

APPENDIX E: Additional Documentation

Appendix E includes additional documentation and data supporting this Progress Report and SIP Revision. It includes additional detail regarding the emissions accounting methodology, supporting data for the progress Tables 2 and 3 found in the body of the report, and information on how ARB staff accounted for the impacts of the recession

SIP Accounting

The Clean Air Act requires the use of air quality modeling to determine the “carrying capacity” or “SIP emissions target”; that is, the maximum allowable emission levels that the nonattainment area can accommodate while attaining the standard.

While the adopted SIP contains a list of category-specific measures with regulatory timelines and expected reductions, ARB’s enforceable commitment is to meet the emissions levels needed for attainment with sufficient aggregate emission reductions, including any from actual changes in emissions.

To track progress toward the emissions target, this report uses a simple emissions accounting approach that explicitly show the impact of the recession and the benefit of the regulations ARB and the local air districts have approved since the PM2.5 SIPs were adopted. The approach looks like

$$(Emissions\ Inventory) - (Emission\ Reductions\ Achieved) = (Remaining\ Emissions)$$

Where:

- Emissions Inventory* = Amount of PM2.5 and PM2.5 precursor emissions the base line
- Emission Reductions Achieved* = Amount of emissions that have been reduce either through adopted regulations or actual emission decreases due to the recession
- Remaining Emissions* = The PM2.5 and PM2.5 precursor emissions level that is forecast to be remaining in the attainment year with the impacts of both regulations and the recession.

This approach keeps the focus on meeting the ultimate goal of the emission target derived from air quality modeling. It also has the advantage of explicitly showing the impacts of both the regulatory actions and the recession that an emissions accounting that looks just at regulatory reductions does not.

Progress Details

The following series of tables provide additional documentation for Tables 2 and 3, showing progress to date for both the South Coast and San Joaquin Valley.

**South Coast Air Basin
2014 Progress to Date on ARB Rules**

NOx Emissions (tpd)			
	SIP	Current	
	2014 Baseline	New 2014 Baseline	2014 Remaining Emissions
Smog Check Improvements (BAR)	134.2	134.2	131.6
Cleaner In-Use Heavy-Duty Trucks & Buses	136.0	151.2	132.6
Cleaner In-Use Off-Road Equipment (over 25hp)	96.9	28.0	27.5
Ship Auxiliary Engine Cold Ironing & Clean Tech.	37.2	23.7	15.6
Cleaner Main Ship Engines and Fuel - Main Engines	33.4	38.5	20.9
Accelerated Intro. Of Cleaner Line-Haul Locomotives	18.3	18.3	18.3
Clean Up Existing Harbor Craft	15.7	15.2	11.1
Cargo Handling Equipment	5.2	3.2	3.2
New Emission Standards for Recreational Boats	11.0	11.0	11.0
Co-Benefits from Greenhouse Gas Reduction Measures	0.0	0.0	0.0
All other local, state, and federal emissions	165	166	159
Total 2014 forecast with rules adopted to date	653	589	530

ROG Emissions (tpd)			
	SIP	Current	
	2014 Baseline	New 2014 Baseline	2014 Remaining Emissions
Smog Check Improvements (BAR)	132.1	132.1	123.5
Cleaner In-Use Heavy-Duty Trucks & Buses	10.2	8.7	5.4
Cleaner In-Use Off-Road Equipment (over 25hp)	13.4	2.6	2.5
Ship Auxiliary Engine Cold Ironing & Clean Tech.	0.7	0.9	0.7
Cleaner Main Ship Engines and Fuel - Main Engines	0.2	1.9	1.4
Accelerated Intro. Of Cleaner Line-Haul Locomotives	2.3	2.3	2.3
Clean Up Existing Harbor Craft	0.7	1.2	1.1
Cargo Handling Equipment	0.6	0.3	0.3
New Emission Standards for Recreational Boats	37.9	37.9	37.9
Expanded Off-Road Rec. Vehicle Emission Standards	6.7	6.7	6.7
Consumer Products Program	102.6	102.6	96.7
All other local, state, and federal emissions		221	206
Total 2014 forecast with rules adopted to date		518	485

Progress Report on Implementation of PM2.5 State Implementation Plans (SIP) for the South Coast and San Joaquin Valley Air Basins and Proposed SIP Revisions

PM2.5 Emissions (tpd)			
	SIP	Current	
	2014 Baseline	New 2014 Baseline	2014 Remaining Emissions
Smog Check Improvements (BAR)	7.8	7.8	7.5
Cleaner In-Use Heavy-Duty Trucks & Buses	5.8	6.0	3.4
Cleaner In-Use Off-Road Equipment (over 25hp)	4.9	1.3	1.3
Ship Auxiliary Engine Cold Ironing & Clean Tech.	0.6	0.5	0.4
Cleaner Main Ship Engines and Fuel - Main Engines	2.6	3.9	0.4
Accelerated Intro. Of Cleaner Line-Haul Locomotives	0.7	0.7	0.7
Clean Up Existing Harbor Craft	0.7	0.6	0.4
Cargo Handling Equipment	0.1	0.1	0.1
All other local, state, and federal emissions		74	73
Total 2014 forecast with rules adopted to date		95	87

SOx Emissions (tpd)			
	SIP	Current	
	2014 Baseline	New 2014 Baseline	2014 Remaining Emissions
Cleaner In-Use Heavy-Duty Trucks & Buses	0.3	0.3	0.3
Ship Auxiliary Engine Cold Ironing & Clean Tech.	1.1	1.1	0.8
Cleaner Main Ship Engines and Fuel - Main Engines	20.7	38.7	1.7
All other local, state, and federal emissions		21	17
Total 2014 forecast with rules adopted to date		61	20

**San Joaquin Valley Air Basin
2014 Progress to Date on ARB Rules**

NOx Emissions (tpd)			
	SIP	Current	
	2014 Baseline	New 2014 Baseline	2014 Remaining Emissions
Smog Check Improvements (BAR)	41	41.2	40.5
Cleaner In-Use Heavy-Duty Trucks & Buses	156.9	111.3	110.2
Cleaner In-Use Off-Road Equipment (over 25hp)	31.4	13.7	13.4
Accelerated Intro. Of Cleaner Line-Haul Locomotives	19.9	19.9	19.9
New Emission Standards for Recreational Boats	3.5	3.5	3.5
All other local, state, and federal emissions		123	110
Total 2014 forecast with rules adopted to date		313	298

PM2.5 Emissions (tpd)			
	SIP	Current	
	2014 Baseline	New 2014 Baseline	2014 Remaining Emissions
Smog Check Improvements (BAR)	2.5	2.5	2.4
Cleaner In-Use Heavy-Duty Trucks & Buses	6.2	4.3	2.6
Cleaner In-Use Off-Road Equipment (over 25hp)	1.4	0.6	0.6
Accelerated Intro. Of Cleaner Line-Haul Locomotives	0.5	0.5	0.5
All other local, state, and federal emissions		64	59
Total 2014 forecast with rules adopted to date		72	65

SOx Emissions (tpd)			
	SIP	Current	
	2014 Baseline	New 2014 Baseline	2014 Remaining Emissions
Cleaner In-Use Heavy-Duty Trucks & Buses	0.3	0.2	0.2
Cleaner In-Use Off-Road Equipment (over 25hp)	0.0	0.0	0.0
All other local, state, and federal emissions		24	21
Total 2014 forecast with rules adopted to date		24	21

Assessing the Impacts of the Recession on Good Movement Related Emissions

This section documents the methodologies used to account for the impacts of the economic recession on the emission inventories for trucks, in-use off-road equipment, ocean-going vessels, and cargo handling equipment. Links to more detailed information are provided.

General Methodology

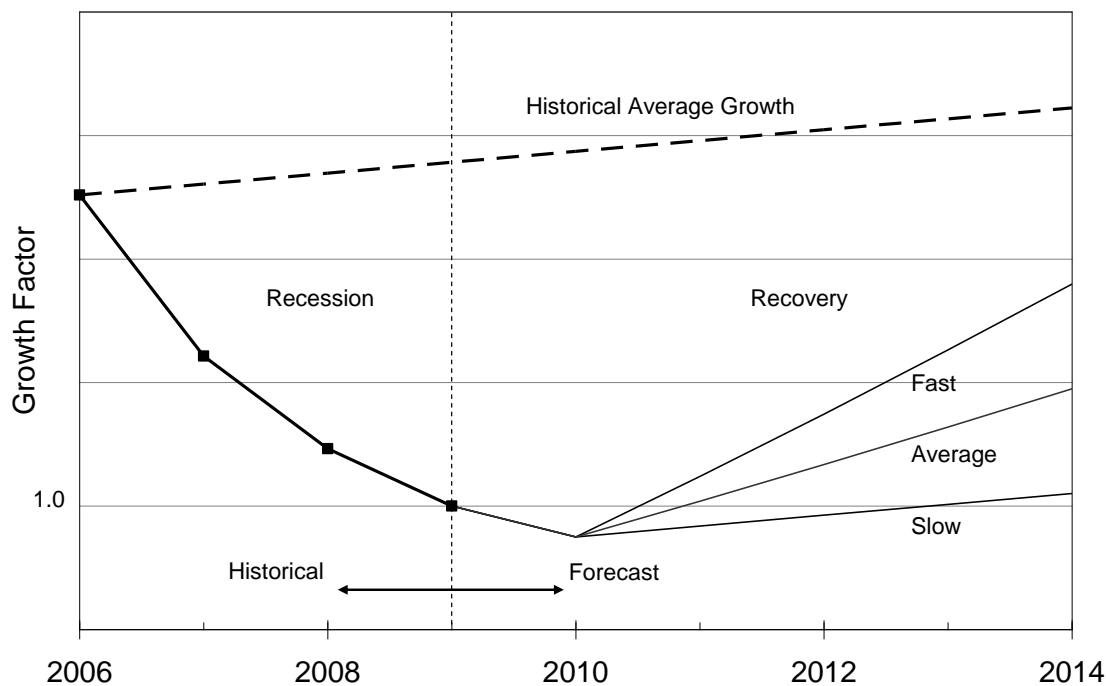
The economic recession officially started in December of 2007 and ended in June 2009. It was the most severe since the Great Depression and had a severe impact on California industries. The emission inventories for trucks, in-use off-road equipment, ocean-going vessels, and cargo handling equipment have all been adjusted to its impact.

To understand the impact of reduced activity on future emissions, staff developed both a fast and slow recovery scenario to bound the recovery possibilities.

The fast recovery scenario assumes that total activity would return to projected historically average levels in 2017 and then grow at the historical average rate after that. This scenario is based on the Congressional Budget Office forecast which indicated that real gross domestic product at a nationwide level will converge with potential gross domestic product trends no later than 2015. Coupling this forecast with the assumption that California's recovery will lag the nation by several years yielded the 2017 recovery date assumed for the fast recovery scenario.

In the slow recovery scenario, staff assumed that activity would be permanently depressed relative to historical levels, but continue to grow at the average historical growth rate beginning in 2011.

While the fast and slow scenarios provide a reasonable bound of possible recoveries, for rulemaking purposes and for this SIP update, a single forecast is needed. For this, staff assumed an average recovery midway between the fast and slow recoveries. The chart below illustrates the two bounding scenarios and the assumed average used in this report. This is the same approach developed to provide economic relief through last year's regulatory amendments to the diesel trucks, buses, and off-road equipment rules.



In-Use On-Road Trucks & Buses

Staff updated the inventory for diesel trucks and buses to support ARB consideration of regulatory amendments to provide economic relief last December 2010. The update was comprehensive and included a revised population, new regional allocation factors, lifetime odometer assumptions, revised growth rates, forecasted vehicle age distributions to reflect the impact of the economic recession, and updated out-of-state vehicle activity. These changes are described in detail at <http://www.arb.ca.gov/regact/2010/truckbus10/truckbus10.htm>.

This progress report required emission estimates for years and pollutants (SOx and ROG) that were not needed for the 2010 rulemaking. Staff used the same methodologies and principles used for the December 2010 regulatory inventory to develop estimates for the other years and pollutants in this report.

In-Use Off-Road Equipment

Just as for trucks and buses, staff completed a comprehensive revision to the inventory for off-road equipment to support ARB consideration in December 2010 of regulatory amendments to provide economic relief. Updates were made to the population of equipment, annual activity, load and future equipment sales. These changes are described in detail at <http://www.arb.ca.gov/regact/2010/offroadlsi10/offroadlsi10.htm>.

This progress report required emission estimates for years and pollutants (SO_x, ROG and total organic gases (TOG)) that were not needed for the 2010 rulemaking. Staff used the same methodologies and principles used for the December 2010 regulatory inventory to develop estimates for the other years and pollutants in this report.

Ocean-Going Vessels (OGV)

The OGV inventory in the PM2.5 SIP included vessel-specific data, improved vessel traffic network, vessel-specific hoteling and anchorage times, and improved vessel speeds. Staff has refined that inventory since then to support rulemaking in 2008 on the sulfur content in fuel. Staff has further updated that 2008 inventory in anticipation of amendments to the same fuel rule later this year. That information is used in this report. In general, the updates include improved algorithms for vessel speed reduction (VSR), auxiliary engine power, and estimating low load adjustment factors. Recession impacts are based on container throughput statistics for the Ports of Los Angeles, Long Beach and Oakland. OGV activity was down about 25% for the combined ports of Los Angeles and Long Beach and about 15% for the Port of Oakland between 2006 and 2009.

More information is available at <http://www.arb.ca.gov/ports/marinevess/ogv.htm>.

Cargo Handling Equipment (CHE)

An update to the cargo handling equipment (CHE) inventory is currently underway using new information about the population, equipment usage, impacts of the recession and fleet turnover. The new model is still under development and not available for use in this report; therefore, staff scaled the existing PM2.5 SIP CHE emissions inventory to account for the new data.

The inventory used for the SIP was based on population and activity values from a 2001 to 2004 survey. As part of the adopted regulation, equipment owners were required to report the population of their equipment to ARB. Additionally, between 2005 and 2009 the ports and rail yards have conducted their own emissions inventories. This new information indicates that the total state population is slightly higher than originally assumed. These same data sources include updates to activity and load factor. However, changes in activity and load factors offset these increases in the population.

To account for these changes, staff compared baseline 2006 emissions from the original inventory to the draft updated inventory baseline. As discussed in a recent February workshop, emissions for PM and NO_x emissions are approximately 20 percent and 27 percent lower, respectively. For this report staff assumed 2006 emissions were 27 percent lower than in the SIP. To forecast emissions forward from 2006, staff compared the original growth assumptions for CHE to the growth in port truck activity in the 2010 Truck and Bus Rule inventory model. Assuming that the CHE activity relates

chiefly to the movement of shipping containers, staff reduced growth by approximately 20%.

More information is available at <http://www.arb.ca.gov/ports/cargo/cargo.htm>.

Commercial Harbor Craft

In 2007 ARB adopted a commercial harbor craft regulation and adopted amendments to the original rule in 2010. Updates were made to the population of equipment, annual activity, and regional allocation. These changes are described in detail at <http://www.arb.ca.gov/ports/marinevess/harborcraft/hcdocuments.htm#regulatory>.