NOx, NOx – Who’s There?

Presentation to OTC Air Directors
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Nancy Seidman
John Shenot
Topics

• Why Appliance Standards, Why NOx?
• Current Regulations
• Development of a Model Rule
• Issues to Consider
• Q and A, Discussion
• Next Steps
1 Why regulate NOx emissions from water heaters?
Impacts of Nitrogen Oxide Pollution

- Ground-level Ozone
- Acid Rain and Transported Pollution
- Visibility Impairment
- Water Body Eutrophication
- Fine Particle Health Impacts

Source: US EPA
Exhibit 1

US gas appliance pollution rivals or exceeds gas power plant pollution

Source: RMI
Potential Avoided Emissions

Exhibit 3

Annual avoided emissions from all new electric appliance requirement by 2030

Annual Avoided NOx Emissions
(hundred thousand tons)

Annual Avoided PM$_{2.5}$ Emissions
(thousand tons)

Source: RMI
2 Current Regulations
Existing NOx Emissions Limits for Natural-Gas Fired Water Heaters

- Texas
- Utah
- Bay Area AQMD (CA)
- San Joaquin Valley APCD (CA)
- South Coast AQMD (CA)
- Ventura County APCD (CA)
Standards in Some Jurisdictions Vary by Type of Water Heater and/or Size

- Storage
- Tankless/instantaneous
- Mobile home
- Pool/spa heater

- ≤ 75,000 BTU/hr
- 75,000 – 400,000 BTU/hr
- 400,000 – 2,000,000 BTU/hr
NOx Emissions Limits Comparison

- 10-40 ng/J heat output
- 15-55 ppmv at 3% O₂

NOTE: Many gas-fired water heaters available nationwide meet 40 ng/J or 55 ppmv

- Approximately equivalent to 0.023-0.093 lb/MMBTU
BAAQMD *Proposed* Zero Emissions Rule

Gas-Fired Water Heater Phaseout:

- **1/1/2027** => 0 ng/J for water heaters ≤ 75,000 BTU/hr
- **1/1/2031** => 0 ng/J for water heaters 75,001 - 2,000,000 BTU/hr
3 Development of a Model Rule
How would the model rule work?

• Prohibit sale or installation of water heaters that don’t meet an emissions limit
• Establish the emissions limit using a formula or a schedule of limits for future years
• Calculate the emissions limit based on amount of electricity needed to run a benchmark electric water heater and expected power plant emissions from generating that amount of electricity
Electric Sector Emissions

Water Heater Emissions Limit Will Decline as Grid Gets Cleaner
4 Issues to Consider
Model Rule Elements and Development

- Format – rule and background document
- Sections – definitions, standards, timing, enforcement, other?
- External review – agencies and stakeholders
- Timing – draft 1st Quarter 2022
Equitable Solutions Required
Share Your Feedback!

- Is this idea of interest? What questions or concerns does it spark?
- Could a model rule be a useful starting point for your agency and lessen the burden of developing rules from scratch?
- What role could this committee play in review of any (or all) aspects of the model rule?
- How can we collaborate with sister agencies’ energy efficiency efforts?
Resources

- Utah standards – Section R307-230-5 Standards
- Texas standards
- Bay Area AQMD existing standards
- BAAQMD draft of new zero emission proposal
- BAAQMD public workshop document for zero emission proposal
- NYU Policy Integrity Center legal paper
- RMI paper on air quality and buildings
- RMI fact sheet on appliances and air quality
Discussion/
What’s next?
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