BAY AREA AIR QUALITY MANAGEMENT DISTRICT

Bay Area Appliance Rules Briefing

September 14, 2023

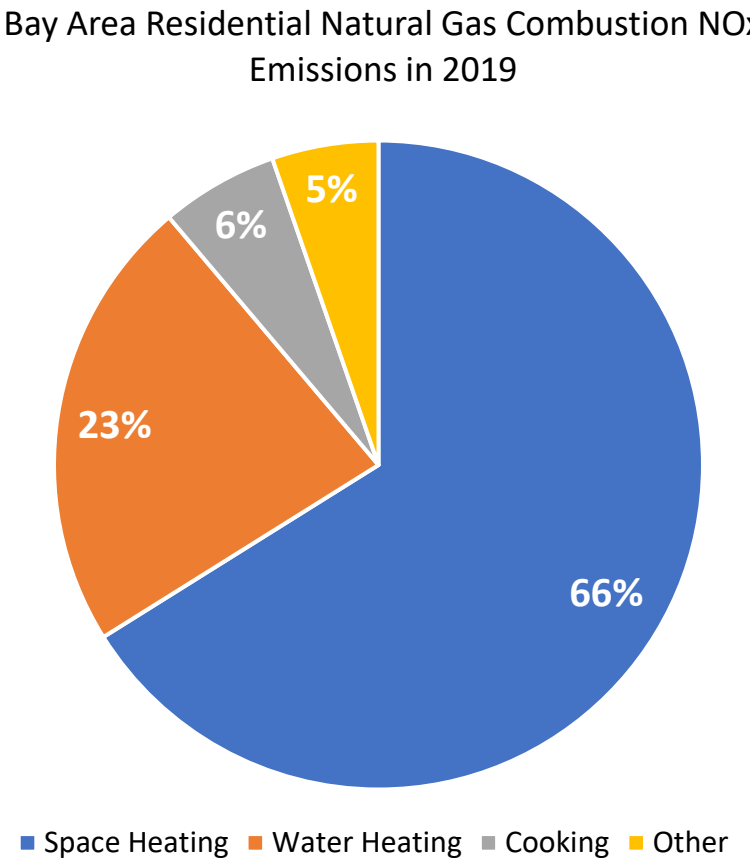
Background: Rules for Amendment

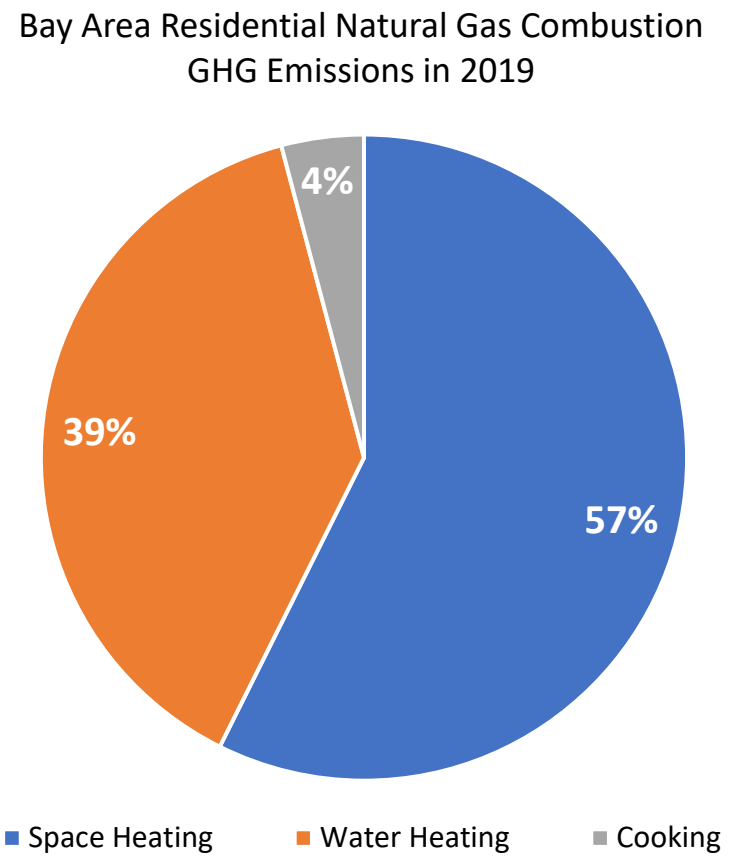
- To address Oxides of Nitrogen (NOx) emissions associated with buildings, amend:
  - Regulation 9, Rule 4 (Rule 9-4): Nitrogen Oxides from Fan Type Residential Central Furnaces
  - Regulation 9, Rule 6 (Rule 9-6): Nitrogen Oxides from Natural Gas-Fired Boilers and Water Heaters

Necessity

- Buildings account for > 25% of all stationary source NOx emissions in the region
- Significant NOx and secondary PM formation reductions
- Primary PM and GHG co-benefits expected
- Bay Area can continue to show leadership in health protective rules

Background: Residential Appliance Emissions





Background

- NOx emissions limits for natural gas fired space and water heaters

Ultra low Nox (14 ng/J)	1/1/2024	Central natural gas-fired furnace
Zero NOx	1/1/2027	Water heaters less than 75,000 BTU/hr
Zero NOx	1/1/2029	All applicable natural gas-fired furnaces
Zero NOx	1/1/2031	Water heaters 75,000 to 2 million BTU/hr

- Draft amendments released for public comment and workshop in October 2021
- Rule amendments adopted on March 15, 2023

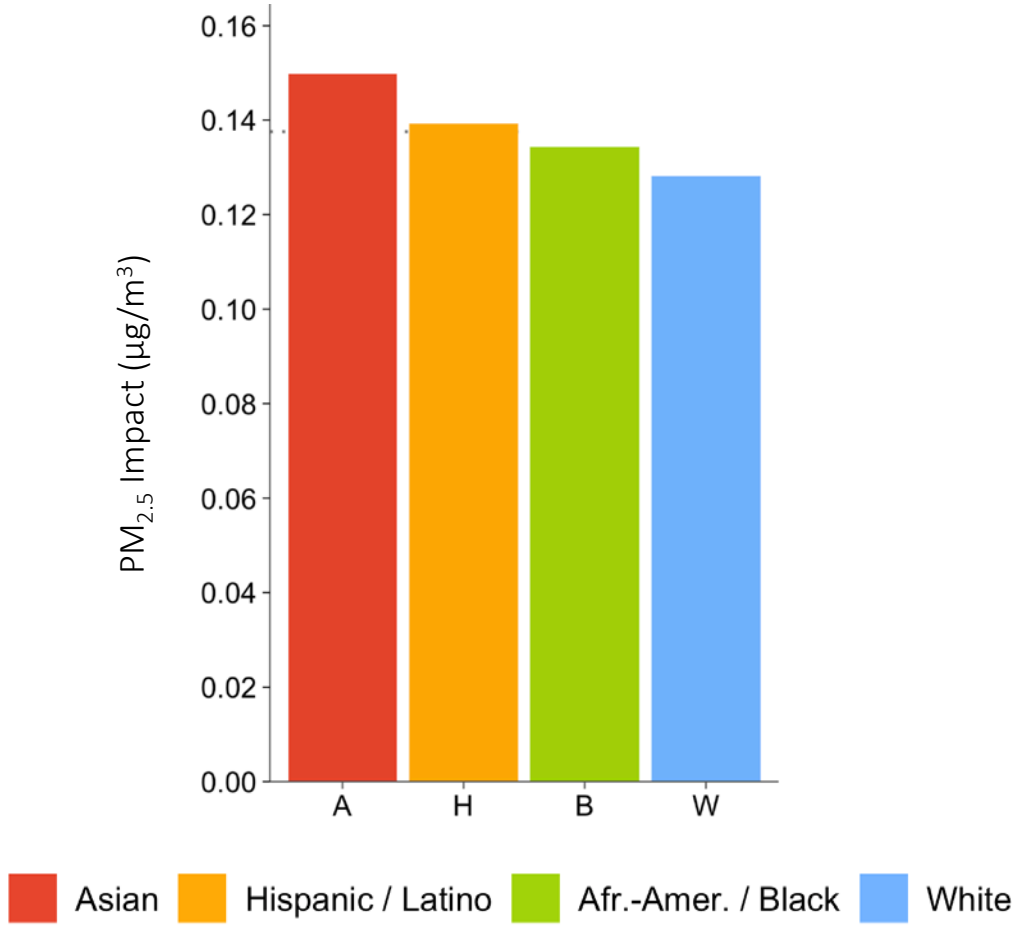
Summary of Impacts

- Potential premature deaths avoided: 37–85 deaths per year
- Potential total benefit valuation: $400–890 million per year
- About 60% of benefits accrue from eliminating NOx emissions
- About 40% from eliminating $PM_{2.5}$ emissions (electric appliances)
- People of color most impacted by $PM_{2.5}$ attributed to combustion of natural gas for residential space and water heating
- Needed to attain and maintain National Ambient Air Quality Standards

Equity Assessment

- The counties most affected by these sources, like Santa Clara, tend to be higher % Asian / Pacific Islander. This explains most of the regional pattern (shown at right).

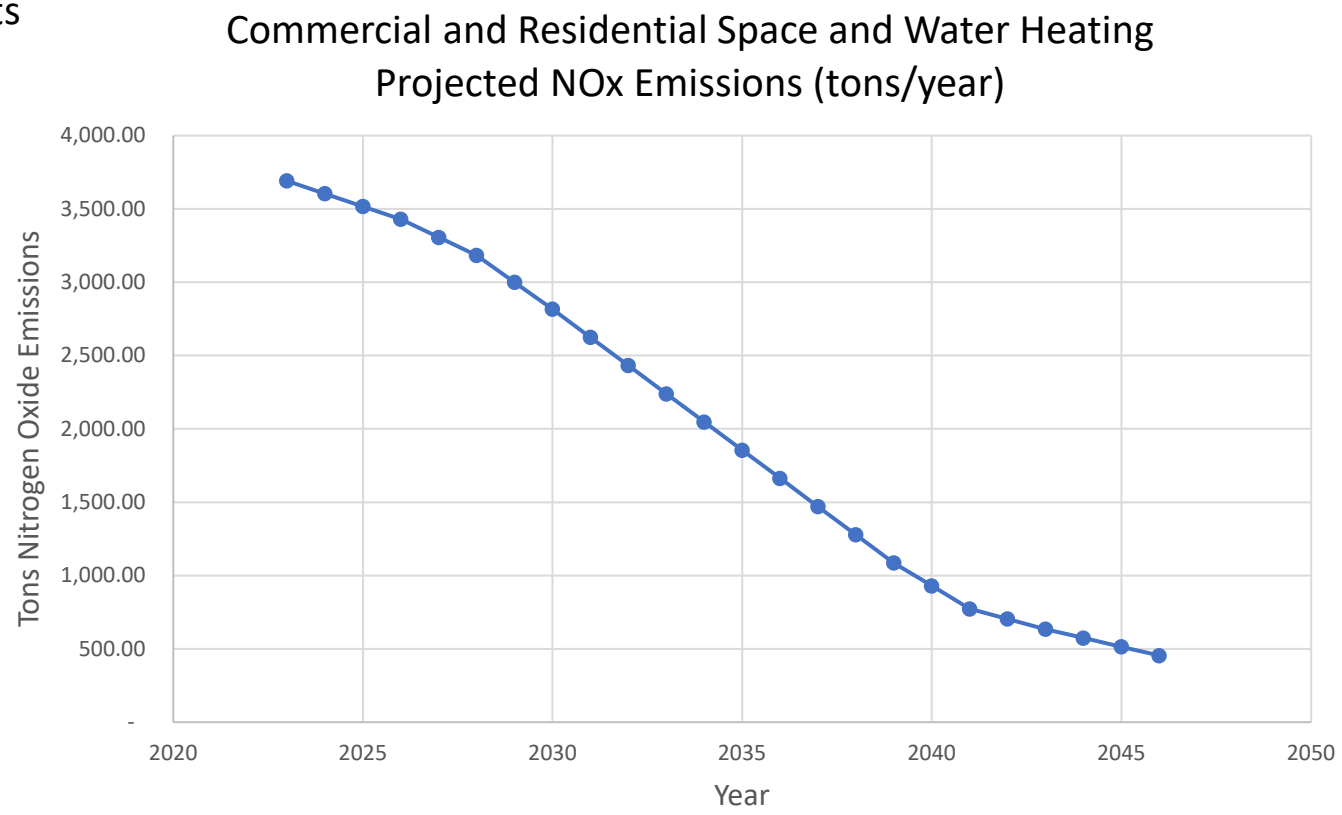
- Within every county, the most-impacted residents tend also to be people of color: primarily Hispanic and African-American/Black.



NOx Emissions Reductions Expected

Projected NOx Emissions from Proposed Rule Amendments

Year	Projected Yearly NOx Emissions (tons/year)	Projected NOx Reduction vs. Baseline (tons/year)
2018	3,690	-
2025	3,516	174
2030	2,816	874
2035	1,855	1,835
2040	930	2,761
2045	515	3,176
2046	454	3,236



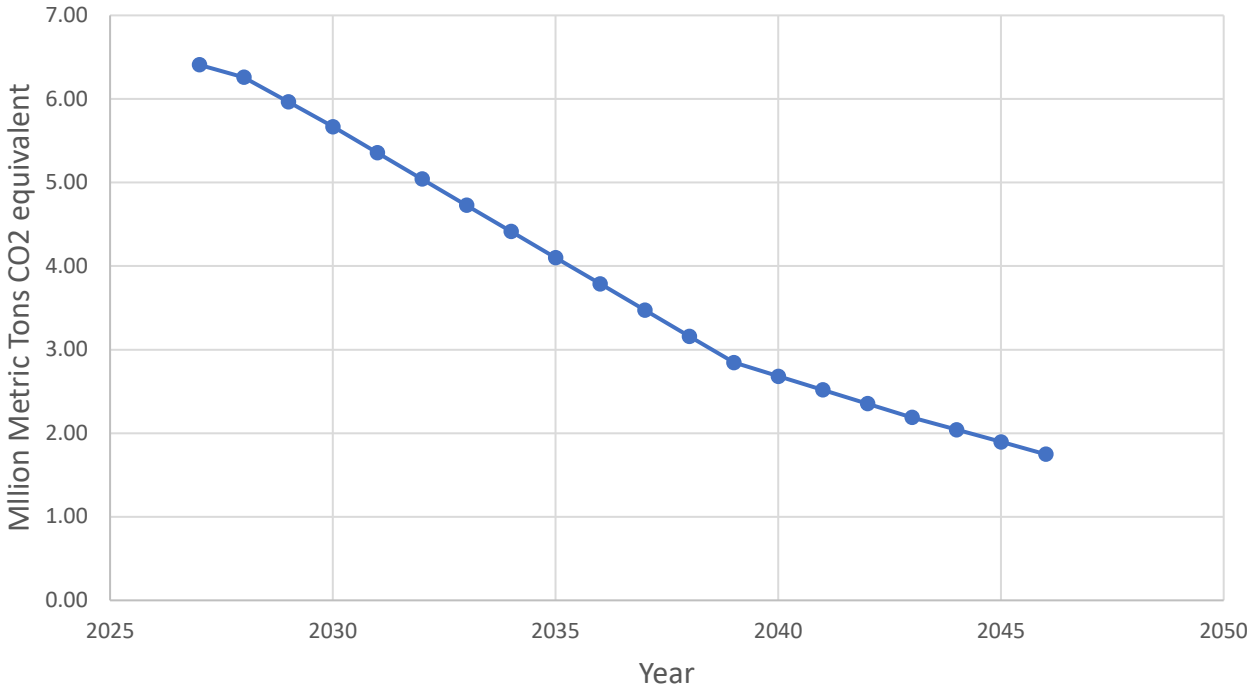
Total Reductions Expected: 40,744 Tons NOx from 2023-2046

GHG Emissions Reductions Expected

Projected NOx Emissions from Proposed Rule Amendments

Year	Projected Yearly GHG Emissions ($MMTCO_2e/yr$)	Potential Reduction vs. Baseline ($MMTCO_2e/yr$)
2018	6.56	-
2030	5.67	0.89
2035	4.10	2.46
2040	2.68	3.88
2046	1.75	4.81

Commercial and Residential Space and Water Heating
Potential GHG Emission Reductions (MMTCO2e/year)



Total Reductions Expected: 54.54 MMT of GHG from 2023-2046

Public Comments - Cost

- Concerns
  - Concerns about high cost of compliance in individual circumstances
    - Panel upgrades, utility costs, access to funding, upfront capital costs
- Responses
  - Implementation working group to track cost to consumers, facilitate access to funding as appropriate (focusing on low-income households)
    - Appliance costs expected to go down as market grows
    - Minimize need for panel upgrades and other expenses
    - Funding mechanisms that minimize upfront costs
    - Workforce availability and training

Public Comments - Grid

Grid Capacity & Reliability

- Concerns:
  - Insufficient capacity of grid distribution infrastructure to meet the needs of proposed rules
  - Alignment with state-wide planning processes and generation resource build-out
  - Reliability and access to heat and hot water during power outages
  - Emergency replacements
- Responses:
  - E3 report discusses impact to grid and alignment with CEC/CPUC planning processes
  - Modern natural gas appliances require electricity to operate in many cases
  - Emergency replacement plans including loaner programs, workforce training, alignment with building code processes

Common Questions

Q: Is this a natural gas ban?

A: No -

- The proposed rule amendments only address natural gas furnaces and water heaters.
- The zero-NOx emissions standard could be met by natural gas appliances, but there are none currently available.

Q: Will this effect gas stoves?

A: No – The existing regulations and proposed amendments do not include any requirements for gas stoves.

Q: Will property owners be required to replace their gas appliances immediately when the zero-NOx standard takes effect?

A: No, but if an appliance fails and needs to be replaced after the effective date, the replacement must be zero-NOx.

Common Questions

Q: Do the health benefits come from improving indoor air quality?

A: No –

- The proposed amendments only effect water heaters and furnaces whose emissions are vented to the outside.
- NOx and PM2.5 pollution from these 1.8 million appliances harm outdoor air quality and cause health impacts.

Q: Does this effect propane-fired equipment?

A: No –

- These rules have always only applied to natural gas-fired equipment, which are the cause of most of the air pollution from water heaters and furnaces in the Bay Area.
- Propane-fired equipment is not impacted.

Interim Report

- Introduction of requirement for both rules for interim report to come back to the Board of Directors no later than two years prior to the compliance date
    - Technology options currently (and projected to be) available
    - Market availability of such technology
    - Projected costs of purchase and installation
    - Incentive programs available to reduce costs

Implementation Working Group (IWG)

- **Purpose**: Inform periodic reporting back to the Board on rule implementation for technical readiness and equitable transition
- **Stakeholders:**
  - environmental justice groups
  - community-based organizations
  - tenant groups
  - affordable housing development
  - building management
  - labor and trade organizations
  - technology manufacturers
  - subject matter experts/ building energy advocates
  - technology entrepreneurs focused on home electrification at scale
  - local governments
  - CARB, CEC, CPUC
  - PG&E and CCAs

IWG Structure

IMPLEMENTATION WORKING GROUP

SUPPORT

EQUITY + TECHNICAL SUBCOMMITTEE

Provide information, data, subject matter expertise

STEERING COMMITTEE

Consultation for agenda planning

All IWG

Review and comment

STAFF

Synthesize and summarize

CONSULTANTS

Provide additional staff support, gap-fill

FACILITATOR

Kearns & West

Draft Workplan: Technical Subcommittee Scope & Goals

COSTS		**Understand all costs associated with zero NOx appliance installation in the Bay Area region**
TECHNOLOGY		**Find cost-effective zero NOx technology solutions for all use cases**
MARKET / WORKFORCE		**Understand zero NOx technology market availability and trends**
PERMITTING		**Support streamlined permitting for installation of zero NOx appliances**

Draft Workplan: Technical Subcommittee Scope & Goals, cont.

GRID CAPACITY AND RELIABILITY		**Understand and advocate for electric infrastructure readiness (grid capacity and reliability) to support zero NOx appliances**
RESIDENTIAL INTERCONNECTION		**Understand and advocate for improving residential interconnection to support the installation of zero NOx appliances**
POWER OUTAGES		**Support awareness and solutions to address power outages, particularly for vulnerable communities and/or populations**

Draft Workplan: Equity Subcommittee Scope & Goals

WORKFORCE		**Support sufficient and adequately trained workforce to install additional zero NOx appliances resulting from building appliance rules**
HOUSING IMPACTS		**Minimize negative housing impacts from zero NOx appliance installation on Bay Area residents**
AFFORDABILITY		**Support affordable zero NOx appliance installation for all Bay Area residents, particularly low and moderate income households, by rule compliance dates**

Workplan: Timeline & Phases

ASSESS [now – Q1 2024]	Current Landscape	Gap Analysis	Equity and Tech Subcommittees, IWG and Air District Equity and Tech Consultants may gap fill
STRATEGIZE [Q1 – Q3 2024]	Refine Objectives	Define Strategies	
REPORT OUT [Q3 – Q4 2024]	Remaining Challenges	Report to Air District Board	Air District
IMPLEMENT [Q1 2025 - 2027]	Roadmaps and Plans	Annual Update to Stakeholders	Air District and Implementing Partners

What Can Local Govt. Do Now?

- Education
  - Make sure property owners know about upcoming requirements for water heaters and furnaces, especially if they are pulling permits for other types of electrical work.
  - Encourage property owners to plan now so they can take full advantage of current incentives and be ready for when the requirements take effect.
- Regulatory
  - Consider requiring heat pumps be installed when central air conditioners are replaced. (San Carlos has already done so.)
  - Review permitting requirements for streamlining opportunities.