### Administration's Cap-and-Trade Report Provides New Information, Raises Issues for Consideration

LAO Bottom Line. The administration's 2016 cap-and-trade spending report represents a step forward by providing the Legislature with consolidated information about spending and greenhouse gas (GHG) reduction estimates for most programs. Based on the estimates that are included in the report, the cost-effectiveness varies widely among programs, but many programs appear to be relatively costly methods of reducing GHGs. However, we advise the Legislature to exercise caution when using these estimates to make future funding decisions because (1) estimates of co-benefits are not included in the report and (2) we have some concerns about some of the methods that are used to estimate GHG reductions. Consequently, we continue to recommend the Legislature consider the following: (1) the long-term benefits of cap-and-trade spending versus reliance on other policies, including the cap-and-trade *regulation*, in achieving state GHG reduction goals, and (2) opportunities to improve the amount and quality of information provided to the Legislature to help inform future decisions.

# Annual Report Consolidates Spending and GHG Information

**2016 Report Provides Information on Projects Funded Through 2015.** Cap-and-trade auction revenue has been awarded to over two dozen different programs that are intended to reduce GHG emissions. (For more background on cap-and-trade spending, please see our January 2016 report *Cap-and-Trade Auction Revenues: Strategies to Promote Legislative Priorities* and our February 2016 report *The 2016-17 Budget: Resources and Environmental Protection.*) State law requires the Department of Finance to submit a report each year to the Legislature on the status and outcomes of projects funded from state cap-and-trade auction revenues. In March 2016, the administration submitted its annual report to the Legislature. The report (1) consolidates existing information on the projects that have been funded through 2015, (2) estimates of GHG reductions that will be achieved through these projects, and (3) estimates of the percent of funding that has gone to projects that either are located in or benefit disadvantaged communities. (Disadvantaged communities are determined by the

California Environmental Protection Agency.) Consolidating this information is a valuable step toward helping the Legislature evaluate the outcomes of programs that have been funded so far, hold programs accountable, and inform future funding decisions.

#### 14 Million Metric Tons of GHG Reductions Estimated Over Life of

**Projects.** Departments have awarded a total of \$1.7 billion in cap-and-trade revenue to various projects through 2015. As shown in Figure 1, the administration estimates that the projects selected to date will reduce total GHG emissions by more than 14 million metric tons of carbon dioxide equivalent (MMTCO2e) over the projects' lifetimes. (For context, the total *annual* GHG emissions in California were estimated to be 459 MMTCO2e in 2013.) These GHG reduction estimates are based on methodologies that are developed by the Air Resources Board (ARB). The reductions are expected to occur over the estimated life of the projects, which span from ten years to more than several decades. The above figure does not include an estimate of the GHG reductions from \$850 million awarded to the high-speed rail project, as such reductions would not be achieved until the total project is fully funded and operational. (In a 2013 report, the administration estimated that high-speed rail will reduce 44 MMTCO2e over a 50-year period once it is fully operational.) In addition, estimates of GHG reductions are not provided for a few programs where estimates have not been developed or completed.

#### Figure 1

### Administration Estimates 14 Million Metric Tons of GHG Reductions

Agency and Program	Amount of Cap-and-Trade Funds Awarded <sup>a</sup> (In Millions)	GHG Reductions (1,000 MTCO2e)
High-Speed Rail Authority		
High-speed rail project	\$850	N/A <sup>b</sup>
California State Transportation Agency		
Transit and intercity rail capital	224	865
Department of Transportation		
Low carbon transit operations	24	N/A
Strategic Growth Council		
Affordable housing and sustainable communities	154	810
Sustainable agricultural lands conservation	4	71

Air Resources Board		
Clean vehicle rebates	205	4,470
Truck and bus voucher incentives	20	44
Enhanced fleet modernization program "plus-up"	12	29
Car sharing in DACs	2	N/A
Incentives for public fleets pilot project for DACs	3	4
Department of Community Services and Development <sup>c</sup>		
Single-family energy efficiency and solar water heating	24	85
Single-family solar photovoltaics	22	107
Large multifamily energy efficiency and renewables	24	70
California Department of Food and Agriculture		
Dairy digester research and development program	11	1,377
State water and efficiency and enhancement program	18	552
Department of Water Resources		
Water-energy grant program	28	197
Water turbines	20	N/A
Department of Fish and Wildlife		
Delta and coastal wetlands restoration	15	519
Mountain meadow ecosystems restoration	6	52
Department of Forestry and Fire Protection		
Forest health	8	2,046
Forest legacy	4	387
Urban and community forestry	16	134
Department of Resources Recycling and Recovery		
Organics composting/digestion grants	15	1,658
Recycling manufacturing	5	323
Organics and recycling loans	2	470
Totals	\$1,716	14,270

<sup>a</sup>Amount that has been committed to projects through 2015.

<sup>b</sup>Administration estimates that the high-speed rail project will reduce emissions by 44 MMTCO2e over a 50 year period once fully funded and operational.

GHG reduction estimates are midpoint of range provided by the administration.

GHG = greenhouse gas; MTCO2e = metric tons of carbon dioxide equivalent; N/A = not available; and DACs = disadvantaged communities.

#### More Than Half of Funding Going to Projects That Benefit Disadvantaged

**Communities.** State law directs the administration to allocate at least 10 percent of auction revenues to projects located in disadvantaged communities and at least 25 percent to projects that benefit disadvantaged communities. The administration estimates that it is has exceeded these minimum requirements. Specifically, it estimates that 51 percent of the funding has been awarded to projects that benefit disadvantaged communities and 39 percent has gone to projects located in disadvantaged communities. (For purposes of calculating these percentages, the administration includes a slightly different set of projects than the \$1.7 billion that is included in Figure 1.)

### Estimated Average GHG Reduction Cost Is High With Wide Variation Across Programs

Based on the data provided in the administration's report, programs for which estimated data is available will spend an average of \$57 in cap-and-trade auction revenue to reduce each ton of GHG. (As we discuss in more detail below, we have concerns about the methods and assumptions used to quantify GHG reductions.) As shown in Figure 2, the estimated average costs vary greatly among programs. Certain programs, such as diary digester research and development and organics composting and digestion, appear to be relatively inexpensive strategies for reducing GHGs. Other programs have substantially higher costs per ton of reduction. The cost per ton is more than \$100 for about half of the programs.

#### Figure 2

### **Estimated Average Cost Per Ton of Reduction Varies Greatly**

Program	Cost Per Ton <sup>a</sup>
Organics and recycling loans	\$4
Forest health	4
Dairy digester research and development program	8
Organics composting/digestion grants	9

Forest legacy	10
Recycling manufacturing	15
Delta and coastal wetlands restoration	30
State water and efficiency and enhancement program	33
Clean vehicle rebates	46
Sustainable agricultural lands conservation	59
Mountain meadow ecosystems restoration	113
Urban and community forestry	116
Water-energy grant program	141
Affordable housing and sustainable communities	191
Single-family solar photovoltaics <sup>b</sup>	209
Transit and intercity rail capital	259
Single-family energy efficiency and solar water heating <sup>b</sup>	282
Large multifamily energy efficiency and renewables <sup>b</sup>	343
Enhanced fleet modernization program "plus-up"	414
Truck and bus voucher incentives	452
Incentives for public fleets pilot project for DACs	725
Overall Average	\$57

\*Calculated as the amount of cap-and-trade funds awarded to a program divided by the total estimated greenhouse gas (GHG) emission reductions from the projects that receive cap-and-trade funds.

<sup>b</sup>Assumes GHG reductions at the midpoint of the administration's estimated range.

DACs = disadvantaged communities.

One potential benchmark against which these costs might be evaluated is the market price of cap-and-trade allowances. In theory, allowance prices reflect the marginal cost of GHG reductions needed to meet the state's GHG goals. At the most recent auction in February 2016, allowances sold for less than \$13 per ton—substantially less than the average cost of the cap-and-trade spending programs included in the annual report. We note that there are important differences among programs' average spending per ton of GHG reduction and allowance prices that make the comparisons imperfect. For example, the average cost for many spending programs reflects costs to achieve GHG reductions over the longer term—often decades—while current allowance prices are more likely to reflect costs to achieve near-term GHG reductions.

# Current Shortcomings Limit Usefulness of Report to Policymakers

The administration's report increases the amount and accessibility of information that is made available to the Legislature, but the information included in the report has significant limitations. As a result, we advise the Legislature to be cautious when using the information provided in the report to make future funding decisions. We discuss the most significant limitations below.

**Concerns About Accuracy of GHG Estimates.** Based on our initial review, we identified concerns with some of the administration's GHG quantification methodologies. Two of our primary concerns with the administration's methodologies are similar to those we identified in our February 2016 report:

- **Ignores Interactions With Existing Regulations.** In particular, the GHG reduction estimates provided in the report do not account for interactions with the cap-and-trade regulation. These interactions can mean that spending will not actually reduce total emissions as expected because the overall number of allowances issued determines the level of emissions.
- Does Not Adequately Account for Likely Activities That Would Occur Without the Program. Many estimates do not account for activities that would likely occur without the program. Specifically, the administration's estimates implicitly assume that none of the projects funded would be undertaken without the cap-and-trade funds.

As a result of these limitations, at least some of the estimates probably do not accurately predict the program's likely effect on GHG emissions.

One additional concern we would note is that some of administration's assumptions are inconsistent with research the ARB commissioned in 2014 about the impacts of various transportation-related activities on GHG emissions. For example, the administration's estimate of GHG reductions associated with providing clean vehicle rebates (such as for electric vehicles) assumes all consumers receiving rebates would have otherwise purchased a conventional gasoline powered vehicle. However, based on the literature review commissioned by ARB, studies of past rebate programs in other jurisdictions indicated that about one-quarter of consumers purchase alternative vehicles as a result of government incentives, while most other consumers that access the rebate would have purchased the vehicle anyway. By ignoring this likely effect, the administration's estimates of GHG reductions are almost certainly overstated.

**Key Differences Between Programs Make Comparisons Challenging.** Some key differences between programs make it difficult to compare the cost-effectiveness of GHG reductions. For example, the administration treats grant and loan programs similarly when estimating GHG reductions even though the benefits and costs of these types of programs can be fundamentally different. With respect to costs, grant programs are a one-time state cost, while loan programs provide funding that is repaid to the state over time. Furthermore, the amount of GHG reduction achieved by state spending can vary depending on whether it was provided as a loan or grant. A grant will directly reduce the recipients costs for a project, while a loan is more likely to reduce the recipient's borrowing costs. The GHG reductions from each program depend on the extent to which each approach encourages projects that would not have otherwise occurred.

In addition, cap-and-trade spending is often only a portion of the overall amount of funding for each project, such as for transit improvement projects and affordable housing developments. As a result, it can be difficult to assess what portion of the GHG reductions should be attributed to state funds versus other funding sources. The administration's estimates appear to include all GHG reductions associated with a project, regardless of the portion of total funding that is provided by the state.

**Report Lacks Estimates of Co-Benefits.** Many of these programs can provide significant co-benefits that the Legislature might also consider important, such as reduced local air pollution, water conservation, financial savings for low-income households, enhanced wildlife habitat, and improved forest health. Understanding the magnitude of these co-benefits can be an important piece of information when evaluating various spending options and weighing trade-offs between achieving GHG reductions and other co-benefits.

Although the report describes the types of co-benefits that each program is expected to achieve, it does not include quantitative estimates of co-benefits. According to the administration, it focused its initial quantification efforts on GHGs and greater focus will be on co-benefits in the future. Given that all programs are intended to facilitate GHG reductions, the administration's initial focus on GHGs is reasonable. However, the current lack of quantitative information about co-benefits limits the amount of information that can be used to weigh the complete trade-offs between various spending options.

# **Considerations for Improving Outcomes and Information**

*What Role Should Cap-and-Trade Spending Play in Achieving GHG Goals?* As we discussed in our January 2016 report, in theory, the legal requirement to spend auction revenue on GHG reduction activities is likely not necessary to meet the state's GHG goals and likely increases the overall costs of emission reduction activities. The 2016 annual report appears to provide additional evidence that many of the programs receiving cap-and-trade revenue are a relatively costly way to achieve GHG reductions. In the long run, the Legislature might want to consider the extent to which cap-and-trade spending programs should play a role in achieving its GHG reduction goals. For example, as discussed in our January report, the Legislature might want to consider relying more heavily on the cap-and-trade *regulation*, rather than expenditure programs, to achieve the most cost-effective emission reductions.

To the extent the Legislature elected to rely more heavily on these alternative approaches to encourage GHG reductions, it could also consider removing the current legal requirement to spend auction revenue on GHG reduction activities by authorizing the program with a two-thirds vote. Such an approach would give the Legislature greater flexibility to use the revenue to (1) provide rebates or tax reductions that offset the costs that would be incurred by households or businesses and/or (2) fund projects that promote the Legislature's highest priorities. Alternatively, if the current legal requirement to spend auction revenue on GHG reduction activities remains in place, the Legislature might want to consider targeting spending in ways that achieve its highest priorities most effectively, such as by: (1) funding activities that facilitate cost-effective reductions and that are missed by existing regulations, (2) prioritizing co-benefits, and/or (3) offsetting other state spending.

**Opportunities to Improve Future Reports.** The Legislature might want to consider requiring that future reports include more accurate and complete information. Such information could help the Legislature evaluate the trade-offs associated with funding different programs and allocate funds in a way that achieve its goals most effectively. For example, as the administration increases its efforts to quantify co-benefits, the Legislature could direct the administration to focus its efforts on the co-benefits that are of most interest to the Legislature. This could help ensure future reports include information that is most relevant for policymakers.

Second, the Legislature might want to consider additional steps to ensure estimates reflect the best available data, methods, and assumptions. Some potential options include:

- **Direct Administration to Take Certain Factors Into Account.** The Legislature could direct the administration to account for interactions with other state and federal policies when it estimates program outcomes. It could also direct the administration to provide estimates that factor in assumptions about what project outcomes would have occurred without the allocation of auction revenue.
- **Establish Independent Expert Committee.** In our February 2016 report, we recommended that the Legislature consider establishing an expert committee to help develop a strategy for targeting auction revenues effectively and estimate the outcomes of different programs. We continue to support this proposal because a formal committee of independent experts could provide useful guidance on various cap-and-trade spending issues, including methodologies, data, and assumptions used to estimate program outcomes.