Air Quality Permitting and Planning for Data Centers

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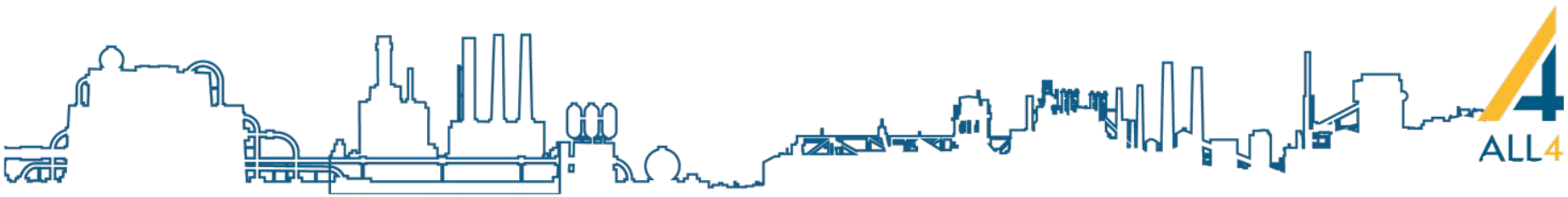


Logistics

Thank you for attending!

Questions?

- Please enter questions in the text box
- We will address questions at the end

Will I get a copy of the slides?

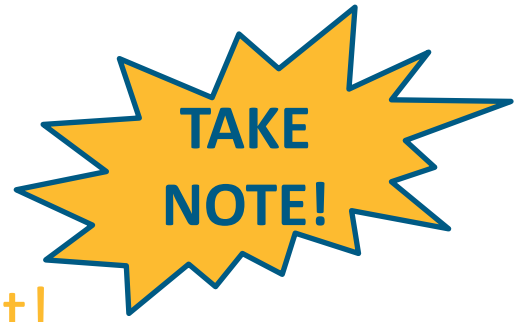
- Yes, we will post webinar recording and slide deck on our website
- Link will be emailed to participants

Webinar Series

Second session of data center webinar series!

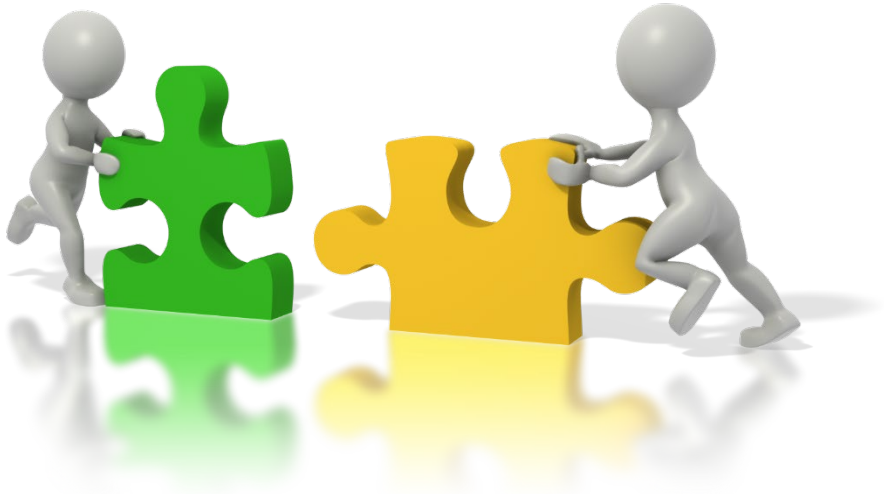
Example topics of remaining sessions:

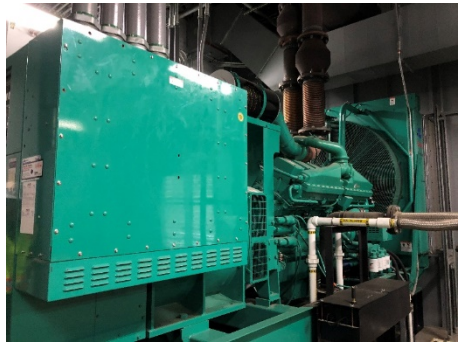
- Storage Tanks and Hazardous Materials
- Regulated Waste Management (e.g., Hazardous, Universal)
- On-Going Environmental Compliance
- Refrigerants



Check out our first session if you missed it!
https://www.all4inc.com/insights-webinars/environmental-roadmap-to-building-and-operating-a-data-center/

It's All Connected!





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Not on the Menu

- Non-Generator Equipment
- Discussion of Federal Engine Regulations
- Permit Applicability/Exemption Criteria
- Air Permit Application Specifics
- Review of Every State

Today's Agenda

- When and Where to Start: 5 Step Strategy
- Finding the "Right" Engine
- State Examples
- Permit Timing and Issuance
- Permit In-Hand…Now What?

When and Where to Start: 5 Step Strategy

When to Start

- Now! The Sooner The Better!
  - Evaluate air permitting requirements during site design and before equipment selection
    - Late planning can lead to delays and loss of flexibility
  - Air permit application will be submitted later

Where to Start: 5 Step Strategy

- #1 Campus
  - How many generators and what size?
  - Did you consider next 5 years and full build-out?
  - Did you review all properties that are contiguous and adjacent for common ownership?
- #2 Generator
  - What fuel type works best?
  - How will it be used?
  - What Federal and state engine requirements apply for fuel, size, age, location, and use?

5 Step Strategy

- #3 Operational Flexibility
  - How much will engines run (e.g., maintenance, emergencies)?
  - What restrictions are acceptable (e.g., only one building tested at a time)?
- #4 Project Regulatory Review
  - What emissions data will agency accept?
  - What emissions thresholds for Title V, public comment, dispersion modeling, etc. may be applicable?
  - If modeling is required, for which pollutants?
  - Are there over-burned communities near site for environmental justice considerations?

5 Step Strategy

- #5 Emissions Scenarios and Thresholds
  - Request and review emissions data from manufacturer
  - Quantify project emissions and compare to thresholds
  - Evaluate multiple scenarios (e.g., different engine manufacturers, fuel limits, air pollution controls)
  - If air dispersion modeling is required, it fits here too

This is a key opportunity for strategy!

Finding the "Right" Engine

- Engine Emissions Requirements
- Definition of Emergency Nuances

Engine Emissions Requirements

- **Individual engine:** consider fuel type, size, age, location, and use
  - Regulatory definition focuses on how engine is used, not configuration (prime vs. standby)
  - U.S. EPA requires:
    - New diesel emergency engines - Tier 2 or Tier 3 certified
    - New diesel non-emergency engines - Tier 4 Final certified
      - U.S. EPA does not accept Tier 2 or Tier 3 engine retrofitted with controls (i.e., made Tier 4 Final "compliant")
      - Industry concern with Tier 4 Final
    - New spark ignition engines - meet 40 CFR Part 60, Subpart JJJJ

Engine Emissions Requirements

- Continued…
  - States may be more stringent with their local Best Available Control Technology (BACT) programs
    - Use emissions data from manufacturer to evaluate
    - May need to purchase certain type of engine
    - May need to install air pollution control equipment (e.g., selective catalytic reduction, diesel particulate filter)
    - May need to de-rate to lower emissions rate or program new fuel curve to optimize for pollutant of concern

Engine Emissions Requirements

- **Campus:** consider existing units, operational flexibility, modeling results, and regulatory thresholds
  - Is there existing equipment to include?
  - Find acceptable balance:
    - Operational flexibility
    - Air pollution control equipment
    - A passing modeling scenario
    - Title V major source or other program avoidance (e.g., BACT, public comment period)

- **Side-note on campus planning: consider potential for re-entrainment of exhaust**

Nuances of Emergency Definition

- Emergency Demand Response (EDR) is generally a non-emergency function
  - May require emissions controls or Tier 4 Final engine (except model years ~2006-2010)
  - States can vary in how they view it
- Limited storm avoidance can be allowed by U.S. EPA but not all states allow it
- No delegated authority of Federal engine regulations to some states can lead to confusion

State Examples

- Virginia
- California
- Oregon
- Maricopa County

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Virginia

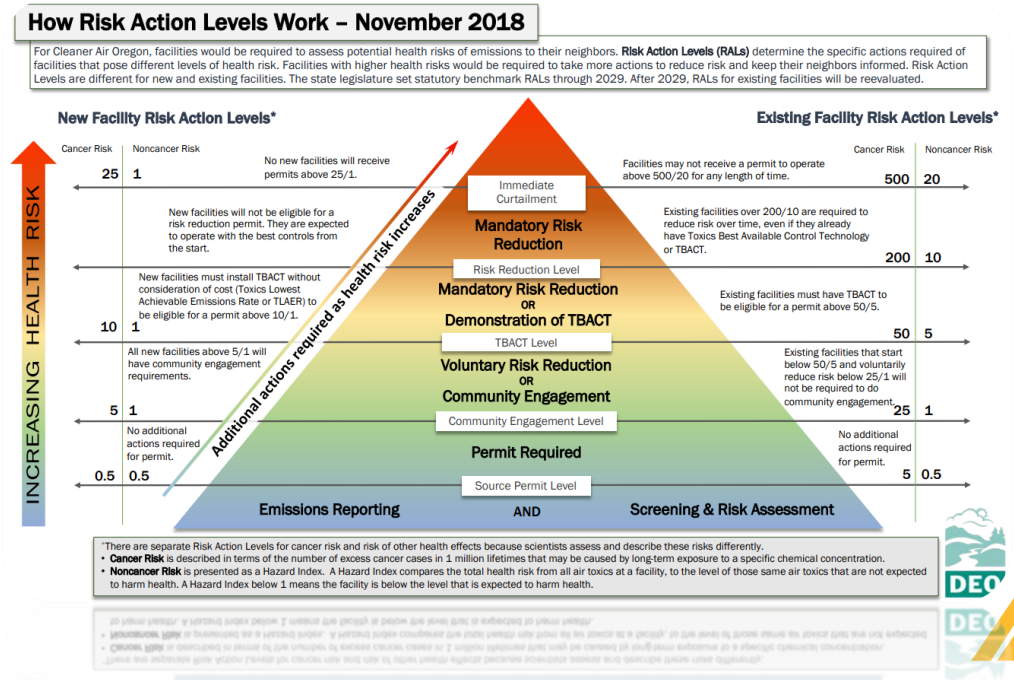
- Fuel-based limits are common
- BACT
  - Emergency: 6.0 g/bhp-hr NO_X
    - Based upon not-to-exceed emissions data
    - Demonstrate compliance typically through stack testing
  - Non-emergency: 0.6 g/bhp-hr NO_X
    - Tier 4 Final or SCR addition required
- Local Governing Body Form needed for brand new sites

California

- Health Risk Assessments may require modeling and public comment
- Emissions credits may be required
- Regulations vary by regional Air Quality Management District (AQMD)
  - Examples:
    - South Coast AQMD and Sacramento Metropolitan AQMD limit total operation to 200 hours/year/engine
    - **NEW:** Bay Area and Sacramento BACT for emergency engines 1,000 bhp or larger requires meeting Tier 4 emissions limits
      - Several others still require only U.S. EPA Tier certified

Oregon

- Multiple air permit options (e.g., Simple, Standard)
- Separate application required for Cleaner Air Oregon
  - Health-based air toxics regulatory program
  - Modeling, public comment, emissions controls, and stack testing may be needed

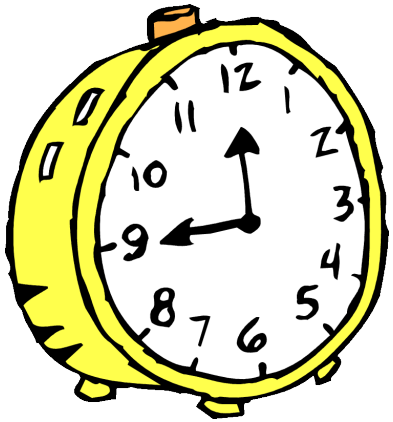


Maricopa County (AZ)

- Maricopa County Air Quality Division (AQD) is its own regulatory agency within Arizona
- Typically permit based upon hours of operation and engine load; fuel-based limits are case-by-case
- Emissions thresholds for BACT applicability, NO_X modeling, and public comment
- **NEW:** BACT for emergency engines 1,000 bhp or larger requires meeting Tier 4 emissions limits for those pollutants where BACT applicability is triggered

Permit Timing and Issuance

- Communication and Completeness
- Permit Fees



Communication and Completeness

- Maintain on-going dialogue about project
  - Meet with stakeholders regularly
  - Discuss questions with regulatory agency early
  - Ask about historical public engagement to plan for public input
- Advise construction team of permitting timeline and potential challenges
  - Have permit prior to installing engines (engines on pads)
  - Application preparation effort can vary based upon requirements (e.g., 2 weeks to 6+ months)
  - Permit turnaround can vary widely by state (e.g., 3 months, 4-6 months, 1 year+)

Communication and Completeness

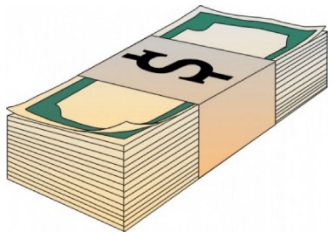
- Submit comprehensive and accurate air permit application (forms, calculations, specifications, etc.)
- Fee-based programs to expedite

Bonus! Review draft air permit for overly-burdensome conditions to help out Operations

Permit Fees

- Vary significantly by location and project!
- Sometimes pay upfront; sometimes invoiced
- Sometimes per application; sometimes per piece of equipment
- Sometimes a flat fee; sometimes calculated based upon hours spent by regulatory agency writing permit

There may be on-going fees as well based upon permit type, equipment type, or emissions!



Permit In-Hand…Now What?

- Develop compliance materials such as template logs, tracking tools, calendar reminders, and checklists
- Submit required notifications
- Prepare and conduct air compliance training
- Coordinate stack testing as needed
- **Future efforts: submit required reports and conduct air compliance audits**

Stay Tuned…

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Questions or Comments?

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