PF Topic Analysis
February 2016

This February, Public Forum debaters will be discussing **"Resolved: The United States federal government should adopt a carbon tax."** Considering the wealth of public attention currently being directed towards green issues, there should be no shortage of high-quality research for you to structure your cases around. While the various issues that intertwine on this topic can be fairly technical and complex, this paper is intended to help you build a solid foundation of topic understanding and strategic prowess, so you can tackle February's rounds with ease.

We'll begin by taking a closer look at the meaning of the key phrases in the resolution.

Resolutional Analysis

This resolution differs from many past PF topics in that it prescribes a specific actor: "**the United States federal government" (USFG)**. This means that the pro must defend legal enactment and enforcement through the 3 branches of the American federal government, located in Washington, D.C.

For further discussion of what USFG means for Public Forum resolutions, check out our past topic analysis covering the issue.

In addition to USFG, this particular topic uses the verb "**should."** Together, "USFG" and "should" can be understood to create a particular burden for the pro side of the debate: to advocate a policy action.

"Should" is distinct from words like "ought" in that it is non-normative—it does not convey any kind of moral or ethical requirement. Saying one "ought" to do something typically is understood to mean that the action is morally correct. Saying one "should" do something, however, is just an expression of utility or expediency.

For example, imagine you are failing math class, and your teacher offers you a deal: she will give you a passing grade, but the price is that she will randomly select one of your classmates (who is currently passing) to fail in your place. You have a big scholarship to college on the line, and failing a class would tank your GPA and cost you the scholarship. In evaluating this situation, it would be reasonable to say both that you "ought" to reject the deal (since most people would agree that punishing an innocent person for your mistakes is morally wrong) and that you "should" take the deal (since getting an automatic passing grade and securing the scholarship is advantageous to you).

Most debaters also understand "should" to call for a policy proposal that is actually feasible. The rationale here is that, when the resolution begins "The USFG should…", the pro team is expected to suggest a law that the USFG might implement, and then demonstrate that such a law would be beneficial. Both sides are supposed to debate about the outcomes of passing that law. If the pro's suggested law is impossible, then the con team can simply argue that passage would have no effect at all.

If that seems confusing to you, keep in mind that when we discuss the USFG, we are discussing a huge bureaucratic structure made up of many parts. Thinking back to basic civics, we know that the legislative branch

(Congress) writes laws, the executive branch (the president and the federal agencies) carries out those laws, and the judicial branch (courts) settles disputes regarding the laws. When Congress passes a law, it isn't as though everything just magically springs into existence. In other words, passage and enforcement aren't the same thing.

Putting it as simply as possible, Congress could pass a law that requires that the government provide a free unicorn to every American citizen. Because unicorns don't exist, though, that would be impossible. Congress can't manifest fictional creatures into existence, no many how many laws they pass. Therefore, policy passage =/= policy enactment, if the action called for is impossible.

In these debates, we are "roleplaying" as policymakers, meaning we pretend that the judge is deciding whether or not to sign a "document" (the ballot) that would pass a new policy into law. The debate round is therefore about whether passing that new law would have good or bad consequences. If the law calls for something that isn't possible, then it can't have any good consequences, meaning the con probably wins.

BUT! It is also important to keep in mind that policy debates are usually understood to involve "fiat." If you've ever competed in CX, this might be familiar to you. If not, don't worry, it's actually pretty simple.

What we mean when we say "fiat" is that everyone in the debate operates under the shared assumption that, if the judge votes aff/pro, the suggested policy is passed into law. The neg/con cannot win just by making an argument like "well, the Republicans control Congress, and they wouldn't vote for a carbon tax, so the pro is impossible." We don't allow that because it would mean the con won every single debate, because they are right—congressional Republicans would likely never vote for any policy that would be topical under this resolution. Instead of wasting everybody's time with nonsense about politics, we focus the debate on the much

more interesting and educational question of what would happen *if they did* enact such a policy. So, we are considering the possible outcomes of passing a law, *not* on the political process of getting the law passed.

If all of that seems confusing to you, just keep this in mind: the con *cannot* win by arguing that powerful people will simply *choose not to* enact/enforce the law—"fiat" eliminates that question. The con *can* win, however, by winning that (despite efforts to enact the law) it is *impossible*.

Here is a simple example: imagine the pro wants Congress to pass a bill requiring all Americans to be provided with a new pill that is claimed to solve cancer. The pro justifies this by making a bunch of arguments about how many people die from cancer, etc. If the con argues that Congress would refuse to pass the bill because they hate cancer patients, that is not a legitimate argument, because "fiat" means we are assuming that the judge has the power to pass the law. If the con argues that the pill doesn't actually exist because the researchers falsified the evidence, therefore it is not possible to distribute this "cure for cancer," the con can win, because their objection is to the *effects* of the bill, not the *process* of its passage.

Chances are, this won't become much of an issue in your debates, but I like to err on the side of more information instead of less. If you're still worried about all of this, feel free to email me and ask for clarification.

Before we move on, here is a definition of "should" that comes from an argumentation and debate textbook, in case you need it:

> *(Austin J. Freeley (former prof. of communication at John Carroll University) & David L. Steinberg (prof. of communication at University of Miami, "Argumentation and Debate: Critical Thinking for Reasoned Decision Making," 12th edition, pp 68-9, 2009)*
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> Most propositions on matters of policy contain the word "should" – for example, "Resolved: That such-and-such *should* be done." **In a debate on a policy proposition, "should" means that** intelligent **self**-interest, social welfare, **or national interest prompts this action, and that it is both desirable and workable**. When the affirmative claims a policy "should" be adopted, it must show that the policy is practical – but it is under no obligation to show it *will* be adopted. The affirmative must give enough detail to show it would work. It may be impossible, within the time limitations of the debate, for the affirmative to give al the details, but it must at least show the outline of its policy and indicate how the details could be worked out. For example, in a debate on federal aid to education, the affirmative could not reasonably be expected to indicate how much money each state would receive under its plan, but it would be obliged to indicate the method by which the amount of the grants would be determined. It is pointless for the negative to seek to show that the affirmative's plan could not be adopted by demonstrating that public opinion is against it or that the supporters of the plan lack sufficient voting strength in Congress.

The next word in this resolution is **"adopt."** As you can probably guess, "adopt" in this context just means "pass into law." If you search Google, you'll see it defined as "take up or start to use or follow (an idea, method, or course of action)." That fits right in with everything we've discussed so far.

Finally, we come to the resolution's key term: **"Carbon tax."** In the simplest explanation possible, a "carbon tax" is a tax, levied by the government, which requires businesses and/or consumers to pay extra tax on the amount of carbon in the fuels they use. The purpose of carbon taxes is to force businesses/consumers to pay some of the cost associated with pollution created by burning fossil fuels.

Now, let's back up a bit and unpack some of that definition.

First, we need to understand what "carbon" is, and how it relates to energy. You doubtless already have at least a general notion of this subject, but in-depth knowledge will improve your ability to make nuanced arguments.

Carbon is a chemical element, one of many that make up the periodic table. Like all elements, it can either exist by itself (diamonds, for example, are made of pure carbon), or it can combine with other elements to form molecules. Carbon is not the "bad guy" on Earth—in fact, pretty much all living organisms are made largely of carbon, including you! However, carbon is also a major ingredient in greenhouse gases like CO2 and methane. When we burn fossil fuels, chemical processes take place that release these carbon-based molecules into the air. That is what we mean when we discuss **"carbon emissions."**

However, the way the word "carbon" is used in the relevant literature can be a bit confusing. Here is an explanation, courtesy of The Guardian:

> In the context of climate change, "**carbon" is commonly used as a shorthand for carbon dioxide**, the most important greenhouse gas released by humans. Technically, however, this isn't accurate. Carbon only becomes carbon dioxide when each atom of carbon joins with two atoms of oxygen (hence the chemical formula of carbon dioxide, CO2).
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> **This shorthand can sometimes cause confusion, because although "a tonne of carbon" will often be used to mean "a tonne of CO2", in a scientific context the same phrase could mean "CO2 containing a tonne of carbon" (which is a much smaller amount, as oxygen accounts for most of the weight of each CO2 molecule).**
>
> **The term carbon also crops up in the phrase carbon footprint, which describes the total amount of greenhouse gases released as the result of a given activity. In this context, "a tonne of carbon" may mean something else still: "a mix of greenhouse gases with a combined warming impact equivalent to that of a tonne of CO2".**

The most important takeaway is that, in the context of environmental policy, "carbon" is usually shorthand for CO2 and other greenhouse gases. It does not refer to pure carbon, but rather the carbon-based molecules of polluting gases. This is because the more pure carbon a fuel cell contains, the more C02 it tends to release (this makes sense, since CO2 is just carbon atoms attached to oxygen atoms). So, although "carbon" and "CO2" are different chemicals, for the purposes of discussing emissions, they are directly correlated enough that many people use them interchangeably.

Turning to the second word in "carbon tax," **what exactly is a tax?** Broadly, the word "tax" refers to a mandatory payment to the government. Taxes can be levied on individuals/families as well as businesses, organizations, etc. There are many, many different types of taxes. Every time you make a purchase from a store, you pay sales tax, which is a percentage of the total value of your purchase, added on top and paid to the government. Most U.S. workers also pay payroll and income taxes, which are both paid through a percentage of each paycheck earned by any given worker, which is withheld by the government to fund things like Social Security and Medicare. (Exactly who has to pay these taxes and how much they pay depends on income and about a zillion other complicated factors I won't bore you with, since it doesn't really matter for this topic.)

Those are the types of taxes you are most likely to be familiar with, but there are lots more. In particular, businesses are subject to a tremendous amounts of different types of taxes, which vary according to size, profits, industry, etc.

The main purpose of taxation is to fund the government and its operations. This includes everything from the military and public schools, to salaries of government workers and interest on the national debt. Of course, the accounting is extremely complex. It's not just one big pot of money; certain taxes pay for certain things. Regardless, requiring citizens to pay taxes is how governments are able to operate.

However, taxes can also serve a second, dual purpose. Sometimes, taxes are created to impose a disincentive to certain behaviors. By adding additional taxes on to the price of something, governments can discourage people from buying it. For example, "sin taxes" apply to products like cigarettes, alcohol, and sometimes certain unhealthy foods. Besides the disincentive effect, these taxes are sometimes also used to fund public programs aimed at health and wellness (for example, cigarette taxes might fund anti-smoking campaigns).

Related to this is the concept of a "Pigovian tax." This term refers to taxes imposed on products/activities that generate significant negative externalities—meaning, costs that aren't directly reflected in the price of the product.

A carbon tax is a classic example of Pigovian taxes. Many industries create a significant amount of pollution in the course of doing business. This might come from production and manufacturing, from shipping, etc. However, since air, groundwater, etc. are all shared natural resources spread out worldwide, no one person "pays for" the damage caused by pollution. Instead, the consequences are borne by everyone collectively. The problem with this is expressed by the economic phrase "tragedy of the commons." If, for example, polluting the air does not cost anything, then businesses have no monetary incentive to attempt to control their emissions. Because reducing safeguards can often be a way to cut costs, some may even see an incentive to behave irresponsibly. Pigovian taxes in general—and carbon taxes specifically—attempt to correct this market imbalance by creating an artificial cost for the targeted activity (in this case, polluting).

Like sin taxes, these serve the dual purpose of discouraging undesirable behaviors by imposing penalties and generating revenue that the government can spend on programs to reduce the costs of those behaviors. In the case of a carbon tax, the goal is to coax businesses into polluting less in order to reduce their tax burden. The money generated by the tax may also be used to fund additional programs, as we will discuss later.

So, how would a carbon tax actually be imposed? Although the specifics could vary depending on the proposal, most carbon tax plans work basically like this: the businesses that actually provide fossil fuels (oil and gas drillers, coal mining companies, etc.) pay the tax to the government directly, then pass some or all of the cost on to whomever is purchasing the fuels. Often, this will be utilities providers—the companies that you pay for the

electricity used in your home. The utilities companies will probably increase their prices to compensate for the rising cost of fossil fuels, so your monthly electric bill goes up a bit. Since businesses must also use energy to produce and distribute their products, it is also likely that the price of nearly all goods will increase some—items that take a lot of energy to create would likely see more dramatic cost increases than those that are less energy-intensive. In this way, only fossil fuel companies would pay a carbon tax directly, but everyone would pay it indirectly.

As explained by the Carbon Tax Center, a pro-carbon tax advocacy group:

> "The tax will be levied at the wholesale level of the fuel supply chain, as far upstream as practicable. For example, electric generators will pay the mandated carbon tax to their coal or natural gas suppliers, who will forward the payment to the government; the generators will pass along the tax to the retail electric utility which in turn will charge it to customers – to the extent that market conditions allow. Similarly for petroleum products (e.g., gasoline, jet fuel, heating oil), with government collecting the tax from refiners or importers of refined petroleum products, and the taxes passed on to oil wholesalers and eventually to retail customers. This approach will maximize accuracy and incentives and minimize paperwork and leakage."

Now, it is extremely important that we distinguish carbon taxes from other related-but-different policies.

Carbon taxes are *not* synonymous with energy taxes, despite the similar names and purposes. Energy taxes charge fees based on total energy usage, regardless of the amount of carbon in the energy source. Carbon taxes also apply to energy usage, but are adjusted according to the carbon-richness of the energy source. So, under an energy tax system, two businesses using the same total energy would pay the same amount regardless of whether one ran off of relatively clean power and the other burned old garbage for fuel (that is a joke;

nobody does that). Under a carbon tax, though, our dumpster-powered-factory would get charged extra for the toxic smoke they release, while the cleaner businesses would see a smaller tax bill.

Here is a piece of **evidence** distinguishing carbon taxes from other taxes on energy usage that aren't indexed to carbon content:

> *(Felicity Jane Deane, Queensland University of Technology, Brisbane, Queensland, Australia, "A new legal avenue for pricing GHG emissions? To trade of to tax?", Environment and Planning Law Journal, 28, pp 111-133, http://eprints.qut.edu.au/54449/2/Carbon_Tax_Article_Final.pdf, 2011)*
>
> The use of taxes to address environmental concerns is not a new concept. Indeed, taxes to control emissions were first introduced in the 1950s in European countries. The United States introduced taxation as a method of controlling Ozone Depleting Substances in the 1980s, and carbon taxes have been implemented since 1990. **Before considering carbon taxes** of other domestic jurisdictions **it is important to define what is meant by the term** carbon (or emissions) tax'. The definition of a carbon tax varies based on existing legal and economic commentary and from observing the different designs of taxes implemented worldwide. **A carbon tax may be narrowly defined to include only those taxes with a base directly related to the carbon content of a particular** commodity or **pollutant**. **This definition would exclude** the legal **measures** adopted in the United Kingdom, for example, **where the** Climate Change **Levy is** designed **without regard for the carbon content of the** taxable **product**. **The definition** may extend to energy taxes or fossil fuel taxes that have been implemented for the specific purpose of reducing GHGs, which are emitted as a direct result of the production of the taxed energy or the combustion of the taxed fossil fuel. The express purpose of these taxes is to mitigate climate change.74 This definition falls short of the broadest definition of a carbon tax, which includes all taxes on activities that cause GHG emissions.75 If defined broadly to include all taxes on activities that cause GHG emissions, an exhaustive analysis would require discussion of all fossil fuel based taxes, which may or may not lead to GHG emissions reductions. Therefore this paper **is concerned strictly with taxes that have been implemented to mitigate climate change through GHG emissions reductions.**

Carbon taxes are also distinct from policies referred to as "emissions trading" or "cap-and-trade." A carbon tax system simply adds a tax charge to the cost of any activity that creates emissions. There is not necessarily any maximum amount of emissions that any one business/individual can release; they are just required to pay the associated taxes. "Cap-and-trade," on the other hand, sets a maximum emissions rate (a "cap") for the entire nation. Once the cap is set, businesses are given a particular number of emissions "permits." Should they decide to exceed the emissions allowed by their permit, they would need to purchase extra permits owned by other companies ("trade"). So, under a cap-and-trade policy, nationwide emissions are

legally required to stay under a predetermined total amount, and individual businesses must determine whether their interests are best served by taking (potentially costly) steps to reduce their emissions and selling their excess permits for a profit, or by maintaining their existing operations and purchasing additional permits when necessary. In this way, a kind of market of carbon credits is created.

While cap-and-trade sets an absolute limit on the total emissions a nation will tolerate, a carbon tax does not. Additionally, a carbon tax creates a continuous, ongoing revenue stream for the government, while a cap-and-trade system instead creates a self-sustaining private market for permits after their initial distribution.

Here is **evidence** on the difference between carbon taxes and cap-and-trade:

> *(Ecolife, environmental dictionary, "Definition of carbon tax"; http://www.ecolife.com/define/carbon-tax.html#sthash.u7yPPZEm.dpuf, 2011)*
> **A carbon tax is a**n environmental **tax applied to the burning of fossil fuels in order to discourage the production of** greenhouse gas **emissions** such as carbon dioxide. Normally **this is conceived as a levy on the production of fuels** such as natural gas, coal, and petroleum, thus encouraging non-carbon fuels and technologies to emerge in the market and better compete against large carbon emitting corporations. **A carbon tax has been proposed as an alternative to a cap and trade** carbon reduction **system**. **In a cap and trade program**, carbon dioxide **emissions** and other greenhouse gases **are limited**. Those **entities producing more** greenhouse gas **emissions than they are allotted** are **therefore** forced to **buy carbon credits** from entities that are producing fewer emissions than they are allotted. **The price** for the carbon credits **is determined by** what **the marketplace** allows. **By contrast, the price of a carbon tax is determined by political and legal structures**. **Those producing** greenhouse gas **emissions are** therefore **free to produce as much as they wish, but must pay a tax** for whatever quantity they emit. This system makes the production of clean, renewable energies such as wind, solar, and geothermal more cost competitive, having the effect of boosting revenues in those industries and limiting them for dirty energies.

We will end our discussion of the differences between various types of anti-GHG policies there for now, but we will be returning to it later on in the substantive strategic section of this guide.

For the time being, the main thing to recognize is that businesses will want to maximize profits by reducing their costs (including, but not limited to, their tax burden), so they will tend to make changes according to which options reap the maximum rewards. Different kinds of taxes can change the outcomes of these calculations. So, the specific mechanism of any given tax has significant ramifications in terms of what types of choices they incentivize. In other words, the devil is in the details.

Now, we'll go over some background information to provide context for your debates.

Background

We now know that this resolution asks debaters to consider the desirability of the United States federal government placing a tax on the carbon content of fuels. Seems simple enough. Before we decide what arguments will make for the most strategic debate cases, however, it would be helpful to know a bit more background information on the topic.

Although not stated directly, we can all infer that this resolution will involve discussions of climate change. Despite how often politicians and talking heads mention climate change, though, most people have a very limited understanding of the science involved. Now, I'm no climatologist, but I am going to do my best to provide a short summary.

Climate debates tend to revolve around **fossil fuels**, which is an umbrella term that refers to coal, oil, and natural gas. These substances are called "fossil fuels" because they are literally made of fossils. As we already noted, carbon is a plentiful element on earth, and it plays a major role in making up the bodies of all plants and animals. About 360-286 million years ago, the Earth was covered with lots of swamps filled with many types of

plants and animals. As these lifeforms died, they would sink beneath the water, where over time they would decompose and be covered by growing layers of sand and mineral deposits. After millions of years of being covered with more and more rock, the intense pressure on this "dead gunk" (as I will very-scientifically call it) squeezed the water out of it, leaving substances made mostly out of the carbon (and other elements) that was present in the ancient plants' and animals' bodies. These substances, which create a lot of energy when burned, are what we call "fossil fuels."

Not all fossil fuels are alike in terms of **carbon content**. Coal contains the highest amount of carbon (and therefore releases the most CO2 when burned), followed by diesel, then gasoline, then natural gas. For more information about carbon content of various fuels, check out the U.S. Energy Information Administration.

CO2 (as well as its also-relevant cousin methane) is a "greenhouse gas," which basically means it likes to hang out in the Earth's atmosphere and trap some of the heat the Earth absorbs from the sun. This is what we call the "**greenhouse effect**." Without CO2 in the atmosphere, the Earth would leak all of its heat into space, making the planet frozen and incapable of supporting life. So, it is actually crucial that we have CO2 in the atmosphere! However, due to its ability to trap heat, too much CO2 could cause the Earth to become hotter than "normal," according to the theory of global warming.

What is "normal" in terms of atmospheric CO2 is a complicated question. The Earth is subject to a complex series of processes known as the "**carbon cycle**," which refers to the ways that carbon atoms are distributed throughout the planet's land, lifeforms, water, atmosphere, etc.

Basically, carbon in the atmosphere can be "absorbed" by plants via photosynthesis, or into water, where it reacts with H2O molecules and forms carbonic acid. As water splashes against rocks, the rocks can "absorb" some carbon from the water, resulting in weathering. Inversely, rocks can also release carbon into water through erosion. Through the food chain, carbon "absorbed" into plants during photosynthesis helps make up the bodies of animals (including humans). When these organisms die, the carbon in their bodies eventually returns to the soil through decomposition, and could eventually (hundreds of millions of years from now) become fossil fuels. Each of these processes occur according to different timeframes that together form a balance to create the Earth's current climate.

Concerns about **global warming** arose due to human activities that accelerate the release of CO2 into the atmosphere and decelerate the processes that remove it. Burning fossil fuels pumps CO2 into the atmosphere at a rate that exceeds natural processes, and things like deforestation and species loss inhibit the speed at which living organisms can "eat up" excess carbon. This, according to concerned scientists, disrupts the carbon cycle, causing an excess of carbon concentrated in the Earth's atmosphere, which they worry could trap enough heat to significantly change the planet's current climate.

We will wait until the strategy section to discuss the validity of various threat predictions associated with manmade climate change. For now, just make sure you understand the basics of the underlying theory.

In response to these concerns, many people argue in favor of environmental policies to decrease carbon emissions. The idea is that reducing the amount of CO2 (and other greenhouse gases) humans send into the atmosphere could allow the planet's natural processes to "re-balance" themselves over time, avoiding climactic shifts. A carbon tax is one such policy.

It may surprise some current high school students to learn that mainstream alarm about climate change did not really begin until relatively recently. In fact, until about the 1980s, there was widespread fear that a new ice age was imminent! In the late 1970's the first academic reports predicting the possibility that greenhouse gases would result in planetary warming were released. Then, during the '80s, scientists began to note that global mean temperatures were on the rise. In 1988, following a report from a NASA scientist predicting danger, the Intergovernmental Panel on Climate Change (IPCC) was founded by the United Nations Environmental Programme and the World Meteorological Organization. The purpose of the IPCC was to bring together scientists from around the world to monitor climactic trends, analyze data, predict future changes, and issue reports. The first IPCC report came out in 1992, followed by revisions in 1996, 2001, and 2007. Policymakers and activists first began calling for legal steps to reduce emissions during the 1990s. Since then, although there have been shifts in opinion on a variety of relevant issues, public awareness of climate change as a political issue has been on an upward trajectory.

(In the interest of clarity, it's important to point out that, although popular worry over the planet's climate did not proliferate until relatively recently, this does not mean that scientists weren't aware of the underlying scientific concepts much earlier. The theoretical underpinnings—such as understanding the nature of the greenhouse effect, the carbon cycle, awareness that burning fossil fuels released CO2, etc.— date back as far as the 1800s. A variety of environmental movements concerned about emissions have also existed since around the middle of the 20th century. The specific idea that human activity may be driving catastrophic future climate change, however, did not reach public awareness until much later.)

I bring up the timeline for climate worry so debaters will understand why only limited empirical data is available on the effectiveness of carbon taxes and other anti-warming efforts. The issue simply didn't have enough public prominence to spur efforts to change the law until the last couple of decades. Making significant changes—especially the kind that cost people money, force economies to adapt, and are politically controversial—takes

time. Therefore, you should expect that the majority of available evidence is going to be predictive (that is, it uses models to make educated guesses about the possible *future effects* of a carbon tax) rather than empirical (the kind that attempts to draw conclusions based on what *did happen* when things were tried in the past). For policymaking, empirical information is preferable, but we'll make do with what we've got!

Today, the United States does not have any national carbon tax, but a few localized policies have been enacted. Since 2006, Boulder, CO has had a carbon tax that applies to all citizens, businesses, and industrial operations. California also passed a statewide carbon tax in 2006, but it has yet to be fully enacted due to ongoing disputes. Since 2008, a few counties in the San Francisco Bay Area do have an active carbon tax, which applies to businesses only. In Maryland, Montgomery County passed a carbon tax in 2010, but it was repealed in 2012 after a series of legal battles.

A number of foreign nations currently has carbon tax policies, but their exact nature varies greatly. I am not going to go into them at length here. However, some of them will come up as examples during our next section on debate strategy. If you're interested in browsing through details of current or former carbon tax policies in other countries, you can start here.

Strategies

We're now ready to dig into the substance of the resolution.

To begin our discussion of debate strategy, we'll start with the question of solvency in the most general sense. Do carbon taxes work?

Of course, when we ask if something "works," we're asking if it successfully achieves its stated goals. In the case of carbon taxes, that means "does a carbon tax decrease carbon emissions?" However, there are complicated technological and economic dynamics at play in this particular discussion. A multitude of different factors must be considered in order to determine the likelihood of solvency. We will take a look at each of the main ones individually.

Efficiency Incentives

The pro, obviously, will want to say carbon taxes do solve.

First, they might use the empirical examples of carbon tax efforts in other nations to demonstrate that the idea has merit. Here is **evidence**:

> *(Donald Marron - director of economic policy initiatives and Institute fellow at the Urban Institute, Eric Toder - co-director of the Urban-Brookings Tax Policy Center and Institute fellow at the Urban Institute & Lydia Austin - research assistant at the Urban-Brookings Tax Policy Center, TAX POLICY CENTER - URBAN INSTITUTE & BROOKINGS INSTITUTION, "TAXING CARBON: WHAT, WHY, AND HOW", http://www.taxpolicycenter.org/uploadedpdf/2000274-taxing-carbon-what-why-and-how.pdf, 2015)*
>
> **In the three years that Australia had** a **carbon pricing** mechanism (set at $19/metric ton of carbon dioxide equivalent and rising annually), **emissions** in affected sectors **fell from 1.5 to 9 percent. British Columbia has had a carbon tax** set at $26/metric ton of carbon dioxide equivalent **since 2008, and emissions fell** around **10 percent between 2008 and 2011**.49 **A survey of carbon taxes in Finland, Denmark, the Netherlands, and Sweden found that all reduced emissions** more than if there were no policy changes; the reductions ranged **from** about **1.5** percent **to** nearly **6 percent**.50

One of the simplest arguments supporting the effectiveness of carbon taxes is the idea that taxes alter businesses' and people's economic calculations. From basic economic theory, we know that people are price-sensitive and tend to seek to avoid costs where they can. Therefore, a carbon tax could create an incentive for

people and businesses to reduce their fuel usage and adopt cleaner energy behaviors. This **evidence** supports that reasoning:

(William Schlesinger, member of the National Academy of Sciences and dean of the Nicholas School of the Environment and Earth Sciences at Duke University, "Carbon Tax Provides Fairest Incentive For Curbing Global Warming," http://today.duke.edu/2005/05/carbontax.html, May 16 2005)

With its upcoming acquisition of Cinergy, Duke Energy will be among the nation's largest coal-fired utilities. It may be surprising then that Duke Energy's chair-apparent, Paul Anderson, has taken such a maverick stance on the reality of climate change and the need to limit emissions of carbon dioxide to the atmosphere. Not only has Anderson embraced the consensus view of the worldwide scientific community that **global warming is real and human-caused**, but he also has urged us to pursue potentially **the most effective means to improve our energy-use efficiency and reduce carbon dioxide emissions – [is] a tax on carbon emissions**. Anderson correctly recognizes that the **emissions** of carbon dioxide **stem from many sectors** of society -- **from** power plants and other **industrial sources and** from you and me, **as we heat and light our houses and drive our cars** on daily errands. **No one sector can solve the** global warming **problem by itself. A carbon tax would be paid whenever a molecule of carbon dioxide is emitted to the atmosphere by burning fossil fuels. Utilities would pay it based on their smokestack emissions and pass the cost to consumers in their monthly electric bill.** Each of us would pay it when we fill up with gasoline, based on the content of fossil carbon in the fuel. **A carbon tax would provide the maximum incentive** for bright engineers **to improve the efficiency of fossil fuel use in all sectors** of society. **It also would maximize the potential for** important "**cross-sector" transfers** of efficiency. **For instance, if engineers find** efficient **ways to reduce** CO_2 **emissions from** the **power plants** that provide our electricity, **the utilities' carbon tax savings could be passed along to consumers. The same principle might make it cheaper to operate an electric car than a gas-powered one. More of us would be motivated to buy electric cars,** especially given the price of gasoline these days. **A carbon tax does not** necessarily mean a net **increase** in our **cost of living**. Carbon tax **revenues could be directed to general government expenditures, so that income tax rates could be reduced** for all Americans -- or perhaps those at the lower income levels. Importantly, our current income tax structure provides no personal choice to reduce our tax; indeed, the more we earn, the more we pay on April 15. **A tax on carbon**, which would show up in higher costs for electricity or gasoline**, would provide an incentive** for each of us **to use energy more efficiently if we wanted to pay lower taxes**. Still want an SUV? Buy it, but each year you'll pay more for gasoline than your neighbor who has a Toyota Prius. Want to live in the country? Fine, but remember it will cost you to drive the extra miles to work each day. Want to save some money at home and send less to the taxman? Put on a warm sweater and lower your thermostat**. Conservation and efficiency must both play a role** in our attempt **to reduce dependence on** dwindling production of foreign **oil. A carbon tax provides an equal incentive for both pathways** to be part of the solution. In the absence of a coherent federal energy policy, various efforts are emerging in individual states to limit carbon dioxide emissions. These are important first steps, but consider the simplicity of a national energy policy based on **a carbon tax** that **would maintain a level playing field in the economic environment across this country.** My suspicion is that a national carbon tax will be the easiest way for the United States to participate in international efforts to curb CO_2 emissions. Without any national energy policy, **the U**nited **S**tates **is rapidly losing an important role in the development of** solar, wind and other **alternative energies**, like integrated gasification combined cycle. Also known as IGCC, this technology will allow power plants to make electricity from coal while capturing the carbon dioxide emissions that might otherwise lead to global warming. **A carbon tax will make such energy** sources **competitive** across this country, **and spur new** high-tech **industries to develop them**. We need to be the world's technology leader of the 21st century, not a stubborn follower of our old inefficient ways. Paul Anderson is right: keep it simple. **A tax on fossil carbon emissions is the way to go.**

More **evidence**:

(Donald Marron - director of economic policy initiatives and Institute fellow at the Urban Institute, Eric Toder - co-director of the Urban-Brookings Tax Policy Center and Institute fellow at the Urban Institute & Lydia Austin - research assistant at the Urban-Brookings Tax Policy Center, TAX POLICY CENTER - URBAN INSTITUTE & BROOKINGS INSTITUTION, "TAXING CARBON: WHAT, WHY, AND HOW", http://www.taxpolicycenter.org/uploadedpdf/2000274-taxing-carbon-what-why-and-how.pdf, 2015)

Thus, **market-based approaches that place a price on emissions are particularly attractive for combatting climate change. Establishing such a price would allow the market to do what it does best: encourage consumers and businesses to reduce emissions** at the lowest cost **and provide an ongoing incentive for innovators to develop new ways to reduce carbon emissions. Policymakers could establish** a price on emissions—for short, **a price on carbon—by levying a tax** or by setting a limit on emissions and allowing trading of emission rights. These two approaches have much in common. By putting a price on **carbon**, both a **tax** and a cap-and-trade system **harness market forces to reduce emissions as efficiently as possible.** If the government auctions emissions rights, rather than giving them away for free, a cap-and-trade system can also raise revenue just as a tax would.

One more piece of pro **evidence**:

(Joshua Meltzer, Fellow Global Economy & Development @ Brookings Institution & Prof International Studies @ John Hopkins, Energy Law Journal, 35:45, "A carbon tax as a driver of green technology innovation and the implications for international trade"; http://www.felj.org/sites/default/files/docs/elj351/14-45-Meltzer_Final%205.13.14.pdf, 2014)

Governments have a range of technology-push and **demand-pull polices to address** these **market failures which lead**s **to underinvestment in clean technology** R&D by the private sector.45 Technology-push measures drive the supply of innovation and include policies to support R&D and regulations, such as those that require utilities to use the best available technology.46 Demand- pull innovation arises in response to market demand, the most obvious one being **a carbon price**, which **by reducing** consumer **demand for the relatively more expensive carbon intensive goods creates an incentive for firms to produce less carbon intensive ones**.47 This is often referred to as induced innovation where **changing the relative price of a factor of production creates an incentive to innovate in order to minimize the use of the relatively more expensive factor**.48 This is a more specific example of the broader economic premise that **pricing carbon is the optimal way of encouraging economically efficient abatement to deal with** the global commons challenge of **climate warming**.49

Underlying these arguments is the economic concept of elasticity. In this case, we are talking about demand elasticity—that is, how strong is the relationship between price and demand? If prices increase, to what extent does demand decrease?

Understanding this, the con might want to argue that energy demand is inelastic, meaning increased prices have very little effect on how much energy people choose to consume. Some of the reasons why this might be true are easy to understand: factories must run their equipment to produce products, individual households cannot turn off major appliances like refrigerators (if they want to avoid spoilage, anyway), areas with cold climates need to heat indoor spaces, commuters in places without decent public transportation may be reliant on their cars to get to work. Therefore, the neg might argue, people will just cut their budget elsewhere to make up for increased energy prices, rather than decrease consumption. That means emissions would remain constant.

There is some data to support this argument. Here is **evidence**:

> *(M.A Bernstein and J. Griffin, RAND Corporation, "Regional Differences in the Price-Elasticity of Demand for Energy ," Subcontract report for the National Renewable Energy Laboratory of the U.S. Department of Energy Office of Energy Efficiency & Renewable Energy, http://www.nrel.gov/docs/fy06osti/39512.pdf, February 2006)*
>
> We also found that **the relationship between demand and price is small. That is, demand is relatively inelastic to price**. We also found that **in the past 20 years, this relationship has not changed significantly**; analyses performed in the 1980s1 showed approximately the same results. These findings might imply that **there are few options available to the consumer in response to changes in the price of energy**, and that price does not respond much to changes in demand. On the other hand, because prices were declining in real terms over most of the period we studied, the inelasticity of demand may be more of an artifact of the lack of price increases.

Here is another piece of **evidence**, this time discussing data on gasoline usage:

> *(U.S. Energy Information Administration, "Gasoline prices tend to have little effect on demand for car travel," 12/14/2014)*
>
> The U.S. average retail price per gallon of regular motor gasoline has fallen 28% from its 2014 peak of $3.70 per gallon on June 23, to $2.68 per gallon on December 8. However, this **price** decline **may not have much effect on automobile travel, and** in turn, **gasoline consumption. Gasoline is a relatively inelastic product, meaning changes in prices have little influence on demand**. Price elasticity measures the responsiveness of demand to changes in price. Almost all price elasticities are negative: an increase in price leads to lower demand, and vice versa. Air travel, especially for vacation, tends to be highly elastic: a 10% increase in the price of air travel leads to an even greater (more than 10%) decrease in the amount of air travel. Price changes have greater effects if the changes persist over time, as opposed to being temporary shocks. Automobile travel in the United States is much less elastic, **and** its **price elasticity has fallen in recent decades. The price elasticity of** motor **gas**oline **is** currently **estimated to be in the range of -0.02 to -0.04** in the short term, **meaning it takes a 25% to 50% decrease in the price of gasoline to raise automobile travel 1%.** In the mid 1990s, the price elasticity for gasoline was higher, around -0.08, meaning it only took a 12% decrease in the price of gasoline to raise automobile travel by 1%.

One way the pro might answer these arguments is by pointing out that consumers don't necessarily have to change their daily activities; instead, they could switch to using more efficient appliances. The result would be less energy usage without any lifestyle changes.

The con could counter that replacement argument by pointing out that most energy-efficient upgrades concern expensive major appliances, and that the immediate cost to the consumer of purchasing such an item could overwhelm future cost savings. For example, even if I know that buying a new energy-efficient refrigerator could reduce my energy costs in the long-term, I still might not have enough flexibility in my budget to spend the several thousand dollars that the new fridge costs. Many people would rather save $2,000 now than save $25 a month spread out over the next 10 years.

This brings us to another pro solvency argument: that a carbon tax would spur innovation in renewable energy sources to replace fossil fuels.

Transition to Renewables

The basic argument here is that a carbon tax would provide incentives for companies to develop new environmental technologies, such as renewable fuel sources (wind, solar, etc.) and carbon-capture technology (tech that actually removes carbon from the air). If a particular energy source has no emissions, than a consumer could use it without paying the carbon tax. Carbon capture could also be employed to reduce the tax burden for those still making use of fossil fuels.

Unfortunately, however, there is currently no technology in either category that has proven effective enough to offer a complete solution. That said, scientists are optimistic that further development could get us there. This is the foundation of the pro argument about renewables: a carbon tax would both raise the cost of fossil fuels enough to make existing renewables cost-competitive *and* it would generate investment in research and development so that the green technology could be improved.

There are two main warrants here. The first is that, in the status quo, the renewable energy options that are available are often more expensive than fossil fuels, which decreases the likelihood that people and businesses will choose to use them. A carbon tax would artificially increase the price of fossil fuels, making a cost comparison between renewables and traditional energy sources much more competitive (or even generating cost savings for users of renewables, depending on the size of the carbon tax). Here is **evidence**:

> *(Joshua Meltzer, Fellow Global Economy & Development @ Brookings Institution & Prof International Studies @ John Hopkins, Energy Law Journal, 35:45, "A carbon tax as a driver of green technology innovation and the implications for international trade"; http://www.felj.org/sites/default/files/docs/elj351/14-45-Meltzer_Final%205.13.14.pdf, 2014)*
>
> Should the United States succeed in **pricing carbon**, a range of international trade issues **will** arise. Some of these are positive as they **reinforce** the need for liberalized **trade as a driver of innovation and the production of cheap green technology**.178 For instance, **a carbon price in the United States would send a strong market signal that there are commercial opportunities in finding**

cost- effective ways to reducing CO2 emissions, whether through incremental improvements in energy efficiency or the development of breakthrough technologies which change the energy paradigm. Maximizing this signal will require an international system that promotes international scientific collaboration but also facilitates the free flow of people, ideas, and capital to countries where they can be best used. In this world, **the U**nited **S**tates **could** expect to **be a significant beneficiary, not only from reduced CO2 emissions but also as the world's talent migrates to places like Silicon Valley to produce another high-tech sector in clean energy technologies.**

More **evidence**:

(Joshua Meltzer, Fellow Global Economy & Development @ Brookings Institution & Prof International Studies @ John Hopkins "A carbon tax as a driver of green technology innovation and the implications for international trade", , Energy Law Journal, 35:45, http://www.felj.org/sites/default/files/docs/elj351/14-45-Meltzer_Final%205.13.14.pdf, 2014)

This brief description of **the innovation process highlights roles for government** and business **in innovation.** Moreover, and as will be discussed in detail**, the development of green technologies will** follow different trajectories that will **require** a range of **policies to address** a series of **market failures which act as barriers to green tech**nology **innovation**. In addition to these market failures, the broader environment within which innovation occurs is also important and includes factors such as the overall level of regulation, education, and infrastructure, support for demonstration projects, and whether there is a culture of risk taking. However, addressing the impact of these environmental factors on innovation is outside the scope of this paper.

The second major warrant for the pro's claim to accelerate the shift to renewables is research and development. As we already noted, while renewables do exist in the status quo, no technology has been developed yet that has been shown capable of truly replacing fossil fuel usage. This is because we have not yet found a zero-carbon way to create very large amounts of power. In order to develop renewables that could create enough energy to eliminate the need for coal, oil, and gas, substantially more research would be needed. But research costs money and, right now, no one has much of an incentive to pay for it.

The pro might argue that carbon taxes generate financial rewards for green energy development, which could accelerate this research, allowing better clean energy options to be developed. Here is **evidence**:

> *(Joshua Meltzer, Fellow Global Economy & Development @ Brookings Institution & Prof International Studies @ John Hopkins, Energy Law Journal, 35:45, "A carbon tax as a driver of green technology innovation and the implications for international trade"; http://www.felj.org/sites/default/files/docs/elj351/14-45-Meltzer_Final%205.13.14.pdf, 2014)*
>
> **A carbon tax is** also **an** important **incentive for companies to innovate and develop new green technologies that reduce their** CO_2 **emissions and their costs of complying with the tax.**66 **A survey of OECD countries using environmental taxes demonstrates a positive effect on innovation**.67 **Carbon taxes therefore provide a double dividend—internalizing the cost of the environmental harm from** $CO_2$68 **emissions and producing green technologies through induced innovation.**

Here is a related piece of **evidence**, which argues that policy action is key to stimulating development of new green tech, because it interrupts the current problem of "technology lock-in":

> *(Joshua Meltzer, Fellow Global Economy & Development @ Brookings Institution & Prof International Studies @ John Hopkins, Energy Law Journal, 35:45, "A carbon tax as a driver of green technology innovation and the implications for international trade"; http://www.felj.org/sites/default/files/docs/elj351/14-45-Meltzer_Final%205.13.14.pdf, 2014)*
>
> **Government action to stimulate innovation in green technologies is** also **required to address** the path dependency created by **technology lock-in**—**the dominance of a market by an inferior technology**.41 Technological **lock-in leads investors to continue investing in improving the efficiency of the incumbent technology, particularly where returns remain large** and information on the new technology and its operation are limited.42 **The risk of** technology **lock-in is especially large in the energy market where the costs of shifting away from coal** fired power stations with low operating costs **creates incentives for owners to update** or incrementally adjust their operations **rather than moving to zero-carbon alternatives such as renewable energy**.43 **This underinvestment in green energy is seen in the private sector's limited spending on energy R&D**, which in 2007 was 0.23% of revenues, compared to the industry average of 2.6%.44

Moreover, the status quo discourages investment in green technology due to a lack of consistency in government policy, according to this **evidence**. Investment becomes more likely as soon as policy uncertainty is resolved:

> *(Joshua Meltzer, Fellow Global Economy & Development @ Brookings Institution & Prof International Studies @ John Hopkins, Energy Law Journal, 35:45, "A carbon tax as a driver of green technology innovation and the implications for international trade"; http://www.felj.org/sites/default/files/docs/elj351/14-45-Meltzer_Final%205.13.14.pdf, 2014)*
>
> Another **market failure arises from** information **uncertainties that lead to suboptimal levels of innovation.**36 For instance, **uncertainty** due to a lack **of** information and financial expertise to assess the **commercial viability of new green technologies leads to underfunding and a lack of commercialization**.37 **Policy uncertainty with regard to climate change action also increases the risk of investing in green technology**.38 For example, **in a 2011 survey of businesses, most respondents cited ambiguity in government support as the key risk associated with low-carbon investments.**39 As a result, renewable energy tax credits that need to be annually approved increase the risk of investing in renewable energy projects.40

This **evidence** shows that other nations with carbon taxes are succeeding in their efforts to transition away from fossil fuels:

> *(Donald Marron - director of economic policy initiatives and Institute fellow at the Urban Institute, Eric Toder - co-director of the Urban-Brookings Tax Policy Center and Institute fellow at the Urban Institute & Lydia Austin - research assistant at the Urban-Brookings Tax Policy Center, TAX POLICY CENTER - URBAN INSTITUTE & BROOKINGS INSTITUTION, "TAXING CARBON: WHAT, WHY, AND HOW", http://www.taxpolicycenter.org/uploadedpdf/2000274-taxing-carbon-what-why-and-how.pdf, 2015)*
>
> **Since the introduction of Denmark's carbon tax in the early 1990s, the makeup of energy supply has markedly changed.** Natural gas and combustible **renewables have grown as reliance on oil, coal, and peat declined,** though reliance on oil has remained somewhat stable since 2000.51 **Similarly, a survey of Norway's energy system following the introduction of a carbon tax in 1991 found that** energy production from natural gas increased substantially, while **production from gasoline and heavy oil fell.**52

Finally, here is one more piece of pro **evidence** emphasizing the value of a carbon tax in spurring innovation. This card was written very recently by a highly-qualified author, and insists on the need for immediate action:

(Steven Chu, Nobel laureate in physics, former US secretary of energy, & professor of physics and molecular and cellular biology at Stanford University, "Making a fair deal on carbon," The Boston Globe, http://www.bostonglobe.com/opinion/2016/01/15/chu/pMlPjvTDQrWYcB307mgvll/story.html, Jan 15 2016)

The most important aspect of a carbon tax that rises inexorably **is that it will unleash scientific ingenuity, innovation, and market investments that are still needed to combat climate change. In the last six years, the cost of solar** modules **plunged** to 20 percent of 2008 prices, **and**, in many areas of the world, **the** life-cycle **cost of wind and solar** energy **is dropping** below the cost of fossil energy. **However, the cost of decarbonizing the first 25 percent of the world economy is far less than the cost of decarbonizing the last 25 percent. A meaningful, and timely**, global **price on carbon is essential to get us to where we have to be in the coming decades. Otherwise, to quote Martin Luther King, "There is such a thing as being too late."**

The con might respond to these renewable energy arguments in several ways.

First, here is a piece of **evidence** that echoes some of the inelasticity arguments from the last section, but also uses empirical data to dispute the idea that higher prices will create investment in green technology:

(Fredrik N. Andersson, Lund University, January 2012, "The Australian Carbon Tax - A Step in the Right Direction but Not Enough", https://www.researchgate.net/publication/235671840, 2012)

Empirical results show that policy instruments such as environmental taxes or tradable emission permits increases innovation in "green technologies" and speeds up the diffusion process of existing technologies [2-5]. However, even if **a carbon tax** is a step in the right direction the tax itself **is unlikely to be enough to reduce emission by as much as the IPCC** [103] **has deemed** to be **necessary** to prevent the global temperature to increase by more than 2 degrees Celsius above the pre-industrial level. **Since 1973**, the **oil price has increased by 350%** in real terms, **but despite this price increase** Australian **demand for oil has grown by 50%**3. **Moreover, despite of a doubling of** the real **oil price** since the late 1990s, **the share of patents in** either **renewable energy** sources or **emissions abatement and fuel efficiency** in transport **has barely risen since 1998 and still account for less than 5% of all patents**4 [104]. **Therefore**, even if a higher carbon price is likely to reduce demand for fossil fuels **it is unlikely that putting a price on carbon is sufficient to** dramatically **reduce emissions.**

This next piece of con **evidence** considers Europe's carbon tax system and also concludes that carbon taxes empirically fail to increase innovation:

> *(Oren Cass, Senior fellow @ Manhattan Institute, National Affairs, "The carbon-tax shell game," http://www.nationalaffairs.com/publications/detail/the-carbon-tax-shell-game, Summer 2015)*
>
> But **empirical evidence demonstrates that the price signal generated by** the kinds of **carbon taxes** under consideration **will not lead to technological breakthroughs**. **That evidence comes from Europe, a comparably sized market to ours, where taxes** and related policies **have already pushed energy costs far above the levels that a carbon tax would take them in the U**nited **S**tates. For instance, $1 of tax on a ton of CO2 emissions adds approximately one cent to the cost of a gallon of gas. With gas prices typically at least $4 higher than U.S. prices, **Europe already has the equivalent of a carbon tax** on the order **of $400 per ton of CO2**. Similarly, taxes and fees drive Europe's electricity costs up to more than double U.S. rates, the equivalent of a carbon tax of more than $200 per ton. **To the extent that** large **price signals** will **produce innovation, the U**nited **S**tates **could presumably free-ride on** the incentives offered and paid for by the **Europe**an market. **But such innovation has not been forthcoming, and it is unclear why more of the same signals in the American market would change the dynamic.**

Furthermore, carbon taxes are not designed to effectively encourage innovation, argues this **evidence**:

> *(Oren Cass, Senior fellow @ Manhattan Institute, National Affairs, "The carbon-tax shell game," http://www.nationalaffairs.com/publications/detail/the-carbon-tax-shell-game, Summer 2015)*
>
> Absolute value aside, **a tax is** uniquely **ill-suited to the task of spurring** the desired **innovation**. **If the goal is to develop products that can compete** head-to-head **with fossil fuels, a well-designed program would support a nascent technology as it pursued commercialization and scale but phase out as it matured, to ensure that producers remained focused on a cheaper-than-carbon endgame. A carbon tax does exactly the opposite: It provides no disproportionate support at the early stages where government intervention is most justified, and it never phases out to apply full competitive pressure.** To the contrary, most carbon-tax designs actually *increase* dramatically over time, guaranteeing innovators an ever-greater advantage over the fossil fuels they are supposed to be driving out of the global market with competitive costs.

The con can also argue that developing reliable alternative fuel sources is not something that is being held back by lack of R&D (research & development) investment, but rather by fundamental problems in their very physics.

Therefore, even if a carbon tax did increase efforts on green tech, that investment would yield no tangible benefits.

The physical obstacles to a renewable energy transition are numerous, and the particular reason depends largely on which alternative energy source one is considering. The scientific debate on these things is enormous and complicated, so cons wishing to make these kinds of arguments will need to research heavily. What I will provide here is just a short overview of some of the main issues.

The first concept you'll need to understand is the technical difference between "energy" and "power." To borrow from Forbes,

> "Energy is the ability to do work; power is the rate at which work gets done. Put another way, energy is an amount; power is a rate. And rates are more telling than amounts…
>
> Power density refers to the energy flow that can be harnessed from a given unit of volume, area or mass. Common metrics of power density include: horsepower per cubic inch, watts per square meter and watts per kilogram. And given the current infatuation with renewable energy sources like wind and solar, the essential metric for power density is watts per square meter (W/m2), which shows how much power can be derived from a given piece of real estate. It is also the metric that exposes the inherent weakness of sources like corn ethanol, wind energy and solar energy. If a source has low power density, then it will likely require too much real estate, material or space to provide the power that we demand at prices we can afford or in the vast quantities that the world needs."

In other words, one problem with renewables is that they tend to take up a huge amount of space relative to the amount of energy they can produce. This is starkly exemplified by data showing that the US would need to convert nearly 100% of its total area of farmland in order to *replace imported gasoline alone* with corn biofuels. Other calculations suggest that many countries would need to cover their *entire national land area* in wind turbines to meet their energy needs—and even that might not be enough. Solar fares just slightly better. These issues present major obstacles to the alternative energy transition predicted by the pro.

The pro will argue that the increased investment in renewables spurred by a carbon tax would result in innovation able to overcome these hurdles, but the con can question that assumption.

Here is con **evidence** arguing that reliable green energy remains decades away from largescale viability:

> *(Robert P. Murphy, Senior Economist with IER specializing in climate change- research focuses on the estimation of the "social cost of carbon," including the proper discount rate to be used in cost-benefit analyses and the implications of structural uncertainty for policy solutions - Ph.D. in economics from New York University, Institute for Energy Research, "Carbon Taxes: Reducing Economic Growth—Achieving No Environmental Improvement", http://instituteforenergyresearch.org/wp-content/uploads/2009/03/Carbon_Taxes_Primer.pdf, 2015)*
>
> Realistically, **a carbon tax would lead to** lower energy use and **lower economic output because low-carbon replacement technologies simply do not exist. Carbon taxes** effectively **increase the cost of fossil fuels in an effort to make non-fossil fuels more economically attractive. The technologies** to significantly reduce greenhouse gas emissions from fossil fuels, **however, are decades away and extremely costly**.16 Instead, the only real way to reduce greenhouse gas emissions in the short run is to reduce energy use and economic output. **Consider automobile use and gas prices.** People have begun to transition toward fuel-efficient cars, but **the** real **impact of high gas**oline **prices in 2008 was to reduce vehicle miles traveled. Just as higher fuel prices led to less driving, higher energy prices will lead to reduced** energy consumption. That will lead to a corresponding drop in our ability to make economic choices. Given current technologies, carbon taxes will result in less **economic output.** The graphic below illustrates that point. The implication is clear—**there is a strong correlation between energy use and GDP.**

The **evidence** below refutes the idea that a carbon tax would launch a renewable energy revolution with three main points. First, there has already been many billions of dollars spent on green energy R&D, and second, all of this investment has not increased usage of renewables. In fact, renewable energy sources made up a larger share of America's total power usage in 1949 than they do today. Third, it argues, Saudi Arabia demonstrates that no amount of attention and investment can create energy out of thin air:

(Robert Bryce, senior fellow at the Manhattan Institute, "Don't Count Oil Out," Slate, http://www.slate.com/articles/technology/future_tense/2011/10/oil_and_gas_won_t_be_replaced_by_alternative_energies_anytime_so.html, Oct 14 2011)

Smil's point can be proven by looking at oil's share of U.S. primary energy consumption. **According to the EIA, in 1949, oil provided 37 percent of America's total energy needs. In 2009, oil's share** of U.S. primary energy **stood at … 37 percent. Over the past six decades, uncounted billions of dollars have been spent on efforts to reduce our need for oil, yet petroleum has been remarkably persistent. Conspiracy theorists will**, of course, **blame Big Oil. But** the conspiracy wasn't hatched in Houston or Detroit. **It's a conspiracy of basic physics**. Love it or hate it—and all of us love what oil provides even as we are continually taught to hate the oil companies—oil is a miraculous substance. If petroleum didn't exist, we'd have to invent it. **Nothing else comes close to oil when it comes to energy density, ease of handling, flexibility, convenience, cost, or scale.** Electric vehicles may be the celebrity car du jour, but modern batteries are only slightly better than the ones that Thomas Edison developed. **Gasoline has 80 times the energy density of the best** lithium ion **batteries**. A final point on energy transitions. Believe it or not, **in 2009, renewable** energy **sources had a smaller share of U.S.** primary **energy than** they did back **in 1949.** Sure, wind and solar have grown dramatically in recent years, but **in 1949, renewables**—almost all of it hydropower—**provided 9.3 percent of** the country's **energy** needs. **In 2009, renewables**—again, much of it supplied by hydropower—**provided 8.2 percent** of U.S. energy. The third issue—scale—is seldom discussed. And for many people, it's likely the most difficult issue to comprehend. There's little mystery as to why that is so. We use a googol of units to measure energy: Oil is sold in barrels, tons, gallons, and liters. Natural gas is measured and sold in cubic meters, millions of Btus, therms, dekatherms, and cubic feet. Coal comes in long tons and short tons, but its pricing depends on myriad other factors, including heat content, ash content, sulfur content, and most important: the distance between the coal mine and the power plant. Electricity is sold in kilowatt-hours but electricity terminology spans other units like volts, amperes, and ohms. Add in joules, watts, ergs, calories, and Btus, and things get even more complicated. We need a simpler measure for **global energy use**, which n**ow totals about 241 million barrels of oil equivalent per day**. That sum is almost impossible to comprehend, but try thinking of it this way: It's **approximately equal to the total daily oil output of 29 Saudi Arabias**. (Since 1970, Saudi Arabia's oil production has averaged 8.2 million barrels per day.) And **of those 29 Saudi Arabias, 25—about 210 million barrels of oil equivalent—come from hydrocarbons.**

Furthermore, over the past decade alone, global energy consumption has increased by about 27 percent, or six Saudi Arabias. Nearly all of that new energy came from hydrocarbons. Scientists and policymakers can claim that carbon dioxide is bad. We can talk about wind, solar, geothermal, hydrogen, and lots of other forms of energy production. But the question that too few people are willing to ask is this one: Where, **how, will we find the energy equivalent of 25 Saudi Arabias and have it all be carbon-free? The hard reality is that we won't. The Saudis have invested hundreds of billions of dollars** over the past few decades **drilling wells and building their infrastructure so that they can remain the world's** most important **oil exporter. And** remember that **all of those billions invested have given them exactly one Saudi Arabia, or about 3.4 percent of total global energy demand.**

Cons wishing to debate renewables would also benefit from understanding the issues surrounding energy storage. Technologies like wind and solar share the problem of being weather-dependent: they can't generate power when the wind is still or when it's dark outside. For these power sources to be useful, then, they must either join power grid systems or utilize battery storage. Both of these poses its own challenges. Grids are highly vulnerable to power fluctuations, which can result in systems collapse. Because of this, it's possible that a wind turbine joined to a power grid could wreak havoc either on unusually windy or unusually still days. The problems with batteries are simpler: they're just not that good. Even the most advanced batteries available today can only hold a tiny amount in relation to average energy needs. Until these obstacles are addressed, renewables can't replace fossil fuels. Gathering energy is not enough; we also need to be able to store and distribute it.

Pro debaters might dispute feasibility arguments by pointing to other nations who are currently working to build renewable energy facilities capable of dramatically reducing their dependence on fossil fuels.

Cons, on the other hand, might dismiss these international efforts as ultimately futile, and/or argue that America's population and geographical size both present obstacles not faced by countries successfully increasing their renewable energy capabilities. They might also bring up counter-examples of foreign nations who have reversed course on alternative energy development due to power shortages and other challenges.

Finally, con teams could point out that, no matter how promising it might seem, every potential future source of green energy risks creating external environmental problems. As a few examples, nuclear energy carries the obvious threat of meltdowns and attacks, wind turbines have been shown to be dangerous to bird and bat populations, biofuel production can increase pollution from agricultural runoff and drive deforestation (as landowners convert forested spaces into pastures for growing lucrative energy crops), and the production of

solar power cells relies on the use of numerous dangerous substances. The con might be able to hedge against the pro's environmental claims by detailing the corresponding risks of non-fossil fuel alternatives

"Leakage"

Another consideration for policymakers interested in a carbon tax is the issue of "leakage." When one country adopts a stricter environmental policy (such as a carbon tax), the result is sometimes an increase in emissions from another country. This phenomenon is referred to as "leakage," and it provides a source of possible argumentation for the con.

The main reasons that leakage occurs are:

1. When [Nation] enacts a carbon tax policy, nationwide usage of [fuel source] decreases as consumers seek to avoid the cost. Due to basic economic principles, though, this reduction in consumption causes the market cost of [fuel source] to drop, encouraging customers in other nations to purchase more [fuel source]. As a result, total global usage of [fuel source] remains about the same, or possibly even increases. **Evidence**:

   > *(Satoshi Yoshida, Sustainable Development Diplomacy & Governance Program @ Tufts, "Climate change, trade and emissions leakage: Trade measures and climate agreements", http://fletcher.tufts.edu/~/media/Fletcher/Microsites/CIERP/Publications/2014/SDDG_Yoshida_MAr2014_9doc.pdf, 2014)*
   >
   > **Energy price driven leakage is** described by the IPCC. **A decrease in** domestic production in **countries with mitigation policies lowers demand for fossil fuels, causing a fall in the global price** of fossil fuels. **This** in turn **encourages** those **countries without carbon** emission **reduction policies to increase consumption of the cheaper fossil fuels, thereby increasing overall carbon emissions in these countries.**

2. When [Nation] enacts a carbon tax policy, businesses that rely on [fuel source] to produce their goods may decide to relocate their factories to other nations with less restrictive environmental policies. As a

result, emissions increase, since relocating businesses would not be subject to *any* American environmental regulations. **Evidence**:

> *(Robert P. Murphy, Senior Economist with IER specializing in climate change- research focuses on the estimation of the "social cost of carbon," including the proper discount rate to be used in cost-benefit analyses and the implications of structural uncertainty for policy solutions - Ph.D. in economics from New York University, Institute for Energy Research, "Carbon Taxes: Reducing Economic Growth—Achieving No Environmental Improvement", http://instituteforenergyresearch.org/wp-content/uploads/2009/03/Carbon_Taxes_Primer.pdf, 2015)*
>
> **Domestic carbon taxes cannot address "leakage." High costs of doing business in America will force jobs** and economic activity **to leave this country in favor of countries with lower energy prices.** China and India have stated they will not impose burdensome climate regulations on their citizens.27 **Because not all countries** will **implement carbon taxes, industries will take** their **jobs to countries where taxes do not eat their profits. Despite a huge American economic sacrifice, global emissions will remain the same.**

Here is **evidence** using quantitative data analysis to support the theory of leakage:

> *(Frederic Branger – London School of Economics and Political Science/Grantham Research Institute on Climate Change and the Environment & Philippe Quirion - Director of research and Senior researcher at CNRS, "Climate policy and the 'carbon haven' effect.", WIREs Climate Change, 2014, 5 (1), pp.53-71, https://halshs.archives-ouvertes.fr/hal-01137895/document, 2014)*
>
> **A recent comparative study of 12 different models gave the most robust results so far** (Böhringer et al. 2012). **The estimate of leakage is** 5-19% (**mean 12%**) **when** Annex I **countries** (except Russia) **abate 20% of their emissions through carbon pricing** without taking any measure to protect EITE sectors. **The loss of output** in these sectors **is** 0.5%-5% (**mean 3%**) in the coalition **and an output gain of** 1%-6.5% (**mean 3%) is observed in the rest of the world**. Some results of leakage estimates can be seen in Table 1.

More **evidence** demonstrating empirical validity:

> *(Frederic Branger – London School of Economics and Political Science/Grantham Research Institute on Climate Change and the Environment & Philippe Quirion - Director of research and Senior researcher at CNRS, "Climate policy and the 'carbon haven' effect.", WIREs Climate Change, 2014, 5 (1), pp.53-71, https://halshs.archives-ouvertes.fr/hal-01137895/document, 2014)*
>
> **Aichele and Felbermayr** (2012) econometrically **assessed the impact of having an emission target under the Kyoto Protocol** (i.e. being a developed country and having ratified the Protocol) **on CO2 emissions**, the CO2 footprint2 and CO2 net imports, using a differences-in-differences approach on a panel of 40 countries. To account for a potential endogeneity bias (the fact that countries with an expected low or negative growth in emissions may be more likely to have ratified the Protocol) they use the International Criminal Court participation as an instrumental variable for Kyoto ratification. **They concluded that countries with a Kyoto target reduced domestic emissions by about 7%** between 1997-2000 and 2004-2007 compared to the countries without a target, **but that their CO2 footprint did not change**d (**CO2 net imports increased by** about **14 %**). These results imply that **domestic reductions have been fully offset by carbon leakage**. However two caveats are in order. First, China became a member of the WTO in 2002, just when most developed countries ratified the Protocol. Since most CO2 net imports are due to trade with China (Sato, 2013), the rise in net imports may well be due to China WTO membership rather than to Kyoto. Second, apart from those covered by the EU ETS, countries with a Kyoto target haven't adopted significant policies to reduce emissions in manufacturing industry. Hence, if Kyoto had caused leakage (through the competitiveness channel), it should show up on the CO2 net imports of countries covered by the EU ETS rather than of countries covered by a Kyoto target; yet the authors report that EU membership does not increase CO2 imports, when they include both EU membership and the existence of a Kyoto target in the regression. This conclusion invites to look more directly at the impact of the EU ETS.

After introducing the concept of leakage, the con may identify several impacts.

First, leakage might actively contribute to global warming. This next piece of **evidence** identifies 3 major reasons. First, the previously-discussed migration of industries to nations with less stringent regulations (and the corresponding increase in emissions related to shipping imported goods back to the US). Second, by undermining international dedication to climate change agreements. Finally, leakage hurts anti-warming efforts by strengthening domestic political resistance to environmental policies:

> *(Satoshi Yoshida, Sustainable Development Diplomacy & Governance Program @ Tufts, "Climate change, trade and emissions leakage: Trade measures and climate agreements", http://fletcher.tufts.edu/~/media/Fletcher/Microsites/CIERP/Publications/2014/SDDG_Yoshida_MAr2014_9doc.pdf, 2014)*
>
> First, **a direct effect is** the **increase in global GHG emissions, which offsets the emissions reduction efforts of countries with mitigation policies. Increased emissions at the global scale arise because of the fall in**

energy prices, less stringent regulations on GHG emissions outside these countries, and emissions from transportation of imported goods.

Second, carbon **leakage erodes the effectiveness and credibility of both domestic climate change policy and international climate change agreements. Loss of credibility discourages those states that committed to emissions reduction to** strengthen commitments or even to **comply** with existing commitments. **Further**, carbon **leakage diminishes the competitiveness of industries in countries with mitigation policies**, and thus fosters fierce opposition from industries in countries with emission reduction commitments. **this** opposition in turn **adversely affects domestic politics attempting to** effectively design and **implement climate change policy.**

Next, here is **evidence** on the harm leakage does to the US global economic competitiveness:

(Donald Marron - director of economic policy initiatives and Institute fellow at the Urban Institute, Eric Toder - co-director of the Urban-Brookings Tax Policy Center and Institute fellow at the Urban Institute & Lydia Austin-research assistant at the Urban-Brookings Tax Policy Center, TAX POLICY CENTER - URBAN INSTITUTE & BROOKINGS INSTITUTION, "TAXING CARBON: WHAT, WHY, AND HOW", http://www.taxpolicycenter.org/uploadedpdf/2000274-taxing-carbon-what-why-and-how.pdf, 2015)

Second, **a US carbon tax may shift** some purchases from **goods produced in the U**nited **S**tates **to** goods produced **abroad in locations subject to lower or no taxes**. In the extreme, if **the tax** simply shifts purchases of carbon intensive goods from the United States to other countries, it **will have no effect on greenhouse gas emissions, but it will make some US industries unable to compete in world markets.**

In response, the pro might argue that data disputes the leakage hypothesis, and that there is no example in recorded history of mass industrial migration caused by environmental policy. Here is **evidence** on this:

(Frederic Branger – London School of Economics and Political Science/Grantham Research Institute on Climate Change and the Environment & Philippe Quirion - Director of research and Senior researcher at CNRS, "Climate policy and the 'carbon haven' effect.", WIREs Climate Change, 2014, 5 (1), pp.53-71, https://halshs.archives-ouvertes.fr/hal-01137895/document, 2014)

The first studies assessing empirically the impacts of environmental regulations on trade dealt with local pollution issues (Kalt 1988, Tobey 1990, Grossman and Krueger 1993, Jaffe 1995). They **showed little evidence to support the "pollution haven" effect: their estimates of the impact of environmental regulations on trade flows were** either small or **insignificant**. However, recent studies have shown some evidence of the pollution haven effect in small proportions (Dean et al. 2005, Levinson and Taylor 2008). Paradoxically,

dirty industries seem less vulnerable, because of capital intensity and transport costs (Ederington et al. 2005). The empirical validity of the pollution haven effect continues to be one of the most contentious issues in the debate regarding international trade and environment (Kellenberg 2009). Nevertheless **a massive environmental relocation has never been observed.**

Further pro **evidence** suggests that any leakage that does occur would be minimal, and not nearly enough to offset the positive environmental impacts:

(Frederic Branger – London School of Economics and Political Science/Grantham Research Institute on Climate Change and the Environment & Philippe Quirion - Director of research and Senior researcher at CNRS, "Climate policy and the 'carbon haven' effect.", WIREs Climate Change, 2014, 5 (1), pp.53-71, https://halshs.archives-ouvertes.fr/hal-01137895/document, 2014)

While competitiveness concerns and carbon leakage are often associated, they are two distinct phenomena. **Carbon leakage** is the increase of emissions in the rest of the world when a region implements a climate policy, compared to a situation where no policy is implemented (Quirion 2010). It **can be measured by the** leakage rate or **leakage-to-reduction ratio, which is the rise in emissions in the rest of the world divided by the abated emissions in the region that has adopted a climate policy.** A 50% leakage-to-reduction ratio means that half of the mitigation effort is undermined by the increase of emissions in the rest of the world, and not the misguided interpretation that 50% of emissions have "leaked" in the rest of the world. **If this ratio is under 100%, emissions have decreased on a global scale, so the policy is environmentally beneficial**. A ratio above 100% is theoretically possible, because the carbon intensity of CO2-intensive products can be higher in the rest of the world, but has only been found in one outlier model (Babiker 2005). **Estimates of leakage** rates **are typically in a range of 5%-20%** depending on many factors (see below).

Companies don't move overseas to avoid environmental regulations, argues this next piece of pro **evidence**. The benefits of relocation simply don't outweigh the costs in pure financial terms, especially when companies tend to be very sensitive to profit losses coming from negative PR. In fact, according to this card, companies that do move offshore (for reasons unrelated to regulations) tend to be so sensitive to accusations of exploitation that they typically adopt environmental practices equivalent to those of U.S.-based companies:

(Frank Arnold, Applied Macroeconomics Incorporated, Prepared under EPA Cooperative Agreement CR822795-01 with the Office of Economy and Environment, U.S. Environmental Protection Agency, "Environmental protection: Is it bad for the economy? A non-technical summary of the literature", 1999)

Even more convincing are studies indicating that **environmental regulations** in different countries **around the world (**and in different regions of the United States) **are far less important than other factors that affect decisions regarding the location of investments in new plant and equipment** [17]. **Multinational companies do not shop around for countries with** particularly **lax** or nonexistent **environmental regulations in order to cut costs by polluting more. Given the relatively small cost of regulation as a percentage of value added, it wouldn't make economic sense to move a plant overseas to avoid environmental protection requirements.**

If anything, **multinationals are keenly sensitive to charges of exploiting** the environment in **developing countries, and generally put in place practices that compare favorably with those in their U.S. facilities. Where plants do move overseas, it is** for market reasons**, usually to gain easier access to raw materials** or cheaper labor, **or to serve their foreign customers more efficiently**. There might be a rogue corporation here or there that actually did move to avoid environmental regulatory cost, but otherwise **the image of** numerous **companies setting up shop in places where they can pollute at will** and then undercut everyone else **is a fantasy.**

The pro can also turn leakage arguments by contending that a carbon tax would force the kinds of innovations that increase efficiency (and therefore global competitiveness), which drives international adoption of new technologies, resulting in "negative leakage." Here is **evidence** supporting this:

(Frederic Branger – London School of Economics and Political Science/Grantham Research Institute on Climate Change and the Environment & Philippe Quirion - Director of research and Senior researcher at CNRS, "Climate policy and the 'carbon haven' effect.", WIREs Climate Change, 2014, 5 (1), pp.53-71, https://halshs.archives-ouvertes.fr/hal-01137895/document, 2014)

Environmental regulations foster innovation and generate technological progress in GHG savings technologies (Newell et al. 1999, Jaffe et al. 2002, Dechezleprêtre et al. 2008**). Diffusion of these technologies reduces emissions in non-abating countries and then creates negative leakage, or positive climate spillover** (Gerlagh and Kuik 2007, Di Maria and Van der Werf 2008, Golombek and Hoel 2004, Bosetti et al. 2008). **There is empirical evidence of climate spillovers,** especially **in energy saving technologies** (Popp 2002), but **also in renewables**. **Feed-in tariffs in Denmark, Germany and Spain generated a massive induced technical change in wind and solar technologies** (Peters et al., 2012) **and are** thus in part **responsible for the spectacular development of wind-power capacities in China**, which became the world leader in terms of wind-power installed capacities, shifting from 2.6 GW in 2006 to 75 GW in 2012 (Roney, 2013).

More **evidence** on technological adoption and reverse leakage:

> *(Satoshi Yoshida, Sustainable Development Diplomacy & Governance Program @ Tufts, "Climate change, trade and emissions leakage: Trade measures and climate agreements", http://fletcher.tufts.edu/~/media/Fletcher/Microsites/CIERP/Publications/2014/SDDG_Yoshida_MAr2014_9doc.pdf, 2014)*
>
> Lastly, some argue that more **stringent emissions standards** in countries **can actually help mitigate carbon leakage**. The argument is that **more stringent emissions standards lead to improvements in technology, which will eventually benefit both carbon– constrained and non-carbon-constrained countries.** though not technically a channel of leakage, **these technological spillover effects can help counter carbon leakage in the long run** (Grubb et al., 2002).

Finally, the pro could endorse a carbon tax policy that applies to imports and exempts exports, which would eliminate the financial incentive to move abroad. This **evidence** explains how that could work:

> *(Donald Marron - director of economic policy initiatives and Institute fellow at the Urban Institute, Eric Toder - co-director of the Urban-Brookings Tax Policy Center and Institute fellow at the Urban Institute & Lydia Austin-research assistant at the Urban-Brookings Tax Policy Center, TAX POLICY CENTER - URBAN INSTITUTE & BROOKINGS INSTITUTION, "TAXING CARBON: WHAT, WHY, AND HOW", http://www.taxpolicycenter.org/uploadedpdf/2000274-taxing-carbon-what-why-and-how.pdf, 2015)*
>
> **To prevent shifts in production, a** unilateral **US carbon tax would have to apply to imports and exempt exports. Taxing imports and exempting exports prevents foreign producers from gaining an advantage** in serving US **and** foreign markets. Exempting exports also **avoids any incentive for US firms to move production abroad** to serve foreign markets. Such border adjustments would mean that **US consumers would pay the tax regardless of where production occurs, and US producers would collect** and pass forward **the** US **tax only if they sell to US consumers. This would make the tax neutral with respect to decisions on the location of production. In that way, it would parallel existing US taxes on highway motor fuels, alcoholic beverages, and tobacco and value-added taxes in most countries, all of which apply to imports and exempt exports.**

On the subject of how other nations' environmental policies can affect the success of American efforts, we must also consider the debate over whether it is worthwhile for the U.S. to act alone.

Foreign Emissions

If the United States takes steps to reduce GHG emissions, will there be significant climate benefits, even if other countries continue to pollute at the same rate? This is a common point of contention in debates over green reforms.

The con might argue that enacting a carbon tax would be pointless, because other nations—especially developing nations experiencing rapid growth, such as India and China—will account for 96% of global emissions over the next century. Therefore, as is stated in this **evidence**, even if the United States reduced all emissions to zero beginning tomorrow, the best case scenario would be a .2 degree reduction in warming:

> *(Paul, Knappenberger, Asst Dir Center Study Science @ Cato Institute; US News & World Report Debate Club; "A U.S. carbon tax wouldn't slow down global climate change"; http://www.usnews.com/debate-club/is-a-carbon-tax-a-good-idea/a-us-carbon-tax-wouldnt-slow-down-global-climate-change, 12/7/2012)*
>
> **A carbon tax will not achieve the goal of** substantially **mitigating** global **climate change**.
>
> **There is** one, and **only one, reason for instituting a carbon tax**: to attempt to mitigate the impacts of **climate change** induced by humankind's use of fossil fuels for the production of energy. And about the only thing that **a carbon tax in the U**nited **S**tates **will not** do is **mitigate** global **climate change** in any meaningful—scientifically, or otherwise—manner.
>
> Why? **Because**, based on mainstream estimates, **of the** approximately **3°C of** global **warming that is being projected to occur between now and the end of the century as a result of** anthropogenic carbon (dioxide) **emissions, the U.S. contribution will only be** about 0.2°C, or about **7 percent of the total warming. And this is assuming that no carbon tax is put in place**. Carbon dioxide **emissions from the rest of the world—primarily driven by rapid** emissions **growth in developing countries** like China and India—**will be responsible for the other 93 percent** of temperature rise.
>
> **The best that any carbon tax in the U**nited **S**tates **could ever hope to achieve would be to reduce** the amount of global **warming across the 21st century from** about **3.0°C down to about 2.8°C. And that tiny, inconsequential reduction would only occur if all greenhouse gas emissions from the U**nited **S**tates **were halted forever, starting tomorrow, which isn't the plan.**
>
> **The emissions reductions under any** sort of **carbon tax will be realized slowly, reducing the magnitude** of the global temperature rise that the tax would avert. For example, **a carbon tax designed to** smoothly **reduce** our greenhouse gas **emissions** from their current

level **to zero by** the year **2100 would result in only about 0.1°C of global temperature "savings"—an amount**, on its own, **not worth pursuing.**

More **evidence**:

(Jerry Taylor, president of the Niskanen Center, "The Conservative Case for a Carbon Tax", http://niskanencenter.org/wp-content/uploads/2015/03/The-Conservative-Case-for-a-Carbon-Tax1.pdf, 2015)

Conservatives often argue that almost **any conceivable U.S. program to reduce** greenhouse gas **emissions would have a negligible impact on global temperatures according to the** general circulation **models used to justify action in the first place.** For instance, were we to run the emission reductions associated with the failed WaxmanMarkey cap-and-trade bill through a model used by the National Center for Atmospheric Research, by one estimate, global temperatures would decline by only 9/100ths of 1 degree Fahrenheit by 2050.67 A subsequent analysis found that **even if the U**nited **S**tates **reduced** greenhouse gas **emissions to zero** over the course of this century, **global temperatures would be only 2/10ths of a degree** Celsius **cooler than** would **otherwise** be the case.68 **Accordingly, there is nothing the U**nited **S**tates **can unilaterally do about warming.** Politically acceptable **mitigation proposals**, so the argument goes, **produce near-zero benefit.**

The pro might respond that a carbon tax would allow the U.S. to assume a position of global climate leadership, and act as a role model that other nations will follow. Here is **evidence**:

(David Roberts, writer, "10 reasons a carbon tax is trickier than you think", Grist, http://grist.org/climate-energy/ten-reasons-a-carbon-tax-is-trickier-than-you-think/, 11/19/2012)

Even **a tax** considerably smaller than that, done right, **could enable Obama to meet the emission reduction goals he pledged in Copenhagen. It might also inspire other countries to follow suit, or at least convince other countries that the U.S. is finally in the climate game.** It would be a big deal.

More **evidence** on American climate leadership:

> *(Adele C. Morris, The Brookings Institution, "15 Ways to Rethink the Federal Budget: Proposal 11: The Many Benefits of a Carbon Tax", http://www.brookings.edu/~/media/Research/Files/Papers/2013/02/thp-budget-papers/THP_15WaysRethinkFedDeficit_F2.pdf?la=en, 2015)*
>
> At a time when the country is facing serious long-term budget difficulties, this proposal is arguably the most efficient way to reduce the deficit over the next few decades. **It offers** three **powerful ways to improve the well-being of future generations. First, it allows the U**nited **S**tates **to adopt more-efficient tax and regulatory policies.** Revenue from the carbon tax funds a permanent reduction in the United States' statutory corporate income tax rate, currently the highest in the developed world, to a more internationally competitive level. **Evidence suggests this** tax swap **will expand investment and improve welfare** in the United States. **A price on carbon also can supplant more-costly and less-effective measures to reduce emissions, promote clean energy and energy efficiency, and drive innovation, saving both budget and regulatory costs. Second, a carbon tax spurs serious cost-effective efforts** by the United States **to address** the global threat of **climatic disruption. Economists widely agree that a price on carbon** in the United States **is necessary to reduce GHG emissions** efficiently **across a wide range of activities; with effective diplomacy, the U**nited **S**tates **can leverage its efforts into broader and more ambitious efforts abroad. This proposal would produce** about **$150 billion or more in climate benefits in the first two decades.** Third, this proposal creates a new source of revenue that will reduce the federal budget deficit by almost $200 billion in the next decade and about $815 billion over the next two decades, even while protecting the welfare of the poorest households.

In response to these leadership claims, this con **evidence** denies that other countries will follow suit, because it is simply against their interests to do so:

> *(Oren Cass, Senior fellow @ Manhattan Institute, National Affairs, "The carbon-tax shell game," http://www.nationalaffairs.com/publications/detail/the-carbon-tax-shell-game, Summer 2015)*
>
> Placing domestic emissions to the side, the pro-tax case quickly shifts to the international scene, where **U.S. "leadership" in the form of a** unilateral domestic **carbon tax is described as necessary for** and perhaps even the lynchpin of **global action.** As a preliminary matter**, conceding in advance and then arriving at the table without any bargaining chips is a very poor negotiating strategy.** To the extent such an agreement could move forward, **moreover, it makes little sense** to suggest **that** our **weak domestic action would serve as the basis for a strong global agreement.**
>
> **The larger problem**, of course, **is that under no theory of negotiation will developing countries accept costly policies that would slow their economic growth and hinder their populations' climb out of crushing poverty. Rapid electrification is a critical** economic and social **priority for these countries, and rightly so.** A 2012 study from the World Resources Institute, for instance, identified 1,200 new coal power plants on drawing boards worldwide with more than three-quarters of that capacity in China and India. Just last month those two countries issued a joint communiqué demanding more action and financial support from developed nations but made no emissions-related commitments of their own.

Developing countries will pursue pollution reduction and invest in alternative energy technologies **where it is in their interest to do so**, and they may even sign on to politically attractive and non-enforceable agreements**. But there is neither evidence nor logical reason to suggest that the U**nited **S**tates **can alter other countries' rational negotiating positions by displaying "leadership."** If one truly believed a domestic carbon tax could serve as an instrument for fostering a global deal, its implementation should be suspended pending execution of a deal that met the desired parameters. Establishing those parameters would no doubt be difficult, but laying them out would be a valuable exercise in itself. No such proposals are forthcoming.

More “no modeling” **evidence** for the con:

(David W. Kreutzer PhD-Research Fellow in Energy Economics and Climate Change in the Center for Data Analysis & Nicolas D. Loris-Herbert and Joyce Morgan Fellow in the Thomas A. Roe Institute for Economic Policy Studies at The Heritage Foundation, “Carbon Tax Would Raise Unemployment, Not Swap Revenue,” Heritage Foundation, The Heritage Foundation, Issue Brief #3819 on Energy and Environment, http://www.heritage.org/research/reports/2013/01/carbon-tax-would-raise-unemployment-not-revenue, Jan 8 2013)

A Carbon Tax Would Not Save the Planet

Unilaterally reducing greenhouse gases would not make a dent on global emissions and, consequently, **would do** next to **nothing to reduce global temperatures**. **Even if the U.S. were to curb carbon emissions 83 percent** below 2005 levels by 2050 (what cap-and-trade bills required**), it would reduce global temperatures by only a few tenths of a degree Celsius by the close of the century**.[4]

This is because future carbon emissions will come overwhelmingly from the developing world (China and India, for example), which shows little appetite for squeezing economic growth for the sake of the environment.

A common argument is that if the U.S. leads in reducing emissions, **the rest of the world would follow** suit. **But this is clearly not the case. Despite actions taken by the EPA to regulate carbon dioxide, the developing world has massive expansions planned to increase coal consumption.** According to a recent report from the World Resources Institute**, there are plans to build nearly 1,200 coal-fired power plants in 59 different countries** totaling over 1.4 million megawatts. China and India alone account for 76 percent of the proposals.[5]

Developing countries want access to cheap, reliable **electricity** (especially since many areas do not even have access to electricity) **and have more pressing environmental needs. It is** simply **wishful thinking to assume that these countries would follow America's lead and curb economic growth to reduce greenhouse gas emissions.**

Another possible pro argument here is that the United States is such a major purchaser of goods produced around the world that other nations will be willing to make adjustments in order to guarantee continued access to American markets. Therefore, says this **evidence**, the U.S. has a large "bargaining chip" to coax foreign governments into adopting their own carbon taxes:

> *(Robert H. Frank, Prof Economics @ Cornell, "Carbon tax silence, overtaken by events", New York Times, http://www.nytimes.com/2012/08/26/business/carbon-tax-would-have-many-benefits-economic-view.html?_r=2, 8/25/2012)*
>
> **SOME** people **argue** that **a carbon tax would do little good unless it were also adopted by** China and **other big polluters**. It's a fair point. **But access to the American market is a potent bargaining chip. The U**nited **S**tates **could** seek approval to **tax imported goods in proportion to their** carbon dioxide **emissions if exporting countries failed to enact carbon taxes at home.**

The pro can also argue that other nations will follow in America's green footsteps because, as the carbon tax spurs increased investment into the development of clean energy, the price of transition away from fossil fuels will decrease substantially. Moreover, once they see the possibility for profit, foreign businesses will want to "get in on the action." Here is **evidence**:

> *(Joshua Meltzer, Fellow Global Economy & Development @ Brookings Institution & Prof International Studies @ John Hopkins, Energy Law Journal, 35:45, "A carbon tax as a driver of green technology innovation and the implications for international trade"; http://www.felj.org/sites/default/files/docs/elj351/14-45-Meltzer_Final%205.13.14.pdf, 2014)*
>
> **The adoption** by the United States **of a carbon tax will create an incentive for both U.S. and overseas firms to innovate and develop green technologies.** As outlined above, a carbon tax can induce innovation **by incentivizing** U.S. **firms to innovate and produce green technologies that reduce the impact of the tax.** Not all firms will be innovators, and **many will instead turn to the market to obtain** the latest green **tech**nologies **to reduce their** CO_2 **emissions**. This **demand for green technologies by the world's largest economy will also create a strong global incentive for** the **development of** new **green tech**nologies **in other countries.**
>
> **Increased global innovation in green tech**nologies **will** also have a range of positive **spillover**s. **As new sources of R&D and opportunities for scientific collaboration open up, greater resources become available to fund the**

innovation process and the knowledge and skills to assess the commercial viability of green technologies increases the access to and reduces the costs of finance. These factors should drive down the costs of innovation and development of green technologies.

Finally, some pro teams might be interested in making the argument that combatting climate change is a moral obligation, regardless of probability of success. Here is **evidence** backing that claim:

(UNESCO COMET, World Commission on the ethics of scientific knowledge and technology, "the ethical implications of global climate change", http://unesdoc.unesco.org/images/0018/001881/188198e.pdf, 2010)

From this consensual perspective**, a duty appears to rest on individual, corporate, national and international agents to ensure that they do not (further) contribute to** causing **climate change, but** rather **contribute towards reversing it**. More specifically, **this means taking measures**, on the one hand**, to mitigate greenhouse gas emissions** and, on the other hand, to put measures in place that will facilitate effective adaptation to those effects of climate change which cannot be mitigated, and will continue to be felt until such time that the measures to reverse climate change take effect. Following from this, there appears also to be a duty for everyone who can contribute to mitigation and adaptation to assist those who have become or will become victims of climate change but cannot help themselves.

While, from an ethical point of view, mitigation and adaptation are equally important tasks, it is crucial to note that the international community has hitherto focused mostly on mitigation, giving adaptation a secondary status. However, **taking into account the long time spans required for** mitigation **measures to take effect, and given that** many of **the processes contributing to climate change are both persistent and irreversible**, the question arises whether the international community should not increase the priority given to adaptation measures while continuing with its efforts regarding mitigation.

Formulated thus, **this** general **response to climate change seems to be justified and reasonable, and therefore not easily dismissed or rejected.** The trouble, however, is that there are challenges from various angles both from within the consensus, and from outside.

The con might respond that taking poorly-designed policy actions to combat climate change has the potential to be equally unethical. This **evidence** provides support:

(UNESCO COMET, World Commission on the ethics of scientific knowledge and technology, "the ethical implications of global climate change", http://unesdoc.unesco.org/images/0018/001881/188198e.pdf, 2010)

What is increasingly clear is the magnitude of the **global climate change** threat, which not only calls immediately for action and response, but also necessarily **raises questions such as "what is to be done?", "who is responsible for what?" and "what is the criterion for proper (good) action?". These questions illuminate the** explicit **ethical thrust of any** serious **engagement with climate change.** In other words, **far-reaching ethical questions can be asked about** the continuation of **human actions** that not only cause climate change, but also contribute to its intensification and acceleration. The ethical stakes surrounding climate change cannot be avoided or reduced. Failure to act could have catastrophic implications, but **responses to climate change that are not**

thought through carefully, with ethical implications in mind, **have the potential to devastate entire communities, create new paradigms of inequity and maldistribution, and render even more vulnerable those peoples who have already found themselves uprooted by other** man-made political and ideological **struggles**. Moreover, it is well known that global climate change has the potential to bring about conflict mobilized by the quest for scarce resources. The need for an ethical approach is therefore compelling.

So far, our discussion has focused mostly on whether or not a carbon tax could offer an effective policy to combat the threat of global climate change. What we have not looked at is the debate over just how threatening climate change really is. We'll go there now.

The Science of Climate Change

The problem with most conversations about climate change today is how deeply politicized they have become. Despite the prevalence of attitudes to the contrary, though, science does not answer to politics. Unfortunately, voices from every side of the debate are often guilty of twisting the facts to some extent. One must keep that in mind when considering climate change issues if one hopes to produce rigorous scholarship.

I will provide only a brief, superficial discussion of climate science in this guide. Soon after this is published, Debate Central will also be releasing a supplementary file dedicated to more thorough coverage of the subject. Make sure to grab that file, as well!

Pros using climate change impacts will want to be prepared to defend the scientific validity of global warming theories. One way of doing this is by deploying the oft-repeated argument that scientists overwhelmingly agree the climate change is real and mostly anthropogenic. Here's **evidence**:

(Kevin Trenberth, Distinguished Senior Scientist at Climate Analysis Section of National Center for Atmospheric Research, also signed by Richard Somerville, Ph.D., Distinguished Professor, Scripps Institution of Oceanography, University of California, San Diego Katharine Hayhoe, Ph.D., Director, Climate Science Center, Texas Tech University Rasmus Benestad, Ph.D., Senior Scientist, The Norwegian Meteorological Institute Gerald Meehl, Ph.D., Senior Scientist, Climate and Global Dynamics Division, National Center for Atmospheric Research Michael Oppenheimer, Ph.D., Professor of Geosciences; Director, Program in Science, Technology and Environmental Policy, Princeton University Peter Gleick, Ph.D., co-founder and president, Pacific Institute for Studies in Development, Environment, and Security Michael C. MacCracken, Ph.D., Chief Scientist, Climate Institute, Washington Michael Mann, Ph.D., Director, Earth System Science Center, Pennsylvania State University Steven Running, Ph.D., Professor, Director, Numerical Terradynamic Simulation Group, University of Montana Robert Corell, Ph.D., Chair, Arctic Climate Impact Assessment; Principal, Global Environment Technology Foundation Dennis Ojima, Ph.D., Professor, Senior Research Scientist, and Head of the Dept. of Interior's Climate Science Center at Colorado State University Josh Willis, Ph.D., Climate Scientist, NASA's Jet Propulsion Laboratory Matthew England, Ph.D., Professor, Joint Director of the Climate Change Research Centre, University of New South Wales, Australia Ken Caldeira, Ph.D., Atmospheric Scientist, Dept. of Global Ecology, Carnegie Institution Warren Washington, Ph.D., Senior Scientist, National Center for Atmospheric Research Terry L. Root, Ph.D., Senior Fellow, Woods Institute for the Environment, Stanford University David Karoly, Ph.D., ARC Federation Fellow and Professor, University of Melbourne, Australia Jeffrey Kiehl, Ph.D., Senior Scientist, Climate and Global Dynamics Division, National Center for Atmospheric Research Donald Wuebbles, Ph.D., Professor of Atmospheric Sciences, University of Illinois Camille Parmesan, Ph.D., Professor of Biology, University of Texas; Professor of Global Change Biology, Marine Institute, University of Plymouth, UK Simon Donner, Ph.D., Assistant Professor, Department of Geography, University of British Columbia, Canada Barrett N. Rock, Ph.D., Professor, Complex Systems Research Center and Department of Natural Resources, University of New Hampshire David Griggs, Ph.D., Professor and Director, Monash Sustainability Institute, Monash University, Australia Roger N. Jones, Ph.D., Professor, Professorial Research Fellow, Centre for Strategic Economic Studies, Victoria University, Australia William L. Chameides, Ph.D., Dean and Professor, School of the Environment, Duke University Gary Yohe, Ph.D., Professor, Economics and Environmental Studies, Wesleyan University, CT Robert Watson, Ph.D., Chief Scientific Advisor to the UK Department of Environment, Food and Rural Affairs; Chair of Environmental Sciences, University of East Anglia Steven Sherwood, Ph.D., Director, Climate Change Research Centre, University of New South Wales, Sydney, Australia Chris Rapley, Ph.D., Professor of Climate Science, University College London, UK Joan Kleypas, Ph.D., Scientist, Climate and Global Dynamics Division, National Center for Atmospheric Research James J. McCarthy, Ph.D., Professor of Biological Oceanography, Harvard University Stefan Rahmstorf, Ph.D., Professor of Physics of the Oceans, Potsdam University, Germany Julia Cole, Ph.D., Professor, Geosciences and Atmospheric Sciences, University of Arizona William H. Schlesinger, Ph.D., President, Cary Institute of Ecosystem Studies Jonathan Overpeck, Ph.D., Professor of Geosciences and Atmospheric Sciences, University of Arizona Eric Rignot, Ph.D., Senior Research Scientist, NASA's Jet Propulsion Laboratory; Professor of Earth System Science, University of California, Irvine Wolfgang Cramer, Professor of Global Ecology, Mediterranean Institute for Biodiversity and Ecology, CNRS, Aix-en-Provence, France, "Check With Climate Scientists for Views on Climate", The Wall Street Journal, http://online.wsj.com/article/SB10001424052970204740904577193270727472662.html , Feb 1 2012)

The National Academy of Sciences of the U.S. (set up by President Abraham Lincoln to advise on scientific issues), as well as **major national academies of science around the world and every other authoritative body of scientists** active in climate research **have stated that the science is clear: The world is heating** up **and humans are** primarily **responsible. Impacts**

are already apparent and will increase. Reducing future impacts will require significant reductions in emissions of heat-trapping gases. Research shows that **more than 97% of scientists** actively publishing in the field **agree that climate change is real and human caused. It would be** an act of **reckless**ness for any political leader **to disregard the weight of evidence** and ignore the enormous risks that climate change clearly poses. In addition, there is very clear evidence that investing in the transition to a low-carbon economy will not only allow the world to avoid the worst risks of climate change, but could also drive decades of economic growth. Just what the doctor ordered.

The con, on the other hand, can argue that scientists are actually not so universal in their agreement, and that data exists that contradicts the hypothesis of imminent catastrophic, anthropogenic climate change. Here is **evidence**:

(Wall Street Journal, editorial signed by the following scientists: Claude Allegre, former director of the Institute for the Study of the Earth, University of Paris; J. Scott Armstrong, cofounder of the Journal of Forecasting and the International Journal of Forecasting; Jan Breslow, head of the Laboratory of Biochemical Genetics and Metabolism, Rockefeller University; Roger Cohen, fellow, American Physical Society; Edward David, member, National Academy of Engineering and National Academy of Sciences; William Happer, professor of physics, Princeton; Michael Kelly, professor of technology, University of Cambridge, U.K.; William Kininmonth, former head of climate research at the Australian Bureau of Meteorology; Richard Lindzen, professor of atmospheric sciences, MIT; James McGrath, professor of chemistry, Virginia Technical University; Rodney Nichols, former president and CEO of the New York Academy of Sciences; Burt Rutan, aerospace engineer, designer of Voyager and SpaceShipOne; Harrison H. Schmitt, Apollo 17 astronaut and former U.S. senator; Nir Shaviv, professor of astrophysics, Hebrew University, Jerusalem; Henk Tennekes, former director, Royal Dutch Meteorological Service; Antonio Zichichi, president of the World Federation of Scientists, Geneva, "No Need to Panic About Global Warming", http://online.wsj.com/article/SB10001424052970204301404577171531838421366.html, Jan 27 2012)

A candidate for public office in any contemporary democracy may have to consider what, if anything, to do about "global warming." Candidates should understand that **the oft-repeated claim that nearly all scientists demand that something dramatic be done to stop global warming is not true. In fact, a large and growing number of distinguished scientists** and engineers **do not agree that drastic actions** on global warming **are needed**. In September, **Nobel Prize-winning physicist Ivar Giaever**, a supporter of President Obama in the last election, **publicly resigned from the American Physical Society** (APS) **with a letter that begins**: "I did not renew [my membership] **because I cannot live with the [APS policy] statement: 'The evidence is incontrovertible**: Global warming is occurring. If no mitigating actions are taken, significant disruptions in the Earth's physical and ecological systems, social systems, security and human health are likely to occur. **We must reduce emissions** of greenhouse gases beginning **now**.' In the APS it is OK to discuss whether the mass of the proton changes over time and how a multi-universe behaves, but the evidence of global warming is incontrovertible?" In spite of a multidecade international campaign to enforce the message that increasing amounts of the "pollutant" carbon dioxide will destroy civilization**, large numbers of scientists, many very prominent, share the opinions of Dr. Giaever. And the number** of scientific "heretics" **is growing** with each passing year. **The reason is a collection of stubborn scientific facts.** Perhaps the most inconvenient fact is **the lack of** global **warming for** well **over 10 years now**. This **is known to the warming establishment**, as one can see from the 2009 "Climategate" email of climate scientist Kevin Trenberth: "The fact is that we can't account for the lack of warming at the moment and it is a travesty that we can't." But the warming is only missing if one believes computer models where so-called feedbacks involving water vapor and clouds greatly amplify the small effect of CO2. The lack of warming for more than a decade—**indeed, the smaller-than-predicted warming**

> **over the 22 years since the** U.N.'s Intergovernmental Panel on Climate Change **(IPCC) began issuing projections**—**suggests** that **computer models have greatly exaggerated how much warming additional CO2 can cause**. Faced with this embarrassment**, those promoting alarm have shifted** their drumbeat **from warming to weather extremes, to enable anything unusual that happens in our chaotic climate to be ascribed to CO2.**

Due to public fixation on the question, a multitude of studies have been conducted attempting to measure scientist opinion on warming, with *someone* always finding a way to object to *something* about the research methodology. Besides the obvious problem that not everyone responds to surveys they are sent, there are also issues surrounding sample selection (include all scientists, or just natural scientists, or just earth scientists, or just climatologists? Include only those who are actively publishing on the subject of climate, or only those publishing at all, or anyone with the relevant degrees/credentials? Etc.) and question wording.

If you're interested, for every study aiming to quantify scientific opinion on climate change, there are a handful of other studies criticizing how the measurements were collected. Feel free to look those up; they're not hard to find.

Regardless, you might want to take this sort of research with a grain of salt. In debate, it's always wise to provide better warrants than "lots of experts agree with me; the end" as proof of one's claims, anyway.

To put a finer point on it, I hope those of you planning to support your pro cases with climate change impacts invest the time it takes to become literate in the science that grounds your arguments, rather than relying entirely on the "scientific consensus" shortcut. For one thing, appealing to authority is a fairly lazy argumentative tactic, and developing lazy habits never benefits you in the long-run (educationally or competitively). Furthermore, if you neglect to prepare against "no impact to warming" as a serious possible con strategy, you are liable to lose to opponents who are actually prepared to debate the relevant warrants in-

depth. So, regardless of what you think about the facts at hand, I strongly discourage you from treating the scientific validity debate as a non-issue.

Again, for deeper coverage of points of contention within the scientific literature on climate change, refer to the forthcoming Debate Central publication on the subject.

However, global warming isn't the only reason one might want to put a tax on carbon emissions. Let's turn now to some of the other pertinent concerns.

Air Pollution

For those of you wishing to avoid getting bogged down in debates about climate change, carbon taxes would also have ramifications in a number of other areas. One of these is air pollution.

In this context, we aren't talking about the planetary impacts of the greenhouse effect, but the much more basic human health benefits of clean air. This has to do with particulate contaminants released along with CO2 when fossil fuels are burned, which linger in the air, potentially causing respiratory problems in humans.

Here is **evidence** discussing the role power plant emissions play in causing health problems and premature death:

> *(C. Schneider and Jonathan Banks, Researchers for Clean Air Task Force, "The Toll From Coal: An Updated Assessment of Death and Disease from America's Dirtiest Energy Source.", Clean Air Task Force, Septemberhttp://www.catf.us/resources/publications/files/The_Toll_from_Coal.pdf, 2010)*
>
> **The direct link between power plant emissions and human health has been documented in an extensive body of scientific research drawing on multiple lines of evidence**, including several rigorous, large-scale epidemiological studies. Much of that literature has been reviewed and summarized in formal rulemakings and regulatory analyses by the U.S. Environmental Protection Agency (EPA) over the last several years and in reports published by the Clean Air Task Force and other organizations advocating on behalf of more stringent regulation of power sector emissions.5 In brief, **public health concerns have focused**, for at least the last decade, **on the role of very small airborne particles in causing** or contributing to **a host of respiratory and cardiopulmonary ailments and increasing the risk of premature death. Fine particles are especially dangerous because they can bypass the body's defensive mechanisms and become lodged deep in the human lung**. Indeed, research also indicates that **short-term exposures to fine particle pollution is linked to cardiac effects, including increased risk of heart attack.**6 Meanwhile, **long-term exposure** to fine particle pollution **has been shown to increase the risk of death from cardiac and respiratory diseases and lung cancer, resulting in shorter life-expectancy** for people living in the most polluted cities compared to people who live in cleaner cities.7 And although research suggests **fine particles reduce the average life span of the general population by a few years, the life of an individual dying as a result of exposure to air pollution may be shortened by 14 years.**8 **Adverse effects, including excess mortality, occur even at low ambient concentrations of fine particles—suggesting there is no "safe" threshold for this type of pollution**.9 Recent studies have also succeeded in identifying plausible biological mechanisms such as systemic inflammation, accelerated atherosclerosis, and altered cardiac function to explain the cardiac and other serious health impacts associated with exposure to airborne fine particles.10 **Because most fine particle-related deaths are thought to occur within a year or two of exposure, reducing power plant pollution will have almost immediate benefits.**11

This piece of **evidence** indicates that air pollution causes 3 million premature deaths per year, and that a carbon tax is an effective way of improving air quality:

> *(Ian Parry, Environmental fiscal policy expert IMF fiscal affairs department, IMF Direct, "Carbon pricing: Good for you, good for the planet", http://blog-imfdirect.imf.org/2014/09/17/carbon-pricing-good-for-you-good-for-the-planet/, 9/17/2014)*
>
> This argument crucially ignores immediate domestic environmental benefits from reducing CO_2. **Fossil fuel combustion**, especially coal, **is a leading cause of** local **outdoor air pollution which, according to W**orld **H**ealth **O**rganization figures, is estimated to **cause over 3 million premature deaths a year worldwide—through increasing the risk of heart disease, lung cancer, and so**

on. Taxing the **carbon** content of coal **will increase** its **price, and decrease** its **use, leading to both fewer CO_2 emissions and better public health due to cleaner air. A carbon tax would also increase motor fuel prices, which will reduce traffic** congestion and **accidents as people economize** a bit **on their use of vehicles. This** again **spurs domestic economic benefits**, at least in countries where people are not already fully charged for these adverse effects through existing motor fuel excises. **These health** and other "co-**benefits**" from reducing fossil fuel use **add to** the gains in **economic efficiency** that start with pricing CO_2 emissions. Ideally, governments would use other policies to address domestic environmental problems, like charges for local air pollution. However, until these policies are fully implemented (likely a long time), policymakers should look at how the indirect impact of CO_2 pricing can help alleviate these problems when they consider shorter-term climate policies.

The con might respond that particulate pollution and CO2 are not necessarily correlated, and that the existing Clean Air Act provides sufficient regulation to protect human health. The **evidence** below makes those arguments, and also contends that it is inefficient to implement a nationwide tax when significant air pollution only affects certain areas:

(Oren Cass, Senior fellow @ Manhattan Institute, National Affairs, "The carbon-tax shell game," http://www.nationalaffairs.com/publications/detail/the-carbon-tax-shell-game, Summer 2015)

But **particulate matter and ozone are not CO2, nor are their emissions necessarily correlated**. **Natural-gas plants, for instance, eliminate** some types of **pollution almost entirely but still emit** half the **CO2** of coal. **A carbon tax** heavily preferences expensive solar, wind, and nuclear energy over cheap natural gas, which **would not be the** top **priority of someone** most **concerned for public health**.

Moreover, because the **pollutants that harm** human **health have** primarily **local effects (unlike CO2)**, **one part of the country might be suffering no harm from their minor presence** while other parts struggle with excessive concentrations. **The U**nited **S**tates **already has a robust regulatory regime, the Clean Air Act, tailored to managing these pollutants** and this challenge. **The Act sets air-quality standards** for each pollutant **at the level deemed safe for human health, and imposes stringent restrictions in areas** of the country **where pollution exceeds those levels.**

Most Americans live in areas of the country **where no pollutant exceeds the** public-health **standard**. **Yet the carbon tax would suppress all economic activity** where they live **to the same degree** it might in areas with poor local air quality. **Using a nationwide tax to compensate for externalities** the costs of which are **concentrated where less than half the population lives is** plainly **inefficient, and** certainly **not Pigovian**. Applying that tax to the wrong type of emissions only adds insult to injury.

Energy policy doesn't just affect the environment and human health, however. It also plays a huge part in the strength of the United States economy.

Economy & Jobs

According to the Institute for Energy Research, energy production accounts for about 9% of America's GDP. The American Petroleum Institute estimates that the energy industry supports 9.83 million US jobs, which is about 5.7% of the nation's workforce. Clearly, any time you enact policies that impact the energy sector, the effects are bound to ripple throughout the economy.

Whether those effects are positive or negative, well… that's up for debate.

Con debaters might argue that a carbon tax would directly result in job cuts, due to the loss of profitability in the energy sector and other carbon-intensive fields.

Here is **evidence** predicting the loss of 1 million American jobs in 2016 alone, as well as a rising cost of living and overall economic slowdown:

> *(David W. Kreutzer PhD-Research Fellow in Energy Economics and Climate Change in the Center for Data Analysis & Nicolas D. Loris-Herbert and Joyce Morgan Fellow in the Thomas A. Roe Institute for Economic Policy Studies at The Heritage Foundation, "Carbon Tax Would Raise Unemployment, Not Swap Revenue," Heritage Foundation, The Heritage Foundation, Issue Brief #3819 on Energy and Environment, http://www.heritage.org/research/reports/2013/01/carbon-tax-would-raise-unemployment-not-revenue, Jan 8 2013)*
>
> 1. **A Carbon Tax Would Damage the Economy** Since **an overwhelming majority of America's energy needs are met by** carbon-emitting **fossil fuels**, regulations of these fuels directly raise the cost of electricity, gasoline, diesel fuel, and home heating oil. **Since low-income families spend a larger proportion of their income on energy, a tax that increases energy prices would disproportionately affect the budgets of the poorest American families.** Businesses, faced with higher energy costs, would likely pass those costs on to consumers. However, if a company had to absorb the costs**, high energy costs would squeeze profit margins and prevent businesses from investing and expanding. Investors might even move their funds away from energy** companies and toward less regulated business enterprises, thus depriving fossil-fuel-based companies much-needed cash for more efficient power generation. **The result is higher energy costs, lower income, and fewer jobs.** In 2012, the U.S. Energy Information Administration (EIA)

made a comparison analysis for a carbon tax that starts at $25 and rises by 5 percent per year (after adjusting for inflation).[1] **Compared to** the baseline case, **without the carbon tax, this would**[2]: **Cut** the **income** of a family of four **by $1,900 per year** in 2016 and lead to average losses of $1,400 per year through 2035; **Raise the** family-of-four **energy bill by more than $500 per year (not counting** the cost of **gasoline**); **Cause gasoline prices to increase by** up to **$0.50 gallon**, or by 10 percent on an average gallon price; **and Lead to** an **aggregate loss of more than 1 million jobs by 2016 alone**. **In particular, energy-intensive industries and manufacturing would feel the adverse effects of a carbon tax, which comes at a time when many companies, lured by the prospect of abundant and cheap natural gas, are moving to the U**nited **S**tates. A recent KPMG analysis of the U.S. chemical industry emphasizes, "With a new and abundant source of low-cost feedstock, the US market has transformed to become one of the most advantageous markets for chemical production in the world."[3] **A carbon tax would unnecessarily reverse this resurgence.**

This next piece of **evidence** identifies several major American industries that would be hit particularly hard by a carbon tax, leading to large amounts of job loss:

(Mark Perry, Prof Economics Univ Michigan- Flint & Scholar @ American Enterprise Institute, "Carbon tax proposal will hobble our already challenged economy, stall growth"; American Enterprise Institute, https://www.aei.org/publication/carbon-tax-proposal-will-hobble-our-already-challenged-economy-stall-growth/, 8/18/2012)

The hardest hit sectors of the U.S. economy from a carbon tax would be energy-intensive industries, particularly **chemicals,** automobile **manufacturing, iron and steel, aluminum, cement**, and **mining and oil refining.**

These large industries would be at a serious disadvantage in the world marketplace, and many companies would move production to countries without such a tax. The cost in dollars, as well as in lost jobs, from a carbon-tax would be staggering. And the cost would ultimately fall on American consumers — without necessarily **generating any environmental benefits if China, India and other countries** with fast-growing economies **continue to pollute.**

The **evidence** below uses the example of Australia's carbon tax to advance the unemployment argument. Australia implemented their carbon tax policy in July of 2012, and this card says the tax resulted in a 10% increase in unemployment in just over a year. It provides several examples of large businesses forced to shut down due to the economic pressures of the tax:

(Dr. Alex Robson, PhD, prof of Accounting, Finance and Economics at Griffith University in Brisbane, Australia, "Australia's Carbon Tax: An Economic Evaluation," The Institute for Energy Research, http://instituteforenergyresearch.org/wp-content/uploads/2013/09/IER_AustraliaCarbonTaxStudy.pdf, September 2013)

None of the official Government **reports** discussed in section 2 above **examine**d in detail **the likely effects of the carbon tax on job losses and unemployment.** Instead, the computable general equilibrium models that were used in the modelling exercises typically assume that markets clear in the long run, so that any labour market effects of the carbon tax must ultimately show up as reductions in real wages. Figure 5.5 shows that in percentage terms, even with compensation in place, the Government expects the reduction in real wages relative to baseline to be much larger in relative terms than the overall reduction in GDP. If labour market rigidities prevent real wages freely adjusting in the manner suggested by Figure 5.5, **then the introduction of the carbon tax means that unemployment will be greater than would have otherwise been the case.** As Figure 5.6 shows, **since July 2012 the number of unemployed workers in Australia has risen by more than 10 per cent**, from 636,564 to 705,421, with the unemployment rate rising from 5.2 per cent to 5.7 per cent over the same period. There is mounting evidence that **the carbon tax is causing job losses** in certain sectors, **particularly in manufacturing. Examples of job losses directly attributable to the** introduction of the **carbon tax include** the following: • 22 **May 2012**: **Norsk Hydro** announced the closure of its **aluminium** smelter at Kurri Kurri in New South Wales, **resulting in** the **loss of jobs for** around **350 fulltime workers and 150 contractors. The company had made at least one submission to the Government** in 2009 **highlighting that the carbon tax "would put** existing **operation[s] at risk** and render an expansion unviable, stripping a potential $4 billion dollar investment and 3000 jobs from the Australian economy." • 19 **December 2012**: Tamworth-based **Grain Products Australia announces** the appointment of voluntary administrators amid concerns of **impending insolvency**, putting the future of 68 employees at risk. The company's **directors cite a 75 per cent rise in electricity costs** over the preceding three years as pivotal to the decision—**and** include **reference** to **the carbon tax**, **saying** that there has been no relief provided by the Federal Government and that "**it is very hard for manufacturing** in Australia **to survive with these** sort of **increases**." Allied Mills ultimately agreed to buy the business in early 2013. • 18 **January 2013: Penrice Soda announces it will cease** soda ash **production** at its Adelaide plant in June, **accounting for the loss of 60 jobs. The company specifically cites the carbon tax**, among other factors, as having had a major bearing on its decision. • 18 **February 2013: Amcor announces that over 300 jobs will be lost** at its operations across Melbourne and Brisbane. **The company stated that** "significant cost increases including **energy**" was one of the factors that "**had a significant impact on our ability to remain competitive** in the cartonboard market." • 11 **March 2013**: **CSR announced** a restructure of its glass manufacturing business, Viridian, with **the loss of 150 jobs** overall at two sites—Ingleburn and Wetherill Park. Rob Sindel, t**he Managing Director, confirmed that the carbon tax had added around $500,000 to** the **annual costs** at its Ingleburn facility. **As the carbon tax increases and further affects economic incentives, it should** be expected to **lead to further reductions in business profitability, job losses, and** ultimately **closures of** certain **businesses**. **Indeed, the whole purpose of the carbon tax is to reduce and**

eventually eliminate certain types of economic activities, as well as the jobs that are created from these activities.

More con **evidence** on Australia's unemployment problems:

(Taylor Smith, policy analyst for The Heartland Institute specializing in energy, climate, and environmental regulation, "Research & Commentary: What the Australian Carbon Tax Means for the United States," The Heartland Institute, https://www.heartland.org/policy-documents/research-commentary-what-australian-carbon-tax-means-united-states, April 25 2014)

Anti-fossil-fuel activists have long advocated federal and state governments should impose carbon taxes. Such a tax, they argue, would correct a "market failure" by placing a price on carbon dioxide (CO_2) emissions that would reflect the external costs imposed on the environment by dangerously modifying Earth's climate. With a price mechanism in place, they say, market actors would reduce CO_2 emissions and invest in cleaner alternatives without the need for command-and-control regulation. Many scientists, economists, and policy analysts disagree, however, noting **a carbon tax would raise energy costs, destroy jobs, and harm the economy.** Many of these experts also reject the notion that CO_2 is a pollutant, pointing out that CO_2 is a natural compound crucial to a healthy ecosystem as well as human life. On July 1, 2012, **Australia implemented a carbon tax** at A$24.14 (U.S. $22) per ton of CO_2, similar to what has been proposed in the United States, **thereby establishing a real-word test of the carbon tax's effects.** Economist Robert Murphy, Ph.D., of the Institute for Energy Research, wrote about those effects after examining a paper by Alex Robson, Ph.D., whose work was published in the February 2014 edition of the peer-reviewed academic journal Economic Affairs. Murphy writes, "**In the year after Australia's carbon tax was introduced, household electricity prices rose 15%, including the biggest quarterly increase on record." In addition**, Murphy observed, **Australia's unemployment rose sharply after the carbon tax was introduced, despite being relatively stable previously.**

High unemployment rates wreak havoc on economies. When a person loses her job, she loses her source of income. As a result, she is forced to reduce her spending. For each person who stops spending money, businesses lose a customer. If a large chunk of the population all start spending less money at once, it can compound into a large enough reduction in consumer activity to make businesses unable to survive. Then, as businesses close, the people they once employed also find themselves out of work, beginning the cycle anew. This cycle can trigger substantial economic downtown.

Case in point- the following **evidence** charges Australia's carbon tax with undermining the nation's entire economy, which reversed course from strong growth before the tax to a severe slowdown shortly thereafter:

(Sierra Rayne, Ph.D. in Chemistry and writes regularly on environment, energy, and national security topics, "Australia 'Green,' Australia Unemployed," American Thinker, http://www.americanthinker.com/articles/2014/07/australia_green_australia_unemployed.html, July 12 2014)

With news from Australia that the Senate down under voted to block Prime Minister Tony Abbott's bid to repeal **the carbon tax, it's time to review Australia's unemployment rate trends** over the past four years. **The carbon tax started on July 1, 2012**, so here are Australia's unemployment rate and unemployment rate for those seeking full-time work in the two years before and after the carbon tax came into force. **The effects of carbon taxation don't get much clearer than this. There was absolutely no trend in Australia's unemployment rate for the 24-month period prior to the carbon tax. Then** – magically – **as soon as the** carbon **tax started**, Australia's **unemployment** rate **began to rise.** At Bloomberg, Christopher Flavelle has an article whereby all Australian and international economists interviewed state that there is no significant relationship between Australia's carbon tax coming into force and the start of the unemployment rise. Must be all a just a coincidence – a coincidence of economic harm starting everywhere we look that dabbles with carbon pricing and greenhouse gas reduction efforts. **Between 2011 and 2012, Australia's** real per capita **GDP growth** trend **was outperforming the major developed nation groupings.** In other words, **its economy was accelerating upward, until the carbon tax was implemented. Then, between 2012 and 2013, the trend** in Australia's growth **slowed** substantially – **to such an extent that it** subsequently **substantially underperformed relative to the major developed nation groupings. The** Aussie **slowdown** from 2012 to 2013 **can't be blamed on a weaker export market**. The real per capita GDP **growth** rate **in China** – **by far Australia's largest trading partner** – **was unchanged from 2012 to 2013. Australia's total exports actually declined from 2011 to 2012 (while the overall economy increased its** rate of **growth**), **and then increased from 2012 to 2013 (in contrast to the economy, which slowed down considerably**), the complete reversal of the economic growth trends. The export increase from 2012 to 2013 also outperformed the prior 5-year average for export growth. **The only rational explanation based on the data** anyone – included both pro- and anti-carbon tax groups – has presented to date **is that the carbon tax severely harmed the Australian economy,** essentially halting and **reversing the accelerating growth trend** built up over the pre-tax period.

More **evidence**, this time forecasting the cost of a carbon tax in the U.S., rather than looking at Australia:

(Rob Jeffrey, managing director and senior economist of Econometrix, "Carbon tax to hurt growth, socio-political stability and exacerbate unemployment," http://www.iol.co.za/business/opinion/carbon-tax-to-hurt-growth-socio-political-stability-and-exacerbate-unemployment-1845755 , April 16 2015)

A carbon tax will increase the costs of electricity and the products of many important industries. These costs will be passed on through price increases to business and consumers. Downstream business and industry will be faced with these increased costs and will in turn pass these costs on to its consumers. Certain industries will be faced with a carbon tax of their own and in turn their increased electricity costs and carbon tax costs will

also be passed on to their consumers and users of their product. **Ultimately, demand will decline as the price increases faced by consumers will reduce their disposable income.** In the case of export industries trading in the global competitive market they will either face a decline in demand and/or reduced prices with resulting lower returns. In turn, imports would become more competitive and import sensitive industries would suffer. The complex impacts of unnecessary real price increases would result in a further deterioration in the current account of the balance of payments, already at an excessively high level. **Furthermore, there would be a decline in the return on investment** of the affected business **and** real **investment would decline.** At present, it is already running at below required levels capable of sustaining an acceptable economic growth rate. Each industry would need to be examined on its merits. An example of the damage it could cause would be the motor vehicle industry. Current exports total more than R100 billion an annum and total employment exceeds 100 000. The competitive damage to this industry alone could be significant. Economic impact Econometrix has calculated the economic impacts of these effects. **The carbon tax would** slow gross domestic product (GDP) growth by 0.4 percent a year, **result**ing **in a** 6.5 percent **reduction in** the size of **GDP** by 2030, or R350bn, **and a reduction of** almost **1.4 million** in the number of **jobs** available. **The number of dependents affected is** therefore estimated at almost **5 million**. This is a sizeable effect on an economy with a population estimated to be approaching 70 million by 2030.

The pro could counter with this piece of **evidence**, which disputes the idea that Australia's economic troubles were caused by the carbon tax, pointing to other factors instead:

(Christopher Flavelle, senior policy analyst for Bloomberg Government , "Carbon Tax Isn't Killing Jobs ... In Australia," Bloomberg, http://www.bloombergview.com/articles/2014-06-11/carbon-tax-isn-t-killing-jobs-in-australia, June 11 2014)

The most pointed moment of President Barack Obama's meeting tomorrow with **Australian Prime Minister** Tony Abbott will probably be when the two discuss climate change: Obama has just proposed new rules on carbon emissions from power plants, while **Abbott is ending the** $23-a-ton **carbon tax imposed** two years ago **by his predecessor.** "We should do what we reasonably can to limit emissions and avoid climate change, man-made climate change, but we shouldn't clobber the economy," **Abbott said** Monday during a stop in Ottawa. "That's why I've always been against a carbon tax or an emissions trading scheme, because **it harms our economy** without necessarily helping the environment." **But Australia's carbon tax experiment doesn't back up those warnings. Although the country's macroeconomic indicators have flagged since the tax took effect, that had little to do with the tax, economists say. Meanwhile, the tax succeeded at reducing emissions. What Abbott paints as a cautionary tale may instead be a model for the U.S.** and others **to follow**. **At first** glance, **Abbott's argument of economic harm seems to match the data**. Australia's gross domestic product grew by 3.6 percent in 2012, the year the tax was introduced. The next year, that slowed to 2.4 percent -- a big drop, but still well above the 1.3 percent average among Organization for Economic Cooperation and Development countries: Australia's unemployment rate also started rising about the time the carbon tax was introduced, after falling for 11 of the previous 12 quarters. When the tax took effect in July 2012, unemployment was 5.1 percent; by the first quarter of this year, it was 5.9 percent, having risen for each quarter along the way: **But when I asked experts on Australia's economy whether the carbon tax caused the dip in the country's performance, they said the slowdown was the result of changes that predated the tax.**

Foremost among them was high demand for Australian natural resources, which led to extensive investment to expand capacity, said Philip Hemmings, **an OECD economist** who follows Australia. "**These** are **huge plants** that **are** just **coming** up **to completion** now," he said. **The result is a slowdown in investment, and with it a drop in GDP growth and a rise in unemployment.** Frank Jotzo, **director of the Center for Climate Economics and Policy at Australian National University, agreed that the tax wasn't a factor in Australia's performance,**

citing instead the "waning resource boom" and other changes. "**The effect of the carbon price is** simply **not observable in the** macroeconomic **data**." John Quiggin, an economics professor at the University of Queensland and fellow at the Australian Research Council, noted that "the government doesn't even attempt to pretend that there will be a positive net impact from the removal of the tax." He cited Abbott's budget, released last month, whose economic outlook said: Resources investment is still expected to detract significantly from growth through until at least 2015-16. ... Real GDP is forecast to continue growing below trend at 2½ per cent in 2014‑15. ... The unemployment rate is forecast to continue to edge higher, settling around 6¼ per cent. If the tax's critics have an argument to make, it's on two points: inflation and electricity prices. But even that argument is wobbly. The tax was "marginally inflationary," according to Mahinda Siriwardana, an economics professor at the University of New England Business School. Sure enough, inflation increased in 2013 after falling the year before, moving in the opposite direction of the OECD average: But it's hard to attribute even that modest increase to the tax, Siriwardana said in an e-mail. OECD projections for this year and next bear that out: With the tax's repeal, Australia's inflation will remain above the OECD average. Electricity rates increased, too, but "the contribution of the carbon tax to this price was small," Siriwardana said. "Power companies upgraded the infrastructure (poles and wires) significantly and that mainly contributed to the electricity price increase in the last two years." Of course, none of this addresses what's arguably the more important question: **Did the carbon tax succeed at reducing emissions**? The answer seems to be **yes**. In the first nine months of **last year,** electricity **emissions were** 0.3 percent **lower than** in the same period **the year before** -- led by a 5.5 percent drop in emissions from the electricity sector, the country's largest source of carbon: In other words, Australia's carbon tax appears to have accelerated a trend that was already under way, as the chart above, from Australia's Department of the Environment, shows**. And it did so without significantly adding to the economic headwinds Australia already faced.**

The pro can also respond that jobs lost in the fossil fuels industry will be replaced by new jobs in green technology, meaning no net job loss. Here is **evidence**:

(Marc Hafstead- PhD in economics & Roberton C. Williams III- PhD in economics, "How Do Environmental Policies Affect Employment?", Resources for the Future, http://www.rff.org/research/publications/how-do-environmental-policies-affect-employment, Sep 24, 2015)

We find **that imposing a carbon tax leads to 2.5** to 3 **percent fewer jobs in the polluting sector** of the economy. Performance standards have a much smaller effect on those industries, with a drop of about 0.25 percent. In all three policies, **however, the job losses in the "dirty" sector are nearly offset by an increase in employment in the non-polluting sector. Because the carbon tax boosts the price of the carbon-intensive goods, demand shifts from those goods to cleaner substitutes, thereby increasing employment.** Consider, for example, a shift away from coal-fired electricity to electricity generated from renewable sources. The shifts are smallest under the performance standard and largest when the carbon tax revenues are used to reduce payroll taxes. **Consequently, the net effect on the unemployment rate** in all three policies **is** relatively **small. Instead, the policies mainly cause a shift in labor from the polluting to the nonpolluting sector**. The largest unemployment effect is seen with the carbon tax with lump-sum rebates; in that policy, the unemployment rate rises by 0.26 percent**. The carbon tax with revenues used to finance payroll tax cuts** and the performance standard **produce almost no net effect**, with unemployment rates rising by 0.02 and 0.04 percent, respectively.

More pro **evidence** on green job creation:

> *(Joshua Meltzer, Fellow Global Economy & Development @ Brookings Institution & Prof International Studies @ John Hopkins, Energy Law Journal, 35:45, "A carbon tax as a driver of green technology innovation and the implications for international trade"; http://www.felj.org/sites/default/files/docs/elj351/14-45-Meltzer_Final%205.13.14.pdf, 2014)*
>
> One way forward is to demonstrate that **the production of green technologies** outside the United States **will** still **produce significant economic gains for the U**nited **S**tates, **both in terms of consumer welfare from access to cheaper green technologies and improved environmental outcomes, and also in terms of jobs**. In this regard, many **green technologies produce high-skilled services jobs** that will be located close to the market demanding the technology. **For instance**, the downstream end of the supply chain for **wind energy is heavily services driven and includes marketing, sales, financing, transportation and logistics, and wind park operations and maintenance**.108 These are also sectors where the United States retains a comparative advantage.

Even more **evidence**:

> *(Congressional Budget Report, "EFFECTS OF A CARBON TAX ON THE ECONOMY AND THE ENVIRONMENT," report prepared at the request of the Ranking Member of the House Committee on Energy and Commerce by Terry Dinan of CBO's Microeconomic Studies Division with guidance from Joseph Kile. Bruce Arnold, J'nell Blanco, Kim Cawley, Wendy Edelberg, etc. al, https://www.cbo.gov/sites/default/files/cbofiles/attachments/44223_Carbon_0.pdf, May 2013)*
>
> **Declines** in such industries **would be offset**, over time, **by increases in employment in industries and sectors (such as services) whose products are less emission-intensive to produce and result in fewer emissions when used. Employment would also increase in industries that manufacture equipment to produce energy from low-emission sources, such as nuclear, solar, and wind power**

Finally, this **evidence** argues that, in the status quo, businesses have no incentive to make the sorts of investments that create jobs, because they are able to meet consumer demand without changing anything. By implementing a carbon tax, however, they would be forced to upgrade their operations, resulting in new jobs:

> *(Robert H. Frank, Prof Economics @ Cornell, "Carbon tax silence, overtaken by events", New York Times, http://www.nytimes.com/2012/08/26/business/carbon-tax-would-have-many-benefits-economic-view.html?_r=2, 8/25/2012)*
>
> **A** second **benefit would occur if a carbon tax were approved** today but phased in gradually, only after the economy had returned to full employment. **High unemployment persists** in **part because businesses, sitting on mountains of cash, aren't investing it because their current capacity already lets them produce more than people want to buy. News that a carbon tax was coming would create a stampede to develop energy-saving technologies. Hundreds of billions of dollars of private investment might be unleashed without adding a cent to the budget deficit.**

Energy Prices

If we're concerned about the pocketbooks of American workers, we can't focus on their income alone. It is also important to consider their expenditures. That is, how much do they have to pay for necessary goods? In this case, we look to how a carbon tax might increase the costs people face when purchasing goods, heating and powering their homes, and driving their vehicles.

Energy prices tend to be reflected in every single product you buy, probably without you thinking about it. When any company prices a product or service, they take their input costs into consideration, in order to ensure the price is large enough to generate a profit. One of those factors is the cost of energy, used for everything from powering manufacturing factories during the production phase to shipping goods across the country. Then, retailers add to the price paid by consumers, in order to account for costs of keeping the store open, such as lighting and heating. Although, of course, there is no line on your receipt that says "cost of energy," it's important to realize that energy costs are included. They're built in to the price.

This **evidence** discusses how rising energy prices played out during Australia's carbon tax:

> *(Australian Industry Group, "Ai Group Survey: business pricing responses to Australia's carbon tax, the first six months," http://www.aigroup.com.au/portal/binary/com.epicentric.contentmanagement.servlet.ContentDeliveryServlet/LIVE_CONTENT/Publications/Reports/2013/Carbon_price_impacts_Jan_2013_REPORT_FINAL.pdf, January 2013)*
>
> **The main way the carbon tax is passed on to** the majority of **businesses and** to all **consumers is through energy prices**, and particularly through electricity prices. **Treasury modelling** released in 2011 (and re-stated in 2012) **estimated that the** total **price effect of the commencement of the carbon tax would add a** one-off, **additional hit of 0.7 percentage points to consumer inflation** (CPI) in 2012-13. **Further**, smaller, one-off **increases in inflation are expected**, as the fixed price increases slightly ahead of its scheduled move to market-based pricing from 2015. **The introduction of the carbon tax** on 1 July 2012, combined with the continuing rise in networkrelated costs, **resulted in the single largest price increase recorded in Australia for household electricity and gas prices** in Q3 2012 since the early 1980s, **with consumer prices rising by more than 18 per cent** p.a. in Q3 2012 for both electricity and gas (see figure 7). This latest increase in household electricity prices came on top of other significant increases over the past decade. National average electricity prices for households increased by 30 per cent between 2000 and 2005, and then by another 50 per cent between 2005 and 2010. The latest rise takes electricity pricing 40 per cent above 2010 levels, and **168 per cent higher than in 2000**. Retail gas prices have increased by a similar margin (151 per cent from 2000 to 2012). **In comparison, all average consumer prices** (headline CPI) **increased by 46 per cent from 2000** to 2012. These latest energy price rises have been possible because energy takes a very small direct share of total household consumption (just 2.2 per cent of aggregate national household consumption expenditure in Q3 2012, down from 2.5 per cent in the 1980's and earlier), and because households have been compensated by Government for the additional cost of carbon emissions in their energy bills. A dramatic increase in investment in energy distribution infrastructure accounts for much of the total cost increase over this period.

This piece of con **evidence** argues that rising prices will compound the previously-discussed problem of unemployment by further biting into the amount of disposable income a person can spend (and therefore circulate throughout the economy):

> *(James Taylor, senior fellow for environment policy at the Heartland Institute, managing editor of Environment & Climate News, JD from Syracuse, "No, A Carbon Tax Cannot Create Jobs, Jobs, Jobs," Forbes, http://www.forbes.com/sites/jamestaylor/2014/10/08/no-a-carbon-tax-cannot-create-jobs-jobs-jobs/#3a5dad693d6d, October 4 2014)*
>
> **A tax on carbon dioxide emissions would destroy** far more **jobs – and wealth** – than it would create, despite the well-intentioned hopes of Forbes.com contributor James Conca. In a Forbes.com article titled "Can A Carbon Tax Create Jobs, Jobs, Jobs," Conca argued a carbon dioxide tax would result in a net increase in jobs if the tax revenues were spent wisely. Key to this hopeful prognosis, Conca asserted, is the requirement that a newly imposed tax on carbon dioxide must be revenue-neutral, with carbon dioxide tax collections being offset on a dollar-for-dollar basis by tax reductions in other sectors of the economy. Conca never explained how merely shifting tax burdens from one sector of the economy to another creates jobs and wealth. Instead, he simply cited three short articles and one longer paper written and published by liberal activists. On important policy issues of the day, however, blindly deferring to self-serving papers written by liberal activist groups, such as the notorious Center for America Progress, is a recipe for disaster. Yes, that is the same Center for American Progress that championed Solyndra and promised Obamacare would lower healthcare premiums, create jobs, and make American families richer. There are many reasons – economic and otherwise – why **a tax on carbon** dioxide is a bad idea. **Let's examine just two of the economic reasons. First**, Conca concedes that **higher taxes are economically harmful**. His solution is to reduce taxes in other sectors of the economy. The problem is the same liberal activist

groups who want to implement carbon dioxide taxes oppose corresponding tax cuts. The Center for American Progress, for example, says carbon dioxide tax revenue should be given to the renewable energy industry rather than returned to the American people. Curiously, the Center for American Progress fails to disclose that it is funded by the renewable energy industry and its founder and chairman of the board has a long and successful career as a renewable energy lobbyist. Conca must first convince his liberal activist group allies to not pilfer carbon dioxide tax revenues before he can plausibly argue that carbon dioxide tax revenues would be returned to the American people. (Good luck on that, by the way, because the Center for American Progress argues very strongly that the renewable energy industry must get to keep the tax spoils rather than government returning the tax money to the American people.) Second, **even in the unlikely event that government returned carbon** dioxide **tax revenue to the American people** on a dollar-for-dollar basis, **this would be revenue-neutral for government but not for the** American **people**. **The entire purpose of a carbon tax is to raise the price of** inexpensive **coal and** natural **gas so** high **as to become more expensive than carbon-free** wind and solar **power**. **However, if the carbon tax fulfills its goal** of raising coal and natural gas prices higher than wind and solar prices, energy providers will no longer use coal and natural gas and **energy producers will** therefore **pay little if any carbon tax. As a result, consumers will pay dramatically higher energy prices but receive little if any compensating tax cuts in return. American families' net disposable income will drop, which will reduce spending and destroy jobs in all other sectors of the economy.** The only beneficiary of this energy-policy Ponzi scheme will be the renewable energy industry. This explains why the renewable energy industry-funded Center for American Progress supports the Ponzi scheme so much.

No credible economists claim that reducing American households' disposable income will grow the economy and create jobs. Yet taxing carbon dioxide sufficiently to reduce carbon dioxide emissions **will by purpose and design dramatically raise energy costs in a manner that will substantially reduce American household income** while generating few corresponding tax rebates. Economically, **all that will be accomplished will be poorer American families, economy-wide economic contraction, jobs destroyed in virtually every American industry, and a Solyndra-style transfer of wealth from hard-working American consumers to** incompetent, **uncompetitive**, politically connected renewable **energy companies.**

Here is further con **evidence** on the harms of high energy prices:

(Robert P. Murphy, Senior Economist with IER specializing in climate change- research focuses on the estimation of the "social cost of carbon," including the proper discount rate to be used in cost-benefit analyses and the implications of structural uncertainty for policy solutions - Ph.D. in economics from New York University, Institute for Energy Research, "Carbon Taxes: Reducing Economic Growth—Achieving No Environmental Improvement", http://instituteforenergyresearch.org/wp-content/uploads/2009/03/Carbon_Taxes_Primer.pdf, 2015)

Energy is the lifeblood of the economy. Policies that increase the price of energy harm the economy. However, **the entire point of** policies like **carbon taxes** and cap and trade **is to increase energy prices**. **These cost increases make the economy less efficient domestically and** it makes **the U**nited **S**tates **less economically competitive internationally.** Higher energy prices harms America's ability to grow its economy at home and **it means more American jobs will be shipped overseas**. Now is not the time to implement an economically harmful plan like carbon taxes or cap and trade. Americans need an efficient economy to reverse the recession and improve the lives of American workers. Carbon taxes and cap and trade will just make it more difficult to reverse the recession.

There is also another piece to this story. Because we live in a globalized economy, businesses that engage in international trade strive to keep their prices as low as possible (while still turning a profit) in order to ensure they can compete with goods made in countries where production costs are lower. Since the United States has more regulations (safety, environmental, worker protections, etc.) than many developing nations, American exporters face a challenge when keeping prices competitive.

So, the con might argue, increasing the price of energy is likely to hurt US consumers and businesses alike, by raising the price of everything and harming international competitiveness. Here is **evidence**:

> *(Christopher Prandoni, Federal Affairs Manager Americans for Tax Reform, US News & World Report Debate Club, "A carbon taxes makes the Democrats overspending problem worse"; http://www.usnews.com/debate-club/is-a-carbon-tax-a-good-idea/a-carbon-tax-make-the-democrats-overspending-problem-worse, 12/7/2012)*
>
> Knowing this, Republican Sen. David Vitter of Louisiana and Republican Rep. Mike Pompeo of Kansas just introduced a resolution opposing a carbon tax. **Highlighting the undeniable damage a carbon tax would have on the American economy**, **Vitter and Pompeo write**: **Energy costs affect the price of every product. Because a carbon tax would jeopardize the affordability of** the most widely used and available **energy** sources, **the result would be a ripple** effect **across the economy that would increase the cost of** consumer **goods for all Americans while** simultaneously **decreasing the competitiveness of America's global exports.**

More **evidence** on how carbon taxes may decrease international competitiveness, once again returning to Australia as an empirical example:

> *(Dr. Alex Robson, Professor of accounting, finance, & economics at Griffith University in Brisbane, Australia, "Australia's Carbon Tax: An Economic Evaluation," http://instituteforenergyresearch.org/wp-content/uploads/2013/09/IER_AustraliaCarbonTaxStudy.pdf, September 2013)*
>
> **The main way in which business profits are** likely to be directly **affected under the carbon tax is** via **increases in energy input costs**. As Figure 5.3 shows, the manufacturing sector in Australia is the main user of electricity, followed by mining. **The adverse effects** of the

carbon tax **are** therefore **most** likely to be **directly experienced by** electricity-intensive **manufacturing** activities (such as refining, cement, aluminium, iron and steel production) as well as certain types of energy-intensive mining activities (particularly coal mining, but also oil and gas mining). Survey evidence suggests that many Australian businesses have been unable to pass on **energy cost increases**, which, **according to the Australian Industry Group** (AIG), have **averaged 14.5 per cent for businesses as a result of the carbon tax. The AIG** has **also published** the results of two **business surveys demonstrating how the carbon tax** has **affected input costs and profits**.34 The survey found that of the three quarters of businesses that were able to estimate how much of their increased costs they were able to pass on to their customers, 70 per cent said they had not been able to pass on any energy cost increases. In other words, in these instances the economic incidence of the carbon tax fell on producers. The most likely reason for the lack of pass-through of the carbon tax for these **firms** is that they are either **producing goods for export or** are **competing** directly **against goods imported from overseas**, and so **face a fixed world price** for their output. **In such cases the carbon tax is likely to lead to** carbon **leakage rather than a reduction in global emissions**. Figure 5.4 provides a diagrammatic analysis of carbon leakage in a domestic import-competing industry. In the diagram, output and emissions are assumed to be produced in constant proportions, and domestic firms produce in an industry in which there is a fixed world price of PW. At this price, domestic output and emissions are equal to E0 . Imports are initially E0 – E0 . Now suppose that Australia introduces a carbon tax. Since domestic producers are price takers on the world market, they cannot pass on any of the tax and so bear the entire economic incidence, receiving for each unit of output. **Domestic firms whose costs exceed [import prices]** this threshold **are rendered unprofitable and are forced to exit the market**. Australia's domestic output and emissions now fall to E1 . There is carbon leakage of E0 – E1 as the rest of the world produces more output and emissions. Global emissions do not change, but Australia's imports now increase to E0 – E1 . **Since there is no change in global emissions, there is no economic or environmental benefit and the tax is simply a tax on import competing firms.** There is a welfare loss equal to the shaded triangle in the diagram, with the incidence of the loss falling entirely on domestic producers. The AIG survey evidence summarised above suggests that the situation described in Figure 5.4 is likely to be quite common. As discussed in section 3.5.2 above, under the carbon tax's "Jobs and Competitiveness Program", certain emissions intensive trade exposed firms are issued with a declining amount of free permits. The Australian Government has argued that the "effective" carbon price for firms in emissions intensive trade exposed industries is only $1.30, which is the permit price multiplied by the share of permits that these firms receive for free. If true, this would mean that firms have little incentive to reduce emissions. However, this ignores the fact that firms make decisions and respond to incentives at the margin. Consider the following simple example of a profit maximising firm whose output varies directly with its emissions, so that its output (Y) is equal to its emissions (E). The firm faces an output price of P and its cost function is C(E).

The pro might refute the use of Australian data by reading this **evidence**, which says that price increases were mainly driven by other factors, but mistakenly blamed on the high-profile carbon tax:

(Australian Industry Group, "Ai Group Survey: business pricing responses to Australia's carbon tax, the first six months,"www.aigroup.com.au/portal/binary/com.epicentric.contentmanagement.servlet.ContentDeliveryServlet/LIVE_CONTENT/Publications/Reports/2013/Carbon_price_impacts_Jan_2013_REPORT_FINAL.pdf, January 2013)

These estimated increases have not been reflected in the ABS Producer Price Index (the PPI data series, see below) data on electricity prices to date, which show an increase of only 6.7 per cent between the June and September quarters of 2012, when carbon pricing was introduced. However the PPI **data does highlight the role of pressures beyond carbon**, with electricity prices for manufacturers increasing by a total of 17.2 per cent over the year to the end of September and by 28.8 per cent since September 2010. It appears likely that **the high profile of the carbon tax may have overshadowed other important cost drivers in electricity pricing**. **Both business and household**s will have seen an increase in generation costs of around 20 per cent, but final **bills** also **incorporate substantial costs for maintaining electricity networks (poles and wires), along with state-based retail** and green scheme **charges**. **Network costs are rising significantly in most regions**, but particularly NSW and Queensland. The Independent Pricing and Regulatory Tribunal (**IPART) increased** regulated **electricity prices** for NSW households **by 18 per cent** on average **from 1 July 2012, with 8.9 percentage points of this increase due to carbon pricing and** most of **the rest due to network costs** (see figure 1). Similar factors also affect electricity pricing for businesses, although for larger users energy costs are a bigger part of the bill than network charges.

The pro could also read this **evidence**, which argues that price increases from a carbon tax would likely be too small for average American households to be bothered by them:

> *(Roger Pielke, Prof Environmental Studies @ Univ Colorado, "Putting a price on carbon: An emissions cap or a tax?", Yale 360, http://e360.yale.edu/feature/putting_a_price_on_carbon_an_emissions_cap_or_a_tax/2148, 5/7/2009)*
>
> **Putting a price on carbon**, however, **makes good sense. A** straight **carbon tax** — at whatever level would be politically acceptable — is a far better place to start than with a fully gamed cap-and-trade system. The point of such a tax **would** not be to change behavior, but to start the process of pricing carbon directly and to **raise** some **significant revenue for clean-energy investments.** Some **experts suggest that** $5-per-barrel oil **tax would not be noticed by consumers but would raise $500 billion over five years to fund investments in a new green economy**. With progress in de-carbonizing the economy, a steadily rising carbon tax should be politically possible, **thereby creating a virtuous circle where the price of carbon rises with — and reinforces — progress** made **in increasing energy efficiency and expanding the role of carbon-neutral energy** sources. With Exxon Mobil supporting a low carbon tax, I reject the contention by some who argue that a carbon tax is politically impossible.

Here is another possible pro response—the United States is actually falling behind in international competitiveness in the status quo precisely *because* of our lack of a carbon tax. This **evidence** indicates that competitor nations are adopting carbon taxes, which will put pressure on America to do the same. This card also suggests that the U.S. could become more attractive to businesses if they used the profits from a carbon tax to decrease other taxes, a proposal we'll discuss more in a later section:

> *(Raymond Kopp, Senior Fellow & Co-Dir Resources for the Future Center for Energy & Climate Economics, "How US gridlock may handicap climate leadership", Resources for the Future Blog, http://www.rff.org/blog/2014/how-us-gridlock-may-handicap-climate-leadership#sthash.lzPs6sui.dpuf, 9/18/2014)*
>
> **Contrast the current US reluctance to embrace carbon pricing with** that of **its** major **economic rivals. The E**uropean **U**nion **integrated carbon pricing** into its climate policy **in 2005** and the program now serves to regulate half of all EU carbon emissions. **China has** five regional **carbon pricing markets** up and running to serve as pilot tests for a future, country-wide system. **The environmental efficacy and economic efficiency of carbon pricing are not lost on these** major US **competitors**. It may very well be the case that **efforts to maintain international economic competiveness** with these heavyweights **will force the U**nited **S**tates **to re-consider** its approach. If and when that time comes, the policy is ready and waiting. Termed **a "revenue-neutral" carbon tax**, the policy prices carbon by simply placing a tax on the carbon content of fossil fuels. Unlike cap and trade, a carbon tax eliminates the need to allocate allowances, establish and police allowance markets, and operate allowance auctions. Moreover, and perhaps most important, **the revenues from the tax can be used** dollar-for-dollar **to draw down existing US taxes that slow economic growth—capital and labor taxes topping this list.**

Effects on Low-Income Households

Another way for the con to deploy arguments about rising energy costs is to focus on low-income Americans. Carbon taxes are often described as "regressive," which means they impose a larger tax burden on low-income households than wealthier ones.

To explain why this is true, let's consider an example. Imagine a carbon tax increases energy costs such that, instead of spending my annual average of $1,200 per year on powering my home, I now pay $2,000 per year. If my annual salary is $80,000, that $800 price bump eats up just 1% of my yearly income. However, if my salary is $15,000, then that same $800 costs me more than 5% of my total annual income.

The reason why carbon taxes could disproportionately harm poorer citizens, therefore, is because they eat up a larger share of total income. If I make a relatively large amount of money, the increased costs may take away from my budget for vacations or other luxuries; if I am already stretching every dollar to make ends meet, those same costs might devastate my household budget.

Here is **evidence** on this:

> *(Donald Marron - director of economic policy initiatives and Institute fellow at the Urban Institute, Eric Toder - co-director of the Urban-Brookings Tax Policy Center and Institute fellow at the Urban Institute & Lydia Austin-research assistant at the Urban-Brookings Tax Policy Center, TAX POLICY CENTER - URBAN INSTITUTE & BROOKINGS INSTITUTION, "TAXING CARBON: WHAT, WHY, AND HOW", http://www.taxpolicycenter.org/uploadedpdf/2000274-taxing-carbon-what-why-and-how.pdf, 2015)*
>
> Investment income is concentrated in upper-income groups, and **lower-income households spend a relatively larger share of their total consumption on carbon intensive products like gasoline, home heating oil, and electricity. For**

those reasons, a carbon tax is regressive: it imposes a relatively larger burden as a share of income on lower-income households than on higher-income ones. A $20 carbon tax in 2015 (a bit smaller than the tax CBO considers) **would be a hit of 0.8 percent of pre-tax income for households in the** lowest quintile (**bottom fifth) of the income distribution** (figure 2, table 4).40 Households in the middle quintile would face a hit of 0.7 percent of pre-tax income, **while households in the top 1 percent would face a hit of only 0.3 percent.**

More con **evidence**, expanding the analysis to provide several new warrants:

(Oren Cass, Senior fellow @ Manhattan Institute, National Affairs, "The carbon-tax shell game," http://www.nationalaffairs.com/publications/detail/the-carbon-tax-shell-game, Summer 2015)

The primary fiscal problem with a carbon tax is its uneven burden. Its regressivity with respect to income **is well known.** As with any consumption tax, **it** both **falls more heavily** than an income tax **on lower-income households** (who consume a higher proportion of their income) **and lacks a means to impose the progressive structure that an income tax can offer.** Even as compared to other consumption taxes, though, a carbon tax is particularly regressive because **energy consumption increases less quickly with income than other forms of consumption**. **A** 2012 **report** by scholars at the American Enterprise Institute and the Brookings Institution, for instance, **found** a **carbon-tax burden as a share of income to be more than five times higher on the lowest income decile than on the highest, the equivalent of proposing a new income tax with a rate of 10% for the poorest Americans but only 2% for the richest.** Even as a share of consumption (and thus relative to other consumption taxes), the burden was nearly two times higher on the lowest decile than on the highest.

A carbon tax is also regressive along dimensions besides income, benefiting those already thriving in the current economy at the expense of those facing the greatest struggles. For instance, while the regional distortion is far less dramatic than the income distortion, **a tax would fall disproportionately on the South, Midwest, and Appalachia as compared to the Northeast, Northwest, and California.** At least as important, within any given region **such a tax would be biased substantially in favor of cities at the expense of suburban and rural communities. Urban living and working spaces are smaller, requiring less heating and lighting. They are closer together, requiring less travel. Travel that does occur is more likely to occur via public transit.**

Finally, the tax favors knowledge-based work at the expense of heavy industry. The fossil-fuel sector and those manufacturing industries that rely on low-cost energy, which have been responsible for so much recent **economic growth, would bear the brunt of the burden. Generally speaking, labor-intensive energy sources would lose out to capital-intensive ones. Social media start-ups would win; agricultural workers would lose.**

On each of these dimensions, **the regressivity as measured by tax dollars paid also understates the full effect,** which by design includes a reduction in energy consumed. While less frequently subjected to formal analysis**, one might presume it is the struggling family rather than the wealthy one that is likely to turn the thermostat down in response to rising energy**

prices. One might also presume it is a drive to visit the grandparents in Dayton that is more likely to be forgone than a private flight to Davos. Free-market analyses rarely account for these costs because the price system and a reliance on expressed preferences are regarded as the best mechanism for allocating scarce goods. But here **the scarcity is artificially imposed by government, in pursuit of objectives** its proponents **concede it will not achieve.** Under those conditions, **shrugging off the fact that the poor are the "least-cost avoiders" and thus should be the ones to cut back on energy use is** a **morally questionable** proposition — doubly so if that logic is not extended on the international stage to impositions on developing countries.

The pro can answer regressivity arguments by defending that carbon tax money could be returned to low-income households to offset increased energy costs, which we will discuss at length in this next section.

Further, the pro might argue that regressivity arguments are non-unique, because all feasible emissions-reduction programs are regressive. Therefore, the only alternative would be inaction (and, according to the pro, environmental disaster). Here's **evidence**:

(Jerry Taylor, president of the Niskanen Center, "The Conservative Case for a Carbon Tax", http://niskanencenter.org/wp-content/uploads/2015/03/The-Conservative-Case-for-a-Carbon-Tax1.pdf, 2015)

Some conservatives **have argued** against **carbon taxes** because they will impact the poor more than the rich and **are** thus highly **regressive**. While possibly true (if overstated78), **this will depend on policy design**.79 Some of the **revenues from a carbon tax could be used to compensate the poorest households for income losses associated with the tax**, blunting the damage.80 **Regardless, this complaint ignores the fact that command-and-control regulation—the main** political **alternative to carbon taxes—is also** highly **regressive**.

The pro might also contend that environmental protections offer inherent social justice benefits that uniquely improve life for the poor. Here is **evidence** explaining that argument:

> *(Yoram Bauman, Ph.D. in economics - Univ. of Washington, "Carbon Taxes Are Even Better than You Think (Part III: Social Justice)", http://carbonwa.org/carbon-taxes-are-even-better-than-you-think-part-iii-social-justice/, March 29 2015)*
>
> **There are three ways that climate policy affects social justice.** The **first**, not surprisingly, is as *climate policy*: everyone seems to agree that global **warming will hit the poor harder than the rich, so there is a social justice benefit to reducing carbon emissions. A carbon tax is a great way to do this**, as described in my previous posts: "Carbon taxes are better than you think (Part I: Transportation)" and "Carbon taxes are even better than you think (Part II: Electricity)".
>
> **By reducing fossil fuel consumption, a carbon tax will also provide *co-benefits* by reducing emissions of** local **air pollutants** like particulate matter and sulfur dioxide; **these** co-benefits **will be especially valuable for the low-income communities and communities of color who are disproportionately affected by local air pollution hot spots. These co-benefits are the second way that climate policy affects social justice.**
>
> **The third way that climate policy affects social justice is as *fiscal policy*. This is** especially easy to see **in** the case of Carbon Washington's carbon tax swap, **a revenue-neutral approach that uses carbon tax revenues to reduce the state sales tax**, fund the Working Families Rebate, and effectively eliminate the B&O business tax for manufacturing.

How the pro might tailor their cases to avoid harming low-income households also involves questions regarding how the government might use the money collected from the tax. We will begin that discussion now.

Revenue Recycling

We can't get a full picture of the economic impact of a carbon tax without considering how the tax might impact government revenues (through taxes) and budgeting, and where those revenues might be spent.

As hinted at above, one popular pro strategy will be to counter con arguments about economic harm by positing that revenue generated by the carbon tax (that is, the money the government receives when people pay the tax)

could be used to offset potential problems. They might propose that the money be used to balance the federal budget, to fund clean energy development and other green initiatives, or returned to the pockets of average Americans. This type of policy is generally referred to as a "revenue-neutral" tax, or alternatively as "recycling" the revenues.

Here is a general piece of evidence advocating a revenue-neutral system, which concludes that adoption would actually *increase* America's overall economic performance:

> *(Mark Muro, Dir Policy Metropolitan Policy Program @ Brookings, "Carbon tax revenue could fund clean energy innovation"; http://www.usnews.com/debate-club/is-a-carbon-tax-a-good-idea/carbon-tax-revenue-could-fund-clean-energy-innovation, 12/9/2012)*
>
> Just think of it: **With this approach the U**nited **S**tates could secure a major "win-win-win" solution by which the nation **would surge forward to** fashion **a serious climate** change **response, stabilize the budget, and spur growth.** At last **we would have located a dedicated revenue source for needed clean energy R&D and deployment programs**, now likely to be cut. **Likewise**, **Congress would gain** needed new **revenue that it could apply to** serious **debt reduction or tax reductions**. And **as models** of such schemes **at Brookings and MIT show, such a package would actually improve overall economic performance beyond what it would be without a carbon tax.**

According to this next piece of **evidence**, a carbon tax would generate substantial amounts of money, which could be used for a variety of purposes:

> *(Congressional Budget Report, "EFFECTS OF A CARBON TAX ON THE ECONOMY AND THE ENVIRONMENT" report was prepared at the request of the Ranking Member of the House Committee on Energy and Commerce. The analysis was prepared by Terry Dinan of CBO's Microeconomic Studies Division with guidance from Joseph Kile. Bruce Arnold, J'nell Blanco, Kim Cawley, Wendy Edelberg, etc. al, https://www.cbo.gov/sites/default/files/cbofiles/attachments/44223_Carbon_0.pdf, may 2013)*
>
> **Lawmakers could increase federal revenues and encourage reductions in** emissions of carbon dioxide **(CO2) by establishing a carbon tax**, which would either tax those emissions directly or tax fuels that release CO2 when they are burned (fossil fuels, such as coal, oil, and natural gas). Emissions of CO 2 and other greenhouse gases accumulate in the atmosphere and contribute to climate change—a long-term and potentially very costly global problem. The effects of a carbon tax on the U.S. economy would depend on how the revenues from the tax were used. Options include using the revenues to reduce budget deficits, to decrease existing marginal tax rates (the rates on an additional dollar of income), or to offset the costs that a carbon tax would impose on certain groups of people. This study examines how a carbon tax, combined with

those alternative uses of the revenues, might affect the economy and the environment. Neither the Congressional Budget Office (CBO) nor the staff of the Joint Committee on Taxation has published an estimate of how much revenue a carbon tax might produce. However, **CBO** has extensively analyzed policies, known as cap-and-trade programs, that would similarly set a price on CO2 emissions. Those **analyses suggest that a carbon tax** that covered the bulk of CO2 emissions or the carbon content of most fossil fuel consumed **in the U**nited **S**tates **could generate** a substantial amount of revenue. For example, in 2011, CBO estimated that a cap-and-trade program that would have set a price of $20 in 2012 to emit a ton of CO2 (and increased that price by 5.6 percent each year thereafter) would raise a total of nearly **$1.2 trillion during its first decade.** In addition, total U.S. emissions of CO2 would be about 8 percent.

For the con side of the debate, this **evidence** disputes the idea that policymakers can ever design a system well enough to truly eliminate the negative consequences of a carbon tax:

(Robert P. Murphy, Senior Economist with IER specializing in climate change- research focuses on the estimation of the "social cost of carbon," including the proper discount rate to be used in cost-benefit analyses and the implications of structural uncertainty for policy solutions - Ph.D. in economics from New York University, Institute for Energy Research, "Carbon Taxes: Reducing Economic Growth—Achieving No Environmental Improvement", http://instituteforenergyresearch.org/wp-content/uploads/2009/03/Carbon_Taxes_Primer.pdf, 2015)

It is impossible to create an optimal carbon tax. A carbon tax would need to be set at an optimal level that accounts for the economy and climate science. This is an impossible task**. One of the greatest insights of the 20th century was that economically efficient central planning is not possible.** Friedrich Hayek and others demonstrated that central **planners cannot aggregate all of the information necessary to make economically efficient choices.**10 Their insight remains true today. A planner (or **Congress) cannot create an optimal tax because** he or **she does not have all** of the **necessary information.** With global warming, **the lack of perfect information is further compounded by partisan politics and uncertain climate science. This makes it impossible to determine an optimal carbon tax.**

This **evidence** argues that carbon tax proponents use misleading tactics to support their favored policy. In particular, it accuses them of relying on contradictory math to purport that the tax can both significantly reduce emissions and avoid economic harms:

(Oren Cass, Senior fellow @ Manhattan Institute, National Affairs, "The carbon-tax shell game," http://www.nationalaffairs.com/publications/detail/the-carbon-tax-shell-game, Summer 2015)

Simply put**, the carbon tax is a shell game. The range of designs, prices, rationales, and claimed benefits varies so widely** – even within many individual arguments for the tax – **that assessing the actual validity of most** discrete **proposals becomes** nearly **impossible**. **The insubstantial effect on emissions gets obscured by discussions of the**

fiscal benefits. The negative fiscal effects get offset by claims of environmental efficacy. The tax's simplicity and practicality are touted, even as **new complexity is introduced to address each flaw. The same revenues are rhetorically spent to achieve multiple ends,** even as the different promises made to each constituency would be rejected by the others. If we grabbed the wrists of carbon-tax advocates and demanded they turn over the shells all at once, we would find there was never a marble to begin with. ***Implementing a US Carbon Tax*, a book released** on Earth Day by the American Enterprise Institute, the Brookings Institution, the International Monetary Fund, and Resources for the Future, **provides a** particularly **transparent example**. **Chapter 4,** "Carbon Taxes to Achieve Emissions Targets," studies carbon taxes that would cut U.S. emissions in half by 2050 and **finds an average price of $35 per ton of** carbon dioxide (**CO2) in 2020, rising to $163 in the final year**. **Chapter 5**, "Macroeconomic Effects of Carbon Taxes," **studies the impact** of carbon taxes **on the economy but reviews taxes with a**n average **starting value below $20 per ton** of CO2 **and a 2050 value averaging less than $90 per ton**. A "carbon tax" helps the environment, and a "carbon tax" has manageable economic effects — but **the two are not at all the same tax.**

We'll now take some time to go over a few of the more popular specific proposals for revenue recycling.

National Debt

One option would be to use money gained through carbon taxation to pay off America's national debt. Here is **evidence** on how that might work:

(Donald Marron - director of economic policy initiatives and Institute fellow at the Urban Institute, Eric Toder - co-director of the Urban-Brookings Tax Policy Center and Institute fellow at the Urban Institute & Lydia Austin-research assistant at the Urban-Brookings Tax Policy Center, TAX POLICY CENTER - URBAN INSTITUTE & BROOKINGS INSTITUTION, "TAXING CARBON: WHAT, WHY, AND HOW", http://www.taxpolicycenter.org/uploadedpdf/2000274-taxing-carbon-what-why-and-how.pdf, 2015)

Another potential **use of carbon tax receipts is lowering the budget deficit.** Despite recent improvements, **the federal budget outlook appears unsustainable** under current tax and spending policies **as population aging and rising health care costs drive up** retirement and health **spending**.33 **The result will be** rising deficits and **debt that** crowd out private investment and **reduce economic growth unless policymakers** choose to reduce spending on public services, such as defense, infrastructure, scientific research, and other appropriated programs, reduce the growth of spending on Social Security, Medicare, and Medicaid, or **raise revenues. Reducing** the growth of **spending is** likely part of the solution, but it may **not** be **sufficient** unless the public is willing to accept much lower income-replacement rates and reduced medical benefits for future retirees. On the revenue side, **a carbon tax is a promising option** given its other benefits.

The **evidence** below says total deficit reduction could reach $815 billion over the tax's first 20 years:

> *(Adele C. Morris, The Brookings Institution, "15 Ways to Rethink the Federal Budget: Proposal 11: The Many Benefits of a Carbon Tax", http://www.brookings.edu/~/media/Research/Files/Papers/2013/02/thp-budget-papers/THP_15WaysRethinkFedDeficit_F2.pdf?la=en, 2015)*
>
> The proposed **carbon tax would raise** about **$88 billion in the first year and** rise to almost $200 billion two decades later (figure 11-1), for an undiscounted total of **$1.1 trillion in the first decade and $2.7 trillion** in revenue **over twenty years**, according to McKibbin and colleagues (2012).10 Adding in the proposed subsidy reduction of $6 billion per year, **this proposal would provide** almost $200 billion in deficit reduction in the first ten years and **$815 billion in deficit reduction** over the first twenty years. In the very long run, emissions will decline enough to reduce annual revenue, so eventually other sources of revenue or spending reductions would be necessary to replace revenue from the carbon tax.

On the other hand, this next piece of con **evidence** argues that the economic impact of carbon taxes is likely to be particularly severe if the government uses the revenue to pay off debts, rather than returning it into the American economy:

> *(Ian Parry- Principal Environmental Fiscal Policy Expert in the IMF's Fiscal Affairs Department, specializing in fiscal analysis of climate change & environment, Adele Morris- senior fellow and the policy director for the Climate and Energy Economics Project at the Brookings Institution , Roberton C. Williams III- prof of agricultural & research economics at the University of Maryland, "Implementing a US Carbon Tax: Challenges and Debates," IMF, Routledge, Feb 11 2015)*
>
> **Given the current state of the US economy**—no longer in recession, but only slowly recovering- **short-term macroeconomic effects are a particular area of interest.** However, **there is relatively little research on how a carbon tax affects unemployment or** short-term economic **growth**. Most models of environmental taxation are full-employment models: models that assume anyone who wants to work (at prevailing wages) can find a job. Such models work well for analyzing the effects pf taxes over the longer run, as business cycles tend to even out over the longer ter. But they are incapable of looking at unemployment, or of realistically modeling effects on short-term growth. Moreover, within the small set of environmental tax models that do model unemployment, nearly all of those models focus on unemployment caused by rigid labor market rules, overly generous union contracts, and similar factors—a type of unemployment that is important in Europe, but far less relevant in the United States**. In the United States, the** relevant **issue is cyclical unemployment**: unemployment **caused by downturns in the business cycle**. And we are unaware of any completed research studies on how carbon taxes (or any other environmental taxes) affect cyclical unemployment. However, **we can draw some tentative conclusions from the broader macroeconomic literature. Research suggests that tax increases** (or cuts in government spending or transfers) **during an economic slump tend to increase** short-run **unemployment and reduce the rate of economic growth. And recent research suggests that those effects are larger than previously thought. This suggests** some **need for caution** in the near term, **particularly if the carbon tax revenue is used for deficit reduction** (rather than funding increased government spending or cuts in other taxes, either of which would tend to stimulate the economy and thus offset the contractionary effect of the carbon tax itself).

Green Energy Subsidies

Another option pros might endorse for revenue recycling would be to use the money to further subsidize the development of clean energy and other green technological innovations. Here is some **evidence** on this:

(Gilbert E. Metcalf- Professor of Economics @ Tufts University & Research Associate @ National Bureau of Economic Research and David Weisbach- Professor @ The University of Chicago Law School, "THE DESIGN OF A CARBON TAX" http://www.ourenergypolicy.org/wp-content/uploads/2013/07/Design-of-carbon-tax.pdf, 2009)

There are a number of options for initial **enactment of a carbon tax**, including a slow ramp-up of the tax, grandfathering existing emissions, and immediate uniform adoption (a "cold-turkey" approach). A slow ramp-up would gradually introduce the tax over time, perhaps by starting with a low initial rate or a narrow initial base and then increasing the rate or base at a pre-announced schedule to reach the desired system. Grandfathering would exempt from taxation a baseline level of emissions, such as an amount equal to emissions in a reference year. A cold-turkey approach would simply introduce the tax without any special provision for transition While cold-turkey introduction is likely the least politically feasible approach, it **is our preferred option** for two reasons. First, **an immediate, uniform tax imposition maximizes** what one might call **the "anticipation effect." If businesses understand today that the** eventual carbon **tax will be imposed** without special relief for existing investments, **they will start adjusting their behavior now, anticipating the future effects of the tax. For example, a utility constructing a power plant now is more likely to use gas instead of coal if** it is clear that **the plant's future emissions will be** fully **exposed to** a future **tax** on carbon (gas being much less carbon-intensive than coal). One can, in effect, think of cold-turkey as pushing some of the effects of the policy earlier in time, which in this case is a good thing. An argument against this sort of anticipation effect is that individuals act, or should be allowed to act, without trying to guess future government policy they should be allowed to rely on current law. The government, by passing current law, has effectively told people what their compliance obligations are, and it is unfair to change those obligations midstream. This argument, however, is circular. Individuals or industries only know they can rely on unchanging rules (or grandfathering, if the rules do change) if there is some external reason why that should be the case. For example, the Fifth Amendment to the Constitution allows property owners to rely on their rights to prevent government takings. **Taxes**, however, **change all the time and there is no fairness reason why people should be able to rely on them not changing.** This is particularly true with respect to a carbon tax, as carbon pricing policies have been widely discussed for a long time. Our second reason for preferring a cold-turkey approach is that the **revenues raised by a carbon tax are likely to be significant in the range of $100 billion per year** 79 and those revenues can likely be spent in better ways than grandfathering carbon emissions. For example, the taxes could be used to reduce the income or payroll taxes. Alternatively, **shifting to a low-carbon economy may require significant changes in infrastructure, and some of the tax revenues could be used to pay for those changes.** As implied in our discussion of the use of revenues, it is hard to imagine that there are not better ways to spend the money than giving it to industries that currently emit carbon. Grandfathering the energy sector also has been shown to have perverse distributional consequences. The value of grandfathered permits accrues to owners of capital, thereby exacerbating the undesirable distributional consequences of carbon pricing

The con, however, might counter that subsidies for the renewables industry would prop up inefficient businesses and, as a result, lead to energy shortages. This **evidence** makes that argument, and uses experiences in Europe as an example:

> *(Rob Jeffrey, managing director and senior economist of Econometrix, "Carbon tax to hurt growth, socio-political stability and exacerbate unemployment," http://www.iol.co.za/business/opinion/carbon-tax-to-hurt-growth-socio-political-stability-and-exacerbate-unemployment-1845755 , April 16 2015)*
>
> **The argument that the tax will be neutral** because this money will be funnelled back to develop the green economy **must be treated with great suspicion.** There are a number of economic arguments that strongly suggest that this will not be the case. **It amounts to a tax on existing industries and** effectively **a subsidy for new ventures** many of **which are less efficient with higher cost structures. It consequently will foster higher costs and inflation**. Bureaucracy is not the best means of fostering economic efficiency. This is the task of market forces in order to develop a more efficient and effective economy. **The experience overseas supports this argument. For example**, there are substantial question marks regarding the policy and **Germany's "Energiewende" is a well-documented case in point. Electricity prices there are the highest in Europe** because of the move to renewables **and** that the development of **the new** transmission **grid has fallen** well **behind** schedule **resulting in** localised **rolling power cuts and** has required **substantial unforeseen investment. As a result**, certain **key electricity-intensive industries are considering moving to the US. It is worth noting that Germany is in the process of building** a number of **coal-fired power stations to correct the imbalance that renewables have caused for electricity supply.**

Relief for Low-Income Households

Finally, returning to our discussion of low-income households, the pro might suggest that carbon tax revenues be used for efforts designed to provide them with financial help.

This **evidence** discusses how revenue recycling can be used to ease any economic harm inflicted on individuals or specific industries:

> *(Donald Marron - director of economic policy initiatives and Institute fellow at the Urban Institute, Eric Toder - co-director of the Urban-Brookings Tax Policy Center and Institute fellow at the Urban Institute & Lydia Austin-research assistant at the Urban-Brookings Tax Policy Center, TAX POLICY CENTER - URBAN INSTITUTE & BROOKINGS INSTITUTION, "TAXING CARBON: WHAT, WHY, AND HOW", http://www.taxpolicycenter.org/uploadedpdf/2000274-taxing-carbon-what-why-and-how.pdf, 2015)*
>
> **Congress may** also wish to **use** some of **the revenues to help individuals, industries, and communities hit particularly hard by a carbon tax.** A tax could have a severe impact on profits and employment in coal mining, which is geographically concentrated. Temporary **financial assistance to affected workers and communities could ease economic distress** as the nation transitions away from using coal to generate electricity. It could also be seen as fair compensation to individuals and firms hurt by an unanticipated policy change and might reduce political opposition to a carbon tax.

Another way the pro might do this is by suggesting that carbon tax revenues could be used to replace the need to collect a payroll tax (because payroll taxes are typically regressive). Here is **evidence**:

> *(Corbett Grainger & Charles Kolstad, Profs Economics @ UC-Santa Barbara National Bureau of Economic Research, Working paper 15329; "Who pays a price on carbon?"; http://www.nber.org/papers/w15239.pdf, August 2009)*
>
> **One candidate for revenue recycling would be to use revenues to finance cuts in the payroll tax 24 The costs of a payroll tax are regressive**, and although part of the burden is paid by the employer, most **studies find that the burden falls almost entirely on workers through reductions in wages** (Fullerton and Metcalf, 2002). **The** Federal Insurance Contributions Act (**FICA**) **tax is regressive** in its very nature **because beyond the Wage Base limit** (currently $102,000 per year), any **additional earnings are untaxed. Therefore the tax, as a percentage of income, effectively declines as income increases** beyond that level.25 According to Chamberlain and Prante, the average effective tax rate for the payroll tax in 2004 was 2.75% for the lowest income quintile, 7.11% for the second, 9.05% for the third, 9.53% for the fourth, and 7.79% for the top quintile. Targeted **revenue recycling from a carbon emissions policy could help create a more distributionally neutral payroll tax.**

Taking a slightly different approach, the pro could also endorse a rebate program to return carbon tax revenues directly into the hands of low-income households. Here is supportive **evidence**:

> *(Chad Stone, chief economist at the Center on Budget and Policy Priorities, ""Designing Rebates to Protect Low-Income Households under a Carbon Tax," http://www.rff.org/research/publications/designing-rebates-protect-low-income-households-under-carbon-tax Sep 24, 2015)*
>
> **A carbon tax is a cost-effective way to reduce** greenhouse gas **emissions**, but the resulting higher prices for home energy and gasoline as well as for food and other energy-intensive goods and services can reduce households' purchasing power. Low- and moderate-income households feel the budget squeeze most acutely; they spend a larger share of their budgets on these items than do higher-income households and are least able to afford new fuel-efficient vehicles, better home weatherization, and energy-saving appliances. Fortunately, **well-designed carbon tax legislation can generate enough revenue to fully offset the impact on** the most **vulnerable households, cushion the impact for many other households, and leave plenty to spare for other uses—without blunting the price signal that is essential** for achieving cost-effective **emissions reductions.** Providing lump-sum rebates to households is the best way to protect low-income groups. **Only a relatively small portion of carbon tax revenues is needed to fund** such **a rebate program, leaving most of the revenue available for other purposes.**

Furthermore, this **evidence** says it would cost less than 30% of carbon tax revenue to offset costs to low-income households, leaving the remaining 70% for use on other priorities:

> *(Congressional Budget Office report, "EFFECTS OF A CARBON TAX ON THE ECONOMY AND THE ENVIRONMENT" report was prepared at the request of the Ranking Member of the House Committee on Energy and Commerce. The analysis was prepared by Terry Dinan of CBO's Microeconomic Studies Division with guidance from Joseph Kile. Bruce Arnold, J'nell Blanco, Kim Cawley, Wendy Edelberg, etc. al, Douglas W. Elmendorf Director May 2013. https://www.cbo.gov/sites/default/files/cbofiles/attachments/44223_Carbon_0.pdf, 2013)*
>
> By one estimate, **offsetting the costs of a carbon tax for households in the lowest two-fifths of the income distribution would take less than 30 percent of the gross revenues from a carbon tax;** offsetting the costs for households in the lowest one-fifth of the income distribution would take roughly 12 percent.

Replace Other Taxes

Another pro option for tax reform would be to use carbon tax revenues to replace capital income taxes. This would initially benefit higher-income business owners the most, but in the long run it would support all workers by encouraging job creation, according to this **evidence**:

> *(Donald Marron - director of economic policy initiatives and Institute fellow at the Urban Institute, Eric Toder - co-director of the Urban-Brookings Tax Policy Center and Institute fellow at the Urban Institute & Lydia Austin-research assistant at the Urban-Brookings Tax Policy Center, TAX POLICY CENTER - URBAN INSTITUTE & BROOKINGS INSTITUTION, "TAXING CARBON: WHAT, WHY, AND HOW", http://www.taxpolicycenter.org/uploadedpdf/2000274-taxing-carbon-what-why-and-how.pdf, 2015)*
>
> **Reducing tax** rates **on** capital **income** (either through a reduction in tax rates on all returns to investment income or a cut in the corporate tax rate) **offsets the** efficiency **cost of carbon taxes** the most. This result reflects the relatively high burden that standard economic models assign to the cost of taxing capital income. **Lower** capital **income taxes will increase the share of income that is saved and invested** instead of consumed. **As a result, it will increase living standards in the long run by raising the amount of capital per worker, thereby raising worker productivity and wages.**

This would have the double benefit of protecting the environment and stimulating economic growth, the pro can argue. This next piece of **evidence** indicates that the benefit would be large enough to outweigh the economic costs of the carbon tax:

> *(Donald Marron - director of economic policy initiatives and Institute fellow at the Urban Institute, Eric Toder - co-director of the Urban-Brookings Tax Policy Center and Institute fellow at the Urban Institute & Lydia Austin-research assistant at the Urban-Brookings Tax Policy Center, TAX POLICY CENTER - URBAN INSTITUTE & BROOKINGS INSTITUTION, "TAXING CARBON: WHAT, WHY, AND HOW", http://www.taxpolicycenter.org/uploadedpdf/2000274-taxing-carbon-what-why-and-how.pdf, 2015)*
>
> In some of the models, **the increase in economic efficiency from using carbon tax revenues to reduce** capital **income taxes is large enough to outweigh the efficiency cost of the carbon tax.** According to these estimates, **a carbon tax/capital income swap will raise economic wellbeing without even accounting for the environmental benefits of reducing greenhouse gas emissions.** In that sense, **the tax swap can be said to result in a double dividend consisting of both net economic benefits and environmental benefits** (box 4).

Con debaters might respond by citing that data suggests that offsetting carbon taxes by reducing the income tax rate still leaves the poorest households worse off. Here's **evidence**:

> *(Donald Marron - director of economic policy initiatives and Institute fellow at the Urban Institute, Eric Toder - co-director of the Urban-Brookings Tax Policy Center and Institute fellow at the Urban Institute & Lydia Austin-research assistant at the Urban-Brookings Tax Policy Center, TAX POLICY CENTER - URBAN INSTITUTE & BROOKINGS INSTITUTION, "TAXING CARBON: WHAT, WHY, AND HOW", http://www.taxpolicycenter.org/uploadedpdf/2000274-taxing-carbon-what-why-and-how.pdf, 2015)*
>
> The net effect of a carbon tax plus recycling varies greatly among the options. **Offsetting the carbon tax with cuts in** corporate or **individual** income **tax rates leaves households in the bottom 90 percent of the income distribution worse off,** on average, **and** leaves **households in the top 5 percent** as net **win**ners. An equal per-adult refundable credit (with each child receiving half the adult amount) more than offsets the burden of a carbon tax for households in the bottom 60 percent of the distribution, but raises tax burdens on average for upper income taxpayers. **The combination of a carbon tax and a reduction in payroll tax rates leaves households in the bottom two quintiles** and the top 1 percent slightly **worse off, while** leaving the tax burdens in the middle quintile approximately unchanged and **reducing** net **tax burdens for** those in **the top two quintiles**, but below the top 1 percent.

The con could also counter with this piece of **evidence**, which argues that carbon taxes create a sort of economic double-bind: the less regressive they are, the more harm they do to the overall economy. So, any carbon tax will either disproportionately harm low-income Americans or it will deal tremendous blows to the economy as a whole:

> *(Oren Cass, Senior fellow @ Manhattan Institute, National Affairs, "The carbon-tax shell game," http://www.nationalaffairs.com/publications/detail/the-carbon-tax-shell-game, Summer 2015)*
>
> Ian Parry and Roberton Williams have summarized the challenge succinctly: "**There are stark trade-offs between cost-effectiveness and distribution in the design of market-based climate control policies.**" In other words, **the more that revenue is used to offset the tax's regressivity, the more it costs.** This effect can be seen plainly in **Williams and Wichman's survey of various proposals**, which **found that any approach other than using the revenue for** a capital tax cut **(lowering the corporate-tax rate) would reduce GDP on the order of 1%. And** recall, **these proposals all have tax rates far too low to achieve the emissions reductions considered necessary from an environmental perspective. The scenario that sets a tax rate high enough to achieve** the official domestic 80% **emission-reduction** goal **literally falls off the bottom of the chart with a net negative impact greater than 3% of GDP by 2050. Another study** by Jared Carbone and colleagues **found** a similar benefit from a corporate-tax cut and **substantially larger**

losses for other uses of the revenue (with losses up to 3.5% of GDP by the 2030s for a policy of rebating the revenue directly back to households).

But the benefits of a capital tax cut fall disproportionately to wealthier households, compounding the regressivity of the carbon tax and making it a uniquely ill-suited financing mechanism. Note that this complaint is not the typical trope that the wealthy get some large percentage of the benefit of a proposed tax cut, which is an unavoidable reality in a world where the wealthy already pay most of almost any tax that might be cut. Rather, the point is that **when raising revenue on a terribly regressive tax base such as carbon, one should not spend it on a use that is more regressive still.** To the extent that one views the source and use of revenue as linked, the argument cuts against the carbon-tax structure rather than in its favor.

Con debaters might further respond that carbon taxes should be evaluated on their own merit, and their consideration shouldn't be conflated with proposals for what the government might do with the money raised. As this **evidence** suggests, the argument is basically "the ends don't justify the means." Just because carbon taxes could fund beneficial programs doesn't make them a good source of revenue; policymakers could always raise that money in a different way:

(Oren Cass, Senior fellow @ Manhattan Institute, National Affairs, "The carbon-tax shell game," http://www.nationalaffairs.com/publications/detail/the-carbon-tax-shell-game, Summer 2015)

Properly **assessing** the fiscal **efficacy of a carbon tax requires** carefully **separating arguments about carbon as an appropriate tax base from** analytically distinct **arguments about the potential uses of revenue raised by such a tax. There are** of course **many ways of spending money that** can **look attractive – be it to reduce other taxes, pay down the deficit, or fund** useful **government services**. Indeed, **if one's goal is to raise and spend money, there are a number of taxes** that many people would gladly increase. **But an attractive use cannot by itself justify carbon as the most appropriate source of the revenue. And** without the justification of substantial environmental benefits, **a tax on carbon is plainly undesirable in a number of crucial respects.**

More **evidence**:

(Oren Cass, Senior fellow @ Manhattan Institute, National Affairs, "The carbon-tax shell game," http://www.nationalaffairs.com/publications/detail/the-carbon-tax-shell-game, Summer 2015)

Tax reform should be a critical policy **priority, but the carbon tax is not a good** example of such **reform**. Almost any reform proposal advanced with a carbon tax as its revenue source would be substantively better and more politically palatable if funded instead by the **elimination of existing**

tax expenditures, the **creation of a** more straightforward **consumption tax, or** perhaps even **an increase in** existing **income-tax rates. Each** of those **offer**s **a more reasonable distribution, a more stable tax base, and fewer market distortions — all with an equal or better claim to low economic drag. The** selling of the **carbon tax then becomes a**n almost purely **political exercise, to no great**er **effect**.

Another way for the con to answer any of these proposals is to argue that a carbon tax is unlikely to generate any tax revenue anyway, and may actually hurt the federal budget. This is based on three major rationales.

First, job loss and depressed economic growth mean people make less money. That is a potential problem, because almost half of the federal government's funds come from individual income taxes. The amount of income tax any one person must pay depends on how much money he or she makes. Those who are particularly low-income have no tax liability (the taxes withheld from their paychecks are refunded to them during tax return reason), and may actually receive a tax subsidy from the federal government. From there, the US tax system is "progressive," meaning those who make more pay a larger percentage of their total income. So, if average Americans see their salaries decrease, the government brings in less money in taxes.

The second reason cons might argue carbon taxes won't create a surplus is because any regulatory system requires people to actually manage it, and creating a new government administration (or expanding the duties of an existing one) costs money.

This piece of **evidence** speaks to both of those concerns:

> *(Rob Jeffrey, managing director and senior economist of Econometrix, "Carbon tax to hurt growth, socio-political stability and exacerbate unemployment," http://www.iol.co.za/business/opinion/carbon-tax-to-hurt-growth-socio-political-stability-and-exacerbate-unemployment-1845755 , April 16 2015)*
>
> Econometrix has calculated the economic impacts of these effects. **The carbon tax would** slow gross domestic product (GDP) growth by 0.4 percent a year, **result**ing **in a** 6.5 percent **reduction in** the size of **GDP** by 2030, or R350bn, **and a reduction of** almost **1.4 million** in the number of **jobs** available. **The number of dependents affected is** therefore estimated at almost **5 million**. This is a sizeable effect on an economy with a population estimated to be approaching 70 million by 2030. Significantly, **it will reduce** the cumulative **taxes collected** by 2030 by R750bn **due to the slower growth. It will require a large and costly bureaucracy to run this complex**, cumbersome and highly inefficient **tax. The reduction in taxes is likely to be greater than the net taxes that will be collected.**

Further **evidence** on the cost and difficulty of actually tracking emissions:

> *(National Post Canada, "Carbon tariff trade war?"; http://www.nationalpost.com/opinion/columnists/story.html?id=6dcb1379-42e1-4200-a656-cef828629182, 5/22/2014)*
>
> **Tracking carbon inputs** in any product **is an impossible task, a nightmare of measurement and calculation that would require a massive bureaucracy** at the World Carbon Trade Measurement Agency **and tie up** carbon trade **negotiators for decades, assuming no trade war intervenes to crash the world trade system.** An example is beer: Canadian beer would benefit if European beer faced a carbon tax on transport costs from Europe. But Canadian beer might use hops and other inputs that have to be transported across Canada. What kind of electricity and water sources are used in each location? Would carbon tariffs become a protectionist policy favouring Canadian beer?

The third reason cons could argue that carbon taxes are a poor source of revenue is perhaps the simplest: the whole point of the policy is to decrease usage of fossil fuels. If the policy succeeds, therefore, less carbon will be emitted, and there will be less tax. This **evidence** explains:

(Oren Cass, Senior fellow @ Manhattan Institute, National Affairs, "The carbon-tax shell game," http://www.nationalaffairs.com/publications/detail/the-carbon-tax-shell-game, Summer 2015)

When evaluated **as a source of revenue**, then, **a carbon tax is** a **highly distortionary** consumption tax **whose burden skews heavily toward the** rural, the industrial, and the **poor for the benefit of wealthy**, urban symbol manipulators. But its case is weaker still, because **even if perfectly distributed in society, carbon would be a poor choice of tax base.**

A good tax base is fairly constant, ideally **growing in proportion to government spending**. Those attached to GDP, despite the problems of cyclicality, are usually best. Tax bases like income and consumption thus make sense, though they have the drawback of creating deadweight loss by taxing a societal good. Pigovian taxes adopt less stable tax bases but have the benefit of eliminating deadweight loss rather than creating it. **To actually fund government through a Pigovian tax**, though, **one needs to tax activities that will** not only continue but **grow over time despite the tax.**

Carbon, by contrast, is a declining-by-design **tax base. Regardless of climate policies, carbon consumption has declined and will continue to decline relative to GDP as the economy's energy efficiency improves.** Implicit in the design of a carbon tax is the assumption that its use will decline in absolute terms as well. And most tax designs increase the tax rate over time with the intention of accelerating that decline. In the short to medium run, it is possible if not probable that an increasing tax rate would overwhelm declining emissions and lead to increasing rather than decreasing revenues. Indeed, in a range of proposals studied by Roberton Williams and Casey Wichman, revenue forecasts at least doubled from 2015 to 2050, typically ending in a range between $200 and $400 billion per year.

The next piece of **evidence** points out why this possibility makes it unwise to replace payroll or income taxes with a carbon tax:

(David Roberts, writer, "10 reasons a carbon tax is trickier than you think", Grist, http://grist.org/climate-energy/ten-reasons-a-carbon-tax-is-trickier-than-you-think/, 11/19/2012)

Remember, **the goal of a carbon tax is to decarbonize the economy. As carbon declines, carbon tax revenues will decline,** unless the tax is almost continuously ramped up. This wouldn't matter so much for revenue earmarked for clean energy or direct rebates. There will be less need for that revenue as the economy decarbonizes. But what **if carbon taxes have replaced payroll taxes**, which fund Social Security? As revenue declines, so will funding for Social Security. Not good. **Or** what if carbon taxes have replaced **income taxes?** As **revenue declines**, individual tax burdens will decline, **which will** delight conservatives, but should **be a source of concern for** liberals in favor of active **government**. The fact that a carbon tax is intended to phase itself out over time cannot have escaped the attention of its conservative supporters.

The con could also choose to use this piece of **evidence** to indict the models (which are systems used to predict economic outcomes of various proposals) used by the pro to claim economic benefits to carbon taxes:

> *(Donald Marron - director of economic policy initiatives and Institute fellow at the Urban Institute, Eric Toder - co-director of the Urban-Brookings Tax Policy Center and Institute fellow at the Urban Institute & Lydia Austin-research assistant at the Urban-Brookings Tax Policy Center, TAX POLICY CENTER - URBAN INSTITUTE & BROOKINGS INSTITUTION, "TAXING CARBON: WHAT, WHY, AND HOW", http://www.taxpolicycenter.org/uploadedpdf/2000274-taxing-carbon-what-why-and-how.pdf, 2015)*
>
> **The models used to reach these economic conclusions have shortcomings**. Taxes enter **the models** in simple ways that **do not reflect the full complexity of** the **tax law**. In particular, **the models** generally **do not account for different ways of taxing capital income having different effects on domestic saving and investment in an economy with international capital mobility. The models also assume perfect competition and so do not reflect the extent to which a portion of the corporate income tax is a tax on economic rents or super-normal returns** instead of a tax on the marginal return to additional equity financed investments.38 Further, it may be unrealistic to assume that policymakers would shift the burden of taxes from capital income to labor income in the presence of a carbon tax when, faced with the same potential efficiency gains from tax reform, they have not made a similar tax shift today.

Returning to the pro side, debaters can also leverage the pro's environmental arguments to create some strategic wiggle-room. Many economists fear that climate change will create a variety of national emergencies requiring difficult and expensive responses from the private sector and governments alike. These crises would severely undermine economic growth. This next piece of **evidence**, therefore, argues that the future economic benefits of reducing emissions (and thus avoiding climate catastrophes) will be large enough to outweigh any direct economic costs of implementing a carbon tax, even if revenue recycling fails to produce any independent positive outcomes.

> *(Donald Marron - director of economic policy initiatives and Institute fellow at the Urban Institute, Eric Toder - co-director of the Urban-Brookings Tax Policy Center and Institute fellow at the Urban Institute & Lydia Austin-research assistant at the Urban-Brookings Tax Policy Center, TAX POLICY CENTER - URBAN INSTITUTE & BROOKINGS INSTITUTION, "TAXING CARBON: WHAT, WHY, AND HOW", http://www.taxpolicycenter.org/uploadedpdf/2000274-taxing-carbon-what-why-and-how.pdf, 2015)*
>
> Nonetheless, **both economic reasoning and the results of simulation models suggest that the net burden of a carbon tax can be substantially reduced by using** some or all of **the revenue to reduce other taxes that distort**

economic behavior. And **even absent a double dividend, the economic benefits from reduced emissions will** almost **always exceed the** net **economic cost of** substituting **a carbon tax** for other revenue sources.

Finally, here is a piece of **evidence** for the con, which sums up many of the intertwining economic arguments against carbon taxes. It concludes that the tax would depress the economy in a number of ways, not create any meaningful tax revenue windfall, and not even succeed in combatting climate change:

(Michael Bamidele Fakoya PhD, prof of environmental economics at the University of Limpopo, "Carbon tax policy implications for economic growth and unemployment rates in South Africa: a conceptual thought ," Environmental Economics, Volume 5, Issue 3, http://businessperspectives.org/journals_free/ee/2014/EE_2014_03_Fakoya1.pdf, 2014)

On the other hand, **a carbon tax is not likely to reduce global warming judging from the experiences of other countries that have implemented a carbon tax**. The ongoing debate about how to address the fallout that may result from imposing a carbon tax to improve the South African economy and at the same time reduce carbon emissions has been considered in the literature review in this study and is unlikely to be any different in the case of South Africa. This assertion is **based on the experiences of countries that have implemented the carbon tax model** which indicates that **the net effects on** most of these **economies are negative** (Fakoya, 2013). **Specifically**, findings indicate that **revenue raised by a carbon tax has significant negative impacts that outweighed its contribution to the overall economy.** Most significantly, **a carbon tax would have a net negative effect on jobs, consumption, and investment resulting in lower national revenues from taxes on capital and labor as experienced by Australia**. As a consequence, by **factoring in lost revenue from reduced economic activity from lost jobs; reduced consumption as a result of lost jobs; low investment resulting from** the **additional** carbon **tax**; **and the relocation of businesses to other** carbon tax relaxed **countries**, **the net revenue from a carbon tax** available to finance national deficit and debt, and lower tax rates **will be** relatively **small**. **In addition, the increased costs of** coal, natural **gas** and petroleum products due to a carbon tax **will cause ripple effect in the** already slow **economy resulting in higher production costs and less spending** on energy-intensive goods. **Consequently, a carbon tax is likely to result in lower real wage rates because companies would have higher costs and lower labor productivity.** Conclusion **While a carbon tax is intended to encourage companies to invest in low carbon energy sources, the cost of alternative energy sources are often too expensive to be undertaking by individual companies**. In addition, **the increasing cost of fossil fuel is unlikely to force organizations to switch** to cleaner fuel. Moreover, **forcing businesses and households to reduce energy use, may be unrealistic** as they will be forced to seek other means to avoid a carbon tax burden. However, if the switch to more efficient and cleaner energy sources by businesses is successful, this will make the economy become less dependent on fossil fuels and, as such, prevent the economy from energy price shock effects. But the experiences of countries that have implemented a carbon tax policy suggest that the net effects on most of these economies are negative. The study anticipates that a carbon tax is likely to worsen the unemployment and economic growth rates in South Africa should the proposed carbon tax be implemented. Also, the study believes that despite the likelihood of a carbon tax to encourage investment in renewable energy sources, **the capital outlay of investing in renewable energy is** a major setback and **unlikely to produce any significant reduction in global carbon emission**. As such, the granting of carbon tax holidays to selected companies will bring about short-cuts in the operations and declarations of those excluded from such incentives. Alternatively, the study recommends that government should adopt other policy options like carbon tradeoff that allow companies in South Africa to offset the impact of carbon tax without threatening their local and international competitiveness. Another approach could be to lower the capital tax rates and increasing depreciation allowances of carbon-intensive industries to reduce overall production costs, or a general reduction of the carbon tax on such companies with

a condition to investment savings in renewable energy projects after agreeing to a holiday period. In effect, for a successful implementation of a carbon tax to be achieved by the South African government, it has to be fully aware of such issues in carbon tax policy that could threaten a host of businesses's bottom line. The study further recommends the continued increase in the development of alternative technologies at national level through aggressive financing of renewable energy technologies to facilitate a switch to cleaner energy. The study suggests further study into the actual effect of a carbon tax on unemployment and economic growth when the policy commences.

In the portions I haven't underlined, the above card also proposes a number of alternatives to a carbon tax that its authors consider superior. That brings us nicely to the final section in this paper.

Alternatives to Carbon Taxes

While some cons might choose to pursue a direct negation strategy on this topic, others might prefer to endorse an alternative method of decreasing emissions. For our final section in this topic paper, we will take a closer look at some of these options.

The most popular alternative strategy will be the implementation of a cap-and-trade system, instead of a carbon tax. If you have forgotten, you can refer to the resolutional analysis section above for a discussion of the difference between the two types of policies.

One reason the con might argue that cap-and-trade is preferable is its inclusion of the titular "cap"—it sets a firm limit on total emissions. A tax, on the other hand, doesn't necessarily enforce a maximum; it only forces businesses/consumers to pay for their emissions.

The **evidence** below indicates that the inclusion of a limit makes cap-and-trade a superior strategy for combatting climate change:

(Frances Beinecke, President Natural Resources Defense Council, Yale 360, "Putting a price on carbon: An emissions cap or a tax?", http://e360.yale.edu/feature/putting_a_price_on_carbon_an_emissions_cap_or_a_tax/2148/, 5/7/2009)

A carbon cap is a more effective approach to solving global warming than a tax. First and most importantly, it sets a clear goal for emissions reductions. **With a tax, we are guessing** about how much it will reduce carbon emissions, **and it may not be sufficient to change** the course of global **warming**. **A** declining **cap gives you firm reduction targets** and a system for measuring when you hit them.

Second, **we have on-the-ground experience in** curbing global warming pollution from **cap programs, while the tax model remains** entirely **untested**. **Caps are already being used in the E**uropean **U**nion **and in 10 Northeastern states.** They are underway in **[and] California.** Both the President and Congressional leaders are focused on cap-and-trade. Despite the bubble of pundit interest, there is very little support for a carbon tax among our nation's legislators. **Some** advocates **claim that a tax would be simpler** than a cap. **But Congress does not write simple tax bills. When it gets converted into reality, any tax legislation will be complex and vulnerable to loopholes. In** 19**93**, **the** BTU **tax was killed after industry lobbied** successfully **for** a bunch of **exemptions, and then cynically lobbied to end the whole thing because it was full of loopholes**. One clever lobbying firm went as far as sending blocks of Swiss cheese to members of Congress. In the end, the discussion about a carbon tax is a distraction, because it frames the debate in fiscal policy terms — How high should the tax be? What should be done with the revenue? — instead of focusing on how quickly we need to reduce global warming pollution. **The crisis of global warming is so urgent that we can't wait for** lawmakers, industry, and the American people to spend **years hashing out the details of an entirely new system. We have to act now to reduce emissions, and a** declining **cap is the way to do it.**

More **evidence** supporting the need for a firm "cap," which also argues that cap-and-trade would be less costly to businesses and consumers alike:

(Fred Krupp, President Environmental Defense Fund, Yale 360, "Putting a price on carbon: An emissions cap or a tax?"; http://e360.yale.edu/feature/putting_a_price_on_carbon_an_emissions_cap_or_a_tax/2148/, 5/7/2009)

From an environmental point of view, **the advantage of a**n emissions **cap over a carbon tax is clear: A cap puts a legal limit on pollution. A tax does not. Guessing what level of tax might drive the pollution cuts we need to avert runaway climate change is a risk we** simply **can't afford** to take. **Only a cap** with strong emissions reduction targets — and clear rules for meeting them — **can guarantee that we achieve the environmental goal. Cap-and-trade also has the upper hand on the economics.** When we create a market that rewards emissions reductions, we put the vast know-how, manufacturing base, and investment capital of the private sector to work. Nothing can match the immense resources that the private sector can bring to bear — and **nothing beats a cap when it comes to**

driving sustained investment in the jobs and technologies that will solve the problem. We know from the EPA that cap-and-trade will mean as little as $98 a year – **about a dime a day** – **for American households. Those costs are small**, but they are real. Fortunately, **Congress has options for ensuring that** the cap is equitable and that **consumers are treated fairly** as the country makes the long-term transition to a low-carbon economy. President **Obama has proposed putting revenue generated by the auction** of emissions allowances **back into Americans' wallets**. The U.S. Climate Action Partnership, of which the Environmental Defense Fund is a member, has a blueprint for legislation that would enable regulated energy suppliers **to offset costs for consumers.**

This **evidence** further supports the implementation of cap-and-trade over a carbon tax, because it predicts that, for political reasons, the tax rate will be set at a fairly low level. As a result, polluters will find it less costly to simply pay the tax than to upgrade, resulting in a totally toothless GHG reduction strategy:

(David Roberts, writer, "10 reasons a carbon tax is trickier than you think", Grist, http://grist.org/climate-energy/ten-reasons-a-carbon-tax-is-trickier-than-you-think/, 11/19/2012)

The great benefit of a carbon cap over a carbon tax is that a cap ensures a particular level of emissions reductions (yes, yes, depending on how carbon offsets are used). **The thing with a tax is, no one can be sure** in advance **how much it will reduce emissions. The history of environmental policy is one of overestimating costs, so** chances are good that **the initial tax level will be set conservatively. That's what typically happens** with cap-and-trade systems – **compliance costs are overestimated**, there are too many emission permits issued, permit prices plunge**, and there's little financial incentive to reduce emissions.** But a cap-and-trade program has a built-in protective measure: *the cap*. Emissions are either falling or they aren't, and if they aren't, the cap provides a statutory basis for further action. It's not perfect, but it's something. **What happens if a tax isn't reducing emissions enough? It means Congress has to raise it. How much does Congress like raising taxes? How much do American voters like it when Congress raises taxes? Now imagine raising a tax repeatedly, on an ad hoc basis.** Unless taxes take on a very different political valence in U.S. politics, that looks like a nightmare. **The carbon tax could end up limping along at hopelessly low levels for ages**, like the U.S. gasoline tax.

The pro will want to respond with comparative evidence analyzing the desirability of a carbon tax versus a cap-and-trade system, rather than generic "cap-and-trade bad" cards. The reason for this is that the similarity between the two options creates a risk of reading indicts to cap-and-trade that are equally harmful to carbon tax policies. In order to avoid impugning your own advocacy, stick to direct comparisons.

This **evidence** argues that carbon taxes are more effective at reducing emissions that cap-and-trade, because the price signals imposed by a tax are more stable:

> *(Frances Sachs, Dir Earth Instit @ Columbia Univ, Yale 360, "Putting a price on carbon: An emissions cap or a tax?", http://e360.yale.edu/feature/putting_a_price_on_carbon_an_emissions_cap_or_a_tax/2148/, 5/7/2009)*
>
> It's sometimes claimed that cap-and-trade will lead to more certain emissions reductions than a tax. In theory this could be true, but in practice it's likely to be false. In fact, **a cap-and-trade system can be** more **easily manipulated to allow additional emissions; if the permits become too pricey, regulators would** likely sell or **distribute more permits to keep the price "reasonable." Since the long-term signals from cap-and-trade are less powerful than a** multi-year **carbon tax, the behavioral changes** (e.g. choice of the type of power plant) brought about by cap-and-trade could well **turn out to be far fewer, as well.**

The pro could further dispute the efficacy of cap-and-trade using this **evidence**, which suggests that polluters will deliberately increase their emissions in the lead-up to implementation of a cap-and-trade policy in order to artificially inflate baseline measurements:

> *(Keith Kendall, Prof Law @ La Trobe Univ,"Carbon Taxes and the WTO – A Carbon Charge without Trade Concerns?", ExpressO, http://works.bepress.com/keith_kendall/4/, 2012)*
>
> **A significant advantage of a carbon tax** over an ETS, though, **is the avoidance of the perverse incentives** described earlier **generated through grandfathering permits. Since** – short of declaring a complete or partial exemption for specific actors based on prior emissions – **there is no scope under a carbon tax for adjusting burdens based on activity levels prior to the introduction of the tax, there is no incentive for polluters to increase their level of pollution leading up to the introduction of the carbon tax.**[37] The problems identified earlier with an ETS in this regard therefore do not arise under a carbon tax.

Pro debaters could also read this **evidence** to claim revenue recycling as a net benefit to choosing a carbon tax over cap-and-trade:

> *(Frances Sachs, Dir Earth Instit @ Columbia Univ, Yale 360, "Putting a price on carbon: An emissions cap or a tax?", http://e360.yale.edu/feature/putting_a_price_on_carbon_an_emissions_cap_or_a_tax/2148/, 5/7/2009)*
>
> **A** straightforward **carbon tax has vast advantages. It can be levied upstream** at a few dozen places — at the wellhead, the mine face, and the liquid natural gas depot — rather than at thousands or tens of thousands of businesses. **A** carbon **tax covers the entire economy, including automobiles, household use, and other units impossible to reach in cap-and-trade. A carbon tax puts a clear price on carbon emissions for many years ahead, while a cap-and-trade system gives a highly fluctuating spot price. A carbon tax raises a clear amount of revenue, which can be used for targeted purposes** (R&D for sustainable energy) or rebated to the public in one way or another, **while the revenues from a cap-and-trade system are likely to be bargained away well before the first trade ever takes place.**

The next piece of **evidence** can help the pro argue that carbon taxes are less economically disruptive than cap-and-trade:

> *(Joshua Meltzer, Fellow Global Economy & Development @ Brookings Institution & Prof International Studies @ John Hopkins, Energy Law Journal, 35:45, "A carbon tax as a driver of green technology innovation and the implications for international trade"; http://www.felj.org/sites/default/files/docs/elj351/14-45-Meltzer_Final%205.13.14.pdf, 2014)*
>
> More conceptually but no less important, **the problem with a cap** and trade system **is that** given the uncertainty with climate change science and the economic costs of reducing greenhouse gas (GHG) emissions, **it gets wrong the balance between** achieving **environmental goals and** minimizing **economic costs.**55 **By setting fixed** quantity **targets** for reducing GHG emissions, **a cap and trade system fails to reflect the uncertainty** of climate science **as to what reductions** in GHG reductions **are necessary while not effectively addressing uncertainty as to the economic costs** of reducing GHG emissions—**which could be small or large, depending** ultimately **on unknown factors such as the rate of economic growth and the speed and cost of developing new clean energy technologies,** such as for renewable energy and carbon capture and storage (CCS).56 **In contrast, a carbon tax** fixes the economic cost which **can be changed if the original tax rate does not lead to the right level of CO2 mitigation**.57

Finally, the pro might choose to permute the con's counter-proposal, using this **evidence** to support enacting both types of policies simultaneously:

> *(David Suzuki, award-winning scientist, winner of the United Nations Environment Program Medal, & Professor Emeritus at Univ. of British Columbia, "Carbon tax or cap-and-trade?", http://www.davidsuzuki.org/about/, 2008)*
>
> There is much discussion about **whether a carbon tax or a cap-and-trade system is** the **best** way to put a price on greenhouse gas pollution. The simple answer is that it **depends on how each system is designed.** The design will determine the environmental and economic effectiveness. For example, **how strong is the economic incentive** (i.e., the carbon price) **to reduce emissions** and switch to cleaner energy? To which emission sectors does the system apply? **And how are the revenues used**? Are they invested in green infrastructure or corresponding tax breaks? **If both approaches are well-designed, the two options** are quite similar and **could** even **be used in tandem**...What's important is that the price on carbon pollution provides an incentive for everyone, from industry to households, to be part of the solution. **Ultimately, the critical factor** in reducing heat-trapping emissions **is the strength of the economic signal. A stronger carbon price will** kick-start more growth in clean, renewable energy and will **encourage adoption of greener practices.**

Although cap-and-trade will certainly be the most popular counter-proposal, there are a few other options cons can experiment with.

We won't be covering these in detail, but those of you who are interested may want to look into literature on ending fossil fuel subsidies, increasing green energy subsidies, providing R&D investment for carbon capture technologies, adding new government regulations on energy production, or strengthening energy efficiency standards for buildings, vehicles, and consumer products.

That brings us to the end of this introduction.

Although our topic guide is finished, you should continue your own research independently. This resolution concerns subjects of tremendous interest to scientists, economists, and policymakers worldwide. We're simply

not able to cover everything here. Dedicated debaters, though, will achieve competitive victory through their hard work and attention to detail.

Need even more cards on this resolution? This month, we're teaming up with www.PFdebate.com to help you make this your best topic ever! Debate Central users can purchase their carbon tax resources for 15% off, using promo code **NSDA**. This exclusive price is available to you through February 29th, 2016.

Remember also that you can always email completed cases to **Rachel.Stevens@NCPA.org** for a free, confidential case critique! Even the best cases can benefit from a look from another set of eyes. Once you submit them, we'll get them back to you, with personalized comments, as soon as we can.

Good luck, PFers!