The Role of Offsets in Climate Change Legislation

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INTRODUCTION

An offset is a measurable reduction, avoidance, or sequestration of GHG emissions from a source *not covered* by an emission reduction program. If a cap-and-trade program includes offsets, regulated entities have the opportunity to purchase the "emission credits" generated by carbon offset projects to help them meet their compliance obligations. In this way, offsets would complement the more traditional emissions trading that can occur between two covered sources. For example, a covered source (an entity in the power generation, chemicals, steel, and cement industries) can make reductions beyond its compliance obligations and then sell these reductions as credits to other covered sources.

The main concern with offset projects is whether or not they represent real emission reductions. For offsets to be credible, a ton of CO2-equivalent emissions from an offset project should equate to a ton reduced from a covered emission source, such as a smokestack or exhaust pipe. This objective presents challenges because many offsets are difficult to measure. If illegitimate offset credits flow into an emissions trading program, the program would fail to reduce GHG emissions. Another concern is whether the inclusion of offsets would send the appropriate price signal to encourage the development of long-term mitigation technologies.

This article shows that including offsets in climate change legislation would likely make an emissions program more cost-effective by: (a) providing an incentive for non-regulated sources to generate emission reductions; and (b) expanding emission compliance opportunities for regulated entities. Some offset projects may provide further benefits, such as: (a) the promotion of sustainable development; (b) improvements in air or water quality; (c) the creation of new domestic and international economic opportunities; and (d) the incentivization of innovation as parties seek new methods of generating offsets.

CREDIBILITY OF OFFSETS

Offsets are sometimes described as project-based because they typically involve specific projects or activities whose primary objective is to reduce, avoid, or sequester emissions. Because offset projects can involve different GHGs, they are quantified and described with a standard form of measure: either metric tons of carbon-equivalents (mtC-e) or metric tons of CO2-equivalents (mtCO2-e). An emissions cap might require only CO2 emission reductions, but still allow CO2-e offsets from projects that involve non-CO2 GHGs.

Additionality

To be credible as offsets, the emissions reduced, avoided, or sequestered must be *additional to* business-as-usual (i.e., what would have happened anyway). This concept is often called "additionality." If Congress establishes a GHG emission cap-and-trade program, only sources not covered by the cap could generate offsets. Although Congress could address GHG emissions with alternative policies - e.g., by enacting a carbon tax or setting emission limits for each source type ("command-and-control) - the option to use offsets is generally discussed in the context of a cap-and-trade regime.

Emission reductions from regulated sources (e.g., coal-fired power plants) would either be required by the emissions cap. For instance, if a covered source reduced its emissions beyond its compliance obligation, the source could sell the reductions as "credits" to other sources subject to the cap. This financial opportunity would create the incentive for sources to find and make reductions beyond their compliance obligations. These type of exchanges represent the foundation of the cap-and-trade system. In contrast, if agricultural operations were not covered under an emissions cap, a project that collects methane emissions from a manure digester would likely be an *additional* GHG emission reduction.

If offsets are allowed as a compliance option in an emissions trading program, eligible offset projects could generate "emission credits," which could be sold and then used by a regulated entity to comply with its reduction requirement. This approach is part of the European Union's (EU) Emission Trading Scheme (ETS), which EU members use to help meet their Kyoto Protocol commitments. A regulated entity may consider purchasing offsets if the offsets are less expensive than making direct, onsite emission reductions. Assuming the offset is legitimate - i.e., a ton of carbon reduced, avoided, or sequestered through an offset project equates to a ton reduced at a regulated source - the objective to reduce GHG emissions is met. From a global climate change perspective, it does not matter where or from what source the reduction occurs: the effect on the atmospheric concentration of GHGs would be the same.

Offsets increase emission reduction opportunities. When offsets are not allowed, incentives to reduce emissions or sequester carbon are limited to the covered sources, and there is little motivation to improve mitigation technologies for non-covered sources. Including offsets in a cap-and-trade program would expand these incentives.

TYPES OF OFFSETS

There are four general categories of offsets: (1) biological sequestration projects; (2) renewable energy projects; (3) energy efficiency projects; and (4) non-CO2 emissions reduction projects.

(1) Examples of Biological Sequestration Projects

- planting trees on previously non-forested land (i.e., afforestation);
- planting trees on formerly forested land (i.e., reforestation);
- limiting deforestation by purchasing forested property and preserving the forests with legal and enforcement mechanisms;
- setting aside croplands from agricultural production to rebuild carbon in the soil and vegetation; and
- promoting practices that reduce soil disruption: e.g., conservation tillage and erosion control.

(2) Examples of Renewable Energy Projects

- wind
- solar
- biomass

A renewable energy offset project could provide the financial support to make renewable energy sources more economically competitive with fossil fuels. Use of renewable sources would avoid emissions that would have been generated by fossil fuel combustion. These avoided emissions could be sold as offsets. Domestic renewable energy projects are not likely to qualify as offsets in a national emissions reduction program. In a carbon-constrained context, project developers would be hard-pressed to demonstrate that a renewable energy project would not have happened anyway. In an "economy-wide" cap-and-trade emissions program, energy sector emissions would likely be capped. The cap would make fossil fuels more expensive and renewable energy sources more attractive. In fact, none of the congressional proposals that allow offsets specifically allow the use of renewable energy offsets. However, renewable energy projects may still create credible offsets in nations without GHG emission controls on their energy sectors.

(3) Examples of Energy Efficiency Projects

- Upgrading to more efficient machines or appliances;
- Supporting construction of more energy efficient buildings; and
- Replacing incandescent light bulbs with fluorescent bulbs.

(4) Examples of Non-CO2 Emissions Reduction Projects

- Methane (CH4) emissions from landfills, livestock operations, or coal mines (GWP = 25)
- Nitrous oxide (N2O) emissions from agricultural operations or specific industrial processes (GWP = 298)
- Hydrofluorocarbon (HFC) emissions from specific industrial processes, such as HFC-23 emissions from production of a refrigerant gas (GWP of = 14,800)
- Sulfur hexafluoride (SF6) from specific industrial activities, such as manufacturing of semiconductors (GWP = 22,800)

CONCERNS REGARDING OFFSETS

There are four areas of concern in regard to offsets: (a) integrity concerns; (b) delay of technology development; (c) transaction costs; and (d) concerns in developing nations.

Integrity Concerns

Perhaps the primary concern regarding offsets is their *integrity*. To be credible, as noted above, an offset should equate to an emission reduction from a direct emission source, such as a smokestack or exhaust pipe. Offset integrity - whether or not the offsets represent real emission reductions - can be determined by analyzing six issues: additionality, supplementarity, measurement, double-counting, permanence, and leakage.

(1) Additionality

Additionality means that the offset project represents an activity that is beyond what would have occurred under a business-as-usual scenario. In other words, would the emission reductions or sequestration have happened anyway? Additionality is generally considered to be the most significant factor that determines the integrity of the offset.

(2) Supplementarity

Supplementarity refers to the idea that the role of offsets in an emission reduction program should be secondary to reduction efforts at regulated emission sources. The term comes from the text of the Kyoto Protocol, which states that emissions credits (or offsets) must be "*supplemental* to domestic actions for the purpose of meeting quantified emission limitations and reduction commitments...."

(3) Measurement

Reliable GHG emissions data are a keystone component of any climate change program.

It is generally much simpler to measure and quantify an emission reduction from a direct source than from an offset project. Indeed, the more difficult measurement may be the main reason such reductions are not required by a control program. Regulated sources determine their compliance by comparing actual GHG emissions data against their allowed emissions. In contrast, project developers determine offset emission data by comparing the expected reduced, avoided, or sequestered GHG emissions against a projected, business-as-usual scenario (sometimes referred to as a counter-factual scenario).

To accomplish this task, offset project managers must establish an emissions baseline: an estimate of the "business-as-usual" scenario or the emissions that would have occurred without the project. Requiring third-party verification (as some proposals do) would potentially address this specific concern.

(4) Double-Counting

To be credible, when an offset is sold, it should be retired and not sold again or counted in other contexts.

Example: a regulated entity may purchase offsets generated through the development of a wind farm in a nation that has not established GHG emissions targets. The U.S. buyer would count the offsets, which may have been purchased to negate increased, onsite emissions at the regulated source. In addition, the nation, in which the wind farm is located, would likely see an emissions reduction due to the wind farm. If this decrease is reflected in the nation's GHG emissions inventory, the offset project (wind farm) might replace other reduction activities that the nation might have taken to meet its target.

Double-counting is less of a problem if the offset project occurs in a nation with only a voluntary target (as opposed to a nation subject the Kyoto Protocol). A tracking system could help avoid such double-counting.

(5) Permanence
With some offset projects there may be a concern that the emission offsets will be subsequently negated by human activity (e.g., change in land use) or a natural occurrence (e.g., forest fire, disease, or pestilence). This issue is most pertinent to biological sequestration projects, specifically forestry activities.

(6) Leakage
GHG emissions leakage generally refers to a situation in which an emissions decrease from a regulated (i.e., capped) source leads to an emissions increase from an unregulated source.

Example: if the United States were to cap emissions from specific domestic industries (e.g., cement, paper), these industries would relocate to nations without emission caps and increase activity (and thus emissions) to compensate for the decreased productivity in the United States. Thus, global net emissions would not decrease, and affected domestic industries would likely see employment losses.

Example: an offset project that restricts timber harvesting at a specific site may boost logging at an alternative location, thus reducing the effectiveness of the offset project.

Delay of Technology Development
The inclusion of offsets would likely lower the overall cost of compliance. Although many consider this a desired outcome, some contend that the price of carbon needs to reach levels high enough to promote the long-term technological changes needed to mitigate climate change.

Example: unlimited availability of offsets could lead utilities to build high-emitting coal plants instead of investing in efficiency, renewables, or plants equipped with carbon capture and storage.

Transaction Costs
Transaction costs generally refer to the costs associated with an exchange of goods or services. In an offset market, transaction costs may encompass the following:

- searching for offset opportunities;
- studying and/or measuring offset projects;
- negotiating contracts;

- monitoring and verifying reduced, avoided, or sequestered emissions;
- seeking regulatory approval;
- obtaining insurance to cover risk of reversal (i.e., nonpermanence).

Concerns in Developing Nations

A further concern is that international offsets may serve as a disincentive for developing nations to enact laws or regulations limiting GHG emissions. For instance, if a developing nation established emission caps or crafted regulations for particular emissions sources, reductions from these sources would no longer qualify as offsets. Developing nations may be hesitant to forego the funding provided by offset projects.

POTENTIAL BENEFITS OF OFFSETS

Cost-Effectiveness

The ability to generate offsets, which could be sold as emission credits, would provide an incentive for non-regulated sources to reduce, avoid, or sequester emissions. The inclusion of offsets could expand emission mitigation opportunities, likely reducing compliance costs for regulated entities.

A 2008 EPA study analyzed the economic impacts of the Lieberman-Warner Climate Security Act of 2008 (S. 2191), a cap-and-trade proposal that would allow covered sources to use domestic and international credits to each satisfy 15% allotments of their allowance submission. EPA's study demonstrated a dramatic difference between the offset scenarios. The study found that if offsets are not allowed, the price of carbon would be substantially higher (e.g., 192% higher in 2015) than if offsets could be used as prescribed by the bill.

Environmental Benefits

Many offset projects have the potential to offer environmental benefits, as well. For example, offset projects that promote carbon sequestration in soil (e.g., conservation tillage) improve soil structure and help prevent erosion. Erosion control may reduce water pollution from nonpoint sources, a leading source of water pollution in U.S. waterbodies.

Benefits to Developing Countries

Developing countries, in particular, may gain if the United States includes international offsets in a GHG emission program.

Offset types, such as renewable energy and/or energy efficiency projects, which could face substantial hurdles to qualify as offsets in the United States, would be eligible offsets from developing nations. These types of projects would likely provide environmental benefits beyond GHG emission reduction - improvements in local air quality - by displacing or avoiding combustion of fossil fuels.

Offset projects in developing nations have the potential to create jobs and promote sustainable development, such as creation of an energy infrastructure that is less carbon-intensive and more energy efficient.

New Economic Opportunities and Innovation
The offset market may create new economic opportunities and incentivize innovation as parties seek new methods of generating offsets.

By allowing sources to generate offsets and sell the offsets (as emission credits) to regulated entities, several benefits are achieved:
(1) Emissions are reduced, avoided, and/or sequestered at sources that may not have otherwise occurred;
(2) the offsets generated increase the compliance options for regulated entities: covered facilities can either make direct, onsite reductions or purchase emission credits generated from offsets. The increased reduction opportunities provided by offsets are expected to lower the cost of compliance. This impact ultimately affects consumers because they are expected to bear the majority of an emission program's costs.

Potential Domestic Benefits
If international offset projects are included in the program, some U.S. business sectors may benefit from the transfer of technology and/or services to support projects in other nations. If international offsets, generally the lowest-cost options, are excluded, the offset projects from the domestic agriculture and forestry sectors would likely gain a greater share of the offsets market, thus generating business opportunities in these sectors. However, as noted above, the bottom line is the inclusion of international offsets would lower the emission allowance price, which would benefit regulated entities and ultimately consumers.

ALTERNATIVES TO OFFSETS

Although beyond the scope of this article, there are three alternative methods of addressing the emission sources and sinks that are often considered to be candidates for offsets: (a) Emissions Cap; (b) Emissions Standards; and (c) Set-Aside Allowances.

CONCLUSION

The ultimate objective of climate change legislation is to reduce overall GHG emissions.

From a climate change perspective, the location of an emission activity does not matter: a ton of CO2 (or its equivalent in another GHG) reduced in the United States and a ton sequestered in another nation would have the same result on the atmospheric concentration of GHGs.

If allowed as part of an emissions reduction program, offsets have the potential to provide various benefits. The ability to generate offsets may:

- provide an incentive for non-regulated sources to reduce, avoid, or sequester emissions (where these actions would not have occurred if not for the offset program);
- expand emission mitigation opportunities, thus reducing compliance costs for regulated entities;

- offer environmental co-benefits for certain projects;
- support sustainable development in developing nations; and
- create new economic opportunities and incentivize parties to seek new methods of generating offsets.

The main concern with offset projects is whether or not they produce their stated emission reductions. If concerns of integrity (e.g., additionality, supplementarity, measurement, double-counting, permanence, and leakage) can be resolved, the potential benefits provided by offsets would outweigh any potential harm.

APPENDICES

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About the Author

Brian J. Donovan is an engineer and attorney with over thirty-four years of international business experience. Mr. Donovan is C.E.O. of Renergie, Inc. ("Renergie"). Renergie was formed on March 22, 2006 for the initial purpose of raising capital to develop, construct, own and operate a decentralized network of ten modular-designed small advanced biofuel manufacturing facilities ("SABMFs") in the parishes of the State of Louisiana which were devastated by hurricanes Katrina and Rita. Each SABMF has a production capacity of five million gallons per year of fuel-grade ethanol. Renergie's unique "Field-to-Pump" strategy is to produce non-corn ethanol locally and directly market non-corn ethanol locally. "Field-to-Pump" maximizes rural development and job creation while minimizing feedstock supply risk, the burden on local water supplies, and the amount of energy necessary to process sugar into fuel ethanol. "Field-to-Pump" disrupts the status quo by allowing advanced biofuel producers to be drivers of transportation fuel prices rather than merely price takers in the market. Renergie is in the process of transferring its proven renewable energy technology worldwide by working closely with developing countries in Latin America, the Caribbean, Asia and Africa.

Mr. Donovan drafted the "Advanced Biofuel Industry Development Initiative" for the State of Louisiana. On June 21, 2008, Louisiana Governor Bobby Jindal signed into law the Advanced Biofuel Industry Development Initiative ("Act 382″). Act 382, the most comprehensive and far-reaching state legislation in the U.S. enacted to develop a statewide advanced biofuel industry, is based upon Renergie's "Field-to-Pump" strategy. On February 24, 2009, the U.S. EPA granted Renergie a first-of-its-kind waiver for the purpose of testing hydrous E10, E20, E30 & E85 ethanol blends in non-flex-fuel vehicles and flex-fuel vehicles in Louisiana. On-site blending pumps, in lieu of splash blending, are used for this test.

Mr. Donovan, a member of The Florida Bar, The U.S. District Court, Middle District of Florida and The United States Court of Appeals for the Eleventh Circuit, holds a J.D. from Syracuse University College of Law (where he was recipient of the "Global Law & Practice Award" as the outstanding graduate in the areas of International Law and International Business Law) and a B.S., with honors, in Marine/Mechanical and Nuclear Engineering from the United States Merchant Marine Academy.

Mr. Donovan does not represent, nor has he received any compensation from, any party in regard to climate change legislation.