

# Getting Into the Game: How POTWs Can Take Advantage of Carbon Trading

*A Primer for NACWA Members*



National Association of Clean Water Agencies



In association with Williams Mullen PC



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## Preface

This Primer has been produced by the National Association of Clean Water Agencies (NACWA) to assist municipal wastewater treatment agencies in understanding the challenges and opportunities presented by emerging carbon markets related to climate change initiatives. This publication was produced as part of NACWA's Critical Issues Action Initiative for the benefit of the Association's public agency members.

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## Acronym Listing

A.B.32	California Global Warming Solutions Act
CARB	California Air Resources Board
CCAR	California Climate Action Registry
CCX	Chicago Climate Exchange
CDM	Clean Development Mechanism
CERs	Certified Emissions Reductions
C-FAR	Carbon Footprint Assessment and Reduction
CFI	Carbon Financial Instruments
CH <sub>4</sub>	Methane
CO <sub>2</sub>	Carbon Dioxide
CO <sub>2</sub> e	Standard unit for one carbon credit (one metric ton of CO <sub>2</sub> reduction)
CRT	Climate Reserve Ton
ECX	European Climate Exchange
EFET	European Federation of Energy Traders
EPA	Environmental Protection Agency
ERPA	Emission Reduction Purchase Agreement
EU	European Union
EUAs	European Union Allowances
EU-ETS	European Union-Emission Trading Scheme
GHG	Greenhouse Gas
HFCs	Hydrofluorocarbons
ICAP	International Carbon Action Partnership
ICLEI	International Council for Local Environmental Initiatives
IPCC	Intergovernmental Panel on Climate Change
ISDA	International Swaps and Derivatives Association
ISO	International Standards Organization
LGOP	Local Government Operations Protocol
MRP	Midwestern Regional GHG Accord Reduction Program
MW	Megawatt
NACWA	National Association of Clean Water Agencies
N <sub>2</sub> O	Nitrous Oxide
OTC	Over-the-counter
PDD	Project Design Documentation
PFCs	Perfluorocarbons
POTW	Publicly-owned treatment works
RGGI	Regional Greenhouse Gas Initiative
SF <sub>6</sub>	Sulphur hexafluoride
UNFCCC	United Nations Framework Convention on Climate Change
U.S.	United States
VCS	Voluntary Carbon Standard
VCU	Voluntary Carbon Units
VER	Voluntary Emissions Reductions
VERPA	Voluntary Emission Reduction Purchase Agreement
WBCSD	World Business Council for Sustainable Development
WCI	Western Climate Initiative
WERF	Water Environment Research Foundation

# INTRODUCTION

The emergence over the past few years of specialized markets focusing on reducing carbon dioxide and other greenhouse gases as part of expanding climate change initiatives has created a series of potential new economic opportunities for clean water agencies. However, many public utilities are unsure of exactly how these carbon markets function or how to best engage them. Cognizant of these questions, the National Association of Clean Water Agencies (NACWA) created this Primer to assist its public agency members in better understanding the role of carbon markets and how public wastewater utilities can become involved if they so choose. NACWA completed work on this project as part of the Association's Fiscal Year (FY) 2009 Critical Issues Action Initiative in an effort to provide both guidance and potential economic benefit to NACWA members confronting complex decisions relating to climate change. This Primer is part of NACWA's larger body of work on climate change issues, including the Association's 2007 white paper, *Climate Change: Emerging Issues for Clean Water Agencies*, as well as ongoing legislative and regulatory advocacy surrounding proposed federal climate change legislation and regulation and the potential impact on municipal clean water agencies. The Primer is intended to complement NACWA's continuing advocacy work by providing practical guidance and information for clean water agencies that are evaluating their response to climate change and may be considering participation in emerging carbon markets.

Carbon trading has become so common that websites offer offsets for sale to footprint-conscious consumers suffering from carbon guilt. In the scramble for carbon neutrality – or at least the appearance of it – individuals can even generate carbon credits for purchase just by using personal eco-friendly credit cards. Despite all the public fanfare, the details about carbon trading are still fuzzy. There are good reasons for confusion, since carbon trading can mean wildly different things. The underlying carbon market policies are also evolving so rapidly that even the most diligent traders find it impossible to stay abreast of daily developments. Nonetheless, active carbon market suppliers and traders all share a common understanding: carbon trading can be extremely profitable if you know how to play and where to play.

This Primer is written with this belief in mind. Publicly-owned treatment works (“POTWs”) are well-situated to capitalize on existing and anticipated carbon markets because anthropogenic (*i.e.* man-made) greenhouse gases (“GHGs”) are typically released as part of the wastewater treatment process. By implementing an eligible GHG emissions reduction project (known as an “Offset”), a POTW can generate and supply the market with carbon Offset credits.

That said, not every POTW is equal from the perspective of carbon market opportunities. Each POTW has different physical characteristics and regulatory constraints. These factors impact a POTW's level of GHG emissions and the feasibility of emissions reduction options. This Primer is intended to provide POTW management personnel considering investments in GHG emissions reductions with an overview of carbon markets and trading. It provides basic information about the rules of the carbon market game, the fundamentals of how to play, and the important issues and policies they will need to consider when making an evaluation of whether to participate. This Primer is not intended as a guidebook for types of emission reduction capital improvement projects, nor should it be used as a replacement for thorough investigation, guidance, and economic analysis. Additional legal, engineering, and economic review and consultation is generally warranted in all instances.

The applicable rules, regulations and policies setting the scope and parameters for the carbon market game are unsettled and may change dramatically in coming years. Management should view this uncertainty as a primary factor in their evaluation of opportunities, but not necessarily as a deterrent to early participation in carbon



Offset projects. In some instances, early action may be the best and most economic option available. For example, implementation of an Offset project now could generate voluntary market Offset credits, which may cover all or some portion of the capital improvement costs. If the POTW waits on the sidelines for a mandatory GHG cap-and-trade program, however, it may be too late, because the POTW may be regulated under a GHG program, extinguishing the opportunity to generate Offset credits. On the other hand, there is also some risk that early action could impair the value of resulting Offset credits if POTWs ultimately end up not being regulated. What is certain, however, is that carbon markets are developing, are here to stay, and may offer POTW management a new revenue source. How and when a particular POTW chooses to participate in carbon markets calls for a case-by-case determination.

If management chooses to tap into this new revenue stream, it needs basic knowledge of the game -- the applicable carbon market rules, opportunities, and potential pitfalls for POTWs (as they are today and are likely to be in the future). This Primer provides that introduction. There are well-established and growing voluntary markets in the U.S., as well as state and regional mandatory cap-and-trade programs. There is no federal scheme yet, but it is coming, and the wise will be ready. Part One of this Primer summarizes the genesis and current state of carbon markets. Part Two provides the foundation for an interested POTW to take preparatory steps to participate in the market of its choosing. Finally, Part Three provides an Offset project roadmap to assist a POTW in engaging fully in carbon trading while accounting for all project, policy, and risk considerations. Part Three also examines the potential for federal carbon regulation through climate change legislation, including the likely efforts of the new Congress and President.



# PART ONE:

## CARBON MARKETS FOR SPECTATORS

### 1. Carbon Markets: The New Gold Rush

Efforts to mitigate the effects of climate change now present POTWs with significant environmental and economic opportunities. A POTW can score a public relations and budgetary victory while also making verifiable environmental improvements. It can reduce GHG emissions from its wastewater treatment process and substantially improve its bottom-line.

As explained in NACWA's 2007 white paper on climate change,<sup>1</sup> POTWs emit methane and nitrous oxide from wastewater treatment. Methane ("CH<sub>4</sub>") has over 21 times more global warming potential than carbon dioxide ("CO<sub>2</sub>"), while nitrous oxide ("N<sub>2</sub>O") has 310 times greater global warming potential than CO<sub>2</sub>. The standard unit for one carbon credit is the equivalent of one metric ton of CO<sub>2</sub> reduction (identified as "CO<sub>2</sub>e"). For every ton of methane or nitrous oxide that a POTW verifiably reduces, it can generate 21 or 310 tons of CO<sub>2</sub>e, respectively. This yields a much higher rate of return on investment than straight CO<sub>2</sub> reductions. This multiplier effect offers POTWs a competitive advantage in the carbon market, which has been repeatedly described as a "gold rush."<sup>2</sup>

With this advantage, POTWs can learn the game and become a real player in the near term. Waiting for a federal cap-and-trade regime could delay or dilute the potential economic benefits. Before becoming a real player in carbon markets, it is important to first understand the diversity and complex structure of the rules underpinning current carbon markets, which determine whether and how a POTW can benefit from becoming involved.

### 2. What is Carbon Trading?

Whether they are dealing in pork bellies or carbon credits, all parties to a trade must perceive some benefit in order for there to be a viable market. Carbon emission limits generate demand for carbon credits by market participants with high costs of reducing emissions. Market participants that are able to reduce emissions at costs lower than others will choose to do so, as long as they can sell the resulting credits for more than their actual reduction costs. The efficiency of the market is therefore realized at the "carbon price" point where the producer profits and the higher-cost participants are willing to buy the reduction rather than produce it themselves. In the voluntary markets, the demand driver may be image enhancement, as when former Vice-President Al Gore bought Offset credits to neutralize criticism over his 13,000 square-foot Tennessee home, or it may simply be market speculation.

A "carbon market" is merely a system of rules and protocols set up by a governmental entity (or a group of willing participants) that will let buyers and sellers vote with their dollars to decide where GHG emission reductions will be achieved and how real the reductions must be. GHG emission reduction costs depend on many factors, including the carbon-intensity of the industry and operations and the costs of emission reductions through abatement or technological change.<sup>3</sup> In theory, all market participants will ultimately integrate the market-based price for carbon into everyday decision-making, thus making low-carbon technologies and cleaner operations

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<sup>1</sup> *Climate Change: Emerging Issues for Clean Water Agencies*, <http://www.nacwa.org/images/stories/public/2007-11ccwp.pdf>, NACWA White Paper, November 2007.

<sup>2</sup> See, e.g., <http://www.bloomberg.com/apps/news?pid=20601109&refer=home&sid=aaqEuN9qUYDs>.

<sup>3</sup> A carbon market will allow a physical emissions reduction to be achieved somewhere else while the carbon-intensive entity integrates the opportunity "cost" of continued high GHG emissions into their operational and risk management strategies rather than seeking direct reductions.

more cost-effective. Of course, the lowest cost reductions will be those that actually have a payoff, such as by energy savings.

There is no unitary carbon market. Instead, there is a wide array of carbon markets - - *each with its own unique rules and protocols* - - that exist in various countries around the world. Every carbon market falls into one of two categories: a mandatory compliance market or a voluntary carbon market. Mandatory compliance markets are created by governmental entities. Voluntary carbon markets are created by private entities collaboratively agreeing through binding contract to pursue market-based CO<sub>2</sub>e reductions.

### 3. How Does Carbon Trading Work?

“Carbon trading” within a given market describes trades of two things: (1) emission credits or allowances (“Allowances”) and (2) Offset credit products. Although both types of currencies are known informally as “Carbon Credits”, comparing the two is like comparing apples and kumquats.

#### a. Trading Allowances

Allowance-based carbon trading is rooted in a regulated or “covered” entity’s recognized right to emit a finite amount of GHG emissions. This is the “cap” portion of a cap-and-trade program.<sup>4</sup> A covered entity’s cap is typically stated as tons of CO<sub>2</sub>e per year limit, based on its historical or reported levels of GHG emissions, but often reduced by a prescribed percentage. Once the cap is established, the entity is allocated or sold a number of annual Allowances at least equal to its cap. Every year thereafter, the entity’s cap will either remain static or decline at a pre-determined rate. To attain compliance, the entity must surrender a number of Allowances equal to its actual GHG emissions during a defined compliance period. Up until the surrender compliance date, the covered entity can freely trade its Allowances. Covered entities that are unable or unwilling to limit their actual emissions to meet their cap can buy Allowances from either other covered entities with a surplus or from third-party marketers, brokers, or dealers of Allowances.

#### b. Trading Offsets

If the market’s rules allow, covered entities may also satisfy some or all of their compliance requirements through the purchase of project-based Offset credits. Offset credits can be generated when an eligible project reduces or avoids GHG emissions that would have occurred without the project’s implementation. Unlike Allowances, Offset credits are specific to projects, not to covered entities. For example, under a particular mandatory regime an Allowance may be available if an electric utility (*i.e.*, the covered entity) directly reduces its power plant emissions, while an Offset credit would be generated if the electric utility invests in a project that results in verifiable emissions reductions at an unregulated landfill. In short, Offsets generally can occur only at a location owned by an unregulated entity (*i.e.*, not subject to the cap), even though a covered entity may fund the project. Any entity can generate Offset credit, but not every Offset qualifies in all carbon markets.<sup>5</sup> While all markets measure reductions from some baseline, they differ in the extent to which reductions must be real, additional, measurable and verifiable (see Section 6 below).

An Offset credit generally represents a right, interest, credit, entitlement, or benefit arising from or in connection with a project’s removal, limitation, reduction, avoidance, sequestration or mitigation of GHG emissions compared to the project baseline. The applicable carbon market rules determine

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<sup>4</sup> An emissions cap can apply to an entire economy, to one or more industrial sectors, to a defined group, or even to specifically-targeted emissions sources.

<sup>5</sup> In an Allowance-based trading regime covered entities cannot implement Offset projects on their own property or operations.

which Offsets may qualify and how the baseline is set and measured. In voluntary carbon markets, project participants may choose among a plethora of different standards. Each set of standards contains unique and sometimes vastly different rules for (1) which type of Offset projects are eligible to generate a particular kind of Offset credit; (2) how the GHG emission reductions are measured and verified; and, in mandatory programs, (3) the extent to which the Offset credits can be substituted for Allowances in cap-and-trade compliance. As discussed in Section 8 below, each of these factors affects the market value of the resultant Offset credits.

#### 4. Mandatory Compliance Markets: Genesis and Evolution

Carbon markets that are currently available to POTWs have been shaped and influenced by the international scheme under the United Nations Framework Convention on Climate Change (“UNFCCC”) and the implementing agreement known as the Kyoto Protocol.<sup>6</sup> The stated objective of the UNFCCC was to stabilize six GHG emissions<sup>7</sup> in the atmosphere at a level that would prevent further man-made effects on climate change.

The Kyoto Protocol set up the first cap-and-trade program for GHG emissions. It does not apply to U.S. entities, and therefore Offsets based in the United States are not eligible to participate in any mandatory carbon markets established as part of it. However, the design and structure of the Kyoto Protocol have become the model for all subsequent mandatory compliance *and* voluntary carbon markets. Therefore, it is important to have a basic understanding of how it works.

##### a. The International Market

Under the Kyoto Protocol, developed country members agreed to reduce their collective GHG emissions by a total of 5.4 percent below 1990 emissions by 2012.<sup>8</sup> Each nation has a reduction target, and each is allowed to reach that target by actual reductions in its national emissions or by means of three different flexibility mechanisms: (i) carbon trading, (ii) implementation of project-based Offsets under the Clean Development Mechanism (“CDM”), or (iii) Joint Implementation.<sup>9</sup> Only the rules and procedures applicable to Kyoto-based carbon trading and CDM projects are germane to voluntary markets and POTWs in the U.S.; Joint Implementation is not.

##### i. Kyoto-Based Carbon Trading

Under the Kyoto Protocol, member countries can establish their own internal Allowance-based carbon market to facilitate actual emission reductions. That market can be linked or harmonized with markets developed in other Kyoto-member countries. For example, members of the European Union (“EU”) created their own combined Emission Trading Scheme (“EU-ETS”). The EU-ETS involves all EU member states and is currently the world’s largest carbon trading market in terms of volume.<sup>10</sup> Trades in 2007 had a value of \$50 billion. As of December 1, 2008, EU Allowances were trading at \$19.61 per ton CO<sub>2</sub>e.

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<sup>6</sup> [http://unfccc.int/essential\\_background/convention/items/2627.php](http://unfccc.int/essential_background/convention/items/2627.php). The Kyoto Protocol came into force in February 2005, and it has the same objective as the UNFCCC.

<sup>7</sup> Carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), hydrofluorocarbons (“HFCs”), perfluorocarbons (“PFCs”), and sulphur hexafluoride (SF<sub>6</sub>).

<sup>8</sup> This is referred to as the first commitment period. See, Article 3(1) of the Kyoto Protocol.

<sup>9</sup> See, Articles 6(12) and 17 of the Kyoto Protocol.

<sup>10</sup> See, e.g., [http://ec.europa.eu/environment/climat/emission/index\\_en.htm](http://ec.europa.eu/environment/climat/emission/index_en.htm). Allowance-based credits traded under the EU-ETS system are called European Union Allowances (“EUAs”).

ii. Clean Development Mechanism (“CDM”)

The second flexible mechanism, known simply as the CDM, is Kyoto’s Project-based Offset regime. It allows certified Offset credits to be generated in member countries that are not listed on an Annex as developed countries. Those credits can then be imported back and used to meet a part of a covered entity’s compliance requirements in developed countries. Brazil, China, India, and Mexico are not considered “developed” under Kyoto, and they have all hosted many CDM projects. The Offset project’s resultant credits, once verified and certified by the host country and an accredited authority, are known as Certified Emission Reductions (“CERs”). Before any CERs become tradable, a “verification report” must be produced by an independent third party verifier, approved by the host country government, and accepted by the CDM Executive Board administered by the UNFCCC.<sup>11</sup> When finally approved, the CERs can then be sold to anyone. The EU has formally linked its EU-ETS with the Kyoto-based CDM market to allow EU entities a greater opportunity to meet their EU-based cap by using a limited proportion of CERs.<sup>12</sup> On December 1, 2008, CERs traded at \$18.31 per CO<sub>2</sub>e, over one dollar less than EU Allowance prices.<sup>13</sup>

b. Domestic U.S. Cap-and-Trade Regimes

In the United States, the federal government does not yet regulate GHG emissions, but federal inaction has prompted 18 states, acting individually and collectively, to initiate their own GHG regulatory regimes. The three most well-known and developed are the Regional Greenhouse Gas Initiative (“RGGI”), the Western Climate Initiative (“WCI”), and the California State GHG program.<sup>14</sup> The various regimes are vastly different from one another in scope, design, and operating structure, but each is largely based on the underlying principles, standards, and criteria employed by the Kyoto Protocol and the EU-ETS.

i. Regional Greenhouse Gas Initiative (“RGGI”)

The RGGI (pronounced “Reggie”) was created by ten Northeastern and Mid-Atlantic States as the first mandatory Allowance-based carbon market in the United States.<sup>15</sup> The scheme was collaboratively developed pursuant to the RGGI Model Rule, which was then adopted and implemented by each participating RGGI state. The Model Rule covers only fossil fuel-fired electric power plants with a generating capacity equal to or greater than 25 MW.<sup>16</sup> Instead of allocating RGGI Allowances directly to the power companies for free (as previously done with mixed results by the EU states under the EU-ETS), the RGGI states agreed to auction a significant portion of the total Allowances.<sup>17</sup> The first successful Allowance auction occurred on September

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<sup>11</sup> See, e.g., UNFCCC Procedures relating to Verification Report and Certification Report/Request for Issuance of CERs (VERSION 01.1), [http://cdm.unfccc.int/Reference/Procedures/iss\\_proc02\\_v01\\_1.pdf](http://cdm.unfccc.int/Reference/Procedures/iss_proc02_v01_1.pdf).

<sup>12</sup> Directive 2004/101/EC of the European Parliament and of the Council of 27 October 2004 amending Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, in respect of the Kyoto Protocol’s project mechanisms, [http://ec.europa.eu/environment/climat/emission/linking\\_en.htm](http://ec.europa.eu/environment/climat/emission/linking_en.htm).

<sup>13</sup> The market price “spread” between EUAs and CERs continuously fluctuates based on a number of variables, and has ranged in difference from \$1 to over \$10 since the EU-ETS went into operation.

<sup>14</sup> Other developing mandatory programs in the U.S. include the Midwestern Regional GHG Accord Reduction Program (“MRP”) ([http://www.midwesterngovernors.org/Publications/Greenhouse%20gas%20accord\\_Layout%201.pdf](http://www.midwesterngovernors.org/Publications/Greenhouse%20gas%20accord_Layout%201.pdf)) and those currently being designed at the state level in Oregon, Hawaii and Washington.

<sup>15</sup> See, e.g., [www.rggi.org](http://www.rggi.org).

<sup>16</sup> States participating in RGGI signed a memorandum of understanding that establishes the regional emissions budget (i.e., the RGGI Cap), and negotiates how to divide the emissions budget among each participating state. [http://www.rggi.org/about/history/model\\_rule](http://www.rggi.org/about/history/model_rule).

<sup>17</sup> Auction proceeds are intended to be re-invested in energy efficiency, renewable energy, and other clean energy technologies.

25, 2008,<sup>18</sup> and the first annual compliance period begins January 1, 2009. Covered entities must annually surrender enough RGGI Allowances to cover their total annual CO<sub>2</sub> emissions.

Like the Kyoto Protocol, the RGGI GHG regime allows covered entities to use project-based Offset credits to meet a portion of their Cap requirement, but the standards for what qualifies are different. RGGI Offset project eligibilities and substantiation requirements are limited and strictly regulated.<sup>19</sup> For example, until the RGGI states amend their Offset regulations, a POTW Offset project to reduce methane emissions would not presently qualify.<sup>20</sup> Moreover, in an effort to ensure that eligible Offset credits represent equivalent actual emissions reductions, the RGGI states developed highly prescriptive standards for the limited Offset project categories.<sup>21</sup>

## ii. Western Climate Initiative (“WCI”)

The WCI is another multi-jurisdictional regime. Its members are seven western states and four Canadian provinces. Seven other U.S. states, another Canadian province, and six Mexican states have observer status (*i.e.*, observers will not immediately take action to set a binding GHG cap with the other members of the group).<sup>22</sup> The WCI states released their “Final Design” of the Regional Cap-and-Trade Program on September 23, 2008.<sup>23</sup> The Final Design outlines the proposed cap-and-trade system broken out into enforceable 3-year compliance periods between 2012 and 2020.<sup>24</sup>

The WCI scope, reduction target, and design all differ from RGGI’s. The WCI Cap will apply to every major sector of the economy, not just to power plants, and its target is to reduce covered GHG emissions by 15 percent below 2005 levels by 2020. The WCI’s Final Design also proposes the establishment of an expansive Project-based Offset system. The Final Design allows 49 percent of required reductions to be achieved through the purchase of qualifying Offset credits. The WCI Offset regime could also enable covered entities to use Kyoto’s CDM credits (*i.e.*, CERs) or other *voluntary* market Offset credits to meet compliance obligations. Moreover, Offset projects located in Canada, the United States and Mexico could be eligible to participate. For example, a covered entity in California could purchase Offset credits generated from a methane capture project in Ohio. If Mexican Offset credits were to qualify, the WCI market would bump right into the Kyoto CDM market, which may impede project compliance and risk double-counting of GHG reductions.

In addition, and of *critical importance to POTWs* in the U.S., the WCI Final Design identifies municipal waste and wastewater management as one of many specific Offset project types

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<sup>18</sup> See, e.g., [http://rggi.org/co2-auctions/results/auction\\_1\\_reports](http://rggi.org/co2-auctions/results/auction_1_reports).

<sup>19</sup> In addition, the use by RGGI covered entities of Offset credits is structurally discouraged. Offset credits can meet no more than 3.3% of an entity’s total compliance obligation during a compliance period. The percentage of eligibility could be expanded to 5% and 10% if certain state defined “trigger events” occur within the RGGI region.

<sup>20</sup> See, e.g., [http://www.rrgi.org/docs/offsets\\_limit\\_5\\_1\\_06.pdf](http://www.rrgi.org/docs/offsets_limit_5_1_06.pdf).

<sup>21</sup> As of this writing, only five project categories are eligible for CO<sub>2</sub> offset allowances within the RGGI regime: landfill methane capture and destruction; reduction in emissions of sulfur hexafluoride (SF<sub>6</sub>); afforestation; reduction or avoidance of CO<sub>2</sub> emissions from natural gas, oil, or propane combustion; and avoided methane emissions from agricultural manure management operations.

<sup>22</sup> WCI members include Arizona, California, Montana, Oregon, Utah, New Mexico, Washington, with Manitoba, British Columbia, Quebec and Ontario. In addition, Saskatchewan, Alaska, Colorado, Florida, Idaho, Kansas, Nevada, Wyoming, and the Mexican states of Baja California, Chihuahua, Coahuila, Nuevo Leon, Sonora, and Tamaulipas are WCI observers.

<sup>23</sup> See, e.g., <http://www.westernclimateinitiative.org/ewebeditpro/items/O104F19865.PDF>.

<sup>24</sup> *Id.* The regional cap will be equal to the sum of the WCI member Allowance budget and include caps on emissions of all of the six GHGs covered by the Kyoto Protocol (see note 7).



prioritized for participation in the WCI Offset system. Moreover, it would allow Offset projects located anywhere throughout the U.S. to qualify, provided they meet the same rigorous standards as applied by the WCI. Finally, the WCI will constitute an administrator similar to the CDM Executive Board to implement and coordinate the review and approval of other proposed project types. The administrator will be modeled on, and may adopt the standards and criteria developed by, the CDM Board.

### iii. California's GHG Reduction Law

Parallel with its participation in WCI, the State of California is also pursuing a statewide GHG emissions reduction regime. In 2006, California enacted the California Global Warming Solutions Act, Health & Safety Code §§38500 *et. seq.* (widely known as "A.B. 32").<sup>25</sup> The legislation requires California to reduce its GHG emissions to 1990 levels by January 1, 2020. The legislature left the design and implementation of the overall plan to achieve the emissions target in the hands of the California Air Resources Board ("CARB"). In October 2008, CARB released its "Scoping Plan" outlining the measures that it will seek to adopt by January 1, 2009.<sup>26</sup> Those measures include direct regulation, alternative compliance mechanisms, monetary and other incentives, voluntary early actions, mandatory GHG reporting requirements, and a cap-and-trade program. The proposed cap-and-trade program will cover an estimated 85 percent of California's GHG emission sources.

One aspect of the Scoping Plan is of particular importance to POTWs. Under the proposed rules of the Scoping Plan, if a local government operates a facility that includes a co-generation facility with a nameplate capacity of 1 MW or higher and emits over 2,500 metric tons of CO<sub>2</sub> per year, that facility will likely be subject to California's mandatory GHG reporting requirements.

CARB seeks to dovetail this program with WCI. It proposes to set annual caps for the electric and industrial sectors beginning in 2012 and for transportation and commercial and residential natural gas use by 2020. Key elements that have yet to be addressed include the method of allowance distribution (allocation vs. auction), the point in the supply chain at which trading will be regulated in each sector, and what the appropriate role of project-based Offsets may be under the regime. The Scoping Plan states only that any compliance Offset "would be subject to stringent criteria and verification procedures to ensure its enforceability and consistency with A.B. 32 requirements."<sup>27</sup>

## 5. Voluntary Carbon Markets

Voluntary carbon markets bear no functional relationship to any mandatory compliance regimes. Voluntary markets are privately administered and driven by market demand. Hence, the carbon credit "products" have no intrinsic value or backing other than the project developer's word. If a mandatory cap-and-trade system is like a company store, a voluntary market resembles a roadside stand. Unless and until a mandatory compliance market allows voluntary market Offset credits to be used for compliance at some point in the future, voluntary carbon markets and the carbon "products" traded on them have no connection to compliance markets. Voluntary

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<sup>25</sup> For full text of A.B. 32, see <http://www.arb.ca.gov/cc/docs/ab32text.pdf>.

<sup>26</sup> See, e.g., <http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm>.

<sup>27</sup> The final Scoping Plan makes a significant change to the text of A.B. 32. "If [Offsets] are used for compliance purposes," according to CARB, "the reductions must be real, additional, verifiable, enforceable and permanent." A.B. 32 does not include the term "additional." *Id.*, at 67.

carbon credit products may rest on unsanctioned standards and lack reliable certification. When assayed, they may be the new fool's gold.

Moreover, the term “voluntary carbon market” itself refers loosely to a broad, disjointed marketplace. It is grounded in contractually-sanctioned emissions reduction standards. There are two main voluntary carbon market segments: (1) voluntary, but still legally-binding, exchanges created by public and private participants, like the Chicago Climate Exchange (“CCX”); and (2) over-the-counter (“OTC”) emissions reduction transactions. Transactions include the financing, purchase and sale of various types and qualities of Offset credits and Allowances. Buyers may use their purchases to meet their contractual reduction obligations, to expiate their carbon consumption sins, to bank them in anticipation of regulation, to retire the credits, or to resell them for profit.

Regardless of motivations, voluntary carbon markets are booming. Based on a survey conducted by *New Energy Finance*,<sup>28</sup> they tripled in size in 2007 to a total volume of 65 million equivalent tons of carbon dioxide (identified as “CO<sub>2</sub>e”). Of that total, 22.9 million tons were transacted across the CCX,<sup>29</sup> and 42.1 million tons changed hands in the OTC market. By comparison, international compliance market transactions totaled 2,959 million tons valued at approximately \$66.5 billion.<sup>30</sup> The voluntary carbon markets combined are therefore still miniscule next to the international regulated markets. But if the recent forecasts of *New Energy Finance* are right, the U.S. carbon market could climb to \$1 trillion by 2020.<sup>31</sup>

a. Carbon Credit Exchanges

Carbon Credit Exchanges are based on well-defined rules that enable participants to buy and sell a carbon credit unit as if it were a financial product.<sup>32</sup> The CCX, for example, starts with a contractual commitment by all of its members to reduce their individual GHG emissions by 6 percent. Those who exceed this agreed-upon reduction can generate credits that can be sold to other CCX members.<sup>33</sup> While a POTW can certainly join CCX or any other exchange, POTWs would generally participate by supplying project-based Offset credits for purchase by other exchange members. CCX Offset credit units are called Carbon Financial Instruments (“CFIs”).<sup>34</sup>

b. Over-the-Counter Carbon Offset Transactions

Outside of established carbon exchanges, a wide range of disparate OTC transactions make up a *de facto* voluntary market. In other words, based on recent trading volume patterns, voluntary carbon

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<sup>28</sup> “Forging a Frontier: State of the Voluntary Carbon Market 2008”, New Energy Finance Publications, May, 2008, [www.newcarbonfinance.com/download.php?n=2008\\_StateofVoluntaryCarbonMarket.pdf&f=fileName&t=NCF\\_dom](http://www.newcarbonfinance.com/download.php?n=2008_StateofVoluntaryCarbonMarket.pdf&f=fileName&t=NCF_dom).

<sup>29</sup> CCX publicly reported a two-hundred and eighty percent (280%) increase in its trading volume from 2007 to 2008. *Id.*

<sup>30</sup> This approximate monetary value is based on 2007 market participant survey data. The Offset credit price for OTC market transactions varies widely depending on, among other things, the parties interests, the type of project, and the location of the Offset. *Id.*

<sup>31</sup> “Economic Researchers Predict \$1 Trillion U.S. Carbon Trading Market by 2020”, New Energy Finance, Found at <http://www.carboncatalog.org/blog/2008/06/20/trillion-carbon-offset-market/>, May, 2008.

<sup>32</sup> The CCX is owned by Climate Change PLC, which also owns the European Climate Exchange (“ECX”). The ECX is one of the most prominent European carbon market exchanges and engages in trading of allowances and CERs generated by the EU-ETS. The CCX also trades in RGGI allowances and plans to create an exchange geared for the California or WCI market. Other exchange-traded voluntary markets include the Montreal Climate Exchange and the GreenExchange (<http://nymex.greenfutures.com/>), and the NASDAQ OMX Platform, offering a range of environmental futures, options, and swap contracts for voluntary carbon credit products.

<sup>33</sup> The CCX membership baseline is calculated as the average annual emissions for the member between 1998 and 2001.

<sup>34</sup> CFIs can be Allowance-based credits, issued by and to emitting Full or Associate Members pursuant to achievement off of their emissions baselines and reduction goals, or to a lesser degree Offset-based credit.



credit shoppers in the U.S. are buying more carbon credits from the equivalent of street vendors than they buy at the mall.<sup>35</sup> This has led some to say OTC transactions resemble the Wild West.<sup>36</sup> As a result there is an increasing amount of skepticism in the market about the credibility of voluntary Offset credits.

OTC transactions are simply bilateral or multilateral agreements that allow one or more parties to get paid voluntarily to reduce GHG emissions from a negotiated baseline. That baseline can be project or entity-specific at the discretion of the parties to the trade. The OTC market units (generically known as “Voluntary” or “Verified” Emissions Reductions, or “VERs”) are generated, verified and validated as though the GHG reductions were Project-based Offsets. OTC contracting parties are increasingly choosing to use the most stringent standards and criteria available because of the high risk of fraud.<sup>37</sup> Even though they are shopping at street vendors, they look for a Saks Fifth Avenue® label.

## 6. Governing Principles of Offset Project Standards and Criteria

Before any Offset credits can be sold, the corresponding emission reductions must first be verified. An accredited third-party verifier is therefore an essential component to completing any Offset project. Verification assures the buyer, the compliance market administrator, and the contracting parties that the reductions have in fact been achieved. The third-party verifier must complete five basic steps: (1) review the Project Design Documentation (“PDD”) (*i.e.*, the materials identifying the baseline levels of emissions and how the project will result in a forecasted level of emission reductions); (2) review project monitoring results and data collection systems used by the POTW to measure and record the emission reductions; (3) evaluate the quality of the data collected; (4) review the project’s management; and (5) and produce a verification report confirming the reductions achieved (*i.e.*, validate the project baseline calculations and methodology used to quantify the reductions). To complete these steps and substantiate a POTW’s claim of voluntary emissions reductions, the third party verifier will rely upon five governing principles:

- **Real:** All emission reductions must be proven to be genuine to qualify under the applicable reduction standard or criteria;
- **Measurable:** All emission reductions must strictly apply recognized and accepted methodologies and techniques for quantification pursuant to the applicable standards or criteria;
- **Permanent:** All reductions claimed must be irreversible, as that concept may be defined by the applicable standards or criteria for the particular project type;
- **Additional:** All emission reduction projects must result in lower emissions than would have occurred in the absence of, or “but for,” the Offset projects;<sup>38</sup> and
- **Verified:** All emission reductions proposed for certification must be verified or validated (or both) by an accredited, independent third-party verifier.

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<sup>35</sup> Examples of voluntary OTC participation including mitigating a company’s future carbon risk exposure, supporting and promoting environmental philanthropy, public relations, preparing for future compliance market obligations, or simple commercial gain.

<sup>36</sup> The Yale Forum on Climate Change & the Media, September 23, 2008, <http://www.yaleclimatemediaforum.org/2008/09/the-us-voluntary-carbon-offset-market/>.

<sup>37</sup> See, e.g., Carbon Offsets: The U.S. Voluntary Market is Growing, but Quality Assurance Poses Challenges for Market Participant, U.S Government Accountability Office, GAO-08-1048 (released September 29, 2008).

<sup>38</sup> Additionality generally has two components, one environmental and the other economic. The economic piece relates to whether an offset project would have been initiated without external investment. The environmental component is connected to the benefit made to the actual emissions occurring (or that would have occurred but for the Offset project).

Documentation of this substantiation process, upon verification and approval, creates the legal rights to the intangible asset (*i.e.*, the Offset credit representing each ton of CO<sub>2</sub>e reduced) that can then be transferred to another party through sale.

a. Prevailing Voluntary Standards & Protocols

Out of necessity, voluntary markets have gravitated toward more stringent standards. This trend is rooted in the need to improve the currency, to authenticate that the Offset project qualifies under an approved methodology. This requires the rigor to confirm that the paper project, (*i.e.*, the offset) shows a project is “additional,” and that the project has been credibly verified based on accurate measurements.<sup>39</sup> The Offset project comes down to legitimacy — legitimacy in the adequacy and accuracy of the baseline and the verification of actual emission reductions achieved.

The Offset project standards that are currently accepted as industry best practices capable of generating the highest quality Offset credits are (i) the Voluntary Carbon Standard (“VCS”), (ii) Kyoto-derived rules and procedures, (iii) the Gold Standard, and, to perhaps a lesser degree, (iv) the CCX Guidelines, and (v) the California Climate Action Reserve. Each of these is described below.

i. Voluntary Carbon Standard (“VCS”)

The VCS was developed by the International Emissions Trading Association, the World Business Council for Sustainable Development (“WBCSD”) and the Climate Group in response to market concerns about the quality of Offset credits and especially the credibility of verification procedures.<sup>40</sup> The VCS is intentionally distinct from other voluntary carbon market standards. It is designed to be the certification process that provides criteria specifically intended to improve the integrity of the voluntary market. The VCS Program Guidelines were devised by the VCS developers explicitly for this purpose.<sup>41</sup>

The VCS uses CDM Offset project methodologies to create a project-specific benchmark to measure emission reductions within particular known categories of projects. The VCS then permits the use of specific methodologies to enhance the likelihood that a project will produce Voluntary Carbon Units (“VCU”) that represent real, measurable and permanent reductions.<sup>42</sup> The third-party verifier of a VCS Offset project can be accredited under the Kyoto-based CDM regime, but at a minimum must be accredited under the WBCSD’s GHG Protocol or Standard No. 14065, which is published by the International Standards Organization (“ISO”).<sup>43</sup> A critical element of the VCS regime is the requirement that all projects using the VCS-approved protocols must be publicly displayed on the VCS electronic project registry database. Furthermore, all registered VCUs must also be electronically tracked.<sup>44</sup>

ii. Kyoto-Derived Rules and Procedures

Although CDM exists in a compliance market, voluntary market developers regularly use the CDM standards and criteria in an effort to provide a handy and known framework for the project, and to ensure the quality and credibility of their purely voluntary project’s emissions reductions. The

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<sup>39</sup> *Supra* note 33.

<sup>40</sup> See, e.g., <http://www.v-c-s.org>.

<sup>41</sup> *Id.*

<sup>42</sup> The WBCSD Greenhouse Gas Protocol (“GHG Protocol”) is a widely used international accounting tool for government to understand, quantify, and manage emissions accounting standards. See <http://www.ghgprotocol.org/>.

<sup>43</sup> See International Standards Organization, [http://www.iso.org/iso/iso\\_cafe\\_climate\\_change.htm](http://www.iso.org/iso/iso_cafe_climate_change.htm). The GHG reduction verification base document is ISO Nos. 14064-3 and 14065.

<sup>44</sup> See, e.g., <http://vcsregistry.apx.com/resources/AccessReports.asp>.

only difference is that the voluntary project generates tradable VERs rather than compliance market CERs.

The CDM was established under Article 12 of the Kyoto Protocol, and CDM standards and criteria are a composite of the Kyoto rules,<sup>45</sup> the decisions of the CDM Executive Board and subsequent decisions of the ratifying countries. To obtain certification of a project, the project participants must complete certain project cycle procedures, including registration and use of an accredited entity.<sup>46</sup> In order to qualify as a project and receive VERs, a project must satisfy the same basic criteria set out in Article 12 of the Kyoto Protocol for CERs, including proving the project's additionality under an approved or valid emissions reduction methodology.<sup>47</sup> Compliance with the general requirements means completing the CDM's template PDD. For example, as part of the PDD the project proponents must present a solid description of the reductions that would have occurred in the absence of the Offset project investment. Each PDD must also describe the baseline scenario from which this additionality is being measured, and it must include a detailed monitoring plan.<sup>48</sup>

### iii. Gold Standard VER

Gold Standard is a voluntary standard program that is more limited in scope than the VCS.<sup>49</sup> The sponsoring organization maintains a registration and certification process based on the mandatory compliance market CDM process. An Offset project seeking to generate VERs using the Gold Standard must register and gain validation approval from the Gold Standard Advisory Committee. Just like the CDM process, a project must prepare PDD documentation to begin the process. Upon implementation, third party verifiers working on a Gold Standard project must be Kyoto-accredited entities. Like VCS, the Gold Standard has recently created a VER registry mechanism to identify all project-based credits to enhance market transparency and substantiation.

### iv. CCX Guidelines

To generate Offset credits for sale on the CCX, a project must be eligible,<sup>50</sup> meet applicable CCX additionality standards, and be able to monitor the reductions properly pursuant to established CCX guidelines and performance standards. The CCX process is similar to the Kyoto CDM process. The project developer must obtain preliminary approval of PDD-style documents, receive third-party verification of the reductions, and ultimately CCX Offset Committee validation and

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<sup>45</sup> The CDM Executive Board supervises the CDM under the authority and guidance of the Kyoto participants. See, <http://cdm.unfccc.int/EB/background.html>. The CDM Executive Board administers the CDM program and is authorized to approve or deny individual CDM projects based on established criteria and acceptable emissions reduction methodologies.

<sup>46</sup> For a list of accredited entities, see <http://cdm.unfccc.int/DOE/list/index.html>.

<sup>47</sup> Article 12(4) of the Kyoto Protocol established an independent governance body to oversee the implementation and administration of the CDM, the CDM Executive Board. Detailed rules and procedures relating to those mechanisms were adopted in 2001. The decision-making body of the UNFCCC is convened as part of the annual meeting of the Kyoto parties, which consists of parties that have ratified, approved, accepted or acceded to the convention, which therefore includes the United States.

<sup>48</sup> For more information about CDM project baseline scenarios and offset project methodologies go to <http://cdm.unfccc.int/methodologies/index.html>.

<sup>49</sup> The Gold Standard is exclusively concerned with renewable and energy efficiency technology offset projects that generate VERs, including methane biogas-to-energy projects. For further information see the Gold Standard Toolkit at [http://www.cdmgoldstandard.org/uploads/file/GSV2\\_Toolkit%20Chapters\\_2008731\\_2.0\\_new.pdf](http://www.cdmgoldstandard.org/uploads/file/GSV2_Toolkit%20Chapters_2008731_2.0_new.pdf).

<sup>50</sup> CCX does not directly recognize methane capture from wastewater systems or biosolids management as qualifying, but does recognize avoided emissions generated through the use of renewable energy systems installed at a POTW (e.g., anaerobic digestion or solar photovoltaic systems).

approval of the project. Upon Committee approval, the CCX will issue Offset credits in an amount equal to the verified volume of emissions actually reduced or avoided during the project's defined compliance period. The credits are issued into the Offset Providers Registry Account, whereupon the Member can sell/trade the credits to other CCX Members.

v. Climate Action Reserve

In 2001, California helped establish the California Climate Action Registry ("CCAR"). CCAR is a private non-profit organization with a voluntary GHG emissions registry that tracks early-action reductions achieved by member organizations through a publicly accessible database. CCAR has developed a GHG reduction reporting program, known as the California Climate Action Reserve ("Reserve").<sup>51</sup> The Reserve provides an online system for tracking qualifying projects and their Offset credit product, known as a Climate Reserve Ton ("CRT", *pronounced* "carrot"). Under the Reserve program, a POTW's project-based Offset would be registered on the Reserve website. The POTW would have to demonstrate that the project meets the specific CCAR protocol criteria for the type of project implemented. After public consideration of the listing, the project can be third-party verified to ensure that it has met the applicable Reserve protocol standards and to accurately quantify the eligible CRTs.<sup>52</sup>

b. Comparing the Voluntary Standards

All of the standards require eligible Offset projects to be registered and verified by a certified or accredited entity/authority. Appendix A to this Primer diagrams the steps that a POTW-based Offset project (*e.g.*, capture of methane to generate onsite electricity) would go through under each prevailing standard before Offset credits would be available for sale.

## 7. What Do Carbon Markets and Offset Standards Mean to POTWs?

NACWA member POTWs are not currently covered entities under any existing compliance program.<sup>53</sup> Therefore, their role in a carbon market will primarily be to generate Offset credits for first sale and delivery (*i.e.*, produce verified credits to sell to third parties). While various mandatory regimes are under development or being proposed, at present any Offset credits that may be generated by a POTW-based project would only be eligible for sale to voluntary carbon market participants (*e.g.*, CCX or OTC transactions). Provided POTWs are excluded from direct state and federal GHG regulation (*i.e.*, do not become covered entities under any domestic mandatory cap-and-trade regime), carbon market opportunities may expand to include mandatory and voluntary regimes. Until the future mandatory market opportunities are clear, however, voluntary markets will remain the only game in town. With that in mind, the next step is developing a sense of how to play.

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<sup>51</sup> The final Scoping Plan reiterates the State's intention to give CCAR reported reductions "early action" credit under any future regulatory scheme.

<sup>52</sup> Each CRT issued to a registered project is assigned a unique serial number to prevent double counting and to provide assurance to a CRT buyer that the corresponding reduction is real and permanent upon purchase.

<sup>53</sup> It is critical at this point to clarify that the non-regulated status of POTWs is not set in stone. Non-regulated status may change under a future state or federal GHG regulatory regime. If a POTW is ultimately regulated such that an emissions cap or other limitation is imposed, all opportunities to generate Offset credits will terminate, although opportunities to sell unused GHG Allowances may still exist. As stated earlier, generally speaking covered entities cannot self-generate Offset credits. NACWA continues to evaluate potential effects on POTWs of any future GHG regulations.

## PART TWO:

# CARBON MARKET SPORTS CAMP – AN OVERVIEW

Much like a sports camp, this next part of the Primer seeks to provide an overview of the game and to impart some fundamentals. More scripted plays and playbooks are in Part Three.

In order to generate Offset credits, a successful POTW capital improvement project will achieve the removal, reduction, avoidance, or sequestration of actual GHG emissions compared against a calculated project baseline. But it will not automatically be a carbon market success. Until the reductions have been completely validated there are no Offset credits. The POTW capital project, whatever it may be, prepares the soil and plants the seeds to generate Offset credits. It is up to the POTW to harvest the reductions and turn them into a currency that can be sold.

Before clearing the fields, however, the POTW should fully consider where climate change regulation policy is headed and how the POTW and any capital projects it seeks to undertake to reduce emissions may be affected. Mandatory cap-and-trade regulations are still in their nascent form and developing rapidly. The final scope and parameters of state and/or federal regulation are highly uncertain and will continue to be so for a number of years. POTW management needs to be mindful of such risks. Taking early action to reduce emissions may limit the economic returns that could be available from higher-priced reductions achieved after a mandatory market has been implemented, or it may maximize the return on investment.

Another possible risk is that introduction of a mandatory market may put downward price pressure on all early action Offsets, especially if state and federal authorities opt not to recognize early action emissions reductions as eligible for compliance. An even bigger problem arises for POTWs taking early action if state or federal authorities opt to directly regulate GHG emissions from wastewater treatment facilities as part of the mandatory market. The number of forecasted Offset credits available for sale would be reduced as of the date of regulation, and any credits that may be generated prior to regulation would decrease in marketable value.

If the POTW completes the policy risk analysis and is comfortable with taking action to reduce its emissions, it can then take six general steps to participate in existing carbon markets, either by itself or in collaboration with its municipal community: (1) GHG emissions inventory, (2) identification of reduction opportunities, (3) Offset credit valuation, (4) total project economic analysis, (5) GHG emission reduction documentation and verification, and (6) sale of the corresponding Offset credits to a willing buyer.

### 1. Assessing the POTW's Carbon Inventory

The first thing a POTW interested in carbon trading should do is assess its overall GHG emissions inventory. That assessment requires examining all POTW operations under control of the POTW (or local government) to determine the annual volume of historical and current GHG emissions.<sup>54</sup> The inventory is necessary to provide a basis upon which all Offset project baseline calculations can then be measured.

The starting point for understanding the minimum inputs and how a POTW should conduct an inventory is the 2006 Intergovernmental Panel on Climate Change ("IPCC") Guidelines for National Greenhouse Gas Inventories

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<sup>54</sup> Many POTWs serve multiple local communities. Only the governmental entity that has operational and/or financial control over the POTW facility itself should assess and report emissions as part of its inventory. See, e.g., <http://www.iclei-usa.org/library/documents/draft-iclei-lg-ghg-emissions-analysis-protocol-4-21-08>.



(Wastewater Treatment and Discharge).<sup>55</sup> The Guidelines provide examples of source emissions that include (a) release of anthropogenic methane (CH<sub>4</sub>) or nitrous oxide (N<sub>2</sub>O) as a result of wastewater treatment or biosolids/sludge drying, conversion, or disposal; (b) production of facility onsite electricity, heat, or steam; (c) chemical processing; and (d) operational transportation. Indirect GHG emissions include emissions associated with the generation of imported or purchased electricity, heat, and steam.<sup>56</sup>

The POTW can seek to take advantage of external assistance in making its assessment.<sup>57</sup> For example, it can choose to participate in the international Carbon Disclosure Project,<sup>58</sup> retain specialist consultants, or use standard software that can be customized to meet a POTW's needs.<sup>59</sup> California's Local Government Operations Protocol ("LGOP") is an additional tool that may be used to conduct the inventory.<sup>60</sup> The LGOP can also assist a POTW in identifying cost-effective opportunities for GHG reduction. All of these options can help guide a POTW to collect the appropriate types of useful GHG emissions data.

## 2. Identifying Cost-Effective POTW Emission Reductions

The next step is to identify where real and verifiable emissions reductions can be achieved within the POTW's particular system. Each POTW is different from a GHG perspective. Moreover, Offset projects and carbon trading are not a POTW's core business. It is therefore important to remember that an "Offset project" is a subproject component of a larger POTW capital improvement project that reduces GHG emissions. It is an adjunct process overlaid on top of any capital improvement project constructed or installed that makes the actual emission reductions possible. The process involves documenting, monitoring, and getting an accredited third party to certify (pursuant to the applicable carbon market standards and criteria) that a known volume of CO<sub>2</sub>e emissions have been eliminated or avoided as a result of the capital project investment.

If there are no capital improvement projects already scheduled that would allow the POTW to overlay an Offset project on top, the POTW can consider possible capital projects that would achieve such emission reductions.<sup>61</sup> Factors to evaluate while assessing the viability of possible improvement project options that will reduce GHG emissions include emissions source and use options, wastewater flows and composition, physical infrastructure characteristics and electrical equipment, interconnection facilities, surrounding area GHG inventory impacts and forecasts, environmental or operational concerns, and required permits and approvals. A few examples of possible GHG emissions reduction projects include methane (CH<sub>4</sub>) capture and destruction (wastewater treatment or biosolids management); installation of onsite renewable energy generation (anaerobic digestion,

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<sup>55</sup> See, e.g., [http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5\\_Volume5/V5\\_6\\_Ch6\\_Wastewater.pdf](http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_6_Ch6_Wastewater.pdf). Michiel R. J. Doorn, Sirintornthep Towprayoon, Sonia Maria Manso Vieira, William Irving, Craig Palmer, Riitta Pipatti, and Can Wang, *2006 IPCC Guidelines for National Greenhouse Inventories*, Intergovernmental Panel on Climate Change, IPCC/OECD/IEA, Paris, France.

<sup>56</sup> *Id.*, IPCC Guidelines, Table 6.1.

<sup>57</sup> NACWA has undertaken a Greenhouse Gas Inventory project to assess GHG emissions from POTW operations, and anticipates releasing a separate report on the topic in 2009. The Water Environment Research Foundation ("WERF") has also undertaken such analysis. WERF is assessing the impact of climate change on clean water utilities and reviewing the risk of climate change.

<sup>58</sup> For more information go to [www.cdproject.net](http://www.cdproject.net).

<sup>59</sup> The International Council for Local Environmental Initiatives ("ICLEI"), for example, offers software customized specifically for municipal governments, and is available for a fee based on city population. See, <http://www.iclei.org/index.php?id=771>. Also, a non-proprietary municipal inventory workbook was set up in 2008 by the City of Columbus, Ohio. The "Carbon Footprint Assessment and Reduction" (C-FAR) workbook provides cities, municipalities and local governments with a simple Microsoft Excel application to enter GHG emissions data from POTWs, track changes over time, and establish feasible reductions goals. [http://www.morpc.org/pdf/C-FAR\\_Guidance\\_v3.pdf](http://www.morpc.org/pdf/C-FAR_Guidance_v3.pdf).

<sup>60</sup> The LGOP is designed to provide a standardized set of guidelines to help local governments quantify and report GHG emissions from governmental operations. [http://www.climateregistry.org/resources/docs/protocols/industry/local-gov/lgo\\_protocol\\_september2008.pdf](http://www.climateregistry.org/resources/docs/protocols/industry/local-gov/lgo_protocol_september2008.pdf).

<sup>61</sup> *Id.*, see Table 10.1 of the LGOP for additional references to common GHG sources.

solar photovoltaic, combined heat and power);<sup>62</sup> and beneficial re-use of biosolids for compost to agricultural soils or forests.

### 3. Offset Credit Valuation

The key variables a POTW must consider when assessing the forward value of Offset credits that may be generated by the underlying capital improvement project are (a) the appropriate carbon market, (b) the forecasted value of any Offset credits generated and sold in that particular carbon market, and (c) the structural and price impacts of future GHG regulations. There are infinite ways to make this assessment. The variations and permutations in both carbon markets and types of project Offset credits create a bewildering level of complexity.<sup>63</sup> It is a good idea from the outset to simplify this assessment by assuming that the Offset project will be subject to the most stringent standards available.

#### a. All Carbon Credits Are Not Created Equal

The more stringent the standard, the greater the corresponding credit's credibility, and the higher the value of the POTW's future Offset credits. But there are still structural problems that, to varying degrees, can also distort a given Offset credit price (*e.g.*, inter-market fungibility, project-type limitations, regulatory risks posed by the uncertain future of the domestic mandatory compliance market). For example, a particular Offset credit is not generally recognized, and cannot be sold or redeemed in, any carbon market other than the one in which it was created.<sup>64</sup>

#### b. Forecasting Forward Credit Value

The value of a particular Offset credit is derived primarily from four sources: (i) the project (*i.e.*, type, location, market, baseline, scope and duration); (ii) the underlying project's eligibility to participate in a defined regulatory compliance market now or in the future, (iii) the quality of the credits (*i.e.*, whether the third-party standard employed to gauge and monitor the reductions is credible), and (iv) regulatory risk. Public sellers and private buyers put a premium on carbon offset credits generated using the most stringent standards possible.<sup>65</sup> Corporate and other buyers may stake their environmental reputations on the legitimacy of the credits they purchase. This realization ups the demand for Offset credits generated from reliable project sources and using the most stringent standards. Simultaneously, there is significant downward price pressures being put on specific Offset credits that are not viewed as being recognized in the future by the federal government as "early action credits."<sup>66</sup>

#### i. Define the Offset Project – What is it and Where?

A POTW should begin its evaluation by looking through the lens of the type and location of the project it may implement. The eligibility of a particular type of project, in a given location, differs from one standard to the next. For example, from a voluntary carbon market perspective, the beneficial use of using biosolids to generate electricity may be viewed as more valuable than capturing and flaring methane.

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<sup>62</sup> See, *e.g.*, <http://www.epa.gov/chp/markets/wastewater.html>.

<sup>63</sup> In mandatory compliance markets covered entities seek to meet their regulatory obligations at the least cost possible (*i.e.*, the primary rationale for carbon trading). For example, the CDM marketplace is now built around the idea of reducing as many "cheap" tons of GHG as possible at the lowest possible cost. In voluntary markets the converse is true.

<sup>64</sup> A notable exception is the linkage between the EU-ETS and the Kyoto-based flexible mechanisms (*i.e.*, CDM-derived CERs can be used to meet obligations under the EU-ETS).

<sup>65</sup> Based on 2007 market survey data, voluntary market demand is mainly driven by companies that want to improve their public image or bank credits in anticipation of future regulation. See, *e.g.*, note 28.

<sup>66</sup> Such credits do not mimic the parameters of existing mandatory compliance markets or projected federal qualifications.



ii. Identify the Target Market

The POTW should then evaluate the carbon market into which it intends to sell credits (or comparative OTC transactions). A carbon exchange like the CCX may be flooded with cheap Offsets all at once with a willing buyer, making it much more susceptible to market fluctuations than carefully-negotiated OTC transactions. Which market the POTW selects will determine the number of third-party verification standards that are available.

iii. Credit Quality - Third Party Standards

The POTW should also select the third party standard that will maximize credit value, which probably means utilizing the most stringent standard. However, in some cases a willing buyer may prefer its own customized yet less stringent process and be willing to pay the POTW to use it.

iv. Regulatory Risk

Finally, the POTW should attempt to assess the regulatory risks if the Offset project were to use the standard identified in the step above. First, a POTW should assess the likelihood of a change in law that could harm the project's implementation or achievement of verifiable reductions (e.g., a law requiring capture, collection, and flaring of all biogas would threaten "additionality" because the Offset would occur even without the project). Second, the POTW developer should evaluate the impact that laws creating a federal or other compliance market will have on the future of the chosen carbon market. Assuming the POTW does not enter into a fixed-price contract with a purchaser, the Offset credits could be exceedingly valuable (eligible in the new compliance market) or swiftly de-valued because the market disappears (buyers are now covered entities and credits do not qualify).

## 4. Total Project Economic Analysis

After the capital improvement project is identified, and feasibility studies completed, the next step is to conduct a thorough cost analysis to incorporate the Offset project valuation component and determine the possible revenue streams that may be generated by carbon trading. Costs will include third party consultant advisory and legal services, additional project capital costs (if any) to track and monitor GHG emissions, costs to develop the Offset project and negotiate the credit sale transaction, and finally, costs to monitor the project and to pay independent verification fees. Depending on particular accounting constraints, these Offset costs can be incorporated into the total capital improvement project budget or be maintained as a separate transaction.

The forecasted value of the potential Offset credits may not necessarily address the underlying financing needs of the total capital improvement project, but it may enhance the economic viability of a desired project with all other variables being equal. A particular capital improvement project may have a greater opportunity of being realized if the POTW can leverage additional capital from external financing sources seeking to be "paid" in Offset credits. Moreover, the Offset component could expand the financing opportunities for the overall capital improvement because of the emissions reduction component (e.g., bond financing, designated carbon funds, private equity, state dedicated subsidies or loan programs, sustainable development funds, or state system benefit charges and accounts).

## 5. Generating and Substantiating Voluntary Emissions Reductions

The Offset project does not commence at the end of the capital improvement project, but should begin contemporaneous to the development of the actual capital improvement because any Offset project needs to have a continuous monitoring program in place to confirm the "realness" of the claimed reductions. As discussed

above, while there are nuances affecting Offset credit generation under various carbon market standards or protocols, the general Offset credit process is as follows:

- The POTW establishes the project baseline (*i.e.*, the anticipated anthropogenic emissions that would have occurred in the absence of the capital improvement project).
- The POTW forecasts the amount of projected GHG emission reductions using appropriate emission models.
- The POTW prepares the PDD materials to document in detail every aspect of the underlying capital improvement project and the forecasted GHG reductions. The PDD will include detailed information about how the reductions are being calculated, under what carbon market standard or protocol, and how the reductions will be monitored over the designated life of the Offset.
- The POTW submits the PDD for initial approval with the relevant verifier or carbon market administrator (or both).
- The third-party verifier generates a “verification report” confirming the actual number of CO<sub>2</sub>e tons of emissions reductions achieved.
- The POTW registers the Offset project (*i.e.*, submits the PDD and verification report under the applicable carbon market standard). The project is then validated automatically or upon approval by the market administrator.
- The authority or administrator “issues” Offset credits equal to the verified reductions. The credits are normally “issued” in a carbon market registry account established for the POTW.

## 6. Selling Verified Offset Credits

After the Offset credits have been issued or recognized, the POTW as first owner will then be able to sell them as currency into the applicable carbon market. If the project was under the aegis of a carbon exchange, the reductions can be introduced for sale. If it was conducted as an OTC transaction, the POTW can sell them to a willing buyer, or, if the Offset credits were sold on a forward basis (*i.e.*, sold in advance of the time when the reductions are actually achieved), deliver them to the buyer’s account. Alternately, the POTW can choose instead to “bank” the credits for later use (*i.e.*, maintain ownership of the credits in the POTW’s credit registry for future sale or compliance use).<sup>67</sup>

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<sup>67</sup> The practice of banking credits may be important if the POTW anticipated being directly regulated. Under some developing cap-and-trade regimes (*e.g.*, WCI), it is anticipated that if POTWs are regulated they will be entitled to use some to-be-designated amount of banked credits to meet their initial compliance obligation.

## PART THREE:

# CARBON MARKETS FOR PLAYERS

### 1. Elements of a Carbon Market Transaction

#### a. Primary Market Transaction

Once the POTW has identified an Offset project it wants to pursue using its selected market standard, the focus should return to the ultimate goal – maximizing financial returns from creditable reductions in GHG emissions. The following is a roadmap a POTW should consider when implementing an Offset and the first sale of any Offset credits from creditable emissions reductions. As stated, the Offset project runs in parallel to, or directly after, the development and construction of the capital improvement project itself, and should therefore coordinate overlapping steps accordingly. For example, a POTW could develop, install, and construct a methane digestion system along with a small turbine generator using the captured biogas. The symbiotic carbon Offset “subproject” made possible by the biogas-to-energy project requires *continuous* emissions monitoring equipment to enable proper documentation and verification of the actual GHG reductions.

#### i. Participants

For any Offset project there will be at least three parties: the project developer (here, the POTW), the independent third party verifier, and the carbon credit purchaser. Other potential participants in any POTW-driven project could be the municipality, an external financing entity investing in the project (e.g., public or private carbon fund, private investor), a carbon market administrator, and an end-use credit purchaser if the first sale is to a credit wholesaler or broker. Municipal bonds, state grant programs (e.g., federal Clean Water State Revolving Funds), and public-private partnerships offer possible financing avenues to implement an Offset project without the need for significant upfront capital investment on the part of the POTW. For example, the POTW can engage in a competitive procurement process seeking development and construction of anaerobic digestion technology and onsite generation facilities. To reduce the cost of facility construction, the POTW can offer to transfer all right, title, and interest in some portion of any forecasted Offset credits to a private developer.

#### ii. Project Design Documentation

The first step is to prepare the PDD. The preliminary information must lay out the basics of the proposed (or actual) project design and emissions reduction effects in conformity with the requirements of the carbon market standard being employed. The POTW must (a) explain the applicable voluntary market standard and project scope/methodology, (b) identify in detail the project baseline calculation and reduction timeline (i.e., when verifiable reductions begin), (c) identify the intended monitoring and compliance mechanisms, and (d) explain the project’s additionality. In accordance with the procurement process, the POTW can typically contract with carbon market consultants to prepare the PDD.

#### iii. Carbon Finance Arrangements/Documentation

This step is optional. If the POTW has obtained external financial contributions or offers for contribution for the subproject prior to implementation in return for future carbon credits or some share of the carbon credit revenues after the first sale, the POTW can prepare all necessary due diligence reports, agreements, letters of intent, and memoranda of understanding that formally identify or signal the investors’ intention to purchase emissions reductions generated by

the proposed project under agreed terms in return for the exclusive rights to contract for the purchase of emissions reductions. By signing a letter of intent, the POTW may well be committing to repay project preparation costs if it decides to end negotiations for any binding carbon credit purchase and sale agreement with the investor(s).

iv. Offset Project Implementation

Depending on the type of capital improvement project being implemented, at some point all necessary physical equipment, infrastructure, or emissions reduction will have been erected, established, or otherwise rendered operational. Pursuant to the Offset Project's PDD and the applicable compliance monitoring protocol being used (*i.e.*, measure and calculate the emissions reductions actually generated), the emission reductions resulting from such project implementation must next be properly tracked and monitored.

v. Initial Third Party Audit

When or immediately after the project becomes operational, the designated third party verifier will audit the project or carry out an independent validation of the PDD (or both, depending on the applicable standard used) to confirm that (a) emissions reductions are additional to the baseline under the applicable voluntary market standard and project methodology, (b) the monitoring compliance program is acceptable under the voluntary standard, and (c) the emissions reductions have occurred so that they can be certified either by the third party verifiers or by a project committee (such as the CCX Offset Program Committee). The verifier will essentially undertake an initial verification, which should confirm that the project is ready to generate verifiable and certifiable emission reductions.

vi. Offset Credit Sales Contract or Project Registration

Prior to or concurrent with the initial project verification, the POTW should negotiate final terms for the sale and purchase of the Offset credits with the project purchaser. As discussed in Section 10, the agreement must lay down detailed requirements, obligations, and procedures for emission reduction, generation, verification, and delivery. The agreement can stipulate the (a) tons to be traded and price to be paid upon delivery, (b) upfront carbon financing (if any) and its recoupment, (c) consequences and damage obligations if the resultant Offset credit units are not delivered (known as "delivery risk"), (d) conditions precedent to the POTW's obligations, and (e) allocation of ownership rights to the Offset credits and their ultimate transfer (pursuant to the designated carbon registry).

vii. Carbon Credit Generation

The POTW must designate in the PDD the estimated emissions reductions and the applicable verification periods. At the end of each period, the third party verifier will verify and validate the emission reductions in accordance with the PDD's monitoring plan under the applicable protocol guidelines. The verifier will issue a certificate or "verification report" to confirm that the emission reductions have been achieved in the applicable verification period. Upon receipt of the verification report, the POTW will submit it for registration with the carbon market administrator. Offset credit units will then either be issued (*e.g.*, CCX) or certified (*e.g.*, OTC transaction) in amounts directly correlating to the actual GHG reductions.

### viii. First Sale and Delivery

At the point of verification or certification (as applicable depending on the relevant carbon market), the POTW as project owner will have perfected its rights. It may (a) transfer the Offset credit products to the private project developer (if any), (b) sell and/or deliver such credits to the project purchaser pursuant to the terms of the agreement, (c) place the credits on a voluntary carbon exchange for sale, or (d) bank the credits in a recognized carbon registry for later compliance use or third party sale.

### b. Secondary Market Transactions

After any Offset credit units are certified and delivered, the POTW may no longer need to remain involved. However, there is a secondary market in which participants can purchase and sell the credits generated by the underlying POTW project (*i.e.*, pure carbon credit trading). The secondary market consists of investment banks, carbon funds, brokers, commercial entities, and end-use purchasers. As the POTW develops the first sale agreement, it will want to minimize its exposure to third-party recourse liability in subsequent secondary market transfers of the Offset credits it seeks to sell. While it may be unlikely that the POTW will seek to participate in secondary market transactions, the project purchaser could aggregate POTW-generated credits with other project credits for sale in secondary markets.

## 2. Key Contracting Plays

As stated, the contractual relationship between the POTW and the Offset credit purchaser must supply the fundamental ground rules in the absence of any underlying compliance market regulatory system. Voluntary carbon markets are booming, but like any boom, less scrupulous participants may be drawn to the action. Without any regulatory infrastructure for the Offset project, the voluntary market standards and the project contract documents must establish and maintain the project's credibility and integrity.

There are currently several template carbon market contracts available, sometimes for a proprietary fee, that parties can use for most Offset projects. The two main standard form agreements include the EU-ETS Emission Reduction Purchase Agreement ("ERPA") first developed by the International Emissions Trading Association, and the model Voluntary Emission Reduction Purchase Agreement ("VERPA") which is still being developed by the American Bar Association in collaboration with the Environmental Markets Association. Secondary market template agreements are the European Federation of Energy Traders Allowances Appendix to its master electricity contract, or the International Swaps and Derivatives Association's ("ISDA") "Emissions Allowance Transaction" agreement, which is a schedule to the ISDA Master Agreement. The example templates can be found at the following websites:

- ERPA: <http://www.ieta.org/ieta/www/pages/download.php?docID=1793>
- VERPA: <http://www.environmentalmarkets.org/page.wv?section=EMA+Document+Library&name=Master+Agreement+For+the+Purchase+and+Sale+of+Emissions+Products>
- EFET: <http://www.efet.org/Default.asp?Menu=30>
- ISDA: <http://www.isda.org/publications/isdacommderivdefsup.html>

Regardless of whether the Offset project participants select a template standard form agreement or choose to design a customized agreement, the contractual issues the POTW will need to consider will be the same.



a. Strictly Define the Offset Parameters

The lynchpin of the Offset credit product sales agreement is a clear, definitive description of the project. The project definition, including the standards and methodology employed, the formula parameters used to establish the project baseline, the monitoring plan, and how the project will generate reductions over a known time horizon, are all essential to defining the integrity and credibility of the CO<sub>2</sub>e reductions. The PDD materials or equivalent documentation regarding the offset project should provide a sufficient definition, if appended as schedules to the credit sale agreement. If the applicable standard does not require extensive PDD, the POTW should demand that any Offset credit product sales agreement incorporate all that information.

b. Strictly Define What is Being Sold and How it Will Be Transferred

Without sufficient detail as to what the POTW will be selling to the Offset credit purchaser, the POTW will shoulder a huge, unnecessary risk. The sales agreement should first define what is being sold. For example, most VERPA transactions define emissions reduction as all existing and future legal and beneficial rights arising from one CO<sub>2</sub>e ton of reduction. Next, the agreement should identify the voluntary carbon standard being used to verify the project's emissions reductions; detail that the emissions reductions will be verified according to a methodology that is approved or acceptable under the standard being used; identify the exact criteria required under the applicable standard to generate verified emission reduction units;<sup>68</sup> qualify how the project-based reductions will comply with those criteria so that the project will result in verifiable units generated according to a periodic compliance schedule; define what party has the initial legal ownership and entitlement to the Offset credits; and finally, define how and when the Offset credits will be delivered.<sup>69</sup>

c. Define the Type of Transaction

The POTW and the purchaser can trade the Offset credits on a spot, forward, or option basis. Spot transactions are rare for project-based Offsets, but can be characterized as being those in which the purchaser and the POTW would negotiate a contract price for the immediate or prompt delivery of a quantity of currently verified emissions reductions. Forward transactions are those in which the project participants agree to the price of the project's resultant emissions reductions well in advance of their realization and verification. In this instance, the POTW would take the risk of delivery and possibly the additional liability incurred by the credit purchaser for non-delivery. Option contracts for the sale and purchase of the project's emissions reduction are those in which the POTW or the purchaser has the right, but not the obligation, to enter into a credit sales agreement at a price and on dates determined in the option contract. The type of transaction that the parties engage in affects the way that the resultant carbon credit units will be delivered.

d. Describe Delivery Obligations

The parties must adequately describe the POTW's delivery obligation. The obligation can be for firm delivery of a projected amount, a non-firm variable amount (*i.e.*, deliver all or some available credits), or a hybrid of firm and non-firm excess deliveries. A firm obligation should be addressed through an identifiable schedule of deliveries, and the agreement should explain how shortfalls in delivery will be

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<sup>68</sup> The methodology that will be employed by the third party verifier (designated in the sales agreement as acceptable to both parties) should be defined and strictly established with specificity in the agreement. It should be precise enough to let a reasonable person know the parameters for compliance that will result in credible credits.

<sup>69</sup> The project documents and the sales agreement should identify the volume of emissions reductions that the project is expected to create during each verification period, regardless of whether the delivery obligation is firm or non-firm.

handled. After the obligation is determined, the consequences of delivery failure must be sufficiently detailed. Purchasers' recourse may include make-up deliveries, replacement delivery of equivalent units, damages equal to the purchaser's excess payments, liquidated damages, price adjustments on future carbon credit units, damages up until a defined liability cap, and even outright termination of the Offset credit sales agreement. Moreover, if carbon financing is involved, any obligation of the POTW to compensate the investors or the credit purchaser (or both) needs to be detailed from the outset, possibly through use of a liquidated damages schedule.

e. **Establish and Define Credit Tracking and Delivery Process**

Assuming that the project will generate verified and credible emissions reductions, an issue that must be anticipated from the outset is how the verified reduction units will be tracked continuously for the agreed-upon term of the contract, accounted for, and delivered. Resolution of this issue depends on the preferences of the parties, but also on what standards apply, what monitoring and emissions reduction tracking mechanisms are in place, and what carbon credit registries or accounts are being used. For example, a forward transaction delivery can be described in the sales agreement by defining where the transfer will occur (*i.e.*, over an exchange, through a registry account transfer, through delivery of transaction logs signifying the units transferred), identifying the accounts held by the project participants, and describing the transfer process that will take place on a future date.

f. **Describe Project Implementation Schedule**

Although the POTW's construction and implementation of the underlying Offset project is integral to the generation of verifiable emissions reductions, the POTW's project development obligations may or may not need to be strictly defined in the sales agreement. It would be necessary, however, whenever the POTW is engaging a private entity to develop the project in return for first sale and transfer of the POTW's right and interest in the CO<sub>2</sub>e emissions reductions.

g. **Establish Terms of Payment**

Depending on the type of transaction, the parties have options on how to establish the payment price to be paid by the project purchaser in exchange for the project-based credits. Examples of such options include market-based index pricing, fixed rate pricing, or formula-based pricing based on defined variables (*e.g.*, performance factors, regulatory risk factor). In addition to price, payment terms must be laid out to make clear when payment is due (*e.g.*, in advance, on delivery, escrow account withdrawal), and when and how title is to be transferred (*e.g.*, payment, delivery).<sup>70</sup>

h. **Describe the Monitoring Plan and Attendant Obligations**

As stated, when the applicable voluntary standard requires a PDD, the monitoring plan should be sufficient to explain the implementation and monitoring phase of the project. The agreement should lay out in detail the obligation of the project developer to comply with the monitoring plan and any reporting requirements or risk damages.

i. **Define and Allocate Project and Regulatory Risks**

Unforeseen risks may impair, harm, or prevent full performance or completion of the Offset project. Therefore, the sales agreement should detail which party bears which risks. The agreement should address and allocate, to the extent possible, all pertinent market risks, project risks, and regulatory risks between or among the parties. Ideally, the party best able to avoid or manage the particular risk

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<sup>70</sup> There may be local law restrictions that could restrict flexibility regarding transfer of title and should therefore be thoroughly researched in advance.



should bear its burden. The POTW, for example, may want to share some project risk (*e.g.*, force majeure) with the project purchaser or external investor. Other project risks include quantifying and allowing for Offset credit shortfalls that may occur (*i.e.*, the number of tons of emissions actually reduced ends up lower than anticipated) and other non-delivery risks (*i.e.*, failure by the POTW to transfer verified Offset credits to the buyer for whatever reason).

Market risks are closely tied to regulatory risks and are primarily affected by downstream Offset credit eligibility or recognition. For example, if the project purchaser is buying credits generated by the POTW project with the intent of banking them as qualifying early action credits in anticipation of a future federal compliance requirement, the Purchaser should likely bear the risk and continue to be obligated to purchase and receive credits (or pay the same in damages) after the date those voluntary credits are determined to qualify under a compliance program.

The largest risk to any Offset credit sale may well be the potential that a change in law will undermine or de-value voluntary carbon markets or the market price for voluntary carbon credit units, or both. Such regulatory risks can range from a law implementing a federal cap-and-trade program to a rule change that impedes (for whatever reason) use of the designated verification criteria for certain types of projects. Allocation of regulatory risk can be handled through price adjustments, specific adaptation triggers (*i.e.*, providing for transition into a compliance market verification program, if possible), apportionment of damages, and no-fault termination of the agreement.

j. Identify Dispute Resolution Procedures

Regardless of how the project participants agree to handle the first sale and delivery of the Offset project's carbon credit units, whatever their quality, the sale agreement should provide for an identifiable dispute resolution process. Depending on municipal or local policy, submission of any material disputes to mediation or arbitration may be preferred to formal litigation.

### 3. Carbon Market Questions & POTW Policy Decisions

As a follow-up guide to the key contracting issues, the following sets of policy issues and questions should be resolved as part of (a) the Offset project development process, and (b) the ultimate sale of verified Offset credits.

a. Carbon Market Participation Questions To Resolve

- Does the municipality or POTW want to engage in Offset credit sales transactions with private parties?
- What are the POTW's carbon market objectives?
  - Carbon neutrality? Green revenue stream?
  - Do such objectives conflict with any activities or objectives of the municipality?
  - What is the POTW intending to sell (*i.e.*, Offset credits or the rights to generate Offset credits on the POTW's property)?
- In which carbon market segment does the POTW intend to participate, mandatory or voluntary?
  - What voluntary carbon market is in the POTW's best short term and long term interest to use for the project? What factors affect that determination?
  - If the POTW wants to participate in a voluntary carbon exchange, does it need to join the exchange? Are there specific membership requirements or commitments?
  - Is the POTW seeking to bank Offset credits for future use or sale in any anticipated compliance markets?

- Is the POTW an eligible offset provider under any existing state or regional cap and trade system?
    - ♦ If so, for what types of emissions reduction offset projects?
    - ♦ What is the likelihood that a POTW-specific project may not qualify in the future?
  - Is the POTW an eligible offset provider under any specific voluntary carbon market standards?
    - ♦ If so, for what types of emissions reduction offset projects?
- What are the forecasted price ranges for any Offset credits, in each targeted carbon market, from the capital improvement project being implemented?
  - What is the POTW financial risk appetite (*i.e.*, what is the extent to which carbon price fluctuations can be tolerated)?
  - Can the POTW accept project investment losses (*i.e.*, failure to realize anticipated carbon credit value)?
  - Will the POTW be able to pass any project investment or carbon risks on to the municipality or its ratepayers?
- What are the estimated administrative and transactional costs involved to complete the project-based Offset? Can those costs be shifted to the purchaser or rolled into the carbon credit purchase price?
- What is the likelihood there will be a state, regional or federal cap-and-trade regulatory system that will affect the POTW or the relevant municipality or municipalities? What is the design and scope of the anticipated cap-and-trade regime?
- Has the POTW integrated into its Offset project's economic analysis the cost impacts if a federal, regional or state cap-and-trade program is adopted during the POTW project?
  - Will the POTW likely be able to convert any voluntary Offset credits to future unknown units?
  - What is the likelihood the POTW will be a covered entity under a state, regional or federal cap-and-trade regulatory system in the future?
  - What is the likelihood that the municipalities associated with the POTW will be a covered entity?
  - Can the POTW engage in financial hedging transactions to mitigate such risks?

#### b. Policy Checklist

- Does the POTW have the legal authority to sell carbon credits under municipal and state law?
- What is the POTW's appetite for Offset credit delivery obligations?
  - Should the POTW execute the project independently and sell resultant credits to the highest bidder after the fact (*i.e.*, spot markets), or engage a project purchaser upfront for future credit deliveries prior to or concurrent with project development (*i.e.*, forward transaction)?
  - Alternatively, should it engage a project purchaser through some kind of option arrangement? Should the option be the POTW's to sell, or the purchaser's to buy?
- What is the applicable emissions reduction standard to be applied?
- Who is entitled to initial ownership of the Offset credits, the POTW or the municipality?
  - Is there risk of double-counting emissions reductions?
- How should the POTW recover payments for delivered/transferred Offset credit units? If there will be multiple payment periods, how should the payments be invoiced/received?
- How should Offset credit unit income (or losses) be allocated and accounted for by the POTW? Are there specific local or state accounting requirements?

- Will the Offset credit revenues be encumbered by any capital project or POTW system bond indenture?
- Can the POTW retain the risk for firm or non-firm delivery (*i.e.*, performance) obligations?
  - What party should bear the risks of project failure, market turns and regulatory changes?
- Should the POTW seek to include the forecasted value of any project-based credits as project collateral for development and implementation of the underlying project? Are there local or municipal restrictions to such collateralization?

#### 4. Anticipating Domestic Federal Carbon Regulation

It appears that carbon markets are here to stay in some form, with or without POTW participation. The fundamental consideration a POTW should incorporate into both its carbon risk management matrix and its analysis and evaluation of any potential project-based Offset is what the future may hold for compliance carbon markets in the United States. A federal cap-and-trade regime could have a great deal of potential impact, both positive and negative, on the POTW community and investments in implementing project-based Offsets. The degree of impact depends on the design, severity, scope and applicability of any implemented legislation.

##### a. Recap of 2008 Legislative Activity

In 2008, the U.S. Senate came within earshot of actually passing legislation to implement climate change regulation. Less than ten additional votes would have resulted in the passage of Senate Bill 2191, America's Climate Security Act.<sup>71</sup> Even though Senate Environment and Public Works Committee Chair Barbara Boxer had substituted her version for the original bill, the legislation was informally known by the name of its two original co-sponsors, Joseph Lieberman (I-CT) and John Warner (R-VA). The proposed "Lieberman-Warner" bill would have reduced U.S. GHG emissions from covered entities by 70% percent between 2012 and 2050, starting with a baseline of 2005 emissions.

The legislation covered the electric power and certain natural gas and large industrial GHG emitters and all six GHGs. Compliance would be accomplished through a market-based cap-and-trade system. Approximately 69% percent of the available emissions allowances would be freely allocated initially with a progressive increase in the amount of allowances auctioned to covered entities. The bill would have established a Carbon Market Efficiency Board akin to the Federal Reserve Board to observe and evaluate the national carbon market and to intervene when necessary to limit significant carbon price increases. Under Lieberman-Warner, covered entities were entitled to meet up to 15% of their total annual compliance cap obligation through the use of qualifying Offsets. Qualifying Offsets were limited to agricultural, forestry, and land use-related projects.

Furthermore, the bill granted the EPA Administrator the authority to allocate a small percentage of the emission allowances established for the years 2012-2016 to early actors. The Administrator would have allocated such allowances to the "owners and operators . . . of covered facilities and other facilities that emit [GHGs], . . . in recognition of [their] actions . . . taken since January 1, 1994, that resulted in verified and credible reductions of [GHGs]."<sup>72</sup> Moreover, the regulations promulgated by EPA would have had to provide for consideration of verified emission reductions registered before the date of enactment of the Lieberman-Warner Bill.

<sup>71</sup> See, e.g., <http://www.govtrack.us/congress/bill.xpd?bill=s110-2191>.

<sup>72</sup> Lieberman-Warner Bill, § 3201 (emphasis added).

b. Anticipating the Components of a Federal Compliance Market

After significant revisions and amendments, the bill was passed by the Senate Environment & Public Works Committee and reached the Senate floor for debate. Republican Senators outmaneuvered the Senate Democratic leadership and, under threat of a filibuster, the managers withdrew the bill from consideration on Friday, June 6, 2008, when it became apparent that there were not 60 votes for cloture.<sup>73</sup> But the legislative exercise and the level of positive support for the Lieberman-Warner package, considered in light of the rapid development of state and regional GHG programs across the country, demonstrate that climate change regulation is likely to pass sometime in the near future. It has also indicated which specific policy components are likely to appear in the final legislation.

i. Cap-and-Trade Regime

A federal program will most likely include a regulated compliance market. The program will have aggressive reduction targets for covered entities that will probably include enough sectors of the economy to cover the major emissions sources (electric generation, certain industrial sectors). There is a chance POTWs or municipalities with GHG emissions above a certain threshold would also be defined as covered entities.<sup>74</sup> If not, the POTWs would not have a direct obligation to comply with the federal emissions cap. It is relatively certain, however, that POTWs will likely be required to track their emissions levels and comply with public disclosure requirements. It remains to be seen whether a new federal agency will be created to be the carbon market administrator, or whether numerous federal agencies will be given jurisdiction over pieces of the market administration.

ii. Allocation Versus Auction

The way emissions Allowances are distributed to covered entities will affect the entire economy.<sup>75</sup> Even if a POTW is not regulated under the regime, the differences in approaches would affect the POTW's operating costs. If the federal program freely allocates Allowances to covered entities, electric utilities with high GHG emission levels may have to purchase Allowances from other entities. But the free allocation mechanism may reduce the incentive for project-based Offsets because the "carbon price" would be dragged down by an abundance of available Allowances. In addition, in regions where the electric utility is a net buyer of Allowances, the costs of Allowance purchases would also eventually be reflected as an increase in the electric rates charged to the POTW to run the facility.

On the other hand, if the federal program auctioned Allowances to covered entities, the higher costs incurred by the utility would be immediately passed through to the POTW's electric rates, and possibly make project-based Offsets relatively more attractive to covered entities and market traders. Auctions arguably foster incentives for private sector innovation.

Perhaps covered entities would rather pay to develop cleaner technologies than pay to buy Allowances. On the positive yet still speculative side, sales revenue from an Allowance auction could be directed at the federal or state level to fund municipal efficiency or emissions reduction

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<sup>73</sup> <http://gristmill.grist.org/story/2008/6/6/6159/54712>.

<sup>74</sup> For example, in proposed federal GHG regulation introduced by Representative Edward J. Markey (D-MA), the chairman of the special House committee on global warming, POTWs would be required to meet strict GHG performance standards under a federal cap-and-trade regime.

<sup>75</sup> See, e.g., Expert Opinion on the Economics of Policy Options to Address Climate Change, Report to Congressional Requesters, GAO-08-605 <http://www.gao.gov/new.items/d08605.pdf>.

projects, which could end up paying the POTW to reduce emissions or to adapt to the negative effects of climate change.

### iii. Offsets Eligibility

There is a clear indication that covered entities will be able to use project-based Offset credits to meet their compliance cap obligation. The unknown variable is what percentage of their obligations can be met through offset credits. Senator Boxer's version of the Lieberman-Warner package allowed fifteen percent, but the recent WCI regional program proposes to allow almost half of a covered entity's obligation to be met by Offsets. The more important variable for POTWs, however, is whether the Offset projects they can implement would be eligible to generate qualifying Offset credits.

### iv. Protocol Standards and Criteria

If POTW-based offset projects do qualify, the next unknown is whether the new federal regime will adopt any of the existing protocols, standards, and criteria to generate verifiable and credible emission reductions, and if so, which ones. If Congress were to adopt existing standards, it would likely choose the more stringent of the existing compliance or voluntary verification standards. Although the CDM is a bedrock program, and VCS and the CCAR programs are proving popular, there is no real indication of what Congress will choose to do. It seems more likely that Congress will establish minimum standards and principles and leave their detailed articulation to the chosen regulatory agency.

### v. Early Action Credit

The next critical issue is whether the final legislation will recognize early action credits. The Lieberman-Warner bill gave only limited recognition to early action credits (*i.e.*, voluntary emissions reductions), and then only for actions undertaken by covered entities. This aspect of a federal regime affects the current value of voluntary market emissions reductions. If a POTW were to implement an Offset project to generate VCUs between 2009 and 2015 that will be sold to a potential covered entity, and then a new federal regime implemented in 2012 decided not to recognize the credits purchased to date, the POTW may find itself without a willing buyer. Alternately, the converse may turn out to be true, in which case the covered entity's investment today may look like a bargain under compliance market pricing.

### vi. Preemption/Integration

One of the most contentious issues that may affect POTWs is federal preemption of the existing state and regional GHG regulatory programs. If the federal program expressly or impliedly preempts regional cap and trade programs, the value of some POTW Offset projects already in progress may be unaffected, other than possible additional administrative costs to transition to the federal verification regime. New projects may or may not benefit. The actual fate of pending Offset projects likely depends on the federal protocols and standards applied and their level of stringency, as compared to the existing regional programs.

If the federal program integrates existing regional or state programs in some form, which seems likely, pending projects may also be unaffected. If Congress preserves state-by-state discretion to develop unique standards and targets, perhaps subject to the harmonization of standards and metrics for compliance, the impact will depend on the regulations ultimately implemented by the



states.<sup>76</sup> Key leaders in the 111<sup>th</sup> Congress driving proposed climate change legislation and debate, Senator Barbara Boxer (D-Calif.), Speaker of the House Nancy Pelosi (D-Calif.), and Representative Henry Waxman (D-Calif.), all strongly oppose preemption.

#### vii. Carbon Market Linkage

A final important regulatory component to pay attention to is whether and how a future U.S. carbon market may be linked to other compliance markets operating around the world. If the U.S. were to create a North American Carbon Market<sup>77</sup> for specifically allowed covered entities to purchase European-based allowances or project-based offsets, the impact would be to reduce (at least initially) the carbon price and provide a possible disincentive for more expensive offset projects implemented by POTWs (compared with similar projects in other countries). WCI states are already participating in international efforts to link carbon markets and to harmonize emission reduction standards.<sup>78</sup>

#### c. Impact that 2008 U.S. Elections Will Have on Policy Debate

*"My presidency will mark a new chapter in America's leadership on climate change that will strengthen our security and create millions of new jobs in the process. That will start with a federal cap-and-trade system."*

-- President Barack H. Obama, November 18, 2008

For those who thought an Obama Administration would put off taking action on climate change regulation in times of economic and financial crisis, think again. President Obama's post-election statements indicate that making a dramatic shift in U.S. policy on climate change is one of his first priorities. With the benefit of Democratic Party majorities in both houses of Congress, President Obama is set to take aggressive steps to regulate GHGs domestically and to resume a leadership role in global negotiations. In short, the train is leaving the station. There will be federal climate change regulation. The remaining questions, therefore, are how soon that train will arrive at its destination and what freight will it carry?

It remains unclear at the time of this writing how an Obama Administration will tactically approach policy and legislative development. It is also unresolved how much Congress will cooperate with the Obama Administration. Members in the Senate and House have been seriously debating the issue for years and have their own views about what federal climate change legislation should include. Different sectors of the economy and regions of the country also have divergent and often conflicting interests that will increasingly complicate carbon politics. A federal carbon market will produce winners and losers. Determining which entities are which will depend on the design, scope and parameters of the federal regulatory regime.

#### i. President Obama's Initial Position

President Obama's starting position for legislative debate is introduction of an economy-wide cap-and-trade program that seeks to reduce GHG emissions to 80 percent below 1990 levels by 2050.

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<sup>76</sup> A possible integration outcome may be that the federal government sets minimum GHG cap-and-trade standards, for example, and authorizes the state to implement standards equal to or more stringent than, the minimum federal standards, within certain defined parameters.

<sup>77</sup> See, e.g., <http://www.pointcarbon.com/news/1.986337>.

<sup>78</sup> In 2007, the International Carbon Action Partnership ("ICAP") was launched to help promote common or harmonized carbon market standards and initiatives around the world. Among others, ICAP is championed by the European Union and U.S. states like California and New York.

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/1627&format=HTML&aged=0&language=EN>

All emission Allowances would be auctioned, with the proceeds directed into clean technology development and deployment. The extent to which Offsets would be included under an Obama plan is uncertain. If implemented, Obama's plan would require no less than a fundamental transformation of our entire economy. To put it in perspective, in just four decades, everything we do now (from how we generate and consume energy to how we live and travel), will need to be done completely differently. The sweeping scale of such redirection is at the core of President Obama's objective of initiating a "green" economic recovery.

ii. Expectations for the 111th Congress

While the Obama Administration will want Congress to get to work on its cap-and-trade proposal, legislators on Capitol Hill have already indicated it will not be easy. There are early indications that the House and the Senate will be debating at least three, and perhaps five, competing proposals. The House, for example, had expected to debate in earnest its own cap-and-trade proposal in early 2009. Energy and Commerce Committee Chairman John Dingell (D-Mich.) and Subcommittee on Energy and Air Quality Chairman Rick Boucher (D-Va.) had released draft legislation in early October 2008 in an attempt to set the parameters for House debate. The draft Dingell-Boucher legislation won high marks from outside observers as a tough but pragmatic solution.

The fate of that draft legislation is up in the air, however, now that Rep. Henry Waxman (D-Calif.) has replaced Dingell as the Energy and Commerce Committee chair. The Committee could start with an entirely different package. Congressman Waxman may even seek to introduce and debate Obama's plan directly. This possibility appears likely because Phil Schiliero (former Chief of Staff to Rep. Waxman) was named as Obama's director of legislative affairs. The Senate, on the other hand, could be the political wild card in 2009. It is expected that Sen. Barbara Boxer (D-Calif.) will introduce "streamlined" legislation, but competing bills could be introduced by Sen. Jeff Bingaman (D-N.M.) and even Sen. John McCain (R-Ariz.). In the event of prolonged legislative horse trading, a potential development to monitor closely will be whether the Obama Administration uses EPA's existing regulatory authority under the Clean Air Act ("CAA") to institute some form of CO<sub>2</sub> regulation in the interim. In June 2008, the EPA released an Advanced Notice of Proposed Rulemaking in response to the landmark Supreme Court ruling that confirmed EPA's authority to regulate CO<sub>2</sub> under the CAA.

d. NACWA Advocacy Efforts Regarding Potential Federal Legislation

NACWA was an active participant in discussions regarding climate change legislation and carbon regulation during the 110<sup>th</sup> Congress and intends to play a key role during the 111<sup>th</sup> Congress as well. The Association discussed climate change issues with members of President Obama's transition team during meetings after the November election and has also engaged key members of Congress regarding potential climate change legislation. NACWA continues to dialogue with member agencies, congressional staff, and other stakeholders about the role of POTWs in any future carbon regulation scheme, including an evaluation of potential advocacy goals with respect to climate change issues. This process will be ongoing over the coming months, and NACWA welcomes member input on these critical issues.



## CONCLUSION

While there are many moving parts to understand before jumping into carbon markets, the learning curve is far from insurmountable. As with any marketplace, the POTW should evaluate the carbon market, its role in that market, and how it might use its inherent advantages to be a player.

Wastewater treatment is a source of GHG emissions. Implementing a capital improvement project that will reduce the volume of emissions that would otherwise be released currently allows the POTW to avail itself of carbon market opportunities as an Offset provider. But it is still up to the POTW to make sure those emissions reductions become formally recognized Offset credits. That monetization process, if approached by the POTW as a business venture, can generate significant value. It is important to approach the process carefully and to account for all potential risks along the way.

In the short term, until the U.S. implements a federal cap-and-trade regime, voluntary carbon markets may be the most obvious place for Offset project potential. Voluntary markets are vying to ensure the ostensible credits parties generate using their standards actually represent credible reductions. The motivation is simple: credible emission reductions mean valuable credits. They also are increasingly viewed as having more long-term value because credible credits are more likely to be eligible for future compliance use.

Once a POTW has decided it wants to take the field and play the carbon market game, its first priority should be to identify what projects it can pursue, and what kind of Offset credits it wants to sell. Those decisions are informed by its location, the carbon market in which it seeks to participate, and the Offset standard it intends to use. Once it has each of those concepts down, the POTW can get started.

## Appendix A

### Comparison of Voluntary Standards

	VCS	CDM	Gold Standard VER	CCX
<b>STEP 1</b> <b>Document the Offset Project</b>	Submit Offset project design documents to verifier (accredited under GHG Program or ISO 124065:2007).  Approved Offset project-type methodologies include CDM and CCAR protocols.	Develop PDD documents demonstrating actual emissions reductions under approved project-specific methodology.  Approved project methodologies include CDM protocols.	Develop PDD documents demonstrating actual emission reductions under approved project-specific protocol, including additional Gold Standard project requirements (if any).  Eligible POTW projects limited to biogas to energy.	Submit project design documents to CCX Offset Committee for preliminary approval.  CCX and CDM-approved projects eligible (on a case-by-case basis).
<b>STEP 2</b> <b>Third-Party Verification</b>	VCS recognized verifier assesses the claim against VCS 2007 and then drafts validations and verification report.	UNFCCC-accredited Designated Operational Entity employed to conduct verification.	UNFCCC-accredited Designated Operational Entity employed to conduct verification.	The POTW must obtain an independent third-party project verification pursuant to the CCX Offset Guidelines using a CCX-recognized verifier.
<b>STEP 3</b> <b>Preparation of Verification Report/Validation</b>	The project developer (whether the POTW or a third party) submits a VCS project description, the validation/verification report and proof of title to a registry operator.	The third-party verifier will verify the emissions reductions pursuant to the applicable project protocol.	The third-party verifier will verify the emissions reductions pursuant to the applicable project protocol.	The POTW will register with the CCX as an Offset Provider or Aggregator ( <i>i.e.</i> , a Participant Member).

	<b>VCS</b>	<b>CDM</b>	<b>Gold Standard VER</b>	<b>CCX</b>
<b>STEP 4</b> <b>Offset Project</b> <b>Validation or</b> <b>Registration</b>	The VCS Registry administrator reviews the project documentation and submits it into the VCS database.	The verifier confirms to the parties that the PDD and project monitoring complies with CDM rules.	The third-party verifier will confirm to the Gold Standard Advisory Committee project compliance with Gold Standard rules.	The POTW will receive/be issued CFI contracts for the registered Offsets.
<b>STEP 5</b> <b>Validation or</b> <b>Issuance of Offset</b> <b>Credits</b>	The VCS association receives VCS registration and issues the Offset project with serial numbers for every VCU.	The contracting parties recognize the Verified Emissions Reductions created. The POTW may sell or deliver (or both) the VERs to a willing buyer.	The Gold Standard Advisory Committee audits validation by the independent entity.	POTW may sell CFIs across CCX exchange.
<b>STEP 6</b> <b>Issuance of Offset</b> <b>Credits</b>	The VCS Registry Administrator issues the VCUs into the POTW's account.	N/A	The Gold Standard Executive Board issues VERs into the POTW's account.	N/A

## Appendix B

### Glossary of Selected Terms

Additionality:	Term that refers to the key eligibility test for Offset projects seeking to generate carbon credits. The specifics of the test vary between carbon markets, but generally dictate that projects are only eligible for carbon credits if the GHG emission reductions achieved were not going to happen anyway ( <i>i.e.</i> , the reductions were “additional” to what would have occurred in the normal course of business).
Allowance:	The primary unit of currency traded in regulated carbon markets. One Allowance represents a covered entity’s right to emit one metric ton of CO <sub>2</sub> e.
Banking:	Administrative mechanism that allows current or future covered entities to hold or carry over Allowances or Offsets from one compliance period to subsequent periods.
Cap-and-trade:	A system that puts a limit ( <i>i.e.</i> the “cap”) on the amount of GHG emissions a covered entity may generate. The individual cap is represented by an equal number of Allowances that are initially allocated or sold to the entity. Covered entities and other interested third parties may trade Allowances or Offsets, provided that at the end of the compliance period, each covered entity is able to surrender enough Allowances to equal the actual level of emissions occurring during that period.
CARB:	California Air Resources Board. CARB has regulatory jurisdiction to design and implement all GHG emission reduction activities under California state law.
Carbon inventory:	Refers to the GHG emissions associated with, or sourced from, all property and facilities under an individual entity’s control.
Carbon trading:	A system of rules, standards and protocols set up by a governmental entity (or a group of willing participants) that allows eligible market participants to buy and sell carbon credits.
CCAR:	California Climate Action Registry. CCAR is an organization created by the State of California to encourage companies, government agencies and other organizations to voluntarily measure and report their GHG emissions and emissions reduction.
CCX:	Chicago Climate Exchange. The CCX was created as the first voluntary exchange-traded carbon market in the United States. It allows CCX members to buy and sell different carbon credit products with other participating members.
CDM:	Clean Development Mechanism. The CDM was created as part of the Kyoto Protocol and allows Offset projects sited in developing countries to reduce emissions and generate tradable Offset credits called Certified Emissions Reductions (“CERs”). CERs can be used by covered entities regulated as part of their country’s implementation of the Kyoto Protocol in order to meet a small portion of their GHG cap requirements.

CERs:	Certified Emissions Reductions. Offset credits generated by verification and validation of emission reductions achieved by CDM-approved Offset projects.
CFI:	Carbon Financial Instrument. The name of the carbon credit product bought and sold across the CCX. Each CFI represents 100 CO <sub>2</sub> e tons of verified reductions of GHG emissions.
Covered entities:	Entities regulated under a GHG cap-and-trade system.
CO <sub>2</sub> e:	Carbon Dioxide Equivalent. CO <sub>2</sub> e is the standard measurement for calculating the amount of emission reductions represented by one Allowance or Offset. The impact of all types of greenhouse gases is measured in terms of equivalency to the impact of carbon dioxide (CO <sub>2</sub> ). For example, one ton of emitted methane (CH <sub>4</sub> ) has 21 times the impact on climate change than CO <sub>2</sub> . One ton of methane reductions would be measured as 21 tons CO <sub>2</sub> e.
CRT:	Climate Reserve Ton. A carbon credit product generated by an Offset Project verified under CCAR's voluntary market standards.
Early Action Credit:	Verified emission reductions achieved by entities in anticipation of a mandatory carbon market. Entities invest in emission abatement or Offset projects with the hope that the U.S. government will recognize such investments for future compliance purposes.
Emissions registry:	A public or private database which shows the ownership of emissions Allowances or Offset credits in an applicable carbon market. Account balances can be viewed and transactions initiated online.
ERPA:	Emission Reduction Purchase Agreement. A spot or forward transaction that transfers some or all rights to any verified emissions reduction credits to another party.
EUAs:	European Union Allowances. An EUA is a tradable Allowance in the EU-ETS carbon market and represents a right to emit one ton of CO <sub>2</sub> e .
EU-ETS:	European Union Emission Trading Scheme. The EU-ETS is the world's largest mandatory carbon market. It was established to enable EU countries to meet their emissions reduction target commitments established under the Kyoto Protocol.
GHG:	Greenhouse Gas. GHGs refer to atmospheric gases that contribute to the greenhouse effect by trapping the heat of the sun in the Earth's atmosphere.
ICLEI:	International Council for Local Environmental Initiatives. An international association of local governments that have made a commitment to emissions reductions and sustainable development.



IPCC:	Intergovernmental Panel on Climate Change. An international panel established in 1988 to assess scientific and technical information related to all significant components contributing to climate change. IPCC represents scientists from 130 nations and is charged with informing and updating the UNFCCC on the latest scientific evidence.
Kyoto Protocol:	An internationally binding agreement which commits participating industrialized nations to achieve a five-percent reduction in their GHG emissions from 1990 levels by the year 2012.
Linkage:	Refers to the concept of connecting one or more carbon markets operating around the world to allow carbon credits generated under one program to be interchangeable with those generated under another.
NACWA:	National Association of Clean Water Agencies.
Offset:	Refers to project-based emissions reductions achieved outside of a market cap on GHG emissions.
Offset Credits:	Depending on the applicable rules of a carbon market, Offset credits can represent a right, interest, credit, entitlement, or benefit arising from or in connection with an eligible project's removal, limitation, reduction, avoidance, sequestration, or mitigation of GHG emissions compared to a calculable project baseline.
OTC Credits:	Over-The-Counter. Refers to voluntary Offset credits generated and sold independent from a regulated or exchange-traded carbon market.
PDD:	Project Design Documentation. Refers to the official application or template project materials and information that an entity must complete in order to register and validate Offset credits. PDD materials identify the project, identify the emissions baseline, explain the methodology used to calculate reductions, and outline monitoring and verification procedures.
POTW:	Publicly-owned treatment works. The term refers to any devices and systems used in the storage, treatment, recycling, and reclamation of municipal wastewater or industrial wastes. The term also can be used to refer to the municipality or agency which has jurisdiction over such devices and treatment system works.
RGGI:	Regional Greenhouse Gas Initiative. The RGGI is the first mandatory U.S. cap-and-trade program. It was established in December 2005 by seven Northeastern and Mid-Atlantic states. The RGGI program sets a cap on GHG emissions from electric power plants and allows covered entities to trade Allowances to lower compliance costs.
Third-party Verifier:	Refers to an independent entity that verifies a registered Offset project under a voluntary or mandatory verification standard. Such verification recognizes and authenticates that the Offset project has achieved the number of emissions reductions identified in the PDD materials.

UNFCC:	United Nations Framework Convention on Climate Change. Refers to the international convention that established the general structure for intergovernmental efforts to undertake the multilateral action to mitigate and adapt to the impact and effects of climate change.
VCS:	Voluntary Carbon Standard. Popular carbon market standard that allows Offset projects to generate Offset credits recognized in the industry as meeting stringent criteria for environmental integrity.
VCUs:	Voluntary Carbon Units. Refers to one Offset credit generated pursuant to the VCS and represents one ton CO <sub>2</sub> e of verified emissions reduction.
VERs:	“Verified” or “Voluntary” Emissions Reductions. Refers to the general name given to Offset credits generated and sold in the voluntary carbon market.
Verification:	Independent assurance that definite or anticipated emission reductions have been or will be achieved from an Offset project during a specified period.
WCI:	Western Climate Initiative. Refers to the collaboration of several western U.S. states and certain provinces of western Canada to find ways to work together to reduce greenhouse gases in the region.



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