

Mexico City Vehicular Emission Control Strategy

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Problem Definition

- **Need to reduce levels of CO emissions in Mexico City**
- **Vehicles contribute 97% of total emissions**
- **Older vehicles represent 26% of the total fleet, and contribute to 40% of all vehicle emissions**
- **Government has decided to target vehicles older than 1980 for removal**

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Goals

- **Design a dynamic strategy to get the maximum value from the emission reduction effort**
- **Flexible plan**
 - Size of processing plant for vehicles removed
 - Enforcement levels
 - Information dissemination
- **Desirable outcomes**
 - High emission reductions
 - Minimal costs

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Recommended Strategy

Phase 1 → **Medium level of effort**

Compliance

High → **Phase 2**
Medium level of effort

Medium → **Medium level of effort**

Low → **High level of effort**

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Options Under Consideration

- **Three levels of effort**
 - **High**
 - \$ 30 million capital cost
 - High scale economies
 - Strict enforcement mechanisms
 - Emphasis on information and promotion
 - **Medium**
 - \$ 20 million capital cost
 - Flexible
 - Moderate enforcement and promotion efforts
 - **Low**
 - \$ 10 million capital cost
 - Highly flexible
 - Minimal enforcement and promotion

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Sources of Uncertainty

- **Public response to vehicle removal program**
 - Effort of the project
 - Willingness to participate
- **Compliance levels**
 - High (100%)
 - Medium (50%)
 - Low (20%)

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Dynamic Strategic Plan

- **First phase: Option between three strategies / levels of effort**
- **Uncertainty: Three possible compliance levels**
- **Second phase: Flexible response**
 - expand
 - continue
 - quit

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Value of Strategy

- **Expected Emissions reductions: 159,703 tons**
 - 38% reduction in emissions from older vehicle fleet
 - 15% reduction in all mobile emissions
- **Total costs: \$273.25 M**
- **Reductions/Cost Ratio 585 tons/\$M**

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Comparison to inflexible strategies

STRATEGY	Expected Value (tons per \$M)
Without Flexibility	
High Effort	510
Medium Effort	521
Low Effort	498
<i>Recommended Strategy</i>	<i>585</i>

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- ## Analytical Methodology
- **The benefits of emissions reductions are not given a monetary value**

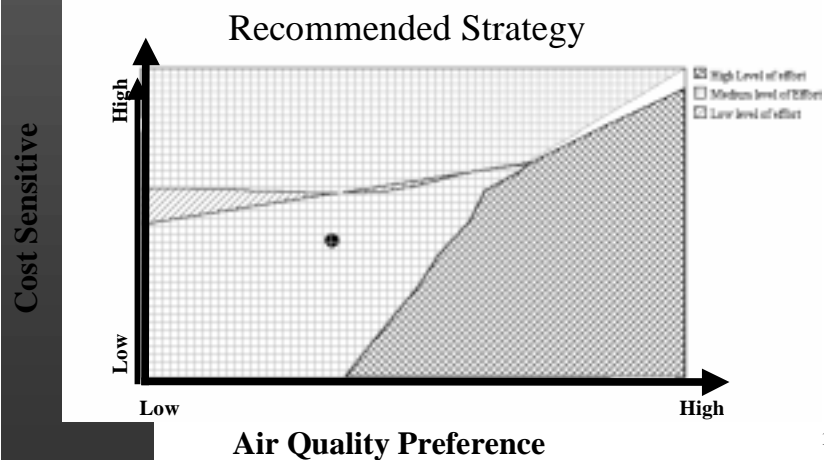
 - **Two analytical approaches**
 - 1. Value-neutral - ratio of benefit / cost
 - 2. Value-sensitive - ranking of preferences
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Incorporating Stakeholder Input

- Decision maker evaluates tradeoff between *air quality* and *cost*
- Impact on Recommendation
 - Cost sensitive - Medium Effort
 - Air quality sensitive - High Effort

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Value of cost versus emissions



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Conclusions

- For the first stage of the program, we recommend a medium level of effort
- Second stage choices are dictated by first stage outcomes
- Strategy robust over a range of preferences

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Thank you *Gracias*