Greenhouse Gas Emissions Allowances and Trading
In New Mexico

Draft Issues Paper – March 16, 2010

I Introduction

In Executive Order 2005-033, Governor Richardson set a goal of reducing emissions of greenhouse gases (GHG[1]) in New Mexico to 2000 levels by the year 2012, 10 percent below those levels by year 2020, and 75 percent below those levels by the year 2050. These reductions may occur through a variety of means, such as energy efficiency programs, incentives for renewable energy, reduced fuel use resulting from more fuel efficient vehicles and stationary engines, and/or through market-based initiatives such as a cap-and-trade program.

Cap-and-trade programs have historically been implemented to address air quality issues by harnessing market mechanisms to achieve emissions reductions at a lower cost to the overall economy.[2] By giving participants a financial incentive to control emissions and the flexibility to determine how and when emissions will be reduced, the capped level of emissions is achieved in a manner that minimizes the cost of emissions reductions. Emissions trading may occur across jurisdictional boundaries. The location of the emission reductions does not matter with respect to climate change. A GHG cap-and-trade program is environmentally effective because a ton of GHG emitted from one source has the same global warming effect as a ton emitted from any other source.

Regional cap-and-trade programs perform better than individual state programs because broader coverage minimizes the cost of the program. With more sources in the program there are greater opportunities for mutually beneficial transactions. For this reason, New Mexico will not implement a state cap-and-trade program unless there are sufficient North American trading partners to make the program efficient and cost-effective.

In February 2007, Governor Richardson joined the Governors of Arizona, California, Oregon, and Washington in signing a memorandum of understanding creating the Western Regional Climate Initiative (WCI). The States of Utah and Montana and the Provinces of British Columbia, Ontario, Quebec and Manitoba have since joined, and several additional states have become observers to the process. The primary objective of the WCI is to develop regional strategies to address climate change, including establishing a regional market-based emissions reduction program that covers a significant part of the regional economy. In Executive Order 2009-047, Governor Richardson mandated that "the New Mexico Environment Department (NMED) shall, in conjunction with the Governor's Office, continue to participate in the Western Climate Initiative to develop a regional greenhouse gas emissions reduction program that addresses the unique characteristics of New Mexico." Information, including the September

[1] A list of acronyms used in this paper is included at the end of the paper.
[2] Examples of cap-and-trade programs include, among others, the U.S. Acid Rain program, the Regional Greenhouse Gas Initiative (RGGI) in the eastern U.S., and the greenhouse gas Emissions Trading System in the European Union (EU ETS).

2008 Design Recommendations for the WCI Regional Cap-and-Trade Program, may be found at www.westernclimateinitiative.org.

The cap-and-trade program would apply to those portions of the state within the jurisdiction of the Environmental Improvement Board (EIB), which does not include Indian Lands or Bernalillo County[3]. All of New Mexico would of course be included in any GHG cap-and-trade program adopted at the federal level.

Due to uncertainty regarding the timing and content of requirements under future cap-and-trade programs, many GHG emitters have hesitated to implement emissions reductions, waiting to determine when or how such reductions would be credited under a state, regional, or federal program. The release of this issues paper is the first step toward providing more certainty by codifying the methods through which GHG emissions allowances issued in a state cap-and-trade program would be distributed to sources. NMED plans to file a petition before the EIB in the summer of 2010 to lay the groundwork for such a greenhouse gas cap-and-trade program.

The WCI conducted a regional economic analysis of projected GHG emissions reductions utilizing Energy 2020, an integrated multi-sector energy model. The modeling shows that the WCI region can meet its 2020 greenhouse gas emissions reduction target with a small net savings to the total regional economy. Savings are realized primarily through energy efficiency programs. An economic modeling analysis will be conducted specifically for the cap-and-trade proposal in the State of New Mexico.

II Opportunities for Comment During 2010 Rulemaking Process

As NMED develops plans for capping GHG emissions, and distributing and trading emissions allowances, there will be many opportunities for interested parties to provide comments and suggestions:

- Comments regarding the options and considerations outlined in this issues paper should be sent to NMED by March 29 to allow for inclusion of input in draft regulations.
- Draft regulatory language is scheduled to be released by April 30. Interested parties will be invited to comment on the draft language.
- NMED will meet with stakeholders to receive comments on the issues related to and language of the proposal.
- In June, NMED anticipates filing its proposed regulation and requesting that the EIB hold a hearing to consider the proposal. NMED anticipates requesting that the hearing be held in September.
- After the EIB sets a hearing date, the public notice of the hearing will be issued, starting a formal 60-day public comment period.
- The EIB will hold a public hearing at which any person may offer technical testimony (by filing a notice of intent) or non-technical testimony. Persons wishing to offer

[3] The jurisdiction of the EIB does not include Indian Lands or Bernalillo County. Indian Lands are currently under the jurisdiction of Regions 6 and 9 of the U.S. Environmental Protection Agency. Bernalillo County is under the jurisdiction of the Albuquerque-Bernalillo County Air Quality Control Board.

technical testimony are advised to consult the public notice for deadlines and requirements that relate to technical testimony.

Please make comments on this paper by opening the comment version at http://www.nmenv.state.nm.us/cc. If you are having difficulty submitting comments on this document in this online version, please contact Sandra Ely at (505) 827-0351.

III New Mexico Cap for Greenhouse Gases

Governor Richardson's emissions reduction goals apply to emissions across the state's economy. The Climate Change Advisory Group [4] acknowledged that meeting these goals would require a comprehensive effort when it forwarded 69 recommendations to the Governor for reducing GHG emissions from energy production, energy use in the residential, commercial and industrial sectors, as well as in agriculture, forestry, transportation and land use. More than 40 of these recommendations, as well as additional proposals, are being implemented to promote fuel and energy efficiency, clean energy production, and energy conservation. State participation in a cap-and-trade program supplements these efforts and was one of the original Advisory Group recommendations.

A cap-and-trade program generally applies only to specified emissions sources. An emissions cap is established to ensure that aggregate emissions from the specified sources do not exceed a limit. Sources reduce GHG emissions when it is technically feasible to do so at a reasonable cost, and sources that do not reduce emissions must purchase credits. The "cap" declines over time to ensure that overall aggregate emissions reductions are made. Sources included in a cap-and-trade program must be able to accurately and verifiably quantify emissions and emissions reductions to ensure the integrity of the cap.

The WCI Design document recommended an initial applicability threshold of 25,000 metric tons of carbon dioxide equivalents (CO_2e)[5] per year per source. Only sources that emit at or above the threshold, have adequate emission quantification methods, and are in the source categories subject to reporting under the WCI criteria would be under the cap[6]. While the emissions data reported to NMED under current rules is not intended to determine the applicability of a cap-and-trade program, this data indicates that when a cap-and-trade program begins, approximately 63 sources under EIB jurisdiction (owned by 26 companies or institutions) might emit greater

[4] The Climate Change Advisory Group (CCAG) was established by Executive Order 2005-033. The CCAG, a diverse group of stakeholders from across New Mexico, developed 69 recommendations over the course of a year and a half with technical support from five Technical Work Groups. Its final report was delivered to Governor Richardson in December of 2006. The CCAG Final Report may be found at http://www.nmclimatechange.us.

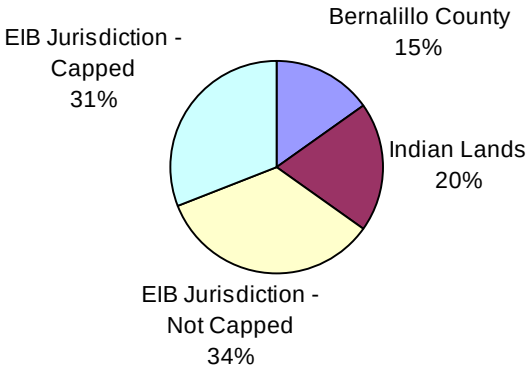
[5] The six gases included in the Kyoto Protocol were carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Emissions of these greenhouse gases are presented using a common metric, CO_2 equivalence (CO_2e), which indicates the relative contribution of each gas to global average radiative forcing by weighting them using the Global Warming Potential (GWP) established for each gas. For example, one ton of CO_2 is equal to one ton of CO_2e, and one ton of methane is equal to 21 tons of CO_2e.

[6] Source categories under consideration for inclusion in a cap-and-trade program and which operate within EIB's jurisdiction include stationary combustion, electricity generation, petroleum refineries, oil and natural gas systems, electronics manufacturing, coal storage, fuel distributors, and electricity imports.

than 25,000 metric tons of CO_2e. Of those sources, 10 are electricity generators (approximately two thirds of capped emissions), 46 are associated with the oil and gas industry (approximately one third of emissions), and 7 are in other sectors[7] (less than 2% of emissions). These estimates are based on emissions of CO_2 only. When data for methane emissions become available, NMED expects that more facilities from the oil and gas industry will meet the threshold of the program. These sources and emissions are listed in Table 1.

In New Mexico, approximately 65% of GHG emissions occur within EIB jurisdiction[3], 20% occur on Indian Lands (principally from one coal-fired power plant), and 15% occur within Bernalillo County[8]. Of the GHG emissions within EIB jurisdiction, approximately 47% are included under the cap.

GHG Emissions in New Mexico



Under a cap-and-trade program, a regulatory authority distributes (e.g., puts into circulation) a number of emissions allowances equal to the number of tons under the cap for each year. An emissions allowance refers to a limited authorization to emit one metric ton of GHG as CO_2e during a specified period of time. The allowances can be distributed to sources in the program through free allocation, sold (e.g., through an auction), or distributed through some combination of the two. Sources can also acquire valid allowances by purchasing them in the trading market or receiving them from another jurisdiction with a cap-and-trade program to which the state program is linked. Offsets (e.g., emissions reductions at sources that are not subject to a cap) that meet the criteria set out by the cap-and-trade program may also be used as allowances. Unused allowances may be banked (e.g., retained for future use) or sold. The allowance expires only when it is surrendered to a regulatory agency in order to meet requirements under a cap-and-trade program.

[7] The emissions from the 7 sources that are in other sectors result from large combustion equipment such as boilers.
[8] These estimates were derived from the Inventory of New Mexico Greenhouse Gas Emissions 2000-2007 and the Draft Albuquerque City-Wide and Bernalillo County Greenhouse Gas Emissions Inventory. Emissions on Indian Lands represent estimates from the Four Corners coal fired power plant, which is the predominant source of emissions on those lands.

The number of allowances in the cap at the start of the program is based on the initial universe of sources subject to the cap, which is in turn is based on applicability requirements such as source category and emissions threshold.[9] To assure the integrity of the program, the cap must be based on verified reports from capped sources. By the end of this year, NMED will propose regulatory changes to require verified reporting of GHG beginning with emissions that occur in 2011.

Once established, the cap will decrease each year. This decrease is based on the emissions reduction goal and desired emissions reduction trajectory (e.g., linear versus steeper in earlier years versus steeper in later years). Governor Richardson set goals for the years 2020 (10% below 2000 levels) and 2050 (75% below 2000 levels).[10] NMED proposes to use the 2020 goal and a linear annual reduction to establish the annual cap decrease.

Governor Richardson's goal for 2020 is based on emissions that occurred in the year 2000. Although emissions for 2000 may be estimated, the available data does not allow these emissions to be estimated with the level of certainty needed for cap setting. The 2007 update of New Mexico Greenhouse Gas Emissions indicates that emissions in the state remained essentially flat between 2000 and 2007. The data for the electricity sector, which has greater certainty and constitutes two thirds of capped emissions, also supports a general trend of flat emissions from 2000 to 2007. If this trend of flat emissions continues, then NMED will propose to use the verified 2011 emissions data for capped sources[11] as a surrogate for 2000 emissions in calculating the 2020 goal.

NMED seeks comments regarding the basis for the cap and the appropriate rate of cap reduction, which NMED currently anticipates will fall in the range of one to three percent per year.

The WCI Design Guidelines recommend that cap-and-trade programs use three compliance periods of three years each, beginning on January 1, 2012 and ending on December 31, 2020. Allowances are typically surrendered by sources at the end of each compliance period, although a cap-and-trade program may be structured to require annual surrender of allowances. For each three-year compliance period, a capped source must surrender a number of emission credits equal to its total GHG emissions during that period. If the source falls short of the required emission credits, it must surrender three times the shortfall of allowances. This approach ensures compliance by removing the economic benefit of noncompliance. Additionally, the affected source may be assessed a civil penalty.

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[9] The cap-and-trade program may later expand the cap to include, for example, additional source categories, smaller sources or additional GHGs. In the event that additional emissions are incorporated into the program in this way, the cap may increase to include those emissions.

[10] Governor Richardson's goal to reduce GHG applies to emissions across the economy. While other reduction measures are underway, conclusive data will not available as to how much actual emissions are reduced outside of capped sources until after such reductions take place. As a result, the percent reduction applied to the cap is the same as the economy-wide reduction goal.

[11] It may be possible for a source that has made early emissions reductions to calculate and verify emissions from an earlier year in accordance for the 2011 reporting requirements. In such a case NMED could consider using the earlier data for the baseline for that source.

In the following sections, this paper describes options available for distribution of emissions allowances and the criteria and overarching considerations by which options will be evaluated.

IV Criteria for Evaluation of Allowance Distribution Options

This paper discusses options for distributing allowances and setting baselines. NMED will use the following criteria to evaluate these options. It is important to note that if one takes into consideration all of these criteria, there are no simple options for implementing the program. This applies not only to the options considered in this paper, but also to alternative approaches for reducing GHG, such as carbon taxes. Readers of this paper are encouraged to suggest additional criteria and comment on those listed.

1. Fairness. To be fair, any advantage gained or lost by one group relative to another would only occur as needed to address the other criteria below. Environmental justice issues may also be considered under this criterion.

2. Environmental benefit. The primary environmental benefit being sought is a real and permanent reduction in GHG emissions. Emissions reductions are real if they are accurately measured, monitored and reported at sources covered by the cap-and-trade program. The transfer of activities that produce emissions from a capped to an uncapped source would not be a real emissions reduction, although emissions in the original location would be reduced (see the discussion of leakage below). Because GHG stay in the atmosphere for long periods of time, early reductions provide the additional benefit of slowing the buildup of these gases.

3. Economic stability. The flexibility in a cap-and-trade program can make it the least cost option for reducing greenhouse gas emissions. Sources that reduce emissions at lower costs may sell excess emission reductions (allowances) to sources with higher abatement costs. Cap-and-trade programs also may include specific cost containment measures such as emission offsets, banking provisions, and broad coverage. Each of the options under consideration has the potential to influence economic and operational decisions. As a result of energy efficiency programs, the economic modeling indicates that the WCI region can meet its GHG emissions reduction target with a small net savings to the total economy. On a microeconomic level, it is important to structure the program to avoid placing energy-intensive businesses at a competitive disadvantage relative to businesses outside the program area. Ultimately, the economic goal of a cap-and-trade program is to avoid economic disruption resulting from the potential impacts of climate change, such as exacerbated droughts, increased temperatures, and more frequent extreme weather events. Carbon markets also can stimulate the economy by promoting economic opportunities in clean energy technologies.

4. Fungibility of Allowances. Fungibility refers to the ability to trade allowances distributed in New Mexico with entities in other jurisdictions that have cap-and-trade programs. To provide fungibility, the mechanisms of each cap-and-trade program must satisfy mutually acceptable criteria. For example, these could include adequate reporting requirements, minimum stringency of emissions reduction targets, sufficient program integrity (e.g., use of verified data

and adequate enforcement), and compatible administrative factors such as timing of compliance periods and reporting platforms.

5. Administrative cost and efficiency. Implementation of the chosen options should be administratively efficient and avoid unreasonable and unnecessary costs. In addition to distribution of allowances, the administration of a cap-and-trade program would include, for example, the mechanisms and tools for trading and market oversight

V Overarching Considerations Related to Allowance Distribution

This section describes overarching considerations and specific issues related to the distribution options described below. Readers of this paper are encouraged to comment on these considerations and to suggest additional considerations.

In addition to the criteria listed in the previous section, the following considerations apply to all or most of the options:

1. Balancing predictability and flexibility. The system should allow sources to reasonably predict how many allowances they will receive in coming years. On the other hand, the system should be flexible to allow adjustments for future economic or technological trends or opportunities.

2. More than one option may be chosen. Distribution options may be considered individually or in combination. For example, in the EU ETS, a portion of the allowances are auctioned while the remaining allowances are distributed without charge (and unused allowances may then be sold by the recipient via the trading system). Distribution methods may also transition over time, such as when allowances are distributed without charge at the start of the program but an increasing percentage of allowances are auctioned in later years.

3. Adjustments within a limited pool of allowances. The cap determines the number of allowances available for distribution. Any distribution option that provides additional allowances to one source or sector necessarily leaves fewer allowances for other sources and sectors. Additionally, the pool of allowances will shrink with the decreasing overall cap. NMED seeks comments regarding the appropriate methods for determining the allocation of allowance shortages that occur.

4. Basing Decisions on Valid Data. The options allocate allowances on the basis of source-specific metrics, for example historical emissions, production, or fuel use. It is important that this data be valid and accurate. Over-allocation of allowances to sources due to inaccuracies in baseline data used to determine allocation may create unfair advantages. NMED anticipates that reported data will be third-party verified

5. Lag time. For many of the options, the distribution of allowances is determined at least in part by metrics (e.g., emissions, input, or output) related to the recipients activities. The metrics for any given year will not be available to the company or reported to NMED until

after that year has passed. As a result, a lag time would occur between the year that determines distribution of allowances, and the emissions year for which the source must surrender those allowances. In that case, sources may need to adjust by purchasing additional allowances, or banking or selling excess allowances. .

6. Competitiveness. The structure of a cap-and-trade program must minimize the competitive disadvantage created for capped sources relative to uncapped sources in the same sector, in another jurisdiction with a cap-and-trade program but free distribution of allowances, or in a jurisdiction without a cap-and-trade program.

7. Avoiding Emissions Leakage. The term leakage refers to the transfer of emissions-generating activities from a capped to an uncapped source. The new source may be located in a jurisdiction outside of the cap or at a source within the original jurisdiction but too small to trigger the cap requirement. Although the emissions at the original location would be reduced, total actual emissions would remain the same. Allowing leakage would be harmful to the environment and economically disadvantageous for sources subject to the cap. When considering how to distribute allowances, NMED will consider provisions that avoid and minimize leakage.

8. Establishment of set-asides. Some cap-and-trade programs set aside a portion of allowances for a variety of purposes, such as accommodating new entrants into the cap-and-trade program, providing incentives, or addressing spikes in the allowance price in the trading market.

9. Consideration of Predominant Sectors. As noted in a previous section, with a threshold of 25,000 metric tons CO_2e for sources, the distribution of emissions from capped sources within NMED jurisdiction would likely be about two-thirds electricity generators and about one-third oil and gas industry sources, with less than 2% of capped sources outside of those sectors. As a result, the unique characteristics of the electricity generation and oil and gas sectors must be taken into account in considering allowance distribution options. The electricity generation sector is predominantly comprised of large sources, many of which have been reporting CO_2 emissions to EPA for many years. The sector's GHG emissions are overwhelmingly CO_2 from the combustion of coal, natural gas and fuel oil (in that order). The EU ETS and RGGI have developed strategies to address this sector in the context of GHG cap-and-trade programs, and this experience can inform NMED's regulatory proposal. The oil and gas sector includes a variety of sources, from compressor stations consisting of one or more engines to large complex sources such as refineries and gas processing plants. The principal GHG from this sector is CO_2, usually as a result of the combustion of natural gas, field gas, or refinery fuel gas. CO_2 emissions also occur from the venting of CO_2 that is removed from coal-bed methane at gas treating facilities. Methane emissions, which are more difficult to quantify, can be significant in this sector.

10. Sector-specific Allocation Plans. In development of the National Allocation Plans for the EU ETS, a number of countries allocated allowances through a two-step process. First, the total pool of available allowances was divided between sectors based on pro rata shares, such as the percentages of national emissions associated with those sectors. Then

regulators worked with those sectors to determine the best allocation plan for the sources within each sector.

11. New Entrants into the Program. Over time, sources may start up or expand such that they meet the applicability requirements of the program. The choices made in distribution methods will determine whether and how such sources receive allowance allocations. Some programs set aside allowances for new entrants.

12. Avoiding windfall profits. The EU ETS experienced what has been called "windfall profits" to electric generators at the expense of electricity consumers. Those profits occurred in countries with deregulated electric power markets. In those countries, electric generators charged consumers for the value that their allowances would have earned if sold on the market (e.g., the opportunity cost), although the generators had received the allowances without charge. This is not anticipated to be an issue in New Mexico. In a regulated market, such as in New Mexico, the Public Regulations Commission determines what consumers pay and the Commission can prevent electric utilities from charging consumers for allowances they receive at no cost

VI Allowance Distribution Options

This section describes options for the distribution of allowances and related issues. Readers of this paper are encouraged to suggest additional options and comment on those listed.

Many of the following options may involve benchmarking, in which the number of allowances received by a source is based on the multiplication of the specific criteria by a benchmark. The benchmark is a predetermined factor that can be based on historical data from the facility or sector, or on specific engineering or technological criteria that apply to that source category or subcategory. For example, the SO_2 trading program used a benchmark of 2.5 pounds of SO_2/million British thermal units of heat input to establish allowance allocation. This benchmark was based on the New Source Performance Standard then in effect.

When the benchmark is determined by evaluating the GHG performance of similar facilities or operations in the same industrial sector, it can represent an industry standard or best practice. When a benchmark is based on the source's historical operations, it can serve as an incentive to increase efficiency. Setting separate benchmarks for different ways of producing the same product (e.g., producing electricity with coal or natural gas) may affect incentives to use the cleaner process. Different benchmarks may be set for new and existing sources.

Establishing benchmarks can allow allocation across a variety of source categories that would not be otherwise comparable. The most significant drawback to this approach is that benchmarks for most source categories have not yet been established, and their development may require significant time and resources.

1. Free Allowances with fixed allocation. Allowances are distributed based on activities (such as emissions) prior to the start of the program. Although the allowances

distributed to the source decrease with the cap, the distribution is independent of what the source or consumers do after the initial distribution schedule is established. For example, under a grandfathering approach such as the one used in the SO_2 trading program[12], allowances are given at no charge to sources based on fuel usage that occurred prior to the date on which the source would have anticipated the applicability of a cap-and-trade program, multiplied by a benchmark (see below). The sources continue to receive allowances (decreasing with the cap) even if they shut down.

An advantage to this approach is that once the allocation is established, sources know what they will receive in each future year and can plan accordingly. Administration of the distribution is relatively simple, once established. The ability to sell unused allowances provides an incentive to reduce emissions and may influence decisions to shut down higher-emitting sources. In addition, sources will know that they will receive a decreasing number of allowances.

A disadvantage to this approach is that it may be perceived as unfairly rewarding larger emitters with more (and continuing) allowances. Such an approach is also administratively rigid, with little provision for adjustments to respond to unexpected outcomes. If sources anticipate the cap-and-trade program, they can manipulate the allocation plan by artificially increasing emissions during the year(s) on which the allocation is based. This approach may create a disincentive for sources to reduce emissions prior to the beginning of the cap-and-trade program and create a competitive disadvantage for new sources, which would need to purchase allowances from existing sources.

2. Free allowances with updating of allocations. Allowances are distributed at no charge to a source based on the levels of specific criteria that occurred at the source in a previous period. The criteria, such as input, output or emissions, are further described below. Distribution updating occurs at regular intervals, such as annually or triennially. For example, using output as the updating metric, a generator's increase in the production of electricity would result in a future increase in the allowances distributed to the source, relative to the allowances that would have been distributed if production had remained the same. The calculation of allowances per unit of output or input is based on benchmarks, which are described below.

One advantage of this approach is that it provides increased flexibility to respond to unexpected outcomes. However, it also introduces uncertainty for sources regarding their future allowance allocations. Future allocations will be influenced not only by activities at the source, but also activities at other sources, due to overall adjustments that would be necessary to administer a limited pool of total allowances. If, for example, the allowances distributed to a source are significantly increased due to increased production, the sum total of allowances distributed to other sources must be decreased.

The method of updating allowances must carefully consider potential consequences. For example, the EU ETS structure created the unintended consequence of favoring new coal combustion over new natural gas combustion. Such an incentive would not meet the criteria of environmental benefit. As with each of the options, the details of the mechanism used to update allowances may influence future business decisions.

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[12] See http://www.epa.gov/airmarkets/trading/factsheet.html.

In the event that allowances are distributed to sources based in whole or in part on source-specific metrics such as input, output, or emissions, these metrics must be clearly established. Accurate metrics are necessary to assure the integrity of the cap-and-trade program. At the start of the EU ETS, overestimation of emissions resulted in the over-allocation of allowances, negating the incentive to reduce GHG emissions. Due to the importance of accurate data to the integrity of the program, it is standard practice for GHG cap-and-trade programs to require third party verification of data submittals. The metrics used for updating of allowances would be submitted by sources as part of metrics in annual emissions reports.

2a. Free allowances with output-based updating of allocation. Allowances are distributed at no charge to a source based on output during a set period multiplied by a benchmark (see above). For example, output may be the number of units manufactured or the megawatt-hours of electricity produced. This approach is also sometimes called output-based benchmarking.

This approach rewards increased production with more allowances, and by doing so minimizes the likelihood that the cost of the increased allowances will be passed on to customers. After output-based updating occurs, sources that have shut down no longer receive allowances. New sources are given allowances once production is established. By rewarding increased production, this approach provides an incentive for increasing output and thus supports economic growth and reduces emissions leakage by encouraging production to remain within the capped area. Because unneeded allowances can be banked or sold, it also provides an incentive for sources to reduce the emissions intensity of production (GHG emissions per unit produced). On the other hand, if source-specific benchmarks are based on the historical emissions and output of each source, the sources that were historically less efficient are rewarded to the disadvantage of sources that have been more efficient.

For example, in the electricity generation sector, output-based updating could be linked to the megawatt-hours of electricity produced. Specific output-based benchmarks may be established to accommodate variation within a sector, such as electricity production using different fuels. In either case, this approach would provide incentives for increased production per unit of emissions. In the oil and gas sector, the greater number and variation of processes used would make development of output-based benchmarks very difficult.

2b. Free allowances with input-based updating of allocation. Allowances are distributed at no charge to a source based on the input of materials (such as consumption of raw materials, electricity, and/or fuel) at the source during a set period, multiplied by a benchmark (see above). Because the input of materials and energy is linked to output of product, this approach carries many of the same advantages and disadvantages as output-based updating. Both provide an incentive for increased efficiency at a source. However, because the vast majority of emissions from most sources in New Mexico are the result of fuel consumption, benchmarks based on fuel efficiency for specific fuels may allow the same benchmark to apply equally to a broad spectrum of sources that use the same fuel. In addition, the potential fuel efficiencies for fuels are well known (although some exceptions may exist, such as refinery gas).

In jurisdictions with sources that require large amounts of electricity as part of their process (such as steel production), providing allowances based on electricity input may offset cap-and-trade related costs passed on by the electricity producer. In New Mexico, however, this problem is not expected to be significant because indirect emissions from purchased electricity are only a small portion of the total industrial GHG emissions.

With regards to the input of raw materials, two sectors could have significant quantifiable process emissions that require additional consideration: gas treatment of coal-bed methane (CBM), and cement manufacturing. When CBM is produced, it can contain a significant amount of entrained CO_2 (approximately 10%). As a result, CBM plants can release significant amounts of non-combustion CO_2. In cement manufacture, large amounts of non-combustion CO_2 are release from limestone calcination. However, the only cement manufacturer in the state is located in Bernalillo County, outside the EIB's jurisdiction.

2c. Free allowances with emissions-based updating of allocation. Allowances are distributed at no charge to a source based solely on its emissions level during a set time. This approach accommodates new sources of emissions (once emissions are established), and reduces the economic impacts of the cap-and-trade program on sources that increase emissions. However, this approach also rewards sources for producing more GHG emissions, undermining the fundamental purpose of the cap-and-trade program.

3. Auctioning allowances. NMED is not proposing this option, which requires sources to purchase needed allowances from the trading market. Auction proceeds are distributed for a variety of purposes, including reducing GHG through complementary programs. Few cap-and-trade programs initiate their program through auctioning, although many programs include auctioning for some allowances and anticipate phasing in auctions.

While auctioning 100% of the allowances under a cap-and-trade program may initially appear simple, the process of determining a fair and environmentally beneficial distribution of the proceeds could be as complex as implementing any of the other options. In addition, NMED would have to develop the appropriate administrative structure. The trading market establishes a price for allowances, which informs the secondary market, thereby allowing the exchange of allowances between sources. The auction process has the advantage of being transparent and treating new entrants and modifications of existing sources the same as non-modifying existing sources. In addition, auctioning provides a direct incentive to reduce emissions because fewer allowances must be purchased.

VIII. Acronyms Used in This Paper

CBM	Coal-bed Methane
CCAG	Climate Change Advisory Group
CH_4	Methane
CO_2	Carbon Dioxide
CO_2e	Carbon dioxide Equivalents
EIB	Environmental Improvement Board
EU ETS	Emissions Trading System in the European Union
GHG	Greenhouse Gases
GWP	Global Warming Potential
HFCs	Hydroflourocarbons
N_2O	Nitrous Oxide
NMED	New Mexico Environment Department
PFCs	Perflourocarbons
RGGI	Regional Greenhouse Gas Initiative
SF_6	Sulfur Hexaflouride
SO_2	Sulfur Dioxide
WCI	Western Regional Climate Initiative

Table 1. Year 2008 carbon dioxide emissions reported to the New Mexico Air Quality Bureau as required by regulations 20.2.73 NMAC and 20.2.87 NMAC. This table includes only sources that reported emissions of 25,000 metric tons or more. Smaller sources that are not included here accounted for less than 4% of reported emissions.

Owner/Operator and Facility	CO_2 Emissions* (thousand metric tons)	Percent of Total
Electricity Generation		
Public Service Co of NM		51.53%
San Juan Generating Station	10,797.5	
Luna Energy Facility	905.8	
Afton Generating Station	329.2	
Lordsburg Generating Station	29.9	
Tri -State Generating		7.50%
Prewitt Escalante Generating Station	1,755.1	
Xcel Energy		5.09%
Cunningham Station	881.4	
Maddox Station	310.0	
El Paso Electric		1.97%
Rio Grande Generating Station	461.7	
City of Farmington		0.85%
Bluffview Power Plant	135.7	
Animas Plant	63.1	
Oil and Gas		
Williams Four Corners		9.20%
Milagro Cogeneration and Gas Plant	1,500.5	
Kutz Gas Plant	141.2	
El Cedro Gas Plant	100.5	
La Jara Compressor Station	82.2	
Lybrook Gas Plant	58.6	
Dogie Canyon Compressor Station	42.5	
32-8 No2 CDP Compressor Station	40.9	
32-7 CDP Compressor Station	40.3	
Trunk L Compressor Station	37.2	
Laguna Seca Compressor Station	29.8	
Chaco Compressor Station	26.3	
Cedar Hill Compressor Station	25.7	
Middle Mesa CDP Compressor Station	27.8	

Owner/Operator and Facility	CO_2 Emissions* (thousand metric tons)	Percent of Total
TEPPCO NGL Pipeline LLC		6.23%
Val Verde Treater	1,340.2	
Pump Canyon Compressor Station	41.7	
Frances Mesa Compressor Station	30.5	
Gobernador/Manzanares Compressor Station	44.9	
Enterprise Field Services LLC		3.16%
Chaco Gas Plant	395.3	
Blanco Compressor C and D Station	263.5	
Rattlesnake Canyon Compressor Station	47.0	
South Carlsbad Compressor Station	32.9	
Navajo Refining		3.07%
Navajo Refining - Artesia Refinery	624.2	
Lovington Refinery	93.8	
Versado Gas Processors, LLC		1.68%
Targa - Eunice Gas Plant	187.8	
Monument Gas Plant	96.4	
Saunders Gas Plant	67.0	
North Eunice Compressor Station	42.5	
DCP Midstream		1.61%
Artesia Gas Plant	66.1	
Eunice Gas Plant	146.1	
Linam Ranch Gas Plant	164.2	
Western Refining		1.57%
Ciniza Refinery	264.5	
Bloomfield Refinery	103.5	
Conoco Phillips		1.48%
San Juan Gas Plant	244.1	
East Vacuum Liquid Recovery	65.4	
Wingate Fractionation Plant	36.8	
El Paso Natural Gas		1.30%
Lordsburg Compressor Station	61.3	
Florida Compressor Station	45.8	
Eunice A Compressor Station	41.5	
Monument Compressor Station	38.6	
Afton Compressor Station	35.0	
Pecos River Compressor Station	81.1	

Owner/Operator and Facility	CO_2 Emissions* (thousand metric tons)	Percent of Total
Southern Union Gas Limited Jal No3 Gas Plant	226.8	0.97%
OXY USA WTP Limited Partnership Indian Basin Gas Plant	111.3	0.48%
Intrepid Potash New Mexico LLC East KCl Compaction	106.6	0.46%
Freeport-McMoRan Chino Mines Co Chino Mine - Hurley Facility	87.8	0.38%
Davis Gas Processing Denton Gas Plant	64.3	0.27%
Western Gas Resources San Juan River Gas Plant	62.1	0.27%
Mosaic Potash Carlsbad Inc Mosaic Potash Carlsbad Inc	43.6	0.19%
Frontier Field Services LLC Empire Abo Gas Plant	40.6	0.17%
Other		
DairiConcepts LLC Portales	50.7	0.22%
American Gypsum Bernalillo (Wallboard) Plant	32.1	0.14%
US DOE Los Alamos National Laboratory	31.2	0.13%
State of New Mexico New Mexico State University Campus	26.8	0.11%
Total from sources ≥ 25K metric tons	23,408.9	100.00%

*Methane emissions were not required to be reported for the 2008 emissions year. Vented CO_2 emissions from some gas treatment and processing plants may be underestimated.