Supply and Demand of Carbon Offset Credits in the Context of the American Clean Energy and Security Act of 2009

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INTRODUCTION

Carbon offsets are an essential element in allowing both regulated and unregulated companies to meet their greenhouse gas emissions reduction commitments. Globally, these projects result in the installation of new energy efficiency and renewable energy infrastructure that will be critical to a low carbon future. In addition, carbon offset projects have the potential to create countless jobs in the U.S. and abroad. Despite these benefits, when developed quickly in large quantities, carbon offset projects can pose the risk of diminished quality and therefore failure to actually reduce greenhouse gas emissions.

For certain industrial sectors or companies, especially energy or heavy manufacturing, lowering each metric ton of greenhouse gas (GHG) emissions can be very expensive[i]. However, these companies can meet a portion of their reduction targets by purchasing carbon offset credits. These credits represent emissions reductions made by entities outside of a regulatory framework[ii]. The unregulated entities achieve emissions reductions, via energy efficiency and renewable energy projects, at costs lower than what regulated companies would incur when reducing their own emissions.

To reduce costs while meeting emissions reduction goals, it is important that the availability of low cost, high quality offset credits matches demand. High quality offset credits are defined as real, measurable, verifiable, enforceable, additional, and permanent. In addition, there must be assurance the credits are not double counted, do not cause leakage, and are protected against performance risks such as delays or failure in project completion.[1]

The world has yet to see an efficient, transparent and inexpensive system that successfully reviews and approves large quantities of high quality offset projects. As the U.S. strives to regulate emissions through a federal climate bill, ensuring the quality of these offset credits is crucial to the accomplishment of our domestic and global emission reduction goals. For this reason this paper analyzes the proposed offsets program in the bill that recently passed in the U.S. House of Representatives, the American Clean Energy and Security Act of 2009 (ACES).

[1] See Appendix I for definition of these terms.

EXECUTIVE SUMMARY

Three principal conclusions emerge from analysis of the historical experience with and future prospects for carbon offset credits in the context of proposed federal climate legislation:

(1) There is little prospect that there will be a sufficient quantity of high quality offsets available domestically and internationally to allow the offset provisions of ACES to serve as an effective cost containment mechanism.

(2) To the extent that requirements for emission reductions in the U.S. and internationally increase demand for offsets, the pressure to produce those offsets in quantities desired by the market will likely result in a deterioration of offset quality, in turn compromising emission reduction goals.

(3) The offset provisions of ACES do not constitute an effective cost containment mechanism, largely because where the supply of offsets does not meet demand, prices for both offsets and allowances will rise.

The world has yet to see an efficient, transparent and inexpensive system that successfully reviews and approves large quantities of high quality offset projects. For example, offsets registered under the Clean Development Mechanism (CDM) of the Kyoto Protocol over four years are a fraction of the 2 billion offsets allowed *annually* under ACES, which relies on offset credits for cost containment.

The U.S. EPA projects that demand for offsets will never reach the allowable limits on both domestic and international offsets under ACES. However, it is still anticipated that there will be a gap between available supply of high-quality offsets and demand because of a number of substantive technical and operational complexities: (1) availability of mitigation opportunities; (2) development of effective protocols for measuring, monitoring, and verification; (3) information dissemination and learning curves; (4) cash flow and transaction costs; (5) negotiating, rule-making, and administrative delays; and (6) national and international policy, economic, political, and cultural factors.

This signals shortages in supply, regardless of limits, and significant shortages could mean very substantial increases in price. Banking of low-priced offsets in early years of ACES implementation would put additional upward pressure on prices for the reduced number of available offsets, further limiting any cost containment effects.

In addition, a shortage can be expected to affect the quality of offsets to the extent that stakeholders are likely to press to qualify lower quality offsets to meet demand – compromising the integrity of markets, endangering policy agreements and political consensus, and undermining the accomplishment of emission reduction goals.

This analysis includes three appendices: (I) Theory Behind Carbon Offsets; (II) Offset Project Integrity; and (III) Carbon Offset Quality Under ACES.

OFFSETS PROVISIONS IN ACES BILL

As part of ACES, a program will be created using the aforementioned criteria for offset quality[2]. The following information on ACES is current as of July 2009 and reflects the bill in its entirety upon passage in the U.S. House of Representatives. In its current form, the EPA will oversee the entire program, however the bill grants authority over:

- domestic agriculture and forestry offsets to the Secretary of Agriculture; and
- all international offsets to the Secretary of State and the Administrator of USAID.

ACES allows regulated companies to cumulatively use up to 2 billion offset credits each year to help meet emissions targets. Each offset credit represents the reduction of one ton of carbon dioxide equivalent (CO_2e) from the atmosphere.

- Of these credits, 1- 1.5 billion may be from international projects and between 0.5-1 billion may be from domestic projects.
- If there are fewer than 0.9 billion domestic offset credits available at prices less than or equal to allowance prices then the amount of international offsets will increase up to 1.5 billion and domestic offsets will decrease by the same amount.
- From 2012 to 2017, each offset credit redeemed will count for 1 ton of emissions reduction. Starting in 2018, for international offsets, 1.25 credits will count for 1 ton of emissions reduction.
- Each regulated entity will be allowed to use a percentage of the 2 billion offsets per year, based on a formula provided in the bill.

Program Details

- Eligible offset projects will not have commenced prior to January 1, 2009, unless they are registered under an existing offsets program, in which case they may have commenced after January 1, 2001.
- A periodically updated list of eligible offset project types will be determined[3]. Any citizen has the right to petition to add an offset project to this list.
- A regulated Offset Registry system, published on the Internet, will be created for issuing, recording, holding and tracking offset credits. This system will follow the buying, selling, exchanging, transferring, retiring and holding for compliance of offset credits.
- The EPA Administrator will set fees payable by offset project developers in the amount necessary to cover administrative costs of carrying out offset program activities.
- There will be a standardized methodology determined for setting conservative, business-as-usual activity baselines for offset projects. There will also be protocols set for monitoring and accounting for uncertainty.
- All offset credits must be permanent, with the exception of term offset credits – non-permanent reductions that may be used to meet emissions targets temporarily.
- The entire offsets programs will be reviewed and revised at least every five years.
- Offset credits will be valid for a crediting period of 5 to10 years.

[2] See Appendix II for overview of offset quality criteria that is both established and to be determined under this bill.

[3] See Appendix III for an initial list of project types that may qualify under ACES.

- An Offset Reserve will probably be created as insurance against the event that reductions from offset projects are lost due to impermanency.

Early Offset Supply

- Projects registered under state or tribal law, or under any regulatory or voluntary emissions reduction program between January 1, 2001 and January 1, 2009 will be evaluated by the Administrator before being issued offset credits under ACES.
- This applies until three years after enactment of ACES or until a federal offsets program is established, whichever occurs first.

Advisory Committees

- The EPA Administrator will appoint nine experts to serve three-year terms on an Offsets Integrity Advisory Board that will recommend offset and international forest credit regulations. This board will make public scientific reviews of reductions achieved and will ensure the environmental, social and economic integrity of the program.
- The Secretary of Agriculture will establish a similar nine-person advisory committee, the USDA GHG Emission Reduction and Sequestration Advisory Committee for domestic agricultural and forestry practices.

Agriculture and Forestry

- U.S. agriculture and forestry sectors are not included in capped industrial sectors and are therefore eligible to produce offset credits.
- Project developers within these categories will be provided technical assistance through funds appropriated to the USDA's Natural Resources Conservation Service Conservation Operations account.

Project development process

1. Project must be approved (or denied) by the entity overseeing the offsets program within 90 days of receiving petition from the project developer.
2. The project developer must submit a report prepared by a third-party-accredited verifier to confirm emissions offsets have occurred.
3. The government will determine offset quantity within 90 days of receiving the verification report.
4. Within two weeks, one credit will be issued for each ton of CO_2e that is offset.
5. Each offset credit will receive a unique serial number and be registered in the Offset Registry.
6. On an ongoing basis, random audits of offset projects, offset credits and practices of third-party verifiers will be conducted.

International Offset Credits

- International offset credits in developing countries will be issued based on the same criteria used for domestic offsets.
- These offsets can only come from developing countries that are in a bilateral or multilateral agreement with the US that ensures the quality of offsets are in line with US domestic offsets.

- Offsets issued by international bodies established pursuant to UNFCCC or to a treaty that succeeds it count if they have as much integrity as required by ACES.
- Emissions from indirect land use changes outside a renewable fuel's feedstock's country of origin will be excluded from regulation until further research is conducted on this subject by the National Academy of Science, within six months of enactment of ACES.

Sector-based offsets

- To minimize leakage and encourage national mitigation in developing countries, sectors of specific countries with high GHG emissions and sectors that would be under compliance in the U.S. will be identified as eligible for offset credits.
- In each developing country, a national, enforceable, baseline will be established for emissions within each sector. This baseline will be on an absolute basis and will establish growth levels consistent with thresholds – additionality and performance will be determined on the basis of such baselines.

Reduced deforestation

- International reduced deforestation credits, referred to by the United Nations as REDD (Reducing Emissions from Deforestation and Forest Degradation in Developing Countries), will be included in ACES.
- These will be issued only if the activity occurs in a developing country, state or province listed by the administrator (countries that account for less than 1 percent of global GHG emissions and less than 3 percent of global forest sector/land use change emissions and are making a good faith effort to develop a land use or forest sector strategic plan).
- Quantity of international offset credits will be determined by comparing national emissions from deforestation relative to established national deforestation baseline.
- This program will be phased out 5-8 years from when compliance starts.
- USDA, the State Department and USAID will provide expertise to guarantee quality of offsets and prevent double counting of offsets.

Supplemental Emissions Reductions

- EPA and USAID will use funds from the auction of emission allowances from the Strategic Reserve to purchase international reduced deforestation credits.
- The goal is to achieve supplemental emissions reductions of at least 720 million tons of CO_2e in 2020 and a cumulative amount of six billion tons CO_2e by 2025.

DEMAND

While ACES allows for 2 billion offset credits to be used each year, EPA projections for future offset demand under this bill indicate that the annual 1 billion-credit limit on domestic offsets will never be reached. Although low quantities of domestic credits will result in international offset demand averaging over 1 billion credits per year, the 1.5 billion per year upper limit on international credits will also never be reached[iii].

ACES includes the following formula for calculating how many of the total 2 billion annual offsets each regulated entity may use per year:

$$\frac{2 \text{ billion}}{(2 \text{ billion} + \text{total number of allowances allocated in the previous year})}$$

For example, in 2012 the proposed emissions cap would be set at 4.6 billion tons CO_2e. At this cap, the formula allows each regulated entity to use offsets to cover 30.2 percent of the number of allowances it is required to hold under regulation. Using this percentage, roughly 6.6 billon tons CO_2e of emissions would have to be regulated in 2012 for the 2 billion offset allocations to be used. However, this assumes that no entities take any actions to reduce their own emissions and opt to offset the maximum number of emissions they are permitted.

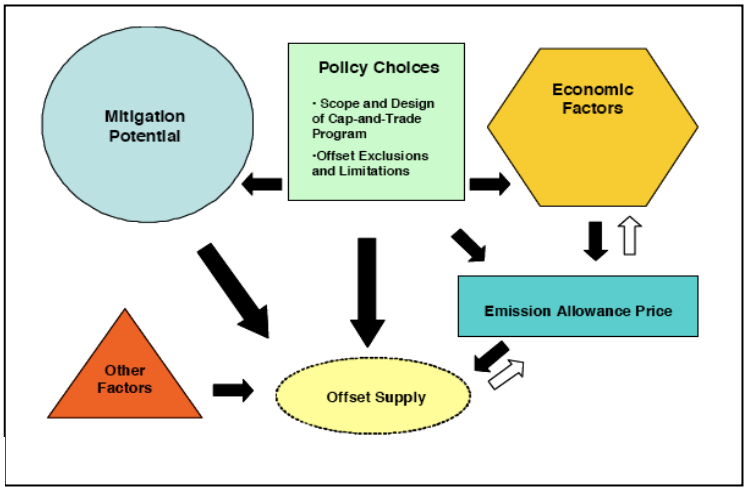
Another scenario would result if instead of using all of these offsets in the year of purchase, regulated entities purchase them in the early years – when they are likely to sell for lower prices – and then bank those offsets to be redeemed in later years. This strategy of cost containment would cause a spike in offset demand in the early years of regulation, potentially resulting in an offset shortage. This is especially true if strict rules are established for offset project approval in order to protect quality. Low offset supply could also occur if there is a bottleneck somewhere in the administrative or auditing components of project approval. Typically in an offset shortage, prices increase on offsets available for sale. The increased offset sale price negates the cost containment capacity that offset credits offer regulated entities. These aspects are explored further in the supply section of this paper.

An important element of ACES is the bill's requirements regarding international offset credits[iv]:

- Starting in 2018, for every four tons of offsets credited from developing countries, five actual tons of emissions reductions must be purchased. These surplus tons will result in emission reductions above and beyond the U.S. cap.
- The bill uses the offset program to leverage reduction commitments in developing nations. For example, forestry projects count as offsets if they reduce emissions below a national baseline that is declining with the goal of zero net deforestation within 20 years.
- Under ACES, a standardized methodology for high quality offset projects will be established.

SUPPLY

Offset supply in a cap-and-trade program such as that outlined in ACES is determined by a complex, interrelated set of variables. This figure illustrates this complexity[v].



Source: Center for Resource Solutions

Mitigation potential
Certain technical assumptions, such as land availability and sequestration rates of various activities, cost of construction and materials, will impact the types of offset projects that are developed, and therefore offset supply. The different mitigation levels of offset activities, for example, influence land use decisions:

- At different price points, one mitigation activity may replace another. Projects that are more expensive to complete will be more likely to be implemented as allowance price, and therefore offset credit price, rises. For example, agricultural soil sequestration is relatively inexpensive and will likely be an initial use of limited lands. However, as offset prices rise, afforestation projects will become cost effective and may replace soil sequestration.
- It is also possible for more than one practice that reduces or sequesters CO_2e to take place on the same land. For example, soil conservation tillage may occur alongside biofuel production, and both could be credited under ACES.

Policy Choices
Under ACES, the following policy decisions will directly and indirectly affect the supply of offsets in a cap-and-trade program:

- Program design, including which emissions sources are regulated, which offset sources are eligible, and protocols, such as how offsets are measured and monitored, will significantly influence the quantity of offsets produced.
- In ACES there are allowances set aside for certain activity categories, such as for international forestry, which reduces the amount of offset credits that will be generated in these sectors.
- The structure and stringency of protocols will impact the costs of producing offset projects: the more complicated the protocol, the more expensive it will be to complete an offset project and generate credits for it.
- Offset supply is strongly impacted by policy actions made by other nations. ACES requires national-level control of emissions reductions within certain categories in developing countries. The ability of these countries to meet these requirements will determine offset availability.
- Other state- and national-level U.S. policy decisions, such as federal renewable portfolio standards and state-level emission standards that are higher than those determined at the federal level will reduce the availability of offset credits.

Economic Factors
The potential supply of offsets will be affected by how the economy responds to a federal cap-and-trade program such as ACES. The development and market penetration of low-carbon technologies will be very important in determining the economic impact of such a program. If these technologies are available earlier than predicted, this will lower the cost of complying with emissions targets and the emission allowance price itself, thereby making fewer types of offset projects cost effective.

Emission Allowance Price

- All the factors discussed above will influence allowance price, which will impact offset supply and type. In turn, availability of offsets will impact the allowance price: if fewer

offsets are available, more regulated entities will have to rely on allowances to meet their emissions targets, thus driving up the price of allowances.

- Offset supply will fluctuate with the allowance price. If the allowance price is low, only the "low-hanging fruit" projects will be financially viable. As allowance price increases, more offset projects will become economically competitive.

Other Factors

There are many non-price variables that may affect offset production:

- Groups such as farmers may have cultural hesitations to changing the way they use their land or the way they raise their livestock, even if making changes would be more profitable than current practices.
- Political discussions may slow the creation of certain types of offsets, such as international forestry offsets, which will rely on actions by other governments and are very hard to regulate.
- Imperfect information dissemination may reduce the production of offset credits. The world of offsets is hard to navigate and many entities that would like to profit from creating offset projects will have a lot to learn before they are able to master the system.
- Transaction costs may be prohibitive in developing offset projects. It may not be economically viable for small operators to pay project development transaction costs if they are generating a relatively small quantity of offsets.
- There are many technical challenges to implementing offset projects. In certain sectors project developers will have to learn how to use brand new technologies.

IMPLEMENTATION CHALLENGES

International Offsets

- Under ACES, up to 1.5 billion international offset credits may be redeemed each year. Likely demand within the first few years will be under 1.5 billion credits. However, as the cap tightens and demand for offsets increases, if an average project generates 100,000 offset credits per year, then 15,000 new international projects would need to be approved within the first three years of the program to satisfy demand. This is seven times the total number of projects registered cumulatively over four years under the Clean Development Mechanism, a program that entered into force through the Kyoto Protocol[vi].
- Cost containment within ACES relies on offset credits, and international offset credits in particular. If the full amount of international offsets is not available, the economic impact could be substantial or even huge, depending on the size of the shortfall. It is unlikely that plus or minus 15,000 projects will be completed in the timeframe necessary for entities to meet compliance requirements. This is due to administrative barriers of approving all of these projects and ability to verify the permanence, additionality and overall quality of the projects[vii].
- Increased international offsets will not materialize until criteria for accepting these types of projects is clearly outlined. As mentioned earlier, these projects take time to develop and pass through the regulatory process. This means there will likely be a significant shortage of international offset projects in the early years of enactment of a cap-and-trade program such as ACES.

- These challenges have resulted in interest moving away from project-by-project offset generation to sector-wide reductions. Within ACES there are provisions for the creation of these types of sector-wide offsets. Offsets would be measured against a national-level commitment to reduce emissions in a specific sector. Resolving the methodological, measurement, and political uncertainties with this approach will pose a challenge and slow down the rate of offset credit approval. According to the Congressional Budget Office (CBO):

  > Based on information from the Department of State, EPA, and outside experts, CBO expects that the agreements necessary to generate offsets with certain countries would take significant time to negotiate….CBO also assumed that other developed countries (for example, those in the European Union) would seek offsets for their own emissions reduction programs, thereby reducing the supply available to U.S. entities.[viii]

- In addition, in its June, 2009 report, *Forging the Climate Consensus: The Need For Action*, the National Commission on Energy Policy said "the question is how large a role offsets can play without undermining the administrative feasibility and environmental integrity of the underlying program." The commission cautioned against an "over-reliance on international offsets" that "could undermine program goals and political support, especially if substantial U.S. funds are leaving the country to support abatement efforts abroad rather than at home.[ix]"

Cash Flow

The more complex offset projects require large capital investments dedicated in advance of project development. Adequate funds will be crucial in ensuring that a sufficient number of projects are developed and implemented in time for the ACES compliance deadline of 2012. *New Carbon Finance* estimates that some €9 billion needs to be invested between now and 2012 to help finance projects to meet the world's emission reduction targets. Most of this €9 billion will flow into the clean energy and energy efficiency sectors. The offset credit sales price of €20 per ton CO_2e reduced should stimulate the necessary capital flows to these projects. Unfortunately, the EPA-projected price of $13-15 per offset credit in the early years of the emissions cap is well below this necessary €20. At the low price of $13-15 per offset credit, it is possible that there will be a lack of interest by investors in dedicating capital to offset projects.

Verification

In a recent performance assessment of the companies auditing current Clean Development Mechanism offset projects, the World Wildlife Fund gave all of the top five auditors scores of D or lower on an A-F scale[x].

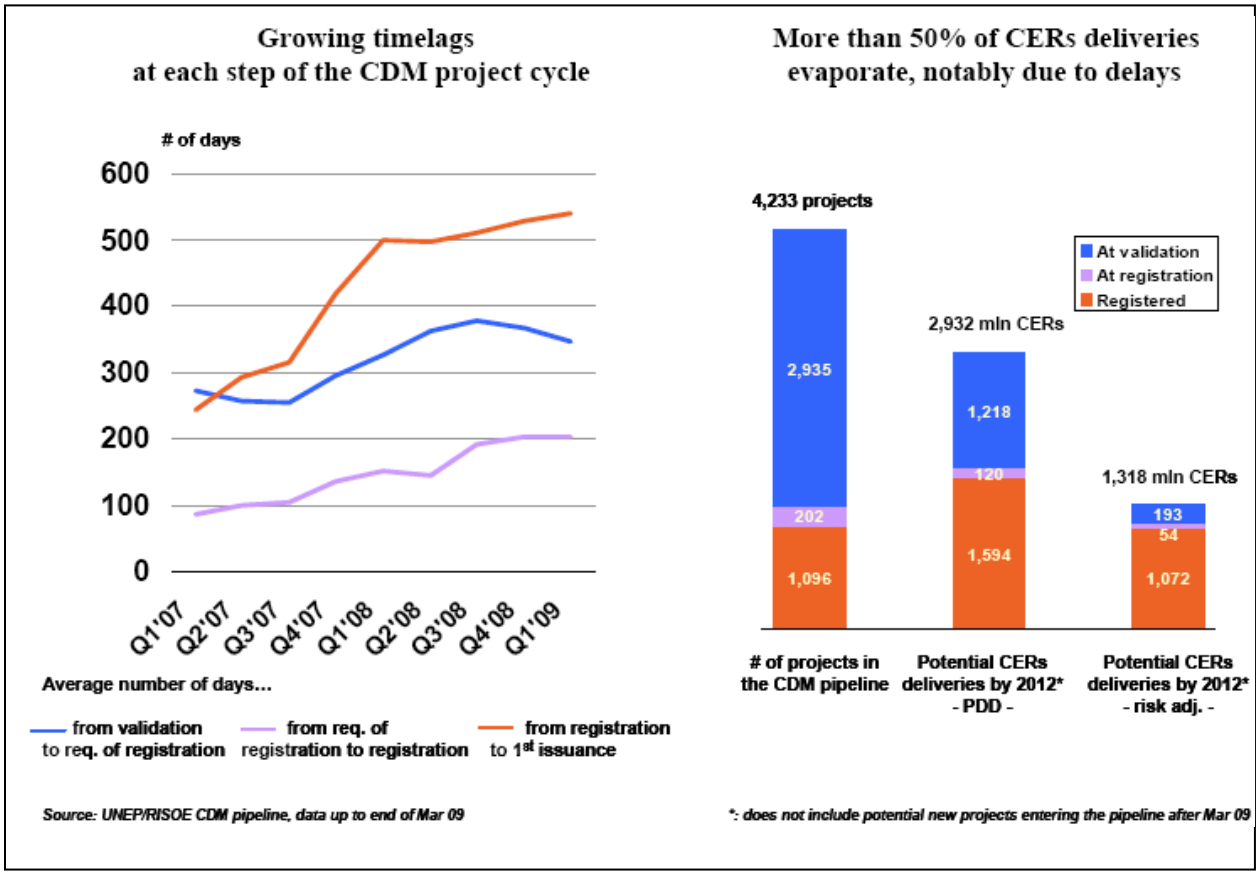
DOE	Rating
TÜV-Nord	D
TÜV-Süd	D
SGS	E
BVC	F
DNV	F

Designated Operational Entities (DOEs) are accredited independent organizations responsible for ensuring that proposed projects under the Clean Development Mechanism (CDM) meet all requirements established by the CDM Executive Board operating under the Kyoto Protocol. This rating of DOEs examines how well they are fulfilling the requirements and expectations of the

CDM Executive Board. In addition, the accreditation of one of the key companies, DNV was temporarily suspended during the past six months. The shortcomings of the CDM auditors do not bode well for the ability of a U.S. offsets program to maintain high quality offset projects.

Delays

There have been many bottlenecks in the process of developing offset projects and issuing offset credits. For example, the largest of the international offset project developers, EcoSecurities suffered an almost 50 percent drop in its share price in 2007. This drop coincided with a slowdown in project approvals and credit issuance by the Executive Board of the Clean Development Mechanism (CDM). The slowdown resulted in a cut in Ecosecurities' expected output of offset credits by almost a quarter. The following chart illustrates the delays that have become typical in the CDM project approval process:



THE MARKET

Despite all the challenges outlined above, when high quality is maintained, carbon offset projects provide an important opportunity for greenhouse gas emissions reduction. In addition, carbon offset projects offer a new source of job opportunities in the U.S. and internationally. The development of offset projects will not only stimulate the economy by expanding new and growing industry sectors, it will also shift the path of U.S. energy use.

Moving away from the fossil fuel-based energy system that the U.S. as a nation is dependent upon poses prohibitive upfront costs to businesses and society. As the carbon market grows, carbon offset projects that involve renewable energy and energy efficiency have been and will continue to be implemented. The expensive energy infrastructure installed in these projects will help in this U.S. transition away from fossil fuel dependence to a clean energy economy. In addition to these benefits, carbon offsets are an essential element in allowing both regulated and unregulated companies to meet their greenhouse gas emissions reduction commitments.

Through carbon offset projects, more than 1.5 billion tons CO_2e have been removed from the atmosphere, resulting in a carbon offsets market valued at over $33 billion. This includes voluntary and regulated markets worldwide and represents an enormous increase from five years ago when the market was virtually non-existent. Despite this rapid increase, carbon markets today remain negligible in relation to the $1.35 trillion estimated future value of world emissions, indicating how much room there is for the growth of these markets[xi]. The following table outlines annual volumes and values for project-based transactions in 2007 and 2008[xii].

	2007		2008	
	Volume *($MtCO_2e$)*	Value *(MUS$)*	Volume *($MtCO_2e$)*	Value *(MUS$)*
Primary CDM	552	7,433	389	6,519
JI	41	499	20	294
Voluntary market	43	263	54	397
Sub-total	636	8,195	463	7,210
Secondary CDM	240	5,451	1,072	26,277
TOTAL	**876**	**13,646**	**1,535**	**33,487**

Voluntary Markets

Currently voluntary markets are a small portion of the overall carbon market, but they are predicted to grow by up to 240 percent every year until at least 2012[xiii]. Between 2006 and 2007 these markets grew 165 percent in terms of volume (compared to 71 percent growth in regulated markets during that time period). As credibility of voluntary offsets increases, through the use of more stringent and verifiable standards, the voluntary market will see dramatic and exponential growth in demand[xiv].

These markets offer credits that are sold at the retail level to individuals, organizations and companies that want to reduce or offset their carbon emissions but are not required to doing so under regulation. Many different entities, including banks, credit card companies, and private equity funds, are showing more interest in these markets. In addition to being motivated by ethics, often these players become involved to improve brand reputation, seek economic benefits, differentiate their products, or respond to consumer demand[xv].

Regulated Markets

The majority of carbon trading occurs within regulated markets. Of these, the European Union Emission Trading Scheme (EU ETS) is the largest emissions trading program. The policy, economic, and procedural complexities of existing regulated markets – and the one ACES will create – provide little prospect that there will be a sufficient quantity of high quality offsets available domestically and internationally within the timeframes that would allow the offset provisions of ACES to serve as an effective mechanism for controlling costs of allowances and energy prices under the provisions of the bill. There are several reasons for this likely shortfall in supply – regardless of whether demand reaches anything like the limit allowed under ACES.

First, there is the difficulty of finding opportunities for offset projects that will generate sufficient credits at an affordable rate. Second, there does not exist at this time a system for efficient, transparent and inexpensive verification and certification of high-quality offset projects – let alone one that could accommodate the volume of projects necessary to make offsets a viable cost containment mechanism under ACES. For example, over *four years*, the projects registered under the Clean Development Mechanism (CDM) of the Kyoto Protocol produced a fraction of the two billion offsets allowed *annually* under ACES.

Couple these issues with the current lack of information and understanding about markets, baselines, and the creation of viable, high-quality projects, financing and transaction costs, and the process involved in regulation and policymaking, domestic and international, and it is entirely likely that a shortfall in supply will occur.

While low prices in the market early on could lead to banking of offsets for later use or sale – further limiting supply – once the market realizes the ultimate shortfall, it could spell trouble, generating substantial increases in price. From this, in turn, a downward spiral might begin, leading to the very volatility in the energy and credit markets offsets are intended to assuage. The quality of offsets would ultimately be affected, as stakeholders press to qualify lower-quality offsets to meet demand – compromising the integrity of markets, endangering policy agreements and political consensus, and undermining the accomplishment of emission reduction goals.

APPENDIX I

Offset Project Integrity

The integrity of the offset credit being traded has the biggest influence on its price. Integrity is often measured across one or more of the following parameters[xvi]:

Parameter	Meaning
Additional	The project would not have happened without the revenue generated by the sale of the emissions reduction credit. Another interpretation says that the project is additional if the emissions from the project are lower than the baseline emissions had the project not occurred. Regardless, if the project would have happened without the carbon market influencing demand, then the project does not actually reduce greenhouse gas emissions above business as usual levels and therefore credits resulting from the project do not count as carbon offsets.
Real and Measurable	To ensure the existence of real emissions reductions, measurable project activity must be monitored and a third party should verify the emissions reductions claimed.
No Double Counting	It is imperative to confirm that a single emissions reduction is not sold to multiple buyers, thereby counting the same credit or credits as offsets for more than one set of emissions.
Permanent	A reduction should be permanent; if an offset project leads to only temporary emissions reductions it is not considered a valid credit[xvii].
Leakage	It is important to ensure that a carbon offset project's creation does not result in higher emissions outside of the project's boundary.
Risks	If the offset project does not reach fruition it will not be able to deliver the promised emissions reduction. Regulatory issues, project development problems, and performance failure could reduce the success – in quality or quantity – of offset projects. To protect against shortfall, contracts define these risks and assign responsibility for them, and these are reflected in the price of the credit. Since late 2006, risk has diminished as a secondary market for certified emissions reductions (CERs) has grown, delivering standardized compliance-grade carbon credits with guaranteed volume deliveries[xviii].

APPENDIX II

Carbon Offset Quality Under ACES

The EPA Administrator will establish the types of projects eligible to generate offset credits. The Secretary of Agriculture will do the same for domestic agriculture and forestry.

Quality Parameters for Offset Projects under ACES:

- Additional – The emissions reduction must not have happened without the offset project.
- Real, Measurable, Verifiable – Must have real emissions reductions; measurable project activity are a must and a third party should verify the emissions reductions claimed
- No Double Counting – A single emissions reduction should not be sold to multiple buyers. There will be an Offsets Registry to prevent this by tracking offsets.
- Permanent – Must have permanent rather than temporary emissions reductions.
- Leakage – The offset must not result in higher emissions somewhere else.
- Uncertainty – Use conservative methods for counting emissions reductions to maximize the certainty that the emissions cap is not compromised.
- Environmental – Avoid adverse effects on human health or the environment. For forestry or other relevant land management-related offset projects, there will be regulations to:
  - ensure that native species are given primary consideration in such projects;
  - enhance biological diversity in such projects;
  - prohibit the use of federally designated or state-designated noxious weeds;
  - prohibit the use of a species listed by a regional or state invasive plant authority within the applicable region or state;
  - use environmentally sustainable forestry practices.

Other Information on Quality:
TERM OFFSET CREDITS. Are valid for a set period of time and serve as a reduction placeholder. They are not permanent and therefore can only be used to meet compliance for a certain time period. Prior to the expiration of these credits, a regulated entity must establish a plan for how to replace the term reductions with permanent reductions.

BIOMASS-BASED DIESEL will be exempted from lifecycle GHG requirements up to (1 billion gallons annually) from facilities that commenced construction before enactment of the Energy Independence and Security Act of 2007.

AGRICULTURE INCENTIVES PROGRAM. Creates emission allowances for agriculture activities that
(A) reduce/avoid/sequester GHGs, but do not meet the criteria for offset credits;
(B) support actions to adapt to climate change; or
(C) prevent conversion of land that would increase GHG emissions (including projects and activities that complement or supplement conservation programs administered by the Secretary).

Criteria in Waxman-Markey that have not yet been defined and are slated to be determined by the EPA Administrator and/or Secretary of Agriculture:

1. Determining which existing methodologies and offset programs (regulated and voluntary) will count for offsets under Waxman-Markey.

2. Standardized methodologies for each offset project type that:
- establish activity baselines to reflect a conservative estimate of business-as-usual performance to ensure an adequate margin of safety.
- quantify GHG benefits of different offset types based on how much an offset exceeds a relevant activity baseline.
- monitor and account for uncertainty.
- determine additionality meaning:
    - not required by law;
    - don't exceed the activity baseline;
    - not commenced prior to January 1, 2009, except:
      (i) offsets registered under an approved offset program;
      (ii) activities where setting an alternative date may produce an environmental benefit by removing an incentive to cease and then reinitiate activities.
- outlines how to account for and mitigate potential leakage taking uncertainty into account, excluding international indirect land use changes; and
- define requirements for reporting and record keeping.

3. Rules for reversals (offsets that are not permanent)
- At least one of the following will be used to maintain the emissions cap in the event of a reversal in permanency of an offset:
    - An offsets reserve that can be used when there is risk the cap is exceeded.
    - Insurance for purchase and retirement of an amount of offset credits or emission allowances equal to emissions released during reversal.
    - Another mechanism that determines and satisfies the requirements.

4. Crediting Periods for each offset project type, the Administrator/Secretary shall specify a crediting period of 5-10 years for any project type other than sequestration.
- 5 years for agricultural sequestration practices;
- 20 years for forestry sequestration practices; and
- 10 years for other practice types that reduce or avoid greenhouse gas emissions or sequester greenhouse gases.

APPENDIX III
Initial Eligible Domestic Agriculture/Forestry Offsets list in ACES:

- agricultural, grassland, and rangeland sequestration and management practices, including
    - altered tillage practices
    - winter cover cropping, continuous cropping, and other means to increase biomass returned to soil in lieu of planting followed by fallowing
    - reducing
        - nitrogen fertilizer use or increase in nitrogen use efficiency
        - frequency and duration of flooding of rice paddies
        - carbon emissions from organic soils
        - GHG emissions from manure and effluent
        - GHG emissions due to changes in animal management practices, including dietary modifications

- changes in carbon stocks attributed to land use change and forestry activities, including
    - afforestation or reforestation of acreage that is not forested
    - forest management resulting in an increase in forest carbon stores including but not limited to harvested wood products
    - management of peatland or wetland
    - conservation of grassland and forested land
    - improved forest management, including accounting for carbon stored in wood products
    - reduced deforestation or avoided forest conversion
    - urban tree-planting and maintenance
    - agroforestry
    - adaptation of plant traits or new technologies that increase sequestration by forests

- manure management and disposal, including
    - waste aeration
    - biogas capture and combustion
    - application to fields as a substitute for commercial fertilizer

Renewable Biomass definition in ACES:

- Plant material, including waste material, harvested or collected from actively managed agricultural land in cultivation, cleared, fallow or nonforested on January 1, 2009.
- Plant material, including waste material, harvested or collected from pastureland that was nonforested on January 1, 2009.
- Nonhazardous vegetative matter derived from waste, including separated yard waste, landscape right-of-way trimmings, construction and demolition debris or food waste (but not municipal solid waste, recyclable waste paper, painted, treated or pressurized wood, or wood contaminated with plastic or metals).
- Animal waste or animal byproducts, including products of animal waste digesters.
- Algae.

- Trees, brush, slash, residues, or any other vegetative matter removed from within 600 feet of any building, campground, or route designated for evacuation by a public official with responsibility for emergency preparedness, or from within 300 feet of a paved road, electric transmission line, utility tower, or water supply line.
- Residues from or byproducts of milled logs.
- Any of the following removed from forested land that is not Federal land and is not high conservation priority land:
    - Trees, brush, slash, residues, interplanted energy crops, or any other vegetative matter removed from an actively managed tree plantation established— (I) prior to January 1, 2009; or (II) on land that, as of January 1, 2009, was cultivated or fallow and non-forested. (ii) Trees, logging residue, thinnings, cull trees, pulpwood, and brush removed from naturally-regenerated forests or other non-plantation forests, including for the purposes of hazardous fuel reduction or preventative treatment for reducing or containing insect or disease infestation. (iii) Logging residue, thinnings, cull trees, pulpwood, brush and species that are non-native and noxious, from stands that were planted and managed after January 1, 2009, to restore or maintain native forest types. (iv) Dead or severely damaged trees removed within 5 years of fire, blowdown, or other natural disaster, and badly infested trees.
- Materials, pre-commercial thinnings, or removed invasive species from National Forest System land and public lands including those that are byproducts of preventive treatments (such as trees, wood, brush, thinnings, chips, and slash), that are removed as part of a federally recognized timber sale, or that are removed to reduce hazardous fuels, to reduce or contain disease or insect infestation, or to restore ecosystem health, and that are—
    - not from components of the National Wilderness Preservation System, Wilderness Study Areas, Inventoried Roadless Areas, old growth or mature forest stands, components of the National Landscape Conservation System, National Monuments, National Conservation Areas, Designated Primitive Areas; or Wild and Scenic Rivers corridors; (ii) harvested in environmentally sustainable quantities, as determined by the appropriate Federal land manager; and (iii) harvested in accordance with Federal and State law, and applicable land management plans.

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