Proposed Amended Rule 1153.1

Emissions of Oxides of Nitrogen from Commercial Food Ovens

Working Group Meeting #8
June 7, 2023

South Coast AQMD

Join Zoom Webinar Meeting

https://scaqmd.zoom.us/j/93381363138

Teleconference Dial-In: 1-669-900-6833

Webinar Meeting ID: 933 8136 3138

Agenda

- Rule Development Progress & Updates
- Key Issues from Comment Letters
- Revised Cost-Effectiveness Calculations
- Revised Draft Rule Language
- Next Steps

Rule Development Updates

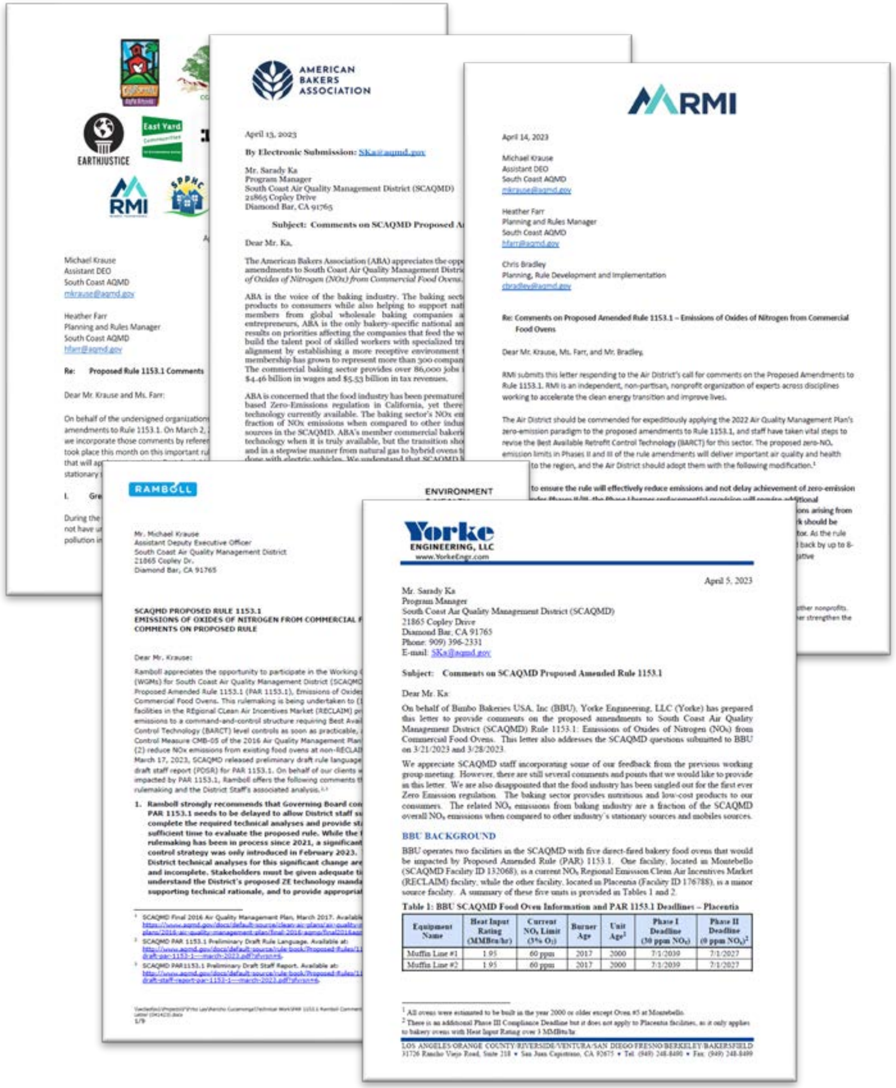
- Public Hearing delayed to August to provide additional time for stakeholder feedback
- Reassessed cost-effectiveness for all categories based on stakeholder comments
- Continued meeting with stakeholders
- Released Fourth Version of Proposed Amended Draft Rule Language

Comment Letters Received

KEY ISSUES IDENTIFIED BY STAKEHOLDERS

Comment Letters Received

- Staff received several comment letters from industry and environmental groups
- Comment letters are available on webpage*
- Key Issues from Comment Letters:
  - o Zero-emission technology may not be commercially available
  - o Burner useful life for Phase I should align with Phase II and Phase III
  - o Electrical grid cannot meet energy demand of zero-emission units
  - o Implementation timeline is too slow to meet air quality goals
  - o Cost-effectiveness did not consider fuel switching costs
  - o Cost-effectiveness methodology does not consider regional costs



* https://www.aqmd.gov/docs/default-source/rule-book/Proposed-Rules/1153-1/coalition-comment-letter-re-proposed-rule-1153-1-final.pdf

Key Comments Received

Key Issue #1

- Zero-emission technology may not be commercially available

- Staff will conduct a technology assessment prior to future effective date of Phase II
  - Technology assessment will evaluate the status and development of zero-emission technology for all categories
- Staff will report results of technology assessment to Stationary Source Committee one year prior to effective date of future effective limits
- If necessary, staff will amend NOx limits and/or compliance schedule before future effective dates

Key Comments Received

Key Issue #2

- Burner useful life assumption for Phase I Emission Limits should be revised to 10-year useful life to align with Phase II or Phase III burner life assumptions

- Staff concurs and revised cost-effectiveness assessment and rule language to reflect 10-year useful burner life for Phase I Emission limits
  - Updated from the previous useful burner life assumption of 25 years
  - Consistent with burner manufacturer feedback

Key Comments Received

Key Issue #3

- Concerns electrical grid cannot meet energy demands of zero-emission units

- California Energy Commission (CEC) conducts utility energy forecast of expected future demands
  - Forecast considers energy impacts from zero-emission regulation expected to be adopted at state and local level
- Compliance schedule provides phased-in approach based on unit age and burner age
  - Allows time for gradual electrical grid upgrades to mitigate impacts
  - Revised proposal will have less of an impact on the grid as fewer Units were found to be cost effective to transition to zero-emission based on fuel switching costs
- Alternative Compliance Schedule provides additional time for facilities if utility provider cannot meet power requirement
- Staff will continue discussions with electricity providers

Key Comments Received

Key Issue #4

- Concerns that the implementation timeline is too slow to meet air quality goals

- Staff is proposing technology forcing zero-emission limits
  - Adequate time is needed for the technology to fully emerge and become commercially available
- Implementation timeline necessary for:
  - Facilities to adjust and test recipes
  - Minimize operational disruptions
  - Upgrades to the grid to meet future electrical demand and mitigate overall impacts
- Proposal includes backstop date to require emission reductions before 2037 8-hour ozone NAAQS attainment date

Key Comments Received

Key Issue #5

- Cost-Effectiveness assessment doesn't include fuel-switching costs between electricity and natural gas

- Staff has re-evaluated cost-effectiveness for each equipment category to include fuel-switching costs
  - Fuel switching costs include the difference in utility rates from operating a Unit on electricity versus natural gas
  - Details included in subsequent slides

Key Comments Received

Key Issue #6

- Cost-Effectiveness methodology used does not consider regional costs

- South Coast AQMD Governing Board adopted the 2022 AQMP in December of 2022
- 2022 Air Quality Management Plan (AQMP) established a Public Health Benefit Screening Cost-Effectiveness Threshold with a value of $325,000 per ton of NOx emissions reduced
- Established threshold is used as a guide when conducting the cost-effectiveness assessment for BARCT emission limits
  - Cost-effectiveness assessment includes direct and indirect costs facilities will incur to comply with the regulation but will not include regional cost

Equipment Age

Equipment Age

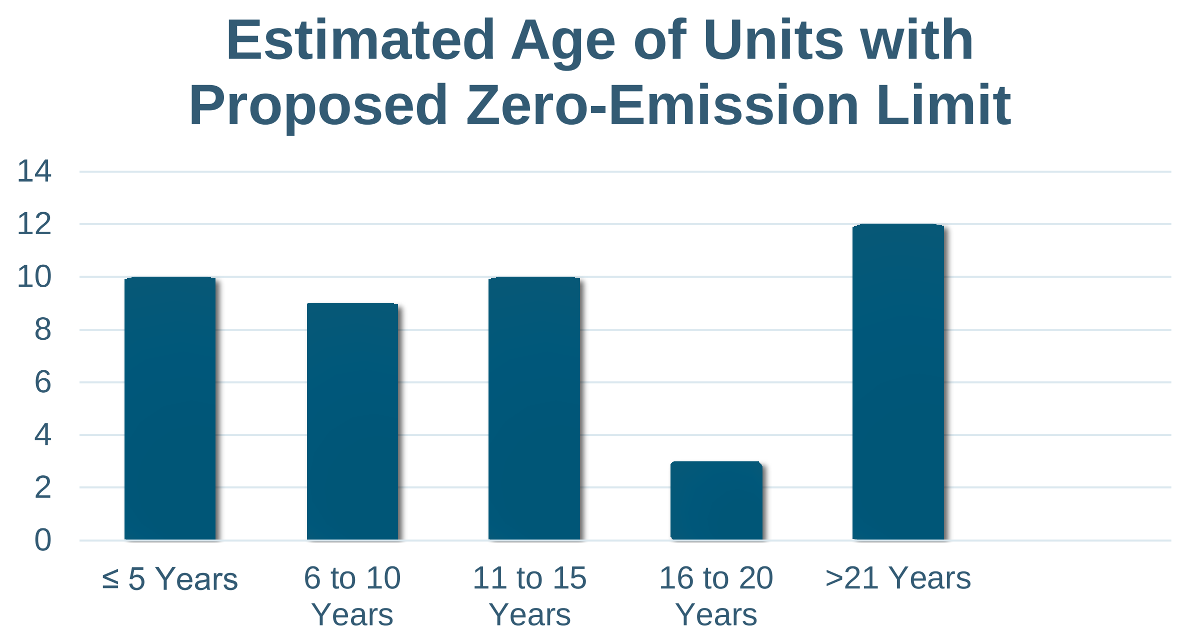
Stakeholders recommended staff research equipment age to estimate impacts of proposed compliance schedule

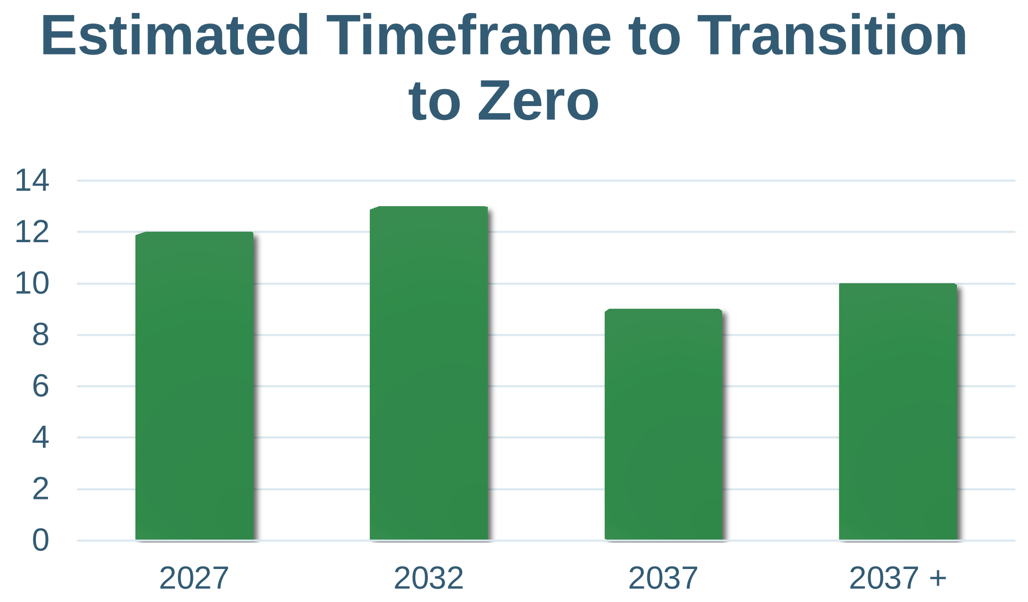
Equipment age will dictate how soon emission reductions will be achieved as emission limits are triggered by end of equipment useful life

Equipment age for units with zero-emission limits is also an indication of the scale of the potential impacts on the electrical grid

Equipment Age

- Staff evaluated facility permit issuance dates to estimate equipment age
  - Some facilities have multiple permits for same equipment due to modifications
    - Oldest permit issuance date for equipment assumed to be the age of the equipment
    - Not all units have permit issuance for burner retrofit
- Staff was not able to identify ages for some units based on permit issue dates due to identical equipment replacement
- Age of some equipment had been provided by facilities as response to survey staff sent at beginning of rule development process
- Equipment age evaluation did not include:
  - Electric units such as existing bakery ovens and smokehouses
  - Units indirectly heated by another source such as steam or thermal oil heaters
    - Heat source subject to other Rules (e.g., Rule 1147 or 1146)



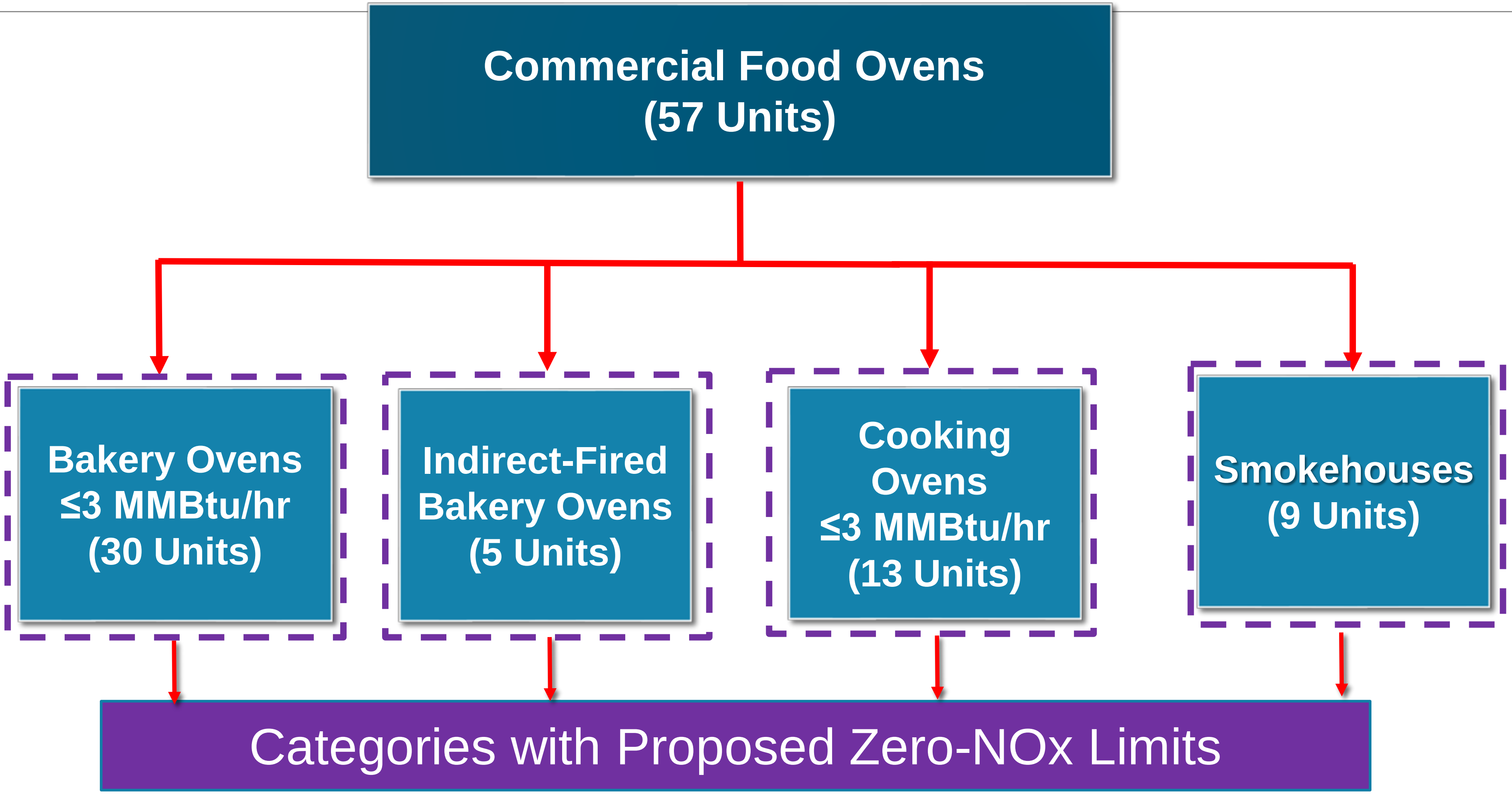


Note: staff did not identify the unit age for each unit projected to transition to zero-emission limits

Estimated Equipment Age and Zero-Emission Transition

- There are a number units that are less than 5 years old
  - Likely installed to comply with last rule amendment
- Transition to zero will be gradual over 10+ years minimizing impact to the grid

Commercial Food Oven Categories with Zero-Emission



Estimated Additional Power Demand from Zero-Emission Commercial Food Ovens

Equipment Categories	Proposed Zero-Emission Standard			
	Number of Units	Estimated Maximum Instantaneous Power Demand	Assuming 20% Efficiency Gain	Estimated Maximum Annual Power Demand***
Bakery Ovens	30	17.8 MW*	14.2 MW	62.0 GWh**
Indirect-Fired Ovens	5	--	--	--
Cooking Ovens	13	3.2 MW*	2.6 MW	11.3 GWh**
Smokehouse Ovens	9	0.5 MW*	0.4 MW	1.7 GWh**
Totals	57	21.5 MW*	17.2 MW	75 GWh**

*Converted from existing equipment's <u>maximum</u> rated heat input capacity in MMBtu/hr

**Maximum GWh is all Units were run at full capacity simultaneously for 50% of the calendar year

***Assuming 50% percent operation

Updated

Potential Increased Energy Demand from PAR 1153.1 at Full Phase II Compliance

	Power Usage Gigawatt hours (GWh)
California	277,764*
South Coast AQMD	124,994^
PAR 1153.1	75
Percent Impact on South Coast AQMD	0.06%

* https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2021-total-system-electric-generation

^ Estimated at 45% of California usage based on population

ˑ Maximum GWh is all Units were run at full capacity simultaneously for 50% of the calendar year

Electricity Rates and Natural Gas Rates

Fuel Switching Costs

- Stakeholder letter stated staff's cost-effectiveness calculation did not consider direct cost of energy usage for transition to zero-emission
- Staff did not include the cost of fuel switching in the original cost-effectiveness analysis
  - Staff acknowledges electricity cost is typically more than natural gas cost
  - Costs will impact facilities that transition to zero-emission technology
- Staff reassessed cost-effectiveness with annual fuel switching cost
  - Included options to offset those electricity cost with photovoltaic systems and fuel cells

Utility Rates

- Electricity and gas rates are calculated using a different metric, must convert to a common denominator for direct comparison
- Electricity is billed in kilowatt-hours (kWh)
  - Amount of energy an equipment using 1000 watts would need per hour
  - Natural gas is billed in therms
  - Calculated based on the amount of heat the gas can provide per cubic foot
- Rates are also separated into residential, commercial, or industrial
- Most facilities subject to PAR 1153.1 are classified as industrial as defined by the U.S. Energy Information Administration (EIA)*
- Prices for both utilities can vary based upon location and sourcing factors which cause price fluctuations
- Overall, natural gas is less expensive than electricity

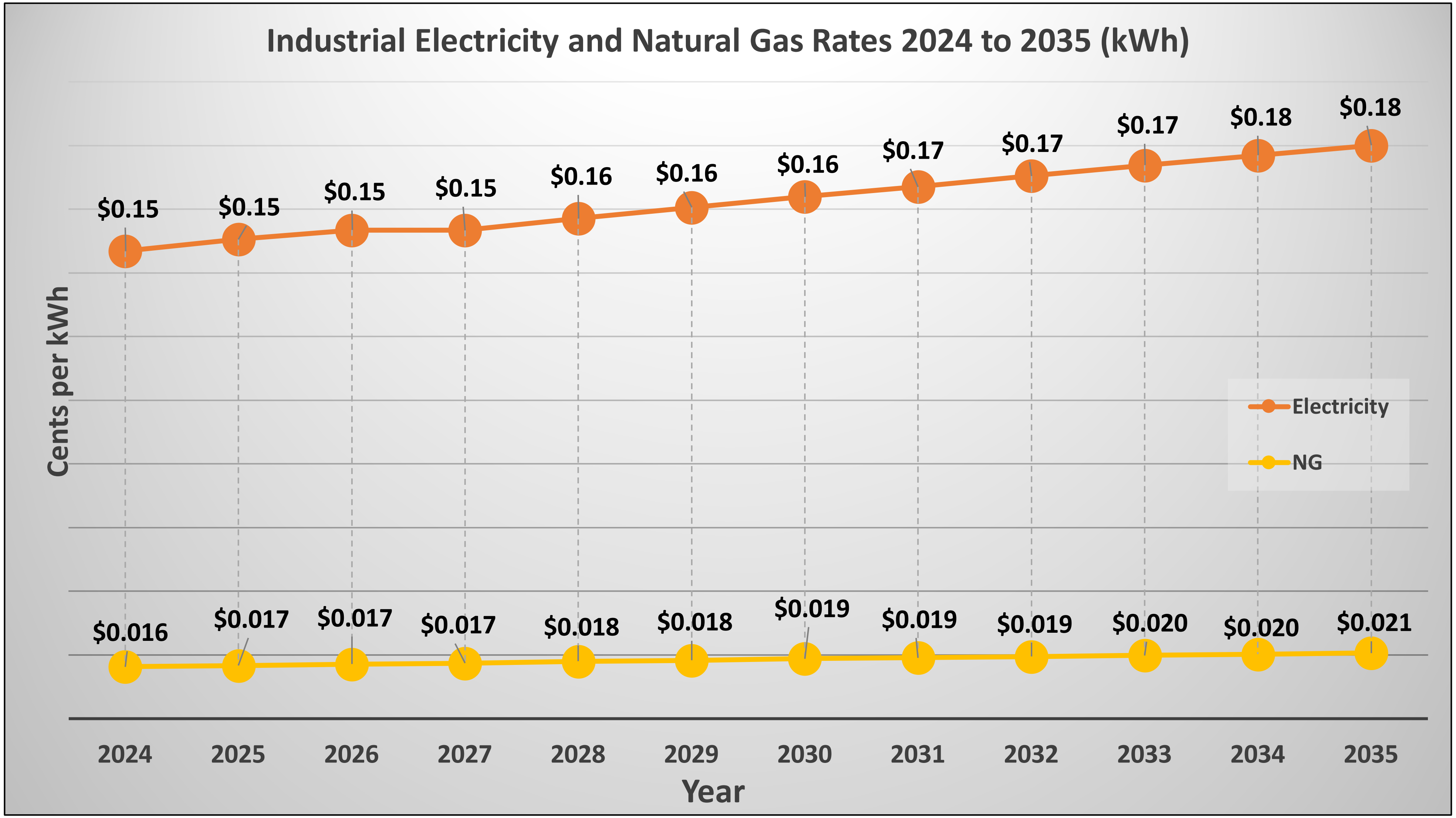
*https://www.eia.gov/dnav/pet/TblDefs/pet_pri_prop_tbldef2.asp

Utility Rates - continued

- Generally, electricity rates do not fluctuate as much as natural gas rates
- Based on most recent EIA data:
  - Industrial electricity rate is 0.1482 cents per kWh*
- Based SoCalGas rates for past 24 months (May 2021 to May 2023):
  - Average natural gas rate is 0.62 cents per therm**
  - Natural gas rates significantly peaked in January 2023 to $3.44 per therm due to sourcing factors
  - Using past 24-month average will be more representative
- Staff also considered energy trends to help estimate future energy costs
  - California Energy Commission (CEC) forecasts future energy costs

*https://www.eia.gov/electricity/sales_revenue_price/pdf/table4.pdf
**https://www.socalgas.com/for-your-business/energy-market-services/gas-prices

CEC Rate Forecast Comparison



- Forecasted rates are expected to rise over the next ten years
- Electricity rates are higher than natural gas rates
- Average CEC forecasted rates between 2024 to 2035 for:
  - 0.168 cents/kWh
  - 0.54 cents/ therm (0.018 kWh)

[California Energy Demand Update, 2022-2035]

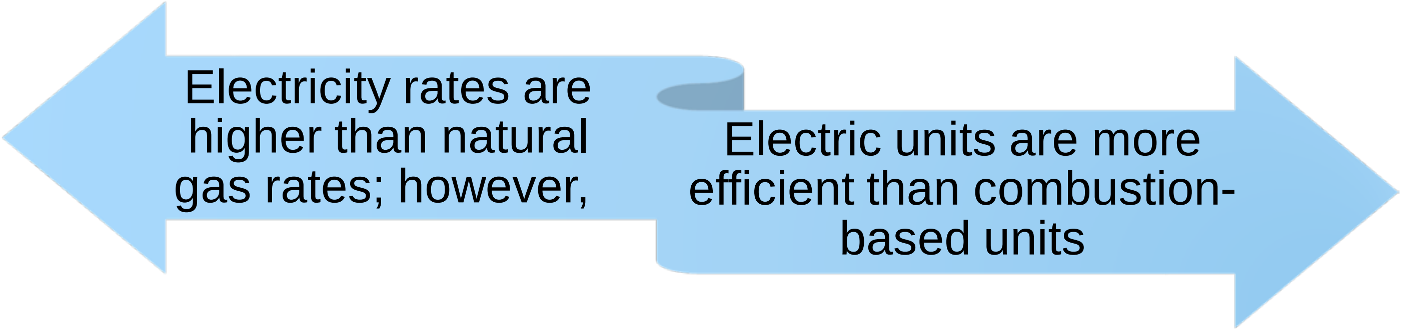
Energy Rates Summary

- Based on compiled data, overall energy rates are expected to rise in the future
- Electricity rates are typically higher but not subject to large fluctuations when compared to natural gas rates
- Recent rates for natural gas have exceeded market forecasts
  - Average rate over past 24 months reflects costs facilities have had to bear
- CEC forecasted rates are based on anticipated normal market conditions
- In order to capture overall rate picture and fuel switching costs, staff used average of:
  - **Recent rates:** EIA industrial rates for electricity (0.1482 cents/kWh) and recent 24-month rates for natural gas from SoCal Gas (0.62 cents/therm)
  - **Future forecasted rates (2024 to 2035):** Average CEC forecasted rate for electricity (0.1682 cents/KWh) and average natural gas rate (0.54 cents/therm)

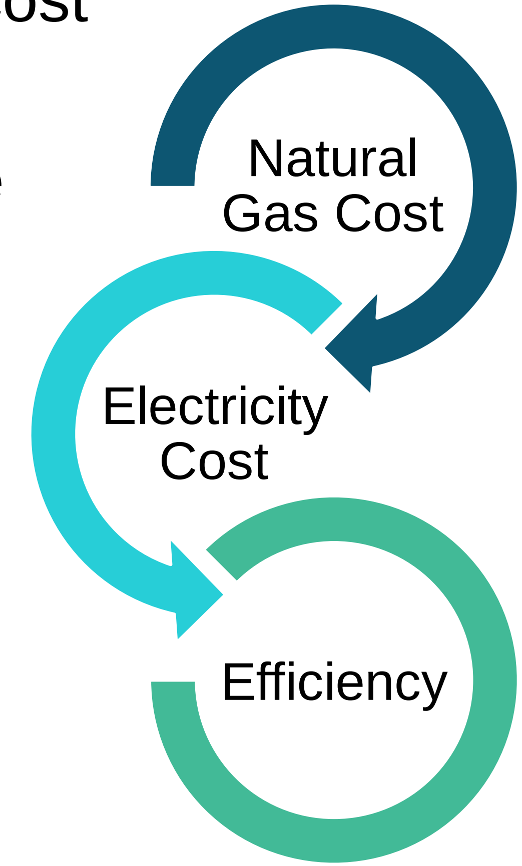
Efficiency of Electricity and Combustion-based Units

Efficiency Impacts on Fuel Switching Costs

- The efficiency of the unit has an impact on the fuel switching cost
- Main driver is the delta in the utility costs:
  - Cost to operate the units on natural gas versus cost to operate the unit on electricity



  - Efficiency gains mitigate some of the increased cost of electricity
  - In the case of air and water heating, heat pump units are so efficient it can result in utility cost savings



Natural Gas Combustion Efficiency

- Energy efficiency equals the energy input required to bake or cook a product compared to total energy used by oven
  - Each product requires certain amount of heat to bake and remove moisture
- Difference in energy is due to heat loss from the system
- Heat loss occurs from:
  - Transfer to burner flue gas
  - Products of combustion must be removed from baking chamber (largest source of heat loss)
  - Insulation and outer covers of oven
  - Heat loss from sides and open ends of oven

Electric Oven Efficiency

- Electric ovens are more efficient using converted heat energy
  - ~20% less electricity required for equivalent heat energy
  - Less wasted heat energy – no products of combustion needs to be removed
  - Efficiency gained when using electric oven (~20%)
  - Initial start-up requires large instantaneous electricity demand but decreases as oven reaches operating temperature
- Staff reduced electricity costs by 20% to account for efficiency gains

Fuel Switching Summary

More costly to operate commercial food ovens using electricity than natural gas

Efficiency gains for electric units help reduce fuel switching costs

Large units that require the most energy to operates have higher fuel switching costs

Revised Cost Effectiveness Assessment

Cost-Effectiveness: Discounted Cash Flow

- Stakeholders requested staff provide additional clarity on the cost-effectiveness
- Cost-effectiveness is a measure that compares the costs of pollution reduction to amount of pollutant reduced
  - Measured in cost per ton of pollutant reduced
  - South Coast AQMD uses the *Discounted Cash Flow Method* to calculate cost-effectiveness
- Cost-effectiveness is calculated as follows:

$$CE\left(\$/_{tons\ NOx\ reduced}\right) = \frac{Total\ Equipment\ Cost + (Present\ Worth\ Value\ x\ Annual\ Operating\ costs)}{Lifetime\ Emission\ Reductions\ (useful\ Life\ of\ equipment)}$$

- **Present Worth Value Formula** = (1-1/(1+r)^n)/r)
  - r = interest rate
  - n = number of cycles (useful life)

- **Present Worth Value** = 15.62 (25 years) and 8.11 (10 years)
  - r = 4%
  - n = 25 years for equipment, 10 year for burner

Cost-Effectiveness Assumptions

- **Staff included the following cost:**
  - **Total Equipment cost**
    - For Phase I, total cost of new low NOx burner
    - For Phase II, cost difference of new gas-fired unit and new zero-emission unit
  - **Installation**
    - Assumed 25% of capital cost
  - **Facility electrical upgrade**
    - Assumed 10% of capital cost
  - **Utility-side upgrade**
    - Utility-side upgrades will be case-by-case depending on grid location and available capacity at that location
    - Smaller units less likely to require utility-side upgrades but included costs to address concern
      - ≤ 3 MMBtu/hr: $2,000
      - > 3 MMBtu/hr: $50,000
- **Annual Operating Cost (recurring costs)**
  - For Phase I, no additional recurring costs – new burners do not require additional maintenance compared to existing burners
  - For Phase II, fuel switching cost (difference in electricity cost with efficiency gain and natural gas costs)

Cost Effectiveness Estimates

- Revised Phase I cost-effectiveness higher than previous assessment due to the shorter useful life (10 years versus 25 years)
  - Cost-effectiveness ranged from $25,000 – $126,000

Phase II cost-effectiveness includes

- Direct facility costs: Difference between equipment cost (electric minus gas-fired)
- Facility-side and utility-side electrical upgrade
- Annual O&M costs: including fuel switching costs

Phase II cost-effectiveness did not include

- *Regional* grid upgrades that may be needed to support regional electrifications
  - Rule only represents a small impact to the grid
  - 57 units will be required to transition to zero-emission technology
  - Impacts will be phased in over next 25 years (end of useful life)

Bakery Ovens

Phase I Cost-Effectiveness	
25-year Useful Life	10-year Useful Life
$37,000	$93,000
Potential NOx Reductions	
0.008 tpd	

Phase II Cost-Effectiveness (Avg.)	
≤3 MMBtu/hr	>3 MMBtu/hr
$292,000	$414,000
Potential NOx Reductions	
0.05 tpd	--

- Baseline emissions for category 0.11 tpd
- Phase I limit revised cost-effectiveness is below $325,000 per ton of NOx
  - Does not include units performing at or below 30 ppmv
- Phase II revised cost-effectiveness including fuel switching impacted previous proposal:
  - Indirect-fired bakery ovens already achieving zero
  - ≤3 MMBtu/hr ovens are cost-effective to transition to zero
  - >3 MMBtu/hr not cost-effective due to increased fuel switching costs
    - Fuel switching cost ranged from $400,000 to $1.6 MM annually
- Two Griddle Ovens not cost-effective for zero-emission, including as separate oven category
  - $513,000 per ton of NOx
  - Baseline emissions 0.002 tpd

Revised Staff Recommendation:

- Zero-emission upon unit replacement for bakery ovens ≤3 MMBtu/hr and indirect-fired bakery ovens
- 30 ppmv NOx limit for bakery ovens >3 MMBtu/hr and griddle ovens

Tortilla Ovens

Phase I Cost-Effectiveness	
25-year Useful Life	10-year Useful Life
$11,000	$29,000
Potential NOx Reductions	
0.015 tpd	

Phase II Cost-Effectiveness (Avg.)
$417,000
Potential NOx Reductions
--

- Baseline emissions for category 0.04 tpd
- Phase I limit revised cost-effectiveness is below $325,000 per ton of NOx
  - Does not include units performing at or below 30 ppmv
  - Units firing IR burners only no additional cost
    - Units currently achieving
- Phase II limit not cost-effectiveness due to increased fuel switching costs and small emission reduction potential
  - Fuel switching cost ranged from $100,000 to $1.1 MM annually

Revised Staff Recommendation:

- 30 ppmv for tortilla ovens (ribbon/IR burners)
- 15 ppmv for tortilla ovens (IR burners only)

Cooking Ovens

Phase I Cost-Effectiveness	
25-year Useful Life	10-year Useful Life
Currently Achieving	Currently Achieving
Potential NOx Reductions	
0 tpd	

Phase II Cost-Effectiveness (Avg.)	
≤3 MMBtu/hr	>3 MMBtu/hr
$191,000	$580,000
Potential NOx Reductions	
0.02 tpd	--

- Baseline emissions for category 0.04 tpd
- Phase I limit revised cost-effectiveness is below $325,000 per ton of NOx
  - Most units performing at or below 30 ppmv
  - Some units are exempt – less than 325,000 Btu/hr
- Phase II revised cost-effectiveness including fuel switching impacted previous proposal:
  - ≤3 MMBtu/hr is cost-effective to transition to zero
  - >3 MMBtu/hr not cost-effective due to increased fuel switching costs
    - Fuel switching cost ranged from $38,000 to $1.2 MM annually

Revised Staff Recommendation:

- Zero-emission upon unit replacement for cooking ovens ≤3 MMBtu/hr
- 30 ppmv NOx limit for cooking ovens >3 MMBtu/hr

Drying Ovens

Phase I Cost-Effectiveness	
25-year Useful Life	10-year Useful Life
$9,000	$22,000
Potential NOx Reductions	
0.0006 tpd	

Phase II Cost-Effectiveness (Avg.)
$359,000
Potential NOx Reductions
--

- Baseline emissions for category 0.009 tpd
- Phase I limit revised cost-effectiveness is below $325,000 per ton of NOx
  - All but two units are performing at 30 ppmv
- Phase II not cost-effectiveness due to increased fuel switching costs and small emission reduction potential
  - Fuel switching cost ranged from $51,000 to $600,000 annually

Revised Staff Recommendation:

- 30 ppmv NOx limit for drying ovens

Smokehouses

Phase I Cost-Effectiveness	
25-year Useful Life	10-year Useful Life
$17,000	$43,000
Potential NOx Reductions	
0.001 tpd	

Phase II Cost-Effectiveness (Avg.)
$63,000
Potential NOx Reductions
0.007 tpd

- Baseline emissions for category 0.007 tpd
- Phase I limit revised cost-effectiveness is below $325,000 per ton of NOx
- Phase II is cost-effectiveness including fuel switching costs
- Three units are currently electric units
- Six units currently exceed 30 ppmv
- Fuel switching cost ranged from $95,000 to $101,000

Revised Staff Recommendation:

- Zero-emission NOx limit upon unit replacement for smokehouses

Dryers

Phase I Cost-Effectiveness	
25-year Useful Life	10-year Useful Life
$8,000	$18,000
Potential NOx Reductions	
0.0006 tpd	

- Baseline emissions for category 0.009 tpd
- Includes spray dryers and rotary type dryers
- Phase I limit revised cost-effectiveness is below $325,000 per ton of NOx
  - All but two units are performing at or below 30 ppmv
- Staff did not identify any commercially available zero-emission spray dryers and dryers at this time

Revised Staff Recommendation:

- 30 ppmv NOx limit for dryers and spray dryers

Roasters

Phase I Cost-Effectiveness	
25-year Useful Life	10-year Useful Life
$34,000	$85,000
Potential NOx Reductions	
0.0002 tpd	

Phase II Cost-Effectiveness (Avg.)
Roasters: Coffee and Nut
$842,000
Potential NOx Reductions
--

- Baseline emissions for category 0.02 tpd
- Phase I limit revised cost-effectiveness is below $325,000 per ton of NOx
  - Most units are exempt - less than 325,000 Btu/hr and/or emit less than one pound per day
  - Four units not performing at 30 ppmv
- Phase II not cost-effectiveness including fuel switching costs
  - Fuel switching cost ranged from $4,000 to $773,000 annually

Revised Staff Recommendation:

- 30 ppmv NOx limit for roasters

Revised Cost-Effectiveness Summary

	Number of Units	Number of Units to Zero	Baseline NOx (tpd)	Phase I Limits (ppmv)	Phase I C/E (10-year life)	Phase II Limits (ppmv)	C/E to Zero (Average)	NOx Red (tpd)
Bakery Ovens								
≤3 MMBtu/hr	30	30	0.05	30	$93,000	0	$290,000	0.06
>3 MMBtu/hr	32	0	0.06	30		-	$400,000	0.0043
Griddle Ovens	2	0	0.002	30		-	$498,000	0.001
Indirect-Fired Ovens	5	5	0	30	Currently Achieving	0	--	--
Tortilla Oven								
IR Burners Only	13	0	0.03	15	$29,000	--	$400,000	--
Ribbon and IR Burners	15	0	0.04	30		-	--	0.015
Cooking Ovens								
≤3 MMBtu/hr	13	13	0.04	30	Currently Achieving	0	$190,000	0.019
>3 MMBtu/hr	10	0		30		--	$560,000	--
Drying Ovens	8	0	0.009	30	$22,000	--	$350,000	0.001
Smokehouses	9	9	0.006		$43,000	0	$60,000	0.006
Dryers	25	0	0.009	30	$18,000	--	-	0.006
Roasters	56	0	0.017	30	$85,000	--	$820,000	0.0002
Total	218	57	0.26					0.11

Offsetting Utility Electricity Costs

Offsetting Utility Electricity Cost for Zero-Emission Technology

- Several options evaluated to offset utility electricity cost for categories where zero-emissions are not cost-effective
- Staff received vendor quotes to estimate cost
- Options evaluated were not cost-effective due to:
  - Additional capital cost and installation costs
  - Increased annual operational costs from additional fuel usage such as hydrogen

Photovoltaic Systems

- Commercial solar panels typically used to offset baseline energy demand and is an option to offset some utility electricity costs
- One example is a large commercial baking facility installing solar microgrid as part of long-term sustainability goals
  - Reduce facility baseline energy usage by 25%
- Commercial solar panels can provide up to 540 watts of power
- Typical commercial installations will have 70 to 100 panels
- Average solar efficiency is between 10 to 20% accounting for inefficiencies from AC to DC
  - Solar panel location and sun intensity will impact electricity production
- Requires space to install solar array
  - Typically installed on roofs and parking lots

Photovoltaic Assumptions

- Capitol and installation costs (~$196,000)
- Amount of power that can typically be generated (~107 MWh)
- Amount of cost offset (~5 – 15 %)

Fuel Cells

- Fuels can either use hydrogen, natural gas, or propane as a source to generate electricity
- Option to offset utility electricity costs
- Consist of a large metallic box with a series of “cells” arranged in a stack
  - Stack consist of cathode and anode like a battery
- A typical fuel cell works by passing the fuel through the anode and oxygen through the cathode separated by catalyst in the middle
- Advantages of fuel cells include:
  - High efficiency (over 80% energy efficient)
  - Low emissions (non-combustion process)
  - Reliable power
  - Can be used in wide range of applications (stationary, emergency backup power, and transportation)

<u>Fuel Cell Cost Assumptions</u>

- Vendor quotes
- Calculated as $/kW
- Cost based on energy demand of electric unit
- Installation assumed to 4% of capital based on vendor quote
- O&M cost includes:
  - Fuel cost such as hydrogen or natural gas
  - Annual service contract

Cost-Effectiveness to Offset Utility Electricity Cost

	Phase II Cost-Effectiveness	Solar Array	Hydrogen Fuel Cells	Natural Gas Fuel Cells
Bakery Ovens				
≤3 MMBtu/hr				
>3 MMBtu/hr	$414,000	$472,000	$2.4 MM	$879,000
Griddle Ovens				
Tortilla Oven	$417,000	$370,000	$3 MM	$756,000
Cooking Ovens				
≤3 MMBtu/hr				
>3 MMBtu/hr	$580,000	$489,000	$1.7 MM	$1.4 MM
Drying Ovens	$359,000	$372,000	$1.6 MM	$753,000
Smokehouses				
Dryers				
Roasters	$842,000	$562,000	$3.6 MM	$1.7 MM

Summary of Updated Proposed Limits

	Phase I	Phase II	Number of Units	Reductions at Full Implementation (tpd)
Bakery Ovens				
≤3 MMBtu/hr	30 ppmv	0 ppmv	30	0.06
>3 MMBtu/hr	30 ppmv	--	32	0.0043
Indirect-Fired Ovens	30 ppmv	0 ppmv	5	**
Griddle Ovens	30 ppmv	--	2	0.001
Tortilla Oven (IR burners)	15 ppmv	--	13	**
Tortilla Oven (Ribbon/IR)	30 ppmv	--	15	0.015
Cooking Ovens				
≤3 MMBtu/hr	30 ppmv	0 ppmv	13	0.019
>3 MMBtu/hr	30 ppmv	--	10	**
Drying Ovens	30 ppmv	--	8	0.001
Smokehouses	30 ppmv	0 ppmv	9	0.006
Dryers	30 ppmv	--	25	0.006
Roasters	30 ppmv	--	56	0.0002
Total			218	0.11

**currently achieving, no additional reductions

Summary of Fourth Version of Preliminary Draft Rule Language

Released June 2, 2023

Purpose (a)

- Reverted to **“gaseous and liquid fuel fired”**
- PAR 1153.1 will only apply to Units combusting fuel, electric units with no permit will not be applicable to the rule

Previous

(a) Purpose~~ and Applicability~~

The purpose of this rule is to reduce ~~nitrogen oxide~~Oxides of Nitrogen (NOx) and Carbon Monoxide (CO) emissions from ~~gaseous and liquid fuel-fired combustion equipment~~ Commercial Food Ovens as defined in this rule.

Current

(a) Purpose~~ and Applicability~~

The purpose of this rule is to reduce ~~nitrogen oxide~~Oxides of Nitrogen (NOx) and Carbon Monoxide (CO) emissions from gaseous and liquid fuel-fired ~~combustion equipment~~ Commercial Food Ovens as defined in this rule.

Applicability (b)

- Streamlined applicability to reference defined term “Units” instead of listing all categories
- Reverted to language **“that require South Coast AQMD permits”**
- PAR 1153.1 will only apply to permitted Units; zero-emissions units will not require a Rule 1153.1 NOx limit on their permit and potentially not a permit

Previous

(b) Applicability

This rule applies to owners or operators of Commercial Food Ovens including, but not limited to, ~~with in-use ovens~~ Bakery Ovens, Tortilla Ovens, Dryers, Smokehouses, ~~Food Ovens,~~and ~~dry roasters~~ Roasters ~~with nitrogen oxide (NOx) emissions from fuel combustion~~ that ~~require South Coast Air Quality Management District (SCAQMD) permits and~~ are used to prepare food or products for making beverages for human consumption. ~~As of November 7, 2014, the equipment subject to this rule is no longer subject to SCAQMD Rule 1147 except for the compliance determination option set forth in Rule 1147 (d)(7).~~

Current

(b) Applicability

This rule applies to owners or operators of ~~Commercial Food Ovens including, but not limited to, with in-use ovens Bakery Ovens, Dryers, Roasters, Smokehouses, Tortilla Ovens, Food Ovens,and dry roasters with nitrogen oxide (NOx) emissions from fuel combustion~~ Units that require South Coast Air Quality Management District (SCAQMD) permits and are used to prepare food or products for making beverages for human consumption. ~~As of November 7, 2014, the equipment subject to this rule is no longer subject to SCAQMD Rule 1147 except for the compliance determination option set forth in Rule 1147 (d)(7).~~

Revised Definition (c)

- Removed the 325,000 Btu/hour reference in definition

Previous

(5) COMMERCIAL FOOD OVEN means a cooking device with a Rated Heat Input Capacity greater than 325,000 British Thermal Unit(s) (Btu) per hour used to heat, cook, dry, or prepare food or products for making beverages for human consumption that is used as part of a business.

Current

(5) COMMERCIAL FOOD OVEN means a cooking device ~~with a Rated Heat Input Capacity greater than 325,000 British Thermal Unit(s) (Btu) per hour~~ used to heat, cook, dry, or prepare food or products for making beverages for human consumption that is used as part of a business.

New Definitions (c) *(cont.)*

- Included definitions for new oven categories
- Spray dryers and dryers are included in single category, so combined definition

New definitions

(6) COOKING OVEN means a Commercial Food Oven used to cook food products including, but is not limited to, meat, fish, poultry, or vegetables. Cooking ovens do not include Bakery Ovens, Tortilla Ovens, Drying Ovens, and Smokehouses.

(9) DRYER means a Commercial Food Oven, using either a direct or indirect heat source, to dry food products using a rotating drum. Dryers include Spray Dryers which are Commercial Food Oven where liquids or slurry are atomized and dried into powder form by spraying the feed into a heated chamber.

(~~6~~13) GASEOUS FUEL means natural gas; compressed natural gas (CNG); liquefied petroleum gases (LPG), including but not limited to propane and butane; synthetic natural gas (SNG); or other fuel that is a gas at ambient temperature and atmospheric pressure.

(14) GRIDDLE OVEN means a Commercial Food Oven that uses a moving griddle, which is a flat or grooved metal plate, that is heated between 550°F to 900°F to produce baked products such as English muffins.

Hybrid Ovens (c) & (d)

- Removed hybrid oven definition and requirement from rule
- Not cost-effective with fuel switching cost
  - Cost-effectiveness ~$ 2.2 MM even assuming 50% of the operation would be electric

Definition (c)

~~(16) HYBRID OVEN means any Unit that is equipped with both a Combustion System and an Electric Heating Element.~~

Requirements (d)

~~(3) Hybrid Oven Requirements~~

~~An owner or operator of a Hybrid Oven shall only operate the Combustion System to preheat the Hybrid Oven to normal operating temperature and shall operate the Hybrid Oven solely using the Electric Heating Element during routine operations to produce the food product.~~

Requirements (d)

- Removed references and dates to comply with Phase III emission limits

Subparagraph (d)(1)(A)

Previous

(A) For a Unit that was installed and in operation before [*Date of Rule Adoption*]:

(i) Phase I Emission Limits specified in Table 1 according to the compliance schedule in paragraph (e)(1);

(ii) Phase II Emission Limits specified in Table 1, if applicable, on and after January 1, 2027, and before January 1, 2030, for Units that have a Phase III Emission Limit, according to the compliance schedule in paragraph (e)(2); and

(iii) Phase III Emission Limits specified in Table 1, if applicable, on and after January 1, 2030, according to the compliance schedule in paragraph (e)(3).

Current

(A) For a Unit that was installed and in operation before [*Date of Rule Adoption*]:

(i) Phase I Emission Limits specified in Table 1 according to the compliance schedule in paragraph (e)(1); and

(ii) Phase II Emission Limits specified in Table 1, if applicable, on and after January 1, 2027~~, and before January 1, 2030, for Units that have a Phase III Emission Limit, according to the compliance schedule in paragraph (e)(2); and~~

~~(iii) Phase III Emission Limits specified in Table 1, if applicable, on and after January 1, 2030, according to the compliance schedule in paragraph (e)(3).~~

Requirements (d)

- Revised dates to meet Phase I and II limits for units installed after date of rule adoption
  - Limits are triggered by permit submittal date instead of unit installation

Subparagraph (d)(1)(B)

Previous

(B) For a Unit that is installed on or after [*Date of Rule Adoption*]:

(i) Phase I Emission Limits for a Unit that is installed before January 1, 2027; and

(ii) Phase II Emission Limits, if applicable, for a Unit that is installed on and after January 1, 2027, and before January 1, 2030, for Units that have a Phase III Emission Limit; and

(iii) Phase III Emission Limits, if applicable, for a Unit that is installed on and after January 1, 2030.

Current

(B) For an owner or operator that submits a permit application to install a Unit that is installed on or after [*Date of Rule Adoption*]:

(i) Phase I Emission Limits ~~for a Unit that is installed before January 1, 2027~~ for a permit application that was submitted before January 1, 2024, for a Unit with a Phase II Emission Limit; and

(ii) Phase II Emission Limits, if applicable, ~~for a Unit that is installed on and after January 1, 2027 and before January 1, 2030, for Units that have a Phase III Emission Limit; and~~ for a permit application that was submitted on and after January 1, 2024.

~~(iii) Phase III Emission Limits, if applicable, for a Unit that is installed on and after January 1, 2030.~~

Requirements (d) *(cont.)*

- Updated Table 1 to reflect revised proposal
  - Removed Phase III
  - Added Griddle Oven
  - Separated Cooking Ovens into size categories
  - Emission limits reflect Units where Phase II is not applicable

PAR 1153.1 Table 1 Emission Limits

Equipment Categories		Phase I		Phase II	
		NOx	CO	NOx	CO
Direct Fired Bakery Ovens	≤3 MMBtu/hr	30	800	0	0
	>3 MMBtu/hr	30	800	N/A	N/A
Indirect-Fired Bakery Ovens		30	800	0	0
Griddle Oven		30	800	N/A	N/A
Tortilla Ovens	Heated solely by IR Burners	15	800	N/A	N/A
	All Other Tortilla Ovens	30	800	N/A	N/A
Cooking Ovens	≤3 MMBtu/hr	30	800	0	0
	>3 MMBtu/hr	30	800	N/A	N/A
Drying Ovens		30	800	N/A	N/A
Smokehouses		30	800	0	0
Dryers		30	800	N/A	N/A
Roasters		30	800	N/A	N/A

Requirements (d) *(cont.)*

- Based on stakeholder feedback, including Technology Assessment in rule language instead of resolution

Paragraph (d)(10)

(10) The Executive Officer shall conduct a technology assessment and report to the Stationary Source Committee by January 1, 2026, if the Phase II Emission Limits established in Table 1 are technically feasible and represent Best Available Retrofit Control Technology (BARCT) as defined in the California Health and Safety Code Section 40406 and assess if zero-emission limits for other Commercial Food Oven categories can be established as BARCT. If the technology assessment specified in this paragraph demonstrates Phase II Emission Limits will not be technically feasible by the applicable compliance date and/or demonstrates additional Commercial Food Oven categories are technically feasible to transition to zero-emission technologies, the Executive Officer shall initiate rule development for a revised compliance schedule.

Compliance Schedule (e)

- Section (e)(1) establishes compliance schedule to meet Phase I Emission Limits
  - Useful life for burners reduced to 10 years
  - Separated compliance schedule based on burner age of 7 years (allows three years from permit submittal to operation)

Paragraph (e)(1)

(A) For a burner that is 7 years or older, as determined pursuant to paragraph (f)(1), as of [*Date of Rule Adoption*]:

(i) Submit a permit application on or before July 1, 2024, for each Unit to limit the NOx and CO emissions to a level not to exceed the Phase I Emission Limits; and~~:~~

(ii) Not operate a Unit that exceeds the applicable Phase I Emission Limit later than 12 months after the date a permit is issued, or the extension date as approved in writing pursuant to Rule 205 – Expiration of Permits to Construct (Rule 205).

~~(i) On or before July 1, 2024, for any Unit where the burner(s) is replaced or where the burner age is 227 years or older, as determined pursuant to paragraph (f)(1), as of [*Date of Rule Adoption*]; or~~

(B) For a burner that is less than 7 years old, as determined pursuant to paragraph (f)(1), as of [*Date of Rule Adoption*]:

(~~i~~i) Submit a permit application ~~O~~on or before the July 1st that follows the calendar year when a Unit's burner reaches ~~22~~7 years, as determined pursuant to paragraph (f)(1).

(~~B~~ii) Not operate a Unit that exceeds the applicable Phase I Emission Limit later than one of the following dates, whichever is sooner:

(~~i~~A) 12 months after the date a permit is issued, or the extension date as approved in writing pursuant to Rule 205 – Expiration of Permits to Construct (Rule 205); or

(~~ii~~B) The burner age is ~~25~~10 years as determined pursuant to paragraph (f)(1).

Phase I Emission Limit Example One

Rule Adoption

Burner is 10 years old

July 1, 2024

Submit application for burner replacement pursuant to subparagraph (e)(1)(A)(i)

Burner is 10.5 years old

July 1, 2024

January 1, 2026

-Permit to construct issued

-Burner is 12 years old

-Comply with Phase I Emission Limit pursuant to subparagraph (e)(1)(B)

-Burner is 13 years old

January 1, 2027

Phase I Emission Limit Example Two

Rule Adoption

Burner is 5 years old

July 1, 2025

Burner is 7 years old

Submit Application pursuant to (e)(1)(A)(ii)

July 1, 2025

January 1, 2027

-Permit to construct issued

-Burner is 9 years old

Comply with Phase I Emission Limit pursuant to subparagraph (e)(1)(B)

-Burner is 10 years old

January 1, 2028

Phase I Emission Limit Example Three

Rule Adoption

Burner is 1 years old

January 1, 2029

Burner is 7 years old

July 1, 2029

Submit Application pursuant to (e)(1)(A)(ii)

January 1, 2031

-Permit to construct issued

-Burner is 8.5 years old

January 1, 2032

Comply with Phase I Emission Limit pursuant to subparagraph (e)(1)(B)

-Burner is 9.5 years old

Compliance Schedule (e)

- Paragraph (e)(2) updated to reflect Alternative Compliance Schedule Plan
- Updated age for permit submittal from 25 years to 22 years to build in time for permit submittal process
- Added a backstop date of January 2036 with permit requirement in 2033 to build in time for permit submittal

Paragraph (e)(2)

(2) Phase II Emission Limits

Unless an owner or operator has an approved Alternative Compliance Schedule Plan, on and after January 1, 2027, an owner or operator of a Unit required to meet the Phase II Emission Limits shall:

(A) For existing Units that will be retrofit to meet Phase II Emission Limits ~~and for Units with a Hybrid Oven emission limit pursuant to (d)(3),~~ submit a permit application for each Unit to limit the NOx and CO emissions to a level not to exceed the Phase II Emission Limits:

(i) On or before July 1, 2027, if:

(A) The Unit is ~~25~~22 years or older by January 1, 2027, as determined pursuant to paragraph (f)(2); and

(B) The burner is ~~10~~7 years or older by January 1, 2027, as determined pursuant to paragraph (f)(1).~~; and~~

(ii) On or before the July 1st after the end of the calendar year when:

(A) The Unit reaches ~~25~~22 years of age, as determined pursuant to paragraph (f)(2); and

(B) The burner reaches ~~10~~7 years of age, as determined pursuant to paragraph (f)(1)~~; and~~ or the end of the calendar year is deemed as December 31, 2032, whichever is earlier.

(B) For Units subject to a subparagraph (e)(2)(A) permit submittal requirement, not operate a Unit that exceeds the applicable Phase II Emission Limit later than one of the following dates, whichever is sooner:

(i) 12 months after the date a permit is issued, or the extension date as approved in writing pursuant to Rule 205 – Expiration of Permits to Construct (Rule 205); or

(ii) On or before January 1, 2036, the date the ~~burner~~Unit age is 25 years or older, as determined pursuant to paragraph (f)(2), and the burner age is 10 years or older, as determined pursuant to paragraph (f)(1); or

(iii) After January 1, 2036, the date the Unit age is 25 years or older, as determined pursuant to paragraph (f)(2).

Phase II Emission Limit Example One

Rule Adoption – January 1, 2024

-Unit is 25 years old

-Burner is 10 years old

-Currently complying with Phase I Emission Limit

January 1, 2027

Future effective date for Phase II Emission Limit

July 1, 2027

Submit permit application for compliance with Phase II Emission Limit pursuant to (e)(2)(A)(i) or decommission unit pursuant to (e)(2)(C)

January 1, 2029

Permit to construct issued for units complying with (e)(2)(A) by modification or retrofit

January 1, 2030

Comply with Phase II Emission Limit pursuant to (e)(2)(B) for modification or retrofit

Phase II Emission Limit Example Two

Rule Adoption

- -Unit is 25 years old
- -Burner is 7 years old
- -Not complying with Phase I Emission Limit

July 1, 2024

Submit permit application for compliance with Phase I Emission Limit pursuant to (e)(1)(A)(ii)

January 1, 2026

Permit to construct issued for burners

January 1, 2027

Future effective date for Phase II Emission Limit

July 1, 2027

New Burner is installed

July 1, 2028

- -Burner is one year old
- -Unit is 30 years old

July 1, 2036

- -Burner is 8 years old
- -Unit is 38 years old
- -Decommission unit pursuant to (e)(2)(C)

Subdivision (l) Exemptions

- Reverted to original language that clarified units subject to Rule 222 registration are exempt
- Removed provision that exempted existing zero emission Units from rule provisions
  - Zero-emission Units will not be subject to rule

Subdivision (l)

Subparagraph (l)(1)(B) – Reverted language

(B) Units subject to registration pursuant to SCAQMD Rule 222;

Subparagraph (l)(2)(B)

~~(2) The provisions of paragraphs (e)(2), (e)(3) and subdivision (j) shall not apply to an owner or operator of a Unit with NOx and CO emission not exceeding the applicable Phase II or Phase III Emission Limit upon [*Date of Rule Adoption*].~~

Next Steps

Continue Stakeholder Meetings

Stationary Source Committee – June 16, 2023

Release Draft Rule Language and Draft Staff Report – July 5, 2023

Public Hearing August 4, 2023

Receiving PAR 1153.1 Updates

- To receive email updates, sign up at South Coast AQMD sign up page *http://www.aqmd.gov/sign-up*
- Enter email address and name
- Subscribe by scrolling down to “Rule Updates” and check the box for Rule 1153.1 and click on the subscribe button at bottom of page
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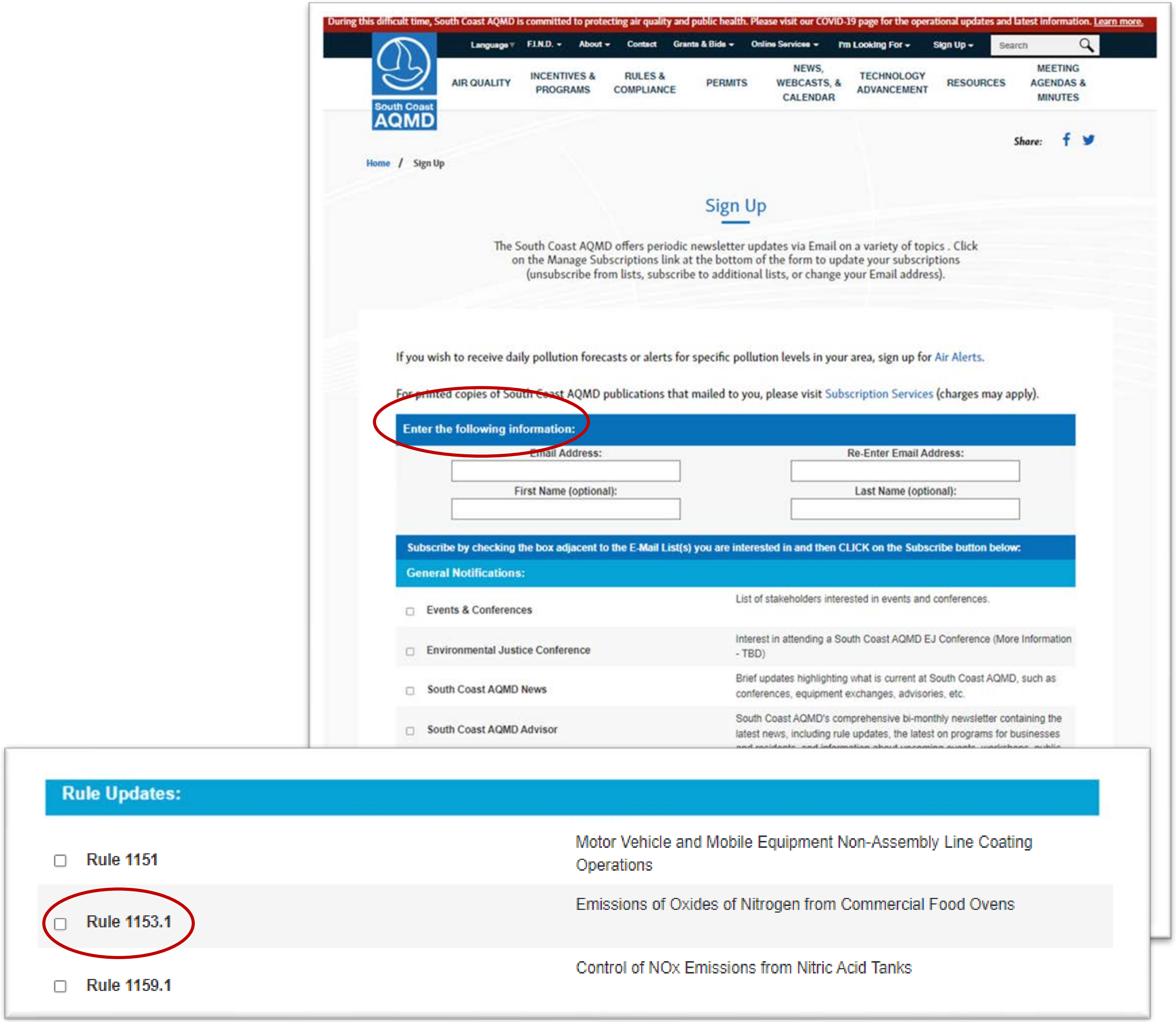

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