• California Health & Safety Code requires consideration of cost-effectiveness of control measures in the AQMP
  • Must evaluate cost-effectiveness of each control measure to the greatest extent possible
  • Control measures must be ranked by cost-effectiveness
• Cost-Effectiveness is the total cost (capital and annual operating costs) to achieve a standard over the emission reductions for the life of the equipment *compared to a business-as-usual scenario*
High and Low Cost-Effectiveness Scenarios

High Cost-Effectiveness
- Low Cost with Very Low Reductions
  - $50,000
  - 0.5 ton
- High Cost with Moderate Reductions
  - $1,000,000
  - 10 tons

Cost-Effectiveness
- $100,000/ton

High cost-effectiveness does not necessarily mean high cost

Low Cost-Effectiveness
- Low Cost with Moderate Reductions
  - $50,000
  - 10 tons
- High Cost with Very High Reductions
  - $1,000,000
  - 200 tons

Cost-Effectiveness
- $5,000/ton

Low cost-effectiveness does not necessarily mean low cost
Requirements for Cost Effectiveness Under the Health and Safety Code

2022 AQMP

- Requires cost-effectiveness analysis of each control measure to the greatest extent possible
- Requires that control measures are ranked by cost-effectiveness

Rulemaking

- Must account for economic impacts when establishing BARCT standards
- Requires cost-effectiveness analysis when establishing BARCT

AQMP Control Measure

Initial cost-effectiveness estimate

Proposed Rule

Comprehensive cost-effectiveness analysis
Cost-Effectiveness Analysis in Rulemaking

Comprehensive cost-effectiveness analysis conducted when establishing BARCT standards during rulemaking

Capital Costs (One-Time Costs)
- Equipment costs
- Installation costs
- Permitting fees

Annual Costs (Recurring Costs)
- Labor and maintenance
- Fuel, Electricity, etc.
- Source Testing
- Monitoring, Reporting, and Recordkeeping
- Catalyst, filters or other materials for pollution controls

Bottom-Up Approach
- Facility-specific information where available
- Use actual cost data where available from affected facilities and equipment vendors

Other Considerations
- Stranded assets
- Cost savings
- Equipment life

Comprehensive cost-effectiveness analysis conducted when establishing BARCT standards during rulemaking
Cost-Effectiveness Threshold for Rulemaking

- Comprehensive cost-effectiveness analysis will continue to be conducted during rulemaking.
- To guide rulemaking efforts, previous AQMPs included cost-effectiveness thresholds to assess the cost-effectiveness of a proposed rule.
- If the average cost-effectiveness exceeded the threshold, previous AQMPs suggested that the rulemaking include:
  - A more rigorous cost-effectiveness analysis
  - Alternatives to lower the cost
  - Additional public meetings
- Draft 2022 AQMP proposed a cost-effectiveness threshold of $59,000/ton of NOx reduced, which is based on past AQMP costs adjusted to inflation.
- Some Board members expressed concern that $59,000/ton may be too low:
  - Particularly when considering the cost-effectiveness of measures in the 2022 AQMP
Control Measure Cost-Effectiveness and NOx Emission Reductions

*Using Levelized Cash Flow Method (modified for costs incurred through 2037)
**Clean Miles Standard, [0.1 tpd] (not shown) has a cost savings

Control Measures Ranked by Cost-Effectiveness

- Primarily Federally/Internationally Regulated Sources in CARB SIP
- Primarily CARB Regulated Sources
- South Coast Regulated Sources

Control Measure, 2037 NOx reductions (ton/day)
[size of circle indicates amount of NOx reduction]
Alternative Cost-Effectiveness Threshold

- Staff is proposing an alternative cost-effectiveness threshold based on public health benefits instead of cost of pollution controls.
- Public health benefits threshold monetizes public health impacts associated with specific air contaminants such as:
  - Premature deaths, lost school and work days, hospital admissions, respiratory and cardiovascular symptoms.
- Public health benefits threshold:
  - Accounts for health impacts and overall benefit to society from improved air quality.
  - Used by U.S. EPA and CARB for rulemaking.
• Revised Draft 2022 AQMP proposed an alternative public health benefit screening threshold of:
  • $325,000/ton of NOx reduced
  • Based on U.S. EPA studies and 2016 AQMP

• Threshold would be used as a guide for evaluating the:
  • Cost-effectiveness and incremental cost-effectiveness for stationary and mobile source rulemakings
  • If cost-effectiveness or incremental cost-effectiveness of the proposed rule exceeds the threshold, public meeting would be required
  • Public meeting would identify alternatives to reduce the cost-effectiveness

• Public hearing for proposed rules includes cost-effectiveness analysis and will be presented to the Board for their consideration