Community Risk Reduction Strategy: A Hayward Case Study

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Presentation Overview

- Project Components
- Technical Modeling Approach and Results
- Risk Exposure Reduction Measures
- Benefits
- Challenges and Lessons



Project Components

Community Risk Reduction Strategy





Project Components: Objectives

- To quantify cancer risk and respirable particulate matter concentrations from various sources within the study area (Hayward)
- identify areas of highest health risk and fine particulate matter concentrations (model)
- reduce health risk exposure associated with toxic air contaminants (TACs) and fine particulate matter (PM_{2.5}) concentrations in both existing and new development (BMP/GPU Policies).
- Approve and adopt CRRS for City of Hayward



Modeling Approach: Modeling Concept

- Identify all sources and geographic location to model
 - Source Inventory
 - Geo-location (address, trace shapefiles)
- Determine model inputs for each source type
 - E.g., Emission rates, elevation
- Receptor Grid- X/Y coordinate that represent study area (9,371 points)
- Generate final concentrations for cancer risk and PM2.5
- Visualize



Modeling Approach: Sources/Emission Factors

Rail Roads

- Diesel PM, exhaust emissions
- daily train volume, speed
- Vehicle Traffic (truck and automobiles)
 - Diesel PM, exhaust emissions, PM2.5, brake/tire wear
 - ADT, vehicle type, speed for each road segment
- Stationary Sources (gas stations, generators, refineries, power plants)
- A total of 314 stationary sources, major roads and truck routes, and all rail roads







AERMOD Output Example

Sub-grid Several models Combine models

ASCENT





High Risk Areas





Disadvantaged Communities





CRRS/GP Policy

NR-2.16 Sensitive Uses

The City shall minimize exposure of new sensitive receptors to toxic air contaminants (TACs) and fine particulate matter (PM_{2.5}), to the extent possible, and consider distance, orientation, and wind direction when siting sensitive land uses in proximity to TAC- and PM_{2.5}-emitting sources in order to minimize exposure to health risk.



CRRS/GP Policy

NR-2.17 Source Reduction Measures

 The City shall coordinate with and support the efforts of the BAAQMD, CARB, EPA, and other agencies as appropriate to implement source reduction measures and best management practices that address both existing and new sources of toxic air contaminants (TACs) and fine particulate matter (PM2.5).



CRRS/GP Policy

NR-2.18 Exposure Reduction Measures for New Receptors

 The City shall require development projects to implement all applicable best management practices that will reduce exposure of new sensitive receptors (e.g., residences, hospitals, schools, daycare facilities, elderly housing and convalescent facilities) to toxic air contaminants (TACs) and fine particulate matter (PM_{2.5}).



CRRS/GP Risk Reduction Measures

- Plant fine-needle conifer trees along freeways, major roadways and rail corridors. (applies to existing and new receptors)
- All new loading docks used by more than 1 truck per week shall be equipped with electrical hook-ups for electrical hook-ups to reduce idling from transport refrigeration units (source redux)
- All new or replacement backup diesel generators shall meet EPA Tier 4 emission standards. (source redux)
- Avoid siting sensitive receptors, including residences, schools, or hospitals, in areas with "high" levels of cancer risk or in areas "high" annual average PM_{2.5} concentrations. (new receptor)



CRRS/GP Risk Reduction Measures

 Residential buildings or buildings where people work, including schools, developed in areas identified as having "high" levels of cancer risk or "high" annual average PM2.5 concentrations shall be designed with air filtration systems that have a minimum efficiency reporting value (MERV) of 13 and mechanical airflow and ventilation systems that are equipped to handle necessary air flow needs, as determined by an specialist certified by the American Society of Heating, Refrigeration, and Air-Conditioning. (applies to existing and new receptors)



CRRS Challenges

- Data Acquisition
 - Lots of data needed for various sources
 - Air district, city, traffic consultants
 - Data quality and general assumptions where data was missing

Modeling Capabilities

- Source parameters for stationary sources
- Emission fates for roads
- Cancer risk calculations
- Does not account for building height
- Controversial Results



CRRS Benefits

- BAAQMD Threshold Compliance
- At the planning level, to determine highest health risk areas to help avoid siting sensitive receptors there and provide measures to reduce risk when siting in these areas
- Reduce health risk exposure
- Communities that plan on future infill development- reduce risks (BMPs)
- GP Streamline
 - Relavent policies/BMPs included in one place
 - GPU EIR shows evaluates impacts and shows LTS



Questions?

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