Building Support for Carbon Pricing: A Research Guide

Citizens' Climate Lobby

Table of Contents

Building Support for Carbon Pricing: A Research Guide

By Jonathan Marshall, CCL Economics Research Coordinator
March 2023

Introduction

You'd think supporters of a climate policy endorsed by [more than 3,600 U.S. economists](#), the [UN Secretary General](#), [International Monetary Fund](#), [World Bank](#), and [Intergovernmental Panel on Climate Change](#) (IPCC), to name a few, would be riding high. Instead, many advocates of carbon pricing are on the defensive against skeptics who claim it can never work in America.

"The politics of tax-centered climate policy are hopeless," [declared](#) New York Times columnist Paul Krugman in 2022. "This may be the optimal economic policy for reducing carbon pollution, but as the centerpiece of climate reforms, it has proven a political disaster," [asserted](#) two prominent University of California at Santa Barbara political scientists in 2020. That view has become conventional wisdom among [many](#) [journalists](#) as well. It also helps explain why drafters of the original Build Back Better proposal did not include carbon pricing.

The skeptics have a case, of course. Broad new taxes are rarely popular, particularly when supporters can promise only uncertain benefits sometime in the future. The failure of the Waxman-Markey cap-and-trade bill in the U.S. Senate in 2009, the repeal of carbon pricing in Australia in 2014, the failure of ballot initiatives in Washington state in 2016 and 2018, and the "Yellow Vest" protests against higher fuel taxes in France in 2018 all set back the global movement for carbon pricing.

But to call the cause of carbon pricing "hopeless" seems premature when a record 68 such programs covered 23% of all global emissions in 2022, according to the latest [World Bank report](#). America's leading trade partners–the European Union, China, Canada, and Mexico–all use some form of carbon pricing. At the start of 2023, Washington state bounced back from its previous setbacks and began implementing a new "[cap-and-invest" carbon pricing system](#) to help slash emissions 95% below 1990 levels by 2050. Moreover, a rising carbon tax [reportedly](#) came within one vote of being included in the budget reconciliation bill later known as the Inflation Reduction Act of 2022. Climate activists are not about to give up on a policy instrument [described](#) by the IPCC in 2022 as "one of the most widely used and effective options to reduce GHG emissions."

Studies of public attitudes toward climate policy

If carbon pricing is worth doing and experience proves it's possible, how can we raise the odds of implementing it? Many studies by political scientists, economists, and other behavioral scientists shed light on just that question, although they have received little attention in mainstream media or political commentary. Together, however, they provide clear directions for making carbon pricing politically more viable.

Below I summarize key findings from this literature. Following that I have appended excerpts from many key papers to provide a research guide for climate policy campaigners. A bibliography provides abstracts and other short excerpts from the papers cited here.

The central insight provided by this literature is that "carbon pricing" comes in many different forms with equally many degrees of political acceptability. Finding the right political formula without sacrificing effectiveness is the key–and it's doable. As one group of researchers noted, "carbon taxes can be made more acceptable by designing them in a way that responds to voter concerns. Objections to carbon taxation are often not about the introduction of the tax itself, but about its design and the way relevant information is shared. Sociopsychological factors—such as perceived coerciveness, equity, and justice—all affect the extent to which voters accept different climate policy instruments. Factoring them into the design from the outset could make carbon tax legislation easier to pass" (Carattini et al., 2018).[1]

Carbon Fee & Rebate Plan — FINAL RECOMMENDATION

Do you favor or oppose the plan for the government to charge a carbon fee to companies and distribute the money collected from the fee to citizens in the form of a monthly rebate check?

FAVOR

National	62
Republicans	32
Democrats	87
Independents	62

CONGRESSIONAL DISTRICTS

Very Red	54
Very Blue	77
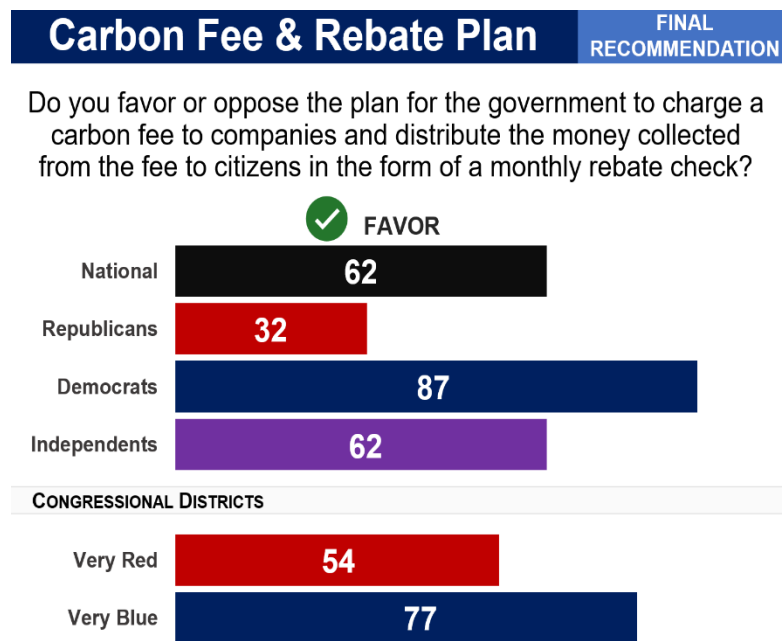
National Survey of Registered Voters, Program for Public Consultation, University of Maryland, March 2021.

Let me first offer a few caveats. Public opinion polls on climate policy, like most other issues, can be easily cherry-picked to prove a point but are often misleading. The public may have little knowledge of the relevant issues and thus their attitudes may be fickle. Subtle differences in wording may greatly bias the results. Respondents who endorse policies in the abstract may greatly exaggerate their actual willingness to pay for solutions. Surveys may accurately capture attitudes at one moment but give little insight

---

[1] In this and most other quotes I have generally dropped literature citations. Sources can be found in the bibliography at bottom.

into what people will think after being targeted by a barrage of hostile advertising in a real-world campaign. For example, a deluge of spending by industry opponents lowered the vote for a 2018 carbon tax measure in Washington state by an estimated 20 percentage points. (Anderson et al., 2023)

To overcome such biases, behavioral scientists try different ways of wording questions. They break respondents into control and experimental groups, offering the latter additional information or choices about policy alternatives to gauge their impact. They also analyze the results of actual referenda to gain insight into what drives voting behavior. For all their limitations, such careful methods elevate most scholarly studies above more anecdotal literature, which is why this research guide focuses only on peer-reviewed journal articles.

Let's start with the bad news: "In studies that have presented respondents with a range of policy options for tackling climate change, taxation has invariably been the least popular," notes Swedish sociologist Malcolm Fairbrother. "That is true even though . . . they are relatively popular taxes" (Fairbrother, 2022). Most people prefer incentives in the form of carrots rather than sticks—that is to say, subsidies rather than taxes or rigid mandates. However, just because survey respondents ignore or underestimate the cost of subsidies doesn't mean politicians can. When expanded to make a really big dent in emissions, subsidies and standards can become enormously expensive with rapidly diminishing returns. Carbon pricing—which most economists regard as the "most cost-effective lever to reduce carbon emissions at the scale and speed that is necessary"—may not be the most popular policy, but if it can be made popular enough to be enacted, that's what counts.

Political obstacles to carbon pricing

So what makes carbon pricing a hard sell, besides the understandable aversion of voters to pay higher costs for fuel, utility bills, and the like? Survey researchers and behavioral scientists identify several recurring issues:

Perceptions of unfairness. Many members of the public worry about the *fairness* of carbon pricing—both to their own pocketbooks and to those less fortunate. That concern was a prime motivator of the 2018 French revolt over higher fuel taxes, which was aggravated by the government's simultaneous cancellation of a wealth tax (Maestre-Andrés et al., 2019). In one meta-analysis of 89 datasets across 33 countries relating to public opinion about climate taxes, researchers found the single strongest factor determining outcomes was the perception of fairness (Bergquist et al., 2022 – see chart below).

Major determinants of public opinion about carbon pricing
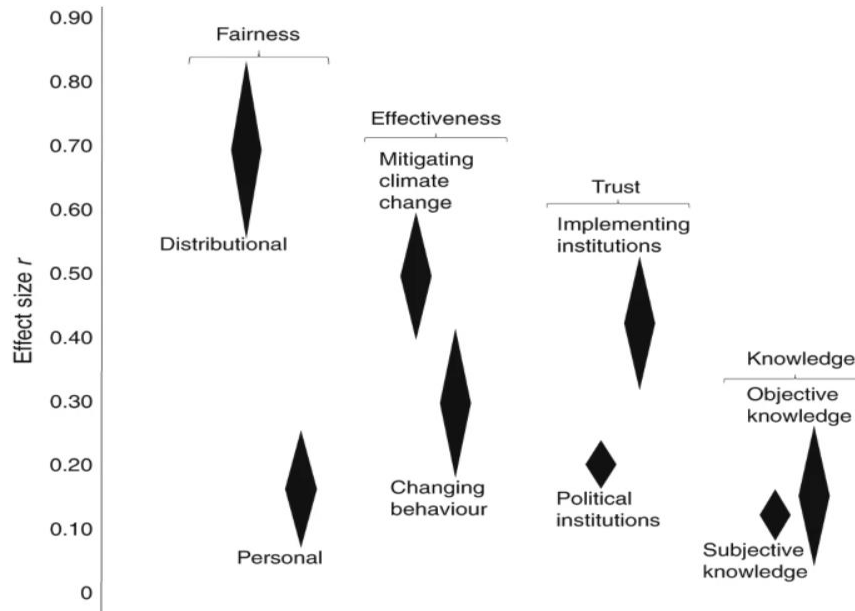
Source: Bergquist et al. (2022), "Meta-Analyses"

Public trust. Studies also show a key obstacle is *lack of public trust*. Many people believe politicians will take the revenue from a carbon tax or similar measure and squander it rather than do anything to improve the environment. This may explain why public trust in politicians is highly correlated with the existence of a high national carbon price (see chart).

Carbon prices, public trust, and perceived corruption
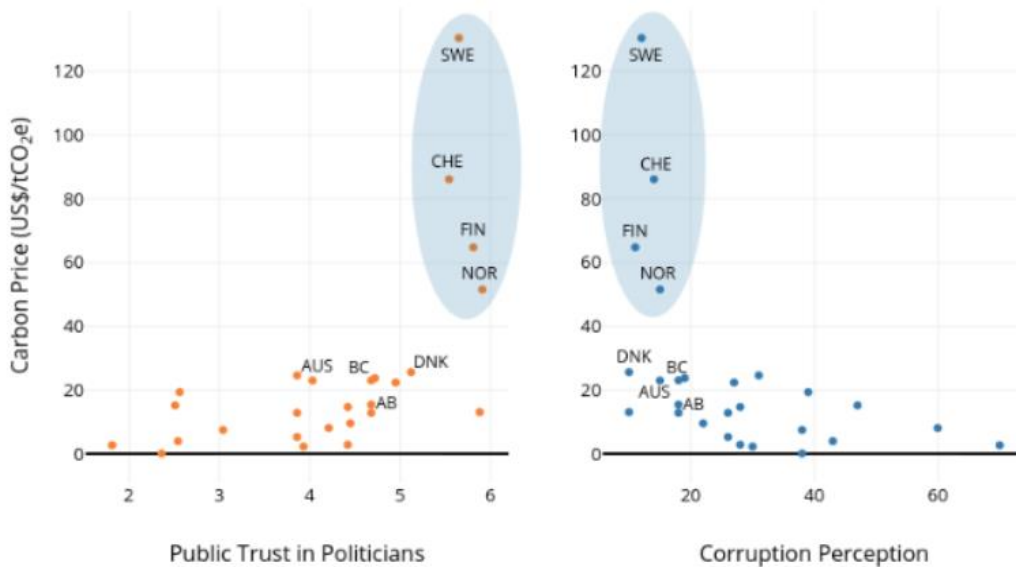
Source: Klenert and Hepburn (2018), [Making carbon pricing work for citizens | CEPR](#)

Climate effectiveness. Closely related to the problem of trust is *public ignorance about the climate effectiveness of carbon pricing*. The power of a carbon tax doesn't come primarily from the revenue it raises but from the price incentives it creates for every consumer and producer to purchase and provide lower-carbon goods and services. Failing to understand this basic economic notion, "most people feel that carbon taxes are just a pretext to raise fiscal revenues" (Baranzini and Carattini, 2017). Their ignorance compounds their lack of trust. In the meta-analysis cited above, researchers found perceived policy effectiveness to be the second strongest factor after fairness. (Bergquist et al. 2022)

Ignorance of co-benefits. Most people are also *ignorant of the environmental and health co-benefits of carbon pricing*, especially those resulting from lower levels of air pollution created by burning fossil fuels. In a survey of Geneva residents, for example, only 42% said they expected to see any health benefits from a national carbon tax exceeding US$100 per ton of CO_2 (Baranzini and Carattini, 2017).
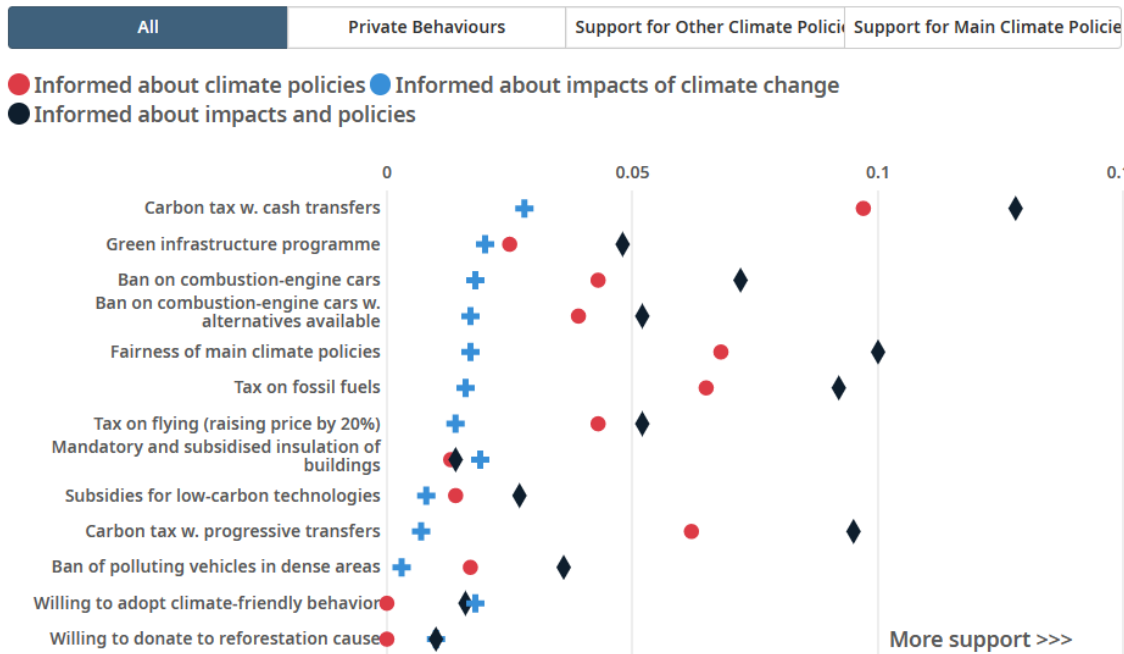
How to boost the popularity of carbon pricing

Fortunately, much of the recent literature on public attitudes toward climate policy and carbon pricing explores possible ways to increase popular support for carbon pricing. Researchers repeatedly emphasize the importance of *how carbon revenues are spent*:

1. Public distrust over government misuse of revenue can be eased by earmarking revenues, either rebating them as revenue-neutral, lump-sum "dividends" to individuals or by spending them on environmental and climate programs. Recycling revenue by cutting other taxes or budget deficits is generally less popular, which helps explain resistance to fuel tax increases in France and the 2016 carbon tax initiative in Washington state, which proposed cuts in the state sales tax. "Even in the best of times, carbon taxes must be carefully crafted to avoid political pitfalls," said Paul Bledsoe, a former Clinton White House climate adviser. "In particular, much of the revenue raised must be recycled back to middle-income workers. [French President Emmanuel] Macron's approach put the money toward deficit reduction, stoking already simmering class grievances." (Washington Post, 12/4/2018)

2. Public concern about the unfair impact of carbon pricing on people with fewer means can also be alleviated by earmarking revenue for low-income households or for dividends that have a progressive impact on such households.

3. *Combining a carbon fee and dividend policy with public education to overcome public ignorance about its environmental and pocketbook effects is a winning strategy.* Even a few minutes of explanation can grow public support substantially. One recent study showed that providing people a simple calculator to show both the cost and rebate from a $50 carbon fee and dividend boosted support among Americans surveyed from 58% to 70% (Fremstad et al., 2022). Another recent study of more than 40,000 people in 20 countries showed that exposure

to a five-minute video on carbon tax and dividend boosted support for the already popular policy by nearly 10 percentage points (Dechezleprêtre et al., 2022).

How does informing citizens affect support for climate change?

Change in level of support

| All | Private Behaviours | Support for Other Climate Policie | Support for Main Climate Policie |

🔴 Informed about climate policies 🔵 Informed about impacts of climate change
⚫ Informed about impacts and policies

	0	0.05	0.1	0.15
Carbon tax w. cash transfers				
Green infrastructure programme				
Ban on combustion-engine cars				
Ban on combustion-engine cars w. alternatives available				
Fairness of main climate policies				
Tax on fossil fuels				
Tax on flying (raising price by 20%)				
Mandatory and subsidised insulation of buildings				
Subsidies for low-carbon technologies				
Carbon tax w. progressive transfers				
Ban of polluting vehicles in dense areas				
Willing to adopt climate-friendly behavior				
Willing to donate to reforestation cause				

More support >>>

Providing a few minutes of explanation about the climate and financial impacts of a carbon tax with cash rebate results in a 13-percentage point increase in support.
Source: Dechezleprêtre et al., 2022

A few other findings to guide climate activists

1. Terminology and labeling really do matter. People respond more positively to the concept of a carbon "fee" or "climate contribution" rather than a carbon "tax" (e.g. Kallbekken et al., 2011). On the other hand, a study of public views in Australia found that the term "carbon price" attracted little more support than "carbon tax" (Hammerle et al., 2021). An audience's ideology also matters a great deal when it comes to framing carbon tax policies. Bear in mind, of course, that opponents will work hard to impose their own, more negative labels and framing.

2. One way to overcome public reluctance to accept new taxes is to start the carbon price low and then raise it over time: "By phasing in carbon taxes gradually, policymakers can take advantage of the fact that aversion tends to abate once people have experienced a policy. A slow ramp-up, or even a trial period, provides individuals with the opportunity to gauge the

costs and benefits of the tax. Taxes can then be raised progressively until they reach the level required to meet the environmental objective" (Carattini et al., 2018).

3. Governments that introduce carbon pricing need to ensure the benefits are highly salient. As one Canadian columnist complained about his own country's otherwise cutting-edge carbon fee and dividend policy, "the best ideas in the world can fail if they're not sold properly. . . All wonkish academic endorsements in the world won't mean anything if voters don't understand why you're doing something and how it benefits them personally." He was referring to the practice of issuing rebates as relatively invisible bank transfers or tax credits rather than well-publicized dividend checks. Proper marketing also means taking care to publicize the climate and environmental co-benefits of carbon pricing. Such information provision can also build public confidence and trust in government more generally.

4. Politicians need to read the public and their economic circumstances with empathy. "Governments must carefully manage the transition to higher carbon prices, in particular where taxes interact with volatile commodity prices," wrote Adair Turner, former chair of the UK's Financial Services Authority, soon after the rise of France's Yellow Vest protests in 2018. "Intended increases should be gradual and declared far in advance, and they should be delayed when oil prices and thus pre-tax fuel costs are sharply increasing." His words were certainly relevant to the political environment of 2022, when persistent and painful energy price spikes followed Russia's invasion of Ukraine.

5. The sequence of policies matters, too. Empirical studies show that the public may be more receptive to carbon pricing if governments first subsidize lower-carbon solutions, such as renewable energy and electric vehicles, to make them more affordable and build a political constituency around them (Linsenheimer et al., 2022; Wagner et al., 2015; Meckling et al., 2015; Meckling et al., 2017).

6. Public opinion is important but not all-important. In view of widespread public ignorance about the effects of carbon fee and dividend policies on carbon emissions and household budgets, it is likely more viable to pursue such policies through Congress and state legislatures rather than public referenda. The success of a "cap-and-invest" policy in Washington state after the failure of two carbon tax referenda offers evidence.

These are not revolutionary ideas. Indeed, some of them have been encompassed in mainstream carbon fee-and-dividend proposals such as the Energy Innovation and Carbon Dividend Act, which attracted 95 co-sponsors in the 117th Congress. Still, it is as helpful and reassuring to see which of one's intuitions are supported by careful research as it is to see which others are off the mark. For carbon pricing advocates who want a deeper dive into the research, the compendium below provides relevant excerpts from some of the most respected papers in the field.

Excerpts from major studies

Concerns about possible unfairness discourage support for carbon pricing

In a meta-analysis of 89 datasets across 33 countries relating to public opinion about climate change taxes and laws, researchers found "Among all determinants, fairness showed the strongest relationship with public opinion. Importantly, fairness is a multicomponent construct referring to the extent that people, a process or a distribution, are treated or implemented equally or according to a criteria such as need or merit. When exploring subtypes of fairness, we found a strong effect for distributional fairness, measuring participants' perceived fairness of policy distributions, for example how subsidies or taxes are distributed between or within specific groups. A weaker effect was found for personal fairness, measuring how fair a policy is perceived 'for me'" (Bergquist et al., 2022).

"The distributional impacts of carbon pricing that received most attention, namely in 14 studies, were impacts on poor households. . . Arguably, in the French case a lack of recycling of carbon tax revenues to households and a simultaneous cancellation of a wealth tax played a role as well. Perceived (un)fairness of carbon pricing has been found to be significantly correlated with its (low) public acceptability" (Maestre-Andrés et al., 2019).

In a survey of 3,000 French households, "among respondents who did not receive the information on the progressivity, only 19% of respondents think the [fee and dividend] policy would benefit the poorest households, compared to 60% who declare that it would not and 20% who do not know" (Douenne and Fabre, 2022).

Public distrust of how the government will use the revenue is another major barrier to carbon taxation

"Much of the opposition to carbon taxes is driven by political distrust. Whenever people pay their taxes, they run the risk that politicians and public administrations will steal or waste their money, and so their trust in government generally influences their support for tax policies—like any other policies entailing a risk or sacrifice. Political trust influences support for CO2 and environmental taxes. People suspect their governments will use such taxes simply as a devious way of raising public revenue, not really to mitigate greenhouse gas emissions" (Fairbrother, 2022).

"The focus groups of Dresner et al. (2006) revealed the high level of distrust in environmental tax reforms among the general public. The general public seems to underestimate the effectiveness of environmental taxes and to perceive them mainly as an excuse for raising additional public revenues. People may only be willing to support their introduction if revenues are clearly earmarked for environmental purposes. They also wonder how environmental taxes could green the economy if revenues were to be redistributed.

Moreover, they raise fears of adverse competitiveness and distributional effects. . . . Similar results are provided in Kallbekken and Sælen (2011). Based on a Norwegian sample, the authors find that perceived ineffectiveness of fuel taxes represents a major obstacle to acceptability" (Carattini et al., 2017).

"[P]olitical distrust is an important reason for people's scepticism of market-based measures for environmental protection. Green tax increases are typically implemented in tandem with offsetting tax reductions elsewhere, often with the objective of winning public acceptance. . . But majorities of citizens in all countries do not believe that politicians keep their promises, and there appears to be widespread scepticism that revenue neutrality will materialize in practice. As such, convincing the public to trust that governments will keep their promises on revenue neutrality is a key challenge for environmental policy makers and advocates; seemingly, until voters are convinced, they will remain hostile" (Fairbrother, 2019).

Public ignorance of its environmental and health effectiveness also erodes support for carbon pricing

"While economists tend to take the beneficial environmental effects as granted, the effectiveness of carbon taxes does not seem to be always internalized by the general public. . . . [T]he general public tends to miss the incentive effect of carbon taxes, thus expecting tax revenues to be earmarked for environmental purposes. When this is not the case, most people feel that carbon taxes are just a pretext to raise fiscal revenues. . . . Pigouvian taxes are thus perceived at the same time as coercive and ineffective. . . If the tax is expected to be effective in reducing emissions, acceptability rises by about 30 %. The impact of co-benefits on acceptability has a similar magnitude . . . Hence, our findings strongly support the literature on the perceived effectiveness of carbon taxes and provide a quantitative estimate of the magnitude of its linkage with acceptability, which is shown to depend also on perceived co-benefits. . . In fact, co-benefits are in the order of several tens of dollars per ton of $CO_2$2 and may well exceed abatement costs. . . That is, co-benefits may be a game changer in the political economy of climate change mitigation, if fully internalized in people's beliefs" (Baranzini and Carattini, 2017).

"In particular, people do not see carbon taxes as effective in combating climate change. Our findings confirm this result. Among the respondents who did not receive the information on environmental effectiveness, only 15% answered 'Yes' when asked whether our tax & dividend would be effective in reducing pollution and fighting climate change, 68% answered 'No' and 18% answered that they did not know" (Douenne and Fabre, 2022).

"The perceived distributional impacts of climate policies are strongly correlated with policy support. Most important (in terms of the share of variation explained) is the perceived effectiveness of a policy, as measured by the belief that it will reduce emissions and the belief

that it will reduce pollution. Beliefs in the effectiveness of policies to reduce emissions and pollution together account for 24% of differences in policy support" (Dechezleprêtre, et al., 2022).

Earmarking revenues for environmental programs may address public ignorance and distrust

"Our results show that, in the absence of earmarking, the majority of voters would like to reduce fuel taxes but earmarking the revenues for environmental measures has a substantial effect on voter support for fuel tax increases, garnering a majority for increases of up to 15% above present levels. Further analysis indicates that a prime reason why earmarking for environmental measures is popular is that it increases the perceived environmental effectiveness of the tax, and hence its legitimacy as an environmental rather than a fiscal policy instrument" (Saelen and Kallbekken, 2011).

"Conventional wisdom holds that a carbon tax is a political non-starter. However, results from the latest version of the National Surveys on Energy and Environment (NSEE) provide evidence of substantial public support for a tax on the carbon content of different fossil fuels when specific uses of tax revenue are attached. A majority [56%] of respondents support a revenue-neutral carbon tax [with rebate checks], and an even larger majority [60%] support a carbon tax with revenues used to fund research and development for renewable energy programs. The carbon tax coupled with renewable energy research earns majority support across all political categories, including a narrow majority of Republicans" (Amdur et al., 2014).

"The most preferred use of revenues is funding environmental projects, as reported in fifteen studies. . . Admittedly, most studies do not properly specify the concrete environmental allocation of the revenues to have an accurate assessment of people's preferences. For instance, they used general terms such as "environmental earmarking" or "environmental projects" without it always being clear what this entailed" (Maestre-Andrés et al., 2019).

But another study finds, "somewhat surprisingly," that "people are not more enthusiastic if green tax revenue is spent on the environment. If anything, people are marginally less willing to pay new environmental taxes if told that the revenues will also be spent specifically on programmes for environmental protection" (Fairbrother, 2019).

Earmarking revenues for lump-sum dividends can ease public concerns about fairness

"An important outcome of our assessment is that providing uniform lump-sum dividends to citizens is favored among behavioral and political studies that emphasize the importance of distributional fairness, revenue salience, political trust, and policy stability amid partisan changes in government. It is also successfully employed in several real-world recycling

schemes. While alternative uses of revenues such as green spending may be appropriate in different national contexts, our findings suggest that lump-sum dividends may be more stable and successful particularly in countries bogged down with issues of economic inequality, political mistrust, and polarization" (Klenert et al., 2017)

"Several revenue-use options dealing with redistribution in order to obtain a less regressive outcome were identified in the studies. . . The elderly are separately mentioned as they are especially vulnerable to low temperatures and therefore to higher energy prices. It was found to be the most preferred option in three studies and the second one in three other studies. Equal share of revenue given to each taxpayer was the second preferred option in two studies and the third option in one study. It is considered progressive because fixed amounts of compensation account for a greater proportion of income in low-income households. Moreover, since low-income households tend to spend less, in absolute terms, on energy consumption than high-income households, then the former will receive more through the monetary transfer than the cost increase they suffer" (Maestre-Andrés et al., 2019).

"With regards to revenue-use options that makes carbon pricing less regressive, we found that redistributing revenue to vulnerable groups and an equal share of revenue given to each taxpayer increased people's acceptability in five studies (one non-significant) in case of the former and two studies in case of the latter (one non-significant). . . One study found that Americans increased their policy acceptability when the extra revenue was refunded equally to American families via a tax rebate" (Maestre-Andrés et al., 2019).

"A common finding in the literature is that people are most willing to accept a carbon tax if its revenues are used to strengthen its environmental effectiveness, which people believe to be small. . . . However, our choice-experiment setting, by informing on the emissions reduction associated with the different carbon taxes, allows closing the gap between (possibly low) perceived effectiveness and (higher) predicted effectiveness. As a result, we find that earmarking for additional abatements is no longer particularly attractive. Information on the scenarios' predictions renders instead lump-sum transfers and social cushioning particularly popular, by making salient their progressive properties. The finding for lump-sum transfers is particularly striking. Despite their minimal administrative burden and the ability to address distributional concerns, lump-sum transfers are especially neglected by the literature on the acceptability of carbon taxes. The reason for this is that these properties may not be perceived by the population, along with revenue neutrality. Our setting shows however that it is sufficient to provide people with some supplementary information to reduce the gap between their preferences and economists' prescriptions. . . . We find that lump-sum transfers and social cushioning are the most preferred options for recycling, while environmental recycling does not seem to obtain the support that it usually receives in the literature" (Carattini et al., 2017).

"Key results indicate that support shifts are largest when the revenue would be refunded and conservatives and Republicans are responsive to different revenue usage options. Specifically, conservatives and Republicans are more supportive of a carbon tax when revenues go towards a tax rebate or deficit reduction. While the differences are relatively small and variable (uncertain), these results provide suggestive insight into the policy design options that may induce a bipartisan basis of public support for carbon taxation policies" (Nowlin et al., 2020).

"The fact that a large majority of American respondents support a high carbon tax when it is fully rebated to the public suggests that carbon pricing in the US is politically possible in the right political environment" (Fremstad et al., 2022)

"The hypothetical potential of climate rebates to increase public carbon pricing support has been shown in the United States, Canada, Norway, Switzerland, the United Kingdom, Australia, Germany, Turkey, France and India. These studies offer strong reasons to expect that bundling carbon taxes with lump-sum rebates could increase public acceptance." However, surveys of Canada and Switzerland find "only limited evidence that [carbon tax rebates] have reshaped the politics of carbon pricing to date. Members of the public in both countries remain ill-informed about the rebates they are already receiving and systematically underestimate their size" (Mildenberger, et al., 2022).

Earmarking revenues for deficit reduction or lowering other taxes may be less popular

"[R]educing existing taxes did not receive much support from the general public, as it was found the least favoured option in seven studies. There are mainly three reasons that can explain this opposition. Firstly, people do not trust that the government will actually do as promised. Dresner et al. (2006b) found that people 'did not believe that other taxes would be reduced in reality or that the money would be spent on what was promised.' Secondly, people are sceptical about the idea of a double dividend of environmental tax reform. Double dividend refers to recycling carbon pricing revenues by reducing distortionary taxes (e.g. labour taxes, income taxes) may have positive impacts on economic growth, employment, or technological development" (Maestre-Andrés et al., 2019).

"Most respondents oppose a carbon tax with revenues used to reduce the federal budget deficit. Overall support for such a tax is 38% with a majority of Democrats, Republicans, and Independents each expressing opposition to this tax. When asked which use of revenue they prefer if a carbon tax were enacted, pluralities of Democrats, Republicans, and Independents each prefer renewable energy over tax rebate checks or deficit reduction" (Amdur et al., 2014).

"[O]ur exercise suggests that even with an extremely low tax rate recycling through VAT rebates could hardly provide a majority in favor of a carbon tax. With social cushioning, and especially lump-sum transfers, the picture is different" (Carattini et al., 2017).

"Empirical studies show that cutting other taxes is the least popular redistribution strategy among the public" (Carattini et al., 2018).

"[E]armarking is an important strategy. For example, some experimental evidence suggests that revenue-neutrality makes a large positive difference to attitudes. Design principles advocated by the minority of carbon tax advocates who come from right-of-center perspectives suggest that revenue-neutrality could be a powerful means of getting more conservatives on-side. Individuals who are politically conservative in particular may be heavily swayed by adding an offsetting tax cut to a proposed increase in a carbon tax. On the other hand, a study of Swiss voters concludes that a failed 2015 popular initiative would have had a better chance of passing had the revenues from a possible new tax been earmarked for spending on environmental protection, rather than simply paying for the abolishment of the VAT [value-added tax]. . . . The most appropriate use of the revenues from new carbon price policies will likely be contextual—with lump-sum universal transfers ("fee-and-dividend") most effective in many but not all contexts" (Fairbrother 2022).

On the other hand, in a national survey of American adults in 2016, participants were asked how they would like to use the revenue from a tax on fossil fuels to help reduce global warming. They were given 10 choices. "Public support is greatest, at nearly 80%, for the development of clean energy (solar, wind) and for improvements to American infrastructure (roads, bridges, etc). More than 70% of Americans support using the money to assist displaced workers in the coal industry, and 66% support paying down the national debt. Between 45% and 60% support reducing federal income taxes, assisting low-income communities most vulnerable to climate change, paying a climate dividend to all households in equal amounts [46%], and helping all communities prepare for and adapt to global warming. Fewer respondents support reductions in payroll taxes (44%) and reducing corporate taxes (24%). . . A follow-up question asked respondents to allot revenue in percentage terms among the expenditure categories for which they had previously indicated support. . . . Americans would like to see the greatest proportion of revenue (17.3%) spent to further develop clean energy. Other categories receiving more than 10% of the revenue are improvements to America's infrastructure, paying down the national debt, and assisting displaced workers in the coal industry. Preferences are lower, though still quite high, for using the revenue to reduce federal income taxes (just under 10%) and paying carbon dividends to households in equal amounts (8.1%)" (Kotchen et al., 2017).

Public education is critically important for building support and trust

"Based on our findings we argue that policy designs usually preferred by economists, but in most cases opposed by the general public, are not necessarily unpopular, provided that the general public shares at least some of the information that economists have. Our findings can help devise effective carbon taxes that are accepted by citizens, because they are convincingly shown to be environmentally effective and because their revenues are refunded in a form that mitigates their burden on low-income households. Addressing the concerns and limited information of the general public is probably the only way to avoid important resistances to cost-effective instruments of climate change mitigation . . . Lump-sum redistribution can be associated to higher acceptability provided that its progressive properties are made explicit. If distributional effects are salient, social cushioning and lump-sum redistribution can lead to higher acceptability" (Carattini et al., 2017).

"As soon as policymakers start considering the design of a carbon tax, they should provide detailed information (obtained through analysis and perhaps model simulations) to navigate the process of public consultations and to pre-emptively address voter concerns. This disclosure would ideally occur before voters are called to a ballot, or before lawmakers consider a carbon tax bill in the parliament. Providing rigorous analytical information through different, trusted channels and devices may ensure that the public debate about the effects of a carbon tax is based on the best available evidence. . .

"An interesting example of a communication strategy is offered by the Citizens' Climate Lobby (CCL), an interest group active in promoting the implementation of a carbon tax with lump-sum redistribution of revenues in the United States as well as in other countries. One of the CCL's main activities is communicating the functioning of the carbon tax to the general public. Their strategy starts with the name that they give to their carbon tax proposal: "carbon fee and dividend." Thanks to external studies, the CCL is able to communicate some general approximations of the effects of its proposal on a relatively large set of outcomes, including the amount of the "dividend" that households would receive thanks to the carbon tax. General equilibrium effects on jobs, and economic output, are also provided, with variation at the regional level.

"Communication efforts need to continue once the policy is implemented. . . For example, a survey . . . administered in 2012 suggests that a surprisingly large proportion of the population may not be aware of the carbon tax on heating fuels that the Swiss government introduced in 2008. Even fewer people seem to be aware that the revenues from this tax are redistributed lump sum to households, through automatic reduction in mandatory health care bills, in which this information is reported in fine print. . . .

"Because the effects of carbon taxes are often not visible, governments are encouraged to measure their effects regularly and inform their citizens about them transparently. The

provision of annual reports that include plans on how revenues have been redistributed in the past and how they will be distributed in the future provides evidence of transparency, credibility, and commitment of a government to execute a carbon tax as originally intended. A world without carbon tax is by definition not observable, once the carbon tax is implemented. Communicating the effect of a carbon tax may therefore be difficult when greenhouse gas emissions increase from year to year, but would have increased even more without the tax. Communication strategies need to be adapted to the fact that the general public may have little familiarity with the empirical toolkit of policy evaluation. Similar adjustments may need to be undertaken also ex ante, if greenhouse gases are expected to increase" (Carattini et al., 2018).

"Seven studies reported dissatisfaction with governmental information provision about the policy. For instance, Kallbekken and Aasen (2010) found for Norway that one third of respondents thought providing information about policy instruments such as taxes is necessary to make them understandable. Moreover, respondents in Klok et al. (2006) declared that the government should provide information about whether CO_2 reduction objectives had been met. Similarly, both business representatives and general public from Germany expressed their concerns about making the environmental tax reform more transparent. Respondents from three studies referred to the insufficient consultation of social partners in designing and implementing carbon pricing. Deroubaix and Leveque (2006) showed that controversies about environmental tax reform in France emerged due to a very small number of protagonists taking part in key decisions concerning its design, a process characterized by confidential negotiations with energy-intensive industries' representatives and exclusion of unions and NGOs. . . [F]our quantitative studies and four qualitative ones found that policy acceptability increases when people are satisfied with governmental information provision about the policy" (Maestre-Andrés et al., 2019).

"Our results indicate that convincing people of the actual incidence and effectiveness of the policy could lead to majority support. Indeed, we find that self-interest has a large effect on support for the policy: the belief that one does not lose from it increases the acceptance rate by more than 50 [percentage points]. Similarly, believing that the tax is environmentally effective increases the approval rate of the reform by more than 40 p.p. We also provide non-causal evidence that believing in the progressivity of the scheme has a large effect on support. Overall, these results suggest that the rejection of carbon taxation does not typically result from clashing principles, such as a disinterest in the climate or a dislike of price instruments but rather from overly pessimistic beliefs about the properties of the reform" (Douenne and Fabre, 2022).

"When respondents are provided with controlled and accurate information about the effects of a carbon price and rebate policy, rebates have a positive effect on public support. Thus, in the absence of political messaging, we find that the inclusion of a rebate substantially

increases support for carbon taxes in both the US and Switzerland. When rebates are included, we find strong support for carbon taxes even at $230/tCO_2, a rate that would substantially reduce emissions. In these experimental conditions, carbon rebates primarily increase support among low-income households that are net beneficiaries of the policy. At the same time, high income groups do not substantially reduce support for a carbon tax when revenues are rebated to the public, leading towards a convergence in levels of support across income quintiles. The fact that a large majority of American respondents support a high carbon tax when it is fully rebated to the public suggests that carbon pricing in the US is politically possible in the right political environment" (Fremstad et al., 2022)

"We show that, across countries, support for climate policies hinges on three key perceptions centered around the effectiveness of the policies in reducing emissions (effectiveness concerns), their distributional impacts on lower-income households (inequality concerns), and their impact on the respondents' household (self-interest). We show experimentally that information specifically addressing these key concerns can substantially increase the support for climate policies in many countries. Explaining how policies work and who can benefit from them is critical to foster policy support, whereas simply informing people about the impacts of climate change is not effective" (Dechezleprêtre, et al., 2022)

Education is no panacea, however, depending on the political context

 "Using a representative survey, we find that after the Yellow Vests movement, French people would largely reject a tax & dividend policy, i.e., a carbon tax whose revenues are redistributed uniformly to each adult. They overestimate their net monetary losses, wrongly think that the policy is regressive, and do not perceive it as environmentally effective. We show that changing people's beliefs can substantially increase support. Although significant, the effects of our informational treatments on beliefs are small. Indeed, the respondents that oppose the tax tend to discard positive information about it, which is consistent with distrust, uncertainty, or motivated reasoning." (Douenne and Fabre, 2022)

"[M]ost survey respondents are not aware of any of British Columbia's climate policies and have little understanding of the potential effect of these on reducing greenhouse gas emissions. Once they are made aware of different types of climate policies, respondents are more likely to express support for regulations, such as the zero-emissions electricity standard and energy efficiency regulations, and less likely to support a carbon tax. Statistical analysis indicates that citizen knowledge of policy is not associated with higher policy support. Furthermore, providing information on likely policy effectiveness to our survey respondents did not translate into higher support, suggesting that widespread knowledge and well-informed citizen support are not necessarily required for implementation of effective climate policies" (Rhodes et al., 2014).

"[E]xperimental provision [of information] about individual rebate size only modestly increased support for the current policy in Switzerland and did not increase support for even a small tax increase. In Canada, information about rebate size did not increase policy support, but instead led Conservative Party respondents to believe the policy imposed net costs on their household. These findings imply that one-time information does not substantially affect policy support" (Mildenberger et al., 2022).

Terms and framing matter

"First, though it may seem simplistic, one very basic thing advocates of carbon taxes can do to make their proposals as unobjectionable to the public as possible is not to call them taxes. People evaluate taxes more positively if nothing else changes except the tax is not called a 'tax.' Better alternatives may be 'fee' or 'contribution' or the like." (Fairbrother, 2022)

"Contrasting the labels 'carbon tax' and 'climate contribution,' we show that labeling can spur acceptability also in the street and not only in the lab. 'Climate contribution' may sound as an appeal to the public good, recalling to the general public the urgency of climate change mitigation." (Baranzini and Carattini, 2017)

"Framing is likely to be important, with policies that are labeled a 'tax' or explicitly connected to climate are not likely to receive support" (Nowlin et al., 2020).

"The labelling of the carbon price may alter perceptions of its desirability. Something as plain as re-labelling a carbon price as a 'CO2 levy', as done in Switzerland and Alberta, or speaking of 'fee and dividend', could circumvent solution aversion and make the measure more acceptable to citizens" (Klenert and Hepburn, 2018).

"[P]eople's political identities influence their judgements about information and policy recommendations, and currently in some countries this is a major barrier. One study with Australian data found that experimentally making people's left-right political identities salient led conservatives to be less believing in anthropogenic climate science, and less supportive of policies to mitigate climate change. In the U.S., people support or oppose policies because of the partisan identity of the proposer, holding constant the content of the proposal. What then can be done? Especially for political conservatives, there are 'patriotic' options for increasing people's climate change concern and/or support for mitigation options. National identity can be an effective theme around which to build communications about climate change mitigation. Some (limited) research suggests that there are ways of appealing to nationalism (landscape, made-at-home industry). Based on online experiments with a representative UK sample, argue that talking about climate from a justice perspective is politically polarizing, but some alternative narratives are not, like the principle of avoiding waste, and the advantages of 'Great British Energy.' Such narratives may appeal to a wide political spectrum, with support for climate policy can enhanced by arguments about the

benefits to be derived by people's own countries, rather than the globe as a whole" (Fairbrother, 2022).

However, remember that no one side can control the message. "Counter-framing and argumentative competition occur in real life, but only infrequently in trials with integrated surveys. If arguments for and against climate change mitigation cancel each other out, effects are expected to be far smaller in reality than in survey experiments. Thus, more research is needed on how competing arguments are conceived and processed within realistic debates around policy issues in order to better understand the complexity of individual opinion formation." (Heyer and Wicki, 2022)

"[O]ur results also reveal that the effect of rebates depends crucially on politics. . . . [W]e expose half of the respondents to simple political messages around carbon taxation by showing them arguments from proponents and opponents of these policies. In contrast to most previous survey approaches, this better simulates what occurs in real world elections and referendums. In both countries, the effect of rebates on respondents overall is no longer statistically significant in the presence of political messaging, suggesting that politics trumps personal economic interests. Thus, even if the financial benefits of carbon rebates are clearly communicated to respondents, public support is not increased when the issue is politicized. . . Future research must investigate whether or how rebates can be more effectively communicated to the public in such real-world settings, and what political messages could counteract these effects to build more robust support for necessary climate reforms" (Fremstad, 2022).

References

Amdur, D. et al. (2014). [Public views on a carbon tax depend on the proposed use of revenue](). *Issues in Energy and Environmental Policy*, no. 13. "Conventional wisdom holds that a carbon tax is a political non-starter. However, results from the latest version of the National Surveys on Energy and Environment (NSEE) provide evidence of substantial public support for a tax on the carbon content of different fossil fuels when specific uses of tax revenue are attached. A majority of respondents support a revenue-neutral carbon tax, and an even larger majority support a carbon tax with revenues used to fund research and development for renewable energy programs. The carbon tax coupled with renewable energy research earns majority support across all political categories, including a narrow majority of Republicans."

Anderson, Soren et al. (2023). [Can Pigou at the Polls Stop Us Melting the Poles]()? *Journal of the Association of Environmental and Resource Economists*, forthcoming. Available as [NBER Working Paper 26146](). "Surveys show majority U.S. support for a carbon tax. Yet none has been adopted. Why? We study two failed carbon tax initiatives in Washington State in 2016 and 2018. Using a difference-in-differences approach, we show that Washington's real-world campaigns reduced support by 20 percentage points. Resistance to higher energy prices explains opposition to these policies in the average precinct, while ideology explains 90% of the variation in votes across precincts. Conservatives preferred the 2016 revenue-neutral policy, while liberals preferred the 2018 green-spending policy. Yet we forecast both initiatives would fail in other states, demonstrating that surveys are overly optimistic."

Baranzini A, and Carattini S. (2017) [Effectiveness, earmarking and labeling: testing the acceptability of carbon taxes with survey data](). *Environmental Economics and Policy Studies*, 19: 197–227. "This paper analyzes the drivers of carbon taxes acceptability with survey data and a randomized labeling treatment. Based on a sample of more than 300 individuals, it assesses the effect on acceptability of specific policy designs and individuals' perceptions of carbon taxes advantages and disadvantages. We find that the lack of perception of primary and ancillary benefits is one of the main barriers to the acceptability of carbon taxes. In addition, policy design matters for acceptability and in particular earmarking fiscal revenues for environmental purposes can lead to larger support. We also find an effect of labeling, comparing the wording 'climate contribution' with 'carbon tax.' We argue that proper policy design coupled with effective communication on the effects of carbon taxes may lead to a substantial improvement in acceptability."

Bergquist, M. et al. (2022). [Meta-analyses of fifteen determinants of public opinion about climate change taxes and laws](). *Nature Climate Change*, 12: 235-240. "Public acceptance is a precondition for implementing taxes and laws aimed at mitigating climate change. However, it still remains challenging to understand its determinants for the climate community. Here, we use a meta-analytic approach to examine the role of public opinion about climate change

taxes and laws. Fifteen variables were examined by synthesizing 89 datasets from 51 articles across 33 countries, with a total sample of 119,465 participants. Among all factors, perceived fairness and effectiveness were the most important determinants."

Cantner, Fabienne and Rolvering, Geske (2022). "Does information help to overcome public resistance to carbon prices? Evidence from an information provision experiment," BGPE Discussion Paper #219, July 2022. "We find that providing information about the efficiency of carbon prices as well as on international emission levels and carbon price initiatives changes people's perceptions and their support. Information about the possibility and benefits of revenue recycling, however, only affect the views of very specific subgroups of the population, such as individuals with low income or high trust in the government. Moreover, we find that none of the information affects the perceptions and support of climate change skeptics."

Carattini, S., et al. (2017). Green Taxes in a Post-Paris World: Are Millions of Nays Inevitable? *Environmental and Resource Economics*, 68: 97–128. View Article "We tested the acceptability of alternative designs of a carbon tax with a choice experiment survey on a representative sample of the Swiss population. Survey respondents are informed about environmental, distributional and competitiveness effects of each carbon tax design. These impacts are estimated with a computable general equilibrium model. This original setting generates a series of novel results. Providing information on the expected environmental effectiveness of carbon taxes reduces the demand for environmental earmarking. Making distributional effects salient generates an important demand for progressive designs, e.g. social cushioning or recycling via lump-sum transfers. The case of lump-sum recycling is particularly striking: it is sufficient to show its desirable distributional properties to make it one of the most preferred designs, which corresponds to a completely novel result in the literature. We show that providing detailed information on the functioning of environmental taxes may contribute to close both the gap between acceptability ex ante and ex post and the gap between economists' prescriptions and the preferences of the general public."

Carattini, S. et al. (2018). Overcoming public resistance to carbon taxes. *Wiley Interdisciplinary Reviews: Climate Change*, 9. Carbon taxes represent a cost-effective way to steer the economy toward a greener future. In the real world, their application has however been limited. In this paper, we address one of the main obstacles to carbon taxes: public opposition. We identify drivers of and barriers to public support, and, under the form of stylized facts, provide general lessons on the acceptability of carbon taxes. We derive our lessons from a growing literature, as well as from a combination of policy "failures" and "successes." Based on our stylized facts, we formulate a set of suggestions concerning the design of carbon taxes. We consider the use of trial periods, tax escalators, environmental earmarking, lump-sum transfers, tax rebates, and advanced communication strategies,

among others. This paper contributes to the policy debate about carbon taxes, hopefully leading to more success stories and fewer policy failures.

Cherry T.L., et al. (2012). [The acceptability of efficiency-enhancing environmental taxes, subsidies and regulation: An experimental investigation](). *Environmental Science & Policy*, 16: 90-96. "Public opposition to efficiency-enhancing policies is a significant barrier to addressing many environmental challenges. We use a market experiment to explore the acceptability of three types of instruments: Pigouvian taxes and subsidies, and quantity regulation. We find that overall more than half of voters oppose efficiency-enhancing policies. The results replicate previous findings of tax aversion, and, by providing evidence of subsidy and regulation aversion, the estimates also suggest the existence of a broader aversion to market intervention. Voters supported subsidies significantly more than taxes while supporting quantity regulation significantly less than taxes. This is consistent with norms against coercive policy instruments. Concerning a possible trade-off between acceptability and efficiency, estimates indicate differences across instruments. Support for regulation relative to not having any policy in place increases considerably if inefficient half measures are proposed instead of efficient full measures. This is less true for taxes and subsidies. The language used to describe the policy also influences acceptability, which is particularly apparent in the case of the tax instrument."

Cherry T.L., et al. (2014). [The impact of trial runs on the acceptability of environmental taxes: Experimental evidence](). *Resource and Energy Economics*, 38: 84–95. "The paper examines the political difficulty of enacting environmental taxes. We observe significant tax aversion – i.e., opposition to taxes that are materially beneficial. A trial period of an environmental tax significantly mitigates tax aversion."

Copland, S. (2020). [Anti-politics and global climate inaction: The case of the Australian carbon tax](). *Critical Sociology*, 46: 623–641. "Action on climate change has enjoyed popular support in most Western countries. Despite this, successive governments have struggled to implement policy to tackle this issue. Using the case of opposition to the Clean Energy Act, passed in Australia to establish an emissions trading scheme, this paper argues that a growing and broad sentiment of distrust in political elites, described as 'anti-politics', can explain some of this contradiction. Particular forms of climate policy, in particular emissions trading schemes, have been successfully framed as policies that appeal to the interests of a new class of liberal elites while hurting ordinary working people. This frame was used successfully in Australia by conservative forces to oppose the Clean Energy Act. While used cynically by political leaders in this case, the paper argues that anti-political sentiment reflects genuine concerns about the detachment between the state and voting population."

Dabla-Norris, E., et al. [Public Perceptions of Climate Mitigation Policies: Evidence from Cross-Country Surveys](). International Monetary Fund Staff Discussion Notes No. 2023/002,

February 2023. "Using nationally representative individual-level surveys for 28 countries, this note sheds light on the individual characteristics and beliefs associated with climate risk perceptions and preferences for climate policies. . . Along with climate risk perceptions, three key policy attributes are major predictors of whether people support carbon pricing: (1) perceived effectiveness in reducing emissions, (2) perceived fairness or distributional burden, and (3) perceived other or co-benefits in terms of improved air quality, health outcomes, and new jobs. This suggests that providing information about climate change impacts, how carbon pricing works, options for revenue recycling, and improving awareness of policy co-benefits can all be critical to garnering acceptance of carbon pricing. . . Overall, the surveys underscore the critical importance of effective communication and building awareness with respect to climate policy options. There remains significant scope for improving overall knowledge of climate change impacts and policies across all countries. Further, the interventions highlight how even small amounts of information on policy benefits can engender greater support."

De Groote, Oliver et al. (2022). [The political economy of financing climate policy – Evidence from the solar PV subsidy programs](). Toulouse School of Economics, WP 1329, April 2022. "We analyze the political impact of a generous solar panel subsidization program. Subsidies far exceeded their social benefit and were partly financed by new taxes to adopters and by electricity surcharges to all consumers. We use local panel data from Belgium and find a decrease in votes for government parties in municipalities with high adoption rates. This shows that the voters' punishment for a costly policy exceeded a potential reward by adopters who received the generous subsidies. Further analysis indicates that punishment mainly comes from non-adopters, who change their vote towards anti-establishment parties. . . This has important implications for green energy policy. Political rather than economic reasons have been used to justify the choice of technology-specific policies to combat climate change over other measures such as a market for carbon emission rights or a carbon tax. Our results indicate that the political objectives of these policies did not materialize, because the incumbent parties actually lost votes from the excessive support for solar panel adoption."

Dechezleprêtre, Antoine et al. (2022). [Fighting climate change: International attitudes toward climate policies](), Grantham Research Institute working paper, December 2022. "Using new surveys on more than 40,000 respondents in twenty countries that account for 72% of global CO2 emissions, we study the understanding of and attitudes toward climate change and climate policies. We show that, across countries, support for climate policies hinges on three key perceptions centered around the effectiveness of the policies in reducing emissions (effectiveness concerns), their distributional impacts on lower-income households (inequality concerns), and their impact on the respondents' household (self-interest). We show experimentally that information specifically addressing these key concerns can substantially increase the support for climate policies in many countries. Explaining how policies work and

who can benefit from them is critical to foster policy support, whereas simply informing people about the impacts of climate change is not effective."

Dolšak, Nives et al. (2020). [Policy design and public support for carbon tax: Evidence from a 2018 US national online survey experiment](). *Public Administration*, 98: 905-921. "Using a national online sample of 1,606 US respondents, we examine support for a $20/ton carbon tax that is: (1) revenue neutral: revenue is returned to citizens via tax cuts; (2) compensation-focused: revenue is directed to helping actors disproportionately hurt by the tax; (3) mitigation-focused: revenue funds projects reducing carbon emissions; and (4) adaptation-focused: revenue is directed to enhancing community resilience to extreme weather events. We find devoting revenue to mitigation raises overall support for carbon tax by 6.3 per cent versus the control (54.9 per cent) where no information on spending is provided. Other frames raise support in specific subgroups only. Revenue neutrality raises support among lower-income households (+6.6 per cent) and political independents (+9.4 per cent), while compensation increases support among lower-income respondents (+6.1 per cent)."

Dominioni, G. and Heine, D. (2019). [Behavioural Economics and Public Support for Carbon Pricing: A Revenue Recycling Scheme to Address the Political Economy of Carbon Taxation](). *European Journal of Risk Regulation*, 10: 554–570. "Even though carbon pricing is widely accepted as the most efficient policy instrument for climate change mitigation, it has been severely held back by a lack of public support. Building on research in behavioural sciences, we propose a revenue recycling scheme that aims to foster public support for carbon taxes. The scheme has two main strengths: (i) it may allow the implementatin of carbon taxes with higher tax rates than those currently prevailing in most jurisdictions; (ii) it relies on a number of accessible technologies, and thus it can be implemented in a wide variety of settings, both in urban and rural areas of developing and developed countries."

Douenne, T. and Fabre, A. (2022). [Yellow Vests, Pessimistic Beliefs, and Carbon Tax Aversion](). *American Economic Journal: Economic Policy*, 14: 81-110. [Available here.]() "Using a representative survey, we find that after the Yellow Vests movement, French people would largely reject a tax & dividend policy, i.e., a carbon tax whose revenues are redistributed uniformly to each adult. They overestimate their net monetary losses, wrongly think that the policy is regressive, and do not perceive it as environmentally effective. We show that changing people's beliefs can substantially increase support. Although significant, the effects of our informational treatments on beliefs are small. Indeed, the respondents that oppose the tax tend to discard positive information about it, which is consistent with distrust, uncertainty, or motivated reasoning."

Ewald, Jens et al. (2022). [Understanding the resistance to carbon taxes: Drivers and barriers among the general public and fuel-tax protesters.]() *Resource and Energy Economics*, 70 (November 2022). "Lack of trust in government and lack of belief in the Pigouvian mechanism

are especially important motivations for protesters' opposition. When asked about the use of carbon tax revenue, some respondents support revenue refunding (uniform or progressive), but more people support using it for climate mitigation investments."

Fairbrother Malcolm (2019). When Will People Pay to Pollute? Environmental Taxes, Political Trust and Experimental Evidence from Britain. *British Journal of Political Science*, 29: 661–82. Available here. "This article presents results from survey experiments investigating conditions under which Britons are willing to pay taxes on polluting activities. People are no more willing if revenues are hypothecated for spending on environmental protection, while making such taxes more relevant to people – by naming petrol and electricity as products to which they will apply – has a modestly negative effect. Public willingness increases sharply if people are told that new environmental taxes would be offset by cuts to other taxes, but political distrust appears to undermine much of this effect. Previous studies have argued that political trust shapes public opinion with respect to environmental and many other policies. But this article provides the first experimental evidence suggesting that the relationship is causal, at least for one specific facet: cynicism about public officials' honesty and integrity. The results suggest a need to make confidence in the trustworthiness of public officials and their promises more central to conceptualizations of political trust."

Fairbrother, Malcolm. (2022). Public opinion about climate policies: A review and call for more studies of what people want. *PLOS Climate*, 1. "This paper therefore reviews what we know about public attitudes towards climate policies; about the kinds of people who are more versus less supportive of public actions to mitigate climate change; and about the public messages and policy institutions and designs that make people more accepting of climate action. Much of the paper concerns attitudes specifically towards measures that would tax greenhouse gas emissions, given that more studies have investigated attitudes towards taxes than any other climate policy."

Fairbrother M. et al. (2019). Political trust and the relationship between climate change beliefs and support for fossil fuel taxes: Evidence from a survey of 23 European countries. *Global Environmental Change*, 1. "Taxes on fossil fuels could be a useful policy tool for governments seeking to reduce greenhouse gas emissions. However, such taxes are politically challenging to introduce, as public opinion is usually hostile to them. Prior studies have found that attitudes toward carbon and other environmental taxes reflect not just people's beliefs and concerns about the problems these taxes address, but also their trust in their country's politicians and political system. Using multilevel models fitted to data collected in 2016 on 42,401 individuals in 23 European countries, we show for the first time that these two factors interact. Among Europeans who distrust their country's politicians, political parties, and parliament, or who live in countries with low levels of political trust, being aware and concerned about climate change is at most weakly associated with support for taxes on fossil fuels. Europeans with high political trust, on the other hand, tend to be

much more supportive of fossil fuel taxes if they also believe in the reality and dangers of anthropogenic climate change. Cross-nationally, the nations whose populations are most supportive of higher taxes on fossil fuels are not those that are more aware and concerned about climate change; rather, they are those with the highest levels of political trust."

Fremstad, A. et al. (2022). The role of rebates in public support for carbon taxes. *Environmental Research Letters*, 17. "We use a novel carbon tax calculator to provide residents in the US and Switzerland with personalized estimates of the financial costs and benefits associated with carbon pricing policies. Our results indicate that, absent political messaging, rebates increase public support for carbon taxes in both countries by building support among lower income groups. In the US, we find majority support in our sample for both low ($50/tCO$_2$) and high ($230/tCO$_2$) carbon taxes when rebates are included; in Switzerland public support is lower."

Gevrek, Z. E., & Uyduranoglu, A. (2015). Public preferences for carbon tax attributes. *Ecological Economics*, 118: 186–197. "Turkish people prefer a carbon tax with a progressive cost distribution rather than one with a regressive cost distribution. The private cost has a negative effect on the probability of choosing the tax. Earmarking carbon tax revenues increases the public acceptability of the tax. Moreover, there is a preference for a carbon tax that promotes public awareness of climate change."

Hammerle, M., et al. (2021). Public acceptance of carbon taxes in Australia. *Energy Economics*, 101. "We use a discrete choice experiment to quantify willingness to pay for carbon tax design features through higher electricity bills. Our results show higher utility for schemes that provide financial support to low-income households and that recycle revenues for low-carbon technologies."

Heyen, Dirk, and Wicki, Michael. (2022) Increasing public support for climate policy: Research needs, questions, and challenges around politically influenceable acceptability factors, Oeko-Institut Working Paper, February 2022. "This working paper aims to inspire much more research on such factors by critically reflecting on the status quo of existing research and knowledge and by formulating research needs, questions, and methodological approaches with regard to four clusters of politically influenceable acceptability factors: policy design and packaging, different temporal aspects of policies (timing, sequencing, trial runs), participation and coalition building, as well as information and framing."

Kallbekken S, et al. (2011). Do you not like Pigou, or do you not understand him? Tax aversion and revenue recycling in the lab. *Journal of Environmental Economics and Management*, 62: 53–64. "Tax-aversion reduces the likelihood that price rationing can be a politically viable tool for environmental protection. We examine the case of the classic Pigouvian tax to control a negative externality, and consider how recycling the revenues, labeling of the tax and information about its purpose affects the support for

taxation. We test the support for taxation within a single-price market experiment, in which purchases by some buyers impose external costs on others. Observing behavior consistent with tax-aversion, we also find that recycling the revenues to more narrowly targeted groups seems to increase support for taxation. In the absence of narrow revenue recycling, labeling a Pigouvian instrument as a 'tax' may significantly lower the likelihood of voter support."

Kaplowitz, S.A. and McCright, A.M. (2015). Effects of policy characteristics and justifications on acceptance of a gasoline tax increase. *Energy Policy*, 87: 370-381.

Klenert, D. et al. (2018). Making Carbon Pricing Work for Citizens. *Nature Climate Change*, 8: 669-677. See summary here. 2017 working paper. "The gap between actual carbon prices and those required to achieve ambitious climate change mitigation could be closed by enhancing the public acceptability of carbon pricing through appropriate use of the revenues raised. In this Perspective, we synthesize findings regarding the optimal use of carbon revenues from both traditional economic analyses and studies in behavioural and political science that are focused on public acceptability. We then compare real-world carbon pricing regimes with theoretical insights on distributional fairness, revenue salience, political trust and policy stability. We argue that traditional economic lessons on efficiency and equity are subsidiary to the primary challenge of garnering greater political acceptability and make recommendations for enhancing political support through appropriate revenue uses in different economic and political circumstances."

Klenert, David and Mattauch, Linus. Carbon Pricing for Inclusive Prosperity: The Role of Public Support. EFIP Policy Brief 16, September 2019. "Given the urgent need to deliver on global climate targets, our research shows that a theoretically beautiful carbon pricing scheme may not resonate as well with the public as a scheme that takes into account the public's concerns about fairness, salience of the benefits and citizen's distrust in government. If the most important aim of a policy proposal for higher carbon prices is to maximise its chance of passage and preservation in the political process, a set of considerations is important beyond efficiency losses and competitiveness concerns. As citizens are concerned about individual losses, it is important to design carbon pricing schemes in a way that citizens feel they are getting some immediate benefits. In effect, using the proceeds from carbon pricing revenues as lump-sum dividends is generally a commendable strategy: Equal per capital transfers are salient if paid out as checks, they can create constituents in favor of climate policy and could also be advantageous in political contexts in which solution aversion or lack of political trust are the dominating factors. However, there is no single best solution for all contexts, but rather advice on revenue-recycling needs to account for local circumstances."

Konc, Theo et al. (2022). Co-dynamics of climate policy stringency and public support. *Global Environmental Change*, 74. "Public support for stringent climate policies is currently weak. We

develop a model to study the dynamics of public support for climate policies. It comprises three interconnected modules: one calculates policy impacts; a second translates these into policy support mediated by social influence; and a third represents the regulator adapting policy stringency depending on public support. The model combines general-equilibrium and agent-based elements and is empirically grounded in a household survey, which allows quantifying policy support as a function of effectiveness, personal wellbeing and distributional effects. We apply our approach to compare two policy instruments, namely carbon taxation and performance standards, and identify intertemporal trajectories that meet the climate target and count on sufficient public support. Our results highlight the importance of social influence, opinion stability and income inequality for public support of climate policies. Assuming that misperceptions vanish overtime, our model predicts that carbon taxation consistently generates more public support than standards. Finally, we show that under moderate social influence and income inequality, an increasing carbon tax trajectory combined with progressive revenue redistribution receives the highest average public support over time."

Kotchen M. J., et al. (2017). [Public willingness to pay for a US carbon tax and preferences for spending the revenue](#). *Environmental Research Letters*, 12. " Regarding the tax revenues, Americans are most in support of using the money to invest in clean energy and infrastructure. There is relatively less support for reducing income or payroll taxes, returning dividends to households, and other expenditure categories."

Levi, Sebastian (2021). [Why hate carbon taxes? Machine learning evidence on the roles of personal responsibility, trust, revenue recycling, and other factors across 23 European countries](#). *Energy Research & Social Science*, 73 (March 2021). "The results identify the feeling of personal responsibility for trying to reduce climate change as the most important condition for predicting opposition to carbon taxes and for predicting attitudes on other climate policies. Political trust, in contrast, strongly predicts carbon tax opposition but not attitudes on other climate policies, suggesting that low political trust could explain the peculiar public aversion against carbon taxes. Recycling revenues from existing carbon prices back to households, often considered crucial for securing public support, is only associated with minor increases in the acceptance of higher carbon taxes."

Linsenheimer, M., et al. (2022) [Policy Sequencing Towards Carbon Pricing - Empirical Evidence From G20 Economies and Other Major Emitters](#). IMF Working Paper No. 2022/066. "Here, we examine empirical evidence on the sequence of policy adoption and climate policy portfolios of G20 economies and other major emitters that eventually implemented a national carbon price. We find that all countries adopted carbon pricing late in their instrument sequence after the adoption of (almost) all other instrument types. Furthermore, we find that countries that adopted carbon pricing in a given year had significantly larger climate policy portfolios than those that did not. In the last part of the paper, we examine

heterogeneity among countries that eventually adopted a carbon price. We find large variation in the size of policy portfolios of adopters of carbon pricing, with more recent adopters appearing to have introduced carbon pricing with smaller portfolios. Furthermore, countries that adopted carbon pricing with larger policy portfolios tended to implement a higher carbon price. Overall, our results thus suggest that policy sequencing played an important role in climate policy, specifically the adoption of carbon pricing, over the last 20 years."

Longo A., et al. (2012). Willingness to pay for ancillary benefits of climate change mitigation. *Environmental Resource Economics*, 51: 119–140. Assessing the Willingness to Pay (WTP) of the general public for climate change mitigation programmes enables governments to understand how much taxpayers are willing to support the implementation of such programs. "This paper contributes to the literature on the WTP for climate change mitigation programmes by investigating, in addition to global benefits, the ancillary benefits of climate change mitigation. It does so by considering local and personal benefits arising from climate change policies. The Contingent Valuation Method is used to elicit the WTP for ancillary and global benefits of climate mitigation policies in the Basque Country, Spain. Results show that WTP estimates are 53–73% higher when ancillary benefits are considered."

Maestre-Andrés Sara, et al. (2019). Perceived fairness and public acceptability of carbon pricing: a review of the literature. *Climate Policy*, 19:1186–204. Available here. "While carbon pricing is widely seen as a crucial element of climate policy and has been implemented in many countries, it also has met with strong resistance. We provide a comprehensive overview of public perceptions of the fairness of carbon pricing and how these affect policy acceptability. To this end, we review evidence from empirical studies on how individuals judge personal, distributional and procedural aspects of carbon taxes and cap-and-trade. In addition, we examine preferences for particular redistributive and other uses of revenues generated by carbon pricing and their role in instrument acceptability. Our results indicate a high concern over distributional effects, particularly in relation to policy impacts on poor people, in turn reducing policy acceptability. In addition, people show little trust in the capacities of governments to put the revenues of carbon pricing to good use. Somewhat surprisingly, most studies do not indicate clear public preferences for using revenues to ensure fairer policy outcomes, notably by reducing its regressive effects. Instead, many people prefer using revenues for 'environmental projects' of various kinds. We end by providing recommendations for improving public acceptability of carbon pricing. One suggestion to increase policy acceptability is combining the redistribution of revenue to vulnerable groups with the funding for environmental projects, such as on renewable energy."

Maestre-Andrés, Sara et al. (2021) Carbon tax acceptability with information provision and mixed revenue uses. *Nature Communications*, 12. "Public acceptability of carbon taxation

depends on its revenue use. Which single or mixed revenue use is most appropriate, and which perceptions of policy effectiveness and fairness explain this, remains unclear. It is, moreover, uncertain how people's prior knowledge about carbon taxation affects policy acceptability. Here we conduct a survey experiment to test how distinct revenue uses, prior knowledge, and information provision about the functioning of carbon taxation affect policy perceptions and acceptability. We show that spending revenues on climate projects maximises acceptability as well as perceived fairness and effectiveness. A mix of different revenue uses is also popular, notably compensating low-income households and funding climate projects. In addition, we find that providing information about carbon taxation increases acceptability for unspecified revenue use and for people with more prior tax knowledge. Furthermore, policy acceptability is more strongly related to perceived fairness than to perceived effectiveness."

Meckling, Jonas, et al. (2015). [Winning Coalitions for Climate Policy How Industrial Policy Builds Support for Carbon Regulation](). *Science*, 349 (September 11, 2015). "From the political successes of climate policy leaders, we identify key strategies for building winning coalitions for decarbonization of domestic economies. Green industrial policy provides direct incentives for growth of green industries, which builds political support for carbon regulation."

Meckling, Jonas et al. (2017) [Policy sequencing toward decarbonization](). *Nature Energy*, 2: 918-922. "Many economists have long held that carbon pricing—either through a carbon tax or cap-and-trade—is the most cost-effective way to decarbonize energy systems, along with subsidies for basic research and development. Meanwhile, green innovation and industrial policies aimed at fostering low-carbon energy technologies have proliferated widely. Most of these predate direct carbon pricing. Low-carbon leaders such as California and the European Union (EU) have followed a distinct policy sequence that helps overcome some of the political challenges facing low-carbon policy by building economic interest groups in support of decarbonization and reducing the cost of technologies required for emissions reductions. However, while politically effective, this policy pathway faces significant challenges to environmental and cost effectiveness, including excess rent capture and lock-in. Here we discuss options for addressing these challenges under political constraints. As countries move toward deeper emissions cuts, combining and sequencing policies will prove critical to avoid environmental, economic, and political dead-ends in decarbonizing energy systems."

Mildenberger, M., et al. (2022). [Limited impacts of carbon tax rebate programmes on public support for carbon pricing](). *Nature Climate Change*, 12: 141-47. "Revenue recycling through lump-sum dividends may help mitigate public opposition to carbon taxes, yet evidence from real-world policies is lacking. Here we use survey data from Canada and Switzerland, the only countries with climate rebate programmes, to show low public awareness and substantial underestimation of climate rebate amounts in both countries. Information was obtained using a five-wave panel survey that tracked public attitudes before, during and after

implementation of Canada's 2019 carbon tax and dividend policy and a large-scale survey of Swiss residents. Experimental provision of individualized information about true rebate amounts had modest impacts on public support in Switzerland but potentially deleterious effects on support in Canada, especially among Conservative voters. In both countries, we find that perceptions of climate rebates are structured less by informed assessments of economic interest than by partisan identities. These results suggest limited effects of existing rebate programmes, to date, in reshaping the politics of carbon taxation."

Nowlin, M., et al. (2020). [Revenue Use and Public Support for a Carbon Tax](#). *Environmental Research Letters*, 15. "Recent research indicates that revenue recycling and policy design options may induce public support for carbon pricing, but does not examine change in support as a result of revenue use or possible heterogeneity in these inducements across partisan groups. Does support for a carbon tax shift significantly once revenue uses are discussed? Do conservatives and Republicans and liberals and Democrats respond to different revenue reuse options when formulating opinions about carbon taxation? This study employs a survey experiment to examine these questions. Key results indicate that support shifts are largest when the revenue would be refunded and conservatives and Republicans are responsive to different revenue usage options. Specifically, conservatives and Republicans are more supportive of a carbon tax when revenues go towards a tax rebate or deficit reduction. While the differences are relatively small and variable (uncertain), these results provide suggestive insight into the policy design options that may induce a bipartisan basis of public support for carbon taxation policies."

Povitkina, Marina, et al. (2021). [Why are carbon taxes unfair? Disentangling public perceptions of fairness.](#) *Global Environmental Change*, 70 (September 2021). "The results from our analysis show that people regard carbon taxes based on gas pricing as unfair because they perceive gas prices already being high, because of the need to drive, unfairness for the poor or rural population, lack of trust in government, or considerations that the purpose of the tax is unjustified. . . . We conclude that statements of policy fairness are much more varied than is accounted for in studies only focusing on the fairness-policy acceptability link. This, in turn, suggests that there is likely no one policy instrument that will resolve *all* the public's objections to carbon tax related to fairness. For example, this questions the strife for fee-and-dividend systems as the panacea for alleviating negative public opinions over a carbon tax."

Rhodes E. et al. (2014). [Does effective climate policy require well-informed citizen support?](#) *Global Environmental Change*, 29: 92–104. "Citizen support for climate policies is typically seen as an important criterion in climate policy making. Some studies of climate policy support assume that a significant number of citizens need to be aware of the policies in question and able to provide informed opinions. In this study, we probe this assumption using a web-based survey of residents of the Canadian province of British Columbia ($n = 475$) by assessing: (1) citizen awareness and knowledge of climate policies, (2) citizen support for

different climate policies, (3) the relationship between citizen knowledge and policy support, and (4) the effect of information provision on policy support. Our main finding is that most survey respondents are not aware of any of British Columbia's climate policies and have little understanding of the potential effect of these on reducing greenhouse gas emissions. Once they are made aware of different types of climate policies, respondents are more likely to express support for regulations, such as the zero-emissions electricity standard and energy efficiency regulations, and less likely to support a carbon tax. Statistical analysis indicates that citizen knowledge of policy is not associated with higher policy support. Furthermore, providing information on likely policy effectiveness to our survey respondents did not translate into higher support, suggesting that widespread knowledge and well-informed citizen support are not necessarily required for implementation of effective climate policies."

Rhodes E. et al. (2017). [Exploring Citizen Support for Different Types of Climate Policy](). *Ecological Economics*, 137: 56–69. "This study examines citizen support for several market-based, regulatory, and voluntary climate policies using survey data collected from a representative sample of Canadian citizens (n = 1306). Specifically, the research objectives are to (1) assess citizen support for different types of climate policies, (2) identify the key factors associated with citizen support for different policy types, and (3) explore heterogeneity across respondents based on policy support patterns. Results indicate that most regulatory and voluntary policies receive high levels of support (83–90% of respondents), while a carbon tax receives the highest levels of opposition (47%)."

Sælen H. and Kallbekken S. (2011). [A choice experiment on fuel taxation and earmarking in Norway](). *Ecological Economics*, 70: 2181–2190. "Our results show that, in the absence of earmarking, the majority of voters would like to reduce fuel taxes, but earmarking the revenues for environmental measures has a substantial effect on voter support for fuel tax increases, garnering a majority for increases of up to 15% above present levels. Further analysis indicates that a prime reason why earmarking for environmental measures is popular is that it increases the perceived environmental effectiveness of the tax, and hence its legitimacy as an environmental rather than a fiscal policy instrument."

Savin, I. et al. (2020). [Public views on carbon taxation and its fairness: a computational-linguistics analysis]()." *Climatic Change,* August 2020. This paper analyzes attitudes of the Spanish public toward the fairness of carbon taxes, especially with regard to uses of the revenue. "The results show that, compared to people accepting the carbon tax, those rejecting it show less trust in politicians, think that the rich should pay more than the poor, consider the tax to be less fair, and stress more a lack of renewable energy or low-carbon transport. Respondents accepting a carbon tax emphasize more the need to solve environmental problems and care about a just society. These insights can help policymakers to improve the design and communication of climate policy with the aim to increase its public acceptability."

Sommer, S., et al. (2022). [Supporting carbon taxes: The role of fairness](). *Ecological Economics*, 195. "Using a stated-choice experiment with a sample of 6000 German household heads, we examine how their fairness preferences influence support for carbon taxes under different revenue uses. We find that respondents who prefer green spending are more likely to support a carbon tax, but the support diminishes considerably for higher tax rates – in contrast to respondents who support social cushioning. When restricted to options for direct revenue redistribution, Germans prefer lump-sum payments over directing payments to the poorest or the most affected. Preferences over these options depend both on genuinely different concepts of fairness and economic circumstances. Our findings have implications for advancing carbon pricing, as its support can be increased substantially when designed according to citizens' fairness preferences."

Steg L., et al. (2006). [Why are energy policies acceptable and effective?]() *Environmental Behavior*, 38: 92–111. "This article examines which policy features affect the perceived effectiveness and acceptability of pricing policies aimed to reduce CO2 emissions. A survey study was conducted among 112 Dutch respondents in 2003. As hypothesized, incentives and policies targeting efficiency behavior were perceived to be more effective and acceptable than were disincentives and policies targeting curtailment behavior. Policies targeting direct energy use were evaluated as more effective than those targeting indirect energy use. No significant differences were found between the acceptability of policies targeting direct and indirect energy savings. As expected, push measures were perceived to be more effective and acceptable when revenues are allocated within the energy domain rather than to general funds. Pull measures were evaluated as more effective when they are funded from within the energy domain rather than from general public funds. The way pull measures are funded did not significantly affect their acceptability."

Wagner, Gernot, et al. (2015). [Push Renewables to Spur Carbon Pricing](). *Nature*, 525 (September 3, 2015). "Policymakers are more likely to price carbon appropriately if it is cheaper to move onto a low-carbon path. But reducing the cost of renewable energies requires investment, and thus a carbon price. In our view, the best hope of ending this logjam rests with tuning policies to drive down the cost of renewable power sources even further and faster than in the past five years."

Other useful studies:

Carattini, S. et al., [How to make carbon taxes more acceptable](). London: Grantham Research Institute on Climate Change, 2017.

Climate focus, Perspectives Climate Group, and Adelphi, [Tipping the Balance: Lessons on Building Support for Carbon Pricing](). Policy Brief, 2019

Organization of Economic Cooperation and Development (OECD), Designing Socially Acceptable and Effective Climate Policies, July 2022.

Partnership for Market Readiness and Carbon Pricing Leadership Coalition, Guide to Communicating Carbon Pricing. World Bank, 2018.