



Curbing Greenhouse Gas Emissions — Two Approaches

By Eleanor Revelle (LWVIL and LWVUS Climate Change Task Force Member)

Facing the growing evidence that burning fossil fuels is contributing significantly to global climate change, policymakers are evaluating strategies for reducing U.S. greenhouse gas emissions. They have two general approaches to consider.

With a cap-and-trade system, policymakers set a limit on the quantity of a pollutant (e.g., CO₂) that can be emitted in a given period. The total emissions allowed under this cap are divided into permits representing the right to emit a given amount (e.g., one ton of CO₂). The permits are then allocated to the sources covered by the program (e.g., power plants). At the end of the compliance period, each source must report all emissions and surrender an equivalent number of permits.

Since the number of permits is limited, they have financial value. Companies able to reduce their emissions at low cost can sell the permits they don't need to companies for whom the cost of reducing emissions is high. Each company has the flexibility to choose how to meet its emissions target, but market incentives encourage them to develop new, cleaner technologies. Over time, the cap is lowered to achieve more aggressive emissions-reduction goals.

Carbon Tax

A carbon tax is imposed on fossil fuel suppliers at a rate that reflects the amount of carbon that will be emitted when the fuel is combusted. The tax is included in the price of the coal, oil, and natural gas supplied to wholesale users and ultimately is passed on to consumers in the price of electricity, gasoline and other energy-intensive products. By raising the price of carbon-based energy, the tax creates incentives to reduce energy use, stimulates demand for more energy-efficient products, and promotes a shift to cleaner fuels and renewable energy.

Emissions Certainty

The strength of the **cap-and-trade** approach is that it sets firm limits on emissions. The cap is set at a level designed to achieve a desired environmental outcome (e.g., a reduction of CO₂ emissions to 80 percent of 1990 levels by 2050).

A **carbon tax** allows the quantity of emissions to fluctuate as the demand for energy rises or falls. Allowing emissions to vary from year to year gives firms the flexibility to abate less and pay more in taxes when abatement costs are unusually high (and vice-versa when abatement costs are low). In order to achieve climatic goals, the tax rate can be adjusted over time to attain greater emissions reductions.

Price Predictability

The advantage of a **carbon tax** is that it fixes the price of carbon emissions. It creates a permanent incentive to reduce emissions, thereby encouraging investment in alternative fuels and energy-efficient technologies that have high up-front costs.

Under a **cap-and-trade** system, the price of emissions permits may vary considerably from year to year. An especially cold winter, for example, could increase the demand for energy and cause a spike in the price of permits. This volatility could weaken incentives to invest in cleaner technologies.

For illustrative purposes, this paper focuses on a cap-and-trade system for carbon dioxide (CO₂).

To address volatility, most cap-and-trade proposals include cost-control mechanisms.

- **Safety valve**—establishes a ceiling on the price of permits. If the price reaches this level, the government can sell additional permits at this price to the capped entities.
- **Circuit breaker**—freezes a gradually declining emissions cap if the permit price rises above a predetermined level.
- **Banking**—allows companies to save unused allowances for future years.
- **Borrowing**—allows companies to borrow permits from future years and pay them back, with interest, later.
- **Offsets**—allow companies to cover some of their emissions by purchasing credits created by carbon mitigation projects (e.g., tree planting) from sources outside the cap-and-trade system.

These mechanisms (with the exception of banking) could delay emissions reductions and undermine the integrity of the cap.

Environmental Effectiveness

The impact of a **cap-and-trade** system depends on a number of factors. How stringent is the emissions target? How will baseline emissions be measured and a corresponding and appropriate number of emissions permits be determined and distributed? Will the cap be applied economy-wide or only to certain sectors? Does it include cost-control measures that are likely to break the emissions cap?

The impact of a **carbon tax** depends in large part on whether the tax rate is set high enough to create real market incentives to develop and adopt climate-friendly technologies. Although a carbon tax does not establish a firm limit on emissions, it applies economy-wide and provides a constant incentive for companies to make carbon-saving investments. The tax rate can be increased over time to provide stronger incentives to reduce emissions.

Equity

Under many **cap-and-trade** proposals, a substantial portion of the emissions permits are to be distributed free to the capped entities. Research indicates that only a modest portion of the permit value is needed to offset the costs of the cap, but the full amount is passed along in increased prices to consumers. This would disproportionately affect lower-income households because they tend to spend a larger fraction of their income than do higher-income households and because energy products make up a bigger share of their spending.

A **carbon tax** directly raises substantial revenues. These could be used in part to fund "progressive" tax-shifting policies that would reduce the burden of higher energy costs on lower-income groups.

Simplicity and Transparency

A **cap-and-trade** system requires new institutions (e.g., a system to allocate permits, markets where firms can buy and sell permits, a means of monitoring emissions and trades). Auctioning permits rather than distributing them free could help promote simplicity and transparency.

A **carbon tax** can be levied and collected via existing institutions with experience in enforcing compliance. It is simpler and less expensive to administer and enforce than a cap-and-trade system. Its underlying premise—the price of energy should include the environmental costs associated with its production—is transparent and readily understood.

Produced by the LWVUS Climate Change Task Force

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UPDATE on Issues

League of Women Voters of the Houston Area

April 2009

AIR QUALITY and GLOBAL CLIMATE CHANGE

Last month, the League of Women Voters of the United States joined a coalition of investor, low-income, faith, environmental, and other groups¹ responding to President Obama's call to repower America through market-based legislation to cap global warming by releasing principles for effective, efficient, and equitable global warming legislation.

Those principles are:

1. **Establish science-based pollution reduction targets.** Cut total, economy-wide global warming emissions by at least 25% below 1990 levels by 2020 and by at least 80% below 1990 levels by 2050. To achieve these targets, the United States should reduce its total absolute emissions from fossil fuels by at least 8-14% below 1990 levels by 2020, with the additional reductions achieved through appropriate incentives and programs for domestic and international forest protection and for other sound U.S. climate-friendly agricultural and land-use practices.
2. **Enable periodic science review and update.**
3. **Take international leadership.**
4. **Auction all pollution allowances and devote all proceeds to mitigation and addressing impacts on consumers, workers, vulnerable communities, and natural resources.** By placing a price on carbon, the auctioning of allowances should generate the maximum amount of revenue feasible, amounting to hundreds of billions of dollars a year. These precious dollars should not provide polluting industries windfall profits nor should such industries be able to spend our public resources indiscriminately. Instead, the revenue should be used to most effectively achieve our nation's pollution-reduction goals, assist consumers' and affected workers' transition to a clean energy economy, protect our natural resources from the impacts of global warming, and finance mitigation and adaptation for developing countries.
5. **Effectively include and fund sound land use, agriculture, and forest practices.**
6. **Ensure strong parameters for any offsets.** Offsets within a cap-and-auction program should only be used with strong quality safeguards to ensure they are real, additional, verifiable, permanent, and enforceable. If offsets are included, they should be limited to a percentage of the required emissions reductions, set in a manner to ensure that they do not undermine either the rapid transformation beginning this decade to a clean energy economy or the pollution reduction targets, including the need to reduce domestic emissions from fossil fuels by at least 8-14% from 1990 levels by 2020. This will create jobs, reduce our dependence on oil, and galvanize the made-in-America technologies that will be needed to accelerate emission reductions by nations around the world. In addition to meeting the quality criteria, international offsets should be allowed only if they result in emissions reductions beyond a nationally appropriate country emission reduction commitment consistent with our global science-based emission-reductions goals.
7. **Reject mechanisms that delay pollution cuts.**
8. **Preserve the ability of states to act.** State innovation has been critical to our environmental progress over the last four decades and must be permitted to continue. States should be allowed to set standards for energy, transportation, and global warming emissions that go beyond what is required nationally, with the federal standard serving as a floor, not a ceiling.
9. **Don't dig the hole deeper.**
10. **Don't offshore U.S. global warming emissions.** The United States has the world's largest coal reserves. If even a fraction of the carbon contained in these coal reserves is released, it will be impossible to prevent catastrophic effects of global warming. The United States should phase out the export of coal to countries that do not have a carbon control program comparable to that of the United States.
11. **Provide for strong citizen enforcement and public involvement.**
12. **Help low- and moderate-income Americans transition to clean energy.**
13. **Protect American workers' transition to a low-carbon economy.**

14. **Address the needs of less developed countries.** Assist developing countries that have contributed the least to global warming to increase their resilience, adapt to global warming impacts that are now unavoidable, and develop sustainable low-carbon economies. Funding for adaptation and mitigation must be in addition to other overseas relief and development commitments. Expeditiously provide these countries appropriate technology for both adaptation and mitigation.
15. **Invest in a clean energy economy.**
16. **Establish clean energy standards.**
17. **Invest in transportation infrastructure that reduces global warming emissions.**
18. **Expand opportunity for America's workers and communities.**
19. **Promote a global clean technology transition.** A global clean technology transition is needed to avoid the worst impacts of global warming. Many developing countries will need support to transition to lower carbon economies without compromising basic development needs and without undermining basic rights. The United States should assist in this transition by investing in a global clean energy economy.
20. **Prepare for the changes we cannot avoid.**
21. **Safeguard our natural resources.**²

This is an incredible statement! Aren't we fortunate to belong to an organization that takes such a leadership role? Some of the more difficult to understand principles have their explanations included. You may see the explanations for all of the principles on the Web site of the LWV-US.²

Let's first review the concept of "cap and trade." The "cap" refers to an amount that is set; it's typically the amount of greenhouse gases (primarily CO₂) in the atmosphere in 1990. To reach this target, the U.S. would have to reduce emissions by 25% by 2020. The U.S. would do this by auctioning pollution allowances, thus raising billions of dollars, some of which would be used for clean energy technologies. Subsequently, "trading" occurs when companies that buy the allowances trade with each other. "Offsets" occur when polluters are allowed to purchase credits for carbon reductions achieved or carbon emissions avoided by another party, rather than directly cutting pollution themselves. According to David Hamilton, director of the Sierra Club's Global Warming & Energy Program, "Offsets can play a positive role in attaining carbon emissions reductions from sectors that are not covered by the cap. But offsets that are too low in quality or too great in quantity can delay critical structural reductions that must be made to speed our nation's economic recovery and the transition to a clean energy economy."³

A paper written by Eleanor Revelle, a member of the LWV-US Climate Change Task Force, is included with this *Update on Issues*. Entitled "Curbing Greenhouse Gas Emissions—Two Approaches," it describes the differences between a "carbon tax" and the "cap-and-trade" system. For example, Shell Oil Company prefers a cap-and-trade approach, while ExxonMobil prefers a carbon tax.

We can expect other changes nationally. In 2007, the Supreme Court found that the EPA should regulate CO₂; however, no effort was made to do so. Our new EPA Administrator, Lisa P. Jackson, ordered a review of this question, and on March 11, 2009, she issued a proposed rule establishing a nationwide system for reporting greenhouse gas emissions, a program that could serve as the basis for a federal cap on the buildup of carbon dioxide and other gases linked to global warming. It would cover about 13,000 facilities that account for 85 to 90% of the nation's greenhouse gas output including oil and chemical refineries, cement, gas, pulp and paper plants; manufacturers of motor vehicles and engines; and confined animal-feeding operations. If adopted by the end of the year, the rule could produce greenhouse gas statistics by the end of 2010. Administrator Jackson stated, "Through this new reporting, we will have comprehensive and accurate data about the production of greenhouse gases. This is a critical step toward helping us better protect our health and environment—all without placing an onerous burden on our nation's small businesses."⁴

On February 24, 2009, the U.S. Court of Appeals for the District of Columbia ruled that the EPA had failed to adequately explain why the soot standard, set three years ago, is sufficient to protect public health. The suit was brought by several states and three environmental groups, which argued that the Bush administration ignored its own scientists when it decided in 2006 not to tighten the nearly decade-old standard. The ruling said "the agency's reasoning was curable" and allows the Obama administration to set a new limit for soot, a mixture of airborne matter from diesel exhaust, industrial flares and road grit, among other sources.⁵

In 2007, Senators Joseph I. Lieberman and John W. Warner introduced bipartisan climate legislation that would establish a cap-and-trade system. The legislation was not passed, but similar legislation is currently being considered. Houston Congressman Gene Green, a member of the House Committee on Energy and Commerce, told several Houston LWV members in an interview in March that the committee was hoping to have a bill on climate change ready by Memorial Day, which would include a cap-and-trade provision. This committee also has heard testimony from the U.S. Climate Action Partnership, a coalition of over 30 businesses and nongovernmental organizations that has called for Congress to pass legislation to address the climate change threat. Testimony was heard from a number of individuals including James Mulva, Chairman of ConocoPhillips; Fred Krupp, President, Environmental Defense Fund; Jeffrey Immelt, Chairman of General Electric; and David Crane, President and CEO of NRG Energy. A complete list of those who presented testimony can be found at the Energy and Commerce Committee Web site.⁵

Closer to home, the Texas Legislature is considering a number of bills on air quality and climate change, including:

- Senator Rodney Ellis has submitted a bill to have Texas adopt the California standards for cars and light trucks. He introduced this legislation in the last legislative session, but there appears to be more interest now.
- Senator Ellis has also introduced a comprehensive bill entitled the "Texas Global Warming Solutions Act." The bill requires the Texas Commission on Environmental Quality (TCEQ) to measure "carbon dioxide equivalents," where other greenhouse gases such as methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are measured in terms of the carbon dioxide by weight that would produce the same amount of global warming. The TCEQ is to determine the amount of these greenhouse gas emissions in Texas in 1990 and approve a statewide greenhouse gas emissions limit that must be met by 2023. A report of these amounts is due to the legislature by January 1, 2011. The TCEQ is to consult with other states, the federal government, and other nations to identify the most effective strategies and methods for reducing greenhouse gases. A system of "market-based declining annual aggregate emissions" is one strategy that may be considered. Senator Ellis has done it again in leading the way for energy conservation, alternative sources of energy, and now methodologies for combating global warming! (It would be helpful if his goal was 2020 instead of 2023!)
- Senator Kip Averitt has introduced an omnibus bill relating to both air quality and energy efficiency. The air quality provisions make real gains for Texas: (1) supporting advanced "clean energy" projects, including sequestration of carbon dioxide, (2) funding new technology grants, including those related to reducing oxides of nitrogen, (3) establishing a greenhouse gas registry, and (4) considering the cumulative effects of expected emissions when granting permits (a goal long sought in the air quality field.) Senator Averitt is the chairman of the Senate Natural Resources Committee, and his were the only bills that were passed in the 2007 session of the legislature. So we have real hope that this one will actually pass!

Mayor Bill White is still working in Houston for better air quality. The Texas Clean Air Cities Coalition consists of 37 local governmental entities from around the state representing over half the citizens of Texas. The Coalition was formed in 2006 by Houston Mayor Bill White and then Dallas Mayor Laura Miller to contest the fast-track permitting of more than a dozen coal-fueled power plants across the state. In August 2008, an agreement was reached with NRG Texas LLC regarding its Limestone 3 permit. In response to the Coalition's intervention, a number of innovative commitments were included that are related to emissions of CO₂, nitrogen oxides, sulfur dioxide and mercury, and to other environmental issues including reductions in water usage.

M White said, "We commend NRG for their willingness to work with the citizens of Texas to produce a plant which adds power while reducing emissions from the site."⁶

Other actions of the City of Houston include:

- Filing a petition to the EPA under the Data Quality Act challenging the current emission factors used in point source emission inventories. Volatile organic compounds, including hazardous air pollutants (HAPs) and highly-reactive volatile organic compounds (HRVOCs) traditionally have been undercounted in the Houston region. This is a result of the emission factors in the process established by the EPA. The City asked that real-world measurements be used to correct the emission factors.⁸

- Arguing for a greater decrease in the effects screening level (ESL) of 1,3-butadiene than the TCEQ proposed. While the proposed decrease helps, science clearly indicates that greater decreases are needed to protect public health⁹. The TCEQ proposed level of 4.5 ppb (part per billion) which should be further reduced to 0.15 ppb, a level advocated by the EPA.
- Releasing an Emission Reduction Plan¹⁰ for their internal activities. Emission reduction and energy efficiency measures are included to address both criteria pollutants (NO_x and VOCs) as well as greenhouse gases. The City is on track to be 11% below 2005 emission levels by 2010.
- Continuing to pursue reductions in air toxics through request of contested case hearings for permits¹¹, comments on proposed EPA rules¹², an additional scientific study¹³.

Additionally, Mayor White continues to oppose air pollution using the nuisance statutes.

References:

¹**Organizations Endorsing the National Call to Action on Global Warming:** 1Sky, ACORN, Alliance for Climate Protection, Audubon, Catholic Healthcare West, Center for International Environmental Law, Ceres, Clean Water Action, Climate Law and Policy Project, Climate Protection Campaign, Climate Solutions, Defenders of Wildlife, Democracia USA, Earthjustice, Eco-Equity, Ecology Center, Energize America, Energy Action Coalition, Environment America, Environment and Energy Study Institute, Environment Northeast, Environmental Law and Policy Center, Green for All, Greenpeace, Health Professionals for Clean Air, Hip Hop Caucus, ICLEI USA, Institute for Agriculture and Trade Policy, Interfaith Power and Light, International Forum on Globalization, Kyoto USA, League of Conservation Voters, **League of Women Voters**, League of Young Voters, Massachusetts Climate Action Network, National Hispanic Environmental Council, National Teach-In on Global Warming Solutions, National Wildlife Federation, Oceana, Oxfam, Physicians for Social Responsibility, Progressive Future, Public Citizen, Religious Witness for the Earth, Rock the Vote, SEED Coalition, Sierra Club, Southern Alliance for Clean Energy, Teleosis Institute, The Humane Society of the United States, The Student Public Interest Research Groups, The Wilderness Society, Union of Concerned Scientists

²http://www.jwy.org/AM/Template.cfm?Section=Global_Climate_Change&Template=/CM/ContentDisplay.cfm&ContentID=13001

³http://www.jwy.org/AM/Template.cfm?Section=Press_Releases&TEMPLATE=/CM/ContentDisplay.cfm&CONTENTID=13003

⁴<http://www.washingtonpost.com/wp-dyn/content/article/2009/03/10/AR2009031001445.html?wpisrc=newsletter>

⁵<http://www.chron.com/disp/story.npl/headline/metro/6279220.html>

⁶http://energycommerce.house.gov/index.php?option=com_content&task=view&id=1470&Itemid=95

⁷<http://www.houstontx.gov/mayor/press/20080804a.html>

⁸<http://www.greenhoustontx.gov/reports/epaletter20080709.pdf>

⁹<http://www.greenhoustontx.gov/reports/butadiene20080711.pdf>

¹⁰<http://www.greenhoustontx.gov/reports/emissionreduction20080909.pdf>

¹¹<http://www.greenhoustontx.gov/reports/refiningpermitmatter.pdf>

¹²<http://www.greenhoustontx.gov/reports/petroleumrefineries.pdf>

¹³<http://www.greenhoustontx.gov/reports/benzeneandbutadiene.pdf>

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