California Environmental Protection Agency
AIR RESOURCES BOARD

STAFF REPORT: INITIAL STATEMENT OF REASONS FOR PROPOSED RULEMAKING

REGULATION FOR ENERGY EFFICIENCY AND CO-BENEFITS ASSESSMENT OF LARGE INDUSTRIAL FACILITIES

Stationary Source Division
Emissions Assessment Branch

June 2010

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State of California
AIR RESOURCES BOARD

STAFF REPORT: INITIAL STATEMENT OF REASONS FOR PROPOSED RULEMAKING

Public Hearing to Consider

ADOPTION OF THE PROPOSED ENERGY EFFICIENCY AND CO-BENEFITS ASSESSMENT OF LARGE INDUSTRIAL FACILITIES

To be considered by the Air Resources Board on July 22-23, 2010, at:

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State of California
AIR RESOURCES BOARD

PROPOSED REGULATION FOR ENERGY EFFICIENCY AND CO-BENEFITS ASSESSMENT OF LARGE INDUSTRIAL FACILITIES

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EXECUTIVE SUMMARY

This summary presents an overview of the Air Resources Board (ARB or Board) staff's *Proposed Regulation for Energy Efficiency and Co-Benefits Assessment of Large Industrial Facilities* (Energy Efficiency Assessment Regulation or proposed regulation). The proposed regulation is designed to gather information on the energy efficiency improvement opportunities that are available for California's largest industrial stationary sources of greenhouse gas emissions (GHG), and to quantify the associated emission reductions for greenhouse gases, criteria pollutants, and toxic air contaminants.

In 2006, the Governor signed the California Global Warming Solutions Act (Act or AB 32). Among other provisions, the Act set the State's greenhouse gas emission (GHG) reduction goals into law. The Act directed ARB to prepare a Scoping Plan that identifies how best to reach the 2020 GHG limit. The Board approved the Scoping Plan in December 2008. In the Scoping Plan, the Board outlined a comprehensive set of actions to reduce GHG emissions. The proposed regulation is one of the many measures identified in the Scoping Plan. The goals of the proposed regulation are to:

1) for high GHG emitting industrial stationary facilities in California, identify the energy consumption and the associated GHG, criteria pollutant, and toxic air contaminant emissions;
2) determine potential opportunities for improving energy efficiency and reducing GHG, criteria pollutant, and toxic air contaminant emissions from industrial facilities such as refineries, electricity generating facilities, cement plants, hydrogen plants, and other large industrial facilities; and
3) identify potential future actions for obtaining further reductions in GHG, criteria pollutant, and toxic air contaminant emissions.

Industrial facilities in California are a large source of GHG emissions. In 2008, these facilities emitted approximately 160 million metric tonnes of carbon dioxide equivalent ($MMTCO_2e$) emissions annually or about one-third of the total GHG emissions from all sources in California (ARB, 2010a). Information gathered from the implementation of the proposed regulation will be a valuable resource in determining what GHG emission reduction opportunities are available as well as what criteria pollutant and toxic air contaminant co-benefits might be realized. ARB staff will use these data to inform ARB's GHG, criteria pollutant, and toxic air contaminant emission reduction programs, and the next update to the Scoping Plan. Additionally, the information will help California's largest stationary sources of GHG emissions consider potential co-benefits when deciding on actions to comply with other GHG programs, such as a cap-and-trade program.

Presented below is an overview that briefly discusses the information presented in this Staff Report.

1. What is ARB staff proposing?

ARB staff is proposing a regulation to require selected industrial facilities to provide ARB with information on the key processes and activities, including data on emissions, energy usage, and potential energy efficiency improvement projects. These industrial sectors include petroleum refineries that produce transportation fuels, oil and gas extraction and transmission, electricity producers, cement and mineral production, and hydrogen production.

2. What are the objectives of the proposed regulation?

The objectives of the proposed regulation are to collect information in a one-time assessment to identify the full range of energy efficiency improvement projects and GHG emission reduction opportunities potentially available at California's largest industrial facilities and to identify what criteria pollutants and toxic air contaminants (TAC or toxics) co-benefits could be achieved. The data gathered are meant to provide preliminary estimates on costs, emission reductions, and other impacts that would occur if the identified projects were implemented. Once the information is collected, it will then be used to inform industry, regulatory agencies, and the public on the most effective actions for reducing GHG emissions, criteria pollutant emissions, and toxic air contaminants from these large industrial facilities.

3. What industrial sectors and facilities would be affected?

The proposed regulation will apply to California's largest industrial facilities; those emitting GHG emissions of at least 0.5 $MMTCO_2e$ annually and any cement plants or transportation fuel refineries that emit GHG emissions of at least 0.25 $MMTCO_2e$ annually. Based on this threshold and the 2008 data reported to the ARB pursuant to the Regulation for the Mandatory Reporting of Greenhouse Gas Emissions[1] (Mandatory GHG Reporting Regulation), approximately 60 facilities in five industrial sectors will be affected.[2] The sectors include:

- petroleum refineries (18 facilities)
- oil and gas extraction and transmission facilities (6 facilities)
- electricity generating facilities (18 facilities)
- cement plants and mineral plants (11 facilities)
- hydrogen plants (3 facilities)

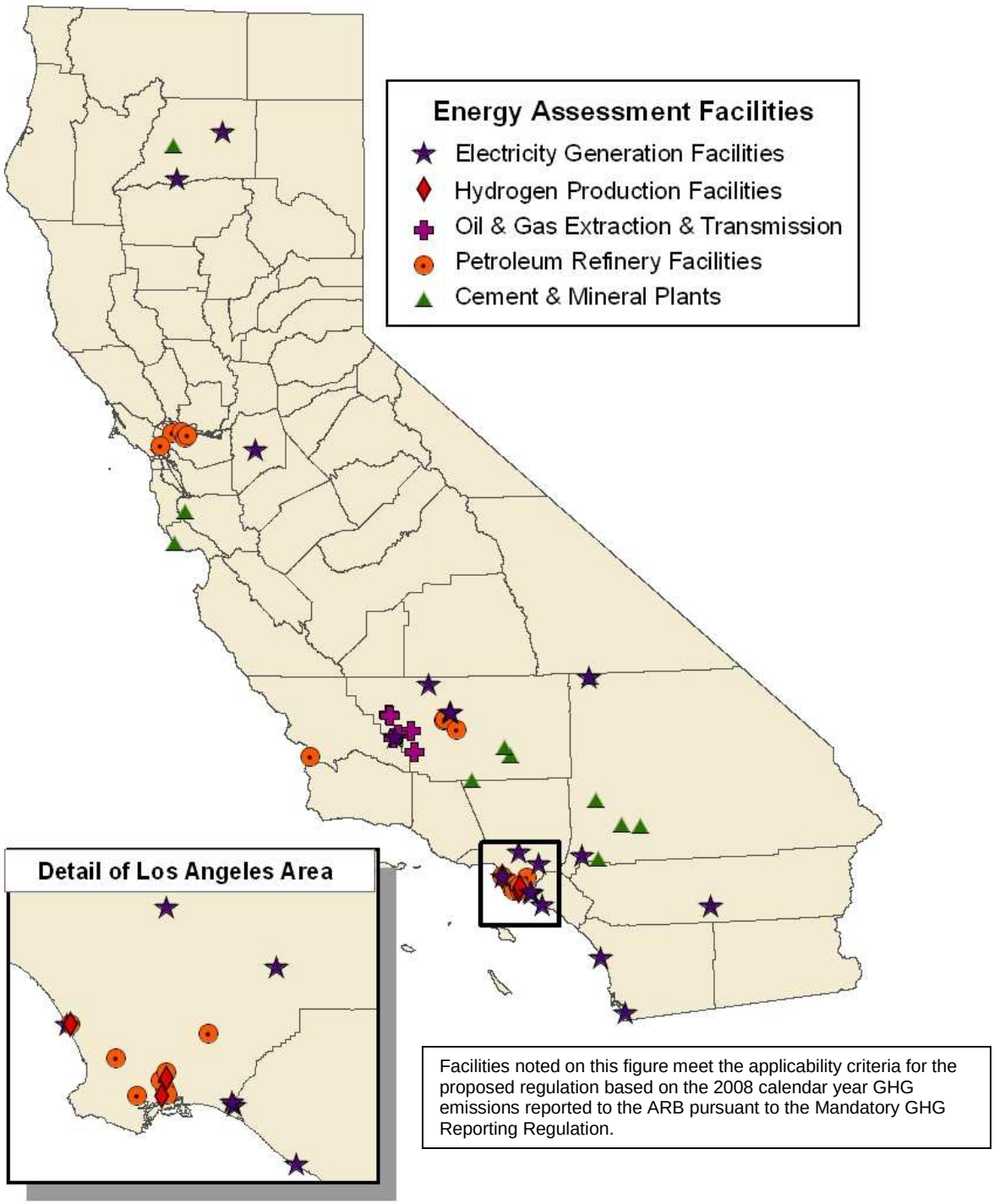
As shown in Figure 1, these facilities are located throughout California with the largest numbers found in the Southern San Joaquin Valley, and in and around Los Angeles and San Francisco. Combined-cycle electricity generating facilities built after 1995 would be

[1] Sections 95100 through 95133, title 17, California Code of Regulations

[2] The actual number of facilities that would be subject to the proposed regulation may be different, since the applicability will be based on the 2009 calendar year data collected under the Mandatory GHG Reporting Regulation, which has not yet been released.

exempt from the proposed regulation because staff finds they are the most energy-efficient facilities within that sector, and implementing the proposed regulation would not have the benefits as great as other facility types.

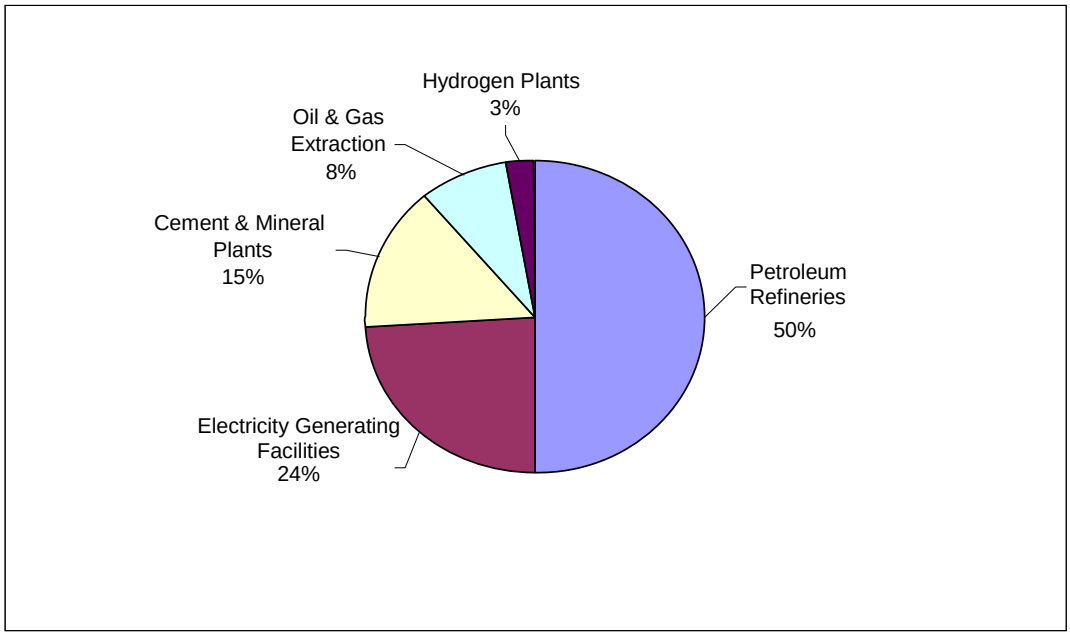
Figure 1: Facility Locations in California (2008) Expected to be Subject to the Proposed Energy Efficiency Assessment Regulation



4. What are the greenhouse gas emissions from the identified facilities?

The combined total GHG emissions at the approximately 60 facilities statewide that are expected to be subject to the proposed regulation was about 70 $MMTCO_2e$ in 2008 or about 45 percent of the total emissions from the industrial sector. This estimate is based on reports submitted by the facilities to comply with the Mandatory GHG Reporting Regulation. Figure 2 below shows the distribution of the emissions from the five sectors.

Figure 2: Distribution of 2008 GHG Emissions by Industrial Sector for the Facilities Expected to be Subject to the Proposed Energy Efficiency Assessment Regulation



(ARB, 2010b)

5. What are the key elements of the proposed regulation?

The proposed regulation has three key elements:

- an analysis of the facility energy consumption and emissions;
- an analysis of the potential for energy efficiency improvements that will result in GHG emission reductions, with additional quantification of associated reductions in criteria pollutants and TACs; and
- a comprehensive report, that would be submitted to ARB containing the information gathered from the two elements above.

As part of the first element, facility operators would be required to provide a process flow diagram, the name and description of the processes and equipment used, and the facility-wide fuel and electricity consumption for 2009. The proposed regulation does

not require facilities to create a new emissions inventory. Instead, facilities would provide their 2009 emissions of GHG, criteria pollutants, and TACs that were reported for the Mandatory GHG Reporting Regulation (for GHG) and Air Pollution Control and Air Quality Management Districts (local district) reporting programs (for criteria pollutants and TACs). The GHG data reported will be validated by a third party verification process that is required by the Mandatory GHG Reporting Regulation. The criteria pollutant and TAC emission data will be validated by ARB and local district staff as part of their existing emission data management programs.

In the second element, facility operators would be required to conduct a comprehensive assessment of potential energy efficiency improvement projects that are possible at the facility and the associated impacts that would occur if the projects were implemented. The operators would include a description of each project, the types of processes and equipment involved, preliminary estimates for costs, timing, status (if the project is being implemented), project life, energy and cost savings, potential emission reductions (GHG, criteria, and toxics), district permitting impacts, and other project related impacts. The methodology for quantifying the estimated emission reductions would also be required to be specified.

For the last element, facility operators would be required to submit a report (Assessment Report) containing the facility's energy consumption and emissions analysis and the energy efficiency improvement analysis. The Assessment Report would be submitted to ARB by the end of 2011, and would then undergo an internal ARB review process to determine its completeness and validity. If a report is deemed to be incomplete, then a new assessment, conducted by an approved third party assessor, may be required.[3] Once staff has completed review of the submitted reports, they will be made available to the public on ARB's Climate Change website. We anticipate that public release would occur in April 2012.

6. What is the timeline for implementing the proposed regulation?

Staff expects to begin implementing the proposed regulation in 2011, with the facility reports due to be submitted to ARB by the end of that year. Staff plans to summarize the findings from the Assessment Reports for each sector and release the information in a public document in mid-2012. Table 1 below shows the expected timeline of key elements in implementing the proposed regulation.

[3] The Executive Officer will approve the third party assessor selected by the facility operator upon demonstration that the third party assessor is qualified to effectively conduct the assessment and that there is no conflict of interest.

Table 1: Timeline for Proposed Energy Efficiency Assessment Regulation Implementation

Action	Proposed Dates
Assessment Reports Due to ARB	December 15, 2011
ARB Publishes Reports Online	April 30, 2012
ARB Draft Report – Preliminary Findings and Recommendations	June 30, 2012

7. What are the benefits of the proposed regulation?

In order to reach the State's mandated 2020 GHG emission limit, all potential emission reduction opportunities must be assessed. The proposed regulation will provide ARB with a comprehensive list of actions that potentially could be taken to reduce emissions from the largest stationary GHG sources. This information will be used to inform GHG, criteria pollutant, and TAC emission control program development and implementation. It will help identify a range of possible approaches (e.g., voluntary action, incentive-based, and State or local regulations) to maximize GHG emission reductions and co-benefits. This will be particularly important as we work to address direct, indirect, and cumulative emissions impacts of other GHG programs such as a California cap-and-trade program. The information will be helpful to assess localized impacts in communities that are already adversely impacted by air pollution. The information will also provide valuable data which ARB, local districts, and the public can use to identify opportunities for achieving further reductions in criteria and toxic emissions.

8. How will the proposed regulation be implemented?

Staff will work directly with the facilities subject to the proposed regulation to provide real-time guidance and feedback throughout the assessment analysis and reporting process. Teams, consisting of ARB staff most familiar with each industrial sector, will work directly with the facility operators as they conduct the assessment. These same ARB staff members will review the facility assessment reports for completeness, validate the information provided, and obtain additional information from the facility where necessary. Having staff involved throughout the analysis and reporting process will allow ARB to provide guidance to facility operators on implementation issues and will help to ensure consistency in the reports. This will speed up the review process as well, since staff will be able to more quickly resolve questions and interpretation issues.

9. Will the information from the assessment reports be made available to the public?

Yes. ARB staff believes it is critical that the information collected be publicly available, particularly to those communities that are located near the facilities. In developing the proposed regulation, ARB staff's goal was to require information that is preliminary but comprehensive enough to guide future decision making. We believe that this can be

accomplished without sources having to provide confidential business information. Since staff would be working with the facility operators throughout the analysis and reporting process, issues regarding confidentiality can be addressed early on, prior to report submittal, to ensure that the information provided to ARB can be directly released to the public. As such, the proposed regulation includes a provision requiring the ARB to publish the completed assessment reports on ARB's website by April 30, 2012.

10. What are the economic impacts of the proposed regulation?

ARB staff estimates that the total cost of the proposed regulation to affected businesses would be approximately $14 million over a period of about 16 to 18 months. A summary of the expected costs by grouped industrial sectors is provided below in Table 2. As can be seen, the majority of the costs will be borne by refineries and oil and gas extraction facilities, which account for about $10 million or 75 percent of the total costs.

Table 2: Estimated Facility Costs and Total Costs for Compliance with the Proposed Regulation

Industrial Sectors	Number of Facilities	Estimated Cost per Facility ($2009)	Total Costs
Electricity Generating Facilities and Hydrogen Plants	21	$78,000	$1,638,000
Cement and Mineral Plants	11	$175,000	$1,925,000
Petroleum Refineries and Oil & Gas Extraction and Transmission	24	$425,000	$10,200,000
Totals	56	N/A	$13,763,000

Overall, the vast majority of the affected businesses are large businesses, many owned by multi-national corporations, and therefore we do not expect their profitability to be adversely impacted. As a result, we do not expect a noticeable change in employment, business creation, expansion, or elimination, or business competitiveness in California. We also found no adverse economic impacts to any local or federal agencies. ARB will incur minimum costs to administer the proposed regulation. These costs would be met with existing resources. No other State agencies will be affected.

No job or business losses are anticipated in California due to the regulation. However, there may be a small increase in the amount of work for consultants in the event facility operators out-source the work needed to fulfill the requirements in the proposed regulation.

11. How does the regulation support the greenhouse gas emission reduction goals?

AB 32 directed the ARB to prepare a Scoping Plan identifying specific actions that could be taken to reduce GHG emissions. The proposed regulation is one of the many measures presented in the Scoping Plan. Implementing the proposed measure will fulfill the goal of the Scoping Plan measure and will acquire the necessary data needed to further pursue achieving GHG emission reductions from the largest GHG emitting facilities in the State. The proposed regulation will also help inform sources and the public of criteria pollutant and toxic air contaminant emissions co-benefits.

12. Why doesn't the proposed regulation require third-party assessments?

Staff has evaluated this option and determined that requiring a facility-conducted assessment is the best approach. Staff believes that it would result in a better product because the equipment and process experts that operate each facility would be conducting the assessment. Given the complexity of many of these sources, it would be difficult to find a third-party assessor with sufficient expertise to conduct the detailed assessment that is required. Additionally, a self-assessment would reduce the amount of time required for rule development and implementation by at least one year by not having to establish a third-party assessor accreditation program. Finally, it would reduce the cost to the regulated community. However, the proposed regulation includes a third-party assessment back-stop, so that if ARB finds that the Assessment Report is unacceptable, ARB could require the facility to conduct a third-party assessment.

13. Why doesn't the proposed regulation require implementation of any identified energy efficiency improvement projects?

Staff's proposal does not include a requirement to implement the improvement projects that are indentified in the Assessment Reports for several important reasons. First, the requirement would likely narrow the focus of the energy efficiency improvement analysis instead of providing a full range of possible improvements that can be made for both near-term and long-term emission reductions. Second, a cost-effectiveness or feasibility trigger would need to be established, which is not only difficult to do prior to determining what opportunities are available, but could result in an inadequate consideration of projects that actually have greater co-benefits for other pollutants. Lastly, requiring implementation of the identified improvement projects within the scope of this proposed regulation would not allow the public to participate in the process of determining the priority of the projects, since project selection would be pre-programmed and done prior to data collection.

14. What is the relationship between the proposed regulation and a possible cap-and-trade regulation?

Any cap-and-trade program would likely rely on data collected by the Mandatory GHG Reporting Regulation to determine the inclusion of an industrial source. We anticipate

that most, if not all, of the approximately 60 stationary source facilities required to comply with the proposed regulation will also have GHG emissions exceeding the 0.25 $MMTCO_2e$ eligibility threshold staff has proposed in the preliminary draft regulation of the cap-and-trade program (ARB,2009). As such, these sources will be required to manage their GHG emissions under an aggregate declining emissions cap that supports achieving the 2020 emissions target established by AB 32. To meet the declining cap, these sources will either have to reduce emissions onsite or through the purchase of additional allowances and/or offsets. The information developed to comply with the proposed Energy Efficiency Assessment regulation will be critical for sources to identify and determine how best to achieve GHG emission reductions needed to meet the cap and, at the same time, consider criteria pollutant and TAC co-benefits.

15. What existing programs are available to improve energy efficiency in the industrial sector and why didn't ARB staff rely on those programs?

Several programs are currently available that provide industrial facilities with information, tools, and opportunities for improving energy efficiency. The federal Department of Energy's Industrial Technologies Program (DOE ITP) works to improve industrial energy intensity through innovative energy efficiency technologies and practices. They provide software tools, industry best practices information, training to certify energy experts in specific energy intensive processes, and assessment programs. Their latest program, Save Energy Now, focuses on implementation of identified improvement opportunities, and is available for qualified large industrial facilities. (DOE, 2010)

ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy that promotes the use of energy efficient products and practices. (U.S. EPA, 2010) ENERGY STAR is creating partnerships with industrial plants to offer a proven energy management strategy that helps in measuring current energy performance, setting goals, tracking savings, and rewarding improvements. The approach is based on the successful energy management practices of over 1,600 commercial and industrial organizations. The *Guidelines for Energy Management* outlines the strategy to set performance goals, create and implement action plans, assess performance and progress, and recognize an organization's achievements. To learn more about the Energy Star Program for buildings and plants visit the following website: http://www.energystar.gov/index.cfm?c=industry.bus_industry

The California Energy Commission (CEC) administers an industrial process energy efficiency program where inspectors, certified through the DOE ITP, conduct free industrial energy efficiency assessments, funded by the Department of Energy. The assessments identify improvements that have a one- to three-year payback period and quantify the energy savings and GHG emission reductions associated with implementation. (CEC, 2009)

Energy efficiency improvement incentive programs for industrial facilities are frequently available through public utility agencies as well. The utilities often work with a facility to

identify energy savings opportunities, and implementing the project(s) can result in a monetary rebate award.

Other programs are also available that help to fund and support research and development of emerging technologies that improve energy efficiency. The Advanced Technologies Program (ATP) of the National Institute of Standards and Technology is one such program that invests in commercial research projects to foster new, innovative technologies. (ATP, 2010) Industrial facilities of all sizes compete equally for ATP cost-sharing to develop improvements in industrial processes that will benefit the industry as a whole, not just the specific facility. While the ATP does not focus solely on energy efficiency, it is one of the program areas that it supports.

Staff did not rely solely on these programs to provide the information required in the proposed regulation because none of the existing programs are comprehensive enough to result in a full assessment of the energy efficiency and emission reductions opportunities that exist at industrial facilities, which is crucial in meeting the goals of the proposed regulation. Moreover, most of these programs focus on energy efficiency improvements and have not looked at the impact of these actions on criteria pollutant and toxic air contaminant emissions. Generally, these programs are focused on specific processes and short payback periods as opposed to providing a full range of opportunities for both the near-term and long-term. However, the proposed regulation does allow the data acquired from participation in these types of programs to be used in order to meet applicable portions of the proposed regulation where appropriate.

16. What future activities are planned?

Once the Assessment Report review and approval process is completed, staff will develop a draft report with preliminary findings and recommendations. This draft report will be used as a starting point for discussion with all stakeholders on what actions and approaches could be taken to maximize GHG, criteria pollutant, and toxic air contaminant emission reductions. We expect the draft report to be publicly available in mid-2012. Staff will then conduct public meetings to discuss the draft report and seek input from the public on actions and approaches (e.g., voluntary action, incentive-based, and State or local regulations) to maximize GHG emission reductions and co-benefits. Additionally, criteria pollutant and toxic air contaminant emission reduction opportunities identified in the Assessment Reports will be evaluated for their relevance to be included in local air district programs and other ARB emission reduction programs.

17. What is staff's recommendation?

Staff recommends the Board approve the proposed regulation presented in this report (Appendix A). The regulation will support ARB's GHG emission reduction objectives and fulfill the goals of the Scoping Plan measure by providing a comprehensive list of feasible actions that can be taken to reduce GHG emissions from the largest stationary industrial facilities in the State. Adopting the proposed regulation will also support other emission reduction programs for criteria pollutants and toxic air contaminants, providing

information necessary to carry out the Board's responsibilities under State law. It will also provide valuable information to the public about facilities in their communities.

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I. INTRODUCTION

This report with associated attachments represents the Initial Statement of Reasons (ISOR or Staff Report) for Proposed Rulemaking required by the California Administrative Procedures Act. In this report, the Air Resources Board (ARB or Board) staff presents the *Proposed Regulation for Energy Efficiency and Co-Benefits Assessment of Large Industrial Facilities* (Energy Efficiency Assessment Regulation or proposed regulation). The Staff Report provides information on how the proposed regulation was developed and what it requires, the industrial sectors that will be subject to the proposed regulation, and information on the environmental and economic impacts from the proposal. In this chapter, the ARB staff provides an overview of the proposed regulation ("proposal") and discusses the regulatory authority ARB has to adopt the proposed regulation. We also discuss other regulatory activities and programs that impact the industrial sectors that will be subject to the proposed regulation, and the public outreach process used to include all interested stakeholders in developing the proposed regulation.

A. Overview

The California Global Warming Solutions Act of 2006 (Act or AB 32) (Assembly Bill 32, Ch. 488, Stats 2006) created a comprehensive multi-year program to reduce greenhouse gas (GHG) emissions in California. The Act requires ARB to create and implement measures needed to reduce current GHG emissions to 1990 levels by 2020. In addition, on December 11, 2008, the Board approved a Climate Change Scoping Plan (Scoping Plan) describing California's strategy for meeting the GHG emissions reductions required by AB 32. One of the measures contained within the Scoping Plan requires a one-time assessment of large industrial sources to determine the potential GHG emission reduction opportunities, as well opportunities to reduce emissions of criteria pollutants and toxic air contaminants (TACs).

The proposed Energy Efficiency Assessment Regulation is designed to meet the requirements identified in the Scoping Plan. Specifically, it will apply to industrial facilities emitting GHG emissions of at least 0.5 $MMTCO_2e$ each annually (e.g. oil and gas production facilities, electricity producers, mineral production, and hydrogen producers) and any cement plants or transportation fuel refineries that emit GHG emissions of at least 0.25 $MMTCO_2e$ each annually. The proposed regulation will require that each facility conduct a one-time assessment of their energy consumption, emissions, and potential for energy efficiency improvements that potentially could result in GHG emission reductions, with additional quantification of associated reductions in criteria pollutants and TACs.

B. Primary Enabling Legislation

In June 2005, Governor Arnold Schwarzenegger signed Executive Order S-3-05, which established targets for reducing GHG emissions in California. The Executive Order

targets GHG emissions to be reduced to 2000 levels by 2010, to 1990 levels by 2020, and finally to 80 percent below 1990 levels by 2050. In 2006, the Governor signed AB 32, which established the 2020 GHG emission reduction goal in State law (Health and Safety Code (HSC) § 38500 et seq.) and made the ARB responsible for monitoring and reducing GHG emissions.

Among the provisions, AB 32 required the Board, by January 1, 2009, to design and adopt an overall plan to reduce GHG emissions to 1990 levels by 2020. On December 11, 2008, the Board approved a Climate Change Scoping Plan (Scoping Plan) describing California's strategy for meeting the GHG emissions reductions required by AB 32.

This proposed measure was identified in the Scoping Plan as a GHG reduction measure. The Scoping Plan states that rulemaking on the Energy Efficiency Assessment Regulation was to be initiated in 2010, effective by 2012, with results available to ARB at least by 2013. (ARB, 2008) State law also provides ARB with general authority to require monitoring and reporting of emissions of air pollutants or air contaminants other than GHGs.

C. Statutory Requirements

AB 32 contains provisions in HSC sections 38510 and 38530 that designate ARB as the state agency to monitor and regulate GHG emissions, and that require ARB to adopt regulations requiring reporting and verification of GHGs, the program for which ARB is to monitor and enforce. ARB is to periodically review and update these requirements as necessary and to make reasonable efforts to promote consistency with other GHG reporting requirements. Here ARB is promoting consistency by allowing affected sources to use the same inventory generated for the Mandatory GHG Reporting Regulation.

In addition, longstanding authority pre-dating AB 32 provides ARB with comprehensive authority to require sources of air pollution to submit information to determine the amount of their emissions. See HSC sections 39600, 39601, and 41511.

AB 32 also contains provisions in HSC sections 38560 and 38562 that apply to regulations adopted consistent with the Scoping Plan. Those criteria are summarized below in italics along with staff's assessment as to why the proposed regulatory action complies with the specific criteria or does not apply. Several of the AB 32 requirements are not applicable to this proposed regulation because it only requires a one-time report and does not require any emission reduction actions.

> *The State Board shall adopt rules and regulations in an open public process to achieve* the *maximum technologically feasible and cost-effective greenhouse gas emission reduction from sources or categories of sources.*

The proposed regulation was developed in consultation with affected industry, environmental group representatives, other interested parties, and the public. The proposed regulation was developed in an open process including three public workshops, industry-specific consultation meetings, staff visits to affected facilities, consultation meetings with environmental representatives, and numerous telephone conferences. Draft regulatory concepts were first presented in June 2009 and modified through discussion and feedback during this process.

Design the regulations, including distribution of emissions allowance 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.

This requirement is not applicable to this proposed rulemaking. The proposed regulation does not require emission reductions, but rather is designed to gather information about the potential GHG emission reduction opportunities, and associated criteria pollutant and TAC co-benefits.

Ensure that activities undertaken to comply with the regulations do not disproportionately impact low-income communities.

The proposed regulation requires data gathering and not emission reduction actions. However, the data gathered will provide valuable information to assist in designing future requirements that ensure no disproportionate impact low-income communities.

Ensure that entities that have voluntarily reduced their greenhouse gas emissions prior to the implementation of this section receive appropriate credit for early voluntary reductions.

Since the proposed regulation does not require any emission reduction actions, receiving emission reduction credits for early action is not necessary. However, the regulation does provide for sources to report recent GHG emission reduction actions that they have taken or plan to take.

Ensure that activities undertaken pursuant to the regulations complement and do not interfere with, efforts to achieve and maintain federal and state ambient air quality standards and to reduce toxic air contaminant emissions.

The proposed regulation will not interfere with efforts to reduce criteria pollutants and TACs. In fact, it will provide valuable information about the potential criteria pollutant and TAC co-benefits associated with specific actions to reduce GHG emissions and improve energy efficiency.

Consider cost-effectiveness of these regulations.

The proposed regulation does not require any actions to reduce emissions, nor claim any emission reductions associated with implementation of the regulation. Therefore, a traditional cost-effective analysis is not appropriate. We have instead evaluated the cost of complying with the proposed regulation in the context of the revenue generated by the companies that would have to comply with the proposed regulation. Overall, the majority of the companies are large businesses, many owned by multi-national companies with significant annual revenue. None are small businesses. Based on our analysis, which is provided in Chapter V of this report, we do not expect any adverse impacts on the profitability or competitiveness of the businesses that will be affected by the proposed regulation.

Consider overall societal benefits, including reductions in other air pollutants, diversification of energy sources, and other benefits to the economy, environment, and public health.

The proposed regulation is not expected to reduce emissions in a quantifiable way, but rather it is designed to gather information about the potential GHG emission reduction opportunities, as well as associated criteria pollutant and TAC co-benefits. Thus, an analysis on societal benefits is not applicable.

Minimize the administrative burden of implementing and complying with these regulations.

The administrative burden of complying with the proposed regulation has been minimized to the extent possible by providing flexibility in conducting the assessment and ensuring that the reporting requirements are consistent with those contained in ARB's Mandatory GHG Reporting Regulation (17 CCR Sections 95100, *et seq.*). The proposed regulation allows sources to either conduct the assessment with their own staff or to hire a third party. Industry has commented extensively that using their experienced staff will be far less burdensome, and less costly, than hiring a third-party reviewer. To minimize the reporting burden, staff provides that the data reported for criteria pollutant and TAC emissions is the same data that are collected to meet ARB and local district criteria pollutant and TAC emission inventory requirements. Staff also allows for energy efficiency information collected as part of other programs (e.g. Department of Energy, California Energy Commission, National Institute of Standards and Technology) to be used to meet applicable portions of the proposed regulation where appropriate. Finally, the actions required by the proposed regulation are, in large measure, an action that will benefit these facilities under the cap-and-trade requirements that are currently under development by ARB staff.

Minimize leakage

This requirement is not applicable to this proposed rulemaking.

Consider the significance of the contribution of each source or category of sources to statewide emissions of greenhouse gases.

The proposed regulation will affect stationary industrial facilities that are significant sources of GHG emissions in the California. We estimate that the facilities that will be subject to the proposed regulation account for about 45 percent of the GHG emissions from the industrial sector in California.

> *The greenhouse gas emission reductions achieved are real, permanent, quantifiable, verifiable, and enforceable by the State board*.
>
> *The reduction is in addition to any greenhouse gas emission reduction otherwise required by law or regulation, and any other greenhouse gas emission reduction that otherwise would occur.*
>
> *If applicable, the greenhouse gas emission reduction occurs over the same time period and is equivalent in amount to any direct emission reduction required pursuant to this division.*

The above three requirements are not applicable since the proposed regulation does not directly require any actions to reduce emissions, nor claim any emission reductions associated with implementation of the regulation.

> *The State board shall rely upon the best economic and scientific information and its assessment of existing and projected technological capabilities when adopting the regulations required by the law.*

ARB staff used the best available economic and scientific information available to develop the proposed regulation. Staff collected information on all potential regulated entities and reviewed the available literature for other sources of economic and scientific information. Staff relied upon data obtained through ARB's Mandatory GHG Reporting Regulation, the U.S. EPA, industry organizations, trade associations, as well as academic institutions.

D. Existing Regulations and Programs

This section discusses other related regulations and programs that are applicable to the industrial sectors that will be subject to the proposal. It is not intended to be an exhaustive listing; rather, we have highlighted the key programs that are interrelated to the proposed regulation.

Greenhouse Gas Mandatory Reporting Regulation

ARB developed the Mandatory GHG Reporting Regulation under the direction of AB 32. The Board approved the Mandatory GHG Reporting Regulation in December 2007. The regulation appears in sections 95100-95133 of title 17, California Code of Regulations. The Mandatory GHG Reporting Regulation requires facilities to report their annual GHG emissions beginning in 2009 and every year thereafter. The industrial

sectors that must report their emissions are: cement plants, oil refineries, hydrogen plants, electricity generating facilities, cogeneration facilities, other large stationary combustion sources, and electricity retail providers and marketers. All of the facilities that will be subject to the proposed Energy Efficiency Assessment Regulation must also report their emissions to the Mandatory GHG Reporting Program.

The results of the Mandatory GHG Reporting Regulation are intended to provide information that assists with the development and implementation of strategies to reduce the emissions that cause climate change. Under the Act, the Mandatory GHG Reporting Regulation must: begin reporting with the most significant GHG emissions sources, use rigorous and consistent emission accounting methods, and provide for verification of reported emissions data. Additional information, including staff contact information, is available at ARB's Climate Change website, http://www.arb.ca.gov/cc/reporting/ghg-rep/ghg-rep.htm.

Criteria Pollutant Control Program

Under HSC section 40910 (Stats. 1988, ch. 1568, Sec. 11, amended by Stats. 2000, Ch. 729, Sec. 9) the local districts are required to achieve and maintain the state Ambient Air Quality Standards for ozone, carbon monoxide, sulfur dioxide, and nitrogen dioxide by the earliest practicable date. To achieve this objective, the local districts develop attainment plans and regulations with the consideration of the full spectrum of emission sources.

Under HSC section 40701 (Stats. 1975, Ch. 957, amended by Stats. 1990, Ch. 1034, Sec. 1) the local districts have the power to require any owner or operator of any air pollution emission source, except a noncommercial vehicular source, to provide 1) a description of the source and 2) disclosure of the data necessary to estimate the emissions of pollutants for which ambient air quality standards have been adopted, or their precursor pollutants, so that the full spectrum of emission sources can be addressed equitably pursuant to Section 40910. See also section 41511.

California Air Toxics "Hot Spots" Program

The Air Toxics "Hot Spots" Information and Assessment Program was established by AB 2588 (Stats. 1987, ch. 1252) and is set forth in HSC sections 44300-44393. The goals of the "Hot Spots" program are to collect emission data, identify facilities having localized impacts, ascertain health risks, notify nearby residents of significant risks, and require that owners of significant-risk facilities to reduce their risks below the level of significance.

The "Hot Spots" program requires that emissions of TACs from stationary source facilities be quantified and compiled into an inventory according to criteria and guidelines which are specified in the Emission Inventory Criteria and Guidelines (see California Code of Regulations, Title 17, sections 93300-93355). These emission

inventories must be submitted to their local district within 180 days of the approval of their emission inventory plan.

Cap-and-Trade Program

Under AB 32, California must reduce GHG emissions to 1990 levels by 2020. The AB 32 Scoping Plan calls for a California cap-and-trade program that links with other regional partner jurisdictions in the Western Climate Initiative (WCI) to create a regional market system. As adopted in the Scoping Plan, the cap-and-trade program would establish a cap covering about 85 percent of the State's GHG emissions and allow trading to ensure cost-effective emissions reductions. The California cap-and-trade program is still under development. (ARB, 2009) Per AB 32, the cap-and-trade program is to be adopted by January 1, 2011. ARB staff is scheduled to bring a cap-and-trade program to the Board for their review in late 2010.

Energy Efficiency Programs

Several programs are currently available to provide industrial facilities with information, tools, and opportunities for improving energy efficiency. Some of these are briefly described below.

Department of Energy's Industrial Technologies Program: The federal Department of Energy's (DOE) Industrial Technologies Program (ITP) leads national efforts to improve industrial energy efficiency and environmental performance. Under their BestPractices© program, ITP works with companies to implement energy management practices by providing a number of resources for corporate executives, plant managers, technical staff, and the general public. The BestPractices© program provides software tools, industry best practices information, training to certify energy experts in specific energy intensive processes, and assessment programs. ITP's latest program, *Save Energy Now*, is a national initiative that aims to drive a reduction of 25% or more in industrial energy intensity in 10 years. Under this program, any company can partner with ITP to participate in a no-cost onsite plant assessment to help improve energy efficiency and increase productivity. The ITP website provides a list of large plants that have participated in a *Save Energy Now* assessment with their assessment reports. Similarly, case studies are available from the BestPractices© program the shows the results of a plant-wide assessment or demonstration project. (DOE, 2010)

ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy that promotes the use of energy efficient products and practices. (U.S. EPA, 2010) ENERGY STAR is creating partnerships with industrial plants to offer a proven energy management strategy that helps in measuring current energy performance, setting goals, tracking savings, and rewarding improvements. The approach is based on the successful energy management practices of over 1,600 commercial and industrial organizations. The *Guidelines for Energy Management* outlines the strategy to set performance goals, create and implement action plans, assess performance and progress, and recognize an organization's achievements. To

learn more about the Energy Star Program for buildings and plants visit the following website: http://www.energystar.gov/index.cfm?c=industry.bus_industry

California Energy Commission: The California Energy Commission (CEC) administers an industrial process energy efficiency program where inspectors, certified through the DOE ITP, conduct free industrial energy efficiency assessments, funded by the Department of Energy. The assessments look at process furnaces, boiler and steam distribution, compressed air, fans, pumps, motor systems, and can include heating, ventilation and air conditioning (HVAC), refrigeration, and lighting systems. After the assessment, the plant management is given specific energy-saving recommendations. Often the CEC inspectors are able to identify improvements that have a one- to three-year payback period and quantify the energy savings and greenhouse gas emission reductions associated with implementation. The CEC also offers *BestPractices*© *Workshops* which train plant operators in more efficient operation of energy-consuming equipment and systems. (CEC, 2009)

Public Utility Agencies: Energy efficiency improvement incentive programs for industrial facilities are frequently available through public utility agencies. The utilities often work with a facility to identify energy savings opportunities, and implementing the project(s) can result in a monetary rebate award. For example, Pacific Gas and Electric Company (PG&E) is currently offering a free energy analysis or integrated energy Assessment for industrial facilities. Under this program, a technical specialist will conduct an assessment to analyze current energy use and identify savings opportunities. (PG&E, 2010)

Advanced Technologies Program: Other programs are also available that help to fund and support research and development of emerging technologies that improve energy efficiency. The Advanced Technologies Program (ATP) of the National Institute of Standards and Technology is one such program that invests in commercial research projects to foster new, innovative technologies (ATP, 2010). Industrial facilities of all sizes compete equally with other companies for ATP cost-sharing to develop improvements in industrial processes that will benefit the industry as a whole, not just the specific facility. While the ATP does not focus solely on energy efficiency, energy efficiency is one of the program areas for which the provide support.

E. Development of the Proposed Regulation

The proposed regulation was developed in consultation with affected industry, environmental group representatives, other interested parties, and the public. The proposed regulation was developed in an open process including three public workshops, industry-specific consultation meetings, staff visits to affected facilities, consultation meetings with environmental representatives, and numerous telephone conferences, calls, and emails. The regulatory development process spanned over 18 months and included several meetings with industry-specific working groups.

To support regulatory development, ARB staff visited 10 facilities representative of the facilities affected by the proposed regulation and conducted numerous conference calls. During these site visits and conference calls, the staff learned the basic processes of the facilities, how energy efficiency is measured, and what energy efficiency projects have already been completed.

ARB staff has also participated in numerous individual meetings with various stakeholders, supported by individual telephone calls.

ARB staff held three public workshops to discuss the development of the draft regulation and to gather information from industry and environmental representatives on the possibilities and difficulties of preparing an energy assessment.

The announcements and meeting materials for the workshops were posted on the ARB website and distributed through a list serve that included over 6,400 recipients. All of the meetings were audio and video webcast on the California Environmental Protection Agency's public broadcast site. The dates of the workshops and the materials presented at each workshop are available on the following ARB website: http://www.arb.ca.gov/cc/energyaudits/energyaudits.htm .

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II. SECTORS AND FACILITIES

California is home to some of the largest industrial facilities in the country. The industrial sector consumes about 25 percent of the energy used in the State, resulting in GHG emissions of about 160 $MMTCO_2e$ in 2008. (EIA, 2010) (ARB, 2010a) The proposed regulation will apply to the largest industrial facilities in the State. These facilities are responsible for about 45 percent of the GHG emissions from all industrial sources in California. Approximately 60 facilities in five industrial sectors would be subject to the proposed regulation based on applicability criteria in the proposed regulation and the 2008 calendar year GHG emissions data reported to the ARB pursuant to the Mandatory GHG Reporting Regulation.[4] The sectors include petroleum refineries (18 facilities), oil and gas extraction and transmission facilities (6 facilities), electricity generating facilities (18 facilities), cement plants and mineral plants (11 facilities), and hydrogen plants (3 facilities). A listing of the facilities and the 2008 GHG emissions reported under the Mandatory GHG Reporting Regulation is provided in Table 3.

Table 3: Facilities in California Expected to be Subject to the Proposed Energy Efficiency Assessment Regulation and Their 2008 GHG Emissions

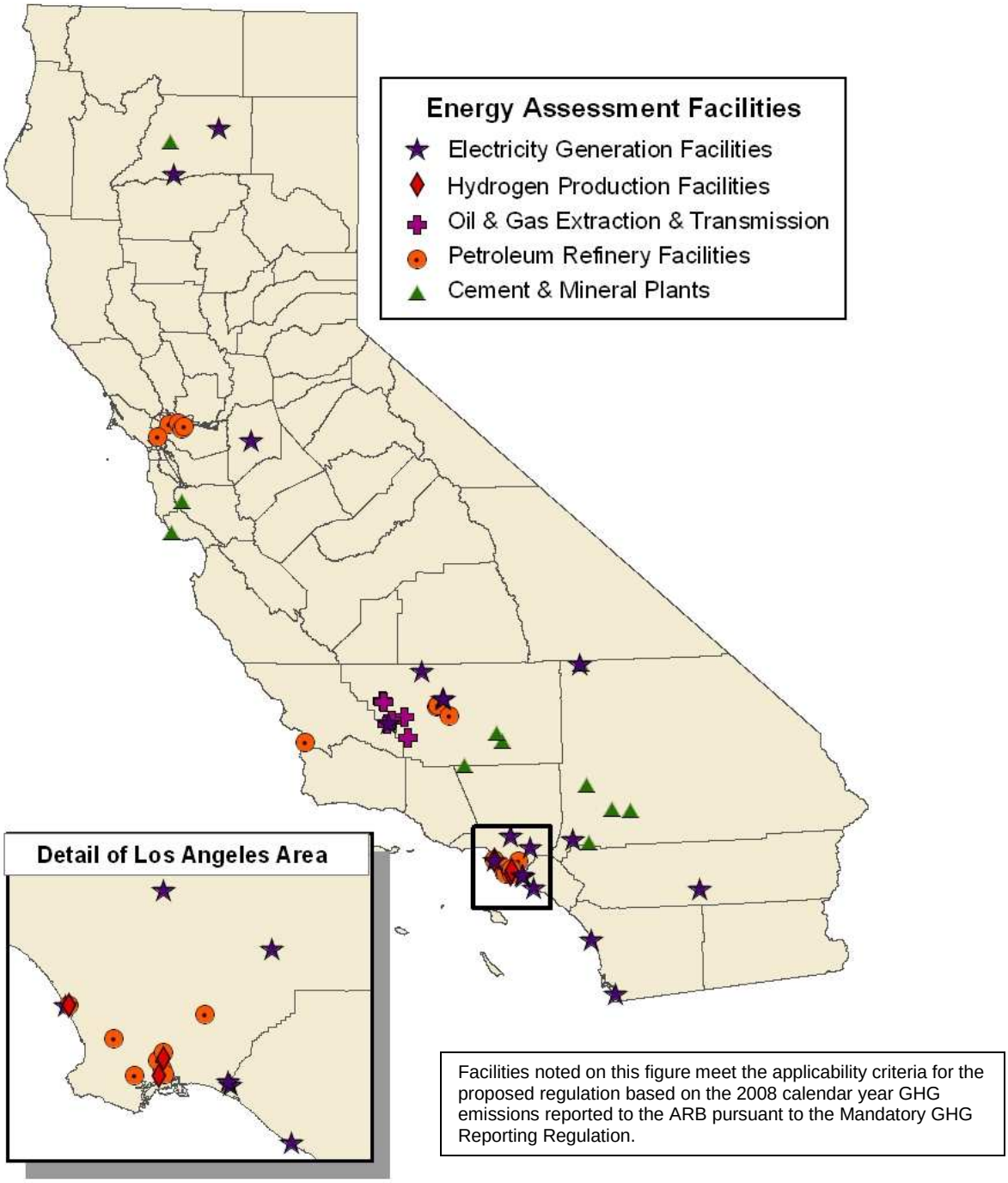
Air Basin	Industrial Sector	2008 GHG Emissions $MMTCO_2e$
Cement and Mineral Plants		
Mojave Desert	Cemex - Black Mountain Quarry	2.2
	Mitsubishi Cement 2000	1.1
	Searles Valley Minerals	1.7
	TXI Riverside Cement (Oro Grande Plant)	0.9
North Central Coast	Cemex - Cement Plant Davenport	0.4
Sacramento Valley	Lehigh Southwest Cement Co - Redding	0.4
San Francisco Bay Area	Lehigh Southwest Cement Company - Cupertino	0.7
San Joaquin Valley	CalPortland Company, Mojave Plant	1.2
	Lehigh Southwest Cement Co. - Tehachapi	0.5
	National Cement Company – Lebec	0.7
South Coast	CalPortland Company, Colton Plant	0.5
Hydrogen Plants		
South Coast	Air Liquide El Segundo Hydrogen Plant	0.7
South Coast	Air Products Carson Hydrogen Plant	0.6
South Coast	Air Products Wilmington Hydrogen Plant	0.7
Electricity Generating Plants		
Mojave Desert	ACE Cogeneration	0.9
Sacramento Valley	Burney Forest Products (Co-Gen)	0.9
	Wheelabrator Shasta Energy Company	0.7
San Diego	Dynegy South Bay, LLC	0.6
San Diego	NRG Energy – Encina	0.7

[4] The proposed regulation applicability will be based on the 2009 calendar year GHG emission data submitted pursuant to the GHG Mandatory GHG Reporting Regulation. The actual number of facilities may be higher or lower than presented here.

Air Basin	Industrial Sector	2008 GHG Emissions $MMTCO_2e$
Electricity Generating Plants Cont…		
San Joaquin Valley	Covanta Delano, Inc	0.5
	Kern River Cogeneration Company (Co-Gen)	0.8
	Midway-Sunset Cogeneration (Co-Gen)	1.2
	Stockton CoGen (Co-Gen)	0.6
	Sycamore Cogeneration Co (Co-Gen)	1.5
South Coast	AES Alamitos, LLC	1.4
	Aes Huntington Beach, Llc	0.9
	Colmac Energy, Inc. 92254	0.5
	Los Angeles Department of Water & Power-Haynes Generating Station	2.2
	Los Angeles Department of Water & Power-Scattergood Generating Station	0.9
	Los Angeles Department of Water & Power-Valley Generating Station	1.0
	Puente Hills Landfill, LA County Sanitation	0.6
	RRI Energy Etiwanda, Inc.	0.6
Oil & Gas Extraction and Transmission		
San Joaquin Valley	Aera Energy LLC, Belridge, 93251	1.6
	Aera Energy LLC, MOCO, D&E, 93252	0.6
	Chevron U.S.A Inc - Cymric Asset, 93251	1.2
	Chevron U.S.A Inc - Midway Sunset Asset, 93225	0.9
	Occidental Of Elk Hills, Inc.	0.6
	Plains Exploration & Production Company - San Joaquin Heavy Oil Production Facility	0.9
Petroleum Refineries		
San Francisco Bay Area	Chevron Products Company - Richmond Refinery, 94802	4.8
	Conoco Phillips Refining Company	1.9
	Shell Oil Products US	4.6
	Tesoro Refining and Marketing Company, 94553	2.7
	Valero Refining Company -California, Benicia Refinery and Benicia Asphalt Plant	2.8
San Joaquin Valley	Big West of California Bakersfield Refinery (Areas 1&2)	0.5
	Big West of California Bakersfield Refinery (Area 3)	0.1
	ConocoPhillips Santa Maria Refinery	0.2
	Kern Oil and Refining Company	0.2
	San Joaquin Refining Company	0.1
South Coast	BP West Coast Products LLC, Refinery	4.5
	Chevron Products Company - El Segundo Refinery, 90245	3.6
	ConocoPhillips Los Angeles Refinery Wilmington Plant	2.0
	ConocoPhillips Los Angeles Refinery, Carson Plant	0.9
	ExxonMobil Torrance Refinery	2.9
	Paramount Petroleum Corporation	0.2
	Tesoro Refining And Marketing Co. - LAR	1.6
	Ultramar Inc - Valero	1.0

As shown in Figure 3, these facilities are located throughout California with the largest numbers found in the Southern San Joaquin Valley and in and around Los Angeles and San Francisco.

Figure 3: Location of Facilities in California Expected to be Subject to the Proposed Energy Efficiency Assessment Regulation



A. Sectors and Facilities Subject to the Proposed Regulation

The following discussion provides a short description of each industrial sector and the number and locations of the facilities. These estimates are based on the proposed regulation's applicability criteria and the 2008 calendar year GHG emissions data collected by ARB pursuant to the Mandatory GHG Reporting Regulation. As previously noted, the applicability for inclusion in the proposed regulation will be based on the 2009 calendar year GHG reporting; consequently, the estimated number of facilities and their emissions may change.

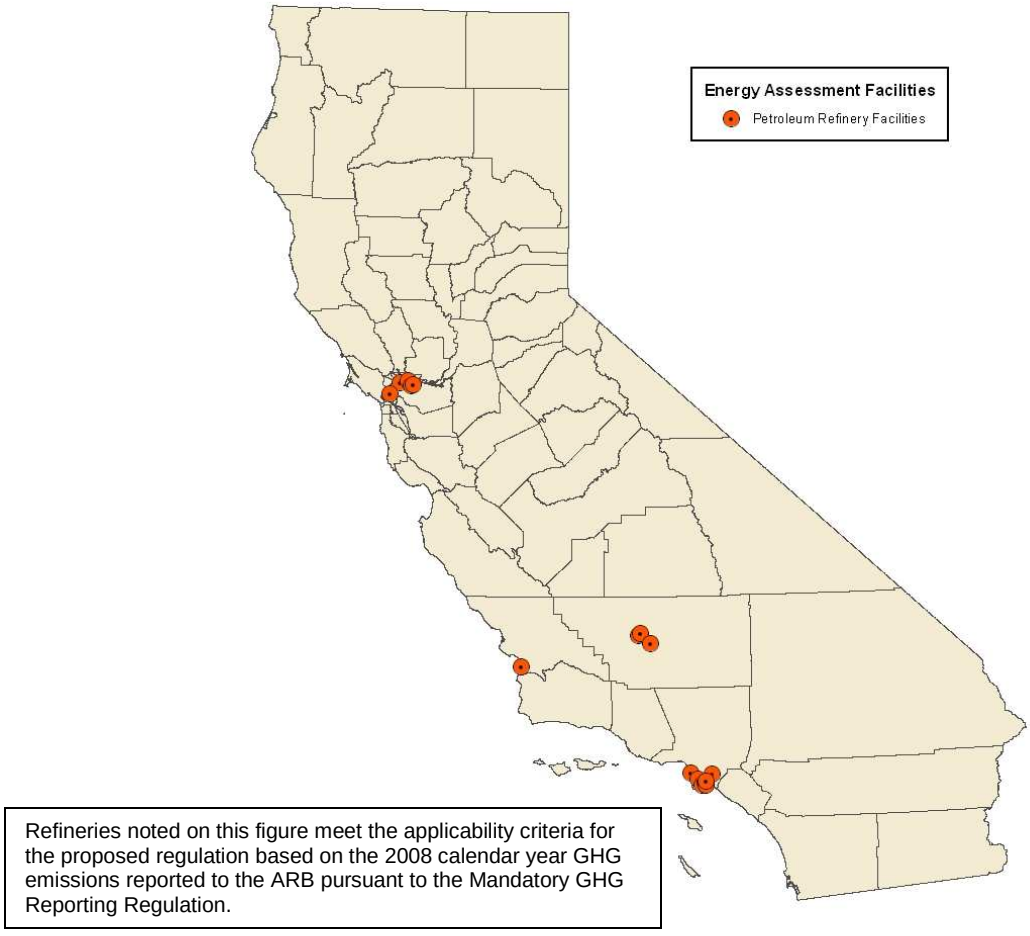
Petroleum Refineries

Currently, California refining capacity represents about 11 percent of the United States' (U.S.) crude distillation unit capacity. (Worrell and Galitsky, 2005) California refineries are more energy intensive operations than typical refineries in the rest of the U.S., primarily due to California's unique product mix and the additional hydrotreating necessary to produce that formulation. (Worrell and Galitsky, 2005) Additionally, the feedstock, or crude oil, available to California refineries has a lower specific gravity than crude oil available to other parts of the U.S. The lower the specific gravity, the more processing is required to produce high quality (i.e., "light") products. Another difference is that California refineries produce a larger fraction of lighter products, including reformulated transportation fuels (gasoline and diesel fuel), and fuels with lower sulfur content. (Worrell and Galitsky, 2004)

As presented earlier in Table 3, there are 18 petroleum refineries that may be subject to the proposed regulation. These refineries produce transportation fuels for release into commerce.

Figure 4 displays the location of the affected California refineries, the majority of which are located in the Southern San Joaquin Valley, Los Angeles and the San Francisco Bay Area.

Figure 4: Location of Petroleum Refineries in California Expected to be Subject to the Proposed Energy Efficiency Assessment Regulation



Oil & Gas Extraction and Transmission Facilities

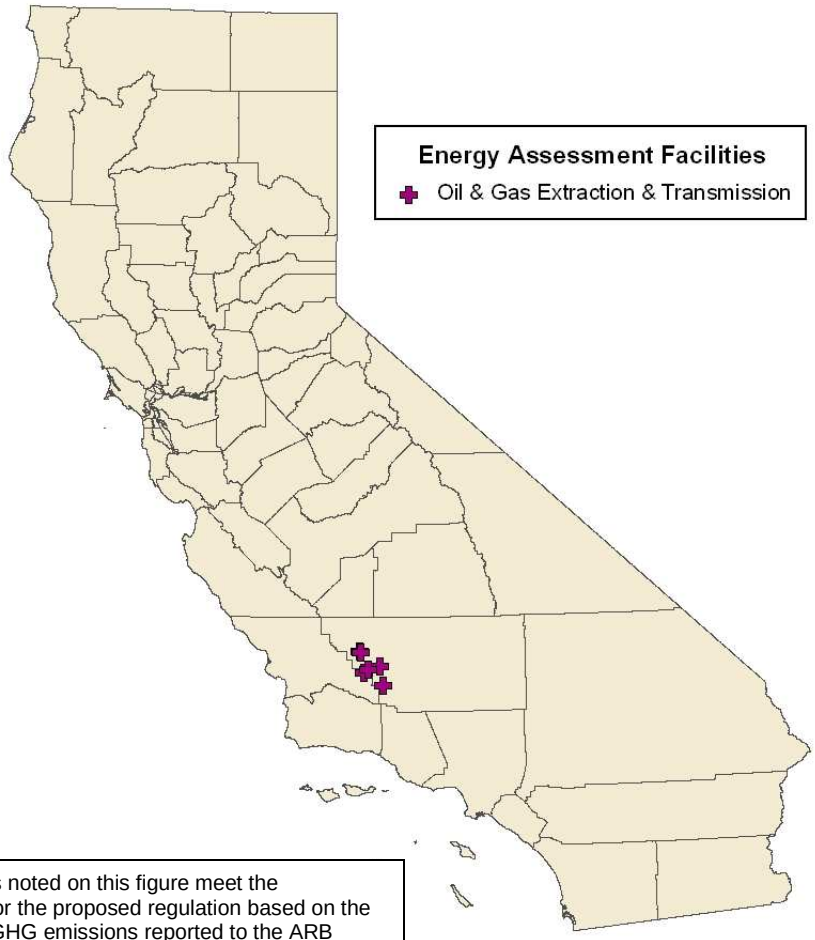
Oil and gas extraction and transmission facilities extract and transport crude oil and natural gas from below-ground oil and gas fields. The product extracted whether it is crude oil or natural gas, is predominantly sent to a refinery for processing. Oil and gas coming from the field is transported by pipelines, trucks, tankers, or barges to centralized processing and transmission facilities. California is considered to be one of the top crude oil producing states in the country. (Tribal Energy 2010)

Rock properties in different oil fields vary in porosity, permeability and heat transfer. The oil within different oil fields also varies in chemical makeup, the amount of dissolved gas, and the resultant viscosity. Therefore, wells in different fields require individual methods of extracting the oil or gas. Ideally, engineers design heating and pressure

maintenance systems for individual wells and groups of wells within a single oil field, depending on the particular rock and fluid properties.

As presented earlier in Table 3, there are six oil and gas extraction facilities that are expected to be affected by the proposed regulation. All of the six of these facilities are located in the southern San Joaquin Valley. The locations of the facilities are shown in Figure 5. There are no transmission facilities that are expected to be affected by the proposed regulation.

Figure 5: Location of Oil and Gas Facilities in California Expected to be Subject to the Proposed Energy Efficiency Assessment Regulation



Oil and Gas Facilities noted on this figure meet the applicability criteria for the proposed regulation based on the 2008 calendar year GHG emissions reported to the ARB pursuant to the Mandatory GHG Reporting Regulation.

Electricity Generating Facilities (Power Plants)

ARB staff estimates there are about 34 electricity generating facilities that meet the 0.5 $MMTCO_2e$ GHG emissions threshold defined in the proposed regulation for applicability. However, the proposal exempts combined cycle power plants built after 1995, because turbine efficiency improved significantly after this time period. Staff believes these plants are the most energy-efficient facilities within the sector, and implementing the proposed regulation would not have benefits as great as other facility types. Therefore, 16 facilities would not be subject to the proposed requirements, leaving 18 facilities that would need to comply. The 18 electricity generating facilities are listed in Table 3 which is shown earlier in this chapter.

While fossil fuels such as coal, petroleum, and gas provide the energy needed to fuel most of the world's electricity generating facilities, most fossil-fueled electricity generating facilities in California currently burn natural gas due to its ready availability and clean burning nature. There are three main types of natural gas electricity generating facilities in California today, and each is described below.

Steam Turbine

In a steam turbine plant, fuel is burned and the hot combustion gas is used to produce superheated steam in a boiler. The superheated steam is expanded through a steam turbine providing power to drive a generator. Low pressure steam from the turbine is passed through a steam condenser and cooling tower to the environment. Steam turbine power plants use an older, less efficient technology compared with cogeneration and combined cycle power plants discussed below. There are 13 steam turbine electricity generating facilities that will be affected by the proposed regulation.

Cogeneration

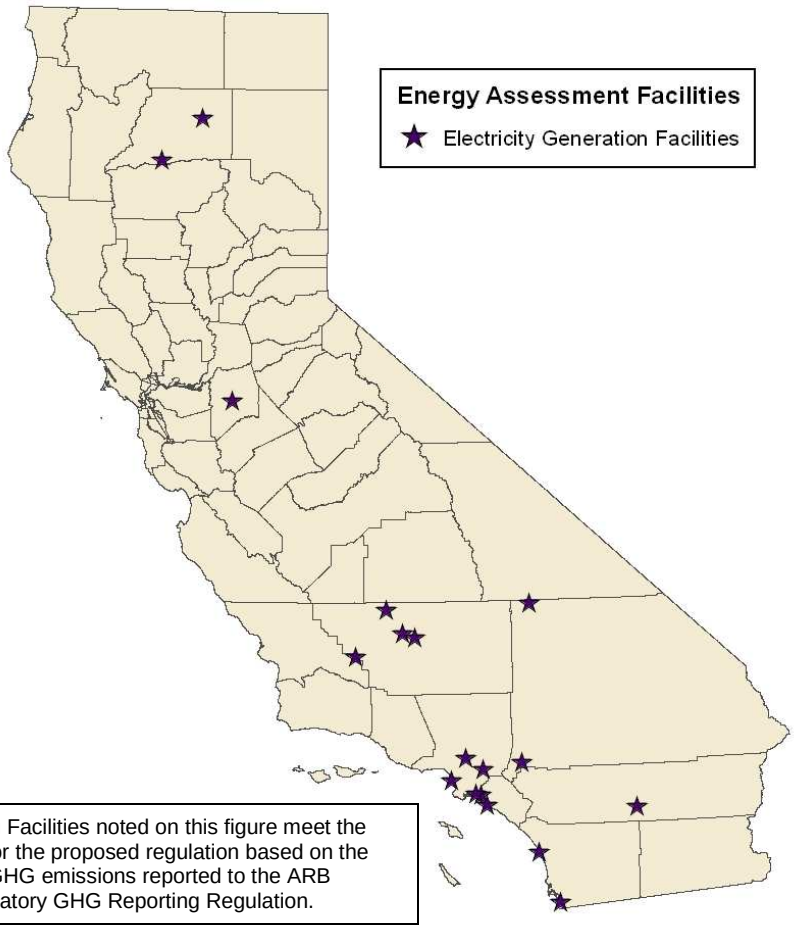
Cogeneration, also known as combined heat and power, produces both electricity and heat in a single process. By design, cogeneration plants recover energy lost in conventional steam turbine plants and provide it for other useful purposes. Such plants send the recovered steam to a host which uses it for things other than generating electricity (manufacturing, for example). Cogeneration plants are usually placed close to the host facility and are built to meet this demand as efficiently as possible. There are five cogeneration facilities that will be subject to the proposed regulation.

Combined Cycle

A combined-cycle gas turbine power plant consists of one or more gas turbine generators equipped with heat recovery steam generators (HRSGs) to capture heat from the gas turbine exhaust. Steam produced in the HRSGs powers steam turbine generators to produce additional electric power. Use of the otherwise wasted heat in the steam turbines results in high thermal efficiency compared to a conventional steam turbine power plant. Combined cycle plants currently entering service can convert

about 50 percent of the chemical energy of natural gas into electricity compared with the older steam turbine power plants which are about 30 percent efficient. (NPPC, 2002) As mentioned earlier, combined cycle electricity generating facilities that were built after 1995 are exempt from the proposed regulation.

Figure 6: Location of Electricity Generating Facilities in California Expected to be Subject to the Proposed Energy Efficiency Assessment Regulation



Electricity Generating Facilities noted on this figure meet the applicability criteria for the proposed regulation based on the 2008 calendar year GHG emissions reported to the ARB pursuant to the Mandatory GHG Reporting Regulation.

Cement and Mineral Plants

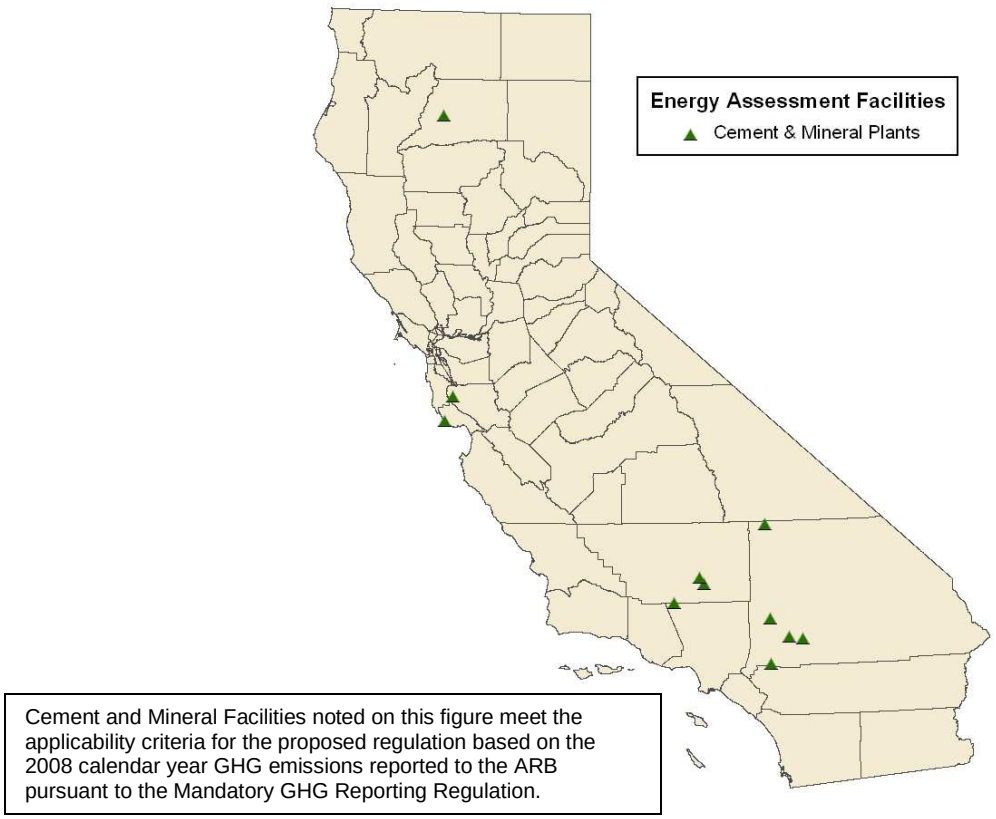
For the purposes of the proposed regulation, aggregate plants, sand and gravel plants, concrete plants, or asphalt plants are not considered cement plants. ARB staff estimates there are 11 cement and mineral plants that would be subject to the proposed Energy Efficiency Assessment Regulation. As shown in Table 3 presented earlier in this chapter, there are 10 cement plants and one mineral plant that will be affected by the proposed regulation.

Cement plants engage in the manufacturing of Portland, natural, masonry, pozzolanic, and other hydraulic cement products. Manufacturing cement is an energy-intensive process involving the grinding and mixing of raw materials, which are chemically altered through intense heat from a high-temperature kiln to form a compound with binding properties. (ARB GHG)

Mineral plants consist of mining operations involving the extraction of desired natural resources to be used as the raw, base materials for many of today's products. There is one mineral plant in California that is expected to be subject to the proposed regulation. This mineral plant mines and processes soda ash, sodium sulfate, and boron minerals. These minerals are then used in the manufacture of a wide variety of goods, including glass, ceramics, animal feed, paper products, and detergents. (SVM, 2009)

Figure 7 displays the 10 cement plants and one mineral plant that meet the proposed regulation applicability. As can be seen, most of the cement and mineral facilities are located in Southern California and 3 are located in Northern California.

Figure 7: Location of Cement and Mineral Facilities in California Expected to be Subject to the Proposed Energy Efficiency Assessment Regulation



Cement and Mineral Facilities noted on this figure meet the applicability criteria for the proposed regulation based on the 2008 calendar year GHG emissions reported to the ARB pursuant to the Mandatory GHG Reporting Regulation.

Hydrogen Plants

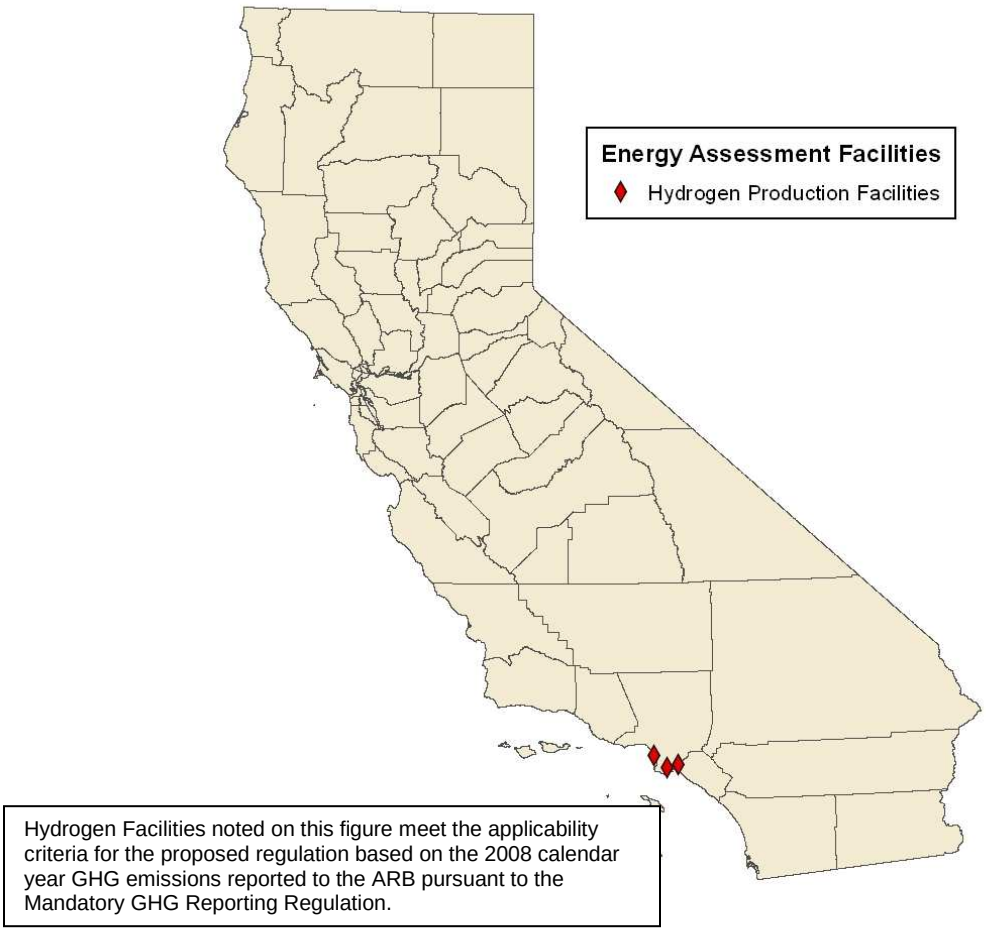
ARB staff estimates there are three “over the fence” hydrogen production facilities that would be subject to the proposed requirements.

Hydrogen production facilities primarily produce hydrogen for refineries that manufacture transportation fuels. Hydrogen is also used in the manufacture of ammonia-based nitrogen fertilizer and in fuel cells for transportation or power generation. (TCPA, 2008). Hydrogen is an essential element of petroleum refining operations. It is used in the hydrotreating process to remove sulfur from fuels and in the hydrocracking process to make lighter fuels from crude oil. Due to environmental pressure requiring removal of sulfur from petroleum products and the need to refine heavier crude oil, the demand for hydrogen continues to increase. (LBNL, 2005)

The hydrogen plant itself is typically located either within a refinery or adjacent to a refinery property as an “over the fence” hydrogen plant. The “over the fence” hydrogen plant may supply product to more than one refinery and be under separate operational control. The new modern hydrogen plants may generate and supply power in addition to hydrogen and steam. (Air Products, 2009) As in the Mandatory GHG Reporting Regulation, hydrogen production plants are addressed separately in the proposed regulation, and the company or organization having operational control of a facility is required to report emissions for the hydrogen facility. ARB staff estimates there are three “over the fence” hydrogen production facilities that would be subject to the proposed requirements.

Figure 8 displays the three hydrogen production facilities that meet the proposed regulation applicability criteria based on the 2008 calendar year GHG emissions data collected by ARB pursuant to the Mandatory GHG Reporting Regulation. The hydrogen facilities are located in the Los Angeles Area near a high concentration of oil refineries.

Figure 8: Location of Hydrogen Facilities in California Expected to be Subject to the Proposed Energy Efficiency Assessment Regulation



B. Estimated 2008 Facility Emissions

In this section, a brief overview of the GHG, criteria pollutant, and TAC emissions from the facilities expected to be affected by the proposed regulation is provided.

Greenhouse Gas Emissions

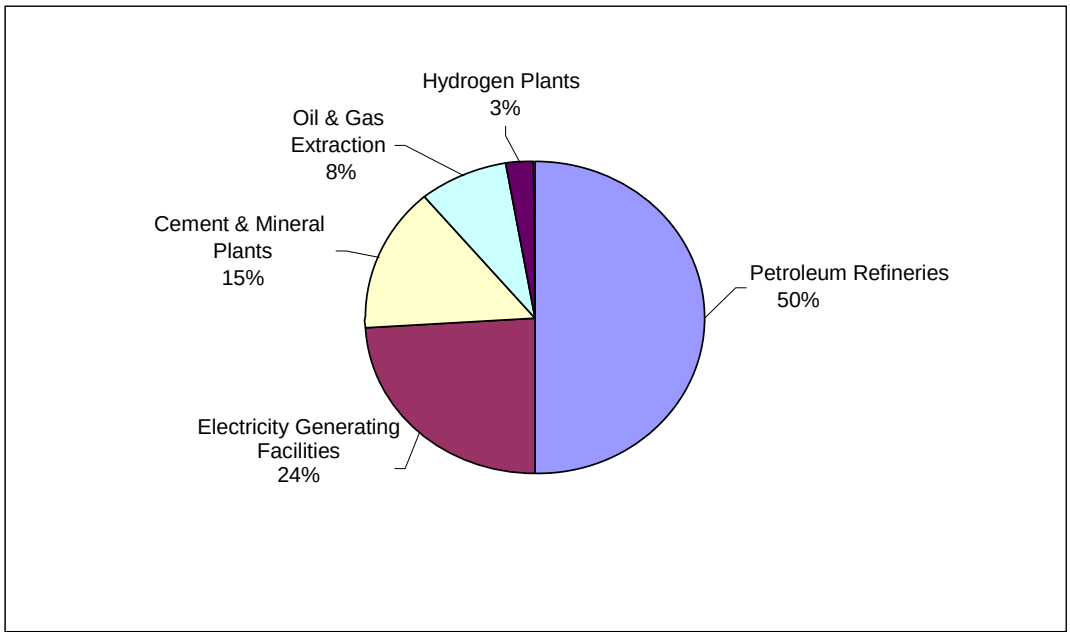
Statewide, the industrial sector as a whole emitted GHG emissions of about 160 $MMTCO_2e$ (ARB, 2010a). The approximately 60 facilities statewide expected to be subject to the proposed regulation were responsible for about 45 percent of those GHG emissions, or about 70 $MMTCO_2e$, and 60 percent of the GHG emissions from the facilities who were required to report for the Mandatory Reporting Regulation. (ARB, 2010b) Table 4 below provides the number of facilities in each industrial sector and the associated emissions. Figure 9 below provides a pie chart of the emissions distribution.

Table 4: 2008 GHG Emissions by Industrial Sector for the Facilities Expected to be Affected by the Proposed Energy Efficiency Assessment Regulation

Source Category	Number of facilities	Total 2008 Carbon Dioxide Equivalent Emissions (MMT)
Electricity Generating Facilities & Cogeneration Facilities	18	16
Petroleum Refineries	18	35
Oil & Gas Extraction	6	6
Cement Plants	10	9
Hydrogen Plants	3	2
Mineral Plant	1	2
Totals	56	70

(ARB, 2010b)

Figure 9: Distribution of 2008 GHG Emissions by Industrial Sector for the Facilities Expected to be Subject to the Proposed Energy Efficiency Assessment Regulation



(ARB, 2010b)

As can be seen in Figure 9, refineries were responsible for about 50 percent of the GHG emissions from all of the facilities and sectors expected to be subject to the proposed requirements. The electricity generating facilities emissions listed in Table 2 and Figure 9 do not include the estimated 16 combined cycle plants that would be exempt from the proposal. The exempted facilities emitted about 25 $MMTCO_2e$ in 2008. (ARB, 2010b)

Criteria Pollutant Emissions

Table 5 shows a breakdown of the criteria pollutant emissions by industrial sector. These emissions estimates are from the California Emission Inventory Development and Reporting System (CEIDARS) for 2008.

Table 5: 2008 Criteria Pollutant Emissions by Industrial Sector for the Facilities Expected to be Subject to Proposed Energy Efficiency Assessment Regulation

Source Category	Number of Facilities	2008 EMISSIONS IN TONS PER YEAR				
		ROG	CO	SOx	NOx	Total PM
Electricity Generating Facilities (Power Plants) & Cogeneration Facilities	18	300	6,700	730	2,300	930
Petroleum Refineries	18	6,800	7,000	14,580	10,540	3,025
Oil & Gas Extraction	6	340	1,200	13	535	50
Cement Plants	10	310	13,500	1,970	20,570	5,600
Hydrogen Plants	3	60	25	2	53	14
Mineral Plants	1	30	300	230	1,840	600
Totals	56	7,840	31,725	17,525	35,840	10,220

Notes: Reactive organic gases (ROG); carbon monoxide (CO); oxides of sulfur (SOx); oxides of nitrogen (NOx); particulate matter (PM). Numbers may not add up to exact totals due to rounding.

Toxic Air Contaminant Emissions

TACs are also emitted from the industrial sectors identified in this report. Table 6 provides a representative listing of the more prevalent TACs by industrial sector. This list of TACs was established using the 2008 emissions data reported to the ARB from the approximately 60 impacted facilities distributed across the five source categories (i.e., cement and mineral plants, electricity generation, hydrogen plants, oil and gas extraction, and petroleum refineries). The emissions for each TAC was weighted based on their carcinogenic and non-carcinogenic health values and their potential for noninhalation impacts. All health information came from the Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics Hot Spots Program Risk Assessment Guideline Manual for Preparation of Health Risk Assessments dated August 2003 and the Hot Spots Analysis and Reporting Program (HARP) Software. See Appendix B for more discussion on the scoring methodology.

The list of TACs for each industrial source category in Table 6 includes the carcinogenic TACs with the top scores or those that have an individually weighted cancer score greater than 50. In addition, the list also contains any substance with an individually weighted noncancer chronic or acute score greater than 50.

This scoring procedure is intended to rank the reported TACs based on emissions and associated health effects. This is a commonly used and simple method for prioritizing TACs. The results from this scoring procedure do not reflect the potential health impacts one might endure from actual exposures to facility emissions. Therefore, these scoring results should not be interpreted as a potential risk estimate or as risk assessment results. Rather, separate State law requires higher scoring facilities to perform health risk assessments (HRAs) containing additional information, and such facilities must undergo further analysis and modeling. Examples of additional

information that would be included in an HRA include the location and release characteristics of each TAC and several exposure assumptions.

Table 6: Toxic Air Contaminants by Industrial Source Category

Category	Pollutants Associated with the Development of Cancer	Pollutants Associated with Noncancer Health Effects
Cement Plants	1,3-Butadiene 3,3',4,4',5,5'-Hexachlorobiphenyl {PCB 169} Acetaldehyde Arsenic Benzene Beryllium Cadmium Chromium, hexavalent (& compounds) Diesel engine exhaust (Diesel PM) Dioxins {PCDDs} and Dibenzofurans (chlorinated) {PCDFs} [a] (total or individual) Epichlorohydrin Formaldehyde Naphthalene Nickel PAHs (total or individual) Vinyl Chloride	Acrolein Ammonia Hydrochloric acid Manganese Mercury Silica, crystalline (respirable)
Electricity Generation[b]	Arsenic Benzene Chromium, hexavalent (& compounds) Diesel engine exhaust (Diesel PM) Dioxins {PCDDs} and Dibenzofurans (chlorinated) {PCDFs} [a] (total or individual) Formaldehyde Naphthalene Nickel PAHs (total or individual)	Acrolein Manganese
Hydrogen Plants[c]	Benzene [c] PAHs (total or individual) [c]	
Mineral Plants	Arsenic compounds (inorganic) Cadmium Dioxins {PCDDs} and Dibenzofurans (chlorinated) {PCDFs} [a] (total or individual)	Hydrogen sulfide Sulfuric acid
Oil and Gas Production[c]	Diesel engine exhaust (Diesel PM) [c]	Ammonia [d]

Table 6: Toxic Air Contaminants by Industrial Source Category (continued)

Category	Pollutants Associated with the Development of Cancer	Pollutants Associated with Noncancer Health Effects
Refineries	1,3-Butadiene Arsenic Benzene Beryllium Cadmium Chromium, hexavalent (& compounds) Diesel engine exhaust (Diesel PM) Dioxins {PCDDs} and Dibenzofurans (chlorinated) {PCDFs} [a] (total or individual) Formaldehyde Naphthalene Nickel PAHs (total or individual)	Ammonia Manganese Mercury Sulfuric acid

a. Dioxins and Furans are assumed to be associated emissions. They are both included on this list if either group has a score greater than 50.
b. Includes power plants and cogeneration facilities.
c. Pollutant scores are less than 50.
d. Included based on emissions.

III. PROPOSED REGULATION

In this chapter, we discuss the key requirements of the proposed regulation for energy efficiency and co-benefit assessments of large industrial facilities. This chapter begins with a general summary of the regulation followed by a discussion of each major requirement of the proposed regulation. This chapter is intended to satisfy the requirements of Government Code section 11346.2, which requires that a noncontrolling "plain English" summary of the regulation be made available to the public.

A. Summary of the Proposed Regulation

The proposed regulation for Energy Efficiency and Co-Benefits Assessment of Large Industrial Facilities is included in Appendix A. The proposed regulation is designed to gather information on the energy efficiency improvement opportunities that are available for California's largest industrial stationary sources of GHG emissions and quantify the associated emission reductions for GHG, criteria pollutants, and TACs. The regulation includes requirements for the facility operator to conduct the one-time assessment and to submit this information to ARB.

The requirements of the proposed regulation applies to all facilities whose 2009 calendar year GHG emissions totaled 0.5 $MMTCO_2e$ or more, and cement plants and transportation fuel refineries that emitted GHG emissions of at least 0.25 $MMTCO_2e$ in 2009, as reported to ARB to comply with the Mandatory GHG Reporting Regulation. The regulation includes exemptions for combined-cycle electricity generating facilities (power plants) built after 1995, refineries that do not produce transportation fuels, and mobile and portable equipment.

Each facility subject to the proposed regulation must provide information on their processes and equipment types used, fuel and electricity consumption data, and emissions data for GHG, criteria pollutants, and TACs. The data provided must be from the 2009 calendar year, or the most recent applicable local district reporting year for criteria pollutants and TACs. The proposed regulation requires the facility operator to conduct a comprehensive analysis of potential energy efficiency improvements that could be made and assess the impacts associated with implementing the potential projects. The assessment must include the type of equipment, processes, or systems involved at the facility, the type of improvement projects identified and a description of each, the status of the projects if they are being considered by the facility for implementation, and estimations for timing, costs, project life, energy savings, and emission reductions of GHG, criteria pollutants, and TACs. The methodology used to estimate the emission reductions must be provided. For each potential project, the facility operator must identify impacts that would occur for complying with local district permitting or California Environmental Quality Act (CEQA) requirements, and any other impacts, such as those related to building, zoning, operations, safety, noise, water and other environmental impacts.

The proposal requires each facility operator to submit to ARB a report of all required information. This report is referred to as the Assessment Report. The Executive Officer would then review the Assessment Report for completeness and validity and work with the facility operator to obtain additional information, if necessary. If ARB determines an Assessment Report to be incomplete, a third-party assessment could be required. Completed Assessment Reports will be made publicly available online on ARB's Climate Change website.

A provision is included in the proposal to allow for a compliance extension if the facility operator can demonstrate that more time is necessary to complete and submit the assessment report. The compliance extension may be granted for up to 45 days if all requirements are met.

B. Discussion of the Proposed Regulation

Purpose

As stated in section 95150 of the proposed regulation, the purpose of the regulation is to require an energy efficiency assessment of California's largest industrial facilities to determine the potential for GHG emission reductions and other pollution reduction co-benefits. The assessment is meant to be a one-time evaluation of potential opportunities that will improve energy efficiency thereby reducing emissions.

Applicability

As stated in section 95151 of the proposed regulation, the regulation applies to operators of a facility in California with stationary sources that produce GHG emissions of at least 0.5 $MMTCO_2e$ in 2009. The regulation also applies to operators of a petroleum refinery in California that produces transportation fuels that are released into commerce if the facility produces at least 0.25 $MMTCO_2e$ of GHG emissions in 2009. Furthermore, operators of a cement plant in California that produces at least 0.25 $MMTCO_2e$ of GHG emissions in 2009 are also subject to the proposed regulation. The cumulative GHG emission totals for all facilities would be determined by the reports submitted by the facility operator to comply with the Mandatory GHG Reporting Regulation for the 2009 calendar year.

Exemptions

As stated in section 95152, the requirements of the proposed regulation do not apply to combined-cycle electricity generating facilities built after 1995. These facilities are known to have the most efficient power generation process and equipment available, as determined by the California Energy Commission. Staff believes that including them in the proposed regulation would not provide a benefit to the public or the State.
The proposed regulation also includes an exemption for petroleum refineries that do not produce transportation fuels, such as asphalt plants. This exemption is provided

because these processes are less energy intensive, emissions are typically less than transportation fuel refineries, and there are a limited number of facilities.

Lastly, the proposed regulation exempts mobile source combustion sources and portable equipment. The Scoping Plan measure for this regulation intended it to focus on stationary sources only, and mobile and portable equipment are not required reporting sources for the Mandatory GHG Reporting Regulation.

Definitions

The proposed regulation provides definitions of all terms that are not self-explanatory. There are about 70 definitions to help clarify and enforce the regulation requirements. Most of the definitions listed in proposed section 95153 are consistent with other adopted regulations, while others were developed by staff, with input from the public during workshops and workgroup meetings. Staff working on this regulation also coordinated with staff working on other GHG regulations to provide consistency where it was practical. Please refer to Appendix A, section 95153 for a list of definitions.

Energy Efficiency Assessment Requirements

As specified in section 95154, the proposed regulation requires the operator of facility types identified in section 95151 to conduct a Facility Energy Consumption and Emissions Analysis as well as an Energy Efficiency Improvement Analysis. The requirements are briefly discussed below.

1. Facility Energy Consumption and Emissions Analysis

The operator of each applicable facility must conduct a Facility Energy Consumption and Emissions Analysis. This analysis identifies the facility's processes and equipment types used in the processes and provides facility energy consumption and resulting GHG, criteria pollutant, and toxic air contaminant emissions. The data acquired in the analysis must be submitted to the ARB in the Assessment Report as is discussed later in the Reporting Requirements section of this chapter.

The required data includes, but is not limited to, facility type and contact information, a process flow diagram identifying each process or system and a description of each, as well as the equipment types used, the types of energy used for each process or system, and the facility energy use and emissions information for the 2009 calendar year. The fuel consumption and emissions must be consistent with what was reported for the Mandatory GHG Reporting Regulation and the district reporting for criteria pollutants and TACs. Facilities that were not required to report to the district in 2009 must include the latest calendar year reporting that was submitted. If not required to report to the local district, the proposed regulation requires that the local district reporting guidelines be followed to provide the emissions data.

The proposed regulation was not intended to create a new emissions inventory but instead to use data from existing reporting programs. However, having certified emissions data was an important consideration. The GHG data reported will be validated by a third party verification process that is required by the Mandatory GHG Reporting Regulation. The criteria pollutant and toxic air contaminant emission data will be validated by ARB and local district staff as part of their existing emission data management programs.

2. Energy Efficiency Improvement Analysis

The operator of each facility subject to the proposed regulation must conduct an Energy Efficiency Improvement Analysis. The Energy Efficiency Improvement Analysis must include the equipment, processes, and systems that cumulatively are responsible for at least 95 percent of the facility's GHG emissions that were reported in the Facility Energy Consumption and Emissions Analysis. This analysis covers the full range of potential energy efficiency improvement opportunities that exist at the facility, from those with relatively low costs that can be implemented quickly, to improvements requiring large expenditures that will take more time and have more extensive facility impacts. A facility that has participated in state- or federally-sponsored energy efficiency assessment programs would be allowed to use the information gathered from those assessments to fulfill portions of the assessment requirements. However, it is unlikely that those assessments will have all of the information that is required in the proposed regulation, so the facility operator would still be required to supplement the assessment program data with the information required in this section. The data acquired in this analysis must be submitted to the ARB in the Assessment Report.

The proposed regulation requires a facility-conducted versus a third party-conducted assessment. Staff has evaluated this option and determined that allowing a facility-conducted assessment is the best approach. Staff believes that it would result in a better product because the equipment and process experts would be conducting the assessment. Additionally, a self-assessment would reduce the amount of time required for rule development and implementation by at least one year by not having to establish a third-party assessor accreditation program. Finally, it would reduce the cost to the regulated community. However, the proposed regulation includes a third-party assessment back-stop, so that if ARB finds that the Assessment Report is incomplete, ARB could require the facility to conduct a third-party assessment. This element is discussed further in the Reporting Requirements section of this chapter.

The analysis data provided would include identification of the existing facility equipment, process, or system involved and the type of potential improvement, including a summary description. Potential improvements can include, but are not limited to, equipment upgrades or modifications, process changes, changes to operating procedures or maintenance practices, or investment in new technologies. The summary description should explain the system involved, the energy efficiency issues that have been identified, and a description of how the improvement would benefit energy efficiency.

The facility operator is required to provide a status of the improvement if it is being considered for, or has begun implementation or indicate that the facility is not implementing the project. Additionally, estimates on timing are required, including the estimated completion date for projects that are under investigation, scheduled, or on-going, and the actual completion date for those that have already been implemented. For projects that will not be implemented, the facility operator must provide a description of the rationale for not implementing the project.

The analysis must include preliminary cost estimates and project life. The facility operator must report the estimated one-time budgetary costs in 2010 dollars, including, but not limited to, capital costs of equipment, installation, design, construction, and permits. Estimated total average recurring annual budgetary costs are required in order to provide an understanding of the estimated ongoing costs associated with implementing the potential improvement project.

The estimated impacts on emissions must be assessed in this analysis. Estimated annual GHG, criteria pollutant, and TAC emission reductions and a specification of the methodology used to quantify them are required. The estimation method would include emission factors, control efficiency assumptions, and any other key assumptions used. This requirement is consistent with the local district reporting requirements for criteria pollutants and TACs.

Other impacts associated with implementing the potential energy efficiency improvement project must be included. Some of those impacts include identifying district permitting requirements, CEQA requirements, and other considerations, such as building, zoning, operational impacts, safety, noise, and other potential environmental impacts.

The data gathered in this analysis is meant to provide preliminary estimates on costs, emission reductions, and other impacts that would occur if the identified projects were implemented. Following the implementation of this proposed regulation, additional focus can occur on the impacts associated with implementing identified improvement projects that meet near-term and long-term emission reduction goals.

3. Alternative Approach Using Energy Consumption

The proposed regulation includes a provision that allows the facility operator to use energy consumption as the metric when determining which equipment, processes, or systems are evaluated in the energy efficiency improvement analysis. Under this provision, the facility operator would evaluate equipment, processes, or systems that cumulatively account for at least 95 percent of the facility's total energy consumption. The Executive Officer may approve this approach provided the analysis based on energy consumption also accounts for at least 95 percent of the facility's total GHG emissions.

4. Fuel Use Measurement Accuracy

The proposed regulation requires the operator to employ the same procedures for fuel use data measurements that are provided in the Mandatory GHG Reporting Regulation. This would achieve consistency when determining fuel usage for the Facility Energy Consumption and Emissions Analysis and Energy Efficiency Improvement Analysis.

Reporting Requirements

The operator of each covered facility must submit an Assessment Report to the ARB by December 15, 2011. The Facility Energy Consumption and Emissions Analysis and Energy Efficiency Improvement Analysis would be the key components of the Assessment Report. Reports are to be submitted via mail; an electronic method may also be used upon approval by the Executive Officer.

Document Retention, Recordkeeping, and Additional Data Requirements

The proposed regulation requires the facility operator to establish and document a system that provides clarity, transparency, and completeness of data and processes. This system must be sufficient to facilitate replication of the Assessment Report information. The proposed regulation also requires submittal of an Assessment Report that is in conformance with the data collection methodologies specified in their Assessment Report. This specifically refers to the methodologies used to quantify estimated emission reductions in the Facility Energy Consumption and Emissions Analysis and Energy Efficiency Improvement Analysis. The operator must retain documents regarding the procedures used to obtain the data supplied in the Assessment Report for a minimum of five years following submittal of the report to the ARB. The operator can retain additional data at the facility to be made available to ARB staff upon request.

Compliance Extension for Assessment Report

The proposed regulation includes an extension option for facility operators who are not able to meet the December 15, 2011, reporting deadline. The facility operatory would be required to apply for the extension by November 15, 2011, and specify the reasons for needing the additional time. Upon approval, the Executive Officer may grant an extension for up to 45 days.

Assessment Report Review, Validation, and Public Disclosure

The proposed regulation includes a process for determining Assessment Report completeness and disclosing the reports to the public. The Executive Officer is required to complete a review of the Assessment Report within 45 days of receipt, and determine whether it is complete as required in the previous sections and whether the data submitted are valid. The provision allows ARB to work with the facilities to gather additional information if there are deficiencies in the report, but if the Executive Officer

determines the report is incomplete, a third-party assessment may be required. This section states that completed Assessment Reports will be made available to the public on ARB's Climate Change website by April 30, 2012.

Third Party Assessment Report

In the event that a facility operator is required by the previous section to complete a third-party assessment, the operator is responsible for submitting a written application to the Executive Officer for approval of the operator's chosen third party assessor, including demonstration of the third party assessor's qualifications to effectively conduct a Facility Energy Consumption and Emissions Analysis and Energy Efficiency Improvement Analysis. The facility operator and the prospective third party assessor would each be required to sign a conflict of interest certification statement, and a quote from the third party assessor to conduct the required assessment is required. Once the Executive Officer approves the third party assessor, the operator must submit the completed third party Assessment Report within 90 days.

Confidentiality

The proposed regulation includes a confidentiality provision that explains how ARB will handle data submitted to comply with the requirements. Emissions data submitted to ARB is considered public information. Any other data submitted may be designated by the facility operator to be confidential because it may be a trade secret ormay be otherwise exempt from public disclosure under the California Public Records Act. ARB staff will handle those requests in accordance with State law. However, ARB staff believes it is critical that the information collected be publicly available, particularly to those communities that are located near the facilities. In developing the proposed regulation, ARB staff's goal was to require information that would provide sufficient detail about energy efficiency improvement projects to facilitate transparency, yet not reveal any confidential business information about the facility. As such, it is expected that a majority of the information received will not be confidential business data. In addition, ARB staff will work with the facility operators throughout the analysis and reporting process to address issues regarding confidentiality such that most if not all of the information provided to ARB can be directly released to the public.

Enforcement

As specified in section 95161, the proposed regulation explains the actions that would result in enforcement action, such as submittal of false information or failure to submit any report or include all information required.

Severability

The proposed regulation's severability clause is intended to ensure that if any portion of the regulation is deemed invalid, the remainder of the regulation will continue in full force and effect.

IV. ENVIRONMENTAL IMPACTS OF THE PROPOSED REGULATION

A. Air Quality and Environmental Impacts

The California Environmental Quality Act (CEQA) and ARB policy require an analysis to determine the potential adverse environmental impacts of proposed regulations. Because ARB's program for the adoption of regulations is certified by the Secretary of Resources (Public Resources Code, Section 21080.5, Exemption of specified regulatory programs), the CEQA analysis requirements are included in the ARB Staff Report (i.e., the Initial Statement of Reasons) in lieu of preparing an environmental impact report or negative declaration. In addition, ARB will respond in writing to all significant environmental points raised by the public during the public review period or at the Board hearing. These responses will be contained in the Final Statement of Reasons for the regulation.

Staff evaluated the potential environmental impacts from the proposed regulation and determined that no significant adverse environmental impacts are likely to result from the proposal. Further, staff has determined that adoption of the proposed regulation will not result in any significant adverse impacts on water quality, land, or biological resources.

This determination was made because the proposed regulation requires only reporting of GHG emissions, energy use, and energy assessments by specified facilities to ARB, and these activities produce no adverse environmental impacts. The collected data may be used in future programs to obtain further reductions in GHG, criteria pollutant and toxic air contaminant emissions. As such, any environmental benefits or impacts are too speculative for review at this time.

B. Public Process and Environmental Justice

State law defines environmental justice as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies (Senate Bill 115, Solis; Stats 1999, Ch. 690; Government Code § 65040.12(c)). The Board approved Environmental Justice Policies and Actions on December 13, 2001. These policies establish a framework for incorporating environmental justice into the ARB's programs consistent with the directives of State law. The policies subsequently developed apply to all communities in California, but they recognize that environmental justice issues have been raised more in the context of low income and minority communities, which sometimes experience higher exposures to some pollutants as a result of their proximity to multiple sources of air pollutants.

Actions of the ARB, local air districts, and federal air pollution control programs have made substantial progress towards improving the air quality in California. However,

some communities continue to experience higher exposures than others because of the cumulative impacts of air pollution from multiple sources.

Adoption and implementation of this regulation will have no negative environmental impacts on environmental justice communities. Facilities throughout the State will be required to report their GHG emissions, with the focus on those facilities producing the highest levels of emissions. The regulation will require a one time reporting for all facilities emitting over specified emission levels in California, including all cement plants and refineries producing transportation fuels. Staff will make this information available to the public.

To ensure that everyone has had an opportunity to stay informed and participate fully in the development of the regulation, staff has held multiple workshops and workgroup meetings, provided opportunities to participate in meetings by internet webcasting and telephone, widely distributed all materials, and maintained consistent contact with interested community and environmental representatives.

V. ECONOMIC IMPACTS OF THE PROPOSED REGULATION

In this chapter, we provide the estimated costs to businesses to comply with the proposed regulation. As stated previously, the proposed regulation will affect about 60 facilities in the State. ARB staff has quantified the economic impacts to the extent feasible, using preliminary cost estimates provided by facility operators and consultants that conduct energy efficiency assessments for large industrial facilities and staff's general knowledge of emissions reporting. Due to the many site-specific factors that are attributed to each industrial sector and individual facilities, a comprehensive cost analysis of each affected facility was not feasible. The cost estimates provided are based on the average or typical costs for the actions necessary to comply with the proposed regulation and serve to provide a general picture of the economic impacts that typical businesses subject to the proposed regulation might encounter. It is acknowledged that the actual costs to individual affected businesses may be lower or higher than that estimated.

Below we provide a summary of the costs, the legal requirements for the fiscal analysis, a discussion on our methodology used to estimate the costs, and the estimated costs and impacts on California businesses as well as on State and local governments.

A. Summary of Costs and Economic Impacts

ARB staff estimates that the total cost of the proposed regulation to affected businesses would be approximately $14 million over a period of about 16 to 18 months. A summary of the expected costs by grouped industrial sectors is provided below in Table 7. As can be seen, the majority of the costs will be borne by refineries and oil and gas extraction facilities which account for about $10 million or 75 percent of the total costs.

Table 7: Estimated Facility Costs and Total Costs for Compliance with the Proposed Regulation

Industrial Sectors	Number of Facilities	Estimated Cost per Facility ($2009)	Total Costs ($2009)
Electricity Generating Facilities and Hydrogen Plants	21	$78,000	$1,638,000
Cement and Mineral Plants	11	$175,000	$1,925,000
Petroleum Refineries and Oil & Gas Extraction and Transmission	24	$425,000	$10,200,000
Totals	56	N/A	$13,763,000

Overall, the vast majority of the affected businesses are large businesses, many owned by multi-national corporations, and therefore, we do not expect their profitability to be adversely impacted. As a result, we do not expect a noticeable change in employment,

business creation, expansion, or elimination, or business competitiveness in California. We also found no adverse economic impacts to any local or federal agencies. ARB will incur minimum costs to administer the proposed regulation. These costs would be met with existing resources. No other State agencies will be affected.

No job or business losses are anticipated in California due to the regulation. However, there may be a small increase in the amount of work for consultants in the event facility operators out-source the work needed to fulfill the requirements in the proposed regulation.

All the cost estimates provided in this chapter are relative to the year 2009 (current value of the costs), and all costs are given in 2009 dollars. The information, assumptions and methodologies used to determine compliance costs are summarized in this chapter.

B. Legal Requirements

Section 11346.3 of the Government Code requires that, in proposing to adopt or amend any administrative regulation, State agencies must assess the potential for adverse economic impacts on California business enterprises and individuals, including the ability of California businesses to compete with businesses in other states. The assessment must also include the potential impact of the regulation on California jobs; business expansion, elimination or creation; and the ability of California business to compete with businesses in other states.

Also, State agencies are required to estimate the cost or savings to any State or local agency and school district in accordance with instructions adopted by the Department of Finance. The estimate shall include any non-discretionary cost or savings to local agencies, and the cost or savings in federal funding to the State.

HSC section 57005 requires ARB to perform an economic impact analysis of submitted alternatives to the proposed regulation before adopting any major regulation. A major regulation is defined as a regulation that will have a potential cost to California business enterprises in an amount exceeding $10 million in any single year. Because the total cost of the regulation is estimated at approximately $14 million, the proposed regulation is being considered a major regulation.

C. Analysis of Estimated Costs for Compliance

The following is a description of the methodology used to estimate costs, as well as the estimated costs to facilities that will be affected by the proposed regulation.

Compliance with the proposed regulation will require facility operators to undertake a variety of actions, some that may be done routinely for other programs or to optimize facility operations and others that will be taken solely for compliance with the proposed

regulation. These include actions such as collecting and analyzing facility energy use data and associated GHG, criteria pollutant and toxic air contaminant emissions; developing process flow diagrams for the facility; identifying energy efficiency improvement projects or opportunities and the associated costs; estimating energy savings and emissions impacts; and any other implementation activities.

For the cost analysis, ARB staff relied on preliminary cost estimates provided by facility operators and consultants that conduct energy efficiency assessments for large industrial facilities and staff's general knowledge of emissions reporting. ARB staff used these cost estimates to develop cost ranges and the average costs for facilities based on the expected complexity (low, medium, or high) of the reporting facilities. Refineries and oil and gas extraction facilities were characterized as high complexity facilities, cement and mineral facilities as medium complexity, and electricity generating and hydrogen plants as low complexity. The average costs for each grouping of facilities was used to estimate the costs for an individual facility and then multiplied by the total number of facilities to determine the total costs for the industrial sectors within each "complexity" grouping.

Table 8 provides a summary of the estimated cost ranges and average costs for compliance with the proposed regulation based on the expected complexity of the facilities within the five industrial sectors.

Table 8: Estimated Cost Ranges and Average Cost for Compliance with the Proposed Regulation

Complexity	Industrial Sector	Number of Facilities	Estimated Cost per Facility ($2009)		
			Low	High	Average
Low	Electricity Generating Facilities and Hydrogen Plants	21	$6,000	$150,000	$78,000
Medium	Cement and Mineral Plants	11	$100,000	$250,000	$175,000
High	Petroleum Refineries and Oil & Gas Extraction and Transmission	24	$250,000	$600,000	$425,000

As can be seen, the "high complexity" facilities, such as refinery or oil and gas extraction facilities have higher compliance costs, ranging from $250,000 to $600,000 per facility, than the "medium complexity" facilities such as cement or mineral plants, which range from $100,000 to $250,000 and the "low complexity" facilities, which range from $6,000 to $150,000 per facility. This is not unexpected, as a refinery or oil and gas extraction facility typically will have numerous processes, process functions, and energy sources involved in the collection or processing of oil. Electricity generating facilities are much simpler in design, typically having one or more natural gas turbine generators and auxiliary equipment.

There is variability within the range of estimated costs within the facility groupings. Each facility is unique. Individual costs, even for the same types of facilities, could vary substantially. This variability is due to the size and complexity of the facility, the presence of existing staffing and systems to assist with estimating emissions, developing an energy efficiency improvement analysis, and other factors. A precise estimate of overall reporting costs for an individual facility is difficult to develop.

In our analysis, we used the average costs to represent the typical costs to a business and estimate the total costs for compliance with the proposed regulation. While the actual costs to individual affected businesses may be lower or higher than that estimated, ARB staff believe the cost estimates developed based on the average costs listed in Table 8 provide a good approximation of the overall costs to businesses in California to comply with the proposed regulation.

Table 9 provides a summary of the expected average costs for each facility within a given industrial sector and the total costs for compliance with the proposed regulation.[5] As is shown, the costs for all businesses to comply with the proposed regulation are estimated to be approximately $14 million. About 75 percent of the costs are borne by the petroleum refineries and oil and gas extraction facilities. The "medium complexity" facilities, cement and mineral plants, account for about $2 million or about 15 percent of the total costs. Cost estimates for the electricity generating facilities and hydrogen plants are about $1.6 million or 10 percent of the total costs.

Table 9: Estimated Facility Costs and Total Costs for Compliance with the Proposed Regulation

Complexity	Industrial Sectors	Number of Facilities	Estimated Cost per Facility ($2009)	Total Costs ($2009)
Low	Electricity Generating Facilities and Hydrogen Plants	21	$78,000	$1,638,000
Medium	Cement and Mineral Plants	11	$175,000	$1,925,000
High	Petroleum Refineries and Oil & Gas Extraction and Transmission	24	$425,000	$10,200,000
	Totals	56	N/A	$13,763,000

[5] As discussed previously in this staff report, there are about 60 facilities that will be affected by the proposed regulation. Of these, four are electricity generating facilities operated by local agencies in Southern California. Because these facilities operate as not-for-profit corporations and can recover costs from the clients they serve, their costs for compliance are included in the total costs of the proposed regulation.

D. Economic Impacts of Proposed Regulation

In this section, we analyze the potential impacts of the estimated costs of the proposed regulation on business enterprises in California. Section 11346.3 of the Government Code requires that, in proposing to adopt or amend any administration regulation, State agencies shall assess the potential for adverse economic impact on California business enterprises and individuals. The assessment shall include a consideration of the impact of the proposed or amended regulation on the ability of California businesses to compete with businesses in other states, the impact on California jobs, and the impact on California business expansion, elimination, or creation.

1. Potential Business Impacts

The proposed regulation focuses on the largest stationary sources of GHG emissions and includes refineries, oil and gas extraction facilities, cement plants, a mineral plant, hydrogen plants, and electricity generating facilities. With the exception of about four electricity generating facilities that are operated by local municipal and county governments, the vast majority of the business that will be affected by the proposed regulation are large businesses, many owned by multi-national corporations. A list of the affected businesses is provided below in Table 10. None of the businesses are considered to be small businesses.

Table 10: Facilities in California Expected to be Subject to the Proposed Energy Efficiency Assessment Regulation

Facility Name	Industrial Sector
CalPortland Company, Colton Plant	Cement Plant
CalPortland Company, Mojave Plant	Cement Plant
Cemex - Black Mountain Quarry	Cement Plant
Cemex - Cement Plant Davenport	Cement Plant
Lehigh Southwest Cement Co - Redding	Cement Plant
Lehigh Southwest Cement Co. - Tehachapi	Cement Plant
Lehigh Southwest Cement Company - Cupertino	Cement Plant
Mitsubishi Cement 2000	Cement Plant
National Cement Company - Lebec	Cement Plant
TXI Riverside Cement (Oro Grande Plant)	Cement Plant
Burney Forest Products	Cogeneration Facility
Kern River Cogeneration Company	Cogeneration Facility
Midway-Sunset Cogeneration	Cogeneration Facility
Stockton CoGen	Cogeneration Facility
Sycamore Cogeneration Co	Cogeneration Facility
ACE Cogeneration	Electricity Generation
AES Alamitos, LLC	Electricity Generation
Aes Huntington Beach, Llc	Electricity Generation
Colmac Energy, Inc. 92254	Electricity Generation
Covanta Delano, Inc.	Electricity Generation
Dynegy South Bay, LLC	Electricity Generation
Los Angeles Department of Water & Power-Haynes Generating Station	Electricity Generation
Los Angeles Department of Water & Power-Scattergood Generating Station	Electricity Generation
Los Angeles Department of Water & Power-Valley Generating Station	Electricity Generation
NRG Energy - Encina	Electricity Generation
Puente Hills Landfill, LA County Sanitation	Electricity Generation
RRI Energy Etiwanda, Inc.	Electricity Generation
Wheelabrator Shasta Energy Company	Electricity Generation
Aera Energy LLC, Belridge, 93251	Oil & Gas Extraction
Aera Energy LLC, MOCO, D&E, 93252	Oil & Gas Extraction
Chevron U.S.A Inc - Cymric Asset, 93251	Oil & Gas Extraction
Chevron U.S.A Inc - Midway Sunset Asset, 93225	Oil & Gas Extraction
Occidental Of Elk Hills, Inc.	Oil & Gas Extraction
Plains Exploration & Production Company - San Joaquin Heavy Oil Production Facility	Oil & Gas Extraction
Searles Valley Minerals	Mineral Plant
Air Liquide El Segundo Hydrogen Plant	Hydrogen Plant
Air Products Carson Hydrogen Plant	Hydrogen Plant

Facility Name (continued…)	Industrial Sector
Big West of California Bakersfield Refinery (Area 3)	Petroleum Refinery
Big West of California Bakersfield Refinery (Areas 1&2)	Petroleum Refinery
BP West Coast Products LLC, Refinery	Petroleum Refinery
Chevron Products Company - El Segundo Refinery, 90245	Petroleum Refinery
Chevron Products Company - Richmond Refinery, 94802	Petroleum Refinery
Conoco Phillips Refining Company	Petroleum Refinery
ConocoPhillips Los Angeles Refinery Wilmington Plant	Petroleum Refinery
ConocoPhillips Los Angeles Refinery, Carson Plant	Petroleum Refinery
ConocoPhillips Santa Maria Refinery	Petroleum Refinery
ExxonMobil Torrance Refinery	Petroleum Refinery
Kern Oil and Refining Company	Petroleum Refinery
Paramount Petroleum Corporation	Petroleum Refinery
San Joaquin Refining Company	Petroleum Refinery
Shell Oil Products US	Petroleum Refinery
Tesoro Refining And Marketing Co. - LAR	Petroleum Refinery
Tesoro Refining and Marketing Company, 94553	Petroleum Refinery
Ultramar Inc - Valero	Petroleum Refinery
Valero Refining Company -California, Benicia Refinery and Benicia Asphalt Plant	Petroleum Refinery

Analysis of Return on Owner's Equity (ROE)

To determine the potential business impacts, ARB staff conducted an analysis comparing the annual return on owner's equity (ROE) for affected businesses before and after the inclusion of the costs associated with the proposed regulation. The analysis uses publicly available information to assess the impacts on competitiveness, jobs, and business expansion, elimination, or creation. As stated previously, ARB staff estimates approximately 60 businesses will be affected by the proposed regulation.

The approach used in evaluating the potential economic impact of the proposed regulation on California businesses is as follows:

(1) Affected businesses were identified using the applicability criteria for the proposed regulation and the 2008 calendar year GHG emissions data reported pursuant to the Mandatory GHG Reporting Regulation. See Table 10 above for a listing of affected businesses.

(2) The costs for the regulation were estimated for each of these businesses based on the estimated costs to conduct the assessment for each type of industrial sector and the number of facilities it owns (see Table 9).

(3) The total annual cost for each business is adjusted for both federal and state taxes.

(4) Three year average (2007-2009) financial data are used to calculate the ROE for each affected business where such data were available. The adjusted cost is subtracted from net profit data to calculate the ROE after the regulation. The ROE before and after the regulation are compared to determine the impact on the profitability of the businesses. A reduction of more than 10 percent in profitability is considered to indicate a potential for significant adverse economic impacts. This threshold is consistent with the thresholds used by the U.S. EPA and others.

Table 11 presents the average ROE of the businesses in the affected industries.

Table 11: Affected Businesses with Change in ROE

Complexity	Industrial Sector	Number of Facilities	Estimated Percent Change in ROE
Low	Electricity Generating Facilities and Hydrogen Plants	21	-0.25
Medium	Cement and Mineral Plants	11	-0.07
High	Petroleum Refineries and Oil & Gas Extraction and Transmission	24	-0.06
Overall Average			-0.1

California businesses are affected by the cost of the proposed regulation to the extent that the implementation of the proposed regulation reduces their profitability. As shown in Table 11, the proposed regulation would reduce the average profitability of the affected businesses by about 0.1 percent. Electricity generating facilities and hydrogen plants would be affected the most and petroleum refineries and oil and gas extraction and transmission facilities would be affected the least. Overall, our analysis shows that the affected businesses will be able to absorb the costs of the proposed regulation with no significant adverse impacts on their profitability. Because the proposed regulation would not alter significantly the profitability of these businesses, we do not expect a noticeable change in employment, business creation, elimination, or expansion, and business competitiveness in California.

2. Impacts to Small Businesses

We are not aware of any small business[6] that would be affected by the proposed regulation. As noted previously, the proposed regulation would apply to only the largest industrial stationary sources of emissions in California. These sources are generally not operated by small businesses.

3. Potential Impact on Business Competitiveness

The affected businesses are large businesses and can either absorb or pass-through the increased costs associated with the proposed regulation with no significant impact on their ability to compete with non-California businesses. For these reasons, we do not believe the relatively low costs of this proposed regulation are high enough to significantly affect the competitiveness of the businesses that are affected by the proposed regulation.

4. Potential Impact on Employment, Business Creation, Elimination, or Expansion

No change is expected to occur in the status of California businesses as a result of the proposed regulation. This is because the proposed regulation is expected to impose a minor cost on businesses in California.

Staff believes that the proposed regulation may slightly increase additional work for existing businesses in California in the event facilities choose to out-source the work needed to comply with the requirements in the proposed regulation. This work would likely be in the fields of technical consulting to assist affected businesses in preparing their GHG, criteria pollutant, and air toxic contaminant emissions reports and energy efficiency improvement analyses. Because some of the reporting and analysis will be done by the facilities and some work will be done by consultants from existing firms for both individual facilities or groups of facilities, precise estimates of the number of jobs created are not possible. However, given that the assessments are a one-time requirement, we anticipate that the work will be done with existing resources in most cases.

[6] Small business definition: Independently owned and operated; and, cannot be dominant in its field of operation; and, must have its principal office located in California; and must have its owners (or officers in the case of a corporation) domiciled in California; and, together with its affiliates, be either: a business with 100 or fewer employees, and an average annual gross receipts of $12 million or less over the previous three tax years, or a manufacturer with 100 or fewer employees. http://www.pd.dgs.ca.gov/smbus/sbcert.htm (DGS 2007)

5. Impacts to Federal, State, and Local Agencies

There are no State agencies that have any facilities that are subject to this regulation. As discussed below, there are four facilities operated by local agencies that will be affected. We are not aware of any facilities affected by the proposed regulation that are operated by the federal government.

With regards to local governments, the Los Angeles Department of Water and Power (LADWP) owns three electricity generating facilities that are subject to the proposed regulation. In addition, the Puente Hill Landfill electricity generating facility is operated by the Los Angeles County Sanitation District (LASCD). These facilities operate as not-for-profit corporations; thus their compliance costs, about $78,000 per facility or about $300,000 combined, are included in the total costs of the proposed regulation as presented earlier in this chapter. Both LADWP and LASCD are expected to cover the estimated compliance costs from within their existing budgets. The proposed regulation will not significantly impact City or County of Los Angeles tax payers through fiscal budgets.

ARB will incur minimum costs to administer the proposed regulation. These costs would be met with existing resources. No other State agencies will be affected.

6. Necessity of Reporting

This regulation is proposed under AB 32 and other authority to receive vital information for use toward achieving the critical public health and welfare goals of reducing GHG and other air pollutant emissions. This additional information is needed to identify promising areas for emission reductions that may not otherwise be identified. The reporting requirements needed to obtain this information will apply to businesses, namely, the largest GHG-emitters in the State. As such, ARB finds that the reporting requirements of the proposed regulation are necessary for the health and welfare of the people of California.

E. Alternatives to the Proposed Regulation

Government Code section 11346.2 requires ARB to consider and evaluate reasonable alternatives to the proposed regulation and provide the reasons for rejecting those alternatives. ARB staff evaluated four alternative strategies to the current proposal. Based on the analysis, none of the alternative control strategies were considered to be more effective than the proposed regulation. Full implementation of the proposed regulation is necessary to achieve ARB's goal, as described in the AB 32 Scoping Plan, to require an energy efficiency assessment of the stationary sources within the largest industrial facilities to determine the opportunities for GHG emission reductions and co-benefits for other pollutants. A description of the alternatives considered and staff's rationale for finding them unsuitable follows below.

Alternative 1: Do Not Adopt This Regulation: Rely on Facilities to Voluntarily Conduct an Energy Efficiency Assessment

One alternative would be to do nothing and rely on existing voluntary programs. As mentioned in previous chapters, several programs are currently available to provide industrial facilities with information, tools, and opportunities for improving energy efficiency. However, none of the existing programs are comprehensive enough to result in a full assessment of the energy efficiency and emission reductions opportunities that exist at industrial facilities. The voluntary programs are focused on specific processes and short payback periods as opposed to providing a full range of opportunities for both the near-term and long-term. The proposed regulation does, however, allow the data acquired from participation in programs such as these to be used in order to meet applicable portions of the requirements where appropriate. Staff believes the proposed regulation will provide a list of feasible energy efficiency and emission reduction opportunities that is far more comprehensive than the existing voluntary programs. Therefore, ARB staff does not recommend this alternative.

Alternative 2: Require a Third-Party Assessment

Another option would be to require the facility assessments to be performed by a third party. Staff believes that requiring third party assessments would increase the costs to the regulated community and ARB and increase the amount of time needed for rulemaking and implementation, since ARB would need to develop a third-party assessor accreditation program. Staff estimates that a third-party assessment would cost about twice as much as a facility-conducted assessment, about $28 million, and would result in an inferior product, because it is estimated that few, if any, sources outside of the facility have the expertise comparable to the facility process and equipment experts. However, the proposed regulation includes a third-party assessment back-stop, so that if ARB determines an Assessment Report to be incomplete, the operator must conduct a third-party assessment. Therefore, ARB staff does not recommend this alternative.

Alternative 3: Adopt Requirements for Refineries Only

Another option would be to adopt requirements only for refineries, which comprise about 50 percent of the GHG emissions from the facilities being affected by the proposed regulation, and not address the energy efficiency and emission reduction opportunities at other industrial facilities. This option would result in costs of about $7.6 million, reducing the overall cost by about 50 percent. However, it would not provide the information necessary to determine the opportunities that exist at other facilities that have significant GHG emissions, and would therefore, not fulfill the goals of the AB 32 Scoping Plan measure. The current proposal would provide ARB with the necessary data to inform our emission reduction programs for the largest industrial facilities in the State in order to design approaches to maximize GHG, criteria pollutant, and toxic air contaminant reductions. Therefore, ARB staff does not recommend this alternative.

Alternative 4: Require ARB Staff to Conduct the Assessment

The last alternative option considered is to require ARB staff to conduct the assessments for each facility. While this option would reduce the costs to the affected facilities, it would increase costs to the ARB. ARB staff has the experience and knowledge necessary to review the assessment conducted by the facilities, but conducting the assessments would require in-depth training and certification through existing programs such as DOE's Industrial Technologies Program to ensure staff are qualified energy experts. Costs associated with certification and travel would be significant. Additionally, implementation of the proposed regulation would require more time, with the final reports not likely to be completed before the end of 2012. This would be in part due to the time it would take to certify and train sufficient ARB staff to conduct the assessments and due to the fact that there is a limited number of ARB staff that could be made available to do the assessments. Therefore, ARB staff does not recommend this alternative.

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