than an efficiency-stabilizing phase in terms of energy usage.

The prior statistics only account for recent changes in consumption and demand. To provide a longer-term view, PC has forecasted the required level of energy to be generated by El Paso Electric over the next twenty-seven years (see Figure 3). This forecast accounts for existing usage, EPE's consumption forecast, and the amount of generating capacity that will be decommissioned. In 2021, EPE generated 10.9 million MWhs of energy. To meet consumer demand by 2045, the final year of the Climate Charter's 100% renewable energy plan, output will need to reach 15.4 million MWhs. This 34% increase is challenging enough, but EPE will also need to decommission and replace older generating units, resulting in the replacement of an additional 8.7 million MWhs. (Note that decommissioning is shown as negative in Figure 3 because these MWhs are replacing rather than serving as a net addition to the generation portfolio.)

Figure 3: Estimated Energy Demand in El Paso, 2021-2050



Source: Points Consulting using data from EPE 2021 Integrated Resource Plan EPE Sustainability Report 2021

Though other sources may become more viable in the future, the vast majority of El Pasoan's renewable energy is due to solar. This will likely continue to be the case, given El Paso's unique climate and available sunshine. El Paso's current capacity of 70 MWs has been on a strong uptick in recent years, as EPE has brough online an average of 8.4 MWs per year over the past four years.[13] Along with that, EPE has increased their battery storage capacity, adding 50 MW in of battery storage in 2021, with contracts for a further 170 MW.[14] Knowing these values, it is simple arithmetic to determine how much renewable capacity must be added between 2023 and 2045 to replace all fossil fuels. Hitting these marks would require the installation of 113 MWs of renewable power every year for the next 23 years. ***This translates to a 13-fold increase in solar panel installations every year until 2045.*** To put that level of generation in perspective, Los Angeles ranks as the second highest solar capacity city in the United States, with its current capacity of 6540 MWs.[15] ***El Paso would need to surpass Los Angeles in solar generating capacity by 2026 and continue that torrid pace for another two decades.***

In our economic impact assessment, we do not assume this lofty solarization pathway for El Paso in the future. Rather, we designed a more moderate solarization model, which assumes solar investment at a more aggressive pace than the last few years (averaging 12 MWs installed per year between 2021 and 2045). Solar or other renewables would need to come with corresponding investment on battery storage, a cost that has not even been considered within this analysis. Meanwhile, fossil fuel sources would phase out according to the 2030 and 2045 benchmarks set by the Climate Charter. ***According to our moderate solarization model, El Paso's available energy decreases by a stunning 69% by 2030 and 72% by 2045.***

This drastic decrease in energy availability helps explain why the economic impact results displayed in Table 1 portend such a catastrophic decrease in economic activity. All facets of the economy require energy to function. Naturally some industries require a heavier diet of energy, such as heavy industrial and transportation, but even professional office buildings require electricity for light, heating/cooling, and powering computers. Impact of the Climate Charter would hurt heavy industry most dramatically, resulting in spectacular job loss and company closures, but so-called white-collar jobs would also not escape unscathed.

City of El Paso's Purchase of El Paso Electric

The Climate Charter states that "The City of El Paso shall employ all available efforts to convert El Paso Electric (EPE) to municipal ownership." This process of municipalization would require the City to purchase a private sector organization at a fair market rate. ***Whatever benefits that would appreciate to the citizens for having control of energy resources would also come at the cost of having to purchase EPE using taxpayer money***. We attempt to estimate the value of EPE using a number of variables so as to prepare taxpayers for this blow. As noted in the introduction to this section, several years of legal negotiations should be expected in the event that the Climate Charter is voted into law. To further complicate the matter, it is not even clear that such a purchase would be possible. JP Morgan's Infrastructure Investment Fund included a commitment in the transaction to retain EPE as part of its portfolio for a minimum of 10 years.[16] As such, we assume in our calculations that this transaction would not occur until 2030, at the earliest. However, PC recognizes that this purchase is unlikely to go through due to the aforementioned clause in the acquisition agreement.

Assuming that seven years pass between the publishing of this report and that transaction, it is necessary to gauge current energy acquisitions and trends and forecast how those would affect EPE's value several years in the future. In conducting this assessment, we accounted for the following variables: the 2020 acquisition price of EPE of $4.3B[17], the forecasted inflation rate over the next seven years, and growth benchmarks for capital markets. Using these variables, ***we arrive at an estimated fair market value for EPE of $9.1B by 2030.***[18] Given the complexity of this modeling effort, some readers may wish to see a more detailed explanation of this model, which is summarized in Appendix B: EPE Fair Market Value Estimation Methodology.

There are further complexities related to modeling the full financial impact of the proposed acquisition of EPE. The primary challenge for PC at this stage is the lack of clear information for citizens about whether the purchase would be funded via bond, tax levy, or a combination of both. As was presented to El Paso taxpayers with the 2022 Community Progress Bond, specific information on the cost, means of collection, and duration of the loan and/or levy will likely be released by City Council at a future date.[19] There is also the issue of whether or not EPE could actually be purchased given IIF's commitment to keeping EPE in its portfolio for at least 10 years, which makes the purchase of the utility by the city more unlikely to happen. Each of these options presents very different implications for the future of EPE. At a later date, PC may incorporate these costs into the economic impact assessment that proceeds

this section but for the moment the acquisition of EPE is considered an additional external cost that is not incorporated into the economic impact model, given its uncertainty.

Losses Among Fossil Fuel Based Industries

One of the more restrictive aspects of the Climate Charter is the ban on the use of city water for the activities of fossil fuels companies outside of the city limits or otherwise any other such purpose. The sale or use of city water would be prohibited for all fossil fuel-based industries, and any existing contracts that permit such use would be cancelled. This would especially impact the petroleum refinery industry, given the high water usage required for its processes. Marathon Petroleum, for instance, use water sourced from a series of groundwater wells on and around their property, but still need to supplement their supply by purchasing water from El Paso Water. A typical refinery uses about 1 to 2.5 gallons of water for each gallon of product produced, for instance.[20] So in the case of Marathon's El Paso refinery, which has an oil refining capacity of 133K barrels per calendar day, their water requirements would range between 133K to 332K gallons of water per day based on these estimates.[21] A refinery needs a vast amount of water for its production processes, which include chemical processing, steam generation, and cooling. These restrictions could thus obstruct the operations of refineries. PC's estimates show, in fact, that the sector that is likely to receive the largest negative impact in terms of output is the refinery sector. This indicates that if the restrictions outlined in the Charter were to be implemented, refineries would suffer the biggest loss in sales.

Adaptation to Electrical

Adapting the entire energy transmission system away from fossil fuels creates the need for a massive capital investment. Currently, most of the households in El Paso utilize natural gas for a combination of cooking and heating (71.6% of households in 2021)[22]. ***Assuming that El Paso's households and businesses need to transition to all electric appliances will result in $2.96B to households, and $750M to commercial users***. It is important to note, that although expensive to homeowners and businesses, this would also be a boon to business in the electric appliances and installation industry. This factor is also considered within the economic impact model.

Staff Costs to City

Direct staff costs are defined as the monetary cost of hiring staff that are directly tasked with the duties assigned to the Climate Director. In order to obtain an estimate of these costs, the team averaged the salaries of positions in the city that are secondary to the City Manager, such as Deputy City Managers. A total of six high-level salaries were used as a reference point for the potential annual earnings of the

Climate Director. Using publicly available data on pay scales, we determined that the Director's salary would be approximately $194K/year. Given the depth and complexity of the Climate Director's role, PC found that it would not be realistic to assume this new employee would conduct their role with no direct reports. Therefore, we also included the costs for two analyst positions that would serve as support to the Climate Director at a pay rate of $60K/year. These analyst-level positions would aid in the Director's responsibilities and allow other departments to focus on their jobs while not being overburdened with climate and emissions reporting requirements.

Including the cost of the Climate Director and two additional analysts, direct costs to the city amount to an estimated $314K/year. On this particular point, it is important to point out that the impact simultaneously has both a positive and negative effect on the local economy. While new jobs are being created in local government, those workers earnings are being drawn upon from local taxpayers, resulting in a slight reduction in their household incomes.

Indirect Cost of Staff Time

PC also calculated the costs associated with the indirect use of the City staff's time. City employees' time is a scarce resource because they have a finite time-budget to complete their work responsibilities. New additional responsibilities will necessarily eat into that budget, resulting in one of two outcomes. Either workers will accomplish less of their existing responsibilities, resulting in productivity losses, or new workers need to be hired to absorb those new responsibilities. A far less optimal third option is that overburdened employees quit their jobs due to burn out, which results in even further decreases in productivity. Research conducted by Eagle Hill Consulting found that the main reason government employees described themselves as "burnt out" this past year was due to issues dealing with their workload.[23] In this survey of over 700 employees, researchers found that burnt-out government employees are 2.5 times more likely to leave their organization in the next year. Thus, increasing employees' workload may have more negative unforeseen circumstances beyond the dollar cost of their time. Therefore, what is seemingly a nebulous soft-cost is actually has very real-world effects for the citizens of El Paso.

Not all City departments would be equally affected by new climate-related tasks. For this reason, the methodology accounts for the varying degrees of time-impact. The project team classified around 7,000 City employees by department into different categories based on how much of their time would be impacted. The four time-impact categories range from "No Impact" to "High Impact". The team then calculated cost ranges for each of these groups based on the average salary for El Paso public employees in 2021 times the proportion of time each of these employees

is expected to spend on duties related to the Charter. The resulting indirect staff cost for this policy is in the range of $800K to $3.3M. For simplicity within this document, we utilize the median of these two extremes. ***The full cost of either decreased productivity or additional staff hours amounts to an additional $2.1M tax burden for Citizens of El Paso.***

Software and Equipment Costs

Per the Climate Charter, one of the central duties of the Climate Director would be to carry out new reporting responsibilities in the form of an annual emissions report and climate impact statements for a wide range of City Council decisions. New responsibilities often require new processes and tools, so it is a reasonable conclusion that the City would incur additional costs related to purchasing equipment and software to enable climate impact tracking. The team reviewed the license costs for several software systems that aid in tracking climate impacts and carrying out climate change assessments at varying levels of detail for the community. ***An annual enterprise license for a climate tracking software, which would allow for unlimited use of the program by the City during the period that the license is valid, would cost around $9K.***[24]

Additional Non-Quantifiable Negative Effects

PC's research indicates that additional detrimental economic effects should be expected, which are more challenging to quantify due to the multiplicity of factors and uncertainty surrounding implementation.

Increased Energy Costs

At present, the vast majority of El Paso's generation of energy is supplied by fossil fuels. Including EPE's directly generated sources and other purchased power, we estimate that just under half of one million of the 10.8 million MWhs consumed in 2021 were from renewable sources, which is just 4.2% of all energy.[25] The costs of moving from such a heavy reliance on nonrenewable energy sources for baseload and balance power are steep. In order to become fully dependent on energy from renewable sources, the City needs ways of storing excess electricity for later use. Researchers at MIT estimate that the costs for battery storage, need to fall by around 90% to be able to completely replace fossil fuels. Other ***researchers have pointed out that as carbon limits approach zero, costs tend to rise sharply.*** Even with the availability of batteries for energy storage, there exists a need for firm low-carbon resources, which include nuclear power, bioenergy, and natural gas plants that capture carbon.[26] In fact, with these low-carbon resources, costs can be lowered 10% – 62% in cases where full decarbonization has been achieved.

On a larger scale, McKinsey research shows that a net-zero transition can lead to a shift in capital allocation, jobs, and costs.[27] In a model analyzing global decarbonization by 2050, the researchers showed what would happen to demand, capital allocation, costs, and jobs due to this transition. Some sectors that would be significantly negatively impacted include steel, cement, and power. A rise in operating costs and capital costs for new investments in these sectors could mean an increase in the price of consumer goods as well. In the case of electricity, for instance, the average delivered cost would rise by about 25%, reaching its peak in 2040, then slowly decreasing. These prices would remain elevated above their 2020 levels, however, and it is not certain if and how these prices could return to their previous lows; leaving low-income households in a more precarious financial position.

Expansion of Government & Lack of Accountability

El Paso is currently a top 20% performing economy when compared to other cities in the nation.[28] However, creating an added layer of bureaucracy may hamper the City's present economic growth trajectory. Most of the existing literature related to the size of government and economic growth indicates that there is an optimal point of government spending and size that, if exceeded, would cause a decline in economic output. This concept in economics is illustrated by the Rahn Curve.[29]

Furthermore, legal research within the United States has uncovered an observed bias in administrative decisions, particularly on environmental topics, that can influence particular outcomes based on favoritism and conflicts of interest.[30] ***One can imagine that soon after the City announces preference for contractors who are environmentally friendly, a raft of new companies will arise touting their environmentally friendly policies, a phenomenon known as green-washing.*** But how will City government be able to decipher the rhetoric from actual environmentally friendly policies? Additionally, on the topic of expanding the administrative decisions to include climate concerns, there is also the potential for a decrease in the efficiency and expediency of decision-making. [31]

Economic Development Losses

If the new rules and regulations imposed by the Climate Charter are perceived to be too onerous and restrictive to the local business environment, businesses may decide to relocate to a different, more favorable location. In a research paper published by the Hoover Institution, researchers tracked the relocation of California business headquarters from 2018 to 2021.[32] In that period the state lost around 350 headquarters—many relocating to Texas. This migration is owed in part to California's punitive regulations and high energy and utility costs. In fact, research by the Mercatus Center showed that California is the nation's most heavily regulated state, which supports the thesis of the aforementioned research paper.[33] ***This shows that***

businesses that have issues complying with strict regulations are a flight risk and will likely look to move to a lower-cost alternative location.[34]

Potential Benefits of Transitioning to Renewable Energy

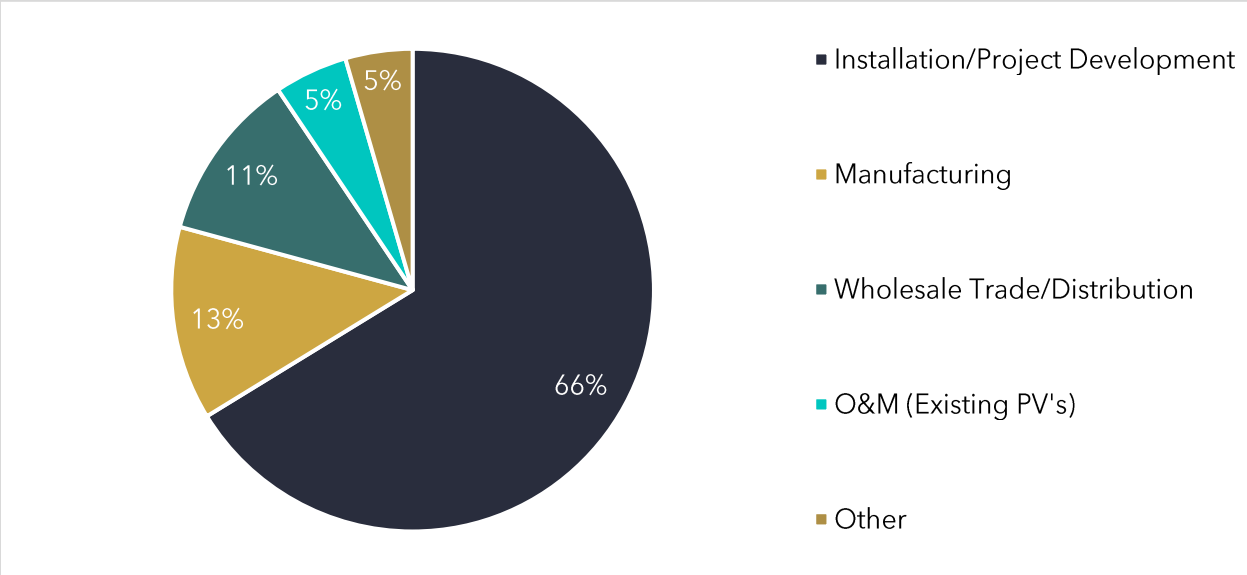
The prior section emphasizes the strong negative economic consequences of the Climate Charter, but there would also be some positive outcomes for the economy as well.

Additional Green Jobs & New Investment

One of the chief ends of the Climate Charter is the creation of new green jobs to replace the loss of fossil fuel related jobs. Though the job loss is likely to exceed the jobs created it is true that the investment in green energy, particularly solar, would result in short term and long-term job creation. For this aspect of our assessment, we focus primarily on solar energy which is the most suitable for El Paso's climate and is the primary source of renewable energy currently. Using a paper from the International Monetary Fund (IMF), called "Jobs Impact of Green Energy," the PC team calculated how many jobs would be created by the Climate Charter. Figure 4 shows a pie chart of solar job creation by sector, based on data from the National Solar Jobs Census. While Installation/Project Development makes up much of the job creation (66%) and would be primarily based in El Paso, the second largest sector, manufacturing (13%), would likely be generated in areas outside of El Paso.

Regardless of location, two categories of jobs would be created by the Charter, construction, installation, and manufacturing jobs (CIM) and operation and maintenance jobs (O&M). CIM job creation would happen mainly in the beginning stages of implementing the Charter, while O&M jobs would be more sustained. The PC team took this into account during the calculations and used the lifetime average number of jobs created in each category, per MW of installed green energy. In the base case model, between 2023 and 2045 the Climate Charter would create a total of 628 jobs: 36 CIM jobs and 592 O&M jobs. As previously noted, most CIM jobs are weighted towards the beginning of implementation and not all CIM jobs create opportunities for the local labor force. Furthermore, not all of the jobs will be specific to the El Paso area.

Figure 4: Solar Jobs by Sector (2021)



Source: National Solar Jobs Census, 2021[35]

Possible Benefits of Environmental Regulations

While environmental regulations may cause some adverse economic effects, they have been shown to be effective in reducing emissions despite increases in manufacturing output. Research from the National Bureau of Economic Research (NBER) found that air pollution emissions at the national level fell 60% between 1990 and 2008, and estimates showed that the implicit pollution tax imposed on manufacturers in that time period doubled.[36] The researchers concluded that the changes in the amounts of regulation were responsible for curtailing emissions, as opposed to any changes in the levels of productivity or trade. Yet, other researchers have noted that changes in the composition of the goods being manufactured may account for a large part of the decrease in emissions. Therefore, the added layer of regulation from the Climate Charter through climate impact and emissions reports may have the effect of lowering emissions produced in the City. This would not restrict the business activity of surrounding communities, however, so improvements to air quality are not a foregone conclusion.

In terms of economic benefits, the McKinsey research paper referenced in the previous section shows that decarbonization efforts can lead to net job creation.[37] Both losses and gains would be concentrated in specific sectors, with gains mostly in fields associated with renewable power production, and the heaviest losses happening in fossil fuel-intensive sectors. Another research paper published by the C40 Cities Climate Leadership Group also highlights the potential for job creation derived from cities taking climate action.[38] ***The study reports that cities that take ambitious climate action by 2030 have the ability to create around 20 million jobs in the buildings, transport, and energy sectors at the national level—with approximately 15.5 million created and supported within the cities themselves.***

Potential to Attract Businesses and Funding

Another potential benefit to the new regulations imposed by the Charter is the possibility of attracting investment and businesses relocations from organizations with a similar environmentally friendly mindset. Among this group are included certain large multinational corporations. Research published in the Journal of International Business Policy showed that ***there exists a positive relationship between "green cities", or cities that invest in improving air quality and wastewater treatment, and increased levels of foreign direct investment (FDI) flows.***[39] The reasons the study outlines as the primary drivers that motivate certain corporations to invest in green cities are: bolstering their reputation and showing their corporate responsibility, and an increased commitment to the well-being of their employees.

The City also has the potential to receive funding and grants for green initiatives and infrastructure programs. These grants can be quite competitive, but they can provide

local governments with the resources to carry out a variety of green development projects. They also often require a funding match from local and state sources for a certain percentage of the funds awarded, although cities can design climate initiatives in a way that maximizes their potential co-benefits.[40] One possible significant source of funding for the City may come from the Infrastructure Investment and Jobs Act that was passed on November 15, 2021.[41] Much of the $550B included in this package will be passed directly to state and local governments through new transportation, water, and energy programs. Several cities have leveraged such federal funds for flood mitigation, greening municipal fleets, and municipal utility planning for vehicle electrification.[42] At the state level, Texas received $13.9B in Bipartisan Infrastructure Law funding in 2022 to be used for improving public transit and school buses to low and zero-emission models, expanding electric vehicle charging, and clean energy, among others.[43]

Additional Issues Effecting Economic Feasibility

A few other details are worthy of mentioning associated with the energy systems in El Paso and various challenges with the aims and language of the Climate Charter. These do not result in any independent economic impacts not otherwise mentioned but they do effect the consulting team's analysis of the issues previously analyzed in the report.

Bonds & Financing

Utilities inherently face such growth-related challenges, which would be exacerbated by the terms of the Climate Charter. Even without the Climate Charter in view, there are other logistical challenges for EPE to financing its operations and manage its capital equipment needs. Building and maintaining facilities routinely requires utility companies to issue long-term debt (or, bonds) in the capital markets to the tune of millions of dollars. For example, EPE had $150M outstanding bonds when it was acquired in 2020, which were paid off. The nature of the utility industry and the extensive regulatory oversight to which it is subjected ensure that investments in that industry pay low returns that are fairly reliable. Low risk equals low reward. ***The heavily regulated, low-return nature of utility companies means that the value of their equity shares and outstanding bonds are especially at risk to inflationary and rising interest rate conditions.*** If the Climate Charter passes, it would add another risk factor to these already low-return investments. At some point, the low returns would not be worth the rising risks due to policy changes, and investors would react accordingly.

Bonds issued by utility companies often include covenants, which require the companies to maintain certain financial ratios, such as a certain debt-to-capitalization

ratio. Some terms in the Climate Charter could make it more difficult for utility companies to maintain their bond covenants. The market would then recognize the added risk and reduce the value of those outstanding bonds, hurting individual investors and retirement funds. The credit ratings agencies would reduce utility companies' credit rating. That would hinder the company's ability to raise debt and equity investment, and they would have trouble increasing power-generating capacity to accommodate the ongoing organic growth in demand. Rate increases would be the most likely lever to be pulled in order to relieve such economic stresses.

Decommissioning Issues

Beyond the previously mentioned continuous growth of energy demand in El Paso, the issue of decommissioning deepens the demand for maintenance and further capital investment. Some of the region's existing power-generating assets will be decommissioned in accordance with existing plans and regulatory requirements. Decommissioning supply could amount to over 1,000 MWs of generating capacity that will need to be replaced by 2050.[44] For comparison, EPE's entire Rio Grande Power Station, which has nine generating units, has a net dependable generating capability during the summer peak period of 276 MWs. The company has recently requested proposals for utility-scale projects to help it add generation capacity. ***Hence, not only is EPE continually dealing with growth in demand, but they are also responsibly executing plans to cull older, less efficient assets as they reach the end of their useful life.***[45]

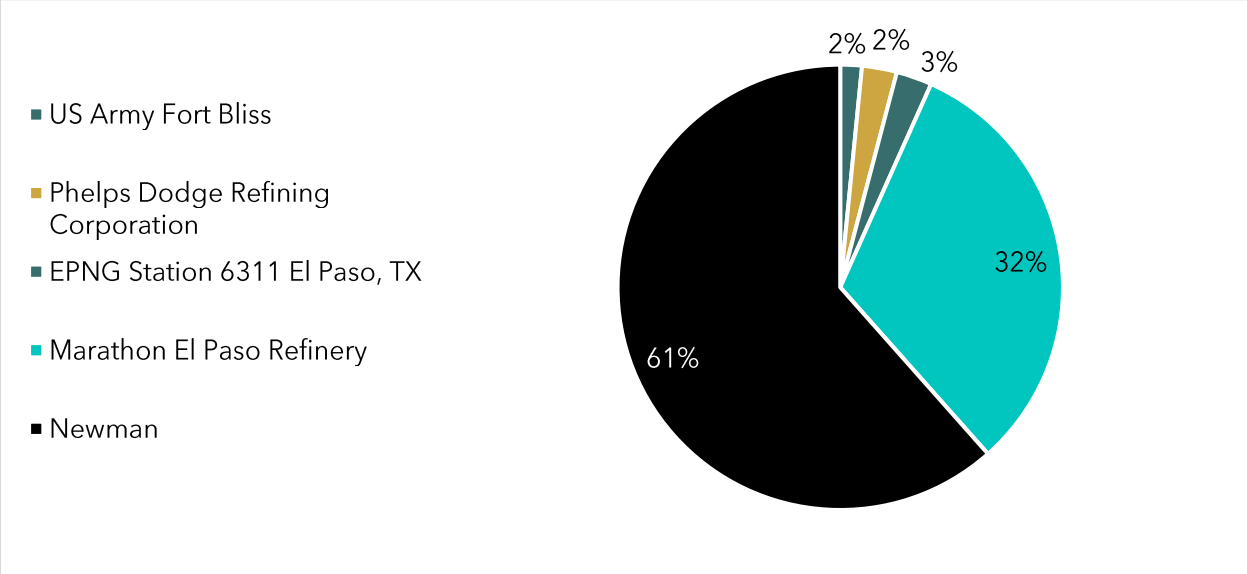
IV. Regional Energy Industry Background

The Economic Impact Analysis summarized in Chapter III contains the information that will draw the most attention from the general public. In order for PC to arrive at these conclusions, we first conducted our own due diligence into El Paso's production, consumption, and emissions patterns, which are summarized in this chapter. We seek first to present regional and community metrics, and then focus on the key players within the energy and fossil fuel industries individually. In addition to serving as our baseline of forecasting and analysis, our hope is that an unbiased portrayal will allow citizens to see both the progress and the challenges that exist for energy and utilities companies when it comes to emissions and climate issues.

Regional Greenhouse Gas Emissions

Various state and federal agencies track emissions both in terms of location and types of pollutants. ***As demonstrated in the following charts, emissions have in fact been decreasing dramatically by any count over the past ten years.*** The environmental investments undertaken by the key players in the El Paso energy ecosystem are clearly paying dividends in terms of decreased pollution.

Figure 5: Top 5 Point Source Emitters (Average/Year for 2011-2021)



Source: EPA, Facility Level Information on GhGs Tool, 2022.

The Environmental Protection Agency (EPA) is the federal agency responsible for protecting the environment and human health. One large task of the EPA is environmental surveillance, which encompasses data on emissions and other environmental factors. The EPA's Facility Level Information on GhG Tool (FLIGHT)

provides GhG emission data from large US facilities. The data is derived from reporting from these facilities under the GhG Reporting Program (GHGRP) Under the regulatory requirements of the EPA's Acid Rain Program, inaugurated in 1990 under the Title IV of the Clean Air Act, electric generating units that burn fossil fuels (i.e. coal, oil and natural gas), and serve a generator greater than 25MWs are required to report and monitor emissions. To support this program the Code of Federal Regulations (CFR) established Part 75 in Volume 40 of the CFR. Part 75 requires on going monitoring and reports of SO2, and CO2 emissions, and NOx emission rate, and heat inputs.[46] Using data derived from FLIGHT, we averaged the total annual emissions per facility in El Paso between 2011-2021 for the top five source emitters in the region.

As shown in Figure 5, the Newman Station (owned by EPE) has carried much of the weight for the emissions in El Paso County, with the Marathon El Paso Refinery coming in second at just over half the emissions of Newman. Outside of these point emitters there were 12 additional emitters with values registered in 2020, with none higher than 150 tons per plant per year.

Emissions Comparison between Texas and El Paso County

The Texas Commission on Environmental Quality (TCEQ) is the state of Texas' environmental agency. Their goals are to protect natural resources and the health of the public by means of clean water, clean air, and proper waste disposal. They are currently the fourth largest environmental agency in the United States.

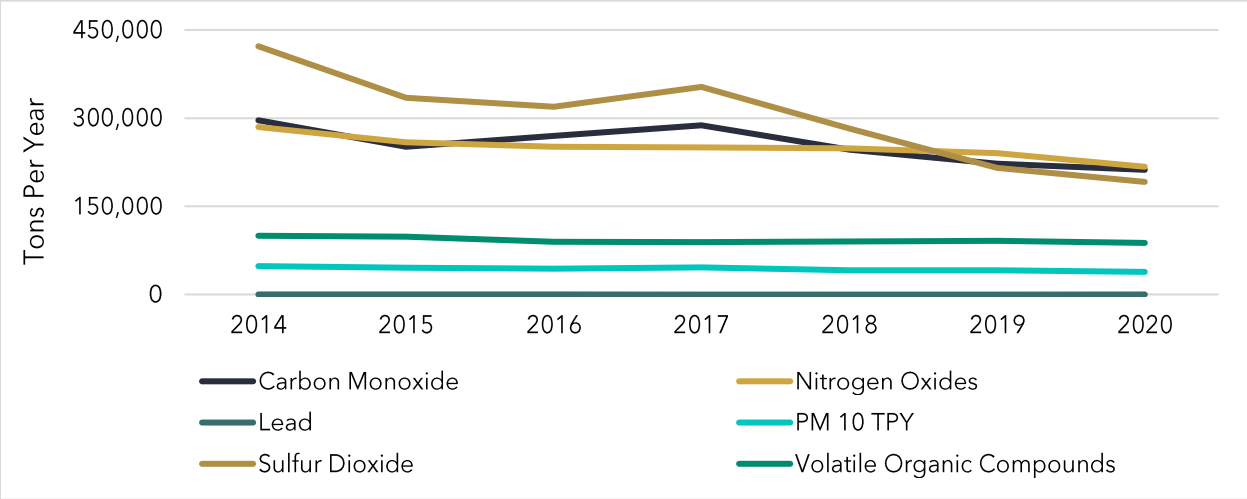
Between the years of 2014-2020, TCEQ's emission reporting requirements present the largest emitters reporting within El Paso County. The State of Texas' Air Reporting System "STARS", tracks sites that emit more pollution than amounts stated under Texas Administrative Codes. Between 2014-2020, there were approximately 2,000 industrial sites reporting annual emissions of criteria pollutants across the state. The Federal Clean Act establishes National Air Quality Standards for six "criteria pollutants", which are commonly occurring, and are considered harmful to both the environment and public health. Among these pollutants are Carbon Monoxide, Nitrogen Oxides (NOX), Lead (Pb), Sulfur Dioxide (SO_2), and volatile organic compounds (VOC's). The National Air Quality Standards also include PM2.5 and PM10, which are particulate matter less than 2.5 and 10 microns in diameter, for a total of seven criteria pollutants that are reported annually.[47] The following charts present these data for both the state of Texas and El Paso County.

Figure 6 highlights the emissions by pollutant for the approximate sites required to report in Texas. Firstly, it is noteworthy that all pollutant criteria decreased between

2014-2020. Results vary by type with sulfur dioxide having the most significant decline and VOC's the least significant. Overall, emissions decreased by 35.1% across the criteria pollutants measured by EPA over the six years between 2014 and 2020. Despite the decreases 2020 still saw the release of roughly 746,000 tons of criteria pollutants.

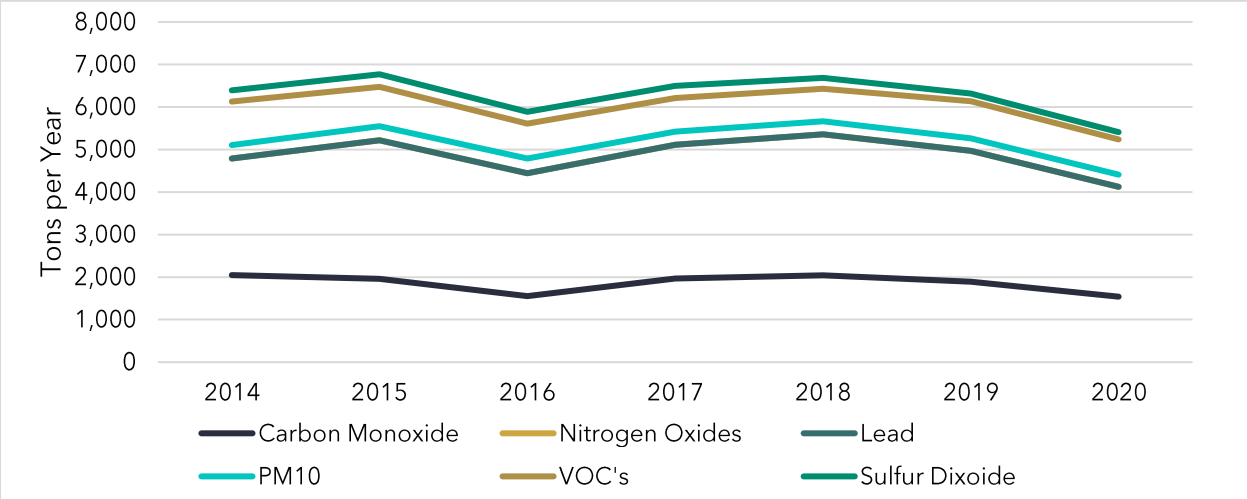
Over the same time period, we compiled the emissions of nearly 20 sites required to report emissions in El Paso County. ***Emissions also went down in El Paso County, but to a less significant degree than the state, 15.1%***. Examining the data in a bit more detail reveals that El Paso County made the biggest strides in reducing emissions of sulfur dioxide and carbon monoxide. ***It is worth pointing out that El Paso's top companies emit less per capita than the state of Texas, in general.*** El Paso County comprised 2.9% of the state's population in 2020, while contributing just 0.7% of its criteria pollutants. Figure 8 shows how El Paso County ranks on this front, in comparison to the five more populous counties in the state of Texas as of 2020. Comparatively speaking, El Paso is in the middle of the pack. Tarrant County achieved significant reductions, whereas Dallas County actually increased in emissions. All six of the metropolitan counties demonstrated in the chart performed worse than the state at large, indicating that rural and micropolitan areas have performed better on reducing emissions, in general.

Figure 6: Total Site Emissions per Criteria Pollutant by Year, Texas



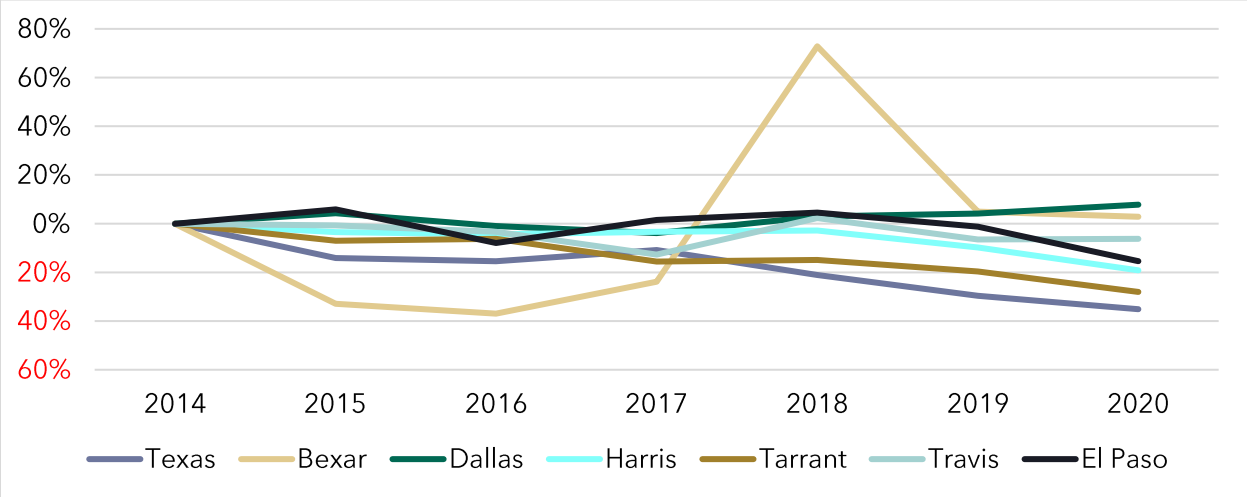
Source: TCEQ, Point Source Emissions Inventory, 2022[48]

Figure 7: Highest Site Emissions per Criteria Pollutant by Year, El Paso County



Source: TCEQ, Point Source Emissions Inventory

Figure 8: Annual Emissions Compound Rate of Change, (2014-2020)



Source: TCEQ, Point Source Emissions Inventory

Economic Characteristics of Energy Industries in the El Paso Area

As summarized in Chapter II, the Climate Charter would have broad and far-reaching influence on all aspects of the energy industry in El Paso. Obviously, the 2030 and 2045 renewable energy targets would directly affect the business patterns of electrical companies. On another front, the water ban against fossil fuel businesses would affect companies that produce energy products in the City or El Paso County that are exported to users outside of the region. Within this section we provide a background on the employment, earnings, +and establishment patterns for this cluster of industries within El Paso County.

When reviewing these data please consider that the federal government groups data according to set industry categories and geographies that are outside of the control of PC to alter. In terms of industries, these include the North American Industrial Classification (NAICS) code system. In terms of geographies, these data are typically reported according to county and metropolitan area, rather than by city.

Per PC's estimates, the roughly 1,000 workers at EPE account for over 50% of all employment in the utilities and oil and gas industries in El Paso County, but there are numerous other businesses directly impacted including oil refineries and natural gas distribution. Most metropolitan areas have some presence of utilities and electric power generation but, natural gas distributors and refinery businesses tend to have a small number of plants that produce energy for a broad geographic area. Although employment may not be especially large in El Paso, these industries these industries are important for residential and commercial use for broad stretches of population. For context, ***in terms of natural gas production, the El Paso MSA ranks among the top 50 in the United States in terms of employment, and within Texas is third only to Houston and Dallas.*** El Paso is an even rarer contributor to the oil refinery industry, as it is one of the just over 100 metropolitan areas in the United States that host any level of refinery employment. ***El Paso's 500+ refinery jobs rank fourth in the state of Texas, behind Houston, Beaumont, and Corpus Christi.*** All this to say that throttling down the natural gas and refining industries in El Paso would have ripple effects within the energy industry that would expand far outside of El Paso County.

Beyond their role as employers, energy industries also tend to possess massive capital investments. Maintaining land, plants and equipment produces substantial economic multiplier effects, which helps explain why the economic impact figures expressed in Chapter III are so large. To site an example, the jobs multiplier effect within the Fossil Fuel Electric power generation industry is 6.47 within El Paso County; by comparison the multiplier for a big box store is 1.36. In other words, ***every one job***

in the fossil fuel electric industry supports 5.47 jobs outside of that industry, whereas an average retail job supports just 0.36 jobs outside of retail.[49]

The series of charts and figures that follow display a ten-year view of several of the key energy industry groups within El Paso in comparison to the United States and Texas. For reasons of data availability, the metrics in these figures are based on the El Paso Metropolitan Statistical Area (MSA), which includes both El Paso and Hudspeth Counties. Data in Table 4 make clear the dominant role of utilities in the El Paso, which contributes over 1,500 jobs and $225M in annual earnings, while petroleum refineries account for 540 jobs and $125M in earnings. Unlike other areas in Texas, the mining, quarrying and oil and gas extraction industries are small in the region and largely in industries unrelated to energy.

Table 4: Employment, Earnings & Location Quotient in El Paso MSA, 2021

	Employment	Earnings ($M)	Location Quotient (LQ)
Utilities	1,536	$225.86	1.21
Petroleum Refineries	540	$125.09	3.94
Mining, Quarrying, and Oil and Gas Extraction	78	$6.74	0.06

Source: Lightcast 2022Q3

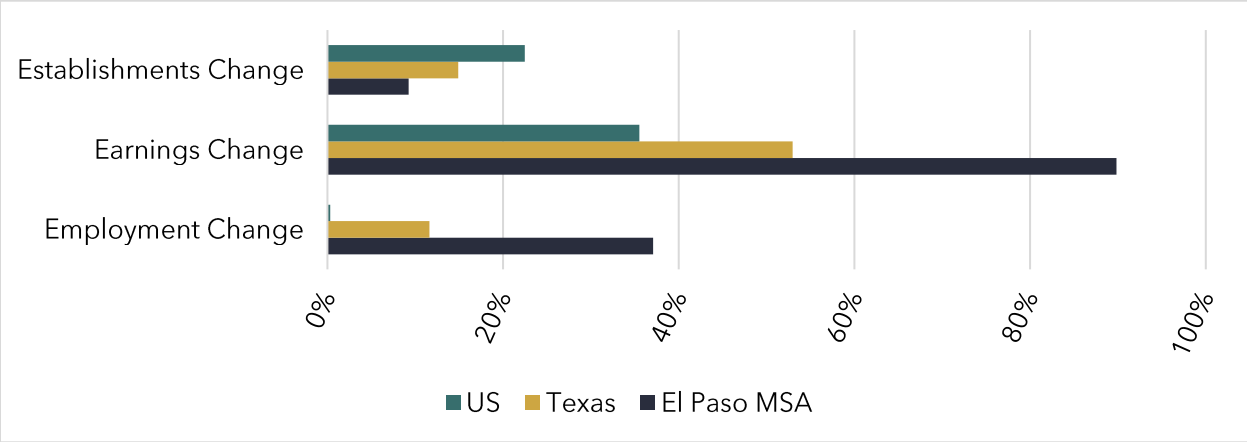
Table 5: Past 10-Years Change in Key Energy Sectors, Employment, Earnings & Establishments

	Employment			Earnings			Establishments		
	El Paso MSA	TX	USA	El Paso MSA	TX	USA	El Paso MSA	TX	USA
Utilities	37.1%	11.6%	0.3%	89.8%	53.0%	35.5%	9.3%	14.9%	22.5%
Petroleum Refineries	(4.1%)	(24.6%)	(15.6%)	27.2%	(5.4%)	4.8%	25.0%	(11.9%)	(19.5%)
Mining, Quarrying, & Oil & Gas Extraction	(46.1%)	(24.2%)	(29.8%)	(21.5%)	(22.3%)	(23.5%)	(44.7%)	(0.8%)	(5.0%)

Source: Lightcast 2022Q3

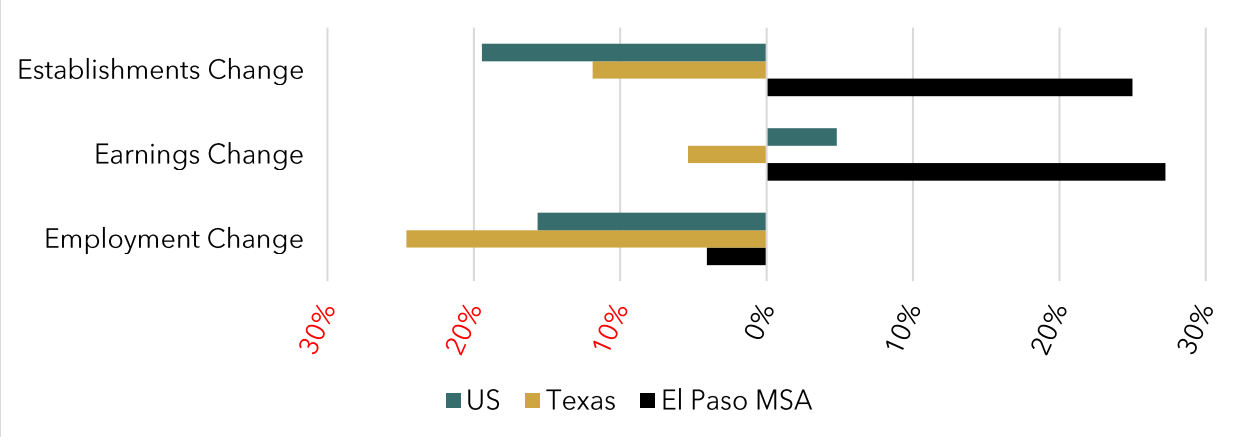
The cumulative change data contained in Table 5 and Figures 9 through 10 indicate that utilities employment and earnings have been expanding more rapidly locally than in Texas and the US, in general. Earnings have been particularly remarkable, expanding 90% between 2011-21. Petroleum refineries have had mixed success between the El Paso MSA and the state, but uniformly have been on the decline at the national level. Meanwhile, the mining and extraction industries have largely decreased in terms of employment, earnings, and establishments over the same period.

Figure 9: Cumulative Percent Change by Category in the Utilities Industry, 2011 - 2021



Source: Lightcast 2022Q3

Figure 10: Cumulative Percent Change by Category in the Petroleum Refineries Industry, 2011 - 2021



Source: Lightcast 2022Q3

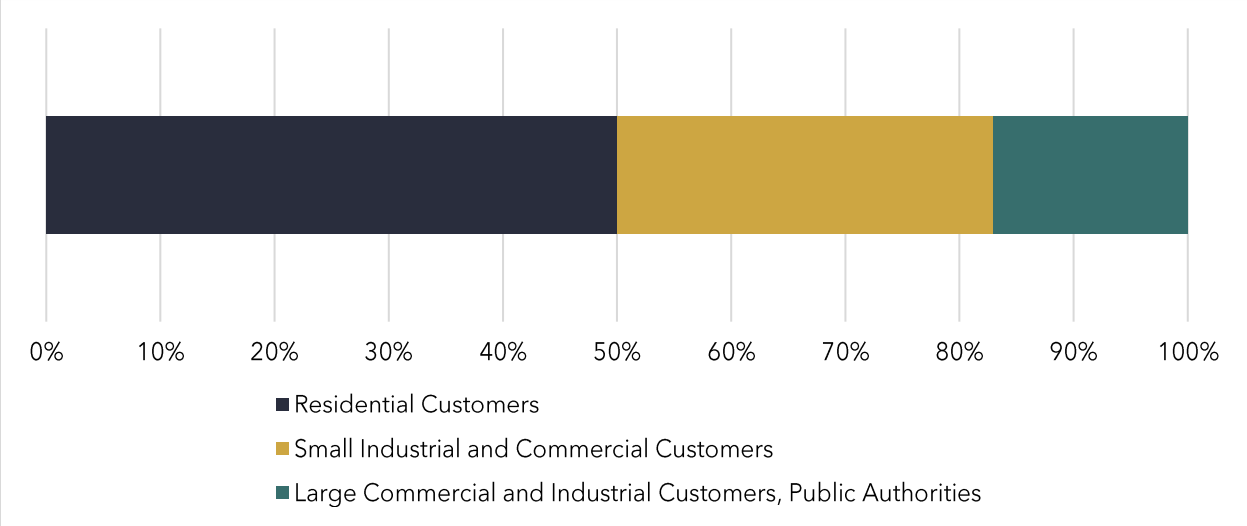
Outline of Key Players

Research on the key organizations that will be most affected by the Climate Charter was conducted by PC in our process of determining the economic impact of the bill. In addition to outlining available metrics on business activities and the company's financial positions, we also highlight existing climate friendly initiatives and projects. This section may serve as helpful background for some voters seeking a full third-party review of these businesses and their climate practices.

El Paso Electric

El Paso Electric (EPE) is a 121-year-old vertically integrated electric utility company including generation, transmission and distribution services. EPE serves almost 450,000 customers in a 10K square-mile area of the Rio Grande valley in west Texas and southern New Mexico, with its largest market in El Paso. EPE's base revenues come from residential customers, large and small commercial and industrial customers, and public authorities (including military installations.)

Figure 11: Approximate Sources of El Paso Electric's Base Revenues, 2021



Source: Fitch Ratings, Rating Report, El Paso Electric Company, August 11, 2021.

Before its acquisition by a private firm, approximately 86% of its revenues came from the retail sale of electricity.[50] The majority (77%) of its customer base is in Texas, a service territory showing strong economic growth. EPE has seen higher than average industry growth in customers and sales, primarily due to expansion at military bases, increased trade between the United States and Mexico, and a shift from evaporative coolers to refrigerated air conditioning. The company has not used coal for any power generation since 2016, when it became the first coal-free utility company in Texas and New Mexico. [51] [52]

EPE was acquired in 2020 by the $24 Billion (B) private entity Infrastructure Investments Fund (IIF). IIF spent $4.3B on the acquisition, including the assumption of $1.5B of the utility's debt and $2.8B in stock. The deal included provisions for $21M in funding for Texas customer bill rate credits and $100M to local economic sustainability funds. Also included were commitments to maintain focus on renewable energy, keep the local workforce intact, and keep its headquarters in El Paso for at least 5 years. [53] [54] [55]

EPE's mission and vision state "We are transforming the Energy Landscape. Together we are powering the next hundred years of Growth, Innovation and Economic Vibrancy." The elements of their current strategic plan are as follows:[56]

- Build trusted partnerships with customers and community
- Propel growth in our company and in the region
- Leverage technology to drive efficiency and security
- Lead environmental sustainability
- Drive a work culture of empowerment, accountability, and inclusion

As a private company, EPE's most current financial information is not publicly available. However, information from Fitch Ratings provides key insights into EPE's financials. Fitch Ratings is one of the three main credit ratings agencies which provide credit ratings, research, and risk analysis on a variety of debt issuers. Fitch ranks EPE 4th out of 11 levels[57] and places EPE in an appropriate position relative to its peer companies. Fitch notes Texas and New Mexico as relatively challenging regulatory environments, especially New Mexico, which accounts for about 20% of EPE's revenues. Utilities in Texas and New Mexico have historically been authorized lower Returns on Equity than the national average. Some of those challenges are offset by supportive rate mechanisms such as fuel and power recovery and energy efficiency program cost riders. In Texas, EPE can recover its distribution and transmission investments through riders, which can provide some protection against regulatory delays between rate cases. [58] [59]

Fitch's "key assumptions" about EPE include a $400M revolving credit facility for managing working capital, and a $1.8B capital investment plan for 2022 – 2026. The focus of capital investment plan is adding new generation capacity, upgrading and expanding transmission and distribution systems, renewable energy generation and storage acquisitions, and replacing equipment at the Palo Verde Nuclear Plant. The ratings agency notes the friction EPE should expect between its large capital investment plan and challenging state regulatory environments, which can negatively affect credit metrics.[60]

The risks already faced by utility companies are worth considering when weighing whether to add additional regulatory burdens. Some of EPE's many risk factors include weather conditions, the local economy, macroeconomic energy prices, inflation, and the age of some of it's power generating units.

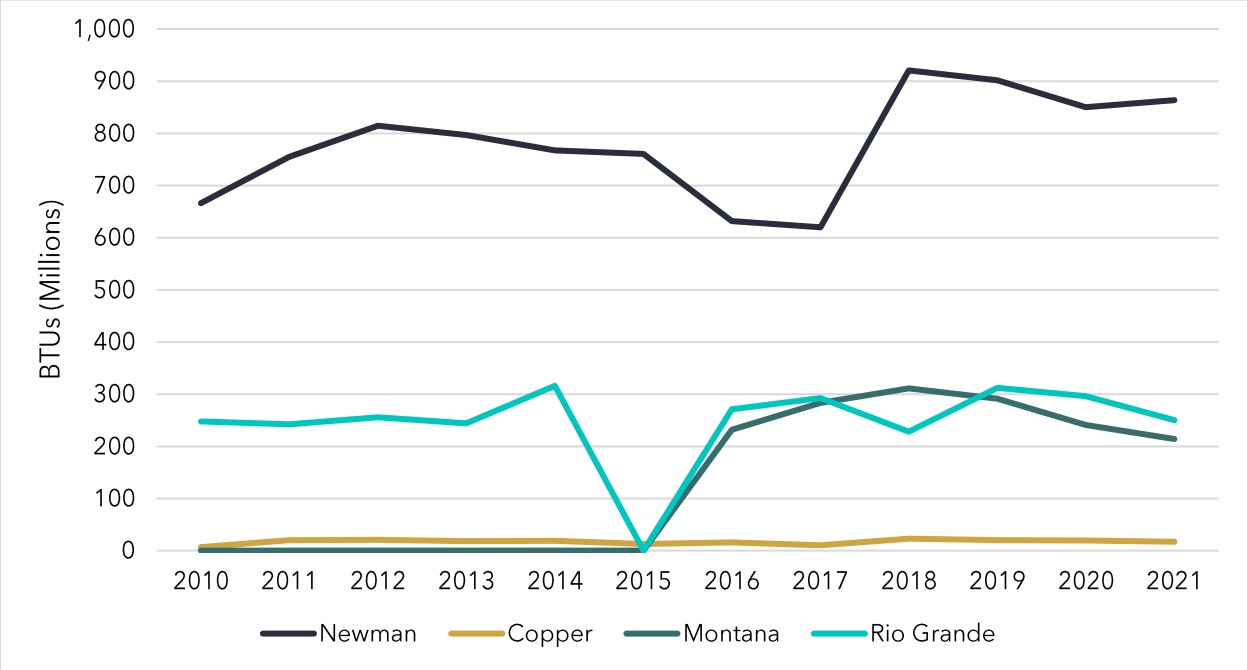
EPE disclosed to investors these Environmental, Social, and Governance (ESG) risks before it went private in 2020:

- Revenues and profitability depend upon regulated rates.
- Inherent risks in the ownership of nuclear facilities.
- Future costs of compliance with environmental laws and regulations could adversely affect operations and financial results.
- Climate change and related legislation and regulatory initiatives could affect demand for electricity or availability of resources and could result in increased compliance costs.
- Adverse regulatory decisions or changes in applicable regulations could have a material adverse effect on business or result in significant additional costs.
- Business is concentrated solely to the electric industry and to one region.
- Success depends on the availability of the services of a qualified workforce and ability to attract and retain qualified personnel and senior management.

The four main power plants operating under EPE are primarily utilizing natural gas for production purposes. However, the Montana Power station uses distillate fuel oil (DFO) for some of its consumption and production purposes, although the quantities are extremely minimal compared to natural gas.

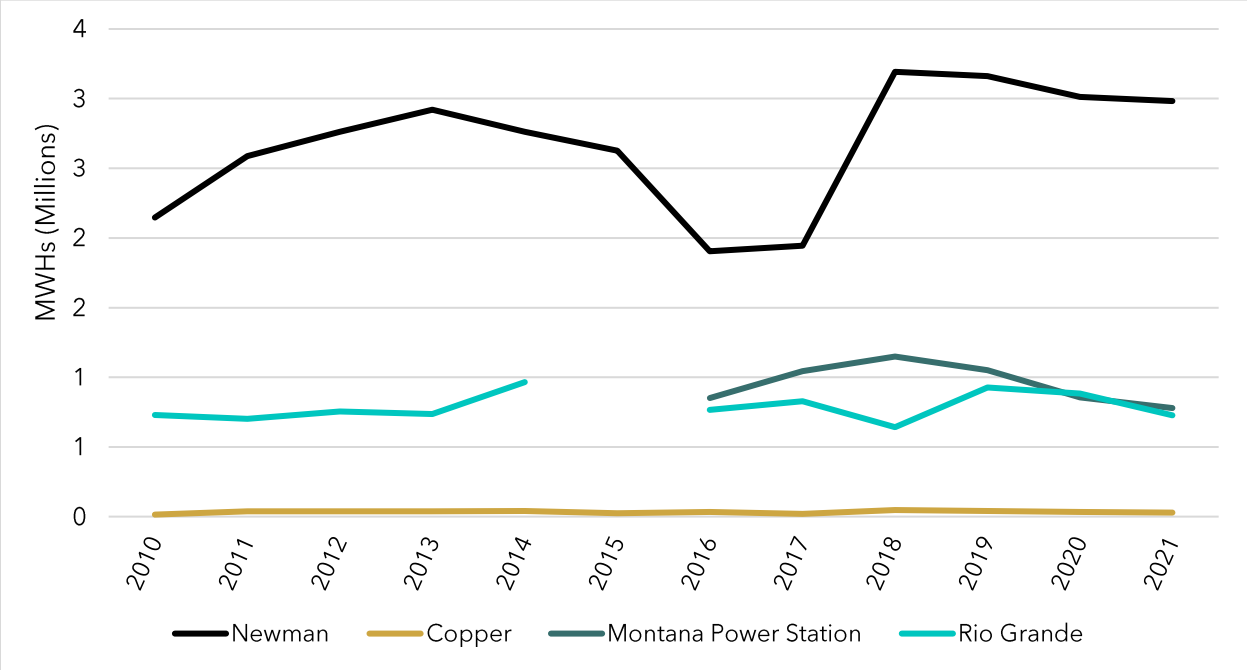
In the last 10 years, EPE's four main power plants have supplied the largest amounts of electricity using natural gas. As shown in Figure 12, the Newman power plant generates the highest amount of all other plants, with Montana Power Station being the second largest operating in 2016 onward. The levels of energy supplied by natural gas are high enough that EPE does not need to seek out energy generation via other resources. However, in 2014 and 2017 EPE erected additional solar energy plants to generate electricity for both Newman and the Montana Power Station.

Figure 12: Annual Natural Gas Consumption of Current El Paso Electric Plants, 2010-2021



Source: U.S. Energy Information Administration, Points Consulting 2022

Figure 13: Annual Electricity Net Generation of Current El Paso Electric Plants, 2010-2021



Source: U.S. Energy Information Administration, 2022

Climate-Friendly Initiatives

EPE is engaged in many climate-friendly initiatives. The company recently revised its corporate strategy and mission by adding a commitment to achieving 100% Carbon-Free energy. The company emphasizes this commitment in their 2021 Sustainability Report:

> *During the last year, EPE established a new mission to transform the energy landscape through new generation, a modernized grid, transportation electrification and enhanced customer options. Central to this vison is the adoption of bold carbon-free energy goals defined by a commitment to 80% carbon-free energy by 2035 and the pursuit of 100% decarbonization of our generation portfolio by 2045.*

Pursuant to this mission, EPE has made measurable improvements to their practices, highlighted by the following:

- Making 48.5% of its total 10.9 MWhs [61] of generated power carbon-free as of 2021
- Lowering its Carbon Emissions by 8.2% since 2019
- Decreasing its Criteria Pollutant emissions by:
    - Carbon Monoxide: 43.3%
    - Particulate Matter: 36.2%
    - Sulfur Dioxide: 18.8%
    - Nitrogen Oxides: 9.6%
- Maintaining its rank in the top quartile for the lowest CO2 emissions among the top 100 power producers.
- Reducing its Carbon Footprint by 6.4% compared to a 2015 baseline[62]

The company's corporate strategy views a long-term resource transition, coupled with actionable near-term projects as the best way to mitigate climate risks. Such projects include renewables and battery storage, microgrid resources to large customers, demand response programs, transportation electrification plans, and voluntary renewable energy subscriptions for smaller customers.

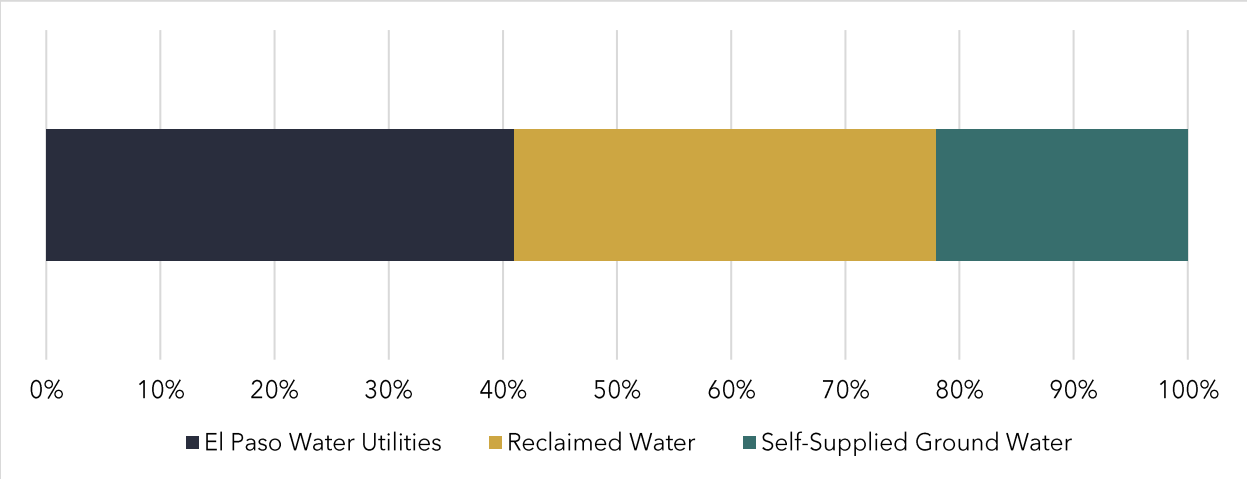
EPE completely divested in coal-fired power in 2016 and has doubled its solar capacity since 2017. Furthermore, a 2020 agreement hopes to triple EPE's renewable energy portfolio by 2025 via purchased solar power and battery storage.[63] Some of EPE's solar power initiatives include:

- 10,000 solar panels with 1MW / 4MWh battery storage on 29 acres, powering 50% of the Las Cruces campus of New Mexico State University.
- A fully-subscribed 5MW Community Solar Program, with 41,000 panels reducing CO2 emissions by more than 8,000 short tons while powering 2,000 homes, which will soon be expanded to 10MWs.
- A successfully implemented system of generating and storing 85MW of power close to where it is used (i.e.: Distributed Generation). This would affect 16,700+ TX customers. The popularity of the program caused it to grow to 127MW in 2021. EPE has 29,00+ kW's of Interconnected Capacity.
- These investments led to the City of El Paso's ranking 4th among Texas cities for total installed solar capacity.[64]

To help EPE achieve its carbon-free goals, the company signed an agreement with Mitsubishi Power Americas. The plan focuses on creating a hydrogen roadmap for EPE to generate carbon-free energy. Among other initiatives, the roadmap includes converting Unit 6 at the Newman Power Station from natural gas to hydrogen.[65] EPE's Newman Power Station's newest unit would move from being 100% powered by natural gas to a 30% nitrogen blend, to eventually being fueled entirely by hydrogen for carbon-free power generation.[66] Unit 6 will also reduce EPE's 2B gallons of annual water consumption by 600M gallons, the equivalent of 12,000 households' use. Figure 14 shows EPE's sources of water for its power generation.

The company offers various energy-efficiency incentive programs, which annually save 40,000+ MWhs of energy. In the grand scheme of things, this is a relatively limited impact, accounting for 0.37% of net energy generation. These programs include a load management program, in which customers partner with EPE to reduce summertime energy demand and allow EPE to adjust their thermostats in exchange for an enrollment credit. In 2021, Energy Star gave EPE the Residential New Construction Market Leader Award due to the company's success in promoting energy efficient new construction.

Figure 14: EPE's Sources of Water for Power Generation



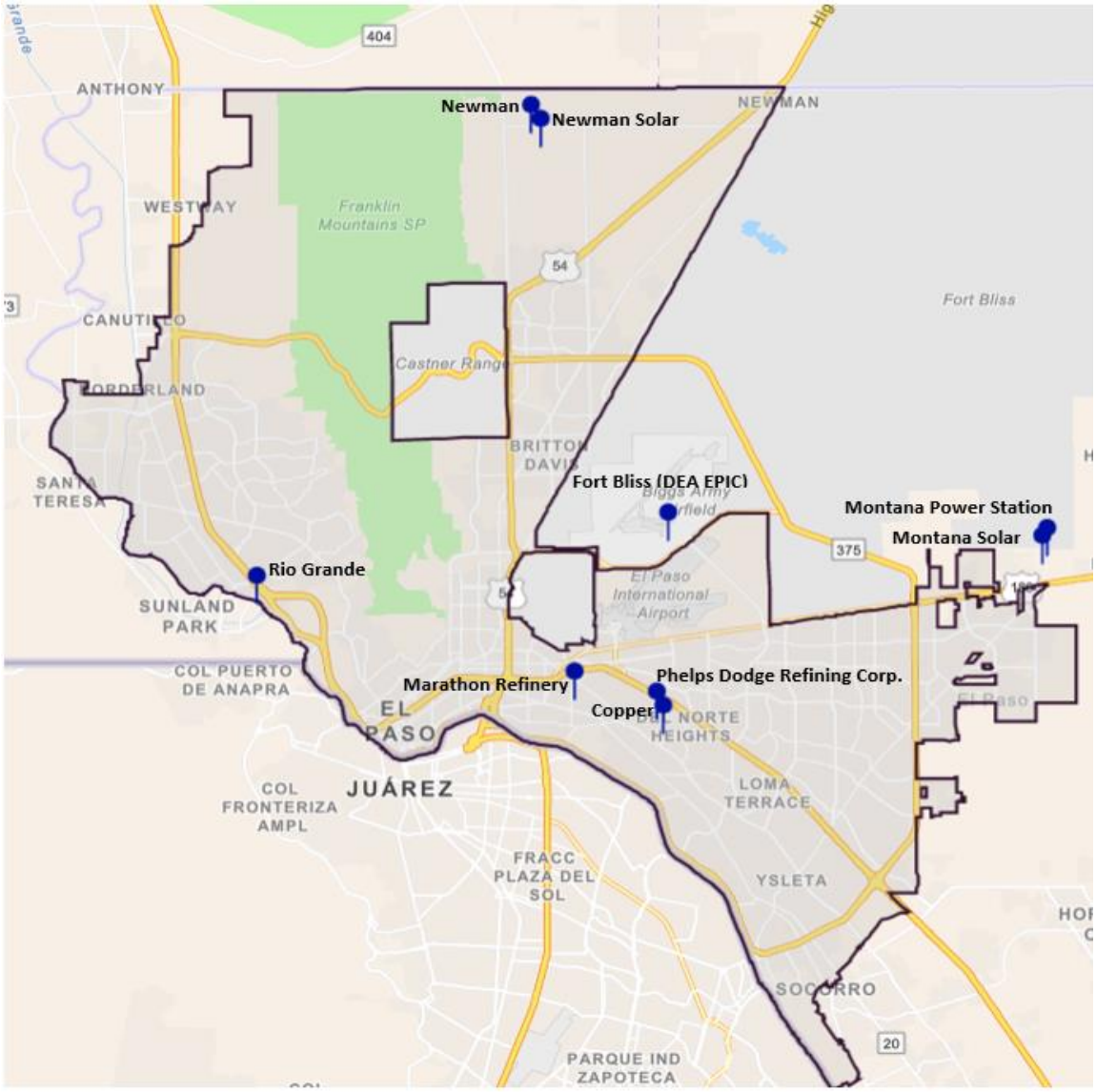
Source: El Paso Electric Sustainability Report 2021

EPE also offsets climate impact through community engagement and outreach programs. EPE sponsors the "SunCycle" bike-share program. In 2021, the program's 14,000 rides offset 73,000+ pounds of carbon. Through strategic partnerships, such as the University of Texas at El Paso (UTEP), EPE collaborates on many initiatives and projects. One of their energy research projects develops models to track emissions in real time at specific locations. Other projects include co-teaching grid-modernization courses, sponsoring senior capstone projects based on electric vehicles, and running the "Discover-E" Trailer, a K-12 mobile engineering classroom and solar panel / battery storage demonstration unit. In December 2021, the New Mexico Public Regulation Commission (NMPRC) gave EPE permission to invest more than $1.2M in electric vehicle infrastructure and outreach in Southern New Mexico. The approval is part of the EPE's Transportation and Electrification Plan (TEP).[67] [68]

Location of EPE Assets

As displayed in Figure 16, both Newman plants are the only EPE owned power plants located within El Paso city limits. The Newman site produces the most electricity generation for consumers within city limits compared to other plants. The Rio Grande site is just outside the city limits located in New Mexico, serving users in both states.

Figure 16: Location of Plants and Refineries in El Paso, Texas, 2023



Source: ESRI BA, EIA, 2023

Texas Gas Service (One Gas)

Texas Gas Service, a division of One Gas, provides natural gas to the El Paso area. Of the 100% regulated public utilities in the US, it is one of the largest among those that are publicly traded. One Gas headquarters in Tulsa, Oklahoma, has 3,600 employees, and services 2.2 million customers. Based on the number of customers served, One Gas's subsidiaries include the largest distributors of natural gas in Oklahoma and Kansas, and the third largest in Texas. Approximately 70% of One Gas's customers are located in seven major metropolitan areas across Oklahoma, Kansas, and Texas, including El Paso. Its average number of Texas customers is 689,000, and it has employs 860 in Texas. The state of Texas ranks 3rd nationally among gas producing states.[69] Texas Gas Service's strategy emphasizes "Safe and reliable energy, High-performing workforce, Capital demand growth, Energy transition solutions, and Customer affordability."

One Gas's financial information is more available than EPE as a public company. S&P Global Ratings rates One Gas as an A-, which qualifies as "stable". Its annual review of the company notes "significant" financial risk, but also "excellent" business risk, a "strong" competitive position, and "adequate" liquidity. In 2021, S&P Global Ratings downgraded One Gas from A to BBB+, because of extreme winter conditions causing it to transact large ($2.5B) natural gas purchases using short term loans. This drop in rank illustrates some of the weather, market, and financial risks large scale utility companies face during price spikes. Its strong balance sheet is what allowed it to take on that urgent transaction, and recover its credit rating relatively quickly, succeeding in providing customers with desperately needed heat during the incredible cold spell brought on by Winter Storm Uri. Some of the items in the Climate Charter could damage the balance sheets of such utility companies, leaving them less able to meet customer demand during emergencies. The company has seven outstanding bonds detailed totaling $2.7B, all of which were rated BBB+.

Continuous and previous investments in the integrity of the company's distribution systems put One Gas in a position to deliver natural gas to millions of customers and critical care centers during the 2021 winter storm. From 2019-2022, One Gas will have spent $1.7B in Capital Expenditures and asset removal, for an average of $568M per year. In 2021 alone, the company invested $544M in long term capital projects, which is 6% more than they spent in 2020, in order to capitalize on the significant economic and population growth happening in their markets.[70]

One Gas expects customer growth of 2% annually in Texas. Over the next five years, their total capital spending is expected to be $3.5B, which is a 19% ($500M) increase from the previous five-year plan. Half of this amount will be allocated towards maintaining system integrity, while the other half will be used to support growth.[71]

One Gas discloses some risks in its 2021 Annual Report that are relevant to the Climate Charter topic: [72]

- Subject to environmental regulations and failure to comply could result in significant fines or penalties
- Subject to various risks associated with climate change, which may adversely affect financial results, growth, cash flows and results of operations
- Customers' energy needs vary with temperature/humidity.[73]
    - The potential reduction of funding to the fossil fuel sector as a result of green initiatives could hamper One Gas's ability to respond to increased demand.
- Lawsuits from various parties related to climate change.[74] Although One Gas has not been named in any of these suits, many are brought on one of the following themes:
    - Oil and gas companies are liable for various asserted damages associated with the production or sale of fuels that contributed to climate change.
    - Oil and gas companies have been aware of the adverse effects of climate change for some time but failed to adequately disclose those impacts to investors or consumers.
- Political, regulatory, and legislative risks
- Subject to comprehensive energy regulation by governmental agencies, and the recovery of costs is dependent on regulatory action
- Carbon neutral, energy-efficiency or other legislation or regulations intended to address climate change could increase operating costs or restrict opportunities in new or existing markets.
- Covenants: One Gas's financing arrangements subject it to various restrictions that could limit operating flexibility, earnings, and cash flows.[75]

Climate-Friendly Initiatives

Signaling its climate-related commitments to regulators, investors, and customers alike, One Gas incorporates "Energy Transition Solutions" as one of its five strategic areas and aspires to be "net-zero" emissions by 2050. The company is a founding member of the EPA's Methane Challenge Program and participates with the nonprofit Gas Technology Institute to identify additional emissions reduction opportunities. One Gas has spent $11M supporting research and development of natural gas innovations, and contributed $1.1M to technology development, funding 80 active technology projects.

One Gas is aggressively increasing the efficiency of its distribution pipelines. One of the company's goals is to reduce absolute emissions caused by leaks by 55% over the next 13 years,[76] achieved in part by replacing and protecting their vintage pipeline. As of December 2021, the company has already achieved 22% reduction in pipeline emissions via the pipeline replacement program, and a 46% reduction in CO2 emissions, by only emitting 155K metric tons, as compared to the 2005 baseline of 289K.

One Gas is also committed to pursuing the use of Renewable Natural Gas (RNG), which is methane of biogenic origin or captured from flaring. Its sources include food waste, waste management operations, livestock farms, wastewater treatment, and landfills. The vision of RNG proponents is that it can be injected into existing natural gas infrastructure easily and act as a substitute. One Gas's distribution assets are capable of using RNG, and its service area includes vast supplies of agricultural feedstock, identified and estimated via One Gas's partnership with Vanguard Renewables. The company is also exploring wastewater and landfill capture RNG projects. As of January 2022, One Gas has 22 RNG projects active, and expects demand for RNG to continue rising as customers desire to reduce their emissions.[77]

One Gas is a member of the Carbon Utilization Research Council (CURC), which successfully advocated that funding for carbon capture projects and testing be included in the Infrastructure Investment and Jobs Act. CURC submitted budget requests to the U.S. Senate Appropriations Committee for $500M allocated to the expansion of CO2 storage, and carbon capture R&D and testing.

As a member of Our Nation's Energy Future (ONE Future), a group of 50 natural gas companies, One Gas is voluntarily working to reduce their methane emissions to 1%, across the entire value chain by 2025. The company replaced 430 miles of main lines, transmission lines, and service lines to reduce emissions. They continue to replace at least 2% of their vintage lines every year, with lower-emitting pipes. Forty-three percent (43%) of One Gas's fleet runs on Compressed Natural Gas (CNG). By using that cleaner-burning fuel, One Gas avoided emitting the equivalent of 10,800+ passenger vehicles' worth of CO2 in 2021 alone.

As the company expands, it has adopted green building standards for new construction and completed three such buildings in 2021. It is growing its energy efficiency programs to help customers use their product more efficiently by means of an energy rebate program. Through the program, One Gas issued $15.8M in rebates to over 100,000 Oklahoma and Texas customers in 2021. Their other energy efficiency programs include:

- Low-Income Energy Efficiency Assistance Program
- Home Improvement and Appliance Replacement Program
- New Home Program
- Commercial Direct Install Program
- Natural Gas Vehicle Rebate Program
- Water Conservation Program

Through those programs, One Gas achieved 5.19 therms[78] of annual savings and 35,000+ metric tons of CO2 reduction in 2021.

One Gas also encourages and facilitates the purchase and use of natural gas vehicles. They offer incentives on their purchase (over 250 rebates since 2015), and operate 145 public and private CNG fueling stations, 33 One Gas fueling stations, and 46 private (fleet) CNG stations. They also transport CNG supply to 66 retail fuel stations. One Gas also achieved a 26.5% increase in water gallons saved in 2021 due to its water management strategies. Joining the ranks of other large corporations, they established their own Environmental, Social, and Governance (ESG) Steering-Committee, and were a supporter of "Energy Choice" legislation which protects a mixture of energy options for consumers in Kansas, Oklahoma, and Texas.

El Paso Water

El Paso Water is run by the Public Service Board. Its mission and vision are:[79]

> *"To provide our customers a sustainable water supply and the highest quality water services to enhance the vitality of El Paso. We are an international model for water resource innovation, respected and trusted by our customers for our leadership in delivering sustainable water services to a thriving El Paso community."*

River water and groundwater have historically provided El Paso its water. The Rio Grande is a major source of river water for El Paso, providing nearly half of the city's potable water. The Rio Grande flows that are directed towards El Paso primarily come from snowmelt runoff from southern Colorado and northern New Mexico. Groundwater for El Paso is extracted from the Mesilla and Hueco Bolsons aquifer, which are located under parts of New Mexico, Texas, and Chihuahua, Mexico. In addition to those traditional sources of water, El Paso Water has also implemented the use of desalinated water to meet high demand during peak summer months and to supplement the water supply during times when river water is scarce.

The U.S. Bureau of Reclamation is responsible for managing the distribution of water from the Rio Grande Project's reservoir to various locations in New Mexico, Texas,

and Mexico. El Paso Water (EPWater) is a customer that receives water through the El Paso County Water Improvement District No. 1. EPWater also leases additional water rights from the Lower Valley Water District in exchange for a wholesale supply of potable water and returns some of the water for aquifer recharge.[80]

El Paso Water's second biggest customer is EPE, which accounts for $4.1M (3.1%) of El Paso Water's revenue, and 6% of its total water usage (2.04B gallons).

Table 6: El Paso Water, Three Largest Customers, 2022

Rank	Name of Customer	Water Usage (Billions of Gallons)	% of Total Water Usage	% of Total Water Revenue
1	Lower Valley Water District Authority	2.09	6.2%	3.4%
2	El Paso Electric Company	2.04	6.0%	3.1%
3	El Paso, City	1.74	5.1%	6.1%

Source: El Paso Water Utilities Public Service Board, 2022.

As an example, EPWater's revenue from EPE's Newman Plant, which is given a special rate, was $285K in 2021, and grew by 30.4% in 2022 to $372K.[81]

El Paso Water's 10 Year Capital Improvement Plan consists of:[82]

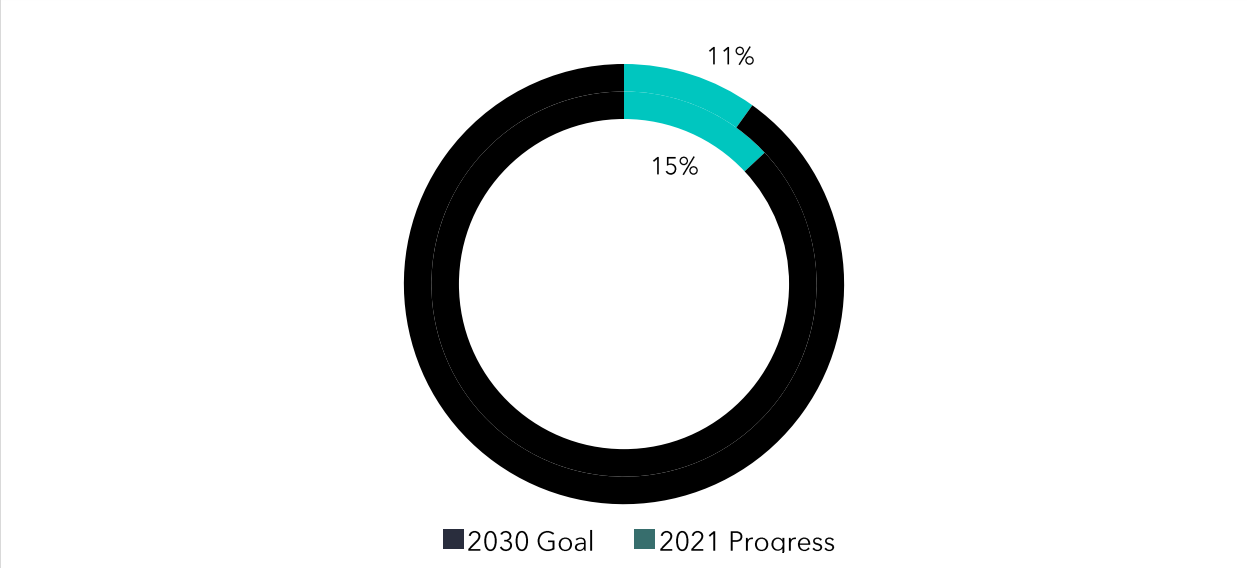
- $3B of construction
- $700M in drainage projects.
- Estimated rate increase over 5 years is 57%
- Estimated drainage fee increase over 5 years is 82%
- 9% fee increase for FY 2022-23
- Budgeted $533M in fiscal year 2022-23 to keep up growth demands, and $70M for drainage.

Marathon Petroleum Corporation

Marathon Petroleum, a prominent private sector member of El Paso's energy production industry, has positioned itself as a leader in sustainability. It was one of the first in its industry to link its executive compensation to its reduction in Scope 1 (direct GHG emissions) and Scope 2 (indirect GHG emissions, from consumption) Green House Gas intensities. Today, it also links its cash bonus to its performance in keeping Environmental Incidents to a minimum, specifically Tier 3 and Tier 4 incidents (release of hazardous materials into the air, land, or water), among other ESG metrics. Up to 10% of its cash bonus is linked to those environmental metrics. The company has a three-pronged strategy to continue its sustainability leadership, consisting of strengthening operational resilience, innovating for the future, and embedding sustainability into its decision-making.

In 2022, Marathon became the first U.S. refinery to commit to reducing its absolute Scope 3 emissions, which are greenhouse gas emissions generated by a company, but not controlled by that company, such as employee commutes or business travel. Figure 17 shows Marathon's progress in reducing its Scope 3 emissions. The company aims for a 15% reduction of Scope 3 emissions from 2019 levels by 2030.

Figure 17: Marathon Petroleum Absolute Scope 3 Emissions Goal

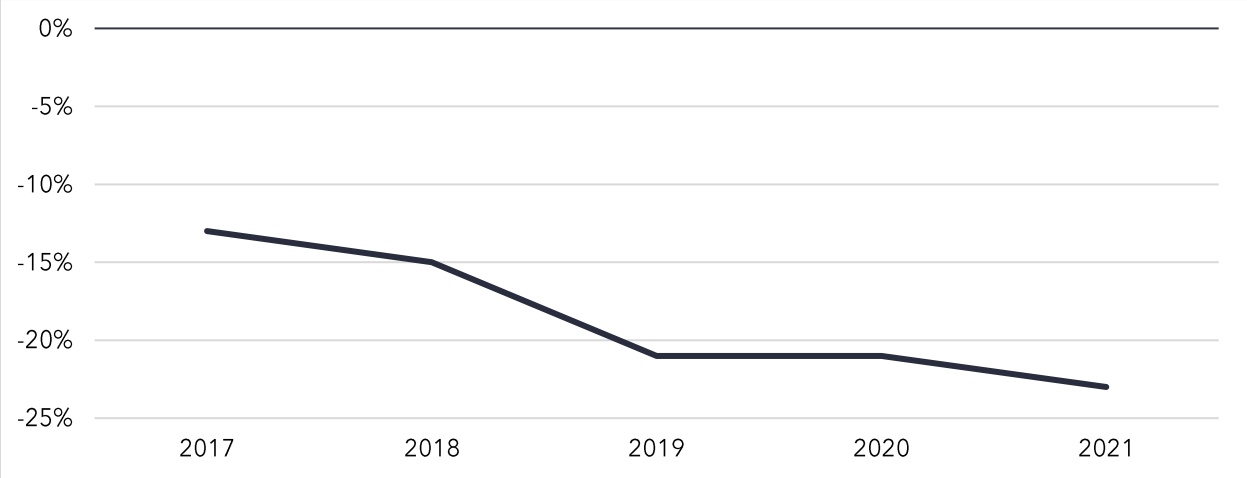


Source: Marathon Petroleum 2021 Sustainability Report.

Marathon is also committed to reducing methane emissions intensity by 75% below 2016 levels by 2030, and to reducing freshwater withdrawal intensity by 20% from 2016 levels by 2030.

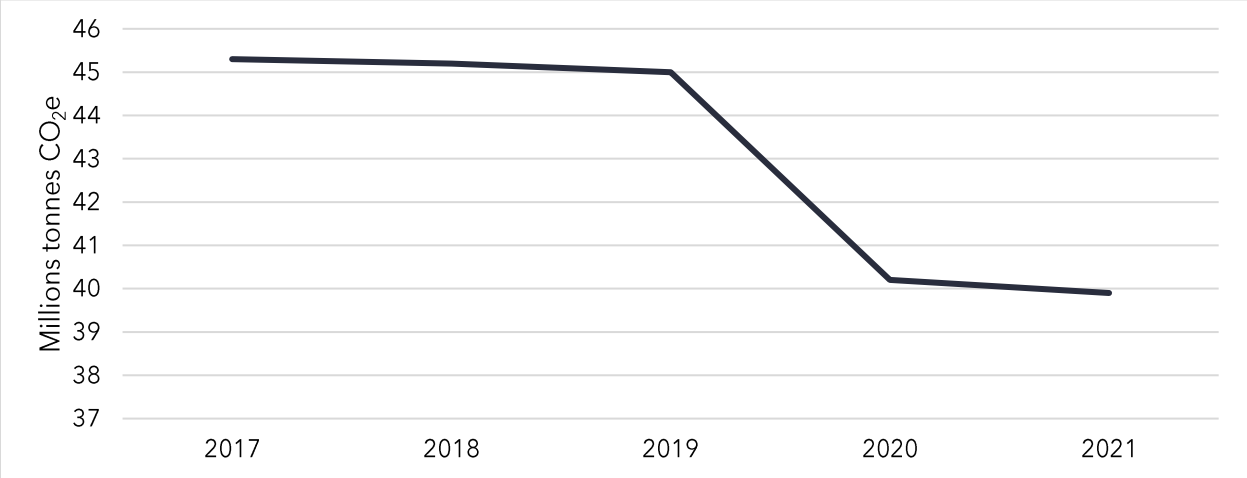
Various initiatives are in place at Marathon to lower its carbon footprint, including the use of renewable energy sources and advanced technologies, emissions reduction projects, and fuel switching. Since 2014, the company has reduced its GHG emissions intensity (Scope 1 and 2) by 23%. Since 2019, companywide emissions (Scope 1 and 2) have fallen by 11%. Since 2016, it has also achieved a methane emissions intensity reduction of 46% and a freshwater withdrawal intensity reduction of 15%.

Figure 18: Marathon Total Scope 1 & 2 GHG Intensity Reduction Since 2014



Source: Marathon Petroleum 2021 Sustainability Report.

Figure 19: Marathon Total Scop 1 & 2 GHG Emissions, 2017-2021



Source: Marathon Petroleum 2021 Sustainability Report.

Marathon Petroleum's programs to increase the use of renewable energy in its operations include using renewable natural gas and installing solar panels at its facilities. Its goal is to boost its use of renewable energy sources to 20% of its total electricity consumption by 2025. The company's portfolio of renewable fuels includes renewable diesel, biocrude, ethanol, and feedstock partnerships. Marathon is also exploring the use of advanced technologies such as carbon capture and sequestration, hydrogen, and advanced biofuels. The company is a leading marketer of renewable fuels in the US, delivering approximately 2.4B gallons to consumers in 2021, an amount which avoided nearly 10M tons of CO2 transportation emissions.

Marathon is also committed to conserving natural resources. It has initiatives to reduce water and energy consumption, improve air quality, minimize waste, and protect biodiversity. Their energy reduction efforts include rearranging compressors (saving 3,500 MWhs/year and reducing Scope 2 emissions by 2,000 metric tons) and implementing continual optimization at the Galveston Bay refinery (reducing Scope 1 and 3 emissions by a combined 8,500 metric tons). Marathon's energy reduction efforts resulted in avoiding about 100,000 homes' worth of yearly energy use, or 2 Billion BTU/hr in 2021 alone.

Marathon has also contributed to the Paso de Norte Air Basin air quality monitoring network, increasing its size by 33%, and facilitating coordinated efforts between federal, state, local, and Mexican air quality authorities. The company incorporates species preservation best-practices into its operational logistics, minimizing the use of pesticides, creating migration-friendly construction schedules, and restoring / re-seeding all disturbed areas.

In addition to fostering sustainability within its own direct operations, Marathon is committed to advancing sustainability throughout its entire supply chain. Marathon works with suppliers who sign its Supplier Code of Conduct, signaling shared values and adherence to Marathon's ESG standards. The company also has robust governance practices in place to ensure accountability and transparency, including committees to oversee its sustainability efforts and the publication of a sustainability report.[1]

[1] Marathon Petroleum 2021 Sustainability Report.

V. Appendices

Appendix A: Topical Literature Review

The following narrative provides broader background on the topics of Climate Change, and international and national initiatives to curb the effects of climate change. As with much of the Chapter IV material, it may serve as a helpful primer for voters not intimately familiar with these topics.

Greenhouse Gas (GhG) Impacts

There is great concern that GhG emissions from human activities strengthen the greenhouse effect, which is the phenomenon of certain gases absorbing and trapping some of the sun's heat in the Earth's atmosphere instead of allowing it to escape back into space. Larger amounts of these gases trap more heat in Earth's lower atmosphere, causing climate change in the form of global warming—the ongoing increase in global average temperature. One such gas is carbon dioxide, an abundant byproduct of the world's major energy production methods. Several attempts around the globe have been made to reduce the amount of human GhG emissions.

The Paris Agreement is an international treaty with the long-term goal of limiting climate change. Adopted in 2015, the Agreement aims to keep the rise in average global temperature below 2°C (3.6°F) above pre-industrial levels, and preferably limit increases to 1.5°C (2.7°F). Carbon neutrality, a state of net-zero carbon dioxide emissions, is hoped to be achieved by balancing emissions of carbon dioxide with its removal – namely by eliminating emissions from human activities. The agreement held that emissions should be reduced as soon as possible to reach net-zero by 2050. To achieve this, each nation provided their own Nationally Determined Contribution (NDC) stating how much they aim to reduce their emissions. There are no consequences to failing to meet pledged NDCs, and many nations have failed to taper their growing amount of, let alone reduce, carbon emissions. Further, the current NDCs are not vigorous enough to cut emissions enough to achieve the Paris agreement's net-zero goal, even should all nations meet the NDCs proposed.[83] The Global Stocktake (GST), a fundamental component of the Paris Agreement used to monitor its implementation and evaluate collective progress, is to be conducted at five-year intervals starting in 2023.

The Intergovernmental Panel on Climate Change (IPCC) is an intergovernmental body of the United Nations that works to advance scientific knowledge about climate change caused by human activities. The IPCC prepares comprehensive Assessment Reports about the state of scientific, technical, and socio-economic knowledge on

climate change, its impacts and future risks, and options for reducing its progression. The last report was the Fifth Assessment Report (AR5) completed 2014. The IPCC is working on the Sixth Assessment Report (AR6), projected to be completed March 2023. IPCC ARs are prepared by three Working Groups, each looking at a different aspect of the science related to climate change: Working Group I (The Physical Science Basis), Working Group II (Impacts, Adaptation and Vulnerability), and Working Group III (Mitigation of Climate Change).

- The Working Group I contribution to the Sixth Assessment Report, *Climate Change 2021: The Physical Science Basis* was released on 9 August 2021.
- The Working Group II contribution, *Climate Change 2022: Impacts, Adaptation and Vulnerability* was released on 28 February 2022.
- The Working Group III contribution, *Climate Change 2022: Mitigation of Climate Change* was released on 4 April 2022.
- The Synthesis Report will be the last of the AR6 products and is scheduled to be released in March 2023 to inform the 2023 Global Stocktake under the United Nations Framework Convention on Climate Change.

Future Energy & Climate Scenarios

Representative concentration pathways (RCPs) are different scenarios depicting the future of Earth's climate adopted by the IPCC. They vary based on the realization of different climactic impacts and events. Radiative forcing is the change in energy flux in the atmosphere caused by natural or human impacts on climate change as measured in watts/metre.[2] It is used to quantify change to Earth's energy balance, and positive radiative forcing means Earth receives more incoming energy from sunlight than it radiates back to space. This net gain of energy presumably causes warming, and the RCPs – such as RCP2.6, RCP4.5, RCP6, and RCP8.5 – are named after a possible range of radiative forcing values in the year 2100 (2.6, 4.5, 6, and 8.5 W/m^2, respectively). Each scenario has its own economic impacts to consider, with RCP 2.6 traditionally being the 'best-case' scenario hoped for by the IPCC through implementation of each nation's NDC, and RCP 8.5 being the worst-case scenario warming the earth most significantly (a 4-6°C increase from pre-industrial global temperatures by the year 2100). The outcomes reflect the ICPP's understanding of GhG emissions and effect based on climate policies implemented, with worst-case RCP 8.5 depicting a future with high population and little regard for human impacts on climate (tripling CO2 emissions by 2100).

Though the effectiveness of each nation at achieving their NDCs will be better assessed publicly with the 2023 GST, it is already suggested that many developing countries do not have the economic bandwidth to focus on generating renewable

energy, as many are in a state of energy crisis without enough energy to go around. Renewable energy is not the most readily available, reliable, or affordable option for energy production in any country, let alone those still struggling to meet energy demands. Cutting emissions, and thus energy, from these countries via climate policy would mean stunting their economic development, if such policies were even possible to enforce. The nations escaping energy poverty are those with higher GhG emissions.[84]

Figure 20: Energy Use Per Capita vs. GDP per Capita

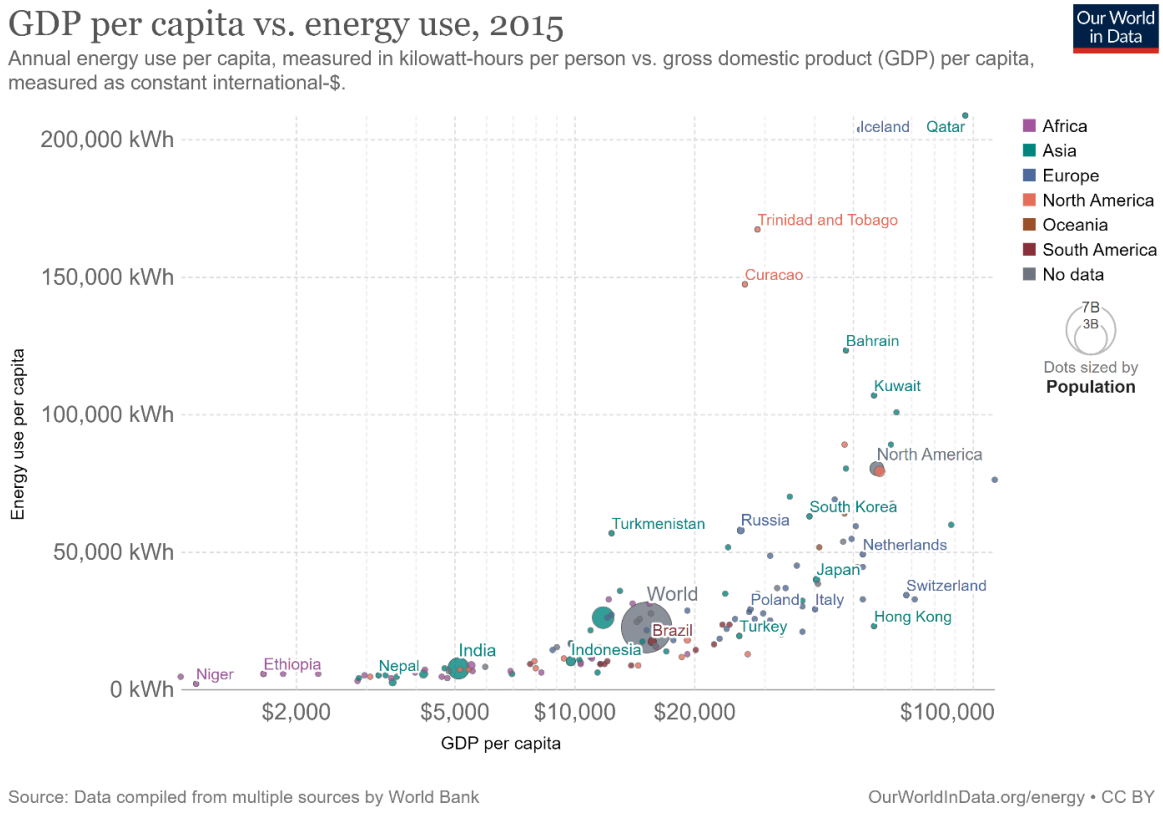
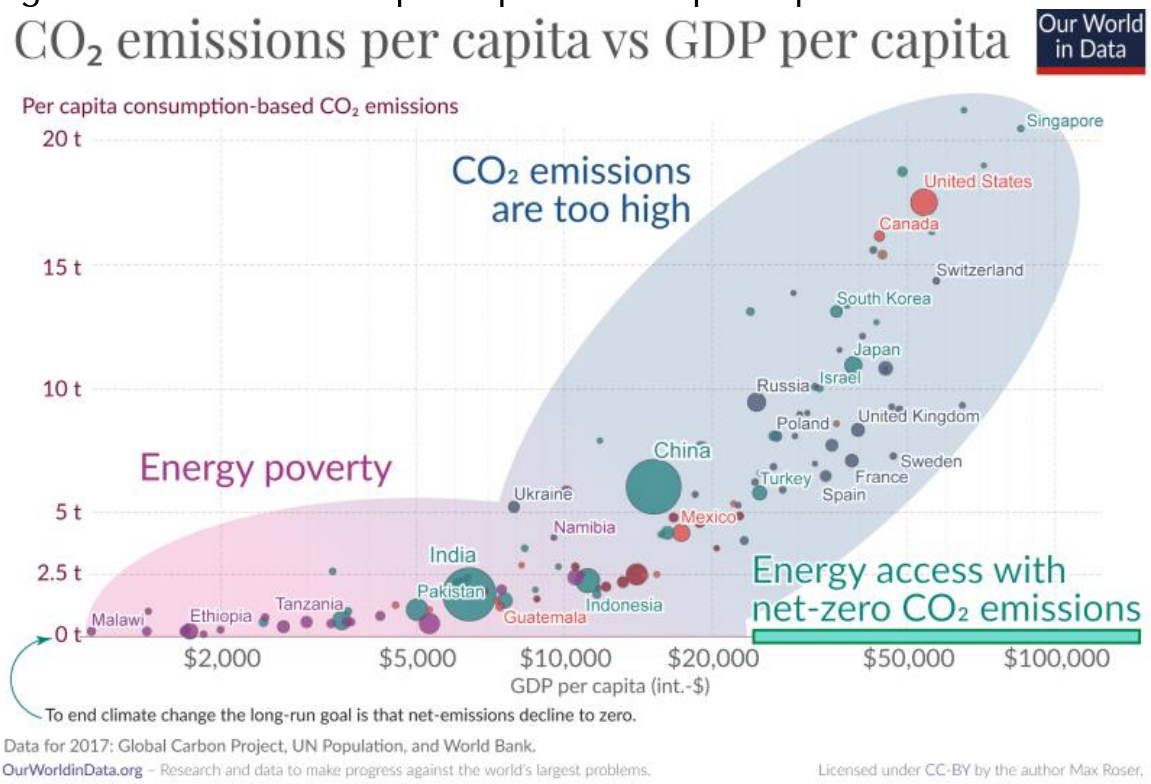


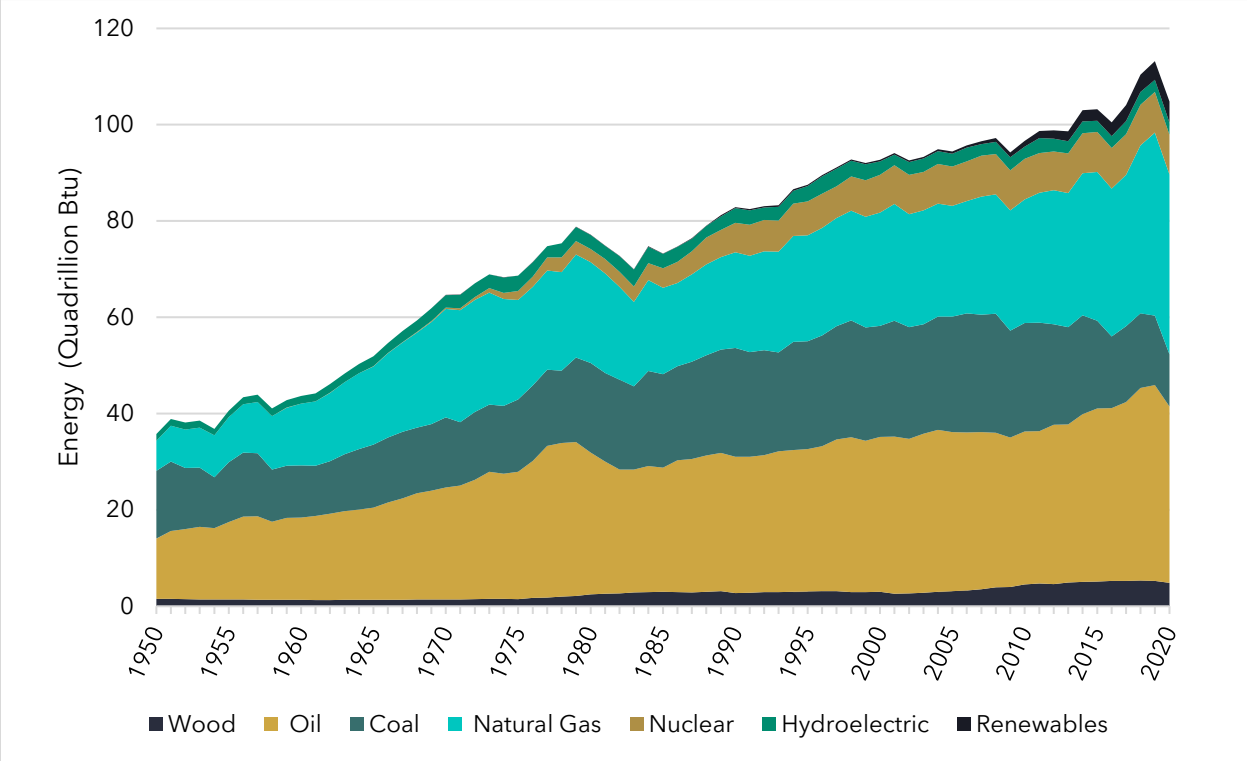
Figure 21: CO2 Emissions per Capita vs. GDP per Capita



AR5 holds that the economic impact of climate change will be small relative to impacts of other drivers.[85] For example, concerns have been raised regarding a warmer climate's impact on crop yields, resulting in a shortage that would lead to higher grain prices. However, the most that can be said is that although crop yields have been increasing for years, and are projected to continue increasing, that they may have gone up more if not for climate change.[86] Though difficult to quantify, there is even speculation that agricultural gains are due to the aptly named greenhouse effect, as plants make use of carbon dioxide emissions.

If the Climate Charter moves forward, it would force energy consumers to shift from use of fossil fuels to renewable energies very quickly; in fact, 100% conversion in a period of just 22 years. There are multiple issues with assuming such a rapid transition. Firstly, although the costs of renewable energy sources are decreasing, all factors considered they are still significantly more expensive than fossil fuels. Secondly, renewable energies are not a temporally available on an as-needed basis, as are fossil fuels. Renewables can be harvested when the sun is shining and the wind is blowing, but those times may not be at the times and in the places where consumers most need the energy.

Figure 22: Sources of US Energy (Produced and Imported,1950-2020)



Source: U.S. Energy Information Administration, 2022, https://www.eia.gov/totalenergy/data/browser/?tbl=T01.02#/?f=A.

A historical review of sources of US energy provides a sobering picture of the feasibility of such a rapid transition. Renewables entered the scene to a noticeable degree starting in the 1980s. Through years of technological development, incentives, and national investment, as of 2022 renewables accounted for just 10.15 quads of energy production in 2022, or just 13.2% of the total.[87] Charting these data across time, in fact, tells us not that energy sources are gradually being replaced but rather that they are being piled on top of the existing stack of energy sources. As renewables have been added to the portfolio, natural gas, nuclear and oil sources are not decreasing, only increasing at a decreasing rate.[88]

Green Jobs

The impacts of climate policy on jobs on the economy are complex. One study looking at short, middle, and long-term job creation in congruence with conversion to renewable energy suggests more jobs would be created as current energy sources are converted. As low-carbon technologies tend to be more labor-intensive, the net number of jobs could grow until efficiency in such positions increase. Long-term, if climate policy triggers the needed widespread structural adjustment, episodes of

'creative destruction' could result in often innovation, job creation and growth.[89] One downside would be that such a large labor force would be expensive to employ, and many jobs created to monitor, plan, and enforce climate policy would predictably be government sponsored with associated tax impacts to consider.

There are studies where environmental regulations are associated with higher production costs and output prices, leading to lower demand and lower employment growth rate,[90] [91] while according to other works, environmental innovations produce a reallocation of labor from regulated to less polluting industries.[92] [93] One study focused on whether green economy investments stimulate firm-level jobs, pitting job displacement and compensation forces of innovative technology against each other. It found environmental innovations to have a "significant negative effect on employment" as it can make firms less competitive than their more traditional counterparts. Lack of knowledge diffusion between firms, too, was found to play a crucial part on labor in the environmental context, as a dearth of experience among the displaced labor force can hinder smooth transition to more environmentally friendly technology. In conclusion, the study found "not only are economic incentives to allow the transition to cleaner technologies required, but also stronger actions to favor job creation relative to environmental activities are needed for a full sustainable achievement of firms."[94]

Appendix B: EPE Fair Market Value Estimation Methodology

EPE was purchased by the Infrastructure Investment Fund (IIF) in 2020 for an estimated $4.3 billion. Given the recency of this transaction and the fact that EPE's performance does not warrant any discounting from this price, this serves as the baseline for our estimate. Additional market factors we analyzed to push this value forward to 2030 including the S&P 500's widely used benchmark historical growth rate of 10% (including dividends), the yield on U.S. Treasuries, and the NASDAQ-listed Utilities Select Sector SPDR® (ticker: XLU).[95]

The team used the Capital Asset Pricing Model (CAPM) to get the estimated acquisition cost, which is called the "expected return" in the model. The calculation is split into two stages in order to reflect the recent dramatic change in interest rates. The first stage ranges from July 29, 2020 – the day the EPE Acquisition closed – to January 2023. In this period, 10-Year Yields had a midpoint of 1.39%, which treat as our "risk-free" rate.[96] During that time, the S&P 500 went from 3,258.44 to 3,919.25.[97] This increase of 20.3% will serve as our market return. The beta of our proxy utility

CAPM formula:

*Risk-free rate + (Beta * (Market return - Risk-free rate)) = Expected Return*

(XLU) is 0.61, and it is likely that El Paso Electric's own beta value would be very close to that.[98]

The defined values associated with the CAPM model from 2020 to 2023 are as follows:

- Risk-Free Rate = 1.39%
- Market Return = 20.3%
- Beta = 0.61

*Stage 1: 1.39% + (0.61 * (20.3% - 1.39%)) = **12.93% Expected Return***

Based on EPE's acquisition price of $4.3B in 2020, and the CAPM formula, we can estimate that EPE would be valued approximately 12.93% higher as of January 2023, at around $4.86B. However, we need to estimate how this value will change by 2030, the anticipated transaction date of EPE.

The defined values associated with the CAPM model from 2023 to 2030 are as follows:

- Risk-Free Rate = 3.48%
- Market Return = 94.87%
- Beta = 0.61

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*Stage 2: 3.48% + (0.61 * (94.87% - 3.48%)) =* ***59.23% Expected Return***

Based on the estimated $4.86B January 2023 value of EPE, EPE's 2030 valuation would be approximately 59.23% higher, at around $7.7B. This projection, however, is based on the 2020 acquisition price and does not consider EPE's current business plan, strategy, or ability to execute, any and all of which could end up adding a good deal of extra value to the company over time. The valuation in 2030 would also be different due to the effects of inflation. Using the Federal Reserve's projected average rate of inflation based on the Personal Consumption Expenditures Price Index (PCE) for the next two years after 2023 and projecting it forward to 2030, it is possible to obtain an estimate of EPE's valuation in 2030 dollars.[99] If we apply the Fed's average inflation rate of 2.3%, EPE would be worth approximately $9.1B in 2030.

Endnotes

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[21] Marathon Petroleum, El Paso Refinery Overview https://www.marathonpetroleum.com/Operations/Refining/El-Paso-Refinery/
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[60] This is mainly due to regulatory lag between rate increase cases. In fact, EPE recently requested a 13.5% rate increase, but was only granted a 2% increase. The ratings agency's report on EPE cites positive "ring-fencing" terms and controls (strong legal provisions and a majority independent board), including a requirement that EPE maintain a BBB rating in order to pay out any dividends.
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[69] Texas Gas Service, https://www.texasgasservice.com/corporate/aboutus.
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[73] "To the extent financial markets view climate change and emissions of greenhouse gases as a financial risk, this could adversely affect our ability to access capital markets or cause us to receive less favorable terms and conditions in future financings. Financial institutions are increasingly making commitments to achieve net- zero financed greenhouse gas emissions. As they take steps to implement these commitments, they may adopt policies that have the effect of reducing the funding provided to the fossil fuel sector. The adoption of such policies may be hastened by government actions, including regulations from the Biden Administration to address climate risk in the financial sector and the Federal Reserve's implementation of recommendations from the Network for Greening the Financial System, a consortium of financial regulators focused on addressing climate-related risks in the financial sector. A material reduction in the capital available or an increase in the cost of capital could make it more difficult for us to finance the investments necessary to maintain the safety and reliability of our distribution system. In addition, increases in the cost of capital or limited availability of capital to the fossil fuel industry could result in decreased supplies of natural gas available for

distribution, or otherwise negatively impact our financial performance, growth, cash flows, or results of operations."

[74] "Various parties (including individuals, local governments, and environmental groups) have brought suit in a number of jurisdictions seeking to hold greenhouse gas emitters liable for the impacts of climate change. Although novel legal theories continue to be developed, many of these suits are brought on one of the following themes: (1) oil and gas companies are liable for various asserted damages associated with the production or sale of fuels that contributed to climate change and (2) oil and gas companies have been aware of the adverse effects of climate change for some time but failed to adequately disclose those impacts to investors or consumers. Although we are not currently named in any such suits, the success of such suits could adversely impact our business, results of operations and cash flows."

[75] "The ONE Gas Credit Agreement includes a requirement that our debt to total capital ratio may not exceed 72.5 percent at the end of any calendar quarter through December 31, 2021, and 70 percent as of the end of any calendar quarter thereafter. Events beyond our control could impair our ability to satisfy this requirement. As long as our indebtedness remains outstanding, these restrictive covenants could impair our ability to expand or pursue our growth strategy."

[76] Based on a 2005 baseline and including all forecasted increases in their distribution assets.

[77] [Note: there's debate about how effective RNG is at reducing methane emissions at scale, because that idea assumes the feedstock source of the RNG would have ultimately emitted methane into the atmosphere as well, which is not necessarily true. Also, the amount of capturable waste methane is under 1% of the current total natural gas demand.]

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[82] El Paso Water Utilities Public Service Board, Ibid.

[83] UN, All about the NDCs, https://www.un.org/en/climatechange/all-about-ndcs.

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[85] AR5, WGII, Chapter 10, https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap10_FINAL.pdf.

[86] Steven Koonin, *Unsettled: What Climate Science Tells Us, What it Doesn't, and Why it Matters*, (BenBella Books, 2021).

[87] United States Energy Information Administration, Table 1.1 Primary Energy Overview, https://www.eia.gov/totalenergy/data/monthly/pdf/sec1_3.pdf. One "quad" is about a billion joules of electricity.

[88] The one exception being coal, which has declined in production notably since the mid-2000s

[89] Samuel Fankhauser, Friedel Sehlleier, Nicholas Stern, "Policy Analysis, Climate change, innovation and jobs", https://www.tandfonline.com/doi/ref/10.3763/cpol.2008.0513?scroll=top&role=tab.

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[97] S&P Dow Jones Indices LLC, S&P 500 [SP500], retrieved from FRED, Federal Reserve Bank of St. Louis, https://fred.stlouisfed.org/series/SP500, January 12, 2023.
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[99] Board of Governors of the Federal Reserve System, "FOMC Projections materials", 2022.