

**SACRAMENTO METROPOLITAN
AIR QUALITY MANAGEMENT DISTRICT**

EXPEDITED BARCT IMPLEMENTATION SCHEDULE

FOR

ASSEMBLY BILL 617

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INTRODUCTION

California Assembly Bill (AB) 617¹ was signed into law on July 26, 2017. Among its provisions, California Health and Safety Code (HSC) section 40920.6 was amended to require each air district that is a nonattainment area for one or more air pollutants to adopt an expedited schedule for implementation of Best Available Retrofit Control Technology (BARCT). This requirement applies to each industrial source subject to the California Greenhouse Gas Cap-and-Trade regulation². A district's BARCT schedule must be adopted by January 1, 2019, and provide for the implementation of BARCT by the earliest feasible date, but no later than December 31, 2023. The schedule must give highest priority to those permitted units that have not modified emissions-related permit conditions for the greatest period of time, but does not apply to an emissions unit that has implemented BARCT due to a permit revision or a new permit issuance since 2007.

BARCT is defined as "an emission limitation that is based on the maximum degree of reduction achievable, taking into account environmental, energy, and economic impacts by each class or category of source³." This document presents Staff's proposed schedule for implementing BARCT, together with a high-level assessment of the anticipated rule development activities. A detailed analysis of emission standards, control technologies, and cost-effectiveness will be performed during the development of each rule.

POLLUTANTS OF CONCERN

Table 1 shows the District's designations for the state and federal criteria pollutant standards.

Table 1. District's Designations for State and Federal Pollutant Standards

Pollutant	California Standard Designation	Federal Standard Designation
Ozone	Nonattainment	Nonattainment
Particulate Matter, Less than 10 Microns in Diameter (PM10)	Nonattainment	Attainment
Particulate Matter, Less than 2.5 Microns in Diameter (PM2.5)	Attainment	Nonattainment
Carbon Monoxide	Attainment	Unclassified/ Attainment
Nitrogen Dioxide	Attainment	Unclassified/ Attainment
Sulfur Dioxide	Attainment	Unclassified
Lead	Attainment	Unclassified/ Attainment
Hydrogen Sulfide	Unclassified	(No Standard)
Sulfate	Attainment	(No Standard)
Visibility Reducing Particles	Unclassified	(No Standard)

¹ Statutes of 2017, Ch. 136, Sec. 2. AB 617, Christina Garcia.

² Title 17, California Code of Regulations (CCR), Section 95800 *et seq.*

³ HSC Section 40406.

The District is designated nonattainment for the state and federal ozone standards, the state PM10 standard, and the federal PM 2.5 standard. Therefore, the expedited BARCT schedule applies to the control of these pollutants and their precursors. Volatile organic compounds (VOCs) and nitrogen oxides (NOx) are precursors to ozone formation. The emissions inventories for Sacramento County for the pollutants of concern are shown in Figures 1 through 4. The contributions of significant emissions categories are also shown.

Figure 1. NOx Emissions Inventory, Sacramento County (34.7 tons per day)⁴

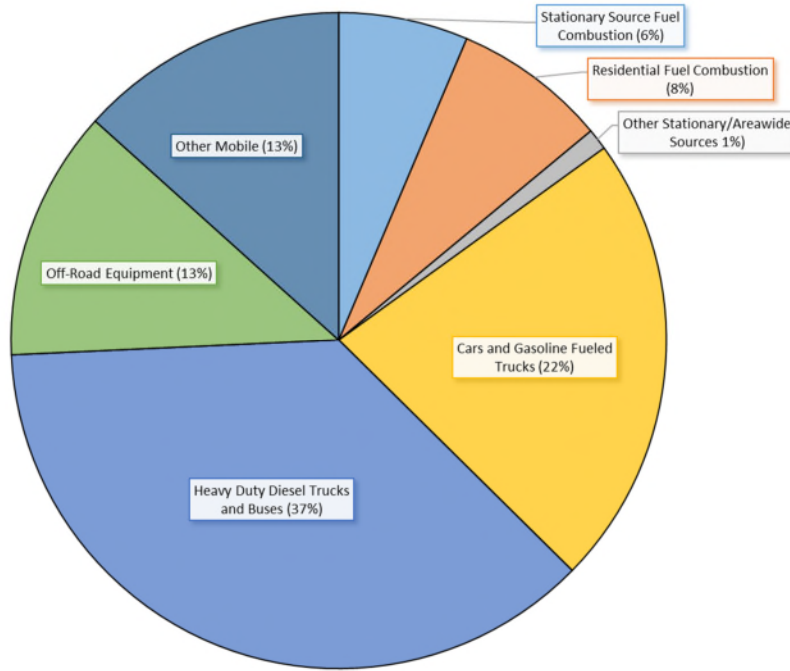
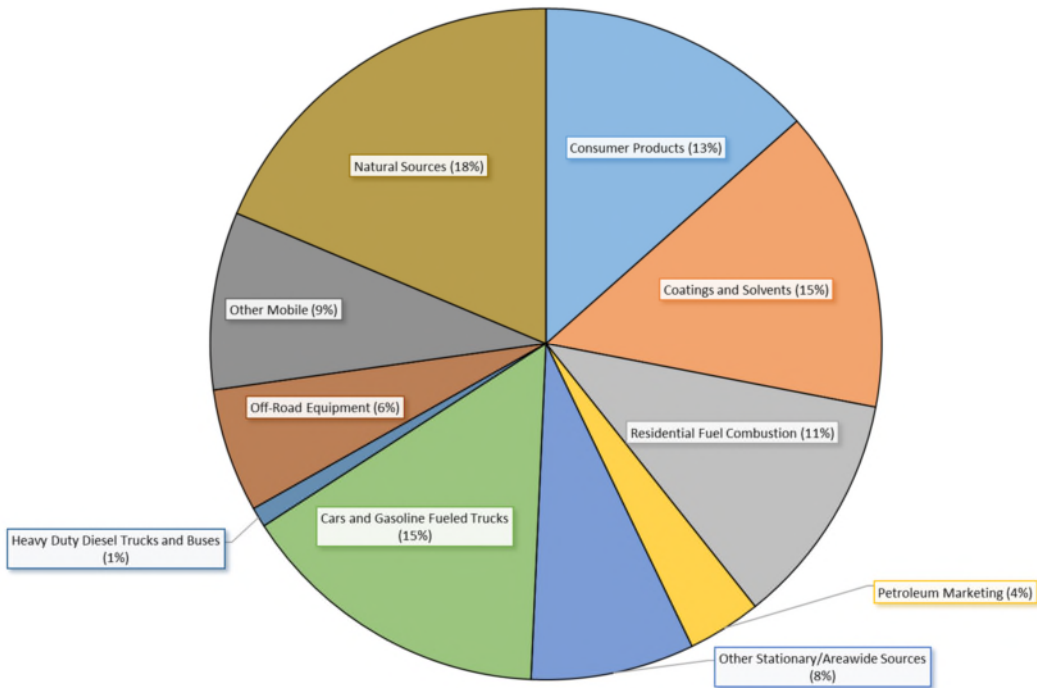


Figure 2. VOC Emissions Inventory, Sacramento County (58.4 tons per day)



⁴ Source: CARB. "CEPAM: 2016 SIP - Standard Emission Tool." (2017 annual average).
<https://www.arb.ca.gov/app/emsinv/fcemssumcat/fcemssumcat2016.php>

Figure 3. PM10 Emissions Inventory, Sacramento County (29.0 tons per day)

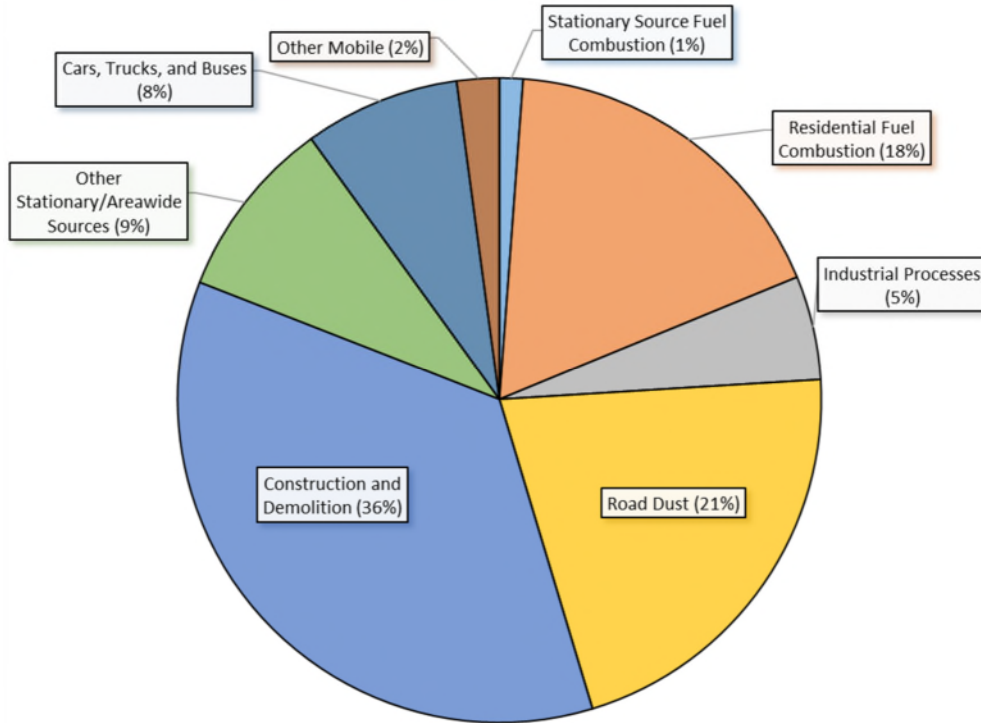
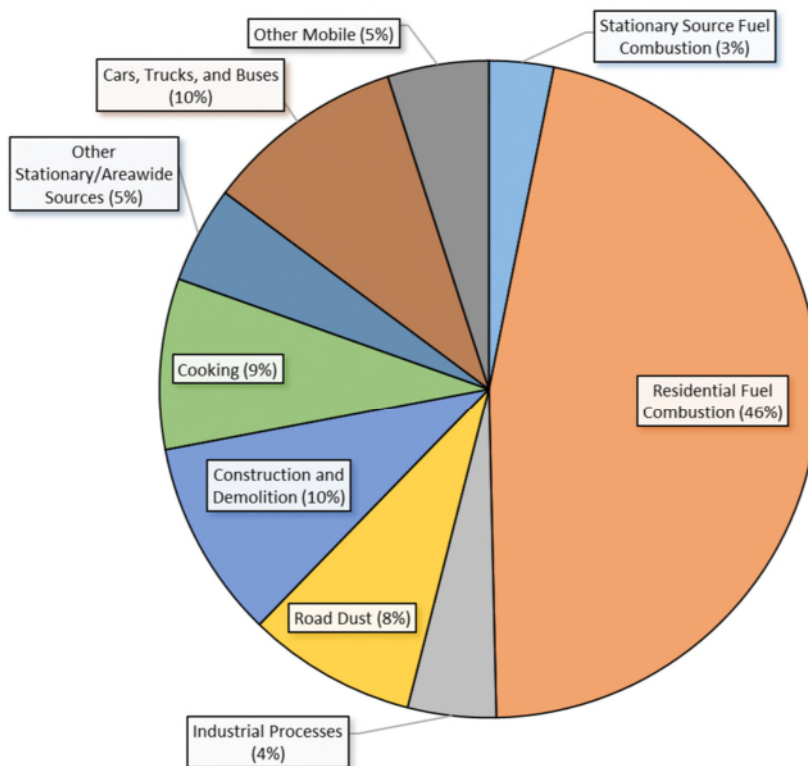


Figure 4. PM2.5 Emissions Inventory, Sacramento County (10.6 tons per day)



AFFECTED SOURCES

Three industrial sources in the District are subject to the California Greenhouse Gas Cap-and-Trade regulation. These sources, together with their 2017 emissions of VOC, NOx, PM10, and PM2.5 are listed in Table 2. Their locations are shown on the map in Figure 5.

Table 2. 2017 Actual Emissions from Cap-and-Trade Sources

Source (Type)	VOC (tons/year)	NOx (tons/year)	PM10 (tons/year)	PM2.5 (tons/year)
Air Products Manufacturing Corp. (Hydrogen Plant)	0.90	9.83	1.24	1.24
California Resources Production Corp., Big Brannon Compressor Station (Natural Gas Production)	7.20	7.20	1.44	1.44
California Resources Production Corp., Baby Brannon Compressor Station (Natural Gas Production)	2.34	2.16	0.43	0.43

Air Products Manufacturing Corp.

At their Sacramento facility, Air Products produces hydrogen using a steam-methane reforming process. Pollutants are emitted from two large, natural gas-fired reformers. These units are subject to Rule 411 - NOx from Boilers, Process Heaters and Steam Generators.

California Resources Production Corporation

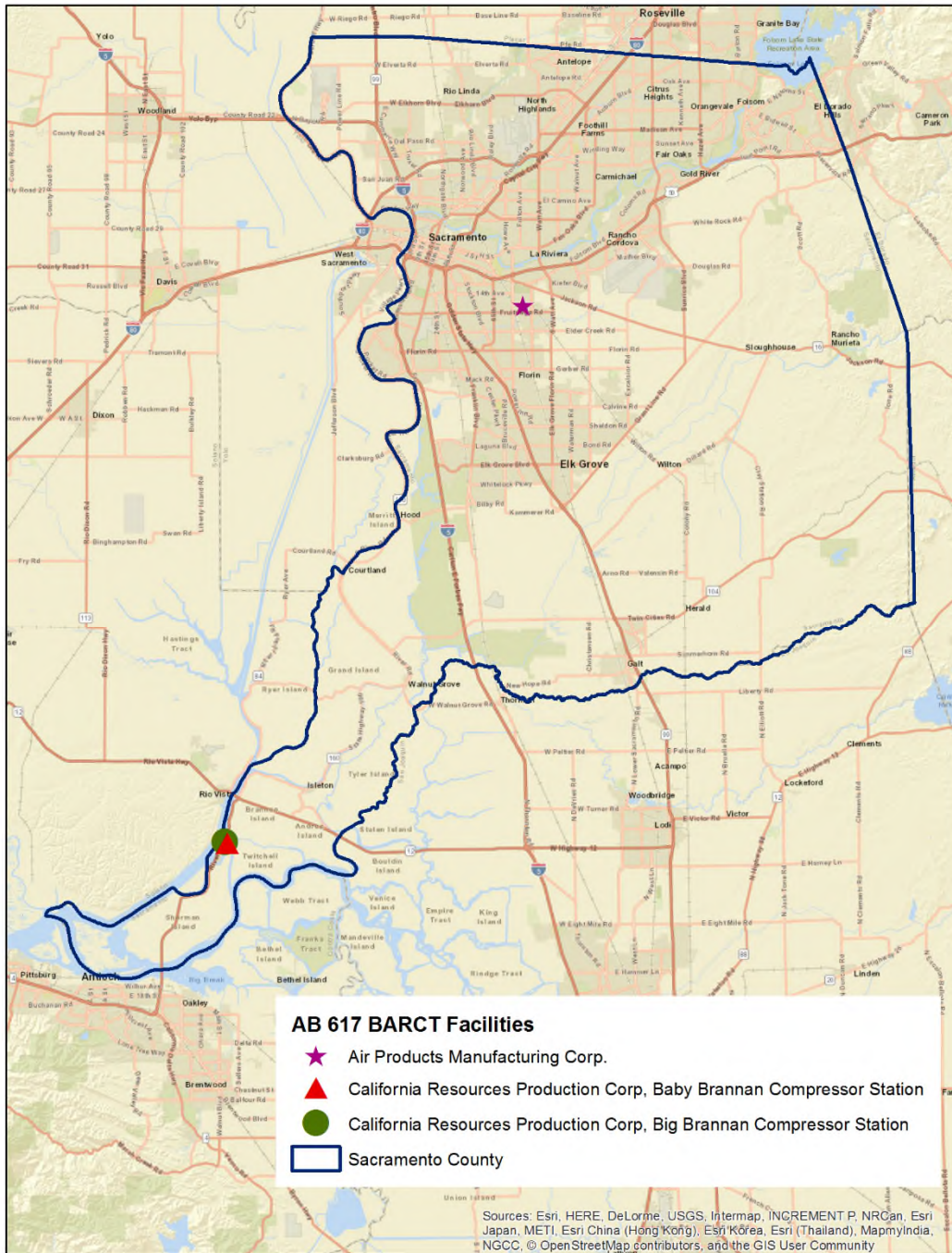
California Resources is an oil and gas production company that produces oil and natural gas throughout California. In the Sacramento Valley geographical basin (designated Basin No. 730), the company extracts, processes, and compresses natural gas in operations in multiple counties, including Sacramento, Butte, Colusa, Contra Costa, Glenn, San Joaquin, Solano, Sutter, Tehama, and Yolo. Under the Cap-and-Trade regulation, all of a company's oil and gas production operations in the same geological basin are treated as a single "facility."

Two permitted California Resources compressor stations in Sacramento County are included in the District's point source emissions inventory: Big Brannon Compressor Station and Baby Brannon Compressor Station, located on the east side of the Sacramento River, southwest of Isleton. The District's emissions inventory includes only the emissions from the internal combustion engines used to drive the compressors. However, there are VOC emissions from other equipment types associated with the natural gas production operations that are also covered under the Greenhouse Gas Cap-and-Trade regulation, including, but not limited to⁵:

- Wellheads;
- Pneumatic devices;
- Liquid storage tanks;

⁵ HSC Section 95852(h).

Figure 5. Location of Industrial Cap-and-Trade Facilities in Sacramento County



- Compressor seals;
- Glycol dehydrator vents; and
- Leaks from valves, flanges, seals, and other fugitive emission components.

Although the Cap-and-Trade regulation applies to greenhouse gas emissions (primarily methane in this case), VOCs are also present in natural gas and are emitted through the same mechanisms. At this time, Staff does not have information on the quantities of VOCs emitted by California Resources' natural gas production operations.

AVAILABLE EMISSION CONTROLS

Process Heaters

Two primary technologies are available to reduce NOx emissions from fuel combustion in process heaters: low-NOx burners and selective catalytic reduction (SCR). Low-NOx burners use flue gas recirculation, precise air-to-fuel ratio control, premix burners, and staged combustion to reduce peak flame temperatures, thereby reducing NOx formation. In many applications, low-NOx burners are capable of achieving NOx emission concentrations less than 10 parts per million by volume (ppmv, corrected to an exhaust oxygen concentration of 3%).

SCR is a post-combustion control in which combustion exhaust gas passes through a catalyst bed, where NOx reacts with a reducing agent, such as urea or ammonia. SCR systems typically are capable of achieving NOx emission concentrations of only a few ppmv. SCR systems have been applied to steam-methane reformers⁶ similar to the units at Air Products.

NOx emissions from Air Products' reformers are limited to 30 ppmv under Rule 411 – NOx from Boilers, Process Heaters and Steam Generators. During the BARCT implementation process, Staff will evaluate the technological and economic feasibility of applying currently available control methods to reduce emissions. Amendments to Rule 411 may be necessary to ensure that Air Products' reformers meet BARCT control levels.

Internal Combustion Engines

The internal combustion engines at the California Resources locations are used to drive compressors. The engines are fueled with natural gas and are rich-burn, spark-ignited engines. The most common, effective control systems for engines of this type use nonselective catalytic reduction (NSCR), in which a three-way catalyst (catalytic converter) simultaneously controls emissions of NOx, VOC, and carbon monoxide.

Rule 412 – Stationary IC Engines Located at Major Stationary Sources of NOx does not apply to the engines at California Resources because it is not a major source of NOx. During the BARCT implementation process, Staff will evaluate whether amendments to Rule 412 are necessary to reduce emissions from California Resource's engines to meet BARCT control levels.

⁶ Johnson Matthey, "Industries – Steam Methane Reforming," <https://www.jmsec.com/industries/steam-methane-reforming/?L=0>, accessed September 26, 2018.

Natural Gas Production Operations

A wide variety of VOC emission points is associated with natural gas production. The potential emission control techniques are listed in Table 2.

Table 2. Natural Gas Production – Potential Control Techniques

Emission Point	Potential Control Techniques
Wellheads	LDAR ^a
Pneumatic Devices (Pumps and Controllers)	No-Bleed or Low-Bleed Devices
Liquid Storage Tanks	Pressure-Vacuum Valves; Floating Roof Tanks; Vapor Recovery Systems; LDAR
Compressor Seals	Seal Maintenance; Vapor Collection/Control Systems; LDAR
Glycol Dehydrator Vents	Vapor Collection/Control Systems
Fugitive Component Leaks	LDAR

^a Leak Detection and Repair

Natural gas production operations in California are subject to CARB's Greenhouse Gas Emission Standards for Crude Oil and Natural Gas Facilities⁷. The District implements and enforces this regulation through a memorandum of agreement with CARB. Although the regulation was adopted as a measure to reduce greenhouse gas emissions (primarily methane), it also reduces VOC emissions has a co-benefit. Other California districts that have adopted rules to control VOC emissions from certain types of equipment used in the natural gas production industry, and there are relevant federal regulations and guidance available as well. During the BARCT implementation process, Staff will evaluate whether additional rulemaking is necessary to ensure that California Resource's operations meet BARCT control levels.

BARCT IMPLEMENTATION SCHEDULE

AB 617 specifies that a district must consider the following factors when adopting its BARCT implementation schedule:

- The local public health and clean air benefits to the surrounding community;
- The cost-effectiveness of each control option; and
- The air quality and attainment benefits of each control option.

The potential emission benefits and cost effectiveness of control options will be estimated during the BARCT determination and rulemaking processes. Nevertheless, Staff has assessed the relative importance of the BARCT emission categories according to the AB 617 criteria and established a priority ranking. The rationale for the each category's priority is discussed below.

Priority 1: Natural Gas Production. Although Staff has not yet determined the precise quantity of VOC emitted by California Resources' natural gas production operations, it is likely to exceed the criteria pollutant emissions from the other categories. Staff expects that implementing BARCT for this category has the greatest potential for reducing emissions, thereby providing the most benefits to public health and air quality attainment. In addition, most of the equipment used in

⁷ 17 CCR § 95665 *et seq.*

natural gas production has not been subject to District permitting requirements, and BARCT has not been evaluated. Emission controls for this category have more potential to be cost-effective than for the other two categories.

Priority 2: Process Heaters. Staff last evaluated BARCT for process heaters during the development of the 2005 amendments to Rule 411. At that time, a BARCT NOx emissions limit for Air Products' steam-methane reformers was established and further control was found not to be cost effective. Staff will evaluate the technological and economic feasibility of current technology to reduce emissions further. Implementing more stringent BARCT for this category has the potential to reduce emissions by a moderate amount and, therefore, may provide moderate benefits to public health and air quality attainment.

Priority 3: IC Engines. Although no District rule applies to the compressor engines at California Resources, the emission limits on the permits for these engines meet the District's current Best Available Control Technology (BACT) standards, which are presumed to be more stringent than BARCT standards. A BARCT determination for this category is less likely to result in more stringent emission limits than for the other two categories, and is the least likely to provide benefits to public health and air quality attainment.

Staff's proposed BARCT implementation schedule, shown in Table 3, is consistent with the priorities for the BARCT emission categories.

Table 3. AB 617 BARCT Implementation Schedule

AB 617 Facility	Emission Category	Implementation Schedule		
		Determination of BARCT Standards	Rulemaking (If Necessary)	
		Timeframe	Timeframe	Affected Rule
California Resources	Natural Gas Production	2019	2020	New Rule
	IC Engines	2021	2022	Rule 412
Air Products	Process Heaters	2020	2021	Rule 411