

REVENUE-NEUTRAL CAP AND TRADE

Amy Sinden

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Introduction

While the global financial crisis grabs the headlines, the “other” global crisis continues to creep up on us, slowly, almost imperceptibly. Although global climate disruption has the potential to cause far more profound, fundamental and far-reaching effects than the financial crisis, it appears in the press only peripherally – an esoteric problem of concern to polar bears and a few Eskimos, maybe, but not of pressing importance to the rest of us, who are busy fretting about our 401k statements. A recent poll found that only 41 percent of the American public believes global warming is caused by human activities.¹ That’s down from 46 percent three years ago, when Al Gore released his movie, *An Inconvenient Truth*. Another recent poll found that Americans rank climate change dead last among a list of 20 issues.²

Perhaps, it’s no surprise then that climate change legislation is meeting fierce opposition in the U.S. Congress. The public is checked out on the issue, which leaves the field wide open for vested interests (the fossil fuel industries come to mind) to fight back against a bill that, if not hopelessly watered down, could literally re-order the U.S. economy for decades to come, replacing dirty fossil-fuel-based energy with the new clean and green energy sources of the future.

* Associate Professor, Temple University Beasley School of Law. Member Scholar, Center for Progressive Reform, www.progressivereform.org. This article is based on the Friel-Scanlan lecture at Temple University School of Law, which I delivered on April 9, 2009. Many thanks to the colleagues and students who attended that lecture for their helpful comments and questions. I also wish to thank David Driesen, Victor Flatt, Alice Kaswan, Lesley McAllister, Scott Schang, and Rena Steinzor for helpful comments on earlier drafts.

¹ *44% Say Global Warming Due to Planetary Trends, Not People* Rasmussen Reports (Jan. 19, 2009), available at: http://www.rasmussenreports.com/public_content/politics/issues2/articles/44_say_global_warming_due_to_planetary_trends_not_people.

² *Economy, Jobs Trump All Other Policy Priorities in 2009*, The Pew Research Center for the People and the Press (Jan. 22, 2009), available at: <http://people-press.org/report/485/economy-top-policy-priority>. See also *Polling: U.S. Investors See Less Urgency in Combating Climate Change*, ClimateWire (July 24, 2009) (“Nearly two-thirds of U.S. investors see climate change as a minor danger or ‘no real threat,’” according to Bloomberg poll)

The problem is that the dirty little secret is out. A cap and trade program, just like a tax, would raise energy prices on consumers.³ No sooner did the Waxman-Markey bill hit the presses than the Republicans had dubbed it “cap and tax.” That’s powerful rhetoric—especially in the midst of the worst recession since the Great Depression.

The basic dilemma is this. In order to ward off the climate crisis, industry and consumers have to stop burning fossil fuels and switch to a whole array of clean, renewable energy sources. But right now, fossil-fuel-based energy is so cheap, people would be crazy not to use it. And because it’s so cheap, it’s easy to waste. The only way to shift people’s incentives so that they stop wasting energy and switch to renewable sources is to make fossil-fuel-based energy more expensive. But one thing’s for sure. If climate change regulation becomes associated with forced financial sacrifice – with increased gas and electric bills – it’s not going to win converts to the cause.

Part of the challenge is that the climate crisis, more than any environmental problem we’ve faced before, requires not just that corporations shift their behavior, but that individuals do so as well. Climate change is about a pollutant that is so ubiquitous, so widespread, and that’s tied so tightly to one of the fundamental drivers of our economy – how we produce energy – that it’s implicated in virtually everything we do. Even if tomorrow, we get all the electric utilities to cut their greenhouse gas emissions in half, if we as individuals keep leaving our computers on all night and buying bigger and better plasma TV screens, we’re not going to solve the problem. Emissions that result from individual choices are estimated comprise 32 to 40 percent of total U.S. emissions.⁴ This means we need to shift the incentives that shape individual behavior, as well as corporate behavior. And that means raising the energy prices that individual consumers pay—not an easy sell politically.

And that’s just part of the problem. Once we put in place a credible plan to cut emissions at home, we must convince China to take action as well, or that country’s mushrooming greenhouse gas emissions fueled by its exponential economic growth, will quickly swallow any

³ A recent GAO report cites several estimates of how much the Waxman-Markey bill would cost the average American household per year in increased energy prices. They range from \$80 to \$175 per year. See GAO, Testimony Before the Committee on Finance, U.S. Senate, *Climate Change Policy: Preliminary Observations on Options for Distributing Emissions Allowances and Revenue under a Cap-and-Trade Program*, GAO-09-950T, at 5 (Aug. 4, 2009).

⁴ See Michael P. Vandenbergh & Anne C. Steinemann, *The Climate Neutral Individual*, 82 N.Y.U. L. Rev. 1673, 1688 (2007).

gains made in the rest of the world. And India is not far behind. But those countries take offense at our suggestion that they should slow economic growth in order to help save the world from global warming. They point out that historically, the vast majority of the emissions that put us in the pickle we're in today came from the developed world, and that even now, if we measure on a *per capita* basis, their emissions are only a tiny fraction of ours.

In fairness, they have a point. Why should a country with only five percent of the world's population have the right to hog 25 percent of a limited global resource—the absorptive capacity of the earth's atmosphere? Anyone who seriously considers, from the perspective of justice, the question of how the capacity of the global atmosphere to absorb greenhouse gases should be distributed among the people and nations of the world, comes to the unremarkable conclusion that it should be allocated in equal shares, on a *per capita* basis.⁵ But any international agreement that takes that principle as its starting point will inevitably entail a massive transfer of wealth from the developed to the developing world—not something the American public is likely to eagerly embrace.⁶

So how do we design domestic climate change regulation in a way that shifts the economic incentives on corporations and individuals sufficiently to dramatically reduce their use of fossil fuels, but that does so in a way that's politically palatable, that drafts individuals to the cause rather than alienating them, and that perhaps also begins to sensitize the American public to the international perspective on this issue?

That's a tall order, and, undoubtedly, there is no perfect solution. There is, however, an idea that perhaps deserves more attention that it has received so far. A "revenue-neutral cap and trade" could take one of two forms: One version, recently dubbed "cap and dividend," would auction off all allowances and return all the revenues to each legal resident in

⁵ See, e.g., Anil A. Agarwal and Sunita Narain, *Global Warming in an Unequal World: A Case of Environmental Colonialism* (New Delhi: Center for Science and Environment, 1991); PETER SINGER, ONE WORLD: THE ETHICS OF GLOBALIZATION 43 (2002); Henry Shue, *Avoidable Necessity: Global Warming, International Fairness, and Alternative Energy*, in NOMOS XXXVII: THEORY AND PRACTICE 239, 257–258 (Ian Shapiro & Judith Wagner DeCew, eds., 1995); BRIAN BARRY, WHY SOCIAL JUSTICE MATTERS 267–268 (2005); AUBREY MEYER, CONTRACTION AND CONVERGENCE: THE GLOBAL SOLUTION TO CLIMATE CHANGE (2000); DONALD A. BROWN, AMERICAN HEAT: ETHICAL PROBLEMS WITH THE UNITED STATES' RESPONSE TO GLOBAL WARMING 213–215 (2002); Amy Sinden & Carl Cranor, *Toward Distributional Justice* in ECONOMIC THOUGHT AND U.S. CLIMATE CHANGE POLICY (David M. Driesen, ed., MIT Press) [forthcoming 2010].

⁶ See Sinden & Cranor, *supra* note 5.

equal shares in the form of a rebate check. Another version—what I’ll call a “fair-share cap-and-trade”—would distribute the tradable allowances themselves to each legal resident in the country in equal shares (instead of handing them out to industry for free). Individuals would *not* be required to hold allowances for their own emissions. Companies—producers and importers of fossil fuels—would be the ones required to hold an allowance for each ton of CO₂ embodied in the fuel they sold. Individuals would simply sell their allowances for cash. In this way, each individual could offset the higher energy prices she faced by selling her share of allowances on the open market to the companies that were required to hold them.

Under either version, a revenue-neutral cap-and-trade would put the money generated by selling tradable allowances in the pockets of consumers rather than in the pockets of industry. It would still raise energy prices, which is good if we want to get people to conserve and switch to renewables, but it would allow individuals who keep their carbon footprints within reasonable limits to break even or even make money on the deal. But perhaps most importantly, such a program—and a fair share cap-and-trade in particular—might have the capacity to engage people in new and positive ways and to entirely reorient the individual consumer’s relationship with the fight against global warming. Giving individuals the opportunity to sell allowances, and perhaps maximize their return if they time the market correctly, might begin to engage people in the process in a positive way. They might begin to view a cap and trade program as a way to make money rather than another government regulation that costs them money. Moreover, to the extent that people saw the connection between their individual carbon footprint and their “fair share” allocation of allowances, such a system might begin to re-frame the issue of climate change in a way that might resonate with widely held social norms of personal responsibility. And perhaps it might even begin to sensitize the American public to the developing world’s perspective on this issue, which is fundamentally grounded in a per capita measurement of greenhouse gas emissions.

Part I provides some background on the science of climate disruption and on the political challenges we face in trying to address the problem, at both the international and domestic levels. Part II examines more closely the challenge of designing domestic climate change regulation. Part IIA explains why the targets of climate change regulation must be individuals as well as corporations. Part IIB explores how social norms play a role in shaping the choices, particularly of individuals, and examines how regulation can shape behavior by influencing social norms. Part III explains how a revenue-neutral cap-

and-trade program would work and why it might be desirable from the perspectives of both politics and policy. After a brief primer on regulatory design—the differences between tax and cap-and-trade schemes and the basic elements of a cap-and-trade program—this section describes how a revenue-neutral cap-and-trade program would operate, considers some difficulties that could arise in implementation, and finally, considers possible objections to such a program.

Particularly in light of political realities, there is no perfect regulatory solution to fix the climate crisis. But revenue-neutral cap-and-trade may be worth an option worth considering both for its political advantages and for its policy advantages. Politically, it has the capacity to defuse the opposition's argument that cap-and-trade will impose financial hardship on consumers. From a policy perspective, it has the capacity to shift both corporate and individual behavior in the right direction both by imposing economic incentives and by influencing social norms.

I. Background

A. The Science

There is now a broad consensus that global warming is occurring and that it is caused by human activity.⁷ The latest Intergovernmental Panel on Climate Change report in 2007, called evidence of a warming globe “unequivocal,”⁸ and concluded with a “very high degree of certainty” that this increase in average global temperatures has been caused by human activities.⁹

A variety of human actions lead to increasing accumulations of heat-trapping gases in the atmosphere. Burning fossil fuels releases carbon dioxide (CO₂).¹⁰ The clearing of vegetation and deforestation also increases CO₂ levels in the atmosphere by reducing absorption by plants.¹¹ Various agriculture practices release methane, as do landfills.¹² Nitrous oxide is emitted by the use of fertilizers and by the burning of

⁷ See Naomi Oreskes, *The Scientific Consensus on Climate Change*, SCIENCE, Dec. 3, 2004, at 1686 (“In recent years, all major scientific bodies in the United States whose members expertise bears directly on the matter have ... all issued statements concluding that the evidence for human modification of climate is compelling.”)

⁸ SUSAN SOLOMON, *et al.*, CLIMATE CHANGE 2007: THE PHYSICAL SCIENCE BASIS 5 (2007).

⁹ SOLOMON, *supra* note 8, at 3, 10.

¹⁰ SOLOMON, *supra* note 8, at 135, 138.

¹¹ SOLOMON, *supra* note 8, at 135.

¹² SOLOMON, *supra* note 8.

fossil fuels.¹³ Although there are a variety of gases that contribute to the greenhouse effect by trapping heat in the atmosphere, the IPCC has called CO₂ the “most important” greenhouse gas because of its prevalence and longevity.¹⁴ CO₂ accounts for 80 percent of emissions and can linger in the atmosphere for centuries or even millennia after it is emitted.¹⁵ Accordingly, the consequences of the actions we are taking today will continue to be felt for generations.

The earth’s average temperature has already crept up by three-quarters of a Celsius degree above pre-industrial levels,¹⁶ and in recent years, the effects of that incremental temperature shift have already begun to become apparent. Eleven of the last twelve years have been among the twelve warmest years on record,¹⁷ and the European heat wave of 2003 was the worst ever recorded.¹⁸ In the Arctic, the permafrost is melting, and the polar ice cap has receded by more than 20 percent since 1978.¹⁹ In 2007, seasonal melting of the ice cap was so extensive that the fabled Northwest Passage was navigable for the first time in human memory.²⁰ As glaciers and ice fields melt around the world,²¹ and the water in the oceans expands as it warms, the seas are gradually rising.²² Indeed, average sea level has already risen by 17 centimeters over the past century.²³ And over the past several decades, changes in precipitation patterns and more intense and extreme draughts have been observed in regions around the world, threatening global food supplies.²⁴

¹³ SOLOMON, *supra* note 8.

¹⁴ SOLOMON, *supra* note 8, at 2.

¹⁵ See A. Montenegro et al., *Long Term Fate of Anthropogenic Carbon*, 34 *Geophysical Research Letters* L19707 (2007)(concluding that “25% [of CO₂ emissions] have lifetimes much longer than 5000 years”)

¹⁶ SOLOMON, *supra* note 8, at 5.

¹⁷ SOLOMON, *supra* note 8,

¹⁸ See Peter A. Stott, D.A. Stone, & M.R. Allen, *Human Contribution to the European Heatwave of 2003*, 432 *NATURE* 610 (2004)(“The summer of 2003 was probably the hottest in Europe since at latest AD 1500.”).

¹⁹ SOLOMON, *supra* note 8, at 7.

²⁰ See Laurie Goering, *Ice-Free Arctic in Summer Seen in 7 Years*, *Chi. Trib.*, (Dec. 14, 2007), at 12.

²¹ SOLOMON, *supra* note 8.

²² James E. Hansen, *Scientific Reticence and Sea Level Rise*, 2 *Envtl. Research Letters* 024002 (2007)(“[A]s a physicist, I find it almost inconceivable that BAU climate change would not yield a sea level change of the order of meters on the century timescale.”).

²³ SOLOMON, *supra* note 8, at 5-7.

²⁴ SOLOMON, *supra* note 8, at 7-8; National Development and Reform Commission, People’s Republic of China, *China’s National Climate Change Programme 5* (June 2007), full text in English available at: <http://www.ccchina.gov.cn/WebSite/CCChina/UpFile/File188.pdf> (increasing drought

But in the coming decades, unless we drastically reduce greenhouse gas emissions, things will only get worse. The IPCC projects that average global temperatures will likely increase by another 1.8 to 4 degrees Celsius by the end of the 21st century,²⁵ triggering a range of impacts on the planet that threaten severe economic, social and ecological disruption.

As disease-carrying insects spread north with higher temperatures, malaria and other infectious diseases are expected to spread to new areas.²⁶ As weather patterns change, new areas will be subjected to decreased rainfall and drought.²⁷ More than one sixth of the world's population, which currently relies on water stored in mountain glaciers and snow-pack will be vulnerable to significant shortages of fresh water this century.²⁸ In Africa alone, 75 to 250 million people are projected to be exposed to increased water stress by 2020.²⁹ In some African countries, agricultural yields may decrease by up to 50 percent by 2020.³⁰ "Many millions more people are projected to be flooded every year due to sea level rise by the 2080s."³¹ This problem will be particularly severe in the "mega-deltas of Africa and Asia" where populations already struggle with poverty.³² These impacts will lead to massive dislocation and migration and the creation of millions of climate refugees. Indeed, a recent report estimates that climate change and related environmental factors could displace 200 million people by mid-century.³³ In this sense, climate change is more than just an environmental problem, it is an international security problem as well.³⁴

in northern China); Keith Bradsher, *A Drought in Australia, A Global Shortage of Rice*, N.Y. Times (April 17, 2008)(6-year drought in Australia severely impacting agricultural yields).

²⁵ SOLOMON, *supra* note 8, at 13. See James E. Hansen, et al., *Dangerous Human-made Interference with Climate: A GISS ModelE Study*, 7 Atmos. Chem. Phys. 2287 (2007)(predicting that warming of more than 1 degree C above 2000 levels will have "effects that may be highly disruptive").

²⁶ MARTIN PARRY, et al., eds., CLIMATE CHANGE 2007: IMPACTS, ADAPTATION, AND VULNERABILITY 407 (2007).

²⁷ SOLOMON, *supra* note 8, at 11.

²⁸ SOLOMON, *supra* note 8.

²⁹ SOLOMON, *supra* note 8, at 13.

³⁰ SOLOMON, *supra* note 8, at 13.

³¹ SOLOMON, *supra* note 8, at 12.

³² SOLOMON, *supra* note 8.

³³ See Koko Warner, Charles, Ehrhart, Alex de Sherbinin, & Susana Adamo, *In Search of Shelter: Mapping the Effects of Climate Change on Human Migration and Displacement* (May 2009), available at: <http://www.care-international.org/New-report-Climate-Change-is-detectable-driver-of-migration>.

³⁴ See BBC News, *UN Chief Warns on Climate Change* BBC News (Mar. 2, 2007)(reporting that U.N. Secretary General Ban Ki-moon said climate change "likely

If temperature impacts get beyond 1.5 to 2.5 degrees Celsius, the IPCC projects “major changes in ecosystem structure and function, species’ ecological interactions, and species’ geographical ranges, with predominantly negative consequences for biodiversity, and ecosystem goods and services, e.g., water and food supply.”³⁵ Indeed, one study estimates that climate change could push over a third of species to extinction by mid-century.³⁶ Meanwhile, some of the excess CO₂ in the atmosphere is being absorbed by the seas, causing ocean water to become more acidic. This fundamental change in the aquatic environment is having dramatic impacts on creatures at the base of the ocean food-chain, threatening the widespread collapse of ocean ecosystems.³⁷

Particularly sobering are a number of recent reports that indicate that climate change is actually progressing much more quickly than initially projected.³⁸ Greenhouse gas emissions have risen even faster in recent years than the IPCC’s highest-emission scenario in its 2007 report, suggesting that even the dire forecasts in that report may be underestimating the problem.³⁹ And, in recent years, the pace of ice melt in the Arctic and Antarctic has shocked scientists around the world. While the IPCC’s 2007 report projected sea level rise reaching no more than 1.5 feet by the end of this century, a recent report by the U.S. Climate Change Science Program, estimates that sea level rise could reach four feet by 2100,⁴⁰ and other estimates are significantly higher than that. As a result, a number of scientists have recently re-adjusted their proscription for where atmospheric carbon dioxide levels must be

to become a major driver of future war and conflicts”). Indeed, a 2003 report commissioned by the Pentagon analyses the national security implications of global climate change. See PETER SCHWARTZ & DOUG RANDALL, AN ABRUPT CLIMATE CHANGE SCENARIO AND ITS IMPLICATIONS FOR UNITED STATES NATIONAL SECURITY (2003).

³⁵ SOLOMON, *supra* note 8, at 11.

³⁶ See Chris D. Thomas, *Extinction Risk from Climate Change* 427 NATURE 145 (2004)(predicting on the basis of mid-range climate-warming scenarios that 15–37% of species will be ? committed to extinction? by 2050).

³⁷ SOLOMON, *supra* note 8, at 11; Elizabeth Kolbert, *The Darkening Sea*, The New Yorker 66 (Nov. 20, 2006).

³⁸ See Juliet Eilperin, *Faster Climate Change Feared: New Report Points to Accelerated Melting, Longer Drought*, Wash. Post A2 (Dec. 25, 2008); Geoffrey Lean, *Global Warming ‘is Three Times Faster than Worst Predictions,’* The Independent (June 3, 2007)(reporting results of National Academy of Sciences study).

³⁹ See Lean, *supra* note 38.

⁴⁰ See Eilperin, *supra* note 38.

stabilized to avoid “irreversible catastrophic effects.” While a few years ago, experts generally agreed on a target of 450 parts per million (ppm) of carbon dioxide in the atmosphere, James Hansen and others have recently amended that target to 350 ppm or lower.⁴¹ This would mean actually lowering the current concentration of CO₂ in the atmosphere, which is presently at about 387 ppm.

In short, we are conducting a vast experiment with the only planet we have. It is an experiment that, if we stay on the present course, will drastically alter every ecosystem on the planet, drive over a third of all species to extinction, and unleash a cascade of effects on the human race that sounds like some apocalyptic story from the bible—disease, drought, famine, floods.

B. International Politics

And to make matters worse, all of this is largely our fault. Of all countries on earth, the United States is responsible for the largest percentage of the CO₂ currently accumulated in the atmosphere.⁴² China just recently surpassed us in terms of annual emissions,⁴³ but arguably it has the right to do that. China’s population is four times the U.S.’s. In *per capita* emissions, the U.S. is way out ahead of China and almost every other country on earth. Per capita emissions in the U.S. are close to 20 metric tons per year, compared to just over four and a half tons in China and just over one ton in India.⁴⁴ Even most other countries in the developed world aren’t doing nearly as badly as we are. The United Kingdom, for example, has per capita emissions of less than 10 tons.⁴⁵

⁴¹ James Hansen, Makiko Sato, Pushker Kharecha, David Beerling, Valerie Masson-Delmotte, Mark Pagani, Maureen Raymo, Dana L. Royer & James C. Zachos, *Target Atmospheric CO₂: Where Should Humanity Aim?*, 2 *Open Atmospheric Sci. J.* 217, 217 (2008)(“If humanity wishes to preserve a planet similar to that on which civilization developed and to which life on Earth is adapted, paleoclimate evidence and ongoing climate change suggest that CO₂ will need to be reduced from its current 385 ppm to at most 350 ppm, but likely less than that.”); Bill McKibben, *Remember This: 350 Parts Per Million*, *Wash. Post*, A21 (Dec. 28, 2007).

⁴² See National Academy of Sciences, et al., *Understanding and Responding to Climate Change* 18 fig.12 (2005)

⁴³ See *Carbon Dioxide Information Analysis Ctr., Oak Ridge Nat’l Lab. (ORNL), Recent Greenhouse Gas Concentrations* (2008), available at <http://cdiac.ornl.gov>.

⁴⁴ These figures are for 2006. See United Nations Statistics Division, Millennium Development Goals Indicators, Carbon Dioxide Emissions (CO₂), metric tons of CO₂ per capita (last updated 1 Aug. 2007), available at: <http://mdgs.un.org/unsd/mdg/SeriesDetail.aspx?srid=751&crd=>.

⁴⁵ See United Nations Statistics Division, *supra* note 44.

Although the Obama administration has begun talks with China on climate change, China has so far resisted binding limits on greenhouse gas emissions.⁴⁶ China arguably has good reason to be defensive about our efforts to make them reduce their emissions. Most people in China don't drive cars, and many don't even have a refrigerator. They are simply asking to be allowed to develop a reasonable standard of living. But imagine what will happen when everyone in China gets a car and a refrigerator. China's projected emissions for the coming decades are so large, that even if every other country on earth brought emissions to zero, China's emissions alone might well be sufficient to trigger catastrophic effects.⁴⁷

One response to "the China problem" is to give up. Indeed, those opposed to mandatory emissions limits in this country often point to rising emissions in China and other developing countries as a reason why expending resources here to reduce emissions is pointless.⁴⁸ They argue that China will never control its emissions because it has all sorts of strong incentives not to. Indeed, China's phenomenal economic boom of the past decade was largely fueled by the manufacture of exports, which was in turn driven by cheap energy prices made possible by the country's bountiful coal reserves.⁴⁹ Thus, the strong incentives China faces to continue exploiting its vast coal reserves to fuel its economic expansion cannot be gainsaid.⁵⁰

But there also may be reason for some optimism that China is actually prepared to take meaningful steps to reduce its greenhouse gas emissions.⁵¹ China stands to incur substantial losses if climate change continues to worsen, including droughts, flooding, decreased agricultural yields, water shortages, and sea level rise in some of the country's most

⁴⁶ See Jim Puzanghera & David Pierson, *U.S. China, End Talks with Smiles but No Progress on Climate Change*, L.A. Times (July 29, 2009).

⁴⁷ See Michael P. Vandenberg, *Climate Change: The China Problem*, 81 S. Cal. L. Rev. 905, 908 (2008).

⁴⁸ *Mass v. EPA*; Anne C. Mulhern, *Coal Industry Sees Life or Death in Senate Climate Debate*, N.Y. Times (July 6, 2009) (quoting statement of Senate Minority Leader Mitch McConnell (R-Ky.) on FOX News Sunday on June 28, 2009: "I don't think putting clamps on our economy when you know the Chinese and the Indians are not going to do it is a good idea."); Vandenberg, *supra* note 47, at 909..

⁴⁹ See Vandenberg, *China* 117-123.

⁵⁰ See Cass R. Sunstein, *The World vs. the United States and China: The Complex Climate Change Incentives of the Leading Greenhouse Gas Emitters*, 55 U.C.L.A. Law Rev. 1675 (2008); WILLIAM NORDHAUS, *A QUESTION OF BALANCE: WEIGHING THE OPTIONS ON GLOBAL WARMING POLICIES* (2008); Vandenberg, *supra* note 47.

⁵¹ See Peter Foster, *Is China Really Going Green?* Telegraph (May 3, 2009); Keith Bradsher, *Green Power Takes Root in the Chinese Desert*, N.Y. Times (July 2, 2009).

populous and economically thriving areas.⁵² Chinese leaders also have considerable incentives to shift to renewable energy technologies, as some of the other environmental impacts that accompany the combustion of fossil fuels reach catastrophic levels.⁵³ Indeed, environmental degradation has gotten so bad in China that it has begun to contribute significantly to social unrest. China's top environmental official estimated that there had been a staggering 51,000 pollution-related protests in 2005.⁵⁴ This has sparked the attention of Chinese leaders, as

⁵² The Chinese have already begun to see increasing floods in the south and increasing droughts in the North, *see* National Development and Reform Commission, People's Republic of China, *China's National Climate Change Programme* (June 2007), Sec. 1.1; 2.2.3; 10.2.3, full text in English available at: <http://www.ccchina.gov.cn/WebSite/CCChina/UpFile/File188.pdf>, while watching the glaciers in Tibet, on which millions depend for water, shrink by 2 percent. *See* PARRY, ET AL., EDS., *CLIMATE CHANGE 2007: IMPACTS, ADAPTATION, AND VULNERABILITY*, §§ 3.4; 10.4.4.3; 10.6.2. (2007). These trends are all expected to significantly worsen throughout this century as climate change progresses. Sea level rise is also projected to impact some of China's most populous and economically thriving areas, including the Bo Hai Gulf area just east of Beijing, the Yangtze River Delta around Shanghai, and the Pearl River Delta around Hong Kong. *See* Kenneth Lieberthal & David Sandalow, *Overcoming Obstacles to U.S.-China Cooperation on Climate Change* 11 (Brookings Institution Jan. 2009). These areas are home to hundreds of millions of people, and are responsible for much of China's economic prosperity. In 2002, these three regions were responsible for 38 percent of China's GDP, and by 2020 that share is projected to jump to 65 percent. *See* Lieberthal, *supra*, at 11. China's agricultural production is also projected to decline substantially due to climate change. Yields of wheat rice and corn could decline by as much as 37 percent over the next century. *See China Report Warns of Agriculture Problems from Climate Change*, *China Daily* (Jan. 3, 2007), available at: <http://www.chinapost.com.tw/latestnews/200713/43451.htm>.

⁵³ In 2007, a World Bank study estimated that 750,000 people in China die prematurely every year due to air pollution. *See* David Barboza, *China Reportedly Urged Omitting Pollution Death Estimates*, *N.Y. Times* (July 5, 2007); *See* Elizabeth Economy, *The Great Leap Backward? The Costs of China's Environmental Crisis*, 86 *Foreign Aff.* 38, 40, 47 (2007). Although Chinese officials pressured the Bank to leave the statistic out of their final report for fear of inciting social unrest, *See* Barboza, *supra*; Economy, *supra* note 53, at 47; World Bank & State Environmental Protection Administration, P.R. China, *Cost of Pollution in China: Economic Estimates of Physical Damage* (Feb. 2007), available at: http://siteresources.worldbank.org/INTEAPREGTOPENVIRONMENT/Resources/China_Cost_of_Pollution.pdf, even a research institution affiliated with the government has put the number of air-pollution related deaths at 400,000 annually. Economy, *supra* note 53, at 47. And Chinese coal mines have one of the worst safety records in the world. Official statistics put the annual death toll from coal mining accidents in the range of 3 to 4 thousand, but many people believe the official figures vastly underestimate the problem, possibly by orders of magnitude *See* Sharon LaFraniere, *Graft in China Covers Up Toll of Coal Mines*, *N.Y. Times* (April 10, 2009); Howard W. French, *Carving Plight of Coal Miners, He Churns China*, *N.Y. Times* (July 14, 2007).

⁵⁴ *See* Economy, *supra* note 53, at 47.

have studies showing that pollution and environmental degradation may be reducing China's GDP by 8 to 12 percent each year.⁵⁵

Thus, Chinese leaders—increasingly aware of the threats posed by climate change and of the economic and social benefits that will come with switching to renewable energy sources—have already implemented some significant energy efficiency and renewable energy programs. They have established a target to reduce energy intensity by 20 percent by 2010, they have a fuel economy standard for cars of 36 miles per gallon (higher than the U.S.'s), and, according to a report by the U.S. Senate Foreign Relations Committee, their investment in renewable energy technology ranks second in the world.⁵⁶ Indeed, a senior climate negotiator for the United Kingdom has said that “China has the world's most ambitious policies at the moment on energy efficiency, and arguably on renewable energy and nuclear, as well”⁵⁷

While there are glimmers of hope, however, at this writing, Chinese leaders remain staunch in their opposition to binding emissions limits. In truth, they have a compelling argument based in universal principles of fairness. Basically, it comes down to: You broke it, you fix it. While China's yearly aggregate emissions have now surpassed ours, when you look at the current aggregation of greenhouse gases in the atmosphere that's actually causing this problem—many of which were deposited there a century or more ago—the issue looks very different. The vast majority of the greenhouse gases currently warming our globe were put there by the developed world. And indeed, the U.S. is responsible for more of them than any country on earth.⁵⁸ Moreover, on a *per capita* basis, China's emissions are still less than a quarter of ours.⁵⁹ With these facts in mind, it's easy to see why the Chinese may react with irritation when the U.S.—which has yet to implement its *own* binding emissions controls—tries to pressure China into accepting mandatory emissions limits. If we view the problem in historical and per capita terms, the U.S. has a lot to do to clean up its own house before it can rightfully expect sacrifices from China and the rest of the developing world. India, whose aggregate emissions are fourth in the world and growing, but whose per capita emissions are just *one fifteenth* of those in

⁵⁵ Economy, *supra* note 53, at 46.

⁵⁶ See Saqib Rahim, *China: Will Meaningful Actions Follow Ambitious New Carbon Policies?* Climate Wire (July 24, 2009).

⁵⁷ Rahim, *supra* note 56; Lieberthal, *supra* note 52, at 30 (noting that “Beijing is taking many initiatives that will potentially reduce its carbon emissions when measured against a [business as usual] model,” while also observing that Chinese leaders still view rapid economic growth as their primary goal).

⁵⁸ See National Academy of Sciences, *supra* note 42, at 18, fig. 12.

⁵⁹ See United Nations Statistics Division, *supra* note 44.

the U.S.,⁶⁰ takes a similar view of the problem, as do other developing countries.⁶¹

In short, the bottom line is that, although the climate crisis is unquestionably an international problem that ultimately demands an international solution, in order to have credibility in international negotiations, the U.S. must take meaningful action to impose deep, mandatory, and enforceable cuts in its own greenhouse gas emissions.⁶² Accordingly, the rest of this article focuses on the question of how we can best meet that domestic political challenge in a way that takes seriously the realities of domestic U.S. politics but also remains sensitive to the legitimate demands of the international community.

C. Domestic Politics

Even just figuring out how to reduce domestic greenhouse gas emissions poses daunting political challenges. Putting aside political constraints, the best regulatory mechanism would probably be a carbon tax.⁶³ Requiring fuel producers and importers to pay a tax for each ton of carbon dioxide embodied in the fuel they sell would create a clear economic incentive to replace fossil fuels with alternative energy sources that don't contribute to global warming. It would be easy to administer and involve fewer transaction costs than a cap-and-trade program.⁶⁴ The tax would only need to be imposed on the relatively small number of entities at the top of the production chain that actually produce or import fuel; the price signal would then be passed down along the production stream in order to create incentives throughout the economy. We already

⁶⁰ See United Nations Statistics Division, *supra* note 44.

⁶¹ See Mark Landler, *Meeting Shows U.S.-India Split on Emissions*, N.Y. Times (July 19, 2009) ("No sooner had Mrs. Clinton marveled at the . . . environmentally friendly features [of a building outside New Delhi], than her hosts vented frustration at American pressure on India to cut its emissions," citing India's low per capita emissions.).

⁶² See Thomas D. Peterson, Robert B. McKinstry, Jr., and John C. Dernbach, *Developing a Comprehensive Approach to Climate Change Policy in the United States that Fully Integrates Levels of Government and Economic Sectors*, 26 Va. Env'tl. L. J. 227, 268 (2008) ([P]roactive and unilateral action by the United States is a necessary prerequisite to international re-engagement.").

⁶³ See U.S. Congressional Budget Office, *Policy Options for Reducing CO2 Emissions* (Feb. 2008), available at: <http://www.cbo.gov/ftpdocs/89xx/doc8934/02-12-Carbon.pdf>. Roberta F. Mann, *The Case for the Carbon Tax: How to Overcome Politics and Find our Green Destiny*, 39 Env'tl. L. Rep. 10118 (2009); RICHARD D. MORGENSTERN, *REDUCING CARBON EMISSIONS AND LIMITING COSTS* 3-4 (Resources for the Future (RFF) 2002), available at <http://www.rff.org>. ; Reuven S. Avi-Yonah & David M. Uhlmann, *Combating Global Climate Change: Why a Carbon Tax is a Better Response to Global Warming than a Cap and Trade*, 28 Stan. Env'tl. L. J. 3 (2009).

⁶⁴ See Mann, *supra* note 63, at 10122-23.

have an agency practiced at collecting taxes; the IRS could add this new tax to its responsibilities with relatively little disruption. Finally, a tax would generate a pool of money that the government could use to fund all sorts of worthy initiatives. It could invest substantial sums in renewable energy research, adaptation, and weatherization programs in low income neighborhoods, for example.

Indeed, most economists and policy analysts favor a tax.⁶⁵ Sweden has made impressive strides with its carbon tax, reducing CO₂ emissions by 9 percent between 1990 and 2006, exceeding its target under the Kyoto Protocol, while enjoying booming economic growth of 44 percent.⁶⁶ And in 2008, British Columbia implemented an aggressive carbon tax, which starts at \$10 per ton of CO₂ and rises to \$30 per ton by 20 per ton in 2012.⁶⁷

But in this country, policy makers have long ago given up on trying to pass a carbon tax—even though it arguably has a lot of advantages over alternatives—because anything involving the word “tax” in this country is politically toxic. Indeed, no one in Washington D.C. has forgotten President Clinton’s ill-fated attempt to pass a similar measure, the BTU tax, in 1993.⁶⁸ And particularly in the midst of the current financial crisis, lawmakers are loathe to impose additional economic burdens on their constituents.

There is a solution to that, of course. Many people advocate a “revenue neutral tax,” which would recycle the revenue generated back to individuals as a tax rebate or an income tax credit.⁶⁹ Such a scheme would preserve individual incentives to avoid fossil fuels, but should, on average, offset the higher energy costs consumers face. The British Columbia carbon tax takes this form.⁷⁰ But in this country, even a revenue- neutral carbon tax is widely viewed as a political non-starter. The conventional wisdom, accepted pretty much across the political

⁶⁵ See sources cited *supra* at note 63.

⁶⁶ See Gwladys Fouche, *Sweden’s Carbon-Tax Solution to Climate Change Puts it Top of the Green List*, *The Guardian* (April 29, 2008).

⁶⁷ See David G. Duff, *Carbon Taxation in British Columbia*, 10 *Vt. J. Envtl. L.* 87 (2008).

⁶⁸ See Dawn Erlandson, *The BTU Tax Experience: What Happened and Why It Happened*, 12 *Pace Envtl. L. Rev.* 173 (1994).

⁶⁹ See WILLIAM NORDHAUS, *A QUESTION OF BALANCE* (2008); Mann, *supra* note 63, at 10124-25; Michael Waggoner, *Why and How to Tax Carbon*, 20 *Colo. J. Internat’l Envtl. L.* 1 (2008). The British Columbia carbon tax takes this form, recycling all revenues back to individuals and businesses in the form of individual and corporate income tax cuts and a refundable tax credit for low-income households. See Duff, *supra* note 67, at 99.

⁷⁰ See Duff, *supra* note 67, at 99.

spectrum, is that, to have any hope of success, any climate change bill will have to take the form of a cap-and-trade program.

But as we've already seen in Congress this year, even a cap and trade program is a tough sell politically. People have begun to catch on that the thing that makes taxes unpalatable – that they're going to raise the prices consumers have to pay for energy – is just as true of a cap and trade program.⁷¹ It comes down to basic principles of supply and demand. You can't limit (or "cap") the overall quantity of some good and not expect the price to go up. Thus, soon after the Waxman-Markey bill came out this Spring, Republicans dubbed it "Cap and Tax."

II. Identifying the Regulatory Challenge

The good news is that we already have technologies that could drastically reduce our greenhouse gas emissions and thus dramatically reduce the risks we face from climate disruption. There is no one magic bullet. But with a combination of existing technologies, many experts believe we can reduce greenhouse gas emissions enough to avoid a doubling of pre-industrial CO₂ concentrations by mid-century, and thus keep warming within the range of 2 degrees Celsius.⁷²

First, we can do a lot more with conservation. Half our energy now goes to heating and powering buildings, and there are all sorts of things we already know how to do to make those buildings more efficient.⁷³ The technology exists to drastically reduce emissions from cars.⁷⁴ And there is far more capacity to use wind and solar energy than we are currently tapping. The U.S. Department of Energy said last year that the U.S. can meet 20 percent of its power demand from wind by

⁷¹ See Tom Friedman article – April 8, 2009

⁷² S. Pacala & Robert Socolow, *Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies*, 305 *SCIENCE* 968 (2004); BERT METZ ET AL., EDS., *CLIMATE CHANGE 2007: MITIGATION: CONTRIBUTION OF WORKING GROUP III TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE* 16 (2007) (stabilization of CO₂ concentrations "can be achieved by deployment of a portfolio of technologies that are currently available and those that are expected to be commercialised in coming decades"); Joseph Romm, *The Technologies Needed to Beat 450 ppm* Climate Progress Blog (April 8, 2008), available at: <http://climateprogress.org/2008/04/08/the-technologies-needed-to-beat-450-ppm-part-1/>.

⁷³ See M. Levine, *Residential and Commercial Buildings*, in METZ ET AL., *supra* note 72, at 389 ("[S]ubstantial reductions in CO₂ emissions from energy use in buildings can be achieved over the coming years using mature technologies for energy efficiency that already exist widely and that have been successfully used.").

⁷⁴ S. Kahn Ribeiro, et al., *Transport and its Infrastructure*, in METZ ET AL., *supra* note 72, at 325-26, 336-50.

2030.⁷⁵ New concentrating solar power plants, which use mirrors to concentrate the sun's rays and generate electricity, are being built in Spain and in the southwest U.S. A recent report projects that this new technology could meet 8 to 25 percent of global power demand by 2050.⁷⁶ A recent study from scientists at MIT concludes that geothermal energy could also make a significant contribution to U.S. energy supply at competitive prices within the next 50 years.⁷⁷ And researchers are working on developing other as yet untapped sources of renewable energy as well, by, for example, harnessing the energy in ocean waves and currents.⁷⁸

On top of slowing global warming, switching to these technologies will also alleviate the myriad other environmental problems that go along with extracting and burning fossil fuels.⁷⁹ If we can switch to renewable sources of energy and break our addiction to fossil fuels, all sorts of other good things will happen: Coal miners won't die tragically in mining disasters or slowly from lung disease; we won't have to chop the tops off mountains in west Virginia; we won't have to worry about another Exxon-Valdez disaster spoiling beaches, decimating wildlife and bankrupting whole fishing communities; we'll be able to stop the epidemic of asthma among kids in our cities; and we won't have to be nice to politically repressive regimes overseas just because they produce oil.

But even through these great technologies are available, we're not using them. Wind is still only three tenths of a percent of U.S.

⁷⁵ U.S. Dep't of Energy, *20% Wind Energy by 2030: Increasing Wind Energy's Contribution to U.S. Electricity Supply* (July 2008), available at: http://www1.eere.energy.gov/windandhydro/wind_2030.html. See also Xi Lu, Michael B. McElroy, & Juha Kiviluoma, *Global Potential for Wind Generated Electricity* 106 Proceedings of the Nat'l Academy of Sciences, 10933 (2009)(Wind power has capacity to provide 40 times current consumption of electricity worldwide and 5 times global use of all forms of energy; wind power capacity in lower 48 states of U.S. is 16 times current electricity demand).

⁷⁶ Christoph Richter, Sven Teske, & Jose A. Nebrera, *Concentrating Solar Power Global Outlook 09: Why Renewable Energy is Hot* (2009), available at: <http://www.greenpeace.org/international/press/reports/concentrating-solar-power-2009>.

⁷⁷ Jefferson W. Tester, *The Future of Geothermal Energy: Impact of Enhanced Geothermal Systems (EGS) on the United States in the 21st Century* (2006), available at: http://geothermal.inel.gov/publications/future_of_geothermal_energy.pdf.

⁷⁸ See Azadeh Ansari, *Is the Ocean Florida's Untapped Energy Source?* CNN.com (July 27, 2009)(describing efforts by researchers at Florida Atlantic University to design turbines that would generate electricity from the Gulf Stream ocean current), available at: <http://www.cnn.com/2009/TECH/07/27/ocean.turbines/index.html>.

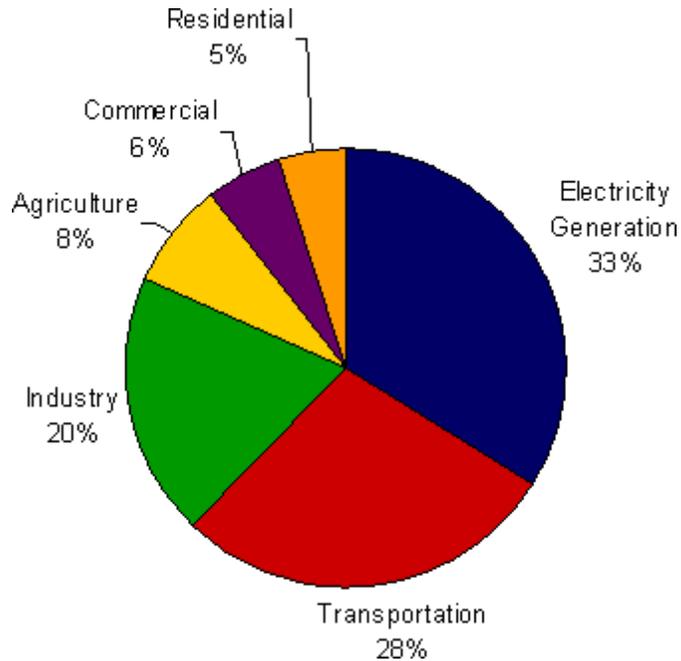
⁷⁹ See David M. Driesen & Amy Sinden, *The Missing Instrument: Dirty Input Limits*, 33 HARV. ENVTL. L. REV. 66, 70-73 (2009) (describing the numerous sources of environmental degradation along the fossil fuel "production stream").

energy demand. Solar is less than a tenth of a percent. The incentives are all wrong. Burning coal is still by far the cheapest way to produce electricity. And because energy is so cheap, we're wasting it like crazy. So the question is: How do we shift incentives so that people start making different choices? And who are the "people" whose choices need to change?

A. Identifying the Regulatory Targets: Corporations and Individuals

The following graph, showing U.S. greenhouse gas emissions by economic sector, is by now commonplace in discussions about the climate crisis.

Aggregate U.S. Greenhouse Gas Emissions, by Sector (2006):

Figure 1⁸⁰

As Michael Vandenberg and Anne Steinemann have pointed out, this graph frames the problem as: Industry Acting Badly.⁸¹ And it suggests that the solution is simply to change the way industry makes decisions. Electric utilities need incentives not to burn coal. Car companies need incentives to build fuel efficient cars. Manufacturers need to get creative about reducing their carbon footprints. The agricultural sector needs to find ways to stop relying on energy intensive fertilizers and pesticides.

In short, the problem is industry acting badly, and the solution is for government to rein them in with regulation. This is the way most of us started out looking at this problem. And it was the natural way to look at it. We've always viewed environmental issues as a struggle between the big bad corporations that pollute our air and water and innocent individuals who fall victim to that pollution. Think Love Canal. Think Erin Brochovitch. Think Silkwood.

⁸⁰ U.S. Dep't of Transportation, Transportation and Climate Change Clearinghouse, <http://climate.dot.gov/about/transportations-role/overview.html>.

⁸¹ See Michael P. Vandenberg & Anne C. Steinemann, *The Climate Neutral Individual*, 82 N.Y.U. L. Rev. 1673, 1688 (2007).

But climate change is about a pollutant that is so ubiquitous, so widespread, and that is tied so tightly to one of the fundamental drivers of our economy – how we produce energy – that it’s implicated in virtually everything we do. We’re each adding to the store of greenhouse gases in the atmosphere every time we turn on our computers or get in our cars. This arguably makes the climate change problem fundamentally different from any environmental issue we’ve seen before.

Corporate decision making and corporate power are undoubtedly at the root of the problem and major drivers of the failure of our political institutions to confront the climate crisis and of the massive disinformation campaign that has created widespread public misunderstanding of the issue for the past two decades.⁸² And, indeed, corporations have had—and continue to have—an enormous influence on the decisions that individuals make, from buying SUVs to living in suburban McMansions. Thus, corporations and the incentives they face must remain a primary target of any regulatory scheme to combat the climate crisis. But this time, there may need to be a secondary target as well. It may not be enough to focus solely on corporate decision making. Even if tomorrow, we get all the electric utilities to cut their greenhouse gas emissions in half, if we as individuals keep leaving our computers on all night and buying bigger and better plasma TV screens, we are not going to solve the problem. Similarly, Detroit could start making more energy efficient cars, but if people keep increasing the number of miles they drive every year, it’s not going to matter.⁸³

Hidden in the graph above are a raft of individual choices that also have a significant impact on CO2 emissions. Vandenberg and Steinemann estimate that the emissions resulting from individual choices amount to 32 percent of total U.S. carbon output.⁸⁴ Another study

⁸² See Amy Sinden, *Climate Change and Human Rights*, 27 J. LAND RESOURCES & ENVTL. L. 255 (2007).

⁸³ John C. Dernbach, *Overcoming the Behavioral Impetus for Greater U.S. Energy Consumption*, 20 PAC. MCGEORGE GLOBAL BUS. & DEV. L.J. 15, 19 (2007). See also Jack N. Barkenbus, *Putting Energy Efficiency in a Sustainability Context: The Cold Facts About Refrigerators*, 48 ENVIRONMENT 10, 13-16 (2006) (noting that though refrigerator efficiency has improved 3 or 4 fold since the 1970’s, electricity demand from refrigerators “has remained comparable in absolute terms” as the size of refrigerators and number of units per household has increased).

⁸⁴ Vandenberg & Steinemann, *supra* note 81, at 1690, 1694 (using statistics from 2000, and defining “individual behavior to include only those behaviors that are under the direct, substantial control of the individual and that are not undertaken in the scope of the individual’s employment.”); see also GERALD T. GARDNER & PAUL C. STERN,

estimated individual emissions at 40 percent.⁸⁵ The following graph shows how these individual choices break down.

Individual Carbon Dioxide Emissions, by Source (2000):

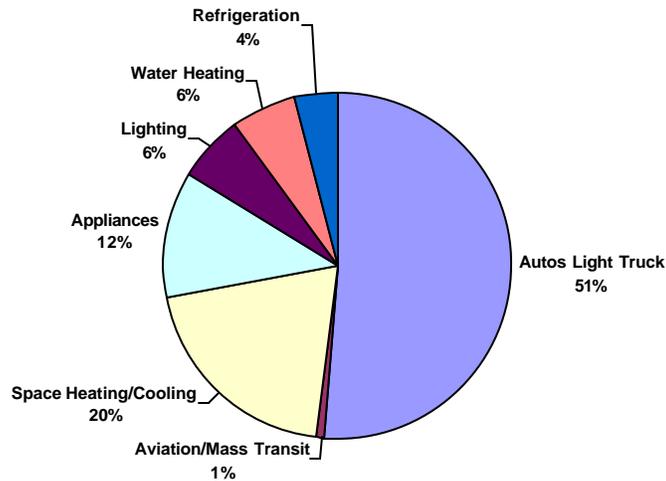


Figure 2⁸⁶

Individuals impact CO₂ emissions through their decisions about how much to drive, what kind of car to drive, how much to fly, whether to insulate their homes, where to set the thermostat, what kinds of appliances to buy, what kinds of light bulbs to use, and so on.

Thus, unless we want to leave 32 to 40 percent of emissions out of our efforts entirely, we have to find a way not only to change corporate behavior, but to change individual behavior as well. The most powerful tool that government can use to affect corporate and individual behavior is undoubtedly economic incentives.⁸⁷ But particularly with

ENVIRONMENTAL PROBLEMS AND HUMAN BEHAVIOR 258 tbl.10-1 (2d ed. 2002)(finding households responsible for 32.4% of U.S. energy use in 2000).

⁸⁵ Shui Bin & Hadi Dowlatabadi, *Consumer Lifestyle Approach to U.S. Energy Use and the Related CO₂ Emissions*, 33 ENERGY POL'Y 197, 206 (2005)(using statistics from 1997).

⁸⁶ Based on data in Vandenberg & Steinemann, *supra* note 84, at 1693 tbl. 1.

⁸⁷ Paul C. Stern, Information, Incentives, and Proenvironmental Consumer Behavior, 22 J. Consumer Pol'y 461, 469 (1999)(?) (large price increases may be nec to induce changes in consumer behavior); Newspaper articles from last summer re: gas price increase.

respect to individual behavior, there is another force that arguably plays an important role as well—social norms.⁸⁸

B. Shifting Individual Incentives through Social Norms

Social scientists have long understood that individual choices are shaped in part by social norms.⁸⁹ In many contexts, people act in ways that cannot be entirely explained by a rational, self-interested calculus of material costs and benefits. A customer at a restaurant in a town she will never visit again leaves a 20 percent tip for the waiter. A person carries an empty soda can an extra five blocks down the street in order to drop it in a recycling bin. A teenager lights up a cigarette, fully aware that smoking increases her risk of dying young from lung cancer. All of these commonplace behaviors are difficult to explain without reference to social norms. As Cass Sunstein puts it, “[n]orms can tax or subsidize choice.”⁹⁰

As the above examples show, social norms can have both positive and negative effects on individual and societal well-being. But it is well-recognized that social norms frequently play a salutary role in

⁸⁸ Social norms can sometimes shape corporate behavior as well, though the evidence on this is mixed. Gunningham & Kagan, 2004(?) (firms react differently to social pressures, depending on attitudes of managers); Dorothy Thornton, Robert A. Kagan, & Neil Gunningham, *When Social Norms and Pressures are Not Enough: Environmental Performance in the Trucking Industry*, 43 *Law & Soc’y Rev.* 405 (2009) (social and normative pressures for better environmental performance minimal in the highly competitive trucking industry made up of many low-visibility firms with low profit margins); Robert A. Kagan, et al., *Explaining Corporate Environmental Performance: How Does Regulation Matter?* 37 *Law & Soc’y Rev.* 51 (2003) (finding 16 pulp and paper mills all overcomplied with legal water pollution requirements despite high pollution control costs); Alex Mehta & Keith Hawkins, *Integrated Pollution Control and its Impact: Perspectives from Industry*, 10 *J. Envtl. L.* 61 (1998).
⁸⁹ See Richard H. McAdams, *The Origin, Development, and Regulation of Norms*, 96 *Mich. L. Rev.* 338 (1997); Lawrence Lessig, *The Regulation of Social Meaning*, 62 *U. CHI. L. REV.* 943 (1995); Philip Pettit, *Virtus Normativa: Rational Choice Perspectives*, 100 *ETHICS* 725 (1990); Judith Blake and Kingsley David, *Norms, Values, and Sanctions*, *HANDBOOK OF MODERN SOCIOLOGY* 456, 461 (Robert E.L. Faris, ed. (1964) (“No one can doubt that norms exercise *some* influence on behavior, but the question of *how much* influence they exercise is highly debatable.”); MAX WEBER, *THE PROTESTANT ETHIC AND THE SPIRIT OF CAPITALISM* 27 (Talcott Parsons, trans. 1958) (“The magical and religious forces, and the ethical ideas of duty based upon them, have in the past always been among the most important formative influences on conduct.”). McAdams defines social norms as “informal social regularities that individuals feel obligated to follow because of an internalized sense of duty, because of a fear of external nonlegal sanctions, or both.” McAdams, *supra* at 340.

⁹⁰ Cass R. Sunstein, *Social Norms and Social Roles*, 96 *Colum. L. Rev.* 903, 910 (1996).

lessening collective action problems.⁹¹ Where some action would impose more material costs than benefits on the individual but nonetheless promote the public good, social norms may develop favoring such actions despite the negative individual cost-benefit calculus. There are innumerable examples in daily life. Why do people vote, contribute to public radio, clean up after their dogs, keep their lawns mowed, or recycle? In each of these situations, social norms produce a sense of obligation that causes people to act to promote the public good even though the material costs to the individual outweigh the material benefits.⁹² To the extent that social norms are grounded in the esteem one receives from others,⁹³ it makes sense that such norms would often develop, since people are generally likely to “approve[] of nearly everyone who benefits [them] in some respect through performing a collectively beneficial action.”⁹⁴

The climate crisis, of course, stems from a massive collective action problem. While it is undoubtedly in our collective interest to reduce greenhouse gas emissions, for each of us individually, the costs of making such reductions clearly outweigh the benefits. Perhaps it is no surprise, then, that we are just beginning to see the emergence of a new social norm favoring the reduction of individual greenhouse gas emissions.⁹⁵ This new norm celebrates the individual who reduces her “carbon footprint” to a minimum or, better yet, achieves “carbon neutrality.” There are now over a dozen different websites that help individuals calculate their personal carbon footprints.⁹⁶ It is impossible for a member of our industrialized society to literally bring her carbon emissions to zero, but these sites encourage people to become “carbon neutral” by buying offsets to compensate for the emissions they cannot eliminate. One can plant 100 trees in Costa Rica to make-up for a trans-Atlantic plane flight, for example.

⁹¹ See Sunstein, *supra* note 90, at 918; Lessig, *supra* note 89, at 993-97; ROBERT C. ELLICKSON, *ORDER WITHOUT LAW: HOW NEIGHBORS SETTLE DISPUTES* 167-83 (1991); EDNA ULLMAN-MARGALIT, *THE EMERGENCE OF NORMS* 18-73 (1977); Pettit, *supra* note 89, at 743-48.

⁹² Social norms may operate externally – motivating people to act in a certain way in order to gain the esteem of other members of the community, or internally, to the extent that people internalize norms and thus feel feelings of guilt or shame when they fail to comply with them whether or not others are aware of the violation... See McAdams at 376-77

⁹³ See McAdams, *supra* note 89, at 355-75.

⁹⁴ Philip Pettit, *Virtus Normativa: Rational Choice Perspectives*, 100 *ETHICS* 725, 744 (1990).

⁹⁵ See Vandenberg & Steinemann, *supra* note 81, at 1717-20.

⁹⁶ J. Paul Padgett et al., *A Comparison of Carbon Calculators*, 27 *ENVTL. IMPACT ASSESSMENT REV.* --(2007).

This new emerging norm of carbon neutrality, or carbon footprint minimization, is probably not deep and widespread enough yet to have made a measurable difference in carbon emissions, but the question is, could it become something that appeals across a wider swath of our culture so that it begins to affect the choices of more than just the granola set?

There is certainly precedent for such a thing. Social norms can change, and they can change relatively quickly. The shift in norms about public smoking in just the last 5 or 10 years is a striking example. Indeed, quickly shifting social norms also played a role in the last big global environmental crisis. When the message got out to the public that aerosol cans were causing a hole in the ozone layer that was going to give us all skin cancer, American's use of aerosol cans dropped by half even before any mandatory regulation was put in place.⁹⁷

Cass Sunstein describes quickly changing social norms as “norm cascades,” and cites as examples the fall of communism and the dismantling of apartheid in South Africa.⁹⁸ He argues that norms can also shift quickly through what he calls the “norm bandwagon” effect, “when the lowered cost of expressing new norms encourages an ever-increasing number of people to reject previously popular norms, to a ‘tipping point’ where it is adherence to the old norms that produces social disapproval.”⁹⁹ In a similar vein, McAdams describes a feedback effect that can occur to create such tipping points and quickly strengthen or weaken norms.¹⁰⁰ As the number of people in a community engaging in a disfavored activity drops, “the disesteem for engaging in [that activity] is concentrated on fewer individuals; because fewer smoke or wear fur, one is now more (negatively) distinguished by smoking or fur wearing.”¹⁰¹ In such a way, one can imagine the pace of norm change accelerating so as to cause a “tipping point” or “bandwagon effect.”

McAdams also distinguishes between concrete and abstract norms. Concrete norms tend to be stated in narrow terms—“clean up after your dog”—while abstract norms are more general—“be a good

⁹⁷ See Michael P. Vandenbergh, *Individual Carbon Emissions: The Low-Hanging Fruit*, 55 U.C.L.A. L. Rev. 1701, 1715 (2008).

⁹⁸ Sunstein, *supra* note 90, at 912.

⁹⁹ Sunstein, *supra* note 90, at 912. One can imagine, for example, that climate change regulation might lower the cost of expressing the carbon neutrality norm (or conversely, raise the cost of expressing an opposite norm of energy profligacy), and thereby help to trigger a “norm bandwagon.”

¹⁰⁰ See McAdams, *supra*, note 89, at 368; see also THOMAS C. SCHELLING, *MICROMOTIVES AND MACROBEHAVIOR* 101-110 ((1978).

¹⁰¹ McAdams, *supra*, note 89, at 368.

neighbor.”¹⁰² Abstract norms are more likely to be broadly shared and internalized, while concrete norms are more context specific and enforced by external sanctions (the withholding of esteem).¹⁰³ Abstract norms tend to be old and stable, while concrete norms can change more quickly.¹⁰⁴ In particular, concrete norms can develop quickly when tied to well-established abstract norms. Thus, a concrete anti-littering norm may develop because a consensus forms that littering violates the abstract norm, “be a good neighbor.”¹⁰⁵

The carbon neutrality norm that is currently emerging is primarily confined to a fairly narrow subset of the general population, generally on the political left. As a concrete norm, however, it may have the potential to spread far more broadly, across cultural groups, if it can be linked to the abstract norm of “personal responsibility.” The personal responsibility norm is widespread in our society, and particularly strong among cultural groups on the political right that have not recently been strongly associated with environmental causes.¹⁰⁶

The bigger challenge may actually be trying to expand the norm across social classes. The problem is that it is virtually impossible right now for anyone to actually eliminate all greenhouse gas emitting behaviors. So the only realistic way for an individual to achieve the carbon neutrality goal is to shell out money to buy carbon offsets. As long as that’s true, the carbon neutrality norm is unlikely to gain much traction outside the upper and upper-middle class.¹⁰⁷

Any attempt to use law to shape or influence individual behavior must take social norms into account. Law can, of course, influence behavior directly by prohibiting or penalizing certain activities. But law can also serve an expressive function and thereby influence social norms:

[L]aw might attempt to express a judgment about the underlying activity in such a way as to alter social norms . . . [Through] [e]ducation campaigns [or] . . . [t]hrough time, place, and manner restrictions or flat

¹⁰² McAdams, *supra* note 89, at 382.

¹⁰³ McAdams, *supra*, note 89, at 383. This is related to Lawrence Lessig’s notion of “social meaning,” which McAdams views as the relationship of a concrete to an abstract norm. *See id.* at 384-85; Lessig, *supra*

¹⁰⁴ McAdams, *supra*, note 89, at 394-97.

¹⁰⁵ McAdams, *supra* note 89, at 383.

¹⁰⁶ *See* Vandenberg & Steinemann, *supra* note 81, at 1713-17, 1720 (“Carbon neutrality . . . squares well with the personal responsibility norm.”).

¹⁰⁷ *See* Vandenberg & Steinemann, *supra* note 84, at 1723-24.

bans, for example, the law might attempt to portray behavior like smoking, using drugs, or engaging in unsafe sex as a sign of individual weakness.¹⁰⁸

Similarly, climate change regulation could begin to portray profligate energy use as a sign of individual weakness—a failure to take personal responsibility for one’s fair share of the climate crisis—and minimizing one’s carbon footprint as a sign of virtue.

All of this suggests that the task of climate change regulation should be not just to try to shift the financial incentives that corporate and individual actors face, but also to try to shift social norms.¹⁰⁹ A law that lowers the cost of expressing the newly emerging carbon neutrality norm might help to spur a “norm bandwagon.”¹¹⁰ A law that frames the issue of greenhouse gas emissions in terms of each individual’s “fair share,” might help to spur a concrete norm of minimizing one’s carbon footprint by connecting it to the abstract norm of personal responsibility. Shifting the social norms that shape individual behavior could, of course, also have a salutary effect on corporate behavior, as corporations try to be green in an effort to attract consumers who have adopted the carbon neutrality norm. Additionally, it could have an effect on politics, as voters become more inclined to support carbon regulation.¹¹¹

The question is, how do we design climate change regulation in way that takes into account this complicated dynamic? How do we design climate change regulation that shifts the economic incentives on corporations and individuals sufficiently to allow us to dramatically reduce greenhouse gas emissions, but that does so in a way that is politically palatable and that reinforces this nascent norm of carbon neutrality rather than undermining it?

¹⁰⁸ Cass R. Sunstein, *On the Expressive Function of Law*, 144 U. Pa L. Rev. 2021, 2034 (1996).

¹⁰⁹ Sunstein, *supra* note 88, at 908 (“A regulatory policy that targets social norms . . . [can] complement . . . existing regulatory approaches.”); Michael P. Vandenbergh, *Beyond Elegance: A Testable Typology of Social Norms in Corporate Environmental Compliance*, 22 Stan. Envtl. L. J. 55, 72 (2003)(observing that law can both trigger and shape social norms).

¹¹⁰ See Paul C. Stern, *Toward a Coherent Theory of Environmentally Significant Behavior*, 56 J. Soc. Issues 407, 419 (2000)(efforts to change individual environmental behaviors through combination of economic incentives and information often more effective than the sum of the two approaches separately).

¹¹¹ See Vandenbergh & Steinemann, *supra* note 81, at 1723 (suggesting that it is “likely that individuals who commit to carbon neutrality . . . will become more supportive of government regulation”).

III. Designing the Regulatory Solution

A. Cap and Trade versus Tax

Understanding the solution proposed here requires some background in environmental regulatory design. Most everyone agrees that the two main contenders for climate change regulation are a carbon tax or a cap and trade program.¹¹² But how would those two approaches actually work, and how would they differ?

Under a pollution tax, each polluter has to pay some amount of money to government for every unit of pollution she releases into the atmosphere. The good thing about it, and the reason economists like it is because you end up with cheaper pollution reductions than you would if you just wrote a regulation that told each polluter to cut pollution levels by a certain amount. Under a tax, the polluters for whom pollution reduction is cheap will reduce pollution levels rather than pay the tax. But the polluters for whom pollution reduction is expensive will simply pay the tax rather than reduce pollution.¹¹³ The government, by adjusting the tax level up or down can try to hit whatever overall pollution level seems most desirable.¹¹⁴

Under a cap and trade system, the government sets an overall cap on the amount of that pollutant it's going to allow all sources in the aggregate to emit. Then it prints up a number of allowances that are equal to the total amount of the cap, and figures out some way to distribute them to the polluters. Finally, it tells the polluters they have to have an allowance for each unit of pollution they emit, but that they can buy and sell the allowances among themselves. This creates a market in pollution allowances.

As with a tax, those for whom pollution reduction is cheapest do most of the reducing. Firms for whom pollution reduction is cheap will reduce their pollution levels a lot and then sell their excess allowances and make a profit. Firms for whom reducing pollution costs more than

¹¹² See Robert N. Stavins, *A Meaningful U.S. Cap and Trade System to Address Climate Change*, 32 HARV. ENVTL. L. REV. 293, 296 (2008).

¹¹³ TOM TIETENBERG, ENVIRONMENTAL AND NATURAL RESOURCE ECONOMICS 51-54 (1992).

¹¹⁴ In an economist's ideal world, the government would set tax rate at the dollar amount precisely equal to the marginal social cost of the pollutant and let the market determine the overall pollution level. In practice, however, such precise calculations of social costs are impossible. See Amy Sinden, *The Tragedy of the Commons and the Myth of a Private Property Solution*, 78 U. COLO. L. REV. 533, 555 & n. 65 (2007).

the price of an allowance will prefer to simply buy extra allowances on the market and pollute more. So you get a cost-effective system of pollution reduction, just like you got under the tax.¹¹⁵ In fact, from the standpoint of economic theory, the two systems are generally equivalent.¹¹⁶

From a political standpoint, however, there are significant differences. There are a couple of reasons why cap and trade is more politically palatable. First, and maybe most important, one uses the toxic term “taxes” and the other uses the near sacred term “markets.”

But there’s another reason the big corporations like cap and trade that goes beyond semantics. It has to do with where the money goes. Under a tax scheme, the money goes to the government. But where does the money go under a cap and trade scheme? It all depends on how the allowances are distributed initially. If they’re auctioned off by the government, a cap and trade scheme is much like a tax.¹¹⁷ The firms have to pay for the privilege of polluting, and the government gets the

¹¹⁵ The idea was first developed by Canadian economist J.H. Dales in 1968. J. H. DALES, *POLLUTION, PROPERTY, AND PRICES* (1968). Nearly two decades later, it was introduced into the legal literature by Bruce Ackerman and Richard Stewart. See Bruce A. Ackerman & Richard B. Stewart, *Reforming Environmental Law*, 37 *Stan. L. Rev.* 1333 (1985); Bruce A. Ackerman & Richard B. Stewart, *Reforming Environmental Law: The Democratic Case for Market Incentives*, 13 *Colum. J. Envtl. L.* 171 (1988); Richard B. Stewart, *Controlling Environmental Risks Through Economic Incentives*, 13 *Colum. J. Envtl. L.* 153 (1988); Richard B. Stewart, *Economics, Environment, and the Limits of Legal Control*, 9 *Harv. Envtl. L. Rev.* 1 (1985).

¹¹⁶ More precisely, the economics literature shows that where the regulator knows the marginal costs of pollution control, then taxes and trading are equivalent – that is, they can be used to achieve exactly the same outcomes. See M. L. Weitzman, *Prices Versus Quantities*, 41 *REV. ECON. STUDIES* 477 (1974); WILLIAM J. BAUMOL & WALLACE E. OATES, *THE THEORY OF ENVIRONMENTAL POLICY* 58 (2nd ed. 1988) (“It is clear that when the relevant functions are known with certainty by a welfare-maximizing regulator, exactly the same result will be achieved by a market in allowances and by a system of effluent charges.”). Where the costs of control are not known (as is typically true in practice), there is substantial debate as to which system is better. See, e.g., Weitzman, *supra* (where there is uncertainty about the costs of, which instrument produces the more efficient result will depend on the relative slopes of the marginal benefit and cost curves); Robert N. Stavins, *Correlated Uncertainty and Policy Instrument Choice*, 30 *J. Envtl. Econ. & Management* 218 (1996) (where there is uncertainty about both costs and benefits, and where those two uncertainties are correlated—if costs are *under-estimated*, benefits are also *under-estimated*—then trading will be more efficient); William Pizer, *Prices vs. Quantities Revisited: The Case of Climate Change* (RFF, Discussion Paper 98-02, Oct. 1997); William Pizer, *Prices vs. Quantities Revisited: The Case of Climate Change* (RFF, Discussion Paper 98-02, Oct. 1997) (taxes better in climate change context); WARWICK J. MCKIBBEN & PETER J. WILCOXEN, *CLIMATE CHANGE POLICY AFTER KYOTO: BLUEPRINT FOR A REALISTIC APPROACH* 62-66 (2002) (same);

¹¹⁷ See Stavins, *supra*, note 112, at 349.

money. But the big companies always lobby for a different distribution scheme. Often they're successful in getting a system in which the allowances are handed out to the firms for free, based on some formula that's tied to previous pollution levels or output.¹¹⁸

Finally, there may also be a third reason why cap and trade is so much more politically palatable than taxes. It appeals to people's gambling instinct—their desire to play the market and try to win. There's something passive about taxes. The IRS tells you what to pay and you pay it. Cap and trade, on the other hand, by creating a market, gives the companies a more active role. Sure, they have to shell out money sometimes to buy allowances, but if they develop a new cheaper technology or figure out how to save energy, maybe they can sell allowances too and make money. And if they time things right, maybe they can make money on market fluctuations.

B. Upstream versus Downstream

Another decision a policy maker has to make in designing climate change regulation is where along the production stream to apply the tax or the allowance requirement.¹¹⁹ One choice is to apply it upstream, to the people who produce or import fossil fuels. Another is to apply it downstream, to the people who ultimately transform the oil or the coal into CO₂ by burning it in their gas tanks or in their power plants. When it comes to taxes, most everyone agrees that it far simpler administratively to apply them upstream, since there are simply far fewer actors at that end.¹²⁰ And it creates all the same financial incentives,

¹¹⁸ See GAO, *supra* note 3, at 15; see also Robert B. Reich, Op-Ed., *How About a Cap-and-Trade Dividend?*, WALL ST. J., June 4, 2008, at A21 (warning that auction revenues are likely to become “fish bait to industries that might qualify for some of them”). Under the Waxman-Markey bill, most allowances would be handed out to electric utilities and fuel suppliers for free, at least in the early years of the program. Under the EU emissions trading program, the vast majority of allowances are also grandfathered to industry. See World Bank, *State and Trends of the Carbon Market 2008*, 10 (May 2008), available at: <http://siteresources.worldbank.org/NEWS/Resources/State&Trendsformatted06May10p.m.pdf>. To the extent that utilities use the free allowances to avoid raising energy prices on consumers, such a program may actually be less effective at encouraging conservation.

¹¹⁹ David M. Driesen & Amy Sinden, *The Missing Instrument: Dirty Input Limits*, 33 HARV. ENVTL. L. REV. 66, 77 (2009); Stavins, *supra* note 112, at 309; Stavins, *supra* note 112, at 309; J.R. DeShazo & Jody Freeman, *Timing and Form of Federal Regulation: The Case of Climate Change*, 155 U. Pa. L. Rev. 1499, 1546 (2007).

¹²⁰ Frank Muller & J. Andrew Hoerner, *Greening State Energy Taxes: Carbon Taxes for Revenue and the Environment*, 12 PACE ENVTL. L. REV. 5, 41 (1994).

since any tax applied upstream gets passed along downstream to the ultimate consumer.¹²¹

When it comes to cap and trade, on the other hand, most people have tended to think in terms of emissions.¹²² Indeed, the general idea of cap and trade is often talked about as “emissions trading,” perhaps because the most prominent and well-known cap and trade program is the acid rain emissions trading program under the 1990 Clean Air Act, in which coal-fired power plants trade allowances for the emission of sulfur dioxide, a precursor to acid rain.¹²³ In the climate change context, it is tempting to simply follow that successful model and design a system that imposes an allowance requirement on greenhouse gas emissions. But, in fact, it is very difficult to design a cap and trade system for climate change that applies only downstream to emissions and yet covers most of the greenhouse gas emissions produced in the economy.¹²⁴ Once you start thinking about the transportation sector, you can see the problem. Are we going to everyone who drives a car to hand in allowances for the emissions they produce? So, all the bills in Congress that create economy-wide cap and trade programs apply the allowance requirement upstream to producers and importers of fuel, at least for the transportation sector.¹²⁵

C. Revenue-Neutral Cap and Trade

This brings us back to the original question: How do we design climate change regulation in a way that shifts the economic incentives on corporations and individuals sufficiently to dramatically reduce greenhouse gas emissions, but that does so in a way that’s politically palatable and that reinforces the nascent norm of carbon neutrality rather than undermining it? Shifting the incentives, of course, means raising the price of fossil fuels, but raising prices in the midst of a recession raises more than a few political hackles.

One way to neutralize the negative effect of rising energy prices on consumers while preserving the incentives they create is to return all the revenue generated by a tax back to consumers in the form of tax rebates or credits, or by lowering other taxes. This idea—dubbed a “revenue neutral tax”—has been widely advocated by many supporters

¹²¹ See Stavins, *supra* note 112, at 310.

¹²² Driesen & Sinden, *supra* note 119, at 80-81.

¹²³ See 42 U.S.C. §§ 7401-7671(q).

¹²⁴ Driesen & Sinden, *supra* note 119, at 80-81

¹²⁵ See Pew Center on Global Climate Change, *Economy-Wide Cap-and-Trade Proposals in the 110th Congress*, available at: <http://www.pewclimate.org/docUploads/Chart-and-Graph-120108.pdf>.

of a carbon tax.¹²⁶ And a version of it has actually been implemented in British Columbia.¹²⁷ But in the U.S. Congress, the idea has made little headway. Maybe the “tax” label is simply too toxic to overcome, even when the tax is not one that will actually cost consumers more money.

But this raises another possibility. Why not design a cap-and-trade program that’s “revenue neutral”? There are various ways such a program could be designed. One way—the way that’s most like the tax scheme—is simply to auction off all of the allowances issued under the cap-and-trade program and then return all of those revenues to consumers, in the form of tax rebates, credits, or by lowering taxes.¹²⁸ One such approach, which would simply distribute all auction revenues in equal shares to each legal resident in the form of a “dividend” check, has recently been dubbed “cap and dividend” and has been advocated by former Secretary of Labor, Robert Reich, among others.¹²⁹ Representative Chris Van Hollen from Maryland introduced a climate bill earlier this year that took this approach, called “The Cap and Dividend Act of 2009,” but it never made it to the House floor.¹³⁰

But there’s another way to design a revenue-neutral cap-and-trade that has not been discussed much, but that might offer certain advantages. Rather than auctioning off allowances and then returning the money to individuals, the government could instead simply distribute the allowances themselves to individuals to begin with and allow them to

¹²⁶ See sources cited *supra* note 69.

¹²⁷ See Duff, *supra* note 67.

¹²⁸ See GAO, *supra* note 3, at 11; Chris Holly, *Should Climate Bill Revenues Go for Consumer Aid?*, ENERGY DAILY, May 12, 2008, at 1; R. Kopp, R. Morgenstern, W. Pizer, and M. Toman, *A Proposal for Credible Early Action in U.S. Climate Policy* (Resources for the Future 1999).

¹²⁹ Robert B. Reich, Op-Ed., *How About a Cap-and-Trade Dividend?*, WALL ST. J., June 4, 2008, at A21; PETER BARNES, CLIMATE SOLUTIONS: WHAT WORKS, WHAT DOESN’T AND WHY: A CITIZEN’S GUIDE (2009). Peter Barnes, a founder of Working Assets, a socially responsible mutual fund, coined the term “cap and dividend” and advocates this approach on his website, capanddividend.org. See Dallas Burtraw, Richard Sweeney, & Margaret Walls, *The Incidence of U.S. Climate Policy: Alternative Uses of Revenues from a Cap-and-Trade Auction* 24 (RFF, June 2009) (“[R]eturning revenues in a lump-sum manner in a so-called cap-and-dividend approach makes for an overall progressive policy [but] [n]ot surprisingly, expanding the Earned Income Tax Credit is even more progressive.”), available at: <http://www.rff.org/RFF/Documents/RFF-DP-09-17-REV.pdf>.

¹³⁰ Cap and Dividend Act of 2009, H.R. 1862 (111th Cong., 1st Sess. 2009). See Chris Holly, Van Hollen Climate Bill to Feature “Cap and Dividend” Energy Daily (Feb. 26, 2009).

sell them to the firms that need them.¹³¹ I'll call this approach "fair-share cap-and-trade."

Such a system might work in the following way: First, the allowance requirement would be applied upstream. All producers or importers of fossil fuels would be required to have an allowance for each ton of carbon embodied in the fuel that they sold.¹³² Then, the government would set a cap and print a number of allowances equal to the cap. But rather than auctioning the allowances off to the fuel producers, or grandfathering them—passing them out for free to the producers based on how much fuel they produced last year—the government would distribute them in equal shares to each man, woman, and child in the country.¹³³ The EPA, or some other appropriate agency, would simply take the cap, divide by the U.S. population, and pass out the allowances.¹³⁴

On January 1st each year, each person in the country would get their allotment of allowances in the mail or over the internet. The oil and coal producers would have to buy up enough of these allowances to cover their sales for the year. Any time during that year, an individual could bring her allowances down to the bank or the post office or go online and sell them on the open market. She could decide to do it right away on January 2nd, or she could decide to wait, if she thought the price will go up in a couple of months.

Then each individual could go online and calculate her carbon footprint. If it was more than her allotment of allowances, then she would know she was using more than her fair share of carbon and that she was going to come out behind financially. The money she earned

¹³¹ See The Foundation for the Economics of Sustainability, *Cap and Share: A Fair Way to Cut Greenhouse Emissions* (May 2008), available at: http://www.capandshare.org/download_files/C&S_Feasta_booklet.pdf.

¹³² Applying the allowance requirement upstream would allow the scheme's coverage to be economy-wide, and would mean that the number of covered entities would be a manageable 2,000 or so. See Ctr. For Clean Air Policy, *U.S. Carbon Emissions Trading: Description of an Upstream Approach* 6 (1998).

¹³³ Obviously, some specific criteria for eligibility would need to be established. Rep. Chris Van Hollen's Cap and Dividend bill would provide a dividend to "any individual with a valid social security number (other than a nonresident alien individual) who is lawfully present in the United States." Cap and Dividend Act of 2009, H.R. 1862 (111th Cong., 1st Sess. 2009), Sec. 9912(a)(2).

¹³⁴ The government would need to withhold a small number of allowances to cover the costs of administering the system. See GAO, *supra* note 3, at 9. This would also be true under the cap and dividend approach described above. See Cap and Dividend Act of 2009, H.R. 1862 (111th Cong., 1st Sess. 2009), Sec. 9911(c)(1) (allocating no more than 0.5 percent of auction revenues for administrative expenses).

from selling her allowances would be less than the extra money she would pay out in increased energy prices. But if her carbon footprint was lower than her allocation of allowances, then she would know she was coming out ahead—both morally and financially.

1. Advantages of a Fair-Share Cap-and-Trade

In purely economic terms, a fair-share cap-and-trade is not particularly different from a cap-and-dividend approach, except that it probably involves more transaction costs. A neo-classical economist might view the two systems as equivalent. But from the point of view of social norms and the expressive value of law, the two systems may be quite different. Giving an individual an allotment of pollution allowances arguably sends a very different message than a rebate check. The rebate is money. It comes in a generic form, and it gets cashed and spent or added to other sums of money in a bank account. But an allotment of pollution allowances is something different. Admittedly, its ultimate value comes from the fact that it can be traded for money, but paying the “dividend” to the individual in the form of an allowance allotment rather than a check, may draw a clearer symbolic connection to the climate crisis. Rather than receiving a check for a sum of money, one receives a certificate (or set of certificates) for some number of tons of carbon dioxide emissions. In this way, the allowance allotment creates a link between the individual and the larger public enterprise of combating the global threat of climate change.

Because the allowance allotment represents each individual’s “fair share” of the absorptive capacity of the atmosphere, it has the capacity to take on moral significance. The issuance by the government of a quantity of allowances equal to the cap—the legitimate or “safe” amount of greenhouse gas we as a community have decided to release into the atmosphere—and the distribution of those allowances to each individual in equal shares tends to frame the climate change issue in a way that begins to bring into focus its moral content. It frames the problem as one involving a limited but commonly-owned resource to which each individual in the country has an equal claim. It may well be hopelessly naïve to assume that busy Americans will stop to ponder the grand moral significance of an award of carbon allowances. But they will understand their financial significance. And to the extent that the financial significance of an individual’s allocation of carbon allowances links to the idea of an individual’s “carbon footprint,” there is perhaps some hope that the moral significance of one’s “fair share” of carbon emissions will begin to resonate as well.

While the match will not be perfect, we can assume that an individual's "fair share" allotment of carbon allowances should be worth an amount of money that roughly offsets the increased energy costs she would pay if she were using just her "fair share" of fossil-fuel-based energy, carbon-intensive consumer goods, and so on. This is because all the allowances issued will have to be bought up by fossil fuel producers to offset the CO₂ emissions embodied in each unit of fuel they sell. This will cause producers to increase the price of fuel and those price increases will be passed on to consumers all along the production stream, including consumers of fuel, electricity produced from fuel, goods that require fuel or electricity to produce, and so on. While there will, of course, be distortions, the total price paid to individuals for all of the allowances in the aggregate should roughly correspond to the total aggregate price increases throughout the economy due to the imposition of the allowance requirement on fuel producers. If these price increases, like the allowances, were evenly distributed among all consumers, then for each individual the price she received for selling her allowances would be roughly equal to the aggregate price increases she faced over the course of the year as a result of the regulatory program. In actuality, of course, the price increases will not be evenly distributed throughout the population. Those with carbon intensive life-styles—those who use a lot of energy or consumer a lot of carbon intensive goods—will pay out more due to increased energy prices than they will receive from selling their allotment of allowances. On the other hand, those with low-carbon lifestyles will come out ahead—they will make more money from selling their allowances than they will have to pay out due to increased energy prices.

It is conceivable, at least, that the moral and financial significance of the "fair share" allowance allotment would be mutually reinforcing—that the combination of moral and financial motives would cause people to go to one of the many websites that allow one to calculate one's carbon footprint in order to gauge their moral and financial status. The link between one's carbon footprint and one's allowance allotment is simple and direct. A carbon footprint is measured in tons of CO₂ emissions per year. An individual's allowance allotment would also be counted in tons of CO₂ emissions and would represent the individual's equal share of the total tons of CO₂ emissions the nation has decided to emit in the aggregate for that year. Thus, to determine whether one's carbon footprint is within her "fair share," one would literally just compare her footprint (in tons) to her allowance allotment (in tons).¹³⁵ Everyone's allowance allotment (their "fair share") would

¹³⁵ It would be important to standardize the measure of emissions. (Explain difference between tons of carbon and tons of CO₂).

by definition be the same, so it would also be easy for people to compare notes with each other. It is not impossible to imagine that carbon footprints and people's progress in confining them to (or below) their fair share allotments might become a topic of water cooler chit chat, much in the way that people brag about having saved money buying a certain outfit on sale or by switching car insurance companies.

In this way, we can imagine that a fair-share cap-and-trade might actually reinforce the emerging norm of carbon neutrality or carbon footprint minimization. Financial incentives can certainly have an effect in helping new norms to develop.¹³⁶ And while any tax or cap-and-trade scheme that raises the price of fossil fuels aligns a financial incentive with the emerging social norm of carbon footprint minimization, a fair-share cap-and-trade makes the connection between one's carbon footprint and one's financial well-being obvious and easy to see. In addition, by connecting the idea of an individual's carbon footprint with the idea of an individual's "fair share" of carbon emissions, it frames the new carbon footprint minimization norm in a way that makes it easy to link to the abstract norm of personal responsibility. Certainly, the personal responsibility norm encompasses the idea that one should "pull one's weight" in contributing to a common enterprise, and, conversely, that one should not take more than her "fair share" of a common good.¹³⁷

Moreover, a fair-share cap-and-trade scheme would help to shape this new emerging norm in a way that would make it accessible to people at all socio-economic levels. As noted above, when the norm is framed as "carbon neutrality," it runs the risk of excluding low-income people because literal carbon neutrality is impossible and thus meeting the norm requires buying carbon offsets, which only the wealthy can afford. But a fair-share cap-and-trade frames the norm in terms of keeping one's carbon footprint within one's fair share. This is a goal that should be feasible for most people without buying offsets. And many of the actions people would take to comply with this norm would involve energy conservation and therefore would actually save them more money, over and above the income from selling their allowance allotments.

Finally, there is another potential benefit to such a scheme, which brings us back to the international dimensions of the climate crisis. By framing climate change as a problem involving a limited commonly-held resource to which each individual has an equal claim, fair-share cap-and-trade has the capacity to push people in this country to re-conceptualize

¹³⁶ See *supra* note 99, and accompanying text.

¹³⁷ See generally Vandenbergh & Steinemann, *supra* note 4, at 1713-17.

the climate crisis as an issue of justice. Once people in this country get used to thinking of the United States as having an aggregate cap on CO₂ emissions that should be allocated in equal shares to each person in the country, it is not a big leap to envision the absorptive capacity of the *global* atmosphere as a limited, commonly owned resource that should be allocated on a per capita basis to each person on earth in equal shares. This is how the developing world already sees the problem. Once the American public begins to conceptualize the problem that way also, we will be that much closer to being able to see eye-to-eye with China and India in international negotiations.

2. Implementation Issues

While a revenue-neutral cap-and-trade offers many advantages, it may also pose challenges in implementation that more traditional forms of cap-and-trade do not face. This section discusses some of the implementation issues that either a cap-and-dividend or a fair-share cap-and-trade might raise.

First, if distribution of either dividend checks or allowance allocations were truly to be universal, challenges would arise in identifying and locating every individual in the country. The simplest option administratively would be to use an existing distribution system, like the Internal Revenue Service (IRS).¹³⁸ But many poor people do not pay taxes or even qualify for the earned income tax credit, and thus are not on record at the IRS. To the extent that part of the justification for a revenue-neutral scheme is to, at least in part, remedy the regressive nature of a tax on energy, many would view the inclusion of the very poor as crucial to the legitimacy of the program.¹³⁹ Welfare and Social Security Administration records could reach another segment. Alternatively, or additionally, the government could administer an outreach effort to encourage others to file for their allowances.¹⁴⁰ But any of these approaches would still leave out a significant number of people. The Cap and Dividend Act of 2009 does not specify how it would deal with this problem. It simply makes all individuals with a social security number eligible for dividends and directs the Secretary of

¹³⁸ See GAO, *supra* note 3, at 13.

¹³⁹ See Mann, *supra* note 63, at 10125 (“Revenue recycling is the key to avoiding regressivity [in a carbon tax].”).

¹⁴⁰ Such an outreach effort was conducted in connection with the distribution of stimulus checks under the Economic Stimulus Act of 2008. See GAO, *supra* note 3, at 13.

the Treasury to whatever regulations or guidance documents are necessary to carry out the distribution of dividends.¹⁴¹

Under the fair-share cap-and-trade approach, a second set of concerns arise over the possibility that involving every individual in the country in the carbon allowance market would create the potential for widespread fraud. Indeed, the shady practices on Wall Street that have received so much attention lately in connection with the financial crisis make many people skeptical of cap and trade schemes in general.¹⁴² And some will worry that involving millions of unsophisticated individuals in the market could make things even worse.

Certainly, at a minimum, transaction costs would increase. A standard upstream cap and trade in which allowances were either auctioned by the government or handed out for free to fuel importers and producers who were required to have them would involve approximately 2,000 entities in the market.¹⁴³ Trades among these entities would likely involve thousands of allowances in a single deal. Indeed, in the auctions conducted under the Regional Greenhouse Gas Initiative—a carbon cap and trade program among states in the northeastern U.S.—allowances are only sold in blocks of 1,000.¹⁴⁴ Under a fair-share cap-and-trade, on the other hand, individuals might receive roughly 18 allowances per year—and even fewer as the cap declined.¹⁴⁵

Any trading program would need some one to act as broker—to connect sellers of allowances with those wishing to buy. If trades involved smaller quantities, brokerage fees as a percentage of overall allowance value would increase. Moreover, there is certainly a

¹⁴¹ See Cap and Dividend Act of 2009, H.R. 1862 (111th Cong., 1st Sess. 2009), Sec. 9912(c).

¹⁴² See, e.g. Thomas Friedman, *Show Us the Ball*, NYTimes (Apr. 7, 2009); Editorial, *California's Cap-and-Trade Won't Work: A Plan To Combat Greenhouse Gas Emissions Is Open to Abuse*, L.A. Times (Mar. 10, 2008), available at: <http://articles.latimes.com/2008/mar/10/opinion/ed-captrade10>; but see Editorial, *Carbon Markets Create a Muddle*, Financial Times (April 26, 2007)(contending that “intelligent regulatory regimes could prevent . . . gamesmanship” in carbon markets).

¹⁴³ See Ctr. For Clean Air Policy, *U.S. Carbon Emissions Trading: Description of an Upstream Approach* 6 (1998).

¹⁴⁴ See Kimberly E. Diamond, *First RGGI Carbon Allowance Auction Hits a Home Run*, 23 Nat'l Resources & Env't. 52 (2009).

¹⁴⁵ This estimate is based on the Waxman-Markey cap for 2016, the first year that program becomes close to economy-wide. Dividing that cap (5,482 million tons) by current U.S. population (307 million) yields an individual allotment of roughly 18 one-ton allowances. The cap, of course, would decline over time. The Waxman-Markey cap declines to 1,035 million tons in 2050, which comes to just over 3 allowances per person.

possibility that brokers will overcharge unsophisticated sellers of allowances for their services, much as unscrupulous businesses spring up in poor neighborhoods each spring taking exorbitant fees for assistance in filing claims for the earned income tax credit.

There are already widespread reports of fraud and misrepresentation to consumers in carbon offset markets,¹⁴⁶ but that is a very different context. An offset market is inherently far more prone to fraud than a market in capped allowances. Allowances are certificates issued by the government in a limited quantity that polluters must turn in for every unit of pollution they emit. Because they are by definition limited in quantity, absent counterfeiting or lax enforcement, an allowance trading scheme ensures that total emissions will stay below the cap. An allowance purchased and used by one polluter represents one less allowance in the pool available to be used by other polluters. Offsets, on the other hand, occur outside the context of a cap. An offset represents a certification by some entity not covered by the cap—perhaps a polluter in another country—that they have reduced their emissions by a certain amount. Cap and trade schemes often allow polluters to cover some of their emissions by buying offsets rather than allowances.¹⁴⁷ This has the effect of increasing pollution levels in the area covered by the cap, but—assuming no fraud in the offset program—that’s okay, because those increases are “offset” by decreased emissions somewhere else, by those who sold the offsets. This raises the problem of “additionality.”¹⁴⁸ Who’s to say that the seller of offsets wouldn’t have reduced emissions by the same amount even without the money offered by the offset buyer? When the owner of a cement plant in India, for example, sells offsets in return for a promise to shut down the plant, how can we be sure that the owner wasn’t going to shut the plant down anyway for other reasons? Beyond that, there is also the problem of simply verifying that the plant has in fact been shut down.

These problems do not arise in connection with the selling of allowances by individual in a fair-share cap-and-trade scheme, because the things individuals are selling are allowances subject to a cap, rather than offsets. As in any cap-and-trade scheme, offset fraud is only a problem in a fair-share cap-and-trade to the extent that the program

¹⁴⁶ See Government Accountability office, *Carbon Offsets: The U.S. Voluntary Market is Growing but Quality Assurance Poses Challenges for Market Participants*, GAO-08-1048 (Aug. 29, 2008), available at: <http://www.gao.gov/products/GAO-08-1048>.

¹⁴⁷ See, e.g., American Clean Energy and Security Act of 2009, H.R. 2454 (111th Cong. 1st Sess. 2009), §§ 731-736.

¹⁴⁸ See David G. Victor & Danny Cullenward, *Making Carbon Market Work*, Scientific American 70 (Dec. 2007).

allows for the use of offsets. (These problems can be eliminated by simply prohibiting offsets altogether.¹⁴⁹)

Furthermore, in a fair-share cap-and-trade, unsophisticated individuals are primarily in the position of sellers, rather than buyers. The buyers are the 2,000 or so corporations in the business of producing or importing fossil fuels. To that extent, concerns about unsophisticated buyers being sold a fraudulent product do not apply. Unscrupulous brokers buying allowances could certainly make misrepresentations and thereby induce unsophisticated sellers to sell at too low a price, but the level of loss to any individual entailed in such a scheme would not be particularly high. Conversely, making the carbon market visible and accessible to ordinary people might prompt more individuals to attempt to counterfeit allowances, but precautions against counterfeiting would be necessary in any case.

Finally, even in the absence of outright fraud, simple lack of interest or inertia could cause problems in this system. If the transaction costs involved in selling allowances were too high in relation to the value of one's allowance allotment—if it was hard to figure out how to find a broker and execute a trade—many people might simply fail to sell their allowances which would reduce the supply and drive up the price, possibly to economically disruptive levels. Some might fail to sell out of ignorance or lack of capacity, others might fail to sell in a conscious effort to reduce the cap. The higher the value of each allowance allotment, the less a problem this would be. Assuming a cap at the level designated for the early years of the Waxman-Markey bill, each individual's allotment would likely be worth roughly \$200 - \$250, and a family of four would stand to gain up to \$1,000 by selling their allowances.¹⁵⁰ At that level, the incentive to sell would seem to be fairly high. But, in any case, it would be important to the success of such a plan that systems were in place to make the process of selling allowances as simple and easy as possible. The Foundation for the Economics of

¹⁴⁹ The Cap and Dividend Act of 2009 takes this approach. *See* Cap and Dividend Act of 2009, H.R. 1862 (111th Cong., 1st Sess. 2009).

¹⁵⁰ These numbers assume a cap equal to that in the Waxman-Markey bill for 2016 (the first year the cap becomes close to economy-wide). *See* American Clean Energy and Security Act of 2009, H.R. 2454 (111th Cong. 1st Sess. 2009), § 721. Dividing that cap of 5,482 million tons of CO₂ by the U.S. population of 307 million, yields an initial annual allotment of 18 allowances per individual. The EPA has estimated that allowances are likely to trade at \$11 to \$15 per ton initially under Waxman-Markey. *See* EPA Preliminary Analysis of the Waxman-Markey Discussion Draft (April 20, 2009), available at: <http://www.epa.gov/climatechange/economics/pdfs/WMA-Analysis.pdf>. Multiplying the annual individual allotment of allowances, 18, by these estimated allowance prices yields a total return per individual of \$198 to \$270.

Sustainability, an organization based in Ireland that advocates this idea for developing and developed countries alike, suggests that individuals ought to be able to sell their allowances by simply visiting any bank or post-office.¹⁵¹

One way to ensure easy access to the market and keep brokerage fees low would be to simply have the government act as broker. The government could administer an allowance auction periodically—every month or every quarter. Individuals would submit their allowances to be auctioned by some deadline. After the auction was completed, the government would distribute the proceeds to the individual allowance sellers based on the average price per ton yielded by the auction.

Finally, if concerns about the logistics of a fair-share cap-and-trade are ultimately too troubling, an alternative would be to simply employ a variant of the cap-and-dividend approach. Cap and dividend still implicates the problems with locating individuals not on the tax or welfare roles, but it avoids the problems of involving a large number of unsophisticated actors in the market. The draw backs of this approach are, first, that it may not engage people to the same extent because it does not give them the opportunity to “bet” on the market, and, second, that it does not draw as clear a symbolic link between one’s individual allotment and one’s “fair share” of the absorptive capacity of the atmosphere. The first problem cannot be fixed, without returning to a system in which individuals sell allowances, with all of its attendant difficulties. The second problem, however, could be addressed to a large degree by a small tweak of the cap-and-dividend system. Rather than simply mailing out dividend checks, the government would enclose with each check a clear notice explaining that the government had just auctioned off, on that individual’s behalf, their fair share allotment of, say, 18 carbon allowances at a price of, say \$13 each, and that the money in the enclosed check represented the proceeds from that sale. Perhaps the check itself might also state in bold lettering, something like: “Pay to the order of Jane Jones \$250, the proceeds her fair share allotment of 18 carbon allowances, representing her right to emit 18 tons of carbon dioxide or equivalent into the atmosphere.” In this way, it might be possible to preserve, in some small measure, the symbolic link between the auction proceeds and each individual’s fair share of the aggregate emissions cap, thereby help to reinforce the social norm of carbon footprint minimization in much the same way as would a fair-share cap-and-trade.

3. Potential Objections

¹⁵¹ See www.capandshare.org.

One potential objection might challenge the equity of the proposal. While a revenue-neutral cap and trade distributes either allowances or dividend checks on an equal shares basis, it only really has an equal impact on individuals throughout the country if each individual has a similar capacity to reduce her carbon footprint.¹⁵² But as we saw in section IIA, only 32 to 40 percent of greenhouse gas emissions are actually within an individual's control. Individuals don't have direct control over how their utility companies generate electricity, over what methods of electricity generation are cheap or expensive in their locality, and over the extent and quality of public transportation options available in their locality. Thus, a person who lives in a sprawling suburb in the Midwest, where public transportation options are scarce, winters are cold and summers hot, and electricity is produced by coal, is at a decided disadvantage in the competition to reduce one's carbon footprint when compared to an individual who lives in Seattle, where winters are mild, summers are cool, public transportation is widespread, and electricity comes primarily from hydropower.

One response, of course, would be simply to say that people have control over which region of the country they choose to live in, but that is clearly too facile. Employment, family ties and other factors keep many people rooted in a particular locality. And while, in the long run, it may well be a positive development if cities and regions begin to compete for residents in part by promoting their access to low carbon lifestyles, there is an undeniable unfairness to those caught in the middle of this transition.¹⁵³ Another perhaps too facile response would be to say that people have an ability in a democratic society to change the government programs that shape how transportation infrastructure is arranged and how energy is produced. But while it would certainly be a positive byproduct of federal climate change regulation if it moved people to push their local governments for more climate friendly

¹⁵² See GAO, *supra* note 3, at 6 ("The effects of emissions pricing on consumers . . . will vary by region;" in some regions the cost burden will be about 1.5 % of income, in others it will be 1.9%.); Mike Sandler & J.R. DeShazo, *Carbon Costs: How a \$15/ton CO2 Cost Could Raise Household Electricity Bills* (Dec. 10, 2008)(projecting that a \$15/ton CO2 cost will cause average household electricity costs to increase by 15%, but in coal-rich states of North Dakota, Wyoming and West Virginia, bills will rise by 65% to 105%, while in low-coal states of Maine, Vermont, and Hawaii, bills will rise by only 1% or less), available at: http://lewis.spa.ucla.edu/publications/reports/Sandler_Deshazo_Climate.pdf.

¹⁵³ Some unfairness is inevitable and unavoidable as new understandings of environmental problems result in changes to social and legal arrangements. See Joseph Sax, *Property Rights and the Economy of Nature: Understanding Lucas v. South Carolina Coastal Council*, 45 Stan. L. Rev. 1433 (1993).

policies, such change inevitably takes time, and in the meantime, those living in carbon intensive areas remain at a disadvantage.

Another response would be to tweak the system to try to account for this built-in inequity. One could, for example, design the program so that it allocated extra allowances or provided extra large dividend checks to individuals in regions thought to be especially disadvantaged.¹⁵⁴ Once it departs from the simplicity of a formula of equal shares to each individual, however, the program loses much of its appeal. Once the possibility that allocations might be distributed by some formula other than equal shares was opened up, proponents of the plan would quickly lose the moral high ground and become mired in political jockeying by interest groups for a larger slice of the pie. Furthermore, by departing from an equal shares approach, such a program would also lose much of its capacity to frame the climate change issue in moral terms.

The question is, just how much of a disadvantage are we talking about? What is the magnitude of regional differences in the carbon intensity of institutions and arrangements beyond individual control? Several studies actually show that regional differences in the extent to which consumers are impacted by increased electricity prices from climate change regulation are likely to be small.¹⁵⁵ In the end, this level of inequity may just have to be tolerated as an inevitable byproduct of any “public program adjusting the benefits and burdens of economic life to promote the common good.”¹⁵⁶

Others will object to this plan on the ground that it sacrifices a golden opportunity to create a pot of revenue that the government could use for all sorts of laudable purposes. Indeed, auctioning allowances has the capacity to generate a large pool of funds. It is estimated that Waxman-Markey bill would generate approximately \$45 billion annually by 2019, and if all allowances were auctioned, a cap and trade scheme could generate \$300 billion a year.¹⁵⁷ Various auction schemes earmark revenues for renewable energy research, climate change adaptation here

¹⁵⁴ See, e.g., Kopp, *supra*, note 128 (proposing that 75% of auction revenues fund a direct payment to all U.S. households based on legal residency, and 25% given to states based on energy use by low income populations and vulnerability of industry to increased energy costs).

¹⁵⁵ See Hassett, K., A. Marthur, and G. Metcalf, *The Incidence of a U.S. Carbon Tax: A Lifetime and Regional Analysis*. Energy Journal (forthcoming 2009); Burtraw, *supra* note 129 (finding average net consumer surplus loss from cap-and-trade program is 0.23 % of income and “only varies by region by about 0 to 0.4 percent,” though regional differences are more pronounced for low income households).

¹⁵⁶ Penn Central Transp Co. v. New York, 438 U.S. 104, 124 (1978).

¹⁵⁷ See GAO, *supra* note 3, at 7.

and abroad, and targeted assistance programs to alleviate the burden of increased energy prices on the poor, to name just a few.¹⁵⁸ Indeed, it may be that the price signals generated by a cap and trade program will not be sufficient to generate in the private sector the level of investment the development of new energy technologies that we will ultimately need in order to stave off catastrophic climate change.¹⁵⁹ Since technological development will ultimately be crucial to our ability to avert the climate crisis, this argument carries considerable weight.

It is probably true that a well-designed system to auction off all allowances and use the revenues to fund worthy projects would best serve the public good. But ultimately the judgment about which kind of program to pursue must be a political one. It may well be that a cap and trade that auctions off all allowances for government revenues is, like a tax, simply not politically feasible as the country struggles to come out of a recession. A revenue-neutral cap and trade, by decoupling the imposition of a price on carbon from infliction of financial hardship on individual consumers, has the capacity defuse the most politically potent objection to climate change regulation in general. If the “cap-and-tax” objection has the capacity to derail climate change legislation altogether, then compromising on a revenue-neutral plan may be well worth the price.¹⁶⁰

Others may argue that any scheme that either distributes allowances to individuals or auctions allowances is politically infeasible because it foregoes the crucial opportunity to “buy” support from powerful industries by promising them allocations of free allowances.¹⁶¹ To the extent this is true, having a revenue-neutral option on the table will at least help to clarify where lawmakers’ allegiances really lie. If they are primarily concerned with protecting consumers, they should support revenue-neutral cap and trade. If on the other hand, their primary allegiance lies with powerful and well-funded industrial interests, they will support a grandfathering approach.

Conclusion

A revenue neutral cap-and-trade scheme, whether it takes the form of a fair-share cap-and-trade or a cap-and-dividend approach, has

¹⁵⁸ See GAO, *supra* note 3, at 17.

¹⁵⁹ See GAO, *supra* note 3, at 17.

¹⁶⁰ See Burtraw, *supra* note 128, at 25 (“Although climate change is a long-run problem, climate policy has an important short-run political dynamic. Therefore, delivering compensation or finding ways to alleviate disproportional burdens of the policy seems especially important in the early years of climate policy.”).

¹⁶¹ See GAO, *supra* note 3, at 9, 15.

important political advantages over other forms of cap-and-trade because it has the capacity to defuse the opposition's most potent argument—that a cap-and-trade program will impose economic hardship on consumers. In theory, a revenue-neutral tax should offer the same advantage, but, in this country at least, even a revenue-neutral design has not been able to overcome the political stigma associated with taxes of all kinds.

This article has considered two types of revenue neutral cap and trade: A cap and dividend program auctions all allowances and returns the revenue to individuals on a per capita, equal shares basis. A fair-share cap-and-trade distributes the allowances themselves to individuals, also on a per capita, equal shares basis. Individuals can then sell their allowances to the fossil fuel producers and importers that are required to hold an allowance for each ton of CO₂ embodied in the fuel they sell. A fair-share cap-and-trade may be superior to a cap-and-dividend approach in its capacity to reinforce the emerging social norm of carbon footprint minimization as well as a justice-based conception of climate change that views the absorptive capacity of the global atmosphere as a limited commonly held resource to which each individual on earth has an equal claim. On the other hand, implementation of a fair-share cap-and-trade scheme would pose challenges not raised by a cap-and-dividend approach or revenue neutral tax scheme.