**D**eveloping **I**ntegrated **E**mission **S**trategies for **E**xisting **L**and transport
(**DIESEL**) **Program**

# Analytical Framework for Analysis of Diesel Management Options

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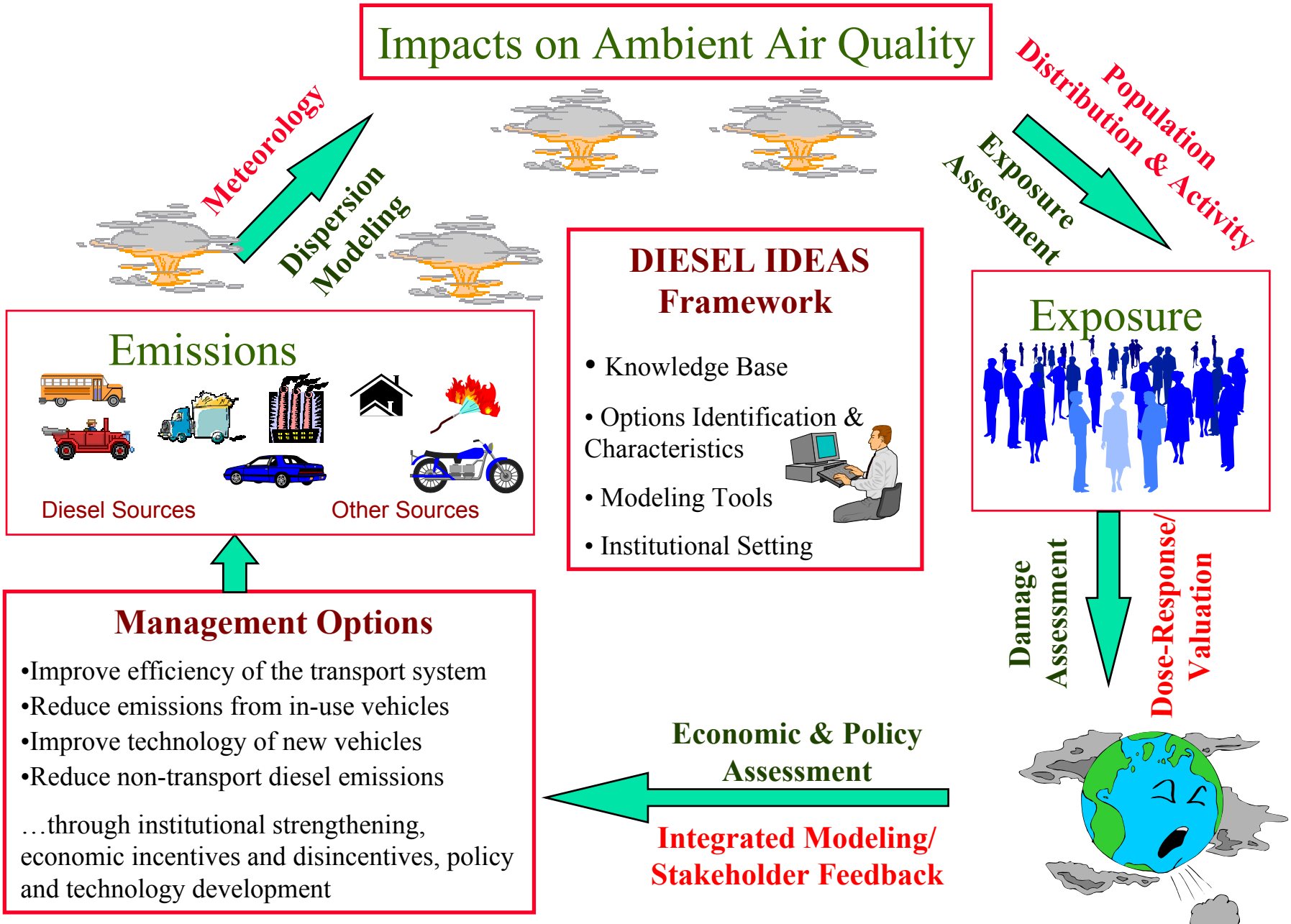
# **I**nformed **D**ecision-support for **E**valuating **A**lternative **S**trategies **(IDEAS)**

- **Objective:** To develop a framework to analyze and visualize options for diesel management in an economic context

- **Why?**
  - Make sense of data/information from multiple sources
  - Simulate the impact and costs/benefits of various options
  - Determine the need for additional information by examining sensitivity of decisions to various parameters
  - Develop a shared vision for planning in an integrated air quality management context

# Analytical Framework for Management of Diesel Options

## IDEAS (Informed Decision-support for Evaluating Alternative Strategies)



# Analytical Framework for DIESEL-IDEAS

## Information Systems

- Geographic Information Systems
- Interactive Spreadsheets
- Other Databases
- Internet/ Other Documents
- Scenarios

Interaction

## Models

- Emissions Inventory
- Dispersion
- Impact Assessment
- Economic Analysis
- Decision Support Systems

Inputs, Updates & Feedback

Dissemination, Use, Decision-making

Data

Information

Knowledge

Decision-Making

## Multi-Disciplinary

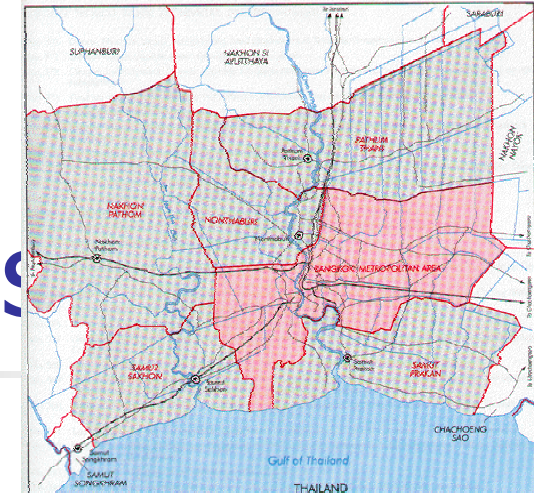
… Air Pollution, Economics, Transportation, Environment, Other Engineering, IT, Ecology, Law, Public Policy, Politics, ...

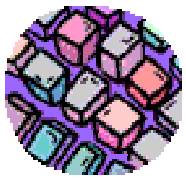
## Multi-Stakeholder

… PCD, DLT, BMA, BMTA, Other Government, Private Transport Sector, Manufacturers, Academia, NGOs, International Institutions, Consultants, General Public...

**Decision Support, Implementation & Adaptive Management**

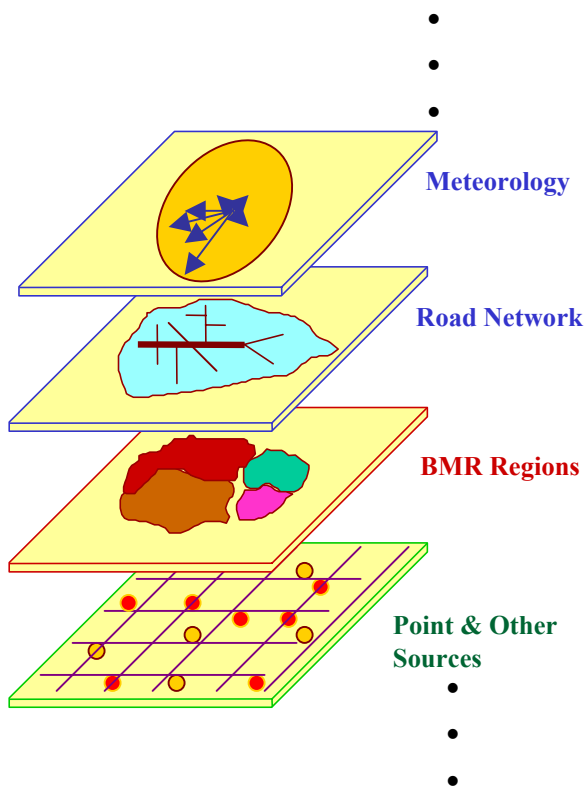
# IDEAS Knowledge Bas



- Meteorology
- Transport Network
- Vehicle Densities
- Regions (e.g. BMR provinces)
- Point Sources

...many of these are spatial and require a GIS for adequate analysis



# Models: Emission Inventory Module

**Sample Inputs**

- Vehicle Population/ Growth
- Vehicle Km Traveled
- Emission Factors for key pollutants
- Fuel Use
- Road Network
- Point Source Emissions
- Scenarios/Options

**Emission Estimation for Key Pollutants**

**Sample Outputs**

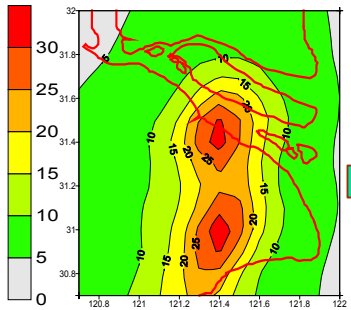
- Emissions by source
- Spatial distribution of emissions
- Projections under various scenarios

...input into **Dispersion Module**

# Models: Dispersion Module

**Sample Inputs**

- Emission Inventory
- Meteorology
- Ambient Concentration Data
- Scenarios/Options




Units: $\mu g/m^3$ $PM_{10}$

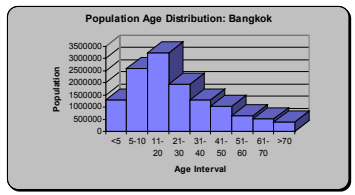
**Spatial Distribution of Ambient Concentrations**

**Sample Outputs**

- Ambient Concentrations
- Projections under various scenarios

...input into **Exposure/ Impact Assessment Module**

# Models: Exposure/ Impact Assessment Module




## Sample Inputs

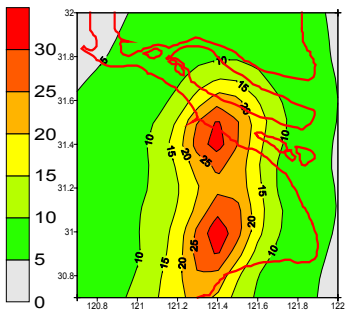
- Ambient Concentrations
- Population Distribution
- Distribution of other sensitive receptors
- Scenarios/Options

**Impact/Exposure Assessment**

## Sample Outputs

- Health Damages
- Projections under various scenarios

...input into **Economic Analysis Module**

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# Models: Economic Analysis Module

## Sample Inputs

- Health and Other Damages and Valuation under various scenarios/options
- Costs of various options

**Economic Analysis of Various Management Options**

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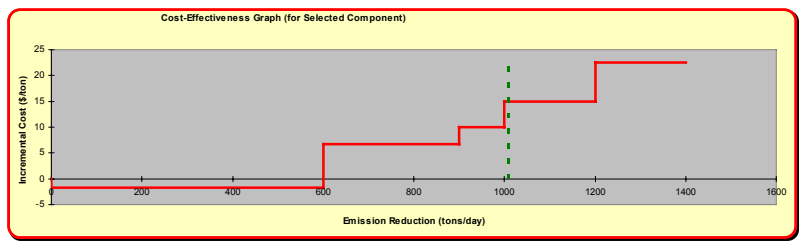
## Sample Outputs

- Cost-Effectiveness of various options
- Net Benefits of various options

...input for **Decision Support**



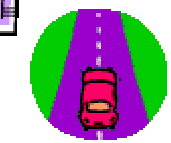
# Scenarios/Options to be Considered

- Improve efficiency of the transport system
- Reduce emissions from in-use vehicles
- Improve technology of new vehicles
- Reduce non-transport diesel emissions

# Types of Questions…

- Which option yields the best economic returns?
- Which is the best strategy to reduce fine particulate emissions?
- How does low-sulfur diesel compare as an option with strengthening of inspection & promotion of a maintenance culture?
- What impact could driver awareness/training have on emissions?
- Which areas in BMR could benefit most by improved bus fleets?

# Limitations



- Results are only as good as the databases – coverage, quality and consistency problems
- Consensus on types of options to be considered
- Evolving methodologies and tools for assessment
- Involvement of multiple stakeholders and disciplines
- Adequate reflection of political economy
- Actual **USE** and constant updating of the systems developed

# Next Steps

- Knowledge Base
  - Description of available knowledge base
  - GIS/Spreadsheets of knowledge base
  - Updating knowledge base
- Models
  - Prototype integrated model development
  - Generation of scenarios/options to be considered
  - Feedback and updating
- Institutional
  - Formation of a Collaborative Working Group on DIESEL IDEAS
  - Regular meetings/exchanges