Using the Value of Allowances from California's GHG Cap-and-Trade System

Todd Schatzki
Robert N. Stavins

2014

RPP-2014-06

Regulatory Policy Program

Mossavar-Rahmani Center for Business and Government
Harvard Kennedy School
79 John F. Kennedy Street, Weil Hall
Cambridge, MA 02138

CITATION

This paper may be cited as: Schatzki, Todd, and Robert N. Stavins.m[2(be)7m0 g/GS7 gs0 G[ )]TJET EMC a0

Using the Value of Allowances From California's GHG Cap-and-Trade System

Todd Schatzki, Ph.D.
Analysis Group, Inc.

Robert N. Stavins
Harvard University

August 27, 2012

Using the Value of Allowances From California's GHG Cap-and-Trade System

Executive Summary

Todd Schatzki and Robert N. Stavins[1]

August 2012

The GHG cap-and-trade system is a key element of the policies designed to achieve California's ambitious goal of reducing GHG emissions to 1990 levels by the year 2020. The cap-and-trade program creates allowances necessary for regulatory compliance that become valuable because of their limited supply. Decisions about how to initially allocate these allowances have important consequences for the cap-and-trade program's environmental effectiveness, economic performance, and distributional impact.

cre437mme vaV7oc3forveoc3norvec.4(eco.267. 5.5 p avi)r Se31e5.5e8 esbke keyno arC395 , -ofeo

Executive Summary: Using the Value of Allowances

- Auction revenues may also be used to mitigate local environmental impacts that may emerge as a consequence of AB 32 policies, particularly in disadvantaged communities. While such impacts are unlikely, this use of revenues could address such environmental justice concerns by funding programs beneficial to local communities. While programs might be related to AB 32 objectives, this may not be the most cost-effective approach to improving living conditions in disadvantaged communities. This use of funding would also avoid other undesirable responses to local impacts, such as modifications to the entire cap-and-trade program.
- Finally, auction revenues could fund programs related to AB 32's goals. Research and development (R&D) into low-GHG technologies may be underprovided by the private sector due to the limits to innovators' abilities to capture the full value of new technologies, because of information spillovers. Consequently, funding the development of low-GHG technologies represents a potentially valuable use for auction revenues, although care must be taken in directing such funding in the most productive fashion. Another frequently proposed use is funding programs to promote energy efficiency. California is already a leader in the implementation of ratepayer funded energy efficiency programs. Many of these programs target particular market failures related to principal-agent and information problems, and behavioral biases. However, further program expansion must consider the fact that not all program's will provide positive net benefits (even when they target these market failures) and potential decreasing returns, particularly given the state's long history in pursuing these programs. Finally, certain types of public infrastructure may be underprovided, particularly when they supply widely used public goods, such as public transportation; however, such investments should be undertaken carefully to ensure they clearly provide positive net benefits.

While there appear to be some opportunities for ARB to use auction revenues to support beneficial policies, the revenues available from auction may far exceed the funds needed to pursue these policies. Given potential legal constraints on the use of auction revenues, policymakers may wish to consider other options, including new legislation to broaden potential uses for auction revenue to include offsetting reductions in tax rates or rebates, as well as other economically and socially beneficial purposes not directly related to climate policy.

Using the Value of Allowances From California's GHG Cap-and-Trade System

Todd Schatzki and Robert N. Stavins[2]

August 2012

The GHG cap-and-trade system is a key element of the Scoping Plan designed to reduce California's GHG emissions to 1990 levels by the year 2020 under Assembly Bill 32 (AB 32). To internalize the cost of GHG emissions in consumer and producer decisions, the program creates allowances that become valuable because of their limited supply. An important part of cap-and-trade design is the mechanism used to allocate allowances.

This paper examines the key consequences of these decisions in regard to three evaluation criteria: environmental effectiveness, economic performance, and distribution of impacts. Although the current cap-and-trade rule already includes mechanisms to allocate allowances, it is important to review allocation options, partly because these decisions may be revisited in the future. We begin with an examination of these options. We then consider issues related to alternative uses of revenues derived from the auction of allowances. The State is in the midst of deciding how best to use auction revenue, and these discussions are likely to be undertaken annually, particularly as revenues increase when fuels are added to the cap-and-trade system.

1. Options For Initial Allowance Allocation

There are three basic options for initially distributing cap-and-trade allowances:

1. Auction. A predetermined and fixed quantity of allowances is sold to market participants via auction, with revenue used by the government for designated purposes.
2. Fixed Allocation. A predetermined and fixed quantity of allowances is allocated for free to market participants. The quantity received is typically based on a pre-determined formula that reflects historical operations (for example, emissions) and/or other factors.

[2] Dr. Schatzki is a Vice President at Analysis Group. Stavins is Albert Pratt Professor of Business and Government, John F. Kennedy School of Government, Harvard University; University Fellow, Resources for the Future; and Research Associate, National Bureau of Economic Research. He is an elected Fellow of the Association of Environmental and Resource Economists, was Chairman of the U.S. Environmental Protection Agency's Environmental Economics Advisory Committee, and served as Lead Author of the Second and Third Assessment Reports and Coordinating Leading Author of the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Institutions listed are for purposes of identification only, implying no endorsement of this work.
Support was provided by the Chevron Corporation, but the opinions expressed are exclusively those of the authors. Valuable research assistance was provided by Michael Kincaid. To request further information or provide comments, Dr. Schatzki can be reached at tschatzki@analysisgroup.com.

have the incentive to shift production out-of-state to avoid incurring abatement or allowance costs (or raise prices to cover such costs.) By contrast, updating output-based allocations can offset this competitive disadvantage – with each additional unit of output, producers receive free allowances that offset their compliance costs. Thus, by offsetting the competitive disadvantage, emission leakage can be reduced or even eliminated.

b. Economic Efficiency Outcomes

The choice among allowance allocation options does not directly affect the cost-effectiveness of actions taken by emission sources to reduce emissions. Under most circumstances, allowance trading provides incentives for the most cost-effective actions to be taken to meet the emissions cap regardless of whether allowances are auctioned or distributed through fixed or updating output-based allocations.[6] However, allowance allocation approach can affect cost

Figure 5: Estimated Use of AB 32 GHG Cap-and-Trade Allowance Value,

b. Considerations for Use of Auction Revenue

From an economic and policy standpoint, the scope of government activity should be premised on a wide range of potential social objectives, as well as the determination of whether there are policies that can meet those objectives with positive net benefits. In this context, benefits may be broadly construed to reflect many underlying values and objectives; for ex

availability of new revenue should not be viewed as an opportunity to undertake new activities that were not previously justified based on their merits.[13]

Along with these economic and policy considerations, legal constraints may pose practical limits on the use of funds in particular circumstances. In the context of AB 32, there is widespread agreement that legal considerations are an important factor affecting the choice of options for auction revenue use. Prior voter propositions (Proposition 13 as modified by Proposition 26) and judicial interpretations of those propositions (the Sinclair Paint

raising the cost of achieving AB 32 goals. We return to this issue below when discussing particular uses of auction revenues.

c. Proposals Under Consideration

Within the context of policy debates and stakeholder discussions, a large number of proposals have been made for potential use of revenues. These can be considered within several categories.

Fiscal Options, including Marginal Tax Rate Reductions, Tax Rebates, and Supplements to General Funds

There are strong economic arguments to use auction revenues to offset other taxes, so that the cap-and-trade auction is revenue-neutral. When auction revenues are used to reduce marginal taxes, such as personal or corporate income taxes, or capital gains taxes, this can reduce tax distortions that provide disincentives to work or invest. By reducing such distortions, economic output increases, thus partially offsetting the costs of the cap-and-trade program. In effect, reducing these distortionary taxes would enhance economy-wide efficiency by shifting taxes from distortionary taxes on desirable activities (labor and investment) to Pigouvian taxes on environmental "bads."[17]

This approach has been implemented in British Columbia, where a revenue-neutral carbon tax is implemented by combining an increasing carbon tax with annual tax adjustments based on actual tax revenues to achieve revenue neutrality. These adjustments have reduced distortionary taxes, including personal income taxes,[18] corporate income taxes,[19] and industrial property taxes.[20]

Within the context of California's on-going budgetary problems, auction revenues have also been proposed as a source of funds to help fill persistent budget gaps. Used in this way, auction revenues could help avoid some combination of new taxes and cuts to government activity that would be needed to close budget gaps.[21]

Another alternative is to recycle auction revenues to taxpayers through fixed ("lump sum") rebates. Because fixed rebates do not affect individuals' (marginal) decisions to work or invest, this option does not create the same economic benefits as using revenues to reduce distortionary taxes (tax rates).

[17] Goulder, Lawrence H., ed. Environmental Policy Making in Economies with Prior Tax Distortions. Northampton, MA: Edward Elgar, 2002.

[18] Personal income tax rates were reduced from 5.35% to 5.06% for the lowest bracket ($0 to $37,013), and from 8.15% to 7.70% for the next lowest bracket ($37,013 to $74.028).

[19] Corporate income taxes were reduced from 12% prior to the program to 11% in 2008, 10.5% in 2010 and 10% in 2011. Corporate income taxes to small business were reduced from 4.5% to 2.5% in 2008, and the threshold for the small-business tax rate was raised from $400,000 to $500,000.

[20] An Industrial Property Tax Credit was implemented to reduce the portion of property taxes collected for schools by 60% for industrial users.

[21] In this context, the economic benefits depend upon whether, on the margin, the auction revenues are avoiding tax increases or avoiding spending cuts (and the particular benefits provided by that spending.)

Mitigating Emissions and Economic Leakage

Allowance value can be used to offset some of the cost disadvantage faced by California businesses as a result of the cap-and-trade system and thus to mitigate emissions and economic leakage. As discussed earlier, updating output-based allocations to EITE industries can mitigate such leakage. Current rules provide "industry assistance" to EITE industries in California through this approach.

Assistance starts at 100% of expected emissions in the First Compliance Period, less a 10% reduction to reflect "best practices" or a "best in class" facility and a 2% reduction to reflect the declining cap. However, this assistance will decline over time depending on how ARB assesses each industry's "Leakage Risk", which, in principle, reflects multiple factors including their emission intensity and trade exposure. Table 6 reports the percent of full allocation provided to industry for each year and on average for each compliance period. By the Third Compliance Period, assistance declines to 84% or 78% for industries ARB determines have High Leakage Risk,[23] 30% for industries with Medium Leakage Risk, and 23% for industries with Low Leakage Risk.[23]

Table 6. Updating Output-based Allocations to Energy-Intensive Trade-Exposed Industry (Percent of Full Allocation)

	Leakage Risk Category			
Year	High (> 50%)	High (Other)	Medium	Low
2013	88%	88%	88%	88%
2014	88%	87%	87%	87%
2015	87%	85%	64%	42%
2016	87%	83%	62%	42%

Note: Percent of full allocation reflects the actual allocation relative to an allocation reflecting industries' historical average industry emission rate (that is, the industry benchmark.) Adjustments from the full allocation are made to reflect:

[22] The level of assistance is higher for three high-emission industries: cement, lime and nitrogenous fertilizer manufacturing.

[23] These estimates of assistance reflect the industry assistance factor, cap adjustment factor and a benchmark set at 90% of historic emissions rate. CARB, Article 5: California Cap on Greenhouse Gas Emissions and Market-based Compliance Mechanisms, §95891.

> a best-practices industry benchmark, declining cap, and declining assistance to industries with lower "leakage risk".

The economic motivation for reducing the magnitude of the free updating output-based allocations is unclear. While ARB has proposed to phase out allocations for industry assistance, absent policy or other specific changes outside of California, the economic conditions that call for the use of updating output-based allocations to mitigate the effect of leakage will not change over time. Of course, if other states and countries adopt climate policies such as cap-and-trade, then allocations for industry assistance would be less necessary; however, if this does not occur, particularly as California enters the Second and Third Compliance Periods of the cap-and-trade program, regulators may want to revisit these issues.

Mitigating Impacts on Disadvantaged Communities

Throughout the development of AB 32 policies, significant attention has been given to issues related to adverse environmental conditions in disadvantaged communities. These "environmental justice" issues have included: whether AB 32 policies will worsen environmental conditions in these communities, and, if so, how to mitigate such impacts; and whether to use AB 32 policies to improve environmental conditions in disadvantaged communities.

Environmental justice issues are legitimate and important concerns for California's policy makers, and ARB has wisely avoided adoption of policies aimed at addressing these concerns that would have simultaneously undermined the effective and efficient operation of AB 32 policies, particularly the cap-and-trade program. In lieu of such modifications, some have proposed to use auction revenues to address environmental justice concerns. Revenues could be used to help improve living conditions in disadvantaged communities; such improvements could target adverse environmental conditions, help manage household energy use (and expenses) in disadvantaged households, or provide other community services (for example, education and health care). Some – but not all -- of these uses would likely face a lower legal risk due to a clearer nexus with AB 32 climate change objectives, although such uses may not be the most cost-effective approach for improving living conditions in disadvantaged communities.

Revenues may also be used to mitigate environmental impacts that may emerge as a consequence of AB 32 policies. While AB 32 policies are expected to improve air quality throughout California by reducing co-pollutant emissions, the possibility remains (however unlikely) that some communities may experience an adverse effect. Within the context of the cap-and-trade program, ARB has proposed to manage this risk through "adaptive management." Under adaptive management, ARB would gather information about local air quality, assess whether these outcomes have occurred as a result of the program, and develop mitigation plans in the event that such adverse outcomes occur.[24] If ARB finds

[24] ARB appears to recognize that determining that the cap-and-trade program caused increases in localized air emissions will be very challenging. The Rule notes that:

> While the program provides flexibility that could allow increased production due to economic growth, such increases would not be caused by the cap-and-trade program. Only in very limited circumstances would a localized emissions increase be the actual result of the incentives created by the cap-and-trade program – e.g. shifting of production within a company from an efficient facility with higher compliance costs to a more

deterioration in local air quality due to the cap-and-trade program, it has stated that potential responses could include: "the adoption of additional regulatory requirements, using funds obtained from the sale of allowances to support local mitigation projects, coordination with other agencies to provide additional incentives for energy efficiency or other emissions reduction activities within the community, or modifications to the Regulation."[25] Some of these options create potential problems.

ARB suggests that it may adopt "additional regulatory requirements" as a response to changes in environmental conditions in particular communities. This raises several issues. First, it is important to keep in mind that all new and existing facilities will need to comply with existing environmental regulations of criteria air pollutants, irrespective of AB 32 policies. Thus, the existing regulatory framework is designed to create limitations on activities that degrade environmental conditions. Second, this traditional regulatory framework aims to achieve certain standards for environmental conditions, rather than focusing on changes from pre-existing conditions. Thus, while regulation aiming to achieve and maintain certain standards or conditions may be justified, imposing additional regulatory requirements in response to selective changes in environmental conditions could lead to arbitrary differences in regulatory standards across the state.

Modifications to the cap-and-trade regulation affecting the entire state for the purpose of addressing isolated circumstances in particular communities would be exceptionally imprudent. ARB has avoided adopting proposals, such as facility-level GHG emission limits, that would have limited effectiveness at addressing local environmental cond

Using the Value of Allowances From Cali

types of energy users (for example, households) compared with others (industry). However, even when programs target these market failures, they do not necessarily generate positive net benefits. There is still much work to be done to test program effectiveness to identify those programs most likely to yield positive net benefits; such research represents a potentially valuable use of auction revenues.[27]

To the extent they generate positive net benefits by addressing such market failures, these programs should be pursued.[28] However, the scope of these activities is subject to several limitations. First, such programs will eventually begin to yield diminishing returns. California has been aggressively supporting energy efficiency investments for many decades, and it is unclear whether additional investments are warranted. Second, from the standpoint of implementation, there may be limits on the extent to which additional energy efficiency programs can be quickly expanded without compromising the effectiveness of their operations (for example, due to limits on availability of trained personnel.)

In 2010, California spent $1.16 billion on rate-payer funded electricity efficiency programs, the third highest spending among the 50 states (as a percent of revenues.) Spending on natural gas efficiency programs was $0.34 billion in 2010, the eighth highest such spending in the country.[29] Some propose using a portion of the revenues from the sale of allowances allocated to electric utilities to directly fund energy efficiency programs; if acted on, this would further increase spending. However, starting in 2015, auction revenues could exceed $5 billion under many reasonable market outcomes; this suggests that opportunities for cost-effectively expanding the state's energy efficiency programs could sensibly absorb only a modest portion of GHG auction revenues.

Another potential revenue use would be funding of public infrastructure projects that support GHG emission reductions. Infrastructure spending by the private sector may be below efficient levels if infrastructure provides public goods, the benefits of which it is difficult for private parties to capture. For example, public transportation systems would be underinvested in or supplied by private companies that cannot reap the benefits of reduced emissions and congestion. That said, such infrastructure investment should be undertaken with great care, to ensure that chosen investments achieve positive net benefits and provide significant public goods. Non-GHG externalities have long been the focus of public infrastructure investment; while increased support for existing infrastructure, including public transportation, may be warranted if fiscal limits have allowed systems to deteriorate, spending on new public infrastructure projects that would provide public goods should only be undertaken if they provide clear positive net benefits to society.

[27] Alcott, Hunt and Michael Greenstone, "Is there an Energy Efficiency Gap?," Journal of Economic Perspectives 26(1): 3-28, Winter 2012.

[28]

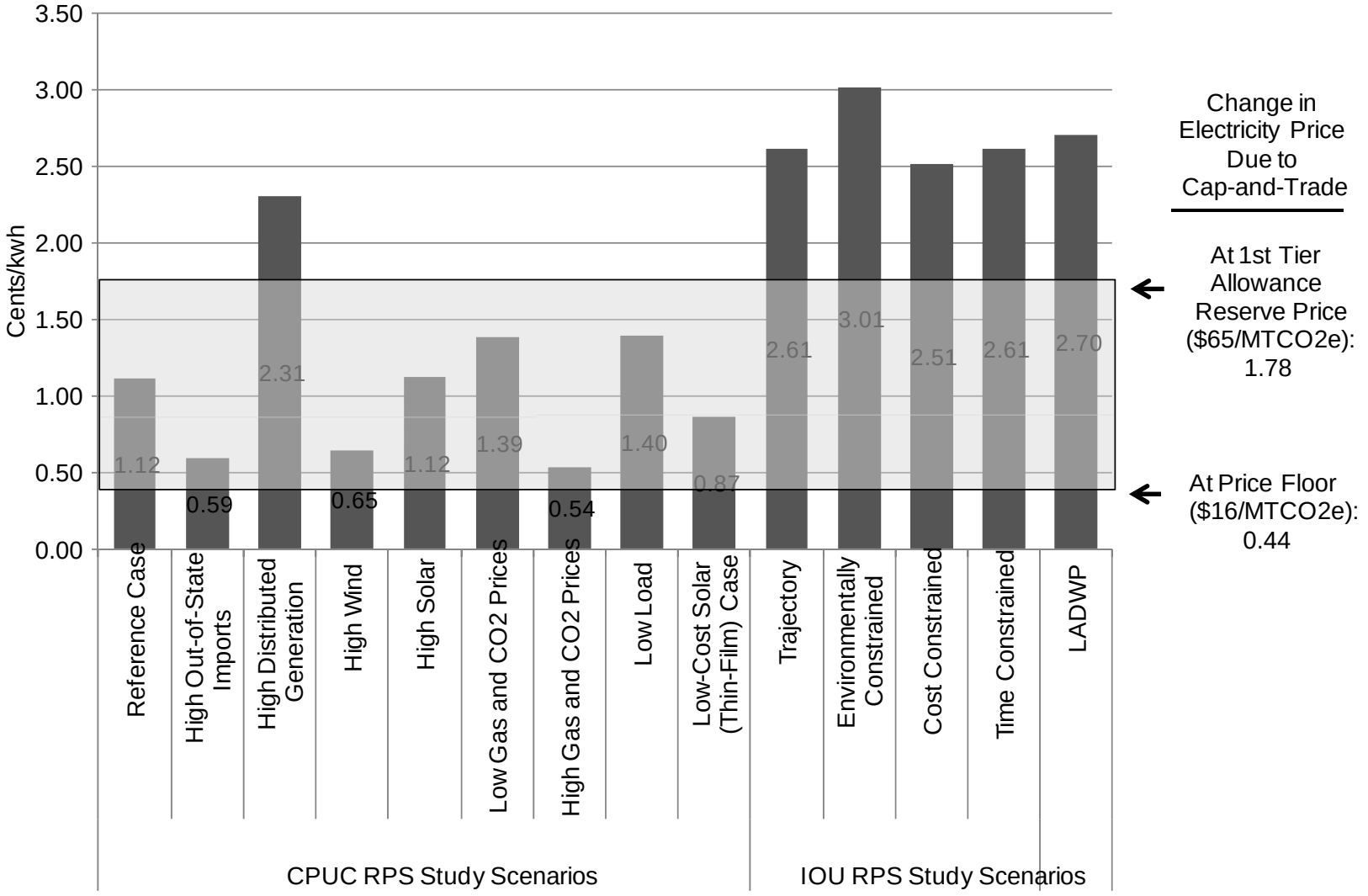
3. Conclusion

Allocating allowances for the AB 32 GHG cap-and-trade system presents both challenges and opportunities for California. Options exist that can address certain policy outcomes. The State has already pursued some of these, including allocations to EITE industries to mitigate leakage. But other economically sensible uses may face legal constraints, such as using revenues to reduce pre-existing distortionary taxes.

Given these limits, the State may find itself with significant auction revenues that can only be directed toward a restricted set of uses. While some of these potential uses may improve policy outcomes (for example, public funding of research and development on low-GHG technologies), the magnitude of auction revenues may well exceed the availability of options that provide positive net benefits. Given these constraints, policymakers may wish to consider other options, including new legislation to broaden potential uses for auction revenue to include offsetting reductions in tax rates or rebates, as well as other economically and socially beneficial purposes.

Figure 2. Change in Retail Electricity Price from 33%RPS (Relative to Baseline with No New Renewables)

Figure 3. Change in Retail Electricity Price from 33% RPS (Relative to 20% RPS)



Notes to Figures 1, 2 and 3:

1. All values in Figure 1 reflect changes in costs, but do not reflect any change in price due to wholesale or retail markups.

2. Low and high values in Figure 1 represent optimistic and pessimistic cost forecasts from each source. For CRA, low and high values represent optimistic and pessimistic assumptions regarding both costs and carbon intensities.

3. The baseline in Figure 2 reflects the "All Gas Buildout" scenario in the "33PercentRPSCalculator.xls", which assumes that all additional capacity will be gas-fired generation.

4. In Figures 2 and 3, the carbon intensity of electricity production assumed when calculating cap-and-trade costs reflects the mix of production (i.e., 20% RPS or All Gas Buildout scenarios.)

Figure 1 Sources:

1. Boston Consulting Group, "Understanding the Impact of AB 32," June 19, 2012.

2. California Energy Commission (CEC), "Biofuel Values." November 2011. Updated version provided through personal communication.

3. Charles River Associates, "Economic and Energy Impacts Resulting from a National Low-Carbon Fuel Standard," June 2010.

4. Sierra Research, Inc., "Preliminary Review of the ARB Staff Analysis of "Illustrative" Low Carbon Fuel Standard (LCFS) Compliance Scenarios," Dec. 2011.

Figure 2 and 3 Sources:

1. California Public Utilities Commission, "33% Renewables Portfolio Standard: Implementation Analysis Preliminary Results," and attached spreadsheet "33PercentRPSCalculator.xls," June 2009.

2. City of Los Angeles, Department of Water and Power, "Comments from the Los Angeles Department of Water and Power to the Lead Commissioner, Workshop on Renewable Energy Costs," California Energy Commission Docket No. 12-IEP-1D, June 5, 2012.

3. Pacific Gas & Electric, "2012 Integrated Energy Policy Report Update/Renewables: