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APPENDIX J
ALLOWANCE ALLOCATION

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Appendix J
Allowance Allocation

A. Introduction

The cap-and-trade program will create a system of tradable allowances. An essential component of the program design is deciding how to place these allowances into circulation so they can be acquired by those who will need to use them for compliance.

Traditionally, cap-and-trade programs have favored freely allocating allowances to the covered entities, often on a basis determined by the historical emissions levels of the covered sources. More recently alternative allocation systems, such as auctioning of the allowances by the program authority or freely allocating on the basis of emissions efficiency benchmarks, have gained in popularity for a variety of reasons.[1]

This Appendix provides the details of the allowance allocation method in the proposed regulation. Section B establishes theoretical concepts relevant to understanding staff's proposed allocation approach. Section C contains the rationale and justification for distributing allowance value to the various uses identified in Subarticle 8 of the proposed regulation. Section D expands upon how covered entities are expected to receive allowances under the allowance allocation framework contained in Subarticle 9 of the regulation. The details of how allowances will be auctioned—contained in Subarticle 10 of the regulation—are examined in Section E. The appendix concludes by summarizing stakeholder comments and recommendations to ARB on allowance allocation issues in Section F.

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[1] This appendix focuses on the California Air Resources Board's (ARB's) proposed allocation approach and only briefly touches on the spectrum of theoretical options for allowance allocation. For more complete treatment of the trade-offs between various allocation strategies see the following references:

Assessing U.S. Climate Policy Options: Issue Brief #6 – Allowance Allocations, Resources for the Future, Raymond J. Kopp, November 2007 http://www.rff.org/Publications/Pages/CPF_AssessingUSClimatePolicyOptions_IB6.aspx (accessed 10/10/10) and

Allocation and Related Issues for Post-2012 Phases of the EU ETS, NERA Economic Consulting for the European Commission, October 2007 http://ec.europa.eu/environment/climat/pdf/post_2012_allocation_nera.pdf (accessed 10/10/10)

B. Allowance Allocation: Background Concepts

1. Allowance Value

Because the allowances in the cap-and-trade system are intended to be bought and sold they are inherently valuable. Whether ARB initially distributes these instruments free of charge, through sale at an auction, or via some other mechanism, design of the program involves fundamental decisions of how best to allocate the value embodied in the allowances.[2]

Estimating total allowance value requires knowledge of how the aggregate emissions cap and sources of emissions reductions jointly determine the allowance price. Figure J-1 illustrates this relationship using a stylized representation of California's emissions market.[3] Allowance price is on the vertical axis and emissions are on the horizontal axis. The curve from the lower right to the upper left section of the figure is a marginal abatement cost (MAC) curve.[4] The point where the MAC curve intersects the emissions (horizontal) axis is the unconstrained emissions level. Marginal abatement cost increases as a greater amount of emissions are reduced.

The dashed, vertical line is the aggregate emissions cap. The line segment on the emissions axis between the unconstrained emissions level and the aggregate emissions cap represents the required emissions abatement from business-as-usual emissions levels. The dashed, horizontal line corresponds to the market price for allowances (p). Total abatement costs are represented by the area under the MAC curve between the pre-constrained emission levels to the cap level.

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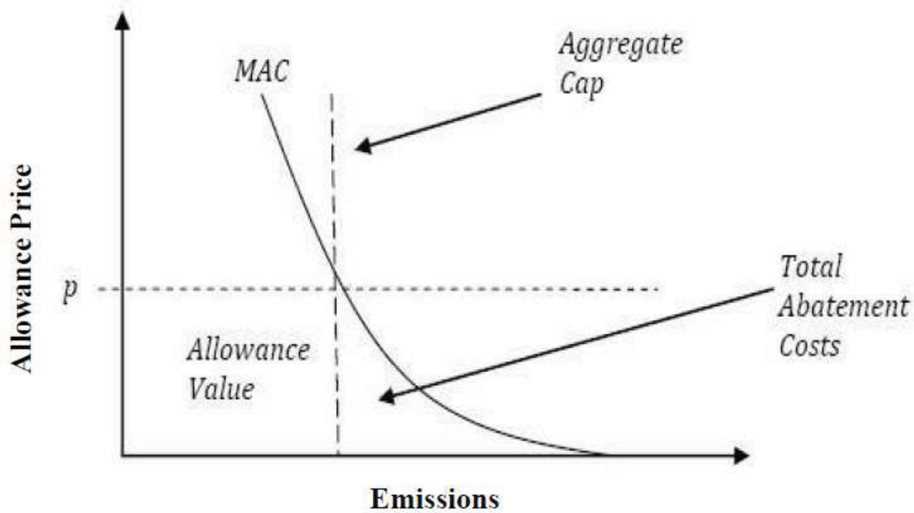
[2] To recognize this concept, the term "allowance value" is used to generically describe decisions related to distributing either allowances directly or the proceeds resulting from the sale of allowances at auction.

[3] Figure J-1 comes from the report *Allocating Allowances Under a California Cap-and-Trade Program*, (EAAC Report) which was produced by the Economic and Allocation Advisory Committee (EAAC). This report is reproduced as Appendix L. The EAAC was jointly established by ARB and Cal\EPA for the purpose of outlining principles for the use of allowance value. The recommendations of the EAAC are discussed in greater detail at the end of this appendix.

[4] Sometimes called "cost of control", abatement cost is the direct cost to the entity reducing greenhouse gas pollution. The marginal abatement cost is the abatement cost associated with each additional unit of emissions reduced (for example reducing emissions by one more metric ton of carbon dioxide equivalent [CO_2e]).

Figure J-1: Theoretical Relationship Between Abatement Costs, Cap Stringency and Allowance Value



The *aggregate allowance value* is the product of two factors—the quantity of emissions allowances introduced in the system and their price. The allowance quantity is a policy choice representing the commitment to achieving the selected emissions targets over a specific time schedule.[5] The market price is set by how the aggregate emissions cap intersects the MAC curve. The aggregate value of allowances is shown in Figure J-1 as the area of the rectangle formed by the lines representing the emissions cap and the market price of allowances.

2. Carbon Cost Pass-Through

This section describes the expected incentive impacts of carbon pricing on the prices of goods produced or sold by the covered entities.

If covered entities were required to purchase all allowances at auction, a significant cost would be imposed. As shown in Figure J-1, covered entities would be required to pay both the total abatement cost to reduce emissions and an amount equivalent to total allowance value to acquire allowances.

Alternatively, if valuable allowances are allocated for free to entities on the basis of historical emissions, the entities face an opportunity cost—if the recipient of free allocation chooses to use, rather than sell, an allowance they lose the proceeds that could have resulted from the sale. In this case, despite the fact that they were given allowances equivalent to total allowance value, covered

[5] For more details on staff's approach to setting emissions limits, see the discussion of cap-setting in Appendix E.

entities still have an incentive to increase product prices to recover the value of the allowances they must surrender to cover their compliance obligations.

When faced with these costs—whether monetary or opportunity in nature—covered entities will pass through to consumers as much of the cost as the market will bear. Additional costs that cannot be passed on to consumers will affect profit margins.

When deciding what fraction of a cost to pass on to consumers, industries weigh the gain in per-unit proceeds from increasing prices against the loss in sales volume from consumers who are no longer willing to purchase the good at the higher price. That is, covered entities that operate in markets where price is not regulated are expected to pass costs on to consumers up to the point where it is no longer profitable to do so. Conceptually, the cost pass-through that would result from auctioning is identical to the cost pass-through that would result due to opportunity costs arising under historical emissions-based free allocation.[6]

a. Avoidance of Windfall Gains

Windfalls can occur when industries are given free allowances and are able to profitably pass through the cost of surrendering allowance value to consumers. Economic research suggests that this type of windfall occurred during the first phase of the European Union Emissions Trading Scheme (EU ETS).[7] Windfalls accruing to the European electric facilities have been studied most closely. Researchers emphasize that windfalls occurred because facilities were awarded free allowances and yet still passed opportunity costs through to consumers.

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[6] See: *The Implications of Free Allocation Versus Auctioning of EU ETS Allowances for the Power Sector in the Netherlands*, Sijm, J., J. Hers, and W. Lise, Energy Research Center of the Netherlands, December 2008 http://www.environmentportal.in/files/e08056.pdf (accessed 10/10/10) and

The Effect of Allowance Allocations on Cap-and-Trade System Performance, R. Hahn and R. Stavins, Prepared for the Journal of Law and Economics. March 2010 http://www.hks.harvard.edu/m-rcbg/rpp/Working%20papers/Hahn%20%20Stavins%20RPP%202010.02.pdf (accessed 10/10/10)

[7] Despite initially opposing the EU ETS, participating industrial sectors in Europe have (in aggregate) profited from its operation to date. See:

Climate Policy and Industrial Competitiveness: Ten Insights from Europe on the EU Emissions Trading System, Grubb, Michael, Thomas L. Brewer, Misato Sato, Robert Heilmayr, and Dora Fazekas. 2009 http://www.climatestrategies.org/component/reports/category/61/204.html (accessed 10/10/10) and

Does the Energy Intensive Industry Obtain Windfall Profits Through the EU ETS? Bruyn, S., A. Markowska, F. Jong, and M. Bles. April 2010 http://www.ce.nl/publicatie/does_the_energy_intensive_industry_obtain_windfall_profits_through_the_eu_ets/1038 (accessed 10/10/10))

Staff notes that the potential exists for windfalls to any sector that is given free emissions allowances if the firms in the sector are able to profitably pass some or all of the cost associated with the value of the allowances through to customers.

Economic analysis of proposed federal greenhouse gas (GHG) cap-and-trade systems have concluded that free allocation of allowances "can eliminate almost all—and in some cases potentially more than all" of costs impacts and emissions leakage.[8] This is an alternative way of stating the potential for windfalls through excessive free allocation.

Windfall profits may be avoided through program design. Requiring covered entities with cost pass-through ability to purchase allowances at auction ensures that such entities do not capture windfalls. Alternatively, freely allocating allowances in a manner that gives industries a sufficient incentive not to pass the cost through to consumers can also help to avoid windfalls.

Staff has addressed windfalls in the proposed regulation by relying on allowance auctioning when possible and requiring, to the extent feasible, free allocation to industrial facilities be based on emission efficiency benchmarks with updating output measurements. Auctioning allowances will prevent windfalls to those sectors otherwise able to pass the cost through to consumers, and the updating output-based free allocation to leakage-exposed industries should dull the incentive for those industries to raise product prices.[9]

b. Incidence of Carbon Costs by Sector

In economics, the term *incidence* is often used to describe who bears the burden of a levy or fee. In the case of a cap-and-trade program incidence refers to how the cost of surrendering allowances for the emissions associated with the production of goods is shared by the producers and consumers of those goods. Incidence is closely tied to the idea of cost pass-through ability.

In general, the incidence of the regulation will fall on consumers if the producer has full cost pass-through ability and will fall on producers if the producer has no cost pass-through ability. In this way, incidence may be thought of as the sharing-out of costs associated with a particular level of cost pass-through ability.

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[8] *The Effects of H.R. 2454 on International Competitiveness and Emission Leakage in Energy-Intensive Trade-Exposed Industries: An Interagency Report Responding to a Request from Senators Bayh, Specter, Stabenow, McCaskill, and Brown*. U.S. EPA, the U.S. Energy Information Administration (EIA) and Treasury. December 2009 http://www.epa.gov/climatechange/economics/pdfs/InteragencyReport_Competitiveness-EmissionLeakage.pdf (accessed 10/10/10)

[9] See the EAAC report (Appendix L) for more details. The reduced incentive to raise product prices means that the full price of carbon is not reflected in these goods. Staff views this as a necessary trade-off in order to minimize leakage to the extent feasible as required by AB 32.

As shown in Table J-1, the incidence of the carbon costs in all regulated sectors—with the exception of the industrial sources—is well understood. The ability to pass on some portion (100 percent in all sectors except for industry) of the carbon cost implies that free allocation levels can be less than emission levels without creating negative impacts on the economic viability of a given covered entity through allocation decisions.

Table J-1: Expected Incidence of Carbon Costs by Sector Assuming No Return of Allowance Value

	Electricity	Industry	Dispersed Natural Gas	Dispersed Gasoline and Diesel
Point of Regulation	Deliverers of Electricity	Industrial Facilities	Fuel Suppliers	Fuel Suppliers
Primary Incidence of Carbon Price	Retail Consumers of Electricity	Product Consumers[1] or Shareholders[2]	End Consumers of Fuels	End Consumers of Fuels
Certainty of Incidence	Certain[3]	**Uncertain**	Certain[3]	Certain[4]
Considerations for Allocation	Regulators control how any value given to utilities is used	Free allocation can be used to minimize leakage Disagreements about cost pass-through ability require sector-by-sector analysis	Regulators control how any value given to utilities is used	

[1] For industry with high cost pass-through ability
[2] For industries with low cost pass-through ability
[3] All in-state consumption is priced evenly and utility rate-making guarantees full cost pass-through
[4] All in-state consumption is priced evenly allowing for full cost pass-through

The uncertainty of incidence in the industrial sector is primarily a reflection of the heterogeneity and complexity of the markets for various industrial products. The intricacy of these activities necessitates a detailed industry-by-industry analysis of which entities might be able to pass through carbon costs to their customers to some degree and which will not be able to do so.[10]

To the extent feasible, staff has recognized the incidence of the carbon costs and attempted to alleviate any undue burden imposed through the allocation of allowance value as described in the following sections.

C. Proposed Distribution of Allowance Value

1. Summary of Approach

ARB will allocate allowance value to one of the following four categories. Each use of allowance value is summarized here and described in more detail in the following sections.

- *Enhancement of Market Operation.* A portion of the total allowances will be dedicated to purposes that enhance allowance market operation. For example, allowances will be placed in the Allowance Price Containment Reserve—a mechanism designed to assist in keeping allowance prices within a predetermined acceptable range. Another small portion of allowances will be set aside for forward auctioning. Selling vintages of allowances from future year allowance budgets will help create a transparent long-term price signal for the allowance market.

- *Protection of Utility Customers and Other AB 32 Purposes.* Allowances will be freely allocated to the electrical distribution utilities that provide electricity to Californian ratepayers. The allowances allocated to these distribution utilities will be auctioned on consignment or, for publicly owned utilities, used directly for compliance. The proceeds from these auctions will be used by the utilities for protection of electricity customers and for other AB 32 purposes. Staff is currently evaluating a proposal to allocate allowances to natural gas utilities in a similar manner.

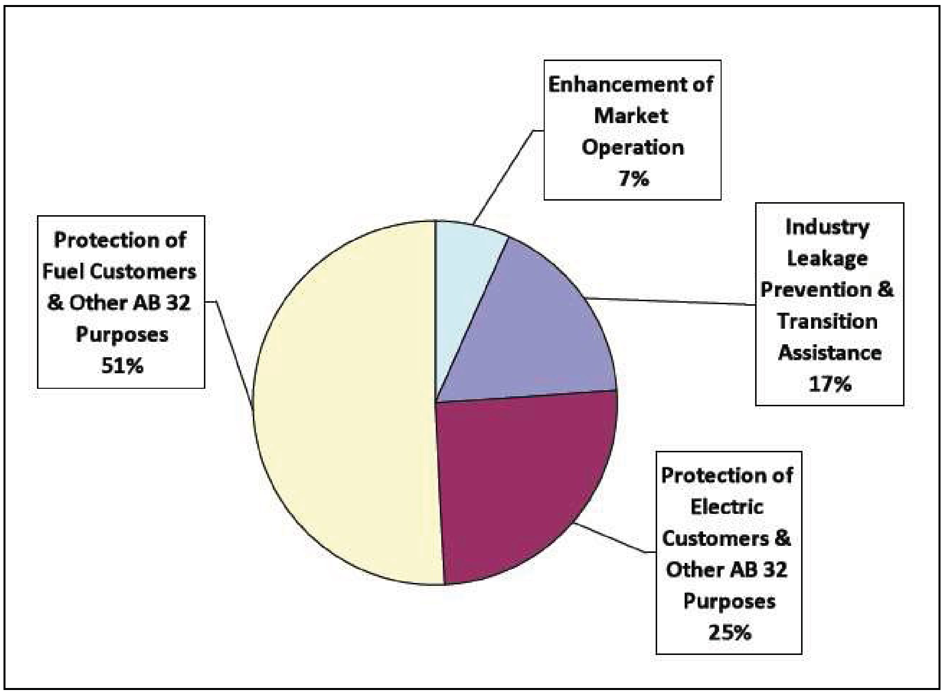
- *Protection of Industry and Leakage Prevention.* Allowances will be freely distributed to covered entities to help smooth the imposition of a carbon price on California industry and minimize leakage as required by AB 32. To the extent possible, allocation to industry will be based on emission intensity product benchmarks, to reward facilities that have taken early action to reduce emissions. This approach will also ensure that, in the future, these industries have a strong incentive to produce products in California and in the most greenhouse gas-efficient way possible.

[10] Staff conducted this analysis as presented in Appendix K: Leakage Analysis.

- *Protection of Fuel Provider Customers and Other AB 32 Purposes.* A portion of the total number of allowances will be auctioned directly by ARB. The proceeds from the sale of these allowances will subject to appropriation by the Governor and Legislature for AB 32 purposes. This use of allowance value will increase in the later years of the program as distributed fuel use is covered and the levels of transition assistance to industrial sources are reduced.[11] The auction proceeds in this category will be used to minimize any adverse impacts on Californians from the program and to achieve the goals of AB 32.

The proposed framework is presented in Figure J-2. This split of allowance value can be compared to the sector split in emissions shown in Figure J-3.[12] Each use of value is described in greater detail below. This first split of allowances is described in Subarticle 8 of the regulation (entitled "Disposition of Allowances"). The allowances placed into these categories are then distributed— either via free allocation or sale—under the mechanisms described in Subarticles 9 and 10 of the regulation.

Figure J-2: Proposed Distribution of Cumulative Allowance Value (2012–2020)



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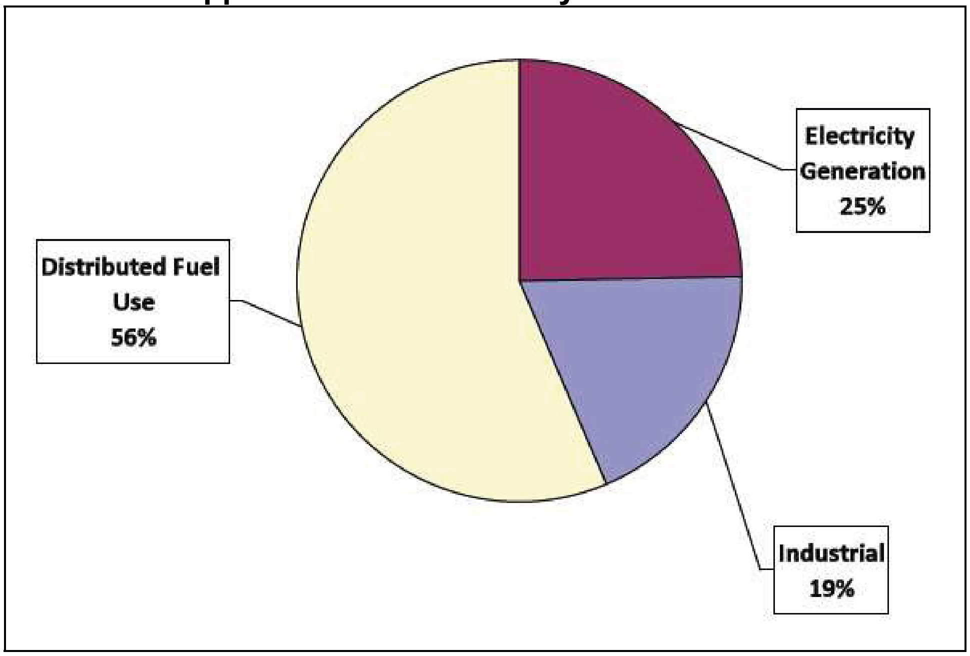
[11] Staff has not yet determined whether allowances associated with natural gas use should be allocated to the distribution utilities as described above or included in the general auction.

[12] The sector-level 2008 GHG emissions from sources expected to be covered by the cap-and-trade program are available at: http://www.arb.ca.gov/cc/inventory/data/forecast.htm

Figure J-3: 2008 Capped GHG Emissions by Sector



2. Enhancement of Market Operation

a. Allowance Price Containment Reserve

A limited amount of allowances will be set aside from each compliance period's allowance budget for use in the Allowance Price Containment Reserve. As described in Appendix E: Setting the Program Emissions Cap, and Appendix G: Allowance Price Containment Reserve Analysis, the design of the reserve mechanism creates a supply of allowances available to covered entities in case of unexpectedly short supply or high prices. The allowances placed into this reserve mechanism, coupled with a robust supply of offset credits, will assist in maintaining the allowance price within an acceptable range.

Staff considers it prudent to employ this form of a "soft price ceiling" in order to minimize any chance of extreme high or low prices, especially during program start-up while uncertainty is the highest.[13] The percentage of the total allowances available in each period that will initially be placed in the reserve is shown in Table J-2.

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[13] For more about this type of reserve mechanism see:

Balancing Cost and Emissions Certainty: An Allowance Reserve for Cap-and-Trade, Murray, B.C., R.G. Newell, and W.A. Pizer, Review of Environmental Economics and Policy, volume 3, issue 1, winter 2009, pp. 84–103 http://reep.oxfordjournals.org/content/3/1.toc (accessed 9/19/10)

Table J-2: Allowances Placed into Allowance Price Containment Reserve by Compliance Period

	Reserve Allowances by Budget Year			
	1st Period (2012–2014)	2nd Period (2015–2017)	3rd Period (2018–2020)	Total (2012–2020)
Reserve Allowances (Millions)	4.9	45.9	72.7	123.5
Total Allowance Budget (Millions)	488.4	1,147.3	1,038.8	2,674.5
Percentage of Allowance Budget in Reserve	1%	4%	7%	4.6%

b. Auctioning of Future Vintages

Auctioning allowances from future budget years in a current compliance period (advance auctioning) provides a price signal to the market about expectation of future prices. Creating a long-term price signal is valuable for entities that need to consider carbon prices when making long-term investment decisions. Advance auctioning also provides covered entities an option for hedging future compliance obligations that does not involve hoarding allowances from current budget years or participation in a secondary derivative markets.[14]

Staff determined that advance auctioning two percent of the budgets from the second and third compliance periods ensured that enough allowances will be available for other purposes in these later years, while still allowing for a future price signal to be established. Each auction will include an advance auction of allowances from the budget for three years in the future (e.g. in 2012, the advance auction will be for allowances from the 2015 budget year). The

[14] For a simple description of advantages of auctioning future vintages see:

Carbon Pollution Reduction Scheme White Paper: Chapter 9 Auctioning of Australian Carbon Pollution Permits. Australian Government. December 2008. http://www.climatechange.gov.au/publications/cprs/white-paper/cprs-whitepaper.aspx (accessed 10/10/10) proceeds from the sale of these allowances will be treated the same as proceeds from the sale of allowances from current allowance budgets.

3. Protection of Electricity Customers and Other AB 32 Purposes

Allowances will be freely allocated to the electrical distribution utilities that distribute electricity to Californian ratepayers. These utilities are receiving these allowances on behalf of these customers. Utilities must use this allowance value to reduce the costs of AB 32 policies on their ratepayers.

Staff proposes that 89 million allowances from the 2012 allowance budget be dedicated to the distribution utilities, and that this allocation decrease consistent with the rate of decline of the narrow scope cap during the first compliance period. The initial allocation in 2012 was selected by multiplying the sector's emissions during 2008 (98.9 million metric tons of carbon dioxide equivalent [$MMTCO_2e$]) by a reduction factor of 0.9 to get an initial sector allocation of 89 million. This estimate does not include the emissions from electricity produced at cogeneration facilities (11.1 $MMTCO_2e$ in 2008), a substantial portion of which is purchased by the distribution utilities. Staff recognizes that the purchase of this electricity should be addressed similar to the purchase of electricity from other generators, and that allowances will be allocated to distribution utilities to reflect purchased cogeneration electricity. Staff is continuing to evaluate the options for defining this portion of the allowance allocation to distribution utilities.

The proposed decline of the allowance budget for distribution utilities is at a linear rate that would achieve a 15 percent decline by 2020. Relative to 2012, the proposed decline by compliance period is:

- First compliance period: 0.981 for 2013 and 0.963 for 2014.
- Second compliance period: 0.944 for 2015, 0.925 for 2016, and 0.907 for 2017.
- Third compliance period: 0.888 for 2018, 0.869 for 2019, and 0.851 for 2020.

a. Expected Reflection of Carbon Price in Electric Rates

The creation of the cap-and-trade program is intended to embed a carbon price in both retail and wholesale rates of electricity. In the wholesale market this price signal will drive investment in new low-GHG generation and help ensure that the most GHG efficient plants are dispatched first to serve electric load. Inserting the carbon price in retail rates will drive increased conservation and energy-efficiency activities.

i. Wholesale Rates

The point of regulation for electrical generating facilities in the cap-and-trade system is the electricity deliverers. Therefore, operators of power plants will need to surrender allowances to match against any greenhouse gas emissions they generate.

Imposing the carbon cost in the cost of generating electricity will ensure that bids into Californian electricity markets will reflect the marginal abatement costs of greenhouse gases and generate an incentive to dispatch the cleanest facilities first.

Because these generators will be able to fully pass any carbon cost through into the wholesale power market, no free allocation will be given to these entities.[15] Thus, the electricity generators will be natural purchasers of allowances in the system, and they are expected to be highly active in acquiring allowances at auction and in the secondary market. Among the electricity generators are waste-to-energy facilities that would have a compliance obligation for the fossil carbon component of their waste stream. These facilities would be treated in the same manner as other generators.[16]

ii. Retail Rates vs. Retail Bills

Once electricity is purchased in the wholesale power markets, it is then sold to customers at the retail level (also known as retail 'ratepayers'). Staff believes that the retail price of electricity should include a price of carbon that reflects marginal GHG abatement costs.[17] This will provide an incentive to reduce electricity through energy efficiency or conservation and allow customers to encourage distribution utilities to source power from a cleaner portfolio.

However, staff is mindful of the need to protect ratepayers from increased expenditures on electricity. Therefore, distribution utilities will receive free allowances, and the value of the allowances must be used to mitigate the bill impacts of AB 32 programs on their distribution customers. The investor-owned distribution utilities (IOUs) will be required to auction these allowances. Possible

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[15] Some generators (including waste-to-energy facilities) have reported that some existing contracts do not include provisions that would allow full pass-through of carbon costs. These contracts pre-date the mid-2000s and many may be addressed through the recently announced combined heat and power (CHP) settlement at the California Public Utilities Commission. Staff will continue to evaluate this issue to determine whether some specific contracts may require special treatment.

[16] The combustion of organic waste at these waste-to-energy facilities may avoid emissions that otherwise would result from alternative waste management practices, such as landfilling. The potential for avoided emissions could be assessed using criteria appropriate for offset projects, which reduce emissions from uncapped sectors.

[17] This view is shared by the Commissioners of the California Public Utilities Commission (PUC) and the California Energy Commission (CEC), the EAAC and many other experts that support the use of the carbon pricing policies (see Appendix L: EAAC Recommendations and M: CPUC/CEC Recommendations).

mechanisms for using the auction proceeds include per-customer rebates or other forms of bill relief. Thus, while rates may go up to include a price of carbon, total expenditures on electricity are expected to remain on-par with levels prior to the imposition of the cap-and-trade program.

Most publicly owned distribution utilities (POUs) own and operate their own generation and do not compete with independent generators in the way IOUs do. Because of this, allowances directly allocated to POUs may either be sold at auction or used directly for meeting their compliance obligations. Each year, IOUs and POUs must report to ARB on the monetary value of auction proceeds and how the use of the value of the freely allocated allowances complies with the cap-and-trade regulation.

b. Basis of Allocation to Distribution Utilities

Staff is continuing to evaluate possible methods for allocating allowances among the electrical distribution utilities. The allocation must further the cap-and-trade emissions-reduction objectives, including providing incentives to reduce emissions cost effectively. The allocation must also enable all the utilities to serve their customers reliably and affordably.

The diversity of resources and emission reduction opportunities across utilities creates challenges for defining an allowance allocation method that satisfies these objectives. Approaches proposed by stakeholders, the PUC and CEC[18] have suggested using a combination of historical emissions and updated electricity sales to allocate allowances. To date, staff's analyses of options based on these factors have not identified an allocation method that provides appropriate incentives for emissions reductions and is considered affordable and effective for all utilities. Staff is continuing to examine options and obtain feedback. With input from stakeholders, staff's analysis is examining additional factors that could be considered. Staff will continue to work with stakeholders and will review comments received during the comment period on this proposal. Staff may bring a more detailed proposal to the Board based on this ongoing effort, and will circulate any such proposal for review in a subsequent 15-day comment period.

c. Monetization Requirements Through Consignment Auction

When IOUs receive allowances for free they are required to "monetize" the allowance value by offering the allowances at auction in a fashion prescribed in

[18] The PUC and the CEC presented recommendations to ARB about the design of a cap-and-trade program for the electricity sector in October of 2008. Those recommendations are included as Appendix M: CPUC/CEC Recommendations.

the proposed regulation.[19] POUs will also be able to use the auction to monetize allowance value in the same way, but will also be able to use allowances directly for compliance. The proceeds raised from these auctions will be used by each utility on behalf of their customers. The intention of this consignment auction mechanism is to ensure that distribution utilities are not able to use allowance value to gain a competitive advantage over merchant power generators and to provide transparency on the use of allowance value distributed to utilities.[20] The way in each utility uses the allowance value will be overseen by the PUC, the governing boards of the publicly owned utilities, and ARB through an annual reporting process.

4. Protection of Industry and Leakage Prevention

a. Rationale for Assistance Program for Industrial Sources

The covered industrial entities are concerned that the price signal created by the cap-and-trade program will displace production in California that will be replaced by imported products and reduce the profitability of facilities in California. These issues arise when the industrial facility cannot pass on costs due to competition within (and across) industries and with importers. Staff divides these concerns into two related but distinct risks:

- *Transition Risk:* The price signal created by cap-and-trade will create costs for some and benefits for others. *Transition risk* is the risk that some California manufacturers will face a loss of profitability as a result of the allocation approach in the cap-and-trade system and that this loss of profitability would inhibit these entities from investing in cost-effective emissions reductions.

- *Emissions Leakage Risk:* Introducing an environmental regulation in one jurisdiction can cause production costs and prices in that jurisdiction to increase relative to costs in jurisdictions that do not introduce comparable regulations. This can precipitate a shift in demand away from goods produced in the implementing jurisdiction toward goods produced elsewhere. As a result, the reduction in production and emissions in the implementing jurisdiction is offset by increased production and emissions elsewhere. The offsetting increase in emissions is called *emissions*

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[19] This approach to distributing value to electricity ratepayers was initially recommended to the ARB by the California Public Utilities Commission and the California Energy Commission (see Appendix M: CPUC/CEC Recommendations).

[20] Investor-owned utilities must monetize all allowances at auction. Publicly owned utilities have more flexibility in how they use allowance value.

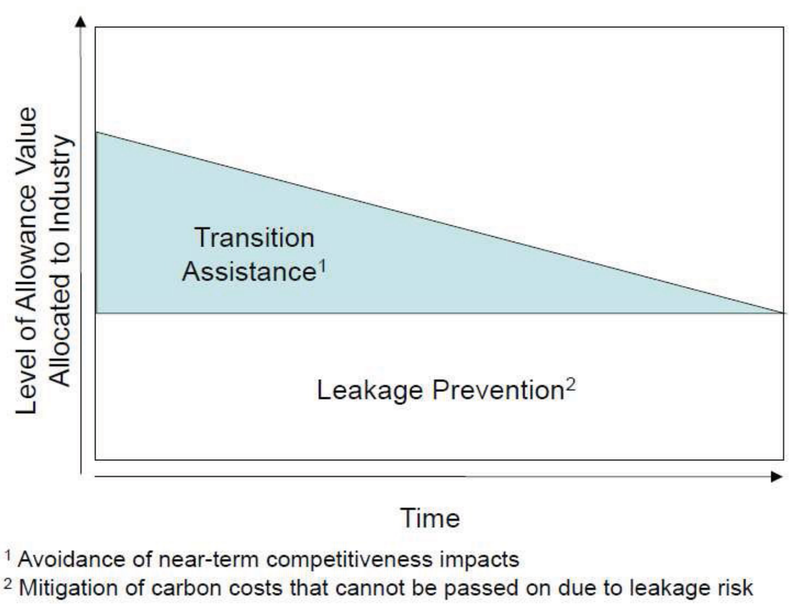
leakage.[21] AB 32 directs ARB to design all GHG regulations to minimize leakage to the extent feasible (HSC § 38562(B)(8)).

In principle, staff believes that assistance levels need to be high at the outset of the program to avoid sudden or undue impact to the current structure of the economy and to address both transition issues and emissions leakage.

As shown in Figure J-4, the assistance in early years will alleviate any short-term economic impacts and will help promote a smooth transition to a low-carbon economy. Assistance rates will decline as the covered entities gradually adjust to the carbon price and adopt energy- and carbon-saving strategies. Thus, the price incentives will gradually permeate through the economy, shifting the choices of companies, consumers and other market participants toward a decision-making framework based on an embedded cost of emitting GHGs.

Free allocation needed to minimize leakage will be maintained until adoption of equivalent carbon-pricing policies by other jurisdictions eliminates the leakage risk or it is determined that such a level of free allocation is not required to shield entities from leakage risk.

Figure J-4: Conceptual Representation of Value for Transition Assistance and Leakage Prevention

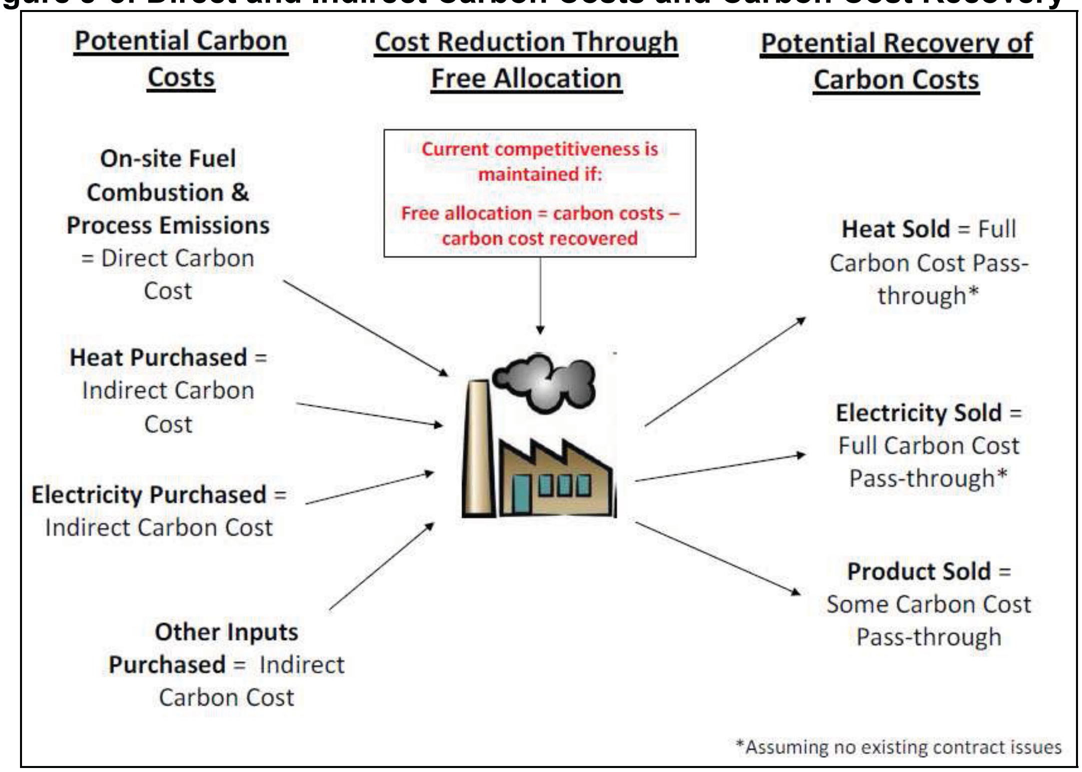


[21] AB 32 defines emissions leakage as "a reduction in GHG emissions within the state that is offset by an increase in GHG emissions outside the state" (HSC § 38505(J)).

b. Types of Potential Carbon Costs: Industrial Facility Perspective

During the development of the proposed regulation staff heard strong concerns from industrial stakeholders about potential program costs. Staff examined the general categories of costs that a facility might face once a carbon price is applied throughout the economy. These costs include both direct compliance costs and indirect costs. The direct costs arise from acquiring the necessary compliance instruments (allowances and offsets) to cover direct GHG emissions reported by the covered facility. Indirect costs arise as the carbon price changes the price on inputs to industrial production such as electricity, heat and other carbon-intensive raw materials. As discussed above, covered entities have some ability to recover costs by raising the prices they charge their customers. As shown in Figure J-5, to prevent leakage and provide transition assistance, the costs that cannot be recovered must be reduced through free allocation.

Figure J-5: Direct and Indirect Carbon Costs and Carbon Cost Recovery



c. Transition Assistance in the Near-Term to Address Concerns about Competitiveness

Embedding a carbon price in the costs of all goods in the California economy is the theoretical goal of the cap-and-trade system. The cap-and-trade carbon price creates the incentive to adopt cleaner technologies and to move the California economy away from high-GHG activities. Some industries may be more profitable, and some less so, under this low-carbon economy.

As described above, this transition from the current state of the marketplace is intended to be gradual, rather than sudden. To ensure this is the case, staff is proposing high levels of free allocation to all industries deemed to have a significant level of exposure to carbon costs. The goal of this transition assistance is to avoid imparting undue initial economic gain or loss to covered entities through allocation in the early years of the program. This higher level of assistance will decline over time to settle at a level needed to prevent leakage specific to each industry.

d. Minimizing Leakage over the Long-term

Evaluating the leakage risk faced by each industrial sector involves examining the sector's emissions intensity and trade exposure. Staff conducted a detailed analysis of the leakage risk for all California industry.[22] The level of leakage risk is likely to decrease over time as other jurisdictions adopt GHG pricing policies similar to California's. Therefore, the evaluation of leakage risk, and the amount allocated to prevent leakage will be revisited during each of the periodic reviews of the cap-and-trade program, which will occur at least once every three-year compliance cycle.

e. Use of Benchmarking in Allocation

Greenhouse gas benchmarks are metrics that enable the comparison of GHG emissions performance across similar industrial facilities. Benchmarks can be used to establish performance standards, set voluntary targets, or as a basis for free allocation in a market-based system such as the proposed cap-and-trade regulation.[23]

Staff recommends that the level of free allocation to industrial facilities be based, to the extent feasible, on product-based GHG emissions intensity benchmarks. Basing free allocation to industrial covered entities on product benchmarks rewards early action and provides entities the correct incentives to produce a given product in the cleanest (lowest GHG-emitting) way possible. As shown conceptually in Figure J-6, assuming no other adjustments in the allocation formula, a facility that is more efficient than the benchmark will receive excess allowances relative to their emission levels. Conversely, a facility that is less efficient than the benchmark will have to acquire some amount of additional allowances beyond those freely allocated—either at auction or on the secondary market for allowances.

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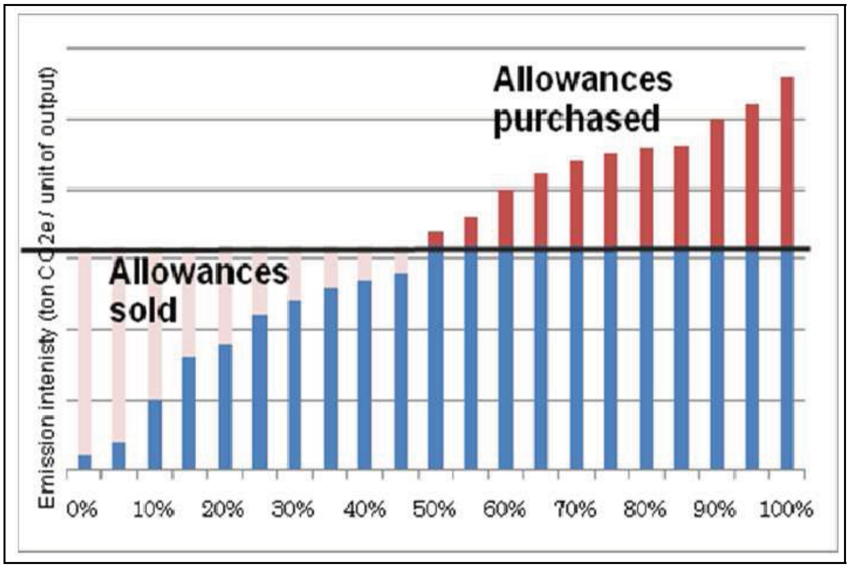
[22] See Appendix K: Leakage Analysis. The results of this analysis have led to industries being classified into the leakage risk categories shown in Table J-3.

[23] *Issues and Options for Benchmarking Industrial GHG Emissions*, Stockholm Environment Institute for the Washington Department of Ecology, June 2010 http://www.ecy.wa.gov/climatechange/docs/Benchmarking_White_Paper_Final.pdf (accessed 10/10/10)

Figure J-6: Depiction of Buyers and Sellers Under Benchmark-Based Allocations



f. Assistance Factors

The level of assistance provided to an industrial sector for both leakage prevention and transition assistance is represented as one factor influencing the free allocation for each facility within the sector in each year.[24] These factors, shown in Table J-3 are determined based on the leakage risk evaluation explained in Appendix K: Leakage Analysis. The range of these factors is based on staff's ordinal estimate of the level to which a given industry has the ability to pass on carbon costs. As described in Section D, the assistance factors are used in the final equation to determine free allocation to each source.

These assistance factors should be thought of in the conjunction with the emissions efficiency benchmarks described above. For example, if an assistance factor is listed as 100 percent, and the benchmark is set to reflect the emissions intensity that matches the intensity of a given facility, the facility in question will receive the number of allowances exactly equivalent to its emissions.

The high initial levels of assistance, coupled with the use of allocation based on emissions efficiency benchmarks, will result in some industrial covered entities that are naturally positioned as buyers and others positioned as sellers in the cap-and-trade program. This should help facilitate the development of liquidity in the secondary market for allowances and create a transparent carbon price in periods between auctions.

[24] See Equation J-3 and Equation J-4 for more details.

Table J-3: Assistance Factors Based on Leakage Risk for Each Industry

Leakage Risk	ARB Classification	NAICS	Industry Assistance Factor (AF) by Budget Year		
			2012-2014	2015-2017	2018-2020
High	Oil and gas extraction	211111	100%	100%	100%
		211112	100%	100%	100%
	Soda ash and mining mfg	212391	100%	100%	100%
	Reconstituted wood product mfg	321219	100%	100%	100%
	Paper manufacturing	322121	100%	100%	100%
	Paperboard manufacturing	322130	100%	100%	100%
	All other basic inorganic chemical mfg	325188	100%	100%	100%
	Flat glass manufacturing	327211	100%	100%	100%
	Container glass manufacturing	327213	100%	100%	100%
	Cement manufacturing	327310	100%	100%	100%
	Lime manufacturing	327410	100%	100%	100%
	Iron and steel mill	331111	100%	100%	100%
Medium	Food manufacturing	311	100%	75%	50%
	Breweries	312120	100%	75%	50%
	Cut and sew apparel mfg	3152	100%	75%	50%
	Sawmills	321113	100%	75%	50%
	Petroleum product manufacturing	324	100%	75%	50%
	Pesticide and agricultural chemical mfg	325320	100%	75%	50%
	Polystyrene foam product mfg	326140	100%	75%	50%
	Gypsum product manufacturing	327420	100%	75%	50%
	Mineral wool manufacturing	327993	100%	75%	50%
	Metal processing	331X	100%	75%	50%
	Turbine and turbine generator set units mfg	333611	100%	75%	50%
Low	Pharmaceutical and medicine mfg	325412	100%	50%	30%
	Aircraft manufacturing	336411	100%	50%	30%

5. Protection of Customers of Distributed Fuel Use and Other AB 32 Purposes

Some allowances will be auctioned directly by ARB; the proceeds will be placed into the Air Pollution Control Fund and subject to appropriation by the Governor and Legislature for the purposes outlined in AB 32. Staff recommends that these revenues be used primarily for the protection of California's consumers and to further the goals of AB 32. The following uses would achieve those ends:

- *Per Capita Consumer Rebate Program.* A significant amount of the allowances auctioned by the State in the second and third compliance period will likely be purchased by fuel suppliers to cover emissions associated with distributed fuel uses. Staff anticipates that these fuel providers will be able to fully pass the cost of acquiring these allowances to the consumers of these fuels. A per capita lump sum distribution of the proceeds raised at auction would help consumers avoid negative impacts of higher fuel prices while still providing the correct incentives to reduce fossil fuel use.[25]

- *Community Benefit Fund.* Staff recommends the creation of a Community Benefit Fund to recognize the community protection goals of AB 32.[26] ARB or another agency could administer a competitive grant program designed to: promote projects that simultaneously reduce GHGs and co-pollutants; finance adaptation/preparedness for climate change health impacts; create improvements to mass transit and land use planning; facilitate natural resource conservation; and support non-utility energy-efficiency programs.

- *Low-Carbon Investment Fund.* Staff received many suggestions that a portion of total allowance value be directed toward public investments in the energy innovation goals of AB 32. Various names have been proposed for this type of program including the "California Carbon Trust" or the "Investment Advisory Board".[27] Conceptually, this use of auction proceeds could be structured as a competitive grant program administered by ARB or another entity. Project types could include: research, development and demonstration projects in zero or low-GHG technologies and/or support for a green technology workforce training program.

6. Summary of Allowance Value Use Through Time

In summary, a total of four primary uses of allowance value are envisioned under the allocation structure described above: Enhancement of Market Operation, Protection of Utility Customers, Protection of Industry, and Protection of Fuel Provider Customers. The value dedicated to each of these uses shifts over time. These four general categories can be broken down further, as shown in Figure J-7.

In the near-term, the emphasis is placed on providing a smooth transition into the program for the industrial covered entities and equity between electricity

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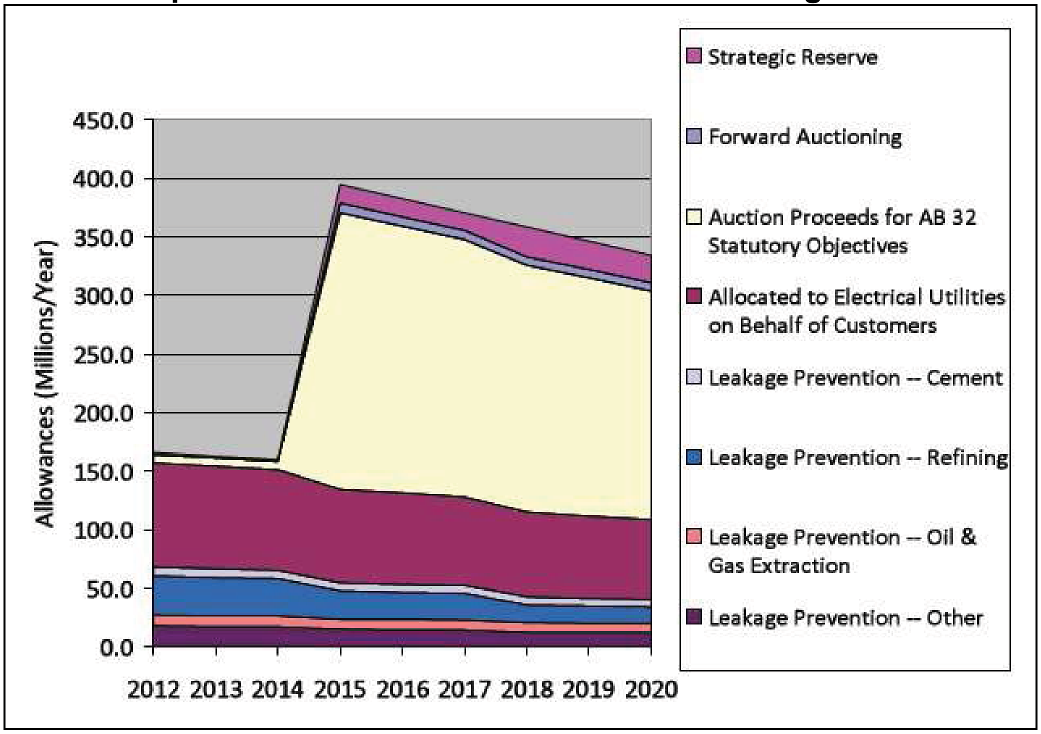
[25] See Appendix L: EAAC Recommendations

[26] Consistent with the requirements of HSC § 38565.

[27] See Appendix L: EAAC Recommendations, Appendix M: CPUC/CEC Recommendations, and *Recommendations of the Economic and Technology Advancement Advisory Committee*, February 2008 http://www.arb.ca.gov/cc/etaac/ETAACFinalReport2-11-08.pdf (accessed 10/10/10)

ratepayers. In the longer term, the focus shifts to the protection of consumers and funding programs designed to help achieve the AB 32 goals.

Figure J-7: Proposed Shift in Allowance Allocation through Time



7. Implementing Allocation

ARB will conduct free allocation annually on or before January 15 of each year. The number of allowances available for free allocation will be those remaining from each annual allowance budget after removing a small amount of allowances for the allowance price containment reserve and advance auction. Allowances will be placed into the accounts of eligible electricity distribution utilities and industrial covered entities using the formulas found in Subarticle 9 of the regulation. The following section describes the details of how this approach to free allocation was developed.

After all free allocation has been conducted the remaining allowances will be auctioned by the State. These auctions will be conducted quarterly.

D. Free Allocation to Individual Entities

This section focuses on the details of how the free allocation methods will function within a given use of allowance value. The emissions intensity benchmarking approach—which forms the basis of free allocation used to minimize leakage risk and provide transition assistance to industrial facilities—is described in detail. The framework for free allocation to distribution utilities for protection of ratepayers is also explained. The free allocation methods described in this section are found in Subarticle 9 of the proposed regulation.

1. Benchmark-Based Free Allocation to Industrial Sources

Benchmarking allows the comparisons of GHG performance of facilities relative to a common standard. The following sections describe staff's work on benchmarking in the cap-and-trade program.[28]

Staff notes that, in the context of cap-and-trade, the benchmarking does not directly require any facility to meet the benchmark level of emissions intensity. Rather, staff's proposed free allocation approach uses the benchmarking as a factor in the equation that determines the compensation to reduce carbon costs faced by the covered entities.

a. Types of Benchmarking Proposed

The free allocation to industrial facilities will be based on two methods of emission intensity benchmarking—product-based benchmarking and energy-use benchmarking.

Product-Based Benchmarking.

Under this approach the benchmark is a function of the quantity of GHGs released per unit of industrial product output. A generic form of a product benchmark is shown in Equation J-1.

Equation J-1. Example Product Benchmark Formula

$$GHG\ Benchmark = \frac{Emissions\ (tonnes\ CO_2e)}{Output\ (tons)}$$

Energy-Use Benchmarking.

In this approach the benchmark is a function of how many GHGs are emitted to produce the energy that is used at a facility. A generic form of an energy-use benchmark is shown in Equation J-2. Many types of energy-use benchmarks are conceivable; as described below staff explored two specific subtypes—heat-

[28] Benchmarking for free allocation purposes is being employed in the third phase of the European Union Emissions Trading Scheme (EU ETS) and is the cornerstone for free allocation in recently proposed federal GHG cap-and-trade systems. See:

Methodology for the Free Allocation of Emission Allowances in the EU ETS Post 2012, Ecofys et al. for the European Commission, November 2009 http://ec.europa.eu/clima/policies/ets/docs/BM%20study%20-%20Project%20Approach%20and%20general%20issues.pdf (accessed 10/23/10)

H.R. 2454: American Clean Energy and Security Act of 2009, http://www.govtrack.us/congress/bill.xpd?bill=h111-2454 (accessed 10/10/10) carrier and fuel choice benchmarks—and combined these subtypes to form one methodology.[29]

Equation J-2. Example Energy-Use Benchmark Formula

$$GHG\ Benchmark = \frac{Emissions\ (tonnes\ CO_2e)}{Energy\ Used\ (MMBtu)}$$

Staff proposes that facilities would be allocated allowances based on either a product-based benchmarking approach or, for sectors in which a product-based approach is not practical, a fallback energy-use based approach.[30]

The estimated number of industrial facilities expected to be receiving allocation under each method is show in Table J-4 and Table J-5. These tables include all facilities that reported in each classification, including some that were below the 25,000 metric ton threshold for coverage in the cap-and-trade program. The estimation is based on ARB Mandatory Reporting Regulation results for the year 2008. The details of the benchmarking approaches are described in more detail below.

[29] The regulation refers to this fallback energy-use method as a "thermal energy" based allocation calculation methodology because it excludes indirect emissions in purchased electrical energy from the costs for which facilities receive direct compensation through free allocation.

[30] This differs slightly from the EU ETS proposal where some facilities can receive allowances under the product-based benchmarks, a heat carrier benchmark, a fuel use benchmark, and historical grandfathering of process emissions. See:

Methodology for the Free Allocation of Emission Allowances in the EU ETS Post 2012. Ecofys et al. for the European Commission. November 2009. http://ec.europa.eu/clima/policies/ets/docs/BM%20study%20-%20Project%20Approach%20and%20general%20issues.pdf (accessed 10/23/10)

Table J-4: Estimated Number of Stationary Sources Receiving Allowances Under Product-Based Benchmark Free Allocation Method

NAICS	ARB Classification	# Facilities Above or Below Emission Threshold in 2008 (25,000 metric ton CO2e/year)		2008 Direct Emission (metric tons CO_2e)
Product-Based Benchmark		***Below***	***7***	***114,496***
		Above	***99***	***59,706,281***
		Total	***106***	***59,820,776***
211111	Oil and gas extraction	Below	2	31,208
		Above	37	10,423,842
		Total	39	10,455,049
212391	Soda ash mining and mfg	Below	0	0
		Above	1	1,677,173
		Total	1	1,677,173
322121	Paper manufacturing	Below	0	0
		Above	3	484,115
		Total	3	484,115
322130	Paperboard manufacturing	Below	0	0
		Above	2	338,594
		Total	2	338,594
324110	Petroleum products manufacturing	Below	2	27,020
324121		Above	30	37,118,650
324191				
324199				
325120		Total	32	37,145,670
327211	Flat glass manufacturing	Below	0	0
		Above	3	220,688
		Total	3	220,688
327213	Container glass manufacturing	Below	0	0
		Above	5	330,650
		Total	5	330,650
327310	Cement manufacturing	Below	1	14,106
		Above	10	8,637,303
		Total	11	8,651,408
327410	Lime manufacturing	Below	0	
		Above	1	27,115
		Total	1	27,115
327420	Gypsum product manufacturing	Below	0	
		Above	3	136,919
		Total	3	136,919
327993	Mineral wool manufacturing (Fiberglass)	Below	2	42,163
		Above	1	47,539
		Total	3	89,702
331111	Iron and steel mill	Below	0	0
		Above	1	42,005
		Total	1	42,005
331221	Hot rolled steel shape manufacturing	Below	0	
		Above	2	221,688
		Total	2	221,688

Table J-5: Estimated Number of Stationary Sources Receiving Allowances Under Energy-Use Benchmark Free Allocation Method

NAICS	ARB Classification	# Facilities Above or Below Emission Threshold in 2008 (25,000 metric ton CO2e/year)		2008 Direct Emission (metric tons CO_2e)
Energy-Use Based Benchmark		***Below***	***19***	***233,323***
		Above	***45***	***2,646,588***
		Total	***64***	***2,879,911***
311	Food manufacturing	Below	4	90,629
		Above	31	1,492,258
		Total	35	1,582,887
312120	Breweries	Below	0	
		Above	3	134,863
		Total	3	134,863
3152	Cut and sew apparel mfg	Below		
		Above	1	27,031
		Total	1	27,031
321113	Sawmills	Below	8	30,898
		Above	1	341,107
		Total	9	372,005
321219	Reconstituted wood product mfg	Below		
		Above	1	30,059
		Total	1	30,059
325188	All other basic inorganic chemical mfg	Below	1	3,039
		Above	3	453,772
		Total	4	456,811
325412	Pharmaceutical and medicine mfg	Below	0	0
		Above	2	75,402
		Total	2	75,402
326140	Polystyrene foal product mfg	Below	0	0
		Above	1	26,320
		Total	1	26,320
333611	Turbine and turbine generator set units mfg	Below	0	
		Above	1	39,558
		Total	1	39,558
336411	Aircraft manufacturing	Below	1	9,300
		Above	1	26,218
		Total	2	35,519
331314	Metal processing	Below	5	99,456
331492		Above	0	
331511		Total	5	99,456

b. Benchmark-Based Allocation Recognizes and Encourages Early Action

Throughout the cap-and-trade regulatory development process the need to recognize early actors who have already reduced GHG emission levels relative to their peers has been clearly articulated by California decision-makers.[31]

[31] Direction to ARB to recognizing early action through allowance allocation includes:

Staff chose benchmarking as a keystone of the free allocation methodology to industrial facilities to reward those who have historically chosen to employ low-GHG fuels and enhance the GHG efficiency of their production processes. As described above, multiple types of GHG efficiency benchmarks are conceivable. Table J-6 shows an explanation of the efficiency in recognition of early action of some possible allocation approaches, including various benchmarking approaches.

Table J-6: Recognition of Early Action from Possible Allowance Allocation Approaches

	Recognizes Historical Clean Fuel Choices	Recognizes Historical Efficiency of Heat Production	Recognizes Historical Efficiency of Heat Use
Auctioning	Yes	Yes	Yes
Product Benchmarking	Yes	Yes	Yes
Heat Carrier (Steam Production) Benchmarking	Yes	Yes	No
Fuel Choice (Combustion Energy) Benchmarking	Yes	No	No
Grandfathering Based on Historical Emission Levels	No	No	No

c. Proposed Hierarchy for Benchmarking Options

Based on the goal of recognizing early action and Table J-6, staff developed the following conceptual hierarchy for use of benchmarking for free allocation to industrial sources:

- AB 32 requires ARB to "design the regulations, including distribution of emissions allowances where appropriate, in a manner that is equitable, seeks to minimize costs and maximize the total benefits to California, and encourages early action to reduce greenhouse gas emissions." See HSC § 98562(b)(1).
- On March 24, 2010 Governor Arnold Schwarzenegger sent a letter to ARB expressing support for a free allocation strategy that "reward[s] companies that have already made significant investments in energy efficiency and carbon reduction." See: http://www.climatechange.ca.gov/eaac/documents/2010-03-24_GOVERNOR_LETTER.PDF (accessed 10/23/10)

- *Product-based benchmarks are preferred to heat-carrier benchmarks.* Benchmarking on a product-basis recognizes historical use of clean fuels as well as all aspects of GHG efficiency in the product production process.

- *Heat-carrier benchmarks are preferred to fuel-based benchmarks.* A benchmark for processes with an intermediate heat carrier (such as steam) can recognize the historical choice of fuel and investments in the efficiency of the boiler or other device used to transfer energy from combustion to the intermediate heat carrier. Unlike product-based benchmarks, efficiency of heat end-use cannot be recognized.

- *Fuel-based benchmarks are preferred to grandfathering based on historical emissions*. Fuel-based benchmarking can recognize low-GHG historical fuel choices but cannot account for past efficient choices in heat production or heat-use efficiency.

Staff believes a heat-carrier benchmark and a fuel-based benchmark can be combined into one energy-based fallback approach that can be employed for sources for which it is challenging to develop a product-based benchmark in the near-term.

d. Updating of Output Measurements

As described previously, basing free allocation on measurements of production can recognize early action and enhance leakage protection. The product-based allocation can utilize product output measurements from data gathered on an ongoing basis. Employing future data in this fashion is sometimes called either *updating* or *ex post* adjustments to the allocation. This approach creates an incentive to maintain production activities in California because the amount of allowances received in the future is dependent on continued California output.[32] Therefore, it is especially valuable to develop updating product based benchmarks for products in sectors with high leakage risk.

In contrast, staff prefers a *fixed* (or *ex ante*) basis for allocation based on energy-use benchmarks. This approach provides greater simplicity and creates the correct incentives to reduce fuel use and maximize efficiency of steam production and consumption at these facilities in the future.[33] For some industries, the degree of annual production variation may raise particular issues with the use of a fixed allocation basis that does not update based on annual production levels.

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[32] Declines in Californian production levels relative to imports are expected to be a symptom of emissions leakage issues.

[33] The option always exists to develop additional product-based benchmarks in the future if an industry currently categorized as receiving allowances under the energy-use methodology is unsatisfied with this approach.

For example, production in the food processing industry has significant annual variation driven primarily by the quantity and quality of crop production over which the processors have no control and a contractual obligation to serve the growers. Staff will explore options for addressing these types of concern based on comments received on this proposed regulation.

e. Relationship Between Compensation for Direct and Indirect Carbon Costs and Free Allocation Using Benchmarks

A key question in establishing the free allocation method is determining what costs are being compensated for or reduced. As shown in Figure J-5, facilities face both direct and indirect carbon costs. Staff proposes that direct allocation to industrial sources at risk for leakage should compensate for direct costs associated with on-site emissions and indirect costs associated with heat purchased.

Indirect carbon costs arising from purchased electricity from the grid will be reduced through compensation from distribution utilities that are given allowance value for the purpose of ratepayer protection. This cost-reduction framework is shown in Table J-7.

Table J-7: Method to Reduce Direct and Indirect Carbon Costs at Industrial Facilities

	Energy Self-Generated or Imported?		
Source of Direct or Indirect Carbon Costs		Produced On-site	Imported from Off-site
	Heat Consumed	Direct Allocation*	Direct Allocation*
	Electricity Consumed	Direct Allocation*	Compensation Through Distribution Utility†

*Include in emissions efficiency benchmarking exercise and final allocation.
†Consider in benchmarking work but remove from final direct allocation.

i. Cap-and-Trade Creates an Incentive for Efficient Combined Heat and Power Systems

Table J-7 also helps to show how the cap-and-trade system creates an incentive for the installation of efficient combined heat and power (CHP) systems. An industrial facility that installs a CHP unit to displace grid electricity will need to hold additional allowances to cover the added direct emissions from a CHP facility, which creates an additional direct cost.

To the extent that the CHP unit produces heat more efficiently than a standard industrial boiler, the industrial facility will lower its compliance obligation related to heat consumed. Additionally, if electricity prices also accurately reflect the carbon price of the marginal generator, the facility accrues a greater carbon cost savings as a result of avoiding indirect carbon costs in purchased electricity. If the emission rate of the CHP unit is lower than the marginal generator serving the grid, the industrial facility's compliance costs related to electricity consumption will also be lower than they otherwise would be if the facility relied only on purchased electricity.

Because the compensation depends—in most cases—on production, an industrial facility with an efficient CHP system will have lower direct and indirect compliance costs but will receive the same compensation compared to a similar facility with no CHP unit.[34]

ii. Profits from Sale of Allowances Allocated Above Expected Emission Levels

One anticipated outcome of a free-allocation methodology based on benchmarks is that facilities that are more efficient than the benchmark may receive more allowances then they need to cover their compliance obligation.[35] These cleaner facilities will be able to sell these excess allowances and generate a profit.

ARB staff does not consider this impact a generation of "windfall profits"; rather, this is an intentional consequence of employing benchmarking to reward early action. In some cases, the benchmarks or the choice of products used in the benchmarking process may need to be modified to ensure that the magnitude of reward is not excessive.

f. Product-Based Benchmarking

As discussed above, product-based benchmarking is staff's preferred approach whenever technically feasible. The ease of developing product-based benchmarks depends on the homogeneity of products and of manufacturing processes within the defined manufacturing activities. For example, some sectors (e.g., cement) have processes and products that are relatively simple

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[34] For this assumption to be true the compensation received through direct allocation (for a facility with a CHP system) and through the distribution utility (if no CHP is installed) must be equivalent. Additionally, electricity rates and allowance prices must reflect an equivalent GHG marginal abatement cost. Staff believes this desired outcome can be achieved.

[35] Assuming no other adjustments to the allocation level.

and uniform. In such sectors, the task of defining which emissions to include—and what products and/or processes to benchmark—can be relatively straightforward. In other sectors the task can be much more difficult. For example, the wide variation among facilities in the petroleum refining sector, including the presence of dozens of unique processes, makes the task of developing benchmarks challenging.[36]

i. Equation for Allocation Based on Product-Based Benchmarks

The benchmarks will be used as a key part of the calculation methodology to determine the annual number of free allowances allocated to each eligible facility. Each facility has to identify the number of manufacturing activities with distinct product output to which a benchmark is established. Allocation will be given for each manufacturing activity. For example, if a facility conducts two different activities with two outputs the number of allowances allocated to this facility will be the sum of those two activities.[37]

Equation J-3: Equation for Allocation Based on Product-Based Benchmarks

$$A_t = \sum_{a=1}^{n} Output_{a,t} * B_a * AF_{I,t} * c_t$$

Equation J-3 shows how the number of allowances a facility will receive in a given year (A_t) will be calculated. The benchmark for each activity is the B_a term, which remains fixed in time. The $Output_{a,t}$ term is an annually updated moving three-year average of product output for each activity. The assistance factor, $AF_{I,t}$ is assigned based on an industry's leakage risk as shown in Table J-3. The cap decline factor, c_t, reflects the decreasing total level of allowances available over time relative to the initial 2012 narrow-scope cap.

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[36] Despite the fact that benchmarking refinery performance is highly complex, the petroleum industry has been developing energy-efficiency benchmarks for more than 20 years in an attempt to minimize fuel costs. The Energy Intensity Index (EII) benchmarking approach developed by Solomon Associates, Inc. has been widely adopted as an industry standard amongst refineries worldwide. See:

EII Analysis Methodology: Gap Analysis vs. World's Best EII, 2008 Fuels Refinery Performance Analysis, Solomon Associates, January 2010 http://solomononline.com/documents/Whitepapers/EII_AM_WWW.pdf (accessed 10/23/10)

[37] For example, some oil extraction facilities conduct both thermally-enhanced oil recovery and non-thermal techniques within the same field.

ii. Product Benchmark Construction: Issues and Options

In initiating work on product-based benchmarks staff attempted to create a uniform framework that could be applied across all industrial sectors. For each product-based benchmark staff considered the following key questions:

- *Benchmark Stringency.* Should the final benchmark be set at a level of stringency that reflects the emissions intensity of an average facility, one that is better than average or the best in a given sample?

- *Data Sources.* What is the appropriate dataset for both product and emissions data? What geographic sample should be considered?

- *Product Output Units.* What product metric will be used for normalizing the benchmark?

- *Emissions.* Which sources of emissions should be accounted for in the numerator of the product data? How should emissions at a given facility be divided among various industrial activities and products?

Staff's current thinking on these key questions is explained below.

iii. Stringency of Product-Based Benchmarks

Staff believes benchmark stringency should reflect the emissions intensity of highly efficient, low-emitting facilities within each sector. Staff's current thinking is that the targeted level of stringency would be created by evaluating each industrial sector's emissions intensity during a historical base period and targeting the benchmark to allocate 90 percent of this level per unit product.

iv. Data Sources for Product Benchmarking

ARB can rely on several data sources to derive product benchmarks. The following data sources have GHG emissions and/or production data:

- *ARB Mandatory GHG Reporting Requirements.* The ARB Mandatory Reporting Requirements (ARB MRR) started with data from 2008. It required GHG emissions reporting from California's industrial facilities. It also required cement facilities to report their production data. MRR results for the reporting year 2008 and 2009 could be used in the development of a product-based benchmark for the cement sector. Verification of the 2008 reported data, which was not required for that initial year of reporting, may be needed if that data is going to be used for establishing the benchmark.

- *ARB Industry Surveys.* ARB conducted industry surveys for the oil and gas extraction sector (for the 2007 data year) and the glass sector (for the 2005–2007 data years) in response to enactment of AB 32. These surveys collected both emissions and production data. Although additional information may be needed, those surveys can be used for the purpose of benchmarking California facilities in these sectors if ARB and stakeholders both agree that the data are appropriate and representative.

- *U.S. EPA Mandatory Reporting Requirements.* The United States Environmental Protection Agency (U.S. EPA) began a mandatory GHG reporting program with the 2010 data year. Under this rule (U.S. EPA MRR), GHG emissions for all applicable sectors and facilities and production data for most sectors at a national level will be collected. ARB expects to have access to those data pursuant to the confidentiality determination which is scheduled to be finalized prior to the data release in 2011.

- *European Union Emissions Trading Scheme (EU ETS) Studies.* Greenhouse gas emissions-efficiency benchmarking has been conducted in the European Union.[38] The EU ETS is in the process of establishing benchmarks for the purpose of allowance allocation applicable to all participating nations for about 14 sectors for Phase III of their cap-and-trade program (which runs from 2013–2020). Their benchmarks are set at a level reflecting a best available technology approach (defined as the average of the top 10 percent most efficient plants). Several other benchmark methodologies have been proposed in the context of EU ETS Phase II (2008–2012) from different participating countries.

- *Academic Literature and Additional Data Provided by Stakeholders.* Some stakeholders groups, including national and regional trade associations, have voluntarily recorded GHG emissions and production data that could be used to derive GHG emissions-efficiency benchmarks. Staff is currently working with various groups to gather this additional data.

To develop benchmarks that create the correct incentives for GHG emissions reductions, staff has thus far embraced the "one product, one benchmark" principle. This means that, in most cases, staff believes it is appropriate to avoid benchmarks differentiated by technology, fuel mix, size, age, climatic circumstances or raw material quality of the installations producing the product. Ensuring that all GHG emissions-abatement options remain viable (including switches to different technologies, fuels, etc.) is an integral part of developing an effective product-based benchmarking approach.

Staff relied on the additional principles listed below to prioritize data gathering for product benchmarking:

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[38] The EU Commission's website on benchmarking for allocation is: http://ec.europa.eu/clima/policies/ets/benchmarking_en.htm (accessed 10/23/10)

- The share of the emissions from a product group in the total cap-and-trade program (focus was placed on getting data for developing benchmarks for the most heavily emitting sectors facing a leakage risk)
- The share of the emissions from a product group in the total emissions of the sector (product benchmarks should capture almost all emissions from a given sector)
- The number of installations producing a certain product (a limited number of installations in California makes benchmarking more challenging)

In addition to the data needs for developing the initial benchmarks, as can be seen in Equation J-3, output information has to be reported annually to ARB in order to perform the calculation for free allocation each year. Staff proposes that the output information will be provided from covered facilities as part of the ARB GHG Mandatory Reporting Requirements.

Equation J-3 employs an average of the three most current years of available product output data. This results in a two-year lag between the most recent output data year and the allocation year, due to the fact that free allocation occurs in January of each year and reported output data is collected in April of each year.

Output data will be collected for many sectors in federal GHG reporting, starting with reporting in 2011 for 2010 emissions and output.[39] Staff reviewed the Federal MRR and harmonized with these requirements to the extent feasible. Justification for any additional information beyond what is collected by the U.S. EPA is presented below and in the Initial Statement of Reasons for the updated ARB MRR.

v. Sector-by-Sector Choice of Output Metrics and Relationship to Mandatory GHG Emissions Reporting Requirements

In determining appropriate output metrics for each sector, staff analyzed California's manufacturing activities and products. Staff relied primarily on the NAICS codes reported under ARB's MRR for the reporting year 2008 and 2009 to identify covered manufacturing activities that are currently conducted in California.[40] Staff also considered the sector classification in the ARB MRR and the U.S. EPA MRR.

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[39] *Mandatory Reporting of Greenhouse Gases; Final Rule* 40 CFR Parts 86, 87, 89 et al. United States Environmental Protection Agency. October 2009. http://www.epa.gov/climatechange/emissions/ghgrulemaking.html (accessed 10/10/10)

[40] The activities and associated outputs determined using NAICS code were then harmonized with the sector categories used in ARB's and U.S. EPA's MRR. The sector-by-sector discussion

For most sectors the NAICS 6-digit level was disaggregated enough to distinguish different processes and different outputs. However, for some sectors where there are more than two distinct manufacturing activities/operations or outputs, multiple output metrics were assigned to a given NAICS 6-digit code. Conversely, if different NAICS 6-digit level activities were part of the same set of production activities they were grouped and assigned a single output metric. Staff worked closely with stakeholders to identify the product output metrics described below.

<u>Cement Manufacturing (NAICS 327310) / Cement Production (EPA MRR Subpart H)</u>

Cement is a building material that is produced by heating mixtures of limestone and other minerals or additives at high temperatures in a kiln to form clinker, followed by cooling and grinding with blended additives. Finished cement is a powder used with water, sand and gravel to make concrete and mortar.

According to ARB MRR results there were nine cement plants that produced clinker in California in 2009. These facilities produced about 13.9 percent of total GHG emissions from the covered industrial sector in 2008 (see Table J-4). A majority of them used short kilns with preheaters and precalciners for clinker production while some used long kilns. In addition to the GHGs from the fuel combusted for kiln operation, calcination of limestone in clinker production creates a large amount of process emissions.

Staff identified three potential product output metrics for this sector:

- Ton of clinker
- Ton of cement (clinker + mineral additives)
- Ton of cementitious materials (clinker + mineral additives + supplemental cementitious materials)

Producing clinker is highly emissions intensive. The emissions intensity per ton of cement can be reduced by blending other materials with clinker to reduce the portion of clinker mixed. Currently two types of additives are blended with clinker: mineral additives such as gypsum or limestone, and supplemental cementitious materials (SCMs) such as fly ash.

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below specifies NAICS description and the US EPA MRR sector classification. Staff also used the NAICS (6-digit level disaggregation) for the emissions leakage analysis described in Appendix K.

ARB has collected data on clinker production, additives to clinker (gypsum, limestone, cement kiln dust and other clinker substitutes) and cement substitutes (including SCMs) for Californian cement plants through the MRR program since the 2008 data year. The U.S. EPA MRR only requires clinker production to be reported.[41]

Representatives from the cement industry proposed using cement (clinker + gypsum and limestone) as the output metric for the purposes of benchmarking. These stakeholders suggested that cement plants have some ability to increase the blending of mineral additives, but limited freedom to blend more SCMs because the final product must meet customer SCM specifications.[42] They also commented that the availability of significant additional SCM supply is currently uncertain.

Staff reviewed 2008 and 2009 ARB MRR results for the amount of mineral additives and SCMs blended by California plants to make cement. Staff found significant variability in the amount of mineral additives and SCM blending from year to year and also from facility to facility. Additional work will be needed to understand the drivers of this variability. Staff believes that ARB needs to understand what influences the level of mineral additives and/or SCM blending in order to fully understand the implications of choosing cement or cementitious materials as the output metric for this sector.[43]

Staff proposes to use cement as the output metric. To address concerns about the processing of imported clinker or the potential trade of clinker from one facility to another for further processing, the cement metric will be based on the level of clinker production at the particular facility. The clinker produced at a facility will be adjusted based on the average level of mineral additives in the cement shipped from that facility to determine the effective cement output. The benchmark will be set using verified emissions and output data collected through the California MRR. Because the data for the 2009 reporting year has not yet been verified, no estimate of the benchmark value is included here. To continue to keep options open for a future change in the output metric, the ARB MRR will retain the reporting requirements for additives to clinker and cement substitute.

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[41] US EPA MRR requirements for cement producers are specified in Subpart H. See http://www.epa.gov/climatechange/emissions/subpart/h.html (accessed 10/10/10)

[42] See the Coalition for Sustainable Cement Manufacturing and Environment's comment submitted to ARB on June 7, 2010. http://www.arb.ca.gov/lists/may-17-allocation-ws/55-ar-m455n_20100616_150805.pdf (accessed 10/10/10)

[43] ARB may overcome this uncertainty by collecting larger datasets from longer time periods and from further interaction with stakeholders.

Staff is also recommending an adjustment to the cap decline factor used in the allocation formula for the cement industry. More than half of the emissions from clinker production result from chemical processes in the creation of the cement itself, with no direct method available for reducing the emissions intensity of this chemical process. For this reason, staff is providing a separate rate of decline: in effect applying the cap decline factor only to the energy use portion of the industries emissions. The resulting cap decline is approximately 0.9 percent per year, rather than the 1.8 percent per year used for other industries and the electricity sector.

<u>Petroleum Refining (NAICS code 324110) / Petroleum Refineries (EPA MRR Subpart Y), Suppliers of Petroleum Products (EPA MRR Subpart MM)</u>

In California crude oil is processed at 21 refineries. These facilities produced about 59.5 percent of the GHG emissions from industrial sector in 2008 that will be covered by the cap-and-trade program (see Table J-4). Refineries can be classified as topping, hydroskimming or complex facilities.[44]

Topping refineries are the smallest and least intricate facilities. These refineries usually have small throughputs, and produce either intermediates or simple final products, such as asphalt. They usually have only an atmospheric distillation tower and potentially a vacuum distillation tower. Hydroskimming refineries have reforming and desulfurization process units in addition to basic topping units. Because these refineries lack the most sophisticated refining equipment, the products they can produce are limited relative to complex facilities.

Complex refineries are larger, use the most technologically advanced refining equipment and machinery, and are the most energy-intensive facilities. The complex refineries—13 of the 21 refineries in the State—produce significant volumes of highly valued transportation fuels. On average, these refineries produce about 935,000 barrels of gasoline per day for California, with a maximum production capability on a short-term basis of 1,000,000 barrels of gasoline per day.[45] These complex refineries have additional process units to "crack" the heavy gas oils and distillate oils into lighter, more valuable products. Using a variety of processes, including distillation, reforming, hydrocracking, catalytic cracking, coking, alkylation, and blending, these refineries produce many different products.

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[44] California Energy Commission Energy Almanac. California's Oil Refineries. http://energyalmanac.ca.gov/petroleum/refineries.html (accessed 10/10/10).

[45] *Proposed California Phase 3 Reformulated Gasoline Regulations, Initial Statement of Reasons*, California Air Resources Board, October 1999 http://www.arb.ca.gov/regact/carfg3/isor.pdf (accessed 10/10/10).

Refining heavier, higher-sulfur crude oil—more prevalent in the market today—into clean transportation fuels requires a high quantity of hydrogen. The majority of the complex refineries in California have a hydrogen plant on their premises, but others receive hydrogen through an offsite third-party producer. For the purposes of allowance allocation staff believes that third-party hydrogen plants, calciners, sulfur acid plants and other related units should be included as part of the refining benchmarking methodology.

Considering the complex nature of the refining process, staff believes that there are three main factors that would affect a refinery's emission intensity unrelated to process efficiency or energy efficiency improvement decisions.

- *Differences in crude oil inputs.* Heavier sour crude oil inherently takes more energy to process.
- *Differences in product outputs.* Producing greater quantities of lighter, cleaner output from the same crude input requires more processing and thus more energy.
- *Differences in configuration.* Different refineries are configured to perform a different combination of processes.

Staff considered three alternatives to developing an appropriate benchmarking metric for the refining sector:

- Simple Output Barrel Approach (Barrels of Product Produced)
- Solomon Energy Intensity Index (EII)
- Carbon Weighted Barrel (CWB)

Of the three approaches considered, the simple barrel and the EII approach appear to be viable in the near term (for use in the first compliance period of the cap-and-trade program). Staff believes that the carbon weighted barrel approach may be feasible to implement for the second and third compliance period of the program. Each approach is described in more detail below.

Staff will focus on developing a version of the EII approach for use at the start of the program, but will continue to weigh the technical and legal issues with each approach and will review comments received on the proposed regulation before developing an approach to include in the final regulation.

Alternative 1: Simple Output Barrel Approach

The simplest product output metric that can be conceived for the refining sector is the total product produced from each facility. Under such a "simple barrel" approach each refiner would report annual production of total barrels of major petroleum products such as gasoline, diesel, jet fuel and residual fuel oil to ARB.

The output metric used for this approach would be:

- Total barrels of product produced.

The U.S. EPA MRR requires suppliers of petroleum products (including refineries) to report the output of each petroleum product.[46] The information required by the U.S. EPA MRR is similar to reporting currently required by the United States Energy Information Administration[47] and the California Energy Commission.[48] This output metric is simple and relatively transparent. However, it may disadvantage more complex refiners relative to their simpler competitors.

Alternative 2: Solomon Energy Intensity Index (EII)

Solomon Associates has been developing energy-efficiency benchmarking for energy-intensive industries for the past 29 years.[49] They maintain an extensive database for refineries' energy consumption and process data covering over 70percent of global refining capacity.

Allocation could be based on Solomon Associate's proprietary Energy Intensity Index (EII) metric. This metric is a measure of a facility's energy efficiency relative to its peers. Under this approach each refinery is assigned a single EII value developed by Solomon by comparing a refinery's actual energy consumption with the "expected" (or standard) energy consumption for a similar size and configuration. The lower a facility's EII, the more energy efficient it is. Since GHG emissions from a defined process unit can largely be determined by how much energy the process consumed to perform a certain operation, there is a strong relationship between energy efficiency and GHG emissions efficiency.

An allocation based on EII might require reporting of details of each refinery's process unit throughput (rather than just total product output) to calculate the amount of free allowances.

The Western States Petroleum Association (WSPA) recommends using the EII approach for the first compliance period because a more complex or

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[46] U.S. EPA MRR requirements for the suppliers of petroleum products are specified in Subpart MM. See http://www.epa.gov/climatechange/emissions/subpart/mm.html (accessed 10/10/10).

[47] U.S. EIA reporting requirements for refineries are found at: http://www.eia.gov/oil_gas/petroleum/survey_forms/pet_survey_forms.html#supply (accessed 10/10/10).

[48] CEC's Petroleum Industry Information Reporting Act and a summary of the associated reporting requirements are found at: http://www.energy.ca.gov/piira/ (accessed 10/10/10)

[49] For company information of Solomon Associates see: http://solomononline.com/ (accessed 10/10/10).

comprehensive benchmarking approach will take time to develop. WSPA also recommends that EII methodology should be “tempered” to moderate differences in efficiency among individual refineries.

Whereas the majority of California refineries currently participate in Solomon’s survey for EII, there are some facilities that do not. ARB may obtain comparable index values from non-survey-participating facilities by requesting that they participate in the survey, or by using existing public efficiency quantification tools. Alternately ARB might employ a simple output barrel approach targeted toward the types and outputs typical to non-survey-participating facilities.

Staff believes that the EII approach might address more appropriately the complex nature of the refining sector compared to the simple output barrel approach because it accounts for the differences in energy demand required to perform different processes within refining activities.

Since the EII approach would rely on Solomon Associates’ proprietary database and efficiency index, ARB staff would need to work through potential legal and confidentiality concerns and balance the need for transparency with the need to protect proprietary information.

Alternative 3: Carbon Weighted Barrel (CWB)

The carbon weighted barrel approach is similar to Solomon’s EII approach but more explicitly GHG intensity oriented. The CWB approach would also be based on a database controlled by Solomon. Under this approach each defined process unit is assigned a carbon weighted factor (CWF) normalized to the distillation process. A carbon weighted barrel value can then be calculated by summing the CWF multiplied by the throughput for each process unit at a given refinery.

The benchmarked metric for this approach would be the total CWB value calculated for each refinery.

This approach is designed to evaluate the GHG efficiency of each process unit. A refinery’s overall GHG efficiency can be determined by the sum of the GHG efficiency for each unit. Therefore, the configuration or the difference in inputs and outputs would not skew the level of allowances a refinery receives.

Similar to EII, CWB relies on Solomon Associates’ proprietary database and would require each refinery’s throughput, rather than product output, to calculate the amount of free allowances.

The EU ETS is proposing to rely on Solomon’s database to establish a benchmarking methodology for the refining sector in its Phase III actions.

Glass Manufacturing (NAICS 327211, 327213 and 327993) / Glass Production (EPA Subpart N)

Thirteen glass manufacturing facilities are located in California. Three of these facilities manufacture flat glass, five manufacture container glass, four manufacture fiberglass, and one facility is engaged in specialty glass manufacturing.[50] For the reporting year 2008, four out of thirteen facilities were below the emission threshold (25,000 metric tons of CO_2e per year) for inclusion in the cap-and-trade program. The nine facilities exceeded the 25,000 metric ton CO_2e threshold produced about 1 percent of total GHG emissions from the industrial sector that would be covered by the cap-and-trade program (see Table J-4).

Glass production produces GHGs from fuel combustion and from the calcinations of carbonate-based raw materials. Reporting of process emissions from calcinations was not required for the reporting year 2008 and 2009 under ARB MRR. It is required under the U.S. EPA MRR starting from the reporting year 2010.

ARB proposes to employ three output metrics for this sector.

- Ton of flat glass pulled
- Ton of container glass pulled
- Ton of fiberglass pulled

All three glass manufacturing processes can be characterized by five major steps: batch preparation, melting, refining, forming, and post-forming processes. Each step, however, can have significant differences depending on the types and uses of glass products. Differences in the melting step include the type of furnace used, average furnace temperature, temperature profile, residence time, and other variables. Similarly, there are differences in all other steps of the glass manufacturing process due to differences in final product requirements. It is therefore appropriate to have three separate benchmarks for these three categories of glass products.

The US EPA MRR requires glass manufacturers to report the annual quantity of glass produced for each continuous glass melting furnace and for all furnaces combined.[51] Although US EPA MRR does not require specifying the type of glass, a facility is typically engaged in only one type of glass manufacturing which

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[50] For detailed description of California glass manufacturing see:

Glass Manufacturers Surveys: Summary of Selected Results. California Air Resources Board. October 2010. http://www.arb.ca.gov/cc/glass/glass.htm (accessed 10/10/10).

[51] US EPA MRR requirements for glass producers are specified in Subpart N. See http://www.epa.gov/climatechange/emissions/subpart/n.html (accessed 10/10/10).

is assigned a distinct NAICS code. All Californian glass manufacturers expected to be included in cap-and-trade produce only one product type (i.e., either flat, container or fiberglass).

Lime Manufacturing (NAICS 327420) / Lime Manufacturing (EPA Subpart S)

Lime is derived by calcining limestone. Limestone is a naturally occurring and abundant sedimentary rock consisting of high levels of calcium and/or magnesium carbonate. If the ratio of magnesium carbonate relative to calcium carbonate is high, it is called *dolomite*. Dolomite-derived product is called *dolime*.

Currently only one lime manufacturing plant operates in California. This facility processes dolomite to produce dolime. In 2008 this facility produced less than 0.1 percent of total GHG emissions from the industrial sector that will be covered by the cap-and-trade program (Table J-4).

Reporting of process emissions from calcinations was not required for the reporting year 2008 and 2009 under ARB MRR but is required under the U.S. EPA MRR starting from the reporting year 2010.

Staff identified two potential product output metrics in lime manufacturing:

- Ton of lime produced from limestone
- Ton of dolime produced from dolomite

Since there is only one facility in this sector in California, and that facility processes dolomite, staff proposes to establish a benchmark using a dolime output metric.

U.S. EPA MRR requires lime manufacturers to report monthly or annual amount of lime produced (or sold + unsold, tons) by lime type.[52]

Paper and Paperboard Mills (NAICS 322121 and 322130) / Pulp and Paper Manufacturing (EPA Subpart AA)

Paper is a thin material mainly used for writing or packaging that is produced by pressing together moist fibers such as cellulose pulp derived from wood. A variety of paper products are produced, depending on the quality of input (pulp) and the end use: newsprint, uncoated fine paper, coated fine paper, tissue, container board, carton board, and so forth.

[52] U.S. EPA MRR requirements for lime manufacturers are specified in Subpart S. See: http://www.epa.gov/climatechange/emissions/subpart/s.html (accessed 10/10/10).

Paper manufacturing has three main processes: the pulp making, recovered paper processing and paper production. No pulp making is currently conducted in California. Five paper and paperboard mills are engaged in recovered paper processing and/or the paper production process. These facilities produced 1.3 percent of total GHG emissions from covered industrial facilities in 2008 (see Table J-4).

Staff proposes the following output metrics for the sector.

- Ton of processed recovered paper
- Ton of uncoated fine paper
- Ton of coated fine paper
- Ton of tissue paper
- Ton of containerboard
- Ton of carton board

Paper products were divided into these categories based on the difference in the processes that result in different level of energy requirements.[53] The GHG emission levels per unit product will also be different if the final product was processed from purchased virgin pulp or from secondary fiber from recycled paper. No virgin pulp producer operates in California, but some facilities process recycled paper to make secondary fiber.

The U.S. EPA MRR requires total annual production of pulp and/or paper products produced.[54] Since it does not require specifying the feedstock type (manufactured or purchased, virgin pulp or secondary fiber from recycled paper), ARB proposes to include reporting requirement for feedstock types in its proposed revision to MRR.

Iron and Steel Mills (NAICS 331111) / Iron and Steel Manufacturing (EPA Subpart Q)

Iron and steel manufacturing is a chain of various processes to convert iron ore to final products such as frames, sheets and pipes.

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[53] The classification is consistent with EU ETS benchmarking approach for the pulp and paper sector. http://ec.europa.eu/environment/climat/emission/pdf/bm/BM%20study%20-%20Pulp%20and%20paper.pdf (accessed 10/10/10)

[54] U.S. EPA MRR requirements for pulp and paper manufacturers are specified in Subpart AA. See http://www.epa.gov/climatechange/emissions/subpart/aa.html (accessed 10/10/10)

Iron and steel production involves the creation of crude steel (slabs, blooms or billets) from either virgin iron ore or from scrapped iron and steel. In NAICS coding systems these activities are typically classified as 331111 (iron and steel mills). Blast oxygen furnaces are usually used to process virgin iron ore and electric arc furnaces (EAF) are widely used to process scrapped iron and steel. One “mini-mill” facility operates in California, processing scrap steel and iron to make reinforcing bars using EAF. It produced less than 0.1 percent of total GHG emissions from covered industrial facilities in 2008 (Table J-4).

Reporting of process emissions was not required for the reporting year 2008 and 2009 under ARB MRR. It is required under U.S. EPA MRR starting from the reporting year 2010.

Staff proposes to establish the following output metric for this facility:

- Ton of steel produced using EAF

The U.S. EPA MRR requires iron and steel manufacturers to report annual production quantity for iron and raw steel.[55]

<u>Rolled Steel Shape Manufacturing (NAICS 331221) / General Stationary Fuel Combustion Sources (EPA Subpart C)</u>

In rolling facilities steel slabs—the product of primary production described above—are introduced in reheat furnace and rolling mills to be reduced to sheet thickness to make hot rolled steel sheets. Hot rolling is assigned 331221(rolled steel shape manufacturing) in the NAICS system. Hot rolled steel coils can be further treated to make galvanized steel sheet. One operator in California processes purchased slab to hot rolled steel sheets and further processes them to make galvanized steel sheets. Another operator processes galvanized sheets from purchased rolled steel sheets. Together they produced approximately 0.4 percent of total GHG emissions from covered industrial facilities in 2008 (see Table J-4).

Staff proposed to establish two output metrics for this secondary steel processing:

- Ton of hot rolled steel sheet
- Ton of galvanized steel sheet

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[55] U.S. EPA MRR requirements for iron and steel producers are specified in Subpart Q. See http://www.epa.gov/climatechange/emissions/subpart/q.html (accessed 10/10/10)

In the U.S. EPA MRR secondary iron and steel processing that does not fall under iron and steel production defined in Subpart Q is considered to be *general stationary fuel combustions sources*. General stationary combustion sources are not required to report output information. ARB proposes to include reporting requirement for above outputs in its proposed revision to MRR.

Oil and Gas Extraction (NAICS 211111) / Petroleum and Natural Gas Systems (EPA Subpart W (proposed))

Crude oil and natural gas extraction is a large industry in California. In 2007, California produced 243 million barrels of crude oil, making it the fourth largest domestic producer of crude oil.[56] This production accounts for 38 percent of the total crude oil delivered to California refineries. The remaining balance of crude oil delivered to California refineries are 45 percent foreign, 16 percent Alaskan, and 1 percent from other sources.[57] In 2008, 39 reporting facilities produced 16.7 percent of total GHG emissions from industrial facilities that will be covered by the cap-and-trade program (see Table J-4).

The 2007 Annual Report of the State Oil and Gas Supervisor stated that 58 percent of California's 2007 crude oil production was extracted through enhanced oil recovery (EOR) techniques. Enhanced oil recovery techniques include thermal, waterflood, and gas injection. Thermal EOR injects steam into the formation, waterflood EOR injects water into the formation, and gas injection EOR injects natural gas, nitrogen, or carbon dioxide into the formation. Of the production that was recovered through EOR techniques, 68 percent used thermal, 27 percent used waterflood, and 5 percent used gas injection techniques.

Staff proposes to establish three output metrics for this sector:

- Barrels of crude oil extracted using thermal production techniques
- Barrels of crude oil extracted using non-thermal production techniques
- Million standard cubic feet of natural gas extracted

Although staff prefers to apply a "one product, one benchmark" principle, an exception was made for oil extraction because non-thermal alternative

[56] *2007 Annual Report of the State Oil and Gas Supervisor*. California Department of Conservation Division of Oil, Gas, and Geothermal Resources. 2008. ftp://ftp.consrv.ca.gov/pub/oil/annual_reports/2007/PR06_2007.pdf (accessed 10/10/10).

[57] *Oil Supply Sources to California Refineries.* California Energy Commission. http://www.energyalmanac.ca.gov/petroleum/statistics/crude_oil_receipts.html. (accessed 10/10/10).

techniques are not usually substitutable in the wells where thermal EOR is applied.

Since some wells extract dry gas and no crude oil, a separate benchmark for natural gas extraction will be developed. The natural gas benchmark will not apply to natural gas production associated with crude oil production because there are no additional GHG emissions associated with co-extracted natural gas.

Currently the U.S. EPA MRR proposal for Subpart W does not include the requirement for the amount of crude oil or natural gas extracted. ARB proposes to include the outputs mentioned above as reporting requirements in its proposed revision to MRR.

Gypsum Product Manufacturing (NAICS 327420) / General Stationary Fuel Combustion Sources (EPA Subpart C)

The gypsum industry covers the activities ranging from mining the mineral gypsum to the production of final products. Products from this sector are plaster, plasterboards, gypsum fiberboard and gypsum blocks. Three gypsum operators are located in California. In 2008 they produced 0.2 percent of the GHG emissions from the industrial sector that will be covered by the cap-and-trade program (Table J-4). GHG emissions from gypsum product production are concentrated in the drying, calcining and finishing process.

Staff proposes to establish benchmarks using the following output metrics.

- Ton land plaster
- Ton plaster
- Ton glass reinforced gypsum (GRG)
- Ton plasterboard (and other finished products except for GRG)

Gypsum manufacturing is not treated as a separate sector in the U.S. EPA MRR; these facilities report as general stationary combustion sources. ARB proposes to collect the above output data in its proposed revision to ARB's MRR.

Soda Ash Mining and Manufacturing (NAICS 212391) / General Stationary Fuel Combustion Sources (Subpart C)

Soda ash is the trade name for sodium carbonate (NA_2CO_3), a chemical refined from the mineral trona or from sodium carbonate-bearing brines (both referred to as *natural soda ash*) and manufactured from one of several chemical processes (referred to as synthetic soda ash). It is an essential raw material in glass, chemicals, detergents, and other important industrial products.

The U.S. soda ash industry consisted of five companies in 2008, with a nameplate capacity of about 15 million metric tons. Wyoming is the largest soda ash-producing state, with about 90 percent of the total production. California has one operator that produced about 10 percent of the total U.S. production.[58] Wyoming produces soda ash from underground trona and the California operator produces soda ash from sodium-carbonate rich brines. Soda ash is synthetically produced in the regions where naturally occurring mineral feedstock is not available.

In California, one company conducts the operation at Searles Lake producing about 2.7 percent of capped GHG emissions from industrial sector in 2008 (see Table J-4). At this facility complex brines are first treated with carbon dioxide gas in carbonation towers to convert the sodium carbonate in solution to sodium bicarbonate, which will precipitate under these conditions. The sodium bicarbonate is separated from the remainder of the brine by settling and filtration and is then calcined to convert the product back to soda ash. The decarbonated brine is cooled to recover borax and Glauber's salt. A second dissolving, precipitating with carbon dioxide, filtering, and calcining the light soda ash to dense soda ash results in a refined product of better than 99 percent sodium carbonate.[59]

The CO_2 used in the carbonating process is recycled and only results in small fugitive emissions. U.S. EPA determined that the CO2 process emissions are assumed to be zero in this process, and that California operation does not fall under the definition of "soda ash manufacturing" (Subpart CC) of the U.S. EPA MRR because it processes brines rather than trona and there are no process emissions.[60]

Staff proposes to use the output metric *tons of soda ash produced* for this sector. ARB proposes to collect this output data as a reporting requirement in the proposed revisions to the MRR.

g. Energy Use Benchmarking

The energy use benchmarking methodology will be employed as a "fallback" approach for sources that are eligible for free allocation because they face a leakage or competitiveness risk but for which a product-based benchmark has

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[58] *2008 Minerals Yearbook, Soda Ash [Advance Release]*. US Geological Survey. January 2010 .http://minerals.usgs.gov/minerals/pubs/commodity/soda_ash/myb1-2008-sodaa.pdf (accessed 10/10/10).

[59] *Identification and Description of Mineral Processing Sectors and Waste Streams, Soda Ash*. US EPA. http://www.epa.gov/osw/nonhaz/industrial/special/mining/minedock/id/id4-soda.pdf (accessed 10/10/10).

[60] For the details of Subpart CC of the U.S. EPA MRR (Soda Ash Manufacturing), see http://www.epa.gov/climatechange/emissions/subpart/cc.html (accessed 10/10/10).

not yet been developed.[61] Stationary combustion of fuel is the only source of GHG emissions for the majority of facilities that will be allocated under this approach. Many of these facilities have boilers that produce steam as a heat-carrier and/or direct process heaters or burners that use heat directly without producing steam.

The energy-use methodology is composed of two components:

- Total thermal energy from combustion (fuel-choice) benchmark
- Steam consumption (heat-carrier) benchmark

ARB will calculate a historical baseline of steam consumption and/or total thermal energy usage from fuel combustion for sources that receive allowances under this methodology.

i. Equation for Allocation Based on Energy Usage Benchmarks

Free allocation to each facility under the energy usage approach (A_t) will be based on Equation J-4.[62]

Equation J-4: Equation for Fallback Allocation Method Calculation

$$A_t = \left(Steam * B_{Steam} + TE * B_{Fuel}\right) * AF_{I,t} * c_t$$

The *Steam* term represents a historical baseline annual arithmetic mean amount of steam consumed, measured in million British thermal units (MMBtu), for use in any industrial process, including heating or cooling applications at the facility in question. This value will include any steam used to generate electricity consumed on-site but shall exclude any steam used to generate electricity for sale or transfer to off-site end users.

The *TE* term represents the historical baseline annual arithmetic mean amount of thermal energy produced from fuel combustion at a given facility, measured in MMBtu. This value will include any energy used to generate electricity consumed on-site but exclude any energy used to generate electricity for sale or

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[61] This approach is consistent with the fall-back approach proposed in the EU ETS benchmarking. See:

Methodology for the Free Allocation of Emission Allowances in the EU ETS Post 2012, Ecofys et al. for the European Commission, November 2009 http://ec.europa.eu/clima/policies/ets/docs/BM%20study%20-%20Project%20Approach%20and%20general%20issues.pdf (accessed 10/23/10)

[62] For a consideration of which emissions (or, equivalently, carbon costs) are considered under this methodology revisit Table J-7.

transfer to off-site end users. This value will exclude energy to generate the steam accounted for in the *Steam* term.

The *Steam* and *TE* terms used in this allocation formula will not be updated, expect in the case of a facility closure or expansion. Both terms are directly proportional to energy use, and updating the values for the allocation formula could result in a perverse incentive to decrease efficiency and increase energy use. For some industries, the approach may raise particular challenges due to degree of annual production variation. For example, production in the food processing industry is driven primarily by the quantity and quality of crop production over which the processors have no control and a contractual obligation to serve the growers. Staff will continue to explore options for addressing these types of concern.

The assistance factor, $AF_{l,t}$, is assigned based on an industry's leakage risk as shown in Table J-3. The cap decline factor, c_t, reflects the decreasing total level of allowances available over time.

B_{Steam} is the emissions efficiency benchmark per unit of steam and B_{Fuel} is the emissions efficiency benchmark per unit of energy from fuel combustion. Values for these benchmarks are shown in Table J-8 and discussed in more detail below.

Table J-8: Draft Benchmark Values for Use with the Fall-back Free Allocation Method for Industrial Sources

	Benchmark Value
B_{Fuel} Combustion Energy (Fuel Choice) Benchmark	5.307×10^{-2} allowances/MMBtu
B_{Steam} Steam Consumption (Heat Carrier) Benchmark	6.244×10^{-2} allowances/MMBtu steam consumed

ii. Details of the Combustion Energy Benchmark

The proposed combustion energy (fuel choice) benchmark is based on the assumption of natural gas as the benchmark fuel in California. Combustion of pipeline quality natural gas produces 5.307×10^{-2} $MTCO_2e$/MMBtu and staff proposes to use this factor as the combustion energy benchmark for the fall-back approach.[63]

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[63] The following input data was used to calculate the Natural Gas fuel choice benchmark factor:

Emission Factors: 53.02 kilograms (kg) CO_2 per MMBtu, 1.0×10^{-3} kg CH_4/MMBtu, 1.0×10^{-4} kg N_2O/MMBtu

Facilities that employ a lower-carbon fuel than natural gas will be rewarded under this approach.

iii. Details of the Steam-Consumption Benchmark

The proposed steam benchmark for use with the fall-back approach is based on a theoretical benchmark facility combusting natural gas to produce steam using an assumed boiler efficiency of 85 percent.[64] This represents an efficient industrial boiler system. The theoretical facility would produce 6.244 x 10^{-2} $MTCO_2e$/MMBtu of steam.[65] Staff proposes this value as the steam consumption benchmark.

Facilities that employ a lower-carbon fuel than natural gas or that produce steam in a highly efficient manner will be rewarded with excess allowances under this approach.

iv. Stringency of Energy-Use Benchmarking

The stringency of the fallback approach is not directly comparable to that of product-based benchmarks. However, the stringency of the steam term could be more closely harmonized with the selected stringency of product-based benchmarks by analyzing the efficiencies of boilers at facilities receiving free allocation under the energy-use approach and setting the benchmark boiler efficiency at a level equivalent to that selected for the product-based benchmarking (e.g., 90 percent of average, top quartile, top decile).

Global Warming Potentials: 21 = Global Warming Potential of CH_4, 310 = Global Warming Potential of N_2O. Source:

US EPA (2010) *Mandatory Reporting of Greenhouse Gases; Final Rule* 40 CFR Parts 86, 87, 89 et al. U.S. EPA. October 2009. http://www.epa.gov/climatechange/emissions/ghgrulemaking.html (accessed 10/10/10).

[64] The choice of this efficiency level was selected after consideration of the industrial boiler efficiency technologies required to generate offset credits under the U.S. EPA Climate Leaders program. See:

Climate Leaders Greenhouse Gas Inventory Protocol Offset Project Methodology for Project Type: Industrial Boiler Efficiency. U.S. EPA. August 2008. http://www.epa.gov/climateleaders/documents/resources/industrial_boiler_protocol.pdf (accessed 10/10/10).

[65] Note that if generation efficiencies are measured in energy terms they tend to not differ much between water and steam at different temperatures. See:

Methodology for the Free Allocation of Emission Allowances in the EU ETS Post 2012. Ecofys et al. for the European Commission. November 2009. http://ec.europa.eu/clima/policies/ets/docs/BM%20study%20-%20Project%20Approach%20and%20general%20issues.pdf (accessed 10/23/10)

v. Determining Allocative Historical Baselines

To implement energy-use benchmarking for allocation purposes at a given facility staff proposes that ARB would determine an annual average historical baseline activity level for each of the following:

- Fuel combusted for direct-fire applications for use in any industrial process, including heating or cooling applications at the facility in question (MMBtu)
- Steam produced, exported, imported, and consumed in any industrial process, including heating or cooling applications at the facility in question (MMBtu)
- Fuel combusted to create steam produced, exported, and consumed in any industrial process, including heating or cooling applications at the facility in question (MMBtu)
- Electricity produced, exported, imported, and consumed in any industrial process, including heating or cooling applications at the facility in question (megawatt-hours, MWh)
- Fuel combusted for electricity produced, exported or consumed in any industrial process, including heating or cooling applications at the facility in question (MMBtu)
- Facility emissions that would generate an obligation under the cap-and-trade program (metric ton CO_2e)

vi. Data Sources for Establishing Energy Use Baselines

Implementing the energy-use benchmarking would require a one-time report of the information listed above for any facilities receiving an allocation under this method. In establishing these annual baseline values, ARB staff will employ any available verifiable data that can be reported to ARB.

The ARB MRR data collection process could be modified to require this one-time report for the facilities expected to receive an allocation under this methodology. Staff envisions employing data reported to the California Climate Action Registry (CCAR) for the 2000–2007 period (if available) and the data reported to ARB for the 2008–2010 period as a check on any submitted values for the base period. In general, fuel use data expressed in energy units (using measured or default heat contents) can be extracted from datasets reported to ARB and to CCAR.[66]

[66] Staff will have to work with CCAR to disaggregate entity-wide emission reports into facility-specific data and to acquire confidential fuel use and emissions data in a more disaggregated format than available in public CCAR reports.

Steam production data is currently only reported only to ARB for cogeneration units (in the form of useful thermal output). Data on imported steam and exported electricity is reported to ARB for all facilities.

vii. Accounting for New Entrants and Plant Closures

Facilities eligible to receive allowances under the fall-back methodology that begin to operate after 2010 will need to be assigned baseline values by ARB as they enter the program. Facilities that close will no longer be eligible to receive free allocations under the cap-and-trade program. Removing this free allocation for closed facilities should provide a disincentive to leakage but may eliminate some emissions-reduction opportunities.

viii. Maximum Allocation Relative to Historical Emission Levels

The proposed regulation includes a maximum on the amount of allowances that can be received under the fallback methodology. This limit is expressed as 110 percent of the maximum historical level of annual emissions from the facility during the base period. This will allow for early actors to be recognized but avoid compensation with a level of allowances significantly beyond compliance obligation. ARB will calculate this maximum allocation value for each facility.

2. Free Allocation to Electrical Distribution Utilities for Customer Protection

Allowances will be freely allocated to the electrical utilities that distribute electricity to California ratepayers. These distribution utilities are receiving these allowances on behalf of these customers. Utilities must use this allowance value to reduce the costs of AB 32 policies on their ratepayers.

a. Types of Electricity Entities in California

The California electricity sector is highly complex. As shown in Figure J-8 different types of entities produce, import, transmit and distribute electricity to the end customers. In general, the entities that supply power to retail customers are classified into the following four categories: investor-owned electric utilities (IOUs), publicly owned electric utilities (POUs), electricity service providers (ESPs) and community choice aggregators (CCAs).

The vast majority of electric load is served by the IOUs and the POUs. These utilities are all vertically integrated to some degree—they own generation facilities, procure electricity on the open market, operate transmission and distribution systems, and sell power to retail customers. These entities have renewable energy procurement requirements under the Renewable Electricity Standard (RES) approved for adoption by ARB in September of 2010.[67] The

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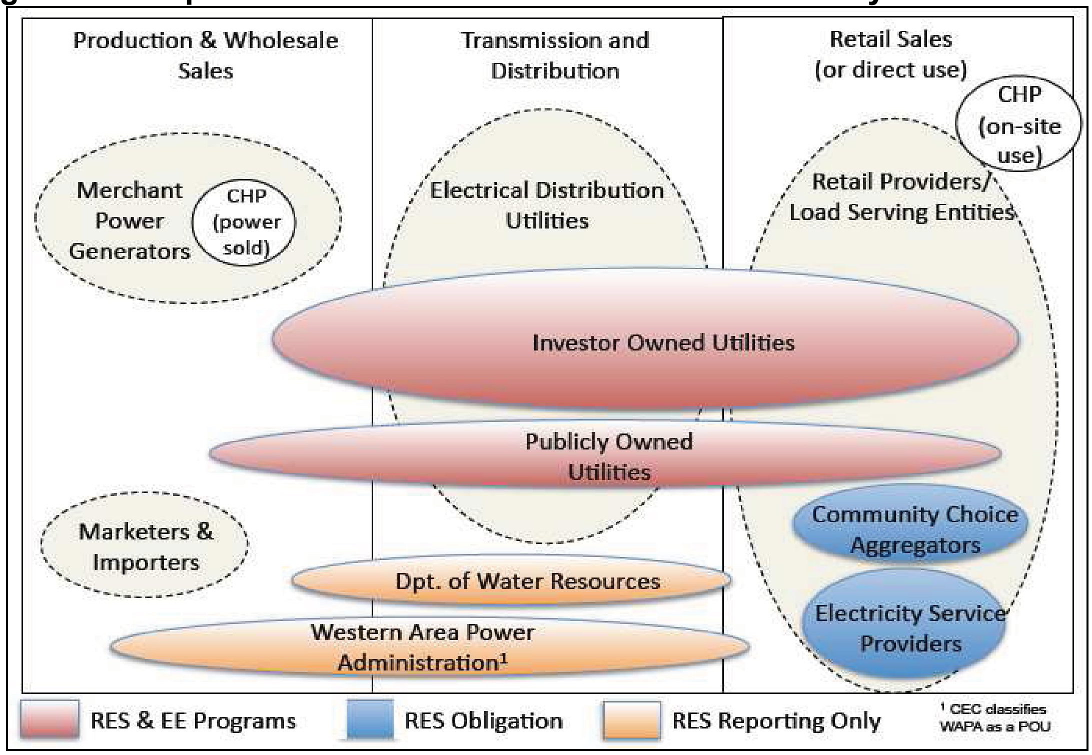
[67] *Renewable Electricity Standard*, California Air Resources Board, 2010. Online, http://www.arb.ca.gov/energy/res/res.htm (accessed 10/10/10)

utilities also facilitate energy-efficiency (EE) programs for customers within their distribution service territory.

Figure J-8: Depiction of Entities in the Californian Electricity Sector



As emphasized above, these entities are receiving free allowances on behalf of their retail ratepayers for which they provide distribution service. The regulation contains provisions to ensure that any allowances allocated to distribution utilities are used on behalf of their customers and cannot be used to create a competitive advantage relative to other market participants in sourcing or operating electrical generation facilities or servicing retail load.

b. Bases for Distribution to Distribution Utilities

In the California stakeholder process, and in the development of federal climate legislation, the proposals for allocation to electric utilities on behalf of their customers have focused primarily on two potential bases for that allocation—retail sales and historical emissions.[68] Allocating allowances to distribution

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[68] Waxman-Markey includes an even 50-50 split between retail sales and historical emissions. The Kerry-Lieberman, Discussion Draft weighted the factors as 75 percent historical emissions, and 25 percent retail sales. See:

H.R. 2454: American Clean Energy and Security Act of 2009. U.S. House of Representatives http://www.govtrack.us/congress/bill.xpd?bill=h111-2454 (accessed 10/10/10), and utilities on a sales basis would be relatively straightforward: whereas, an historical emissions-based approach would be somewhat more complex. The basic incentives created by either of these bases are shown in Table J-9.

Table J-9: Incentives Created by Options for Allocating to Distribution Utilities

	Historical Emissions	Retail Sales (Updating)	Retail Sales Adjusted for EE (Updating)
Rewards Early Action (Generation Resource Choices)	-	+	+
Rewards Early Action (Energy Efficiency)	-	-	+
Recognizes Differences in Historical Mix of Generation Resources	+	-	-
Incentive for Future Switch to Cleaner Resources	+	+	+
Incentive for Future EE	+	-	+
+ Positive incentive; - Negative incentive (or no incentive)			

i. Allocating on a Retail Sales Basis

Under the retail sales basis, allowances would be given to distribution utilities in proportion to the rolling average of the retail sales in their distribution service territory during the three years prior to the allocation budget year.[69] The

American Power Act: Discussion Draft. U.S. Senate. http://kerry.senate.gov/imo/media/doc/APAbill3.pdf (accessed 10/10/10).

[69] The "updating" of this term is somewhat analogous to updating the product output measurements in the formula for allocating to industrial covered entities as discussed in the benchmarking section above.

individual provider allocation would be prorated based on the total retail sales in California during this period.

Some stakeholders have argued that a retail sales-based allocation would provide incentives for distribution utilities to increase sales rather than invest in energy efficiency, and that a measure of energy efficiency should be included in the sales calculation to reward early actions and to avoid incentives to increase sales. Staff has considered an adjustment for energy-efficiency actions. However, due to the fact that no uniform metric for measuring the impact of energy-efficiency programs currently exists across all distribution utilities, staff does not feel that such an adjustment is technically feasible at this time for use in a sales-based allocation formula that is updated annually.

ii. Allocating on a Historical Emissions Basis

Under the historical emissions basis, allowances would be distributed to distribution utilities in proportion to the historical emissions of sources and purchases used to serve each utility's load in the historical period of 2004–2006.[70] The individual provider allocation would be prorated based on the total emissions used to serve load in California during this period.

Employing this historical period would necessitate backcasting emissions from each utility during this period. Staff notes that all of the five largest utilities in the state reported their GHG footprint through the California Climate Action Registry for this period. This CCAR data is not fully consistent across utilities; however, it may still be able to provide a useful point of documentation for this backcasting.

iii. Ongoing Consideration of Options

Staff is continuing to evaluate possible methods for allocating allowances among the electrical distribution utilities. Staff recognizes that substantial demands have been and are continuing to be placed on the electricity sector to realize environmental and energy security goals for California:[71]

- Energy efficiency and demand response are the top priority for meeting future energy needs.

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[70] Proponents of allocating to distribution utilities on the basis of historical emissions have proposed this three-year period because it contained years of both high and low hydropower production. It also represents a period prior to when AB 32 became effective so that distribution utilities who have taken action since the enactment of AB 32 are not penalized.

[71] A summary is presented in *California's Clean Energy Future. An Overview on Meeting California's Energy and Environmental Goals in the Electric Power Sector in 2020 and Beyond*. California Energy Commission Report CEC-100-2010-002. September 2010. http://www.climatechange.ca.gov/energy/index.html (accessed 10/14/2010).

- Renewable energy is the preferred electricity supply resource, reflected in recently adopted renewable energy procurement requirements under the Renewable Electricity Standard.[72]

- Combined heat and power and distributed generation are priorities, including the California Solar Initiative and the New Solar Homes Partnership.

- Continued reductions in the impacts of power plants on air quality and coastal and estuarine environments will be achieved with plant efficiency and control improvements.

- Electrification of transportation is expected to contribute to energy security as well as to environmental goals.

Utilities are committing significant resources to achieve these policy objectives, most of which help reduce GHG emissions.

Staff must also consider that although all the utilities are moving toward these common policy goals, they currently have very different GHG emission profiles and emissions-reduction opportunities. Some utilities, particularly in Southern California, have relied more on coal-fired electricity generation and have long-term commitments that were developed prior to concerns about GHG emissions and AB 32. Although Senate Bill 1368 (SB 1368, Perata, Chapter 598 Statutes of 2006) and its implementing regulations will result in substantial displacement of coal-based electricity imports from long-term commitments, existing contracts and ownership agreements have substantial remaining time periods remaining, and would be costly to terminate.[73] In Northern California hydroelectric resources are more abundant, and combined with natural gas, result in a lower-emitting generation portfolio. Additionally, the absence of long-term contracts tied to high-emitting resources provides more flexibility to reduce emissions prior to 2020.

This diversity of resources and emissions-reduction opportunities across utilities creates challenges for defining an allowance allocation method that provides proper incentives, is affordable for all utilities, and is considered equitable. To date, staff's analyses of options based on historical emissions and sales have not identified an allocation method that provides appropriate incentives for emission reductions and is considered affordable and effective for all utilities. The contracts for high-emitting resources pose a particular challenge. Some contracts

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[72] *Renewable Electricity Standard*, California Air Resources Board, 2010. http://www.arb.ca.gov/energy/res/res.htm (accessed 10/10/10).

[73] Stakeholders have indicated that some existing agreements run through 2027.

expire as soon as 2016, providing substantial opportunity for emission reduction prior to 2020. Other commitments run past 2020, limiting the opportunity to reduce emissions from the existing resource in the next 10 years, even as substantial investments are made to acquire new low-emitting resources. Simply considering historical emissions and sales does not adequately reflect these divergent circumstances. Also, the allocation method must avoid inadvertently providing an incentive to continue using high-emitting resources, but rather must provide incentives to ensure that all cost-effective efforts are undertaken to achieve necessary emission reductions.

Staff is continuing to examine options and obtain feedback. With input from stakeholders, staff's analysis is examining additional factors that could be considered beyond historical emissions and sales, including, among other things, the dates of contract expirations, the rate of achievement of renewable and other low-emitting resources, incentives for early reductions in commitments for high-emitting resources, and other program design features. Staff will continue to work with stakeholders and will review comments received during the comment period on this proposal. Staff may bring a more detailed proposal to the Board based on this ongoing effort, and will circulate any such proposal for review in a subsequent 15-day comment period.

c. Limitations on the Use of Auction Proceeds to Ratepayer Protection

The investor-owned utilities (electrical corporations) will receive free allocation into a special type of account called a *limited use holding account*. Publicly owned utilities will have the option to have allocations distributed to their limited use holding accounts or to their compliance accounts.

Utilities will be required to monetize all allowances placed into limited use holding accounts through sale at auction. The proposed regulation requires that a distribution utility offer each freely allocated allowance placed into a limited use holding account at auction at least once in the calendar year corresponding to the budget year from which that allowance was issued. If an allowance is not sold in the calendar year corresponding to the allowance's budget year (i.e., if the auction reserve price is not met for that allowance), the utility must offer this allowance at auction at least once in each of the following calendar years until it is sold.

Monetization of allowances through auction is intended to ensure that the amount of value given to distribution utilities is transparent to the public and that this value is used on behalf of electricity ratepayers. This practice will also ensure that freely allocated allowances to a distribution utility will not affect competition in the electricity generation market (where utilities compete with merchant power producers).

Proceeds from sale of allowances at auction will generate a new revenue stream for a distribution utility. This revenue stream will need to be accounted for along with all other revenues and costs in the ratemaking actions of the PUC and the governing bodies of the POUs. The statutory goals of AB 32 will apply to all utility proceeds raised through auctioned allowances and all proceeds must be used to the benefit of ratepayers rather than for the benefit of shareholders (or any other entities). Distribution utilities will be required to report to ARB on how they use proceeds generated from the sale of allowances at auction.

The proposed regulation limits how the return of allowance value to customers might function. Staff believes that any rebates to residential customers should be made as separate payments and not simply deducted from customer bills. The purpose of this restriction is to ensure the carbon price is reflected in residential electric rates.

d. Protection of Leakage-Exposed Industrial Ratepayers

As shown in Table J-7, electric distribution utilities are expected to reduce the carbon costs faced by industrial sources due to power purchased from the grid. Staff envisions this compensation would be in line with that given to other customer classes. However, the form of compensation to industrial ratepayers might best be structured as energy-efficiency programs rather than per-customer rebates. The details of how to administer such compensation will be determined by the PUC and the POU governing boards. A key goal will be to ensure that industrial facilities compensation will not unintentionally skew choices between producing electricity on-site or purchasing from the grid.

3. Allocation of Allowances Associated with Distributed Use of Natural Gas.

Beginning in 2015, natural gas distribution utilities will responsible for the emissions associated with natural gas delivered to customers not directly covered under the cap-and-trade program, including residential, commercial and small industrial customers. Following comparable arguments to those applied in the electric sector, the natural gas distribution utilities have requested that allowances be allocated to them on behalf of their customers. The investor-owned natural gas utilities have put forth a proposal that would involve ARB allocating an amount of allowances to the gas utilities based on the proportionate share of total capped emissions from residential and commercial natural gas use over a historical period. In 2008 these emissions represented approximately 14 percent of the emissions expected to be capped under the broad scope of the program (55.1 MMTCO2e).

Under the utilities' proposal, the amount of allowances allocated to the sector would decline over time in proportion to overall cap decline. Division of these allowances among individual utilities would be based on a three year average of deliveries to customers in some multi-year historical period. The utilities requested that ARB allow 90 percent of the allowances to be directly retired to reduce the utility compliance obligations, with the remaining 10 percent offered on consignment by the utility at auction. The proceeds raised from the sale of this 10 percent would be used to fund customer energy efficiency and other GHG-reduction programs.

ARB is considering the proposal put forth by the investor-owned natural gas distribution utilities, along with alternatives approaches. One alternative that would allocate allowances to distribution utilities and still maintain a carbon price signal in natural gas rates would be for ARB to require the utilities to offer all allowances on consignment at auction. Proceeds from the sale of these allowances could then be used to provide rebates to customers on a non-volumetric basis. The CPUC would determine the final amount of proceeds dedicated to rebate programs or to customer energy efficiency and other GHG-reduction programs. This treatment would be analogous to how investor-owned utilities are expected to protect their customers in the electricity sector.

Another alternative under consideration would be to have the allowances that are associated with emissions from dispersed natural gas combustion auctioned and return the allowance value to customers through action by the Governor and the Legislature. This approach is analogous to how other distributed fuel use (i.e. gasoline, diesel, and propane) is treated under staff's current proposal.

E. Auction and Sale of California Greenhouse Gas Allowances

This section describes the advantages of auctioning allowances and the specifics of how allowances will be auctioned. The auction details described in this section are found in Subarticle 10 of the proposed regulation.

1. Advantages of Auctioning as an Allocation Method

Many existing cap-and-trade programs allocate a share of allowance value through the use of an auction. Theory and practice provide several important reasons for using an auction to allocate at least some share of allowance value.

Auctions facilitate price discovery and support the smooth functioning of the allowance market. Auctioning is especially important for price discovery when the majority of the allowances are distributed through administrative allocation. Without a centralized market, transactions costs are likely to impair the efficient flow of allowances. That is, search costs could arise as buyers and sellers attempt to find each other, and in the absence of a well-established trading price, bilateral bargaining arrangements could make it difficult for buyers and sellers to agree on mutually beneficial transactions. In the early days of the U.S. Acid Rain program the existence of an allowance auction helped to reduce volatility and transactions costs by establishing a single market price.[74]

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[74] Before the first auction occurred, initial bilateral trades revealed a wide distribution of prices for emission allowances, reflecting uncertainty about the cost of emissions reduction among compliance entities and about the functioning and liquidity of the emerging market. The first auction in April 1993 cleared at a price that was well below most of the previous trades, and the second auction a year later did so again. While some observers doubted the performance of the auctions at the time, within weeks of the second auction the price of trades in the market fell to

Auctioning is administratively transparent and efficient. While the establishment of auction rules and the collection of bids and distribution of allowances is not without some administrative complexity, the determinate of allowance allocation under an auction mechanism—allowances are allocated to the highest bidders—is plain. To the extent that firms with the highest valuations are also the firms that add the most value to the California economy, initially distributing allowances to these firms through auction could help to reduce the administrative cost of bilateral trading and the cost of emissions reductions.

Auctioning treats new entrants fairly and rewards efficient firms. The introduction of a price on carbon induces Californians to demand greener products. Therefore, new businesses may be founded to meet these growing demands. Some of these businesses may be directly regulated under the cap-and-trade program and be responsible for acquiring and surrendering allowances. Auctioning allowances would treat these potential new businesses equitably relative to previously established firms. Similarly, all existing firms will be induced to make direct emissions reductions. Auctioning is among a class of allocation methods that rewards firms that make direct emissions reductions by requiring them to surrender fewer emissions allowances. Additionally, proceeds from the auction of allowances could be used to invest in emerging technologies to help California meet our long-term emissions-reductions goals.

2. Auction Design Choices

The details of the auction design selected by ARB are described in Volume I, Chapter II of this Staff Report.

3. Appropriation of Auction Proceeds for AB 32 Purposes

An important feature of the cap-and-trade program is the distribution of proceeds from the auction of emissions allowances. Beginning with a small share in the first compliance period, and increasing in share in the second and third compliance periods, the Governor and the Legislature will be responsible for determining how to apportion the proceeds collected from the auction of

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the level observed in the auction and since then the auction has tracked the market, and vice versa, very closely. See:

Markets for Clean Air: The U.S. Acid Rain Program, Ellerman, Joskow, Schmalensee, Montoro, & Bailey, Cambridge Press. 2000.

Auction Design for Selling CO_2 Emissions Allowances under the Regional Greenhouse Gas Initiative. Charles Holt, William Shobe, Dallas Burtraw, Karen Palmer, Jacob Goeree, Erica Myers. October 2007. http://www.rff.org/focus_areas/features/Documents/RGGI_Auction_Design_Final.pdf (accessed 10/10/10).

allowances. How the Governor and Legislature apportion this portion of total allowance value will be important to the legacy of the cap-and-trade program.

Proceeds from the auction could be put toward a number of different areas, such as existing GHG emission-reduction programs; efforts to adapt to future climate change; research, development and deployment (RD&D) of new clean technologies; capital investments including new infrastructure; job training; and programs or projects centered on disadvantaged communities. Additionally, public expenditures could be used to help fund the efforts of state and local agencies to meet their legislated GHG mandates. Staff has offered a potential framework for investment in GHG reductions in Section C of this Appendix.

Investments in emerging technologies could help California meet its long-term emissions-reduction targets. In addition to the 2020 target laid out in AB 32, the Governor has set a target of reducing emissions to 20 percent of 1990 levels by 2050. Achieving these reductions will require advanced technology that is not currently available.

An alternate approach for the use of revenue would be for tax-rate reduction, which could lower the costs of the cap-and-trade program by increasing the efficiency of the tax system. Income and sales taxes lead to reduced production and incomes by reducing work incentives as well as incentives to save and invest. Distortionary taxes reduce the size of the overall economy. The magnitude of the distortion increases with the tax rate. The impact on the economy from these taxes has been estimated to fall in the range of $0.20 to $1.00, which means that for every extra dollar collected from these taxes, the loss of value created by the private sector is between $1.20 and $2.00.[75] Using auction proceeds to finance cuts in the marginal rates of these existing taxes enables the state to avoid this excess burden. In effect, by using auction proceeds to finance tax cuts, California could rely on a non-distortionary source of proceeds—the proceeds from allowance auction—as a substitute for distortionary taxes such as income and sales taxes.

Another option, applicable in other settings, is to use auction proceeds to finance reductions in the deficit. Reducing the budget deficit implies lower future taxes because it leads to lower debt and lower interest payments that must be financed

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[75] *On the Marginal Welfare Cost of Taxation,* E. Browning, American Economic Review, 1987, vol. 77, issue 1, pages 11-23 1987
http://econpapers.repec.org/article/aeaaecrev/v_3a77_3ay_3a1987_3ai_3a1_3ap_3a11-23.htm

The Excess Burden of Taxation, Dale W. Jorgenson and Kun-Young Yun, 1991, U.S. Journal of Accounting, Auditing, and Finance 6, No. 4 (Fall): 487-509.

Welfare Costs per Dollar of Additional Tax Revenue, C. Stuart, The American Economic Review, Vol. 74, No. 3 (June 1984), pp. 352-362 through future taxes. It therefore yields cost savings much as cuts in current tax rates do. However, since California law requires the state to balance its budget, the deficit-reduction issue does not apply here.

Many analysts have supported the idea of "green tax reform"—the substituting of environmental taxes such as carbon taxes or gasoline taxes for ordinary taxes such as income or sales taxes. Such reform causes the tax system to apply more to "bads" like pollution and less to "goods" like work effort, saving, or investment. Using auction proceeds is like green tax reform in that it changes the focus of government's proceeds collections, giving greater emphasis to pollution-related activities and less to ordinary taxes.

While there are strong arguments from an economic efficiency perspective for using auction revenue to adjust the tax structure, staff does not recommend that approach at this time. Decisions related to this type of fiscal reform would need to be made in the context of the larger decisions about California's fiscal system, and are more appropriately handled by discussions among the elected leaders of California than in establishing a program for reducing GHG emissions.

F. Summary of Stakeholder Comments and Formal Recommendations to ARB on the Topic of Allowance Allocation

Since the Scoping Plan process began, staff has received suggestions on how to best to allocate allowances in the cap-and-trade system. This section summarizes the recommendations and feedback ARB received from stakeholders during the regulatory development process.

1. Economic and Allocation Advisory Committee Recommendations

In May 2009, the California Environmental Protection Agency (Cal/EPA) and the ARB jointly appointed the Economic and Allocation Advisory Committee (EAAC) to provide recommendations on the design of an allocation scheme for a California cap-and-trade program. The EAAC was comprised of economic, financial, and policy experts with various backgrounds and areas of expertise. In January 2010, the EAAC formally presented their recommendations to Cal/EPA and ARB. This document contained a detailed set of suggestions on how to allocate allowances to all potential uses of allowance value.[76]

The EAAC recommended that ARB should rely primarily on auctioning as a mechanism for distributing allowances. The committee noted that auction is an especially efficient and transparent mechanism for allowance distribution, and that it facilitates price discovery. The EAAC also noted that the auction clearing price is expected to be equivalent to the actual cost associated with the marginal emissions abatement activity of all bidders. In contrast with free allocation,

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[76] See Appendix L: Economic and Allocation Advisory Committee Recommendations.

auctioning yields proceeds and thereby can reduce the extent of the government's reliance on fees for financing expenditures related to GHG-reduction goals. The committee conjectured that such an allocation scheme could help to reduce the overall costs of AB 32.

The committee recommended that free allocation be used only to address the risk of emissions leakage from trade-exposed industries. EAAC argued that the need for free allocation to address emissions leakage would likely be small. EAAC recommended that, whenever possible, border adjustments should be used in place of free allocation, because border adjustments may better maintain the integrity and intended incentives of the cap-and-trade program. Where border adjustments are not possible, output-based updating allocation—a method that allocates allowances on the basis of production levels—was favored by the EAAC. The committee noted that output-based updating was the only allocation scheme that protected industries at risk of leakage while simultaneously protecting consumers from price increases. Staff accepted this recommendation as part of the proposed approach to allowance allocation.

EAAC stressed the importance of designing flexible and transparent allocation mechanisms so that the cap-and-trade program could be easily adaptable to changing regional and federal conditions. The uniform-price, sealed-bid auction was considered by EAAC to be the most appropriate design for the allowance auction. In advocating this approach, EAAC noted its simplicity, transparency and ease of implementation. Staff included this as the auction format in the proposed regulation.

In recommending uses of allowance value, the committee looked to the objectives of AB 32. As such, the committee highlighted the goals of avoiding emissions leakage, the avoidance of disproportionate adverse economic impacts on low-income households and the avoidance of further environmental impacts to already disproportionately affected communities as chiefly deserving of allowance value. The committee anticipated that a relatively small share of the state's total allowance value would be needed for those purposes. The committee recommended that the remaining proportion of allowance value that was not devoted to those priority purposes should be returned to households, and used to finance investments to reduce emissions and other public expenditures, at a ratio of approximately three-to-one. Although legislative appropriation is required for these uses of allowance value, staff's proposed framework would allow for these uses of value to be pursued.

2. PUC/CEC Allocation Recommendations

The California Public Utilities Commission and the California Energy Commission (the Commissions) formally presented recommendations to ARB about the design of a cap-and-trade program for the electricity sector in October of 2008. This document contained a detailed set of suggestions on how to allocate allowances to entities in the electricity sector.[77]

The Commissions jointly recommend that ARB initially assign allowance value to the electricity sector based on the sector's proportion of total historical emissions during a selected set of baseline years in the California sectors included in the cap-and-trade program (including emissions attributed to electricity imports). Staff modified this recommendation slightly and allocated to the sector a portion of allowances equivalent to 90 percent of the 2008 sector-level emission share.

In subsequent years, the Commissions recommended that a portion of allowance value dedicated to each sector in the cap-and-trade program be reduced proportionally, using the overall cap trajectory chosen by ARB to meet AB 32 goals by 2020. In recommending this approach, the Commissions reasoned that it was appropriate for the economic costs of the emissions reductions be shared equally among all capped sectors. Staff adopted this approach in the allowance value given to electrical distribution utilities.

In regards to allocation to individual entities, the Commissions recommended that beginning in 2012, 20 percent of the emission allowances dedicated to the electricity sector be allocated to the retail providers of electricity on behalf of their customers and auctioned, with 80 percent distributed administratively for free to electricity deliverers. The percentage allocated to distribution utilities and auctioned would increase by 20 percent each year, so that by 2016 100 percent would be auctioned (see Figure J-9).

For the emission allowances distributed to electricity deliverers, the number of allowances given to individual deliverers would be determined using a fuel-differentiated, output-based allocation with distributions limited to deliveries from emitting sources, including unspecified sources. In determining the number of allowances for each deliverer, its output would be weighted based on the fuel source (such as coal or natural gas) of the electricity delivered.

With respect to the allowances given to the retail providers of electricity for auction, the Commissions recommended that the retail providers be required to sell the allowances in a centralized auction undertaken by ARB or its agent. This would ensure open and equal access to allowances by all deliverers who require them.

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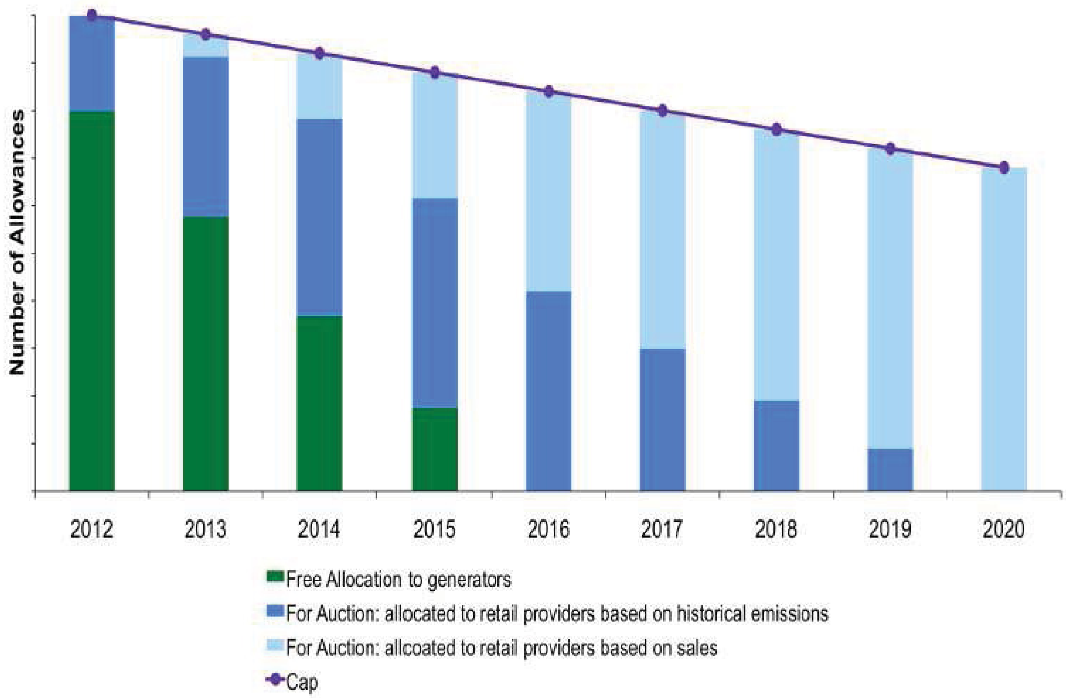
[77] See Appendix M: CPUC/CEC Recommendations.

Figure J-9: Joint Commissions' Recommended Allocation to Electric Sector Entities



Each retail provider would receive all auction proceeds from the sale of the allowances that were distributed to it. The Commissions explicitly stated that, if ARB could not design an auction that is legally separated from other State proceeds, an alternate mechanism should be designed.

The distribution of allowances to individual distribution utilities for subsequent auctioning would transition over time from being based initially on historical emissions in the retail provider's portfolio to being allocated based on sales by 2020.

The governing boards, for publicly owned utilities, and the Public Utilities Commission, for all other retail providers, would determine the appropriate use of retail providers' auction proceeds consistent with the purposes of AB 32.

ARB staff retained elements of the basic framework for allocating to utilities recommended by the Commissions. Free allocation to retail providers was simplified to allocation to only the distribution utilities. Free allocation to generators was removed due to greater assurance about cost pass-through ability for these facilities.

The Commissions recommended that all auction proceeds should be used for purposes related to AB 32, and all proceeds from the auction of allowances allocated to the electricity sector should be used for the benefit of the electricity sector, including the support of investments in renewables, energy efficiency, new energy technology, infrastructure, customer bill relief (possibly through rebates), and other similar programs.

The Commissions were clear that a carbon price signal needed to be created in retail and wholesale rates saying that, "any mechanism implemented to provide bill relief should be designed so as not to dampen the price signal resulting from the cap-and-trade program". Staff has adopted this recommendation.

3. ETAAC Recommendations

The Economic and Technology Advancement Advisory Committee (ETAAC)—established by ARB as required by AB 32—recommended using allowance value to achieve greenhouse gas reductions and drive technology development.[78]

The ETAAC described the creation of a "California Carbon Trust" as a possible mechanism for using allowance value—possibly leveraged with private funds—to further the overall goals of AB 32. ETAAC's recommendation was roughly based on the United Kingdom Carbon Trust. The United Kingdom program was established with public funds, but functions as an independent entity, providing management and consulting services to corporations and small and medium businesses on reducing GHG emissions. It also funds innovations in carbon-reduction technologies.[79] The proposed regulation would allow for development of such an entity, though legislative action would likely be needed to establish such a mechanism.

4. EJAC recommendations

The Environmental Justice Advisory Committee (EJAC), established by ARB as required by AB 32, expressed concern about the use of cap-and-trade as a policy tool. However, the committee did describe the advantages of policies based on "emissions performance standards." The benchmark approach to allocation proposed by staff is in line with this recommendation. The EJAC also offered many suggestions about how any proceeds raised due to a generic policy for pricing carbon could be expended.[80] Staff supports some of these suggestions

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[78] *Recommendations of the Economic and Technology Advancement Advisory Committee*. February 2008. http://www.arb.ca.gov/cc/etaac/ETAACFinalReport2-11-08.pdf (accessed 10/10/10).

[79] The UK Carbon Trust's website is: http://www.carbontrust.co.uk/Pages/Default.aspx (accessed 10/10/10).

[80] *Recommendations and Comments of the Environmental Justice Advisory Committee on the Implementation of the Global Warming Solutions Act*. December 2008. http://www.arb.ca.gov/cc/ejac/proposedplan-ejaccommentsfinaldec10.pdf (accessed 10/10/10).

conceptually and has proposed a Community Benefit Fund be established for these purposes.

5. Scoping Plan and WCI Design Document Relevance to Allowance Allocation Decisions

The 2008 WCI Design Recommendations called for partners to auction a minimum of 10 percent of the allowance budget in the first compliance period beginning in 2012, and a minimum of 25 percent in 2020.[81] The Scoping Plan document recognized this commitment.[82] As described above, staff's proposed approach is consistent with these minimum auction levels, since it includes a small direct auction and the auction on a consignment basis of allowances allocated to the IOUs. In addition, the 2008 WCI framework states that the partner jurisdictions "aspire to a higher auction percentage over time, possibly to 100 percent."

6. Summary of Stakeholder Comments on Allocation

Since ARB initially began to consider cap-and-trade as a potential tool to achieve GHG reductions staff has received many detailed comments on allocation of allowances from stakeholders. Primary comment venues included the Scoping Plan public process, the Preliminary Draft Regulation stakeholder comments and the EAAC public process.[83] In the following sections, staff summarizes stakeholder comments on allowance allocation by topics of concern from all of these public comment opportunities.

a. Allowance Distribution Method: Debate About Auction versus Free Allocation

In early public meetings about cap-and-trade program design, stakeholders' comments focused on a debate about auction versus free allocation. Due to the EAAC discussions on this issue, some stakeholders now recognize that the method by which allowances are distributed can be separated from decisions about who receives the allowance value.

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[81] *Design Recommendations for the WCI Regional Cap-and-Trade Program*. Western Climate Initiative. September 2008 (Corrected March 2009), http://www.westernclimateinitiative.org/component/remository/general/design-recommendations/Design-Recommendations-for-the-WCI-Regional-Cap-and-Trade-Program/ (accessed 9/18/10).

[82] *Climate Change Scoping Plan: A Framework for Change.* California Air Resources Board, December 2008. http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm (accessed 9/18/10).

[83] ARB held its first workshop on allocation on March 17, 2008 during the Scoping Plan process. See: http://www.arb.ca.gov/cc/scopingplan/pgmdesign-sp/meetings/meetings.htm#april25 (accessed 10/10/10) The public comments from the EAAC process are available here: http://www.climatechange.ca.gov/eaac/comments/ (accessed 10/10/10).

Many stakeholders, including environmental groups, labor organizations, and some covered entities, continue to support high levels of auctioning as the most economically efficient and transparent method of distributing allowances.

However, the EAAC recommendation for high initial levels of auction troubled many covered entities. Some covered entity stakeholders were concerned that collection and use of proceeds associated with a cap-and-trade program proposed by the EAAC may not comply with existing laws (e.g., EAAC's tax reduction recommendations).

b. Prevention of Emissions Leakage

Regulated stakeholders (covered entities), especially the industrial sector, have voiced strong support for the concept of using allowance value to address the AB 32 requirement of minimizing emissions leakage. Some regulated stakeholders raised concerns about the technical feasibility and legality of the alternate approaches to free allocation for leakage prevention (such as the EAAC preference for border adjustments). Other regulated stakeholders supported border adjustments in addition to free allocation.

c. Return of Allowance Value to Customers Through Electric Distribution Utilities

As described above, the EAAC recommendation did not explicitly dedicate allowance value to distribution utilities (which EAAC terms "load serving entities") on behalf of their customers. This marks a departure from the CEC/CPUC joint recommendations regarding allowance allocation to the electric sector.

In response to the EAAC, the vast majority of electric utilities in the state jointly filed a comment calling for allowance value to flow to distribution utilities of electricity. They argue that many of the specific emission reduction measures adopted in the Scoping Plan (most notably the renewable electricity standard) will require direct actions within the electricity sector which will carry a cost to the ratepayers above and beyond the cost of carbon seen in other parts of the economy. Therefore, electric utilities believe they should receive allowance value to help reduce the burden of these complementary programs on their customers.

Independent energy producers—which compete with the regulated utilities to build power generation facilities—oppose free allocation to utilities in any fashion that would result in any competitiveness issues in the market for electricity generation. Electric service providers and community choice aggregators—which compete in a limited fashion to serve retail customers—requested equal treatment with the investor-owned and publicly owned utilities.

d. Providing Value for Community Benefits

Local government, public health and green transportation advocates recommended that the proceeds from auctions go towards disadvantaged communities, land-use planning, local governments, and improved public transportation efforts aimed at reducing GHG emissions and meeting Senate Bill 375 (SB 375, Steinberg, Chapter 728, Statutes of 2008) targets.

Other stakeholders support programs that would assist those communities that have been historically affected by poor air quality. AB 32 requires consideration of these communities. Stakeholders expressed the view that projects should achieve co-benefits and reduce criteria pollutants. Some proposed a Community Benefit Fund that could support reductions in GHGs and adaptation to the impacts of climate change. The proposed regulation would allow for development of such a fund. However, this would require legislative action to implement.

e. "Cap and Dividend" Concept

Some public health, consumer advocate, and environmental stakeholders support a cap-and-dividend approach in which the majority of allowance value is returned to Californians in the form of "lump sum" rebates. Other potential recipients of allowance value (most notably many covered entities) oppose this approach. Staff's framework would allow for some of the allowance value to be returned via a dividend. Routes by which dividends might be distributed include action of the Governor and the Legislature and through distribution utilities.