

## **CALIFORNIA AIR RESOURCES BOARD (ARB)**

Assembly Bill 32 Program Design Technical Stakeholder Working Group Meeting

April 25, 2008  
1:30 p.m. - 5:00 p.m.

Sierra Hearing Room  
2<sup>nd</sup> floor of the California Environmental Protection Agency (CalEPA)  
Headquarters Building  
1001 "I" Street, Sacramento, California

Note: The Sierra Hearing Room at CalEPA Headquarters has limited seating. The meeting will be webcast (<http://www.calepa.ca.gov/broadcast/>) and open to real-time questions via e-mail ([ccplan@arb.ca.gov](mailto:ccplan@arb.ca.gov)).

This is another in an ongoing series of program design technical stakeholder meetings. These meetings are being conducted to provide interested stakeholders the opportunity to provide specific technical input concerning various elements of the program design that may become part of the Assembly Bill (AB) 32 Scoping Plan. The attached white paper is also intended to provide background on the cost containment issues that will be discussed.

### **AGENDA**

- A. Opening Remarks
- B. Air Resources Board (ARB) Staff Presentation: "Cost Containment in a Greenhouse Gas Cap-and-Trade System"
- C. Round-Table Discussion on Cost Containment

If a cap and trade program is implemented:

1. What type of cost containment mechanisms should California consider for a potential cap-and-trade system?
2. Is there a need to establish an independent market oversight body?
3. Which systems should be considered for linkage with a potential California cap-and-trade system?

Written comments and responses are welcome. Please submit your comments to [ccplan@arb.ca.gov](mailto:ccplan@arb.ca.gov) by May 9, 2008.

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### **FRAMEWORK FOR DISCUSSION**

#### **Overview**

This paper provides background for the April 25, 2008 program design technical stakeholder meeting. These meetings provide interested stakeholders the opportunity to provide specific technical input concerning various elements of a cap-and-trade system for possible inclusion in the Scoping Plan. AB 32 includes specific criteria that ARB must consider before using market-based measures to implement AB 32, and ARB will evaluate a possible cap-and-trade system against those criteria before deciding whether to include such a system in the Scoping Plan.

The April 25, 2008 meeting will focus on “cost containment,” which can be broadly defined as the ability of regulators to influence the allowance price within a cap-and-trade system, both through program design choices and through active market intervention. In this context “cost” refers to the cost to regulated facilities. Staff recognizes that there are a variety of other costs associated with greenhouse gas reduction programs that also need to be considered in program design. A variety of cost containment tools are available to regulators but ARB has structured this meeting around three primary questions related to this topic:

- What type of cost containment mechanisms should California consider for a potential cap-and-trade system?
- Is there a need to establish an independent market oversight body?
- Which systems should be considered for linkage with a potential California cap-and-trade system?

#### **Background**

*The Goal of Cost Containment Tools: Ensuring Environmental and Economic Performance*

The interest in cost containment arises from the belief that an excessively wide range in allowance price or sudden sharp changes in allowance price (volatility) could be economically disruptive in the short term. The cost containment measures discussed in this paper are designed to address one or both of these issues.

In the long term, tightening the cap (i.e. reducing the supply of allowances) will lead to higher allowance prices. The prospect that continued greenhouse gas (GHG) emissions will carry a high cost in the future is likely to force investment decisions in the direction of a low-carbon economy. Therefore, although many cost containment tools can influence allowance price in the long term, the goal of cost containment measures should not be to prevent a steady increase in allowance prices over time.

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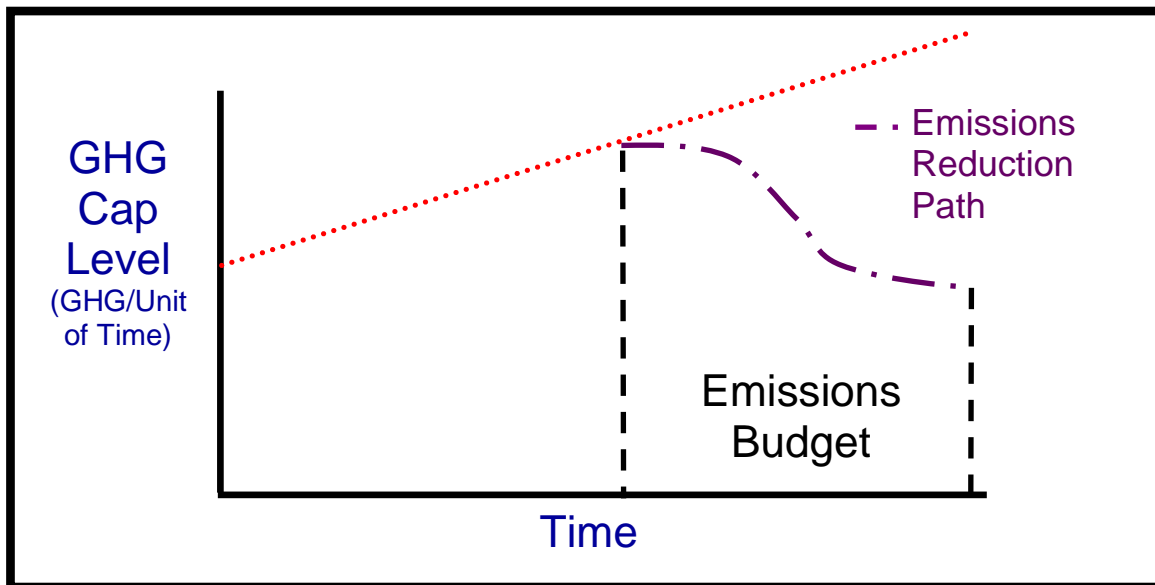
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### *Relationship between how the Cap is Set and the Need for Cost Containment*

The cap represents the total GHG emissions permitted from all sources in the cap-and-trade system during a given compliance period. Stringency of cap levels strongly affects what allowance price will prevail in a cap-and-trade system and, therefore, the need for cost containment options.

The first compliance period of a California cap-and-trade system would likely begin in 2012. The initial cap level could be set aggressively to incent early reductions or could be set more leniently to provide a gentle transition into the program. Similarly, the level of the cap for the compliance period that ends in 2020 is critical—at the end of this period the emission levels from the capped sources must reach the target for these sources in order to ensure the broader economy-wide target is met<sup>1</sup>.

The way in which the cap declines determines the rate at which greenhouse gases can be emitted from covered sources during a given period. This decline will be referred to as the “emission reduction path”. The area under the path curve represents the total amount of emissions which occur and can be referred to as the “emissions budget” (see Figure 1).



**Figure 1.** The emissions budget is equal to the area under the curve of the emissions reduction path.

<sup>1</sup> The target for the sources covered by a cap-and-trade system would be a portion of California’s economy wide 2020 emissions target of 427 million metric tonnes of CO<sub>2</sub>e.

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An infinite number of possible emission budgets—varying from lenient to stringent—could be conceived for a given 2020 target for capped sources<sup>2</sup>. More importantly, multiple potential emission reduction paths exist with the same emission budget. Cost containment mechanisms can involve changes in the aggressiveness of the overall emissions budget, manipulation of the reduction path by which that budget is spent, or a combination of these tools.

#### **What type of cost containment mechanisms should California consider for a potential cap-and-trade system?**

A number of possible cost containment mechanisms are described below. Comments are welcome on the role any of these might play in California, and on whether there are other mechanisms not described here that should be considered.

##### *Length of the Compliance Period*

Expanding the length of the compliance period can help smooth volatility related to annual variations (e.g., low availability of hydroelectric electricity in dry years). The flexibility added by increasing the length of the compliance period may be especially valuable in the earlier years of the system when a bank of allowances has not yet been established.

##### *Banking and Borrowing*

Banking involves saving allowances from the current compliance period for use in future periods. Borrowing involves permitting allowances from future compliance periods to be used in the current period. If both banking and borrowing are allowed, market participants can effectively trade between compliance periods. This inter-temporal trading provides flexibility as to the timing of emission reductions to firms which should help reduce volatility in the allowance prices.

Banking creates an incentive to make early reductions and encourages long-term commitment to the system from stakeholders. In contrast, borrowing may create the incentive for firms which run up a heavy allowance debt to lobby for the cessation of the system.

##### *Price Triggers*

The basic concept of using a price trigger for cost containment is that when allowance prices reach a predetermined value, market intervention occurs in some specified fashion. The primary tools which could be made available to market regulators to implement these triggers include the ability to buy allowances, issue additional

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<sup>2</sup> For this discussion, environmental harm from greenhouse gas emissions will be assumed to be proportional to the total amount of emissions released to the atmosphere regardless of exactly when the emissions occur during the eight year period (2012-2020). Over a longer time period the timing of reductions may need to be considered, with earlier reductions preferable from an environmental standpoint.

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allowances, or allow a variable amount of offsets to be used to meet compliance obligations<sup>3</sup>.

Offset triggers were heavily debated during the program design phase of the Regional Greenhouse Gas Initiative (RGGI)<sup>4</sup>. An offset trigger functions by reducing or increasing the quantitative or geographic limit placed on the use of offsets for compliance in a cap-and-trade system, increasing or decreasing this limit, once allowance prices reach a given level, will alter the price of allowances.

Alternatively, the allowance price could be affected by regulators purchasing or selling allowances in an attempt to create or reduce scarcity. A distinction between the various trigger options available, which involve directly purchasing or selling allowances, can be made relating to the desire to maintain the overall emissions budget. For example, to relieve undesirably high allowance prices regulators could offer allowances from future periods for sale in the current period, and maintain the overall emissions budget<sup>5</sup>. Alternatively, regulators could generate additional allowances to be offered for sale, thus inflating the overall emissions budget.

#### **Is there a need to establish an independent market oversight body?**

The cost containment mechanisms discussed above can have dramatic impacts on allowance prices and the overall functioning of the cap-and-trade system. This high level of potential impact highlights the importance of the individuals making the decisions as to “when” and “how” these tools should be employed.

Static rules governing the use of these tools would likely lack flexibility and may create unintended consequences<sup>6</sup>. A more dynamic option to ensure the proper use of these tools would be to establish an independent oversight board to selectively and proactively use the cost containment mechanisms to manage carbon market efficiency and transparency.

This board could be modeled after the Federal Reserve and be tasked with controlling the allowance budget in such a way as to balance environmental and economic goals. Other potential duties related to cost containment could include: collecting and analyzing market information and reporting to the public and to policymakers on the

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<sup>3</sup> These basic tools provide the foundation for a broad range of mechanisms. At times more precise vocabulary is used to differentiate these mechanisms (e.g., price ceiling/safety valve, price floor, accelerator, circuit breaker, etc). A detailed discussion of all the permutations possible is beyond the scope of this paper. See the work of William A. Pizer for the origin of this discussion:  
<http://www.rff.org/Documents/RFF-DP-98-02.pdf>

<sup>4</sup> Offsets are in of themselves a cost containment mechanism. Due to the complex nature of the topic of offsets this subject was treated in a separate discussion at the April 4 Program Design Stakeholder Technical Workgroup. A white paper and presentation associate with that meeting are available from:  
<http://www.arb.ca.gov/cc/scopingplan/pgmdesign-sp/meetings/meetings.htm>

<sup>5</sup> This may also be thought of a price trigger creating a specific type of borrowing.

<sup>6</sup> For example, price triggers set statically around a certain price may cause the market to gravitate toward that price.

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functioning of the market. The proper release of in-depth information from a reliable source could strongly influence trends in allowance price. This independent body has been given different names by various proponents of the concept such as the “Carbon Market Efficiency Board” or the “California Carbon Trust”<sup>7</sup>.

#### **Which systems should be considered for linkage with a potential California cap-and-trade system?**

The concept of “linkage” involves integrating one emissions trading system with one or more other systems around the world. To accomplish this in California, ARB could choose to accept allowances or offset credits issued by other trading systems. Advantages of linkage associated with cost containment could include further potential for lower cost abatement options, reduced concerns about market power, and reduced price volatility. However, linking with other systems may imply some loss of control over allowance price by regulators and could result in a reduced potential for achieving co-benefits associated with greenhouse gas reductions occurring within California.

Linkage to other markets is only advisable if the designs of the markets are compatible and linked markets should ideally embed mutually acceptable levels of mitigation requirements. The inclusion of some cost containment tools in California’s system designs may influence the feasibility of linking with other systems. For example, the implementation of a price trigger by regulators in one system would affect allowance prices in all linked system.

Several types of linkage are possible. In the simplest case one trading system could allow allowances from other systems to be used for compliance without an expectation of reciprocal treatment (unilateral linkage). Alternatively, a bilateral agreement could be reached between two governments to enable allowances from both trading systems to be used interchangeably. These are both examples of “direct linkages”.

It is important to recognize that “indirect” linkages may also exist—market dynamics in one system may impact market dynamics in another system if both share direct links with a common third system. The variety of potential linkages is best illustrated by the following specific examples:

- California could directly link, unilaterally, with the European Union’s Emission Trading Scheme (EU ETS) by accepting European Union Allowances (EUAs) for compliance in the California system.
- California could indirectly link with EU ETS through the Clean Development Mechanism by accepting Certified Emissions Reductions (CERs) offset credits for compliance in the California system.

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<sup>7</sup> This concept was initially proposed by the Nicholas Institute for Environmental Policy Solutions at Duke University and has been incorporated into federal climate change legislation. See: <http://www.nicholas.duke.edu/institute/carboncosts/carboncosts.pdf>. The Economic and Technical Advancement Advisory Committee (ETAAC) has included a California Carbon Trust that would function along these lines among its recommendations. This recommendation is discussed below.

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- California's participation in the Western Climate Initiative (WCI) would likely involve identical allowances being used for compliance in all WCI partner jurisdictions. This is equivalent to direct bilateral linkage between each pair of WCI partners.

## **SUMMARY OF RELATED ACTIVITIES, RECOMMENDATIONS TO ARB AND PRECEDENTS**

### **Related Activities:**

#### *The Western Climate Initiative*

The Western Climate Initiative is a collaboration which was launched in February 2007 by the Governors of Arizona, California, New Mexico, Oregon and Washington to develop regional strategies to address climate change. Since the inception of the program five additional partner jurisdictions have joined the system<sup>8</sup>. WCI is identifying and evaluating collective and cooperative ways to reduce greenhouse gases in the region. ARB staff and other representatives from California serve on the subcommittees of WCI and are closely involved in the development of this process.

The WCI has recently released draft recommendations on a variety of topics for public comment<sup>9</sup>. With respect to cost containment these documents recommend banking but no borrowing, three year compliance periods with a provision for a special start-up compliance period and establishment of a regional entity to monitor and report on market activities.

### **Recommendations to the California Air Resources Board (ARB):**

#### *Market Advisory Committee*

The Market Advisory Committee (MAC) was formed December 20, 2006 by California Secretary for Environmental Protection Linda Adams and delivered its report to ARB June 30, 2007<sup>10</sup>. The report includes recommendations on many aspects of the design of a cap-and-trade system.

The MAC recommended full banking, no borrowing and compliance periods of approximately three years. A safety valve price trigger which removed the certainty of the cap (price ceiling) was not recommended; however, the committee encouraged ARB to consider enforcing a price floor. Linkages with other mandatory GHG trading

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<sup>8</sup> The WCI Partners are Arizona, California, New Mexico, Oregon, Washington, Montana and Utah, as well as British Columbia, Quebec and Manitoba.

<sup>9</sup> Western Climate Initiative, "Draft Allocation Design Recommendation." April 2, 2008. Available from: [http://www.westernclimateinitiative.org/WCI\\_Documents.cfm](http://www.westernclimateinitiative.org/WCI_Documents.cfm)

<sup>10</sup> Market Advisory Committee, "Recommendations for Designing a Greenhouse Gas Cap-and-Trade System for California," June 30, 2007. Available from: [http://www.climatechange.ca.gov/documents/2007-06-29\\_MAC\\_FINAL\\_REPORT.PDF](http://www.climatechange.ca.gov/documents/2007-06-29_MAC_FINAL_REPORT.PDF)

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systems, including Regional Greenhouse Gas Initiative (RGGI) and the EU ETS were encouraged.

#### *Economic and Technology Advancement Advisory Committee (ETAAC)*

The California Global Warming Solutions Act of 2006 (also known as AB 32) required the establishment of the ETAAC, which delivered its final report February 11, 2008<sup>11</sup>. In Section 9 it responds to the MAC recommendations.

ETAAC recommends the establishment of a California Carbon Trust. The Trust would fund reductions in emissions, environmental justice goals, and California university research, development, and demonstration of low-emission technologies. With respect to cost containment, the Trust is envisioned to act as a “market maker,” smoothing out volatility in the market by buying allowances when prices drop and selling them if prices rise. This active market maker is preferred by the ETAAC to a rigid price trigger such as a safety valve.

The ETAAC report supports banking with the caveat that a large bank established in earlier years could potentially reduce the incentive to innovate in later periods. With regards to borrowing, some ETAAC members felt that limited borrowing might be necessary in order to encourage long-term investments.

#### **Precedents:**

##### *European Union Emission Trading Scheme (EU ETS)*

The EU ETS was established as part of the European Union member states’ strategy for compliance with the Kyoto Protocol. Trading is planned for three phases: Phase I, which ran from 2005–2007; Phase II, which began January 1, 2008, and runs to 2012; and Phase III, which will run from 2013–2020.

No banking was permitted between Phase I and Phase II of the program. This fact, coupled with the sudden realization by the market that there was an over-allocation of Phase I allowances led to a sharp decline in Phase I allowance prices in April 2006. Phase II allows unlimited banking (through Phase III) but no borrowing.

##### *Regional Greenhouse Gas Initiative (RGGI)*

RGGI is a collaboration of ten Northeastern states to create a regional cap-and-trade system for carbon dioxide (CO<sub>2</sub>) emissions from the electricity sector. Compliance is scheduled to start in 2009. RGGI will begin with three year compliance periods and banking but no borrowing<sup>12</sup>. The RGGI Model Rule, a template for state implementation

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<sup>11</sup> Economic and Technology Advancement Advisory Committee, “Economic and Technology Advancement Advisory Committee (ETAAC) Final Report: Technologies and Policies to Consider for Reducing Greenhouse Gas Emissions in California,” February 11, 2008. Available from: <http://www.arb.ca.gov/cc/etaac/ETAACFinalReport2-11-08.pdf>

<sup>12</sup> “Regional Greenhouse Gas Initiative Model Rule” January 5, 2007. Available from: [http://www.rggi.org/docs/model\\_rule\\_corrected\\_1\\_5\\_07.pdf](http://www.rggi.org/docs/model_rule_corrected_1_5_07.pdf)



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of the system, also sets the following fixed price triggers which create linkages if activated:

- If the twelve-month rolling average allowance price rises above \$7 per short ton:
  - Sources will be allowed to cover up to 5 percent of their emissions using domestic offsets<sup>13</sup>. This is an increase from the initial limit of 3.3 percent.
- If the twelve-month rolling average allowance price rises above \$10 per short ton:
  - Sources will be allowed to cover up to 10 percent of their emissions with offsets.
  - The geographic limit on offsets will be relaxed. Offset projects outside the United States including the Kyoto Protocol's Clean Development Mechanism CERs will be permitted for compliance purposes. Allowances from the EU Emissions Trading Scheme and similarly rigorous future systems will also be permitted for compliance purposes.
  - The compliance period will be extended by one year, for a maximum compliance period of four years.

#### *Regional Clean Air Incentives Market (RECLAIM)*

The California South Coast Air Quality Management District established the RECLAIM cap-and-trade system in 1993 to reduce oxides of nitrogen (NO<sub>x</sub>) and sulfur dioxide (SO<sub>2</sub>) pollution. RECLAIM has restricted banking, does not allow borrowing, and has a one year compliance period.

#### *Acid Rain Program*

The Acid Rain Program is a United States cap-and-trade system for SO<sub>2</sub> emissions from fossil fuel burning electricity generators. It was established by the U.S. Environmental Protection Agency under Title IV of the 1990 Clean Air Act Amendments. The system allows banking but no borrowing, has one-year compliance periods, and does not use price triggers. Banking is often credited for much of the early reductions which occurred in this system.

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<sup>13</sup> This is an example of an offset trigger. Domestic offsets include offsets from the RGGI region or from any other U.S. state with a memorandum of understanding with the RGGI states.

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### **GLOSSARY OF TERMS**

#### **Allocation**

“Allocation” is how the program administrator distributes the allowances. Each allowance has a value, which depends on the supply and demand of allowances. In order to achieve emission reductions, the number of allowances issued is usually reduced over time. These allowances can be distributed by various methods including auctioning, benchmarking, and grandfathering.

#### **Allowance**

In a cap-and-trade system an “allowance” is a permit to emit a certain amount of pollution; in California’s discussions of greenhouse gases, one allowance would be equal to one metric tonne of carbon dioxide equivalent (CO<sub>2</sub>e).

#### **Cap**

The number of allowances issued within a cap-and-trade system equals the total permitted level of emissions and is referred to as the “cap.” The cap declines over time to reach a desired emissions target.

#### **Compliance Period**

A “compliance period” is a length of time for which a regulated entities emissions must match the number of allowances surrendered.