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Public Attitudes on Energy and the Climate

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Public Attitudes on Energy and the Climate

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Abstract

Government actions to counteract climate change must take into account how Americans view the climate crisis and what they believe are appropriate policy responses. We explore public opinion on the climate issue at the national level, as well as within energy producing regions of the country that would be most impacted by policies aimed to reduce carbon emissions. We draw on surveys that examine the American public's overall attitudes about climate change and also probe support for specific policy approaches, such as carbon taxes, regulations on emissions, renewable energy portfolio standards, and climate adjustment assistance. While a large majority of Americans believe climate change is happening, most view it as a distant problem for future generations. Our findings reveal that attitudes toward climate policies differ significantly by age, political party, and geographic region, as well as by policy specifics.

[1] The authors thank Diana Ding for her research assistance.

Introduction

Any political response to climate change must be attuned to public concern about this issue broadly and public attitudes toward specific policies. National support for carbon taxes, regulations on Greenhouse Gas (GHG) emissions, and other policies is essential if those proposals are to gain sufficient support in Congress to pass and be implemented successfully. Public opinion will also shape how communities and municipal governments act in anticipation of potential environmental changes in their immediate areas, such as coastal flooding and storm damage, dangerously high temperatures, droughts, floods, and fires. And, public opinion can reveal which policies align with the wishes and needs of local communities that will lose economically and socially in any effort to make deep cuts in US GHG emissions, especially counties with intensive coal, oil, and gas extraction. This paper offers an assessment of the attitudes and opinions of the US public today on climate change generally and on specific policies for remediation. We will contrast national opinions with those of people in areas likely to be most affected by decarbonization policies.

A large majority of the American public – two thirds – believes that climate change is happening. They believe it is a consequence of human activities. They express concern about the problem. Most people, however, see climate change as a distant problem, primarily one affecting future generations, and not having substantial effects on our society today or in the near future.[2]

Although concern has grown over the past two decades, the change has been glacial. Americans' attitudes are evolving slowly on climate change, an issue that is still viewed as beyond the horizon. Against that background, it may be difficult to set out an aggressive policy to remedy the problem, as many Americans may not feel the immediate pain justifies the future benefits. Large majorities of Americans support further development of wind and solar power, a majority supports capping emissions on CO_2 and other GHGs, but majorities oppose carbon taxes. Most telling were two ballot measures in Washington state (in 2016 and 2018) that tied a $15 tax per ton of CO_2 to lowering the sales tax (2016) or funding renewable energy (2018). Both failed.[3]

Attitudes about climate change and climate change policies vary in important ways across different segments of the US public. The differences between Democratic and Republican party identifiers in their acceptance of and concern about climate change are well documented, but that difference is in fact much smaller than for many other issues, such as abortion or immigration. Even within party groups there are substantial divisions along other lines, most notably age. Younger people, across party lines, are much more concerned about global warming or climate change than are older generations. According to the most recent Gallup Poll on Global

[2] See Gallup polling summaries: https://news.gallup.com/poll/1615/environment.aspx

[3] Soren Anderson, Ioana Elena Marinescu, and Boris Shor, "Can Pigou at the Polls Stop US Melting the Poles?" (July 31, 2019), Available at SSRN: https://ssrn.com/abstract=3400772 or http://dx.doi.org/10.2139/ssrn.3400772 . More successful are initiatives that require utilities to use renewable energy sources, and that limit the cost increase that can be passed on to consumers, such as Amendment 37 in Colorado in 2004, Initiative 937 in Washington in 2006, and Proposition C in Missouri in 2008.

Warming, only 29 percent of those over 55 years old think that "global warming will pose a serious threat in your lifetime," compared to 51 percent of those under 35 years old. That fact points to a continuation of the trend in the American public toward concern about climate change and potentially also support for policies to reduce GHG emissions. A further potential divide in the American public falls along economic lines – specifically, the interests of the nation as a whole against the interests of those who will pay the steepest cost of the policies designed to decarbonize the economy.

Assuming that the US can enact policies that aim to reduce GHG emissions, there is the further challenge of how to address the economic and social dislocations that will result in communities and states that rely heavily on fossil fuel extraction. A wide range of adjustment policies are possible, including direct compensation to displaced workers, retraining of local workers, reclamation of polluted or distressed lands, and compensation to local and state governments for lost revenue. The Trade Act of 1974, for example, established the Trade Adjustment Assistance program to provide federal assistance to workers who are adversely affected by foreign trade. What is public support for a similar program aimed to aid workers displaced by international agreements or federal policies that reduce carbon? What sort of adjustment policies do people living in areas likely to be affected want?

Throughout this paper we explore these questions drawing on publicly available polling data, especially from Gallup, Pew, and the Cooperative Congressional Election Study (CCES). Stephen Ansolabehere organizes the CCES, which fields nationally representative surveys of the American public with sample sizes of 55,000 to 65,000 persons every election year and 15,000 to 25,000 each odd numbered year. These surveys contain a battery of questions about energy and environmental policy. Dustin Tingley and his collaborators have conducted a series of surveys that examine public support for different types of spending related to decarbonization, including spending on compensation to workers in fossil fuel sectors who would be displaced.

Section 1. US Public Attitudes About Climate Change and Climate Change Policies

Public concern about global climate change and greenhouse gas emissions has grown steadily since 1990, when there was little awareness of this issue or even consensus among the scientific community. Over the past three decades, understanding of this issue both at the elite and mass levels has expanded, as has concern about the potential threat it poses.

In 1992, at the time of the Rio Earth Summit, only 11 percent of Americans said they understood the issues of global warming "very well" and 42 percent said they understood it "fairly well," according to figures from the Gallup Poll. At the time the Kyoto Protocol was signed in 1997, 16 percent of Americans said they understood the issue of global warming "very well" and another 45 percent said they understood it "fairly well." By 2019, 27 percent said they understood it "very well" and 53 percent said they understood it "fairly well."[4] Eighty percent, then, have some understanding of this issue, but there is still room for improvement in public understanding of it, as only 27 percent said they understand it very well.

Concern about the issue inched upward over the three decades since the Rio Summit. In 1997, 24 percent of respondents to the Gallup Poll expressed a "great deal" of concern about global warming and 26 percent said they were concerned a "fair amount." By 2019, 44 percent of Gallup Poll respondents said they have a "great deal" of concern about this problem and 21 percent expressed a "fair amount" of concern – a twenty-point rise in the highest category of concern.

These figures, though, should be kept in context. Compared to other environmental issues that Gallup asks about, global warming ranks fourth (tied with habitat loss and air pollution) out of 7 environmental issues. People express more concern about pollution of drinking water (56 percent greatly concerned), contamination of soil and water by toxic wastes (53 percent greatly concerned), and pollution of rivers, lakes and reservoirs (53 percent greatly concerned).[5]

Pollution of drinking water is immediate and tangible; climate change is not. But the perception of the threat due to climate change is growing. In 1997, 25 percent said that global warming would "pose a serious threat to you or your lifestyle in your lifetime," and 69 percent said it would not. By 2019, the percent that said that global warming would be a threat in their lifetime had risen to 45 percent, with 55 percent saying it would not.

Figure 1, compiled by Gallup, summarizes the trends in understanding, acceptance, and concern about global warming. These trends show the remarkable stability of aggregate opinion on this issue, with slight upward growth in understanding and concern.

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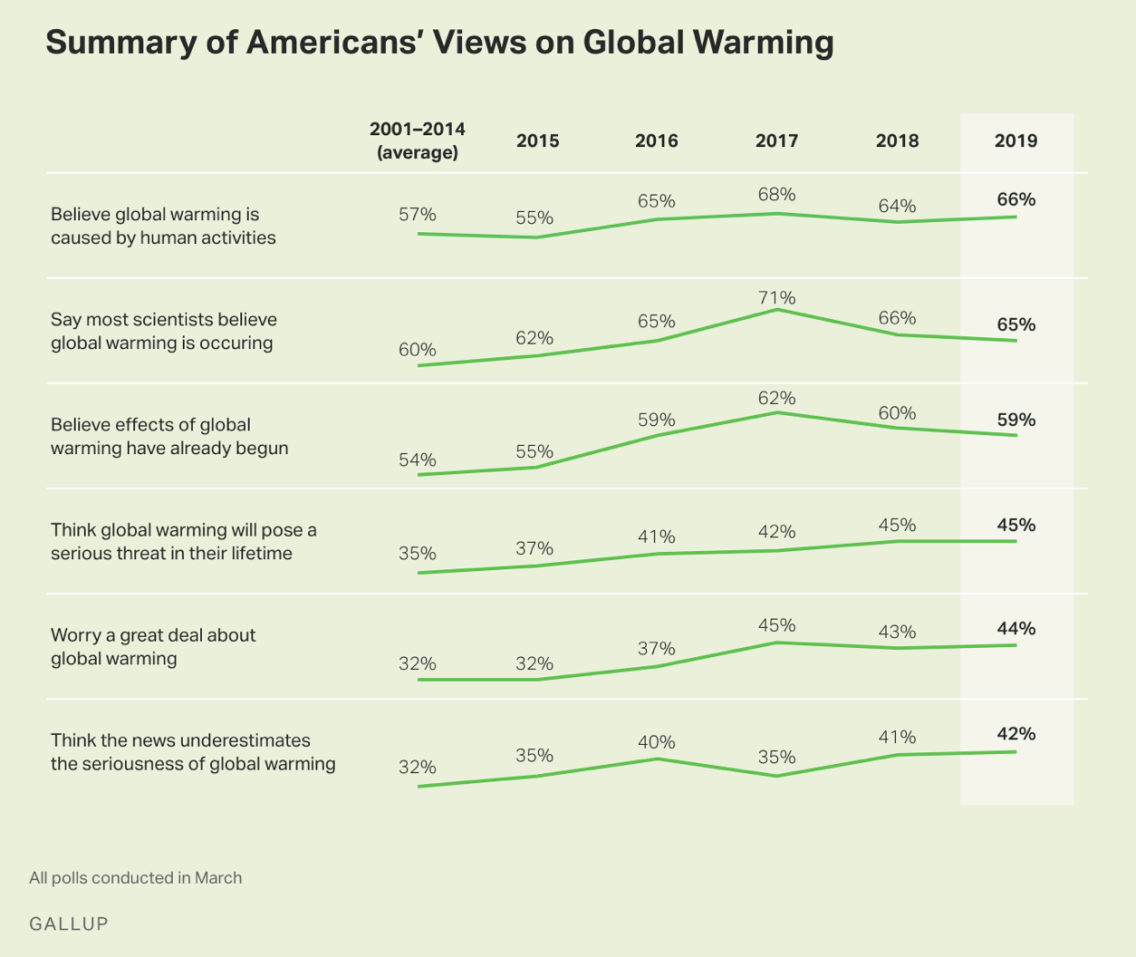
[4] https://news.gallup.com/poll/1615/environment.aspx

[5] The complete list that Gallup has offered respondents over time is (a) Pollution of rivers, lakes and reservoirs, (b) Air pollution, (c) Loss of tropical rain forests, (d) Global warming or climate change, (e) Pollution of drinking water, (f) Extinction of plant and animal species, (g) Contamination of soil and water by toxic wastes, (h) Urban sprawl and loss of open space, (i) Damage to the Earth's ozone layer, (j) Acid Rain (k) Loss of Natural Habitat and (l) Ocean and beach pollution. In 2019, they asked about the first 7.

Figure 1. Gallup Poll Summary of Public Opinion Trends on Climate Change[6]



The findings of the Gallup Poll mirror those of most other survey research on public attitudes about global warming and climate change. As Patrick Egan and Megan Mullin recently surmised in their review of this research:

> Americans' attitudes on climate change reveals a lack of meaningful long-term change in mass opinion. Instead, the structure of Americans' attitudes toward belief in climate change's existence, concern about its consequences, and demand for policy response is similar to that regarding many other issues in contemporary US politics: stability in aggregate opinion that masks partisan and ideological polarization enhanced by communications from elites.[7]

[6] Lydia Saad, "Americans Concerned as Ever About Global Warming," *Gallup.com*, March 25 (2019).
[7] Patrick Egan and Megan Mullin, "Climate Change: US Public Opinion." *Annual Review of Political Science* 20 (2017): 209-227.

There is a downside and an upside to Americans' lack of urgency on climate change. The downside is that there is little pressure to act. Crises usually provoke an immediate reaction by political leaders. Although the rhetoric of advocates and activists casts this issue as a crisis, there is no tangible event pushing the nation to act. There is no brown water coming out of the taps, nor are the rivers choked with combustible, toxic effluence. The upside: there's still time, as the effects are not yet evident. We see the problem, and, hopefully, can rise to the moral and ethical imperatives to act now. Even without an obvious self-interest or crisis, the US public often supports legislation and regulations today to avert environmental catastrophes in the future. The ban on chloro-fluorocarbons being an excellent case in point.

Section 2. Public Attitudes Toward Climate Policies

We distinguish three general policy approaches to remediation of GHGs. They are not exclusive, but they represent distinct policy avenues being explored nationally and locally.

First, impose a higher price on fuels that produce more GHGs. Most commonly these policies take the form of carbon taxes or fuel taxes. This is perhaps the most widely supported approach among economic policy experts, as it is highly efficient. As we will see, it is politically unpalatable.

Second, limit or cap GHG emissions. Regulation on total GHG emissions from power plants follows a familiar approach to air pollution as developed under the Clean Air Act. The Obama administration's Clean Power Plant guidelines are one example. Cap-and-trade systems are more efficient mechanisms for implementing GHG restrictions.

Third, renewable portfolio standards (RPS) require that utilities provide electricity through a minimum percent of low-GHG sources, such as nuclear, hydro, solar, or wind. In 1983, Iowa enacted the first renewable fuel target, requiring a gigawatt of electricity in the state be generated from renewable sources. Since then 29 states have adopted renewable portfolio standards. Half of the growth of renewables over the past decade is attributed to renewable fuel targets.[8]

First, consider public attitudes about carbon taxes.

It is important to distinguish polls that ask about carbon taxes in the abstract and specific levels of carbon taxes. Many polls today find that majorities of Americans support carbon taxes in the abstract. For example, a recent NORC-EPIC poll of the University of Chicago reports that 50 percent of Americans support a carbon tax and 29 percent oppose it. The use of such a generic question about carbon taxes is increasingly common, but the question lacks specificity. How much? Any amount? A small tax? A large tax? The devil, as always, is in the details.

The NORC-EPIC survey went on and probed the level of support for different tax amounts. A majority of people (57 percent) supported a $1 a month tax; only 39 percent supported a $10 a

[8] https://emp.lbl.gov/publications/us-renewables-portfolio-standards-1

month tax, and just 25 percent supported a $40 a month tax. The MIT Energy Surveys, conducted between 2001 and 2014, showed the same pattern. There is high support for carbon taxes in the abstract, but in most years between 2001 and 2014, the majority of Americans supported a $5 a month carbon tax, but majorities opposed carbon taxes of $10 or more a month.[9] The most recent Harvard-Harris poll (November 2019) finds that 27 percent of people support a carbon tax that increases electricity and gasoline prices by 10 percent (or about $30 per person per month), and 49 percent of people oppose such a tax.

To put these figures in context, the United States emits approximately 16 metric tons per person per year. Total energy consumption expenditures in the United States are around $3,500 per person per year, or $290 per month.[10] A very modest $15 per ton of carbon tax, such as the current price of carbon in the California trading system,[11] would amount to a $240 increase in energy costs (such as taxes on gasoline or electricity surcharges) for the typical American, or $20 per person per month. That would be a 7 percent increase in monthly energy costs. The Environmental Defense Fund argues that the social cost associated with carbon emissions is $50 per ton of carbon.[12] That figure translates into a carbon cost of $800 per year, or $67 per person per month. That would be a 25 percent increase in energy costs. Those expenditures are, of course, unequally distributed, with higher income households spending much more than low income households. But, these rough calculations indicate that the sort of energy price increases advocated by those supporting some sort of carbon price or tax are in the neighborhood of $20 to $67 per person per month. Large majorities of Americans today oppose carbon taxes that high.

One practical recommendation for polling about carbon taxes is that survey researchers ask about specific tax levels, and that the tax levels chosen be tied to specific targets that are designed to achieve particular levels of emission reductions or to make renewable sources competitive.

Second, consider regulations that cap GHG emissions.

Polling over the past decade regularly shows large majorities in favor of EPA regulation of carbon emissions under the Clean Air Act. These regulations take a variety of forms. We include efficiency requirements for existing power plants (the Clean Power Plant Rule and the Affordable Clean Energy Rule), new power plant emissions rules (New Source Performance Standards), and fuel efficiency (CAFE) standards for automobiles.

Since 2014, the Cooperative Congressional Election Study has asked whether people support or oppose giving EPA the Power to Regulate CO_2. Nearly 70 percent do. Sixty percent support strengthening EPA enforcement of the Clean Air Act and Clean Water Act. (See Table 3 below.) Lisa Scruggs and Clifford Vickrey analyzed the 2016 CCES and found that support for

[9] See Ansolabehere and Konisky, *Cheap and Clean: How Americans Think about Energy in the Age of Global Warming*. MIT Press, 2014.
[10] https://www.eia.gov/totalenergy/data/monthly/pdf/sec1_17.pdf
[11] https://www.nytimes.com/interactive/2019/04/02/climate/pricing-carbon-emissions.html
[12] https://www.edf.org/true-cost-carbon-pollution

EPA regulation of CO_2 emissions was uniformly high throughout the country, except in Wyoming, which is by far the largest coal producer in the nation.[13]

One weakness with such polling is that it often does not frame the question in terms of economic costs associated with such regulations. Regulatory costs, especially those borne by the consumers, are themselves hard to determine.

Some polling, however, does frame the regulatory question as a tradeoff with economic growth. Since the 1970s the Gallup poll has asked whether people would support stronger environmental protection even if there was lower economic growth or stronger economic growth even if there was poorer environmental protection. For almost the entire series of these data the public has tilted toward the environmental side of the tradeoff, with 55 to 70 percent of Americans usually favoring environmental protection over economic growth. The break in that series occurs from 2008 to 2014. In the depths of the Great Recession, the majority of the American public said they supported weaker environmental protection in order to achieve higher economic growth. Since then the public has shifted back toward weighing environmental protection more heavily in the balance. As of 2019, 65 percent of Americans want stronger environmental protection over economic growth and 30 percent favor stronger economic growth over environmental protection.

Third, consider renewable energy targets and portfolios.

Expansion of renewable energy is by far the most popular approach to addressing carbon emissions. For decades, over 80 percent of Americans have expressed support for increasing renewable energy.[14] That is true even when carbon emissions are not the justification. The American public has extremely favorable views of solar, wind, and even hydroelectric power. (Nuclear power is a different story.)

Renewable energy portfolio standards and targets are one, commonly used means of achieving higher use of solar and wind power. (Hydro faces capacity limitations, as most US rivers are already damned for hydroelectric production.) RPS has proved reasonably popular. Twenty-nine states have adopted such standards, and some have set very high targets, such as California's 60 percent renewable aspiration. Polling data show reasonably high levels of support for renewable targets. In the November 2019, Harvard CAPS- Harris poll, 53 percent expressed support for a law requiring that 50 percent of all electricity come from renewable energy sources by 2030. Twenty-two percent opposed that proposal, and 29 percent were unsure.

As popular as renewable energy is, political support for RPS is not automatic. In the Harvard CAPS-Harris poll a large number of people said they did not know whether they would support such a law. That degree of hesitancy in support for RPS shows up at the polls. Many states have voted on ballot measures to require a renewable standard. Considering that expanding solar and wind power is highly popular, it is surprising that RPS standards often fail to win

[13] https://www.washingtonpost.com/news/monkey-cage/wp/2017/06/05/most-americans-support-government-regulation-to-fight-climate-change-including-in-pittsburgh/

[14] See Ansolabehere and Konisky, *Cheap and Clean*.

majority support when the electorate considers the measures directly. Nevada passed an RPS in 2018, but Arizonans voted it down. RPS passed in Missouri in 2008 but failed in Michigan in 2012.

As with other approaches to climate change, survey questions often mask the cost of the policy, and those costs become central to public debates about specific policies. Unlike GHG regulations, the costs of renewable portfolio standards are more transparent. According to a recent report of the Lawrence Berkeley Lab, "RPS compliance costs totaled $4.1 billion in 2017, which equates to 2.0% of average retail electricity bills in RPS states."[15] Aware of such costs, several states have enacted RPS with 1% limits on the increases in electricity charges that consumers pay in order to comply with renewable targets.

For all three policy approaches, the challenge for public opinion research is to gauge the level of public support once people understand both the benefits and the costs of such proposals. The American public is undeniably concerned about climate change and is willing to support some (perhaps modest) policies to begin to work on the problem now. Low carbon taxes and regulations and renewable standards with small impact on electricity costs gain public support. But support for these laws shrinks when the economic effects become noticeable or when the economy is in recession.

Section 3. Demography of Public Opinion on Climate Change

The American public reflects the attitudes and opinions of 300 million people. In such a large, heterogeneous nation, people's opinions about important issues of the day usually diverge along demographic, cultural, and ideological lines. Climate politics are no exception.

A large number of demographic characteristics correlate with opinions about energy and climate policies, including education, gender, race, income, and religion. We highlight two – Age and Political Party[16] – that are consistently among the most important factors relating to attitudes toward policies designed to lessen climate emissions or strengthen environmental enforcement generally. We examine the same set of policies as in Table 1.

There are undeniably deep partisan differences on most salient energy and environmental policies. Table 2 presents the percent of each partisan group (Democrat, Independent, and Republican) who Support each of the policies in Table 1. On most of the policies examined a majority of Democrats go one way and a majority of Republicans go the other. On Repeal of the Clean Power Plant Rules, 23 percent of Democrats supported Trump's Executive Order compared to 77 percent of Republicans. On a law Requiring a Renewable Portfolio Standard, 78 percent of Democrats supported it, compared to 38 percent of Republicans. On the Withdraw of

[15] https://emp.lbl.gov/publications/us-renewables-portfolio-standards-1

[16] Ideological self-identification (liberal, moderate, or conservative) is equally important to party, and appears in multiple regression analyses to operate separately from party.

the US from the Paris Climate Accords, only 12 percent of Democrats supported the action, compared to 77 percent of Republicans.

There are, of course, some policies on which there are no or small divisions across the parties. All partisan groups support higher fuel efficiency standards. Perhaps most notable, though, is the carbon tax. A 10 percent carbon tax is opposed by large majorities of Republicans, Independents, and Democrats.

Age alone shows more modest divisions in public opinion than party, but nonetheless there are important generational schisms over key policies. The largest gaps between the youngest generation of Americans and the oldest arise over the Paris Climate Accord, Strengthening EPA Enforcement of the Clean Air Act and Clean Water Act, and Giving EPA the Power to Regulate Carbon Emissions. The younger generations express far more support for environmental protection than do older generations.

The partisan differences are magnified by age, as younger people tend to identify more frequently with neither party or with the Democratic party. According to the 2018 CCES, only 22 percent of those under 30 identify with the Republican Party, while 42 percent are Independents and 36 percent are Democrats. Of those over 65, 37 percent identify as Republicans, 30 percent as Independents, and 33 percent at Democrats. At least some of the partisan differences on energy and climate are generational, and that becomes evident upon seeing the differences in opinions across age groups within partisan categories.

Table 4 reveals very large divisions among Republican identifiers and among Independents across generations on five issues: strengthen EPA enforcement, give EPA the power to regulate carbon, repeal the Clean Power Plant rule, require a Renewable Portfolio Standard, and withdraw from the Paris Accord. Younger cohorts of Republicans and Independents are much more environmentally oriented on all 5 of these issues than their older co-partisans. Republicans under 30 are fairly evenly divided on each of these issues. 46 percent want to Strengthen EPA enforcement; 54 percent want to give EPA the power to limit carbon emissions; 53 percent want to repeal the clean power plant rules; 51 percent support RPS; and 55 percent want to withdraw from the Paris Accord. Republicans who are over 65 years old, by contrast, strongly oppose these regulatory policies: only 18 percent want to strengthen EPA enforcement; 76 percent want to repeal the clean power plant rules; and 86 percent support US withdrawal from the Paris Accord.

Independents under 30 favor stronger environmental protection by about 2 to 1. Two-thirds want stronger EPA enforcement of the CAA and CWA; three-quarters want the EPA to have the power to regulate carbon emissions; and only one-quarter support withdrawal from the Paris Accord. Independents over 65 hold ambivalent views on these policies. Only 46 percent want to strengthen EPA enforcement activities. A majority (54 percent) want to repeal the Clean Power Plant Rules and 58 percent support Trump's decision to withdraw from the Paris Accord. Exactly 50 percent want EPA to have the power to regulate carbon, and 50 percent do not.

The Democrats look quite different. All generations of Democrats strongly favor environmental protection across all 5 policies.

A substantial (10 percent or more) carbon tax seems unlikely to move forward politically, as there is across the board public opposition. This fact should not to dissuade enthusiastic economists from promoting such a policy for its efficiency. Rather, it is a caution that the politically feasible policies might be second best from the perspective of economic efficiency. Regulatory actions, such as limits on GHGs, or renewable energy targets enjoy far more support among the American public. And, there are clear opportunities to build political coalitions among Democrats and Republicans, especially younger Republicans, around these policies.

The generational patterns of public opinion regarding climate change and energy policy suggest that support for environmental protection and climate change policies will continue to grow. Democrats are already there (and their support can't get much higher). Younger independents and younger Republicans are much more supportive of such policies than Republicans and Independents over 65.

Regulations, carbon taxes, renewable energy targets, and similar policies will serve a larger, national interest of reducing GHGs. All of these policies, however, will affect another subgroup in the US economy – the areas of the country most intensely involved in extracting, refining, and distributing coal, oil, and natural gas. How do these communities view the political options available to the US today? It is commonly thought that these communities vehemently oppose energy and environmental policies that might address GHGs. Is that true? How do people in the areas with energy extraction view the climate issue today?

Table 1. Public Support for Energy and Environmental Policies

POLICY	Percent Support
Impose a 10 percent tax on gasoline and electricity produced using fossil fuels*	27%
Strengthen the Environmental Protection Agency enforcement of the Clean Air Act and Clean Water Act even if it costs US jobs**	61%
Give EPA the Power to Regulate Carbon Emissions**	67%
Raise the required fuel efficiency for the average automobile from 35 mpg to 25 mpg***	68%
Lower the required fuel efficiency for the average automobile from 35 mpg to 25 mpg**	34%
Repeal the Clean Power Plant Rules**	41%
Allow Construction of the Keystone XL Pipeline**	49%
Require that each state use a minimum amount of renewable fuels (wind, solar, and hydroelectric) to generate electricity even if electricity prices increase**	63%
Require that 50 percent of electricity use renewables by 2030*	53%
Withdraw from the Paris Climate Accord**	42%

* Harvard CAPS-Harris Poll, November, 2019, n=1200
** Cooperative Congressional Election Study, November, 2019, n=18,000
*** Cooperative Congressional Election Study, October-November, 2017, n=18,200

Table 2. Partisan Divisions on Energy and Environmental Policies			
	Democrat	Independent	Republican
Impose a 10 percent tax on gasoline and electricity produced using fossil fuels	34%	22%	24%
Strengthen the Environmental Protection Agency enforcement of the Clean Air Act and Clean Water Act even if it costs US jobs**	82%	54%	29%
Give EPA the Power to Regulate Carbon Emissions**	87%	61%	40%
Raise the required fuel efficiency for the average automobile from 35 mpg to 25 mpg***	83%	67%	53%
Lower the required fuel efficiency for the average automobile from 35 mpg to 25 mpg**	29%	34%	42%
Repeal the Clean Power Plant Rules**	23%	43%	69%
Allow Construction of the Keystone XL Pipeline**	23%	48%	83%
Require that each state use a minimum amount of renewable fuels (wind, solar, and hydroelectric) to generate electricity even if electricity prices increase**	78%	58%	38%
Require that 50 percent of electricity use renewables by 2030*	64%	52%	41%
Withdraw from the Paris Climate Accord**	12%	40%	77%
* Harvard CAPS-Harris Poll, November, 2019, n=1200 ** Cooperative Congressional Election Study, October-November, 2018, n=64,000 *** Cooperative Congressional Election Study, October-November, 2017, n=18,200			

Table 3. Age and Public Opinion on Energy and Environmental Policies				
	18-29	30-44	45-64	65 and over
Impose a 10 percent tax on gasoline and electricity produced using fossil fuels	26%	40%	19%	18%
Strengthen the Environmental Protection Agency enforcement of the Clean Air Act and Clean Water Act even if it costs US jobs**	68%	63%	52%	48%
Give EPA the Power to Regulate Carbon Emissions**	75%	70%	60%	57%
Raise the required fuel efficiency for the average automobile from 35 mpg to 25 mpg***	70%	72%	68%	66%
Lower the required fuel efficiency for the average automobile from 35 mpg to 25 mpg**	33%	32%	35%	35%
Repeal the Clean Power Plant Rules**	35%	38%	46%	50%
Allow Construction of the Keystone XL Pipeline**	38%	42%	54%	61%
Require that each state use a minimum amount of renewable fuels (wind, solar, and hydroelectric) to generate electricity even if electricity prices increase**	69%	65%	56%	52%
Require that 50 percent of electricity use renewables by 2030*	54%	56%	50%	53%
Withdraw from the Paris Climate Accord**	27%	35%	46%	52%
* Harvard CAPS-Harris Poll, November, 2019, n=1200 ** Cooperative Congressional Election Study, October-November, 2018, n=64,000 *** Cooperative Congressional Election Study, October-November, 2017, n=18,200				

Table 4. Party and Age and Public Opinion on Energy and Environmental Policies				
	Among Republican Party Identifiers			
	18-29	30-44	45-64	65 +
Strengthen the Environmental Protection Agency enforcement of the Clean Air Act and Clean Water Act even if it costs US jobs	46%	36%	23%	18%
Give EPA the Power to Regulate Carbon Emissions	54%	46%	36%	32%
Repeal the Clean Power Plant Rules	53%	62%	72%	76%
Require that each state use a minimum amount of renewable fuels to generate electricity even if electricity prices increases	51%	45%	35%	30%
Withdraw from the Paris Climate Accord	55%	70%	83%	86%
	Among Independents			
	18-29	30-44	45-64	65 +
Strengthen the Environmental Protection Agency enforcement of the Clean Air Act and Clean Water Act even if it costs US jobs	65%	61%	50%	43%
Give EPA the Power to Regulate Carbon Emissions	73%	67%	56%	50%
Repeal the Clean Power Plant Rules	36%	36%	47%	54%
Require that each state use a minimum amount of renewable fuels to generate electricity even if electricity prices increases	69%	63%	53%	47%
Withdraw from the Paris Climate Accord	25%	34%	48%	58%
	Among Democratic Party Identifiers			
	18-29	30-44	45-64	65+

Strengthen the Environmental Protection Agency enforcement of the Clean Air Act and Clean Water Act even if it costs US jobs	84%	83%	82%	84%
Give EPA the Power to Regulate Carbon Emissions	87%	87%	87%	91%
Require that each state use a minimum amount of renewable fuels to generate electricity even if electricity prices increases	80%	80%	80%	79%
Repeal the Clean Power Plant Rules	24%	23%	21%	17%
Withdraw from the Paris Climate Accord	14%	15%	11%	9%
Cooperative Congressional Election Study, October-November, 2018, n=64,000				

Section 4. Energy Producing Areas

Very few people in the United States are actively involved in mining fossil fuels. In the early 1920s, there were nearly 900,000 coal miners in the US. At the end of World War II there were roughly 400,000 coal miners in the US. Today there are only 50,000. That is a striking reduction in the use of labor in the coal industry given that total production of coal has doubled since the end of World War II.[17] New mining technology has accounted for most of the reduction in labor.[18] Deep decarbonization resulting in the reduction of coal production, then, will not have a large, direct effect on the US workforce and electorate. However, reducing coal, oil, and gas production in the US may be intensely felt by the communities in the immediate vicinity of fossil fuel production, as those economies directly benefit from these extractive industries in many ways beyond direct employment.

On basic demographic indicators, the fossil fuel intensive counties are much less different from other counties than we initially expected. Coal producing counties contain only about 4 percent of the adult population in the United States. These counties are concentrated in the Mountain West (Wyoming, Montana, Colorado, and New Mexico), Appalachia (Kentucky, West Virginia, Ohio, Pennsylvania, and the Maryland panhandle), and the Midwest (Illinois, North Dakota, and Indiana). Wyoming produces by far the most coal in the United States; it is also the least populous state in the union.

The low population density of the coal producing counties presents a practical problem for survey researchers. It's hard to get sufficient sample in these areas. A typical sample size of 1,000 to 2,000 persons would only contain 40 to 80 people in these areas. Any study of these populations will have to be designed to have oversamples of these counties, or have very large overall samples, such as the CCES.

Oil and gas counties are a different story. Counties with oil and gas production contain 29 and 26 percent of the US population, respectively. There is a lot of overlap between these industries and these counties. And some of the most populous counties in the nation, including Harris County, Texas, and Los Angeles County, California, are included in this set. Much of the population in these counties may not be as directly affected by the oil and gas industry as in less populous counties, such as Webb County, Texas, or Kern County, California. An important research design question concerns variation in the effect of policies across different sorts of energy-producing counties. For this presentation, we treat the entire population of these counties as populations in energy producing areas.

Table 5 displays how three key demographic characteristics vary across coal counties, oil and gas counties, and counties that produce no fossil fuels. The median incomes in coal counties are somewhat lower than elsewhere, but the oil and gas and non-fossil fuel counties have similar median incomes. The ages (among adults) are the same across all of these counties. The differences arise with education levels. Half of adults in coal counties have a high school

[17] https://www.eia.gov/totalenergy/data/annual/showtext.php?t=ptb0702
[18] https://siepr.stanford.edu/research/publications/what-killing-us-coal-industry

education or less, compared with 40 percent of those in counties that produce no fossil fuels. This education gap could have practical implications for economic growth for these counties were coal production to vanish and suggests a conceivable way to address long-term effects of possible economic decline among these populations under deep decarbonization of the energy industry.

There are definite differences in policy preferences and political attitudes between those living in fossil fuel producing counties and those in counties that produce no fossil fuels. The differences in opinions, however, are surprisingly modest. See Table 6. In the most recent CCES (2018), 65 percent of those living in counties where there was no fossil fuel production supported giving EPA Power to Regulate Carbon Emissions. In the coal counties, 57 percent supported EPA regulation of CO_2, slightly lower than in the non-fossil fuel counties, but a definite majority. A majority in coal counties and in the nation as a whole opposed a proposal to lower fuel efficiency standards, and majorities nationwide and in coal counties, supported requirements for renewable fuels. A split between the coal counties and the nation appears with more traditional regulation. 58 percent of the public in non-fossil fuel counties supports strengthening enforcement of the Clean Air Act and Clean Water Act. But in coal counties only 46 percent supports stronger enforcement, and a majority opposes it. The last result suggests that as the effects of carbon emissions policies become felt, public attitude may turn. But the opposition to stronger CAA and CWA enforcement is not overwhelming even in the coal producing counties.

Table 5. Characteristics of the Populations of Counties with Fossil Fuel Production and with No Fossil Fuel Production

Demography

	Est. % Of Pop	Median Income	Median Adult Age	Educ HS or less	4 Yr+
Coal Counties	4%	$40-50K	51	50%	21%
Oil Counties	29%	$50-60K	51	42%	25%
Gas Counties	26%	$50-60K	51	42%	24%
Non-FF Counties	66%	$50-60K	52	41%	27%

Political Attachments and Voting

	Party ID		2014 House Vote		2018 House Vote	
	Demo	Repub	D	R	D	R
Coal Counties	32%	36%	36%	63%	43%	57%
Oil Counties	35%	28%	44%	54%	51%	49%
Gas Counties	34%	29%	44%	54%	50%	50%
Non-FF Counties	35%	27%	46%	53%	53%	47%

Sources: 2014 CCES, N=56,000. 2018 CCES, N=60,000.

Table 6. Support for Environmental and Energy Policies in Coal Counties, Coal States, and the Rest of the Nation Source: 2018 Cooperative Congressional Election Study			
	Coal County	Oil and Gas County	Rest of Nation
Issue Questions	Percent Yes	Percent Yes	Percent Yes
Give EPA Power to Regulate CO_2	57%	63%	65%
Lower Fuel Efficiency	32%	35%	35%
Require Renewable Fuel Standards	53%	58%	60%
Strengthen CAA & CWA Enforcement	46%	54%	58%
Executive Orders			
Allow Keystone XL	60%	50%	49%
Leave Paris Accord	49%	41%	41%
Repeal Clean Power Plant Rules	51%	44%	43%
Withdraw from Iran Nuclear Deal	62%	56%	54%
For Every New Rule, Cut Two Rules	53%	49%	48%
Number of Cases (59,934)	2,107 (3.5%)	16,004 (31.0%)	40,800 (66.4%)
Note: Coal Counties are counties with any coal current coal production; Oil and gas counties are counties with any current oil and gas production.			

Section 5. Adjustment

There are a range of policy levers available that could help the US towards decarbonization. Many of them explicitly or implicitly put a price on carbon. This would have an impact on individual citizens in terms of an added cost they would have to bear. But it would also have an impact on individuals in fossil fuel intensive industries. These are two distinct major distributional impacts of climate policy.

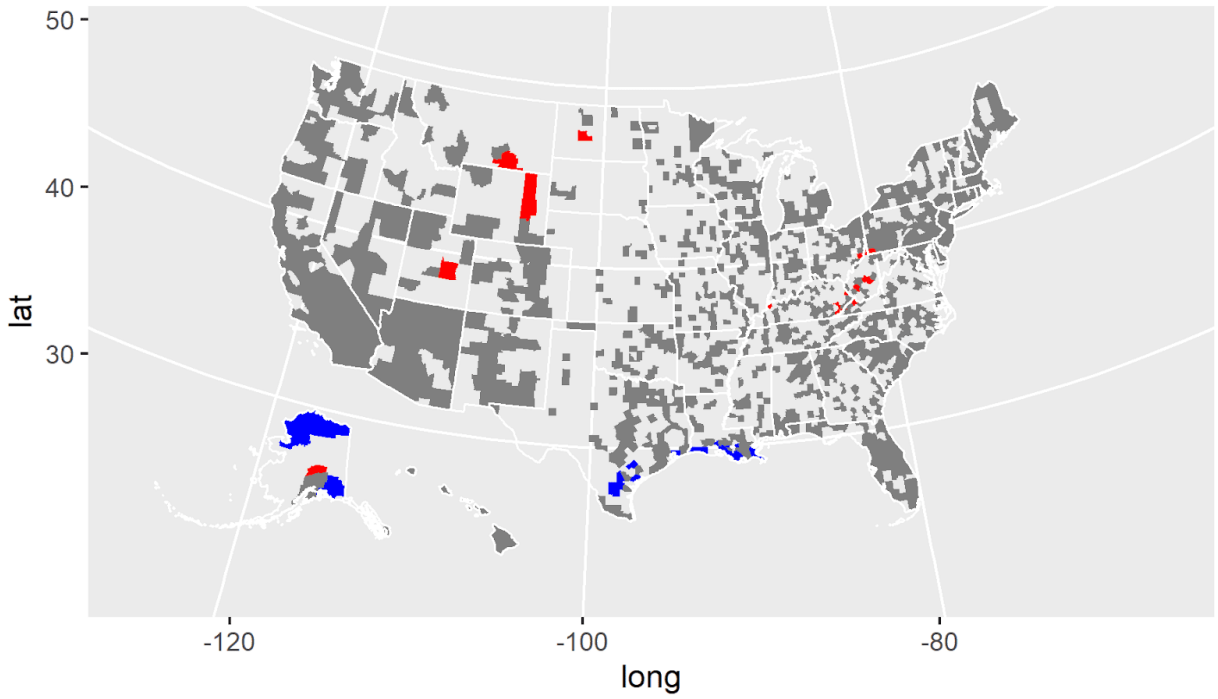
In this section we discuss a different distributional question that focuses on preferences over how to spend any revenue that is generated by making fossil fuels more expensive. More broadly, we discuss priorities for spending across different types of investments. Our purpose here is not to explore public support for narrow technocratic spending choices; instead, we explore more broadly support for larger 'buckets' of spending.

In a recent working paper, Gaikwad, Genovese, and Tingley focus in particular on one dimension, which is the compensation of individuals or communities who would face hardship due to the phasing out of fossil fuel production. Such compensation is politically popular with bipartisan support. In a 2016 Cooperative Congressional Election Study poll, respondents were asked "Congress could consider many important bills in the next two years. If you were in Congress would you vote FOR or AGAINST the following? Climate Adjustment Assistance: Provides education assistance and retraining to workers who have lost their jobs as a result of reductions in greenhouse gas emissions." (65% Republican support, 78% Independent support, 94% Democratic support). A subsequent 2017 USBarometer poll revealed similar levels of support, even when it was stressed that these reductions were due to government policies.

Furthermore, other countries have engaged in similar programs. For example, Spain's Plan del Carbón has led to the closure of all but one coal mine (down by 25 since 2010, with the remaining mine employing ~70 workers). As part of the plan there will be €250MM worth in transfers and training, including early retirement for older coal workers and re-training programs for younger workers.

In their working paper, Gaikwad, Genovese, and Tingley had respondents allocate money raised through a policy that would increase energy costs in order to combat climate change. After a series of pilots and review of policy discourse, four different buckets of spending were possible: (1) direct transfers to individuals in fossil fuel industries, (2) infrastructural investments to help communities prevent or adapt to climate risks, (3) spending on the development of green energy sources, (4) an even distribution of funds across all taxpayers (the 'economist's plan'). Each respondent, furthermore, was asked to allocate funds when they faced three different profiles of average household costs due to the policy ($16, $64, and $256).

They ran three separate surveys, a national representative survey, a targeted poll for anyone living in zip codes with a high level of coal employment, and a targeted poll of anyone living in coastal regions with high levels of oil and gas employment. The below figure displays counties that were captured as part of the survey design, with grey counties from the nationally representative poll, red counties from coal country, and blue counties from the coastal fossil fuel regions.



The top line results are as follows. Individuals in coal mining regions prefer compensation of fossil fuel workers and their communities over other compensatory schemes. The general public and individuals in coastal fossil fuel regions prefer investments in renewables. While the least popular for all groups, adaptation spending was highest for individuals in the coastal fossil fuel region. Finally, support for the 'economist's' preferred plan of even dividends becomes increasingly popular as the cost goes up. This is an important point. Preferred spending mechanisms are price sensitive rather than dictated in advance. That finding is consistent with findings on carbon prices, regulations, and renewable portfolio standards.

If social and economic policies like compensatory schemes for workers most directly impacted become part of the political decarbonization bargain (like what seems to be in the works in other countries like Spain), it is of course an open question around what these compensatory schemes would look like. Gaikwad, Genovese and Tingley look at one narrow component of this (preferences for direct transfers to workers or more community level investment). But the big picture here is that making compensatory transfers more like investments than like payouts will be very difficult for a number of reasons. Especially in coal country there are generations of family history in play, making it difficult for some to simply relocate to other parts of the country. Efforts at re-training can be costly and ineffective. Decarbonization efforts will be wise to look at other re-training efforts like Trade Adjustment Assistance to understand its challenges in responding to decreases in manufacturing employment.[19]

[19] Gaikwad, Nikhar, Federica Genovese and Dustin Tingley, working paper, "Vulnerability, Compensation, and Support for Climate Policies", https://scholar.harvard.edu/files/dtingley/files/compensationvulnerability.pdf

Section 6. Implications

The American public accepts the idea that climate change is occurring and is a real concern, but the problem does not feel immediate. It is not a high-ranking issue on the public's agenda, even on the list of environmental concerns. There is support for modest policy initiatives, such as relatively low carbon taxes, emissions regulations, and renewable energy targets, but not for a substantial carbon tax.

Nonetheless, it is evident that the public will continue to shift in the direction of stronger environmental regulations, and the gradual shifts we have seen so far may accelerate. Democrats of all generations strongly support policies that strengthen environmental protections, give the EPA power to regulate carbon, and international agreements that would commit the US to a pathway to substantial reductions in GHG emissions. Younger Independents similarly embrace these policies, and, perhaps most importantly, younger Republicans are beginning to break from the older cohorts of Republican identifiers, who have to date strongly opposed stronger actions on climate change. The demographics of this issue, then, portend a change in public attitudes toward energy policies designed to reduce GHG emissions aggressively.

If the US follows a path toward deep decarbonization of the economy, areas of the country that produce coal, oil, and natural gas will see economic opportunities in their communities shrink. Some sort of adjustment policy, akin to the trade adjustment mechanisms put in place in the 1970s, are one possible policy solution for adversely affected workers and communities.

Targeted polling reveals that different energy producing communities may favor very different policy solutions. Coal counties favor direct assistance to affected workers. However, oil and gas areas in coastal regions want adjustment funds directed to adaptation and renewables. Most notably, there is a tension between what these communities want and what the nation as a whole supports. Following national opinion alone would lead to further support for renewable energy, but these communities favor direct assistance and adaptation. Further in-depth research in these areas needs to examine more carefully the type of adjustment policies that meets the needs of affected communities.

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