ISSUE BRIEF

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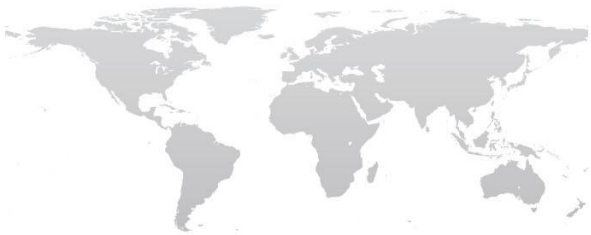
RESOURCES FOR THE FUTURE



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## Resources for the Future

Resources for the Future is an independent, nonpartisan think tank that, through its social science research, enables policymakers and stakeholders to make better, more informed decisions about energy, environmental, natural resource, and public health issues. Headquartered in Washington, DC, its research scope comprises programs in nations around the world.

# If Walmart Were In Charge: Sourcing $CO_2$ Emissions Reductions at Least Cost

Raymond J. Kopp[1]

## Always Shop for the Best Price

Seemingly everyone has an opinion of Walmart, and quite often one finds very divergent opinions. However, just about everyone would agree that Walmart sources the products that fill its shelves in a manner that permits it to sell those products at very low prices. This is partly due to the efficiency of its supply chain technology, but it is primarily due to the simple fact that Walmart is itself a great shopper—for any given product, Walmart looks globally for the best price and encourages suppliers to compete with one another for the multinational corporation's business.

In late 2009, the United States pledged to the international community that it would substantially reduce its carbon dioxide ($CO_2$) and other greenhouse gas emissions by 2020, and the president restated this goal in the most recent *Economic Report of the President*. The U.S. government and congressional committees—not Walmart—are in the market for $CO_2$ reductions, but it would behoove policymakers to take some shopping lessons from Walmart

Although the U.S. Senate did not follow the House of Representatives in 2009 in passing comprehensive climate legislation serving to reduce $CO_2$ emissions, the U.S. Environmental Protection Agency (EPA) is moving ahead with the regulation of $CO_2$ under authority contained in the Clean Air Act (CAA). Despite its recent rejection of comprehensive climate legislation, the U.S. Senate now is considering energy legislation in the form of a *clean energy standard* that would reduce emissions (primarily from the electric utility sector) by requiring a growing percentage of

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the nation's electricity to be generated from zero or low $CO_2$-emitting electricity generation technologies.

Each of these actions—regulatory and legislative—is essentially equivalent to buying reductions in $CO_2$ emissions, and the price being paid is the cost $CO_2$ emitters (and eventually the general public who purchases and uses energy) must pay to comply with these new regulations and standards. The more cheaply emitters can comply with the regulations, the lower will be the energy price increases faced by U.S. households and businesses, and the greater will be the growth of the U.S. economy and jobs. To be perfectly clear, policies allowing $CO_2$ emitters to lower their cost of compliance could be derived from current EPA regulations or from future regulations emanating from a clean energy standard. Such policies would enhance economic growth and employment—something desperately needed in the current economic environment.

## The Importance of Supplier Flexibility

The physical reaction of the global climate system to the emission of an additional ton of $CO_2$ is the same no matter where on the globe that emission takes place. Equivalently, the effect of a reduction in a ton of emissions is the same no matter where that reduction takes place. It does not matter to the climate if the ton reduced comes from a power plant in Ohio, or Texas, or across the border in Mexico. The irrelevance of the emissions location gives rise to an important feature of well-designed climate policy—*where flexibility*, also referred to as *supplier flexibility*. A policy with supplier flexibility is one that enables reductions in $CO_2$ to take place where they are the least expensive—just as one would comparison shop across suppliers for goods like electronics.

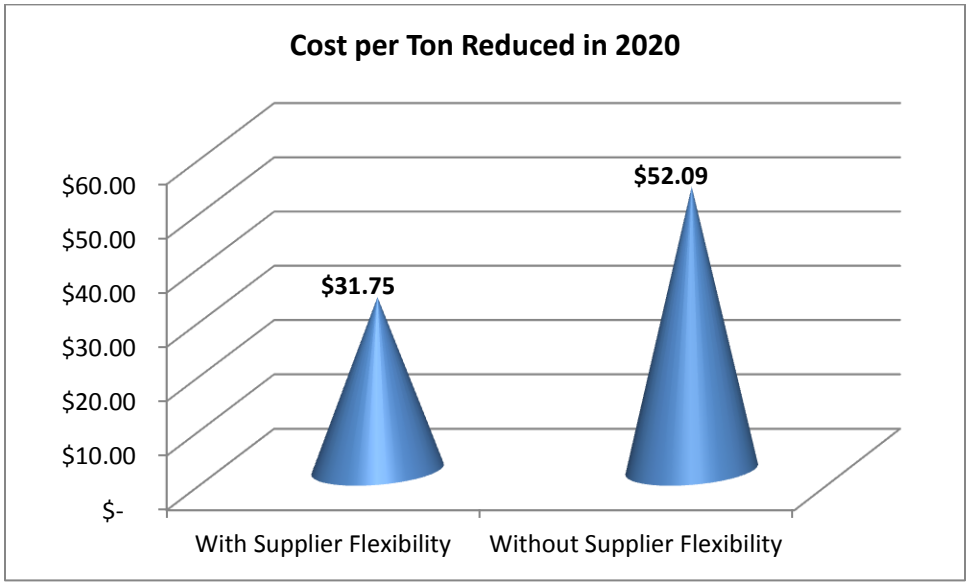
In the marketplace for $CO_2$ reductions, the cost of the reduction can vary a great deal, and therefore shopping for the least cost emissions reduction can have a significant effect on energy prices, economic growth, and employment. For example, the Energy Information Administration (EIA) conducted a series of economic analyses of the House-passed climate legislation—the American Clean Energy and Security (ACES) Act of 2009.[2] In one analysis, EIA allowed reductions in emissions to take place wherever they were least expensive (with supplier flexibility), whereas in a second case, reductions could take place only within the United States (without supplier flexibility).

A comparison of the results is striking. As Figure 1 portrays, the cost of complying with the requirements of the ACES Act in 2020 for the last ton of $CO_2$ reduced would have been $52 if all reductions had to take place in the United States, compared to $31.75 (a savings of more than $19) when emitters of $CO_2$ could shop on the global market for reductions. EIA estimated the cost

[2] See Energy Information Administration, U.S. Department of Energy, *Energy Market and Economic Impacts of H.R. 2454, the American Clean Energy and Security Act of 2009* (Washington, DC, August 2009).

savings gained though global shopping to be worth $19 billion in 2020 in terms of enhanced U.S. gross domestic product.

**Figure 1. Cost of Reducing Emissions with and without Supplier Flexibility**




These cost savings are not the result of arcane and dubious economic analyses, but rather, common sense known to every American consumer—you can find a deal if you shop around

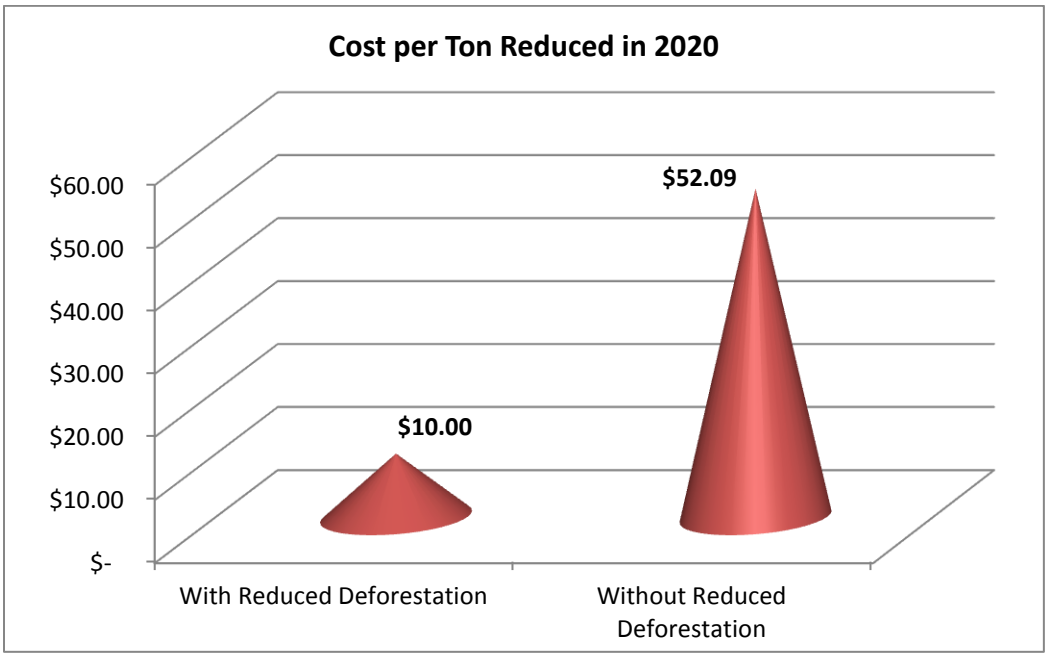
## The Importance of Source Flexibility

The climate does not care *where* $CO_2$ emissions are reduced, nor does it care *how* they are reduced. Every ton of $CO_2$ emitted into the atmosphere has the same effect on the climate as every other ton no matter which sector of the economy emits the ton. It does not matter if a ton comes from burning coal in a U.S. power plant or gasoline in a fleet of automobiles. Every ton is the same regardless of source and this fact gives rise to the importance of *source flexibility*. For example, it is generally acknowledged that it is less expensive to reduce $CO_2$ from electricity generation than from transportation. Well-designed policies incorporating source flexibility ensure that emissions reductions are achieved at the lowest cost by considering all sources of emissions as candidates for reductions and then choosing for reduction those sources with the lowest cost. Once again, this is not an example of complicated economics, but rather straightforward good shopping.

The importance of *source* flexibility in controlling the cost of $CO_2$ reduction is best exemplified by the releases of $CO_2$ that come about from the clearing of tropical rain forests for agriculture and from timber production. Deforestation of these tropical forests is a major source of global $CO_2$

emissions. A recent study provided a comprehensive examination of the cost of reducing emissions due to tropical deforestation.[3] Using conservative assumptions, the study finds that 100–125 million tons of deforestation-related $CO_2$ emissions can be reduced annually at $10 per ton. Figure 2 compares the cost of $CO_2$ reduction from reduced deforestation in tropical countries to the estimates provided by EIA of reducing $CO_2$ emissions solely in the United States. The deforestation costs are one-fifth the domestic U.S. cost—like buying a $1,000 plasma TV for $200.

**Figure 2. Cost of Reducing Emissions with and without Source Flexibility**




The take-away message is simple—shopping for the best deal by looking across locations and sources can lead to very significant cost savings.

## A Lot of the Work Has Already Been Done

Shopping for the best price can be a labor-intensive and time-consuming task, and this is certainly true if one is shopping for the best deal on $CO_2$ reductions. Fortunately, a good deal of the hard work has been done. Certainly one can find many low-cost emissions reduction opportunities within the United States. Improvements in energy efficiency are an obvious example. However, large-scale reductions in line with existing U.S. commitments to reduce $CO_2$ emissions will vastly outstrip the low-cost reductions available from energy efficiency improvements and will force

[3] See E. Madeira et al., *The Feasible Supply of RED Credits: Less than Predicted by Technical Models*, Issue brief 10-18 (Washington, DC: Resources for the Future, November 2010).

reductions from our energy infrastructure, requiring time, large-scale capital investments, and a great deal of money.

The greater the reductions we demand from our energy sector, the greater will be the cost—an economic fact of life. The way to contain the cost within reasonable bounds is to exercise where and *source* flexibility, and by far the best way to do that is to purchase emissions reductions generated through reductions in tropical deforestation.

There are three reasons why reducing tropical deforestation is a preferred emissions reduction policy.

1. As noted above, reducing emissions from deforestation is more cost-effective than reducing emissions via other sources on a per ton basis. Importantly, it is estimated that 18 to 25% of annual global GHG emissions come from deforestation, so reduced deforestation offers a way to substantially reduce emissions..

2. Although it takes a very long lead time and huge sums of capital to transform our energy infrastructure, policies to reduce deforestation can be implemented quickly and emissions reductions can be achieved just as quickly. Thus, although we are investing in new, low-carbon energy systems to reap $CO_2$ reductions in the future, we can meet our immediate emissions reduction commitments now by investing in policies to reduce deforestation.

3. Tropical forests are home to the bulk of the world's biodiversity. Reducing tropical deforestation not only reduces $CO_2$ emissions and is protective of the global climate, but it carries with it the side benefit of maintaining plant and animal habitat and thereby maintaining biodiversity.

## Empowering the Shoppers

In the current regime of $CO_2$ regulation under the CAA or a future regulatory regime based on new legislation, $CO_2$ emitters have the incentives to reduce their cost of compliance with $CO_2$ regulations. The strength and importance of these incentives have been recognized by the State of California as it pursues its $CO_2$ reduction policies under Assembly Bill 32. The development of state regulations for $CO_2$ emitters empowers them to look beyond their own emissions and shop for reductions in the domestic forestry sector.[4] Importantly, the State of California and the State of Chiapas, Mexico, have signed a memorandum of understanding, with California pledging to coordinate efforts to reduce deforestation. This coordination could lead to a broadening of the California regulations to include Mexican forestry projects as well as domestic U.S. projects.

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[4] See Air Resources Board, California Environmental Protection Agency, "Compliance Offset Protocol for U.S. Forest Projects" (discussion draft, Sacramento, CA, July 2011).

Regulation of $CO_2$ emissions is now the law of the land in the United States under the CAA. The CAA, as it has been traditionally applied, generally lacks source and sector flexibility; however, legal scholars and CAA experts are split in their opinions regarding EPA's flexibility under the act. Some argue that EPA might have flexibility in its interpretation of the CAA and could provide regulated entities with the ability to purchase $CO_2$ reductions from overseas forestry projects.[5]

As Congress continues develop policies to promote clean energy within the United States, it has the ability to empower $CO_2$ emitters to reduce their emissions at the least cost globally. Clean energy standards, such as those proposed by the president and under discussion within Congress, would require increasingly greater portions of U.S. electricity to be generated from low $CO_2$-emitting sources. Such standards could easily accommodate where and how flexibility by allowing the purchase of $CO_2$ reductions from overseas forestry projects in lieu of investments in prohibitively expensive low-carbon energy projects, thereby limiting the electricity price increases that compliance with the standard would entail.

Perhaps most importantly, the fiscal policy debate that is now underway in Washington could quite likely result in fundamental U.S. federal tax reform. It is a well-known economic fact that lowering distortionary taxes (such as payroll taxes) has tremendous benefits in terms of enhanced economic growth and job creation. Putting a price on $CO_2$ emissions and using the resulting revenue to lower labor taxes on a neutral dollar-for-dollar basis would both enhance growth and reduce $CO_2$ emissions. Building in a tax credit system based on $CO_2$ reductions from reduced tropical deforestation would reduce revenues a bit, but enhance the economic efficiency of the $CO_2$ pricing policy.

As noted above, $CO_2$ regulatory regimes are available in many flavors. To get the most environmental protection for every dollar spent, the regimes need be where flexible and how flexible; that is, like Walmart, regulated $CO_2$ sources must be able to shop for the least expensive reductions wherever on the globe they may be found. Currently, the least cost reductions come from reduced rates of deforestation in tropical counties. If Walmart were in charge, that's where it would be shopping.

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[5] See D. Burtraw et al., "Opportunities for Flexibility and Cost Savings within EPA's Greenhouse Gas Rules" (workshop summary, Washington, DC: Resources for the Future, July 2011), http://www.rff.org/RFF/Documents/RFF-Burtraw.etal_workshop%20summary.pdf (accessed September 21, 2011). See also D. Burtraw et al. "Greenhouse Gas Regulation under the Clean Air Act: A Guide for Economists," *Review of Environmental Economics and Policy* 5, no. 2 (2011): 293–313.