

Co-Benefits and U.S. EPA's Integrated Environmental Strategies (IES) Program



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Presentation Overview

- Introduction to Co-benefits
- Background on IES
- Case Studies:
 - Santiago: Energy Efficiency
 - Hyderabad: Transportation
 - Beijing: Stationary Source Fuel-switching
- Lessons Learned
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Co-benefits: Why They Matter

- Basic definition: All of the positive outcomes associated with multiple, simultaneous emissions reductions.
 - Outcomes result from reduced emissions of greenhouse gases (GHGs) and local air pollutants (e.g., PM10, SOx, NOx).
- Allows energy options, health impacts, and GHG emissions to be linked together and evaluated.
- Enables sound policy making based on quantitative analysis.
- Helps prioritize options in an environment in which resources are limited.
- Supports decision making for management of air quality and GHGs, and sustainable development planning.

How Can Co-benefits Be Achieved?

Integrated measures that reduce GHG emissions and improve local air quality

- Low-sulfur coal
- Smokestack controls
- Catalytic converters
- Diesel particle traps
- Evaporative controls

Local

Adapted from Jason
West et al (2002)

Integrated

- Clean fuels/renewables
- Energy efficiency programs
- Methane gas recovery
- Fuel switching
- Public transport and land use
- Retirement of older vehicles
- Efficiency standards for new vehicles/appliances
- Inspection and maintenance programs

Integrated

Global

- Geological and terrestrial sequestration
- Land use and land use change
- Control of other GHGs (CH₄, N₂O, HFCs, PFCs, SF₆)

Background on the IES Program

- Established in 1998 as a capacity-enhancing co-control program.
- Partners local teams in developing countries with experts and tools from U.S. EPA, other IES projects, and other organizations (e.g., U.S. AID, National Renewable Energy Laboratory).
- Flexible, to address local air quality and public health needs of stakeholders in cities.
- Identifies and analyzes integrated (i.e., air-quality improvement and GHG mitigation) strategies and co-benefits.

IES Goals

- Identify strategies that reduce GHG emissions and improve local air quality while meeting public health, economic development objectives.
- Provide stakeholders with quantitative estimates of global and local co-benefits of policies and technologies.
- Engage stakeholders to set the stage for implementation of cost-effective air quality management strategies.
- Build analytical, institutional, and human capacity for multidisciplinary analysis of GHG mitigation, health, and environmental impacts of alternative strategies.
- Transfer analytical tools and methodologies.

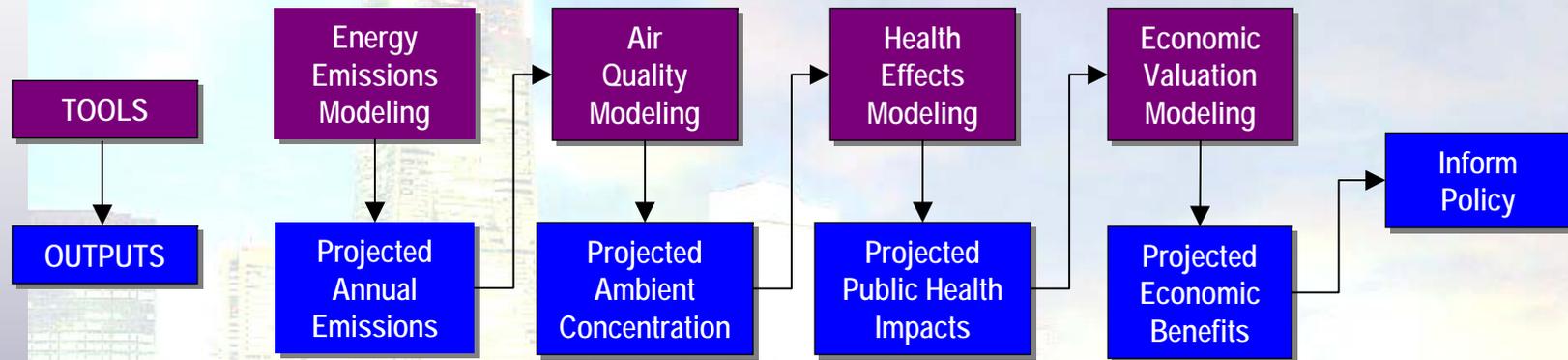
IES Partners



Countries with IES projects:



How IES Works

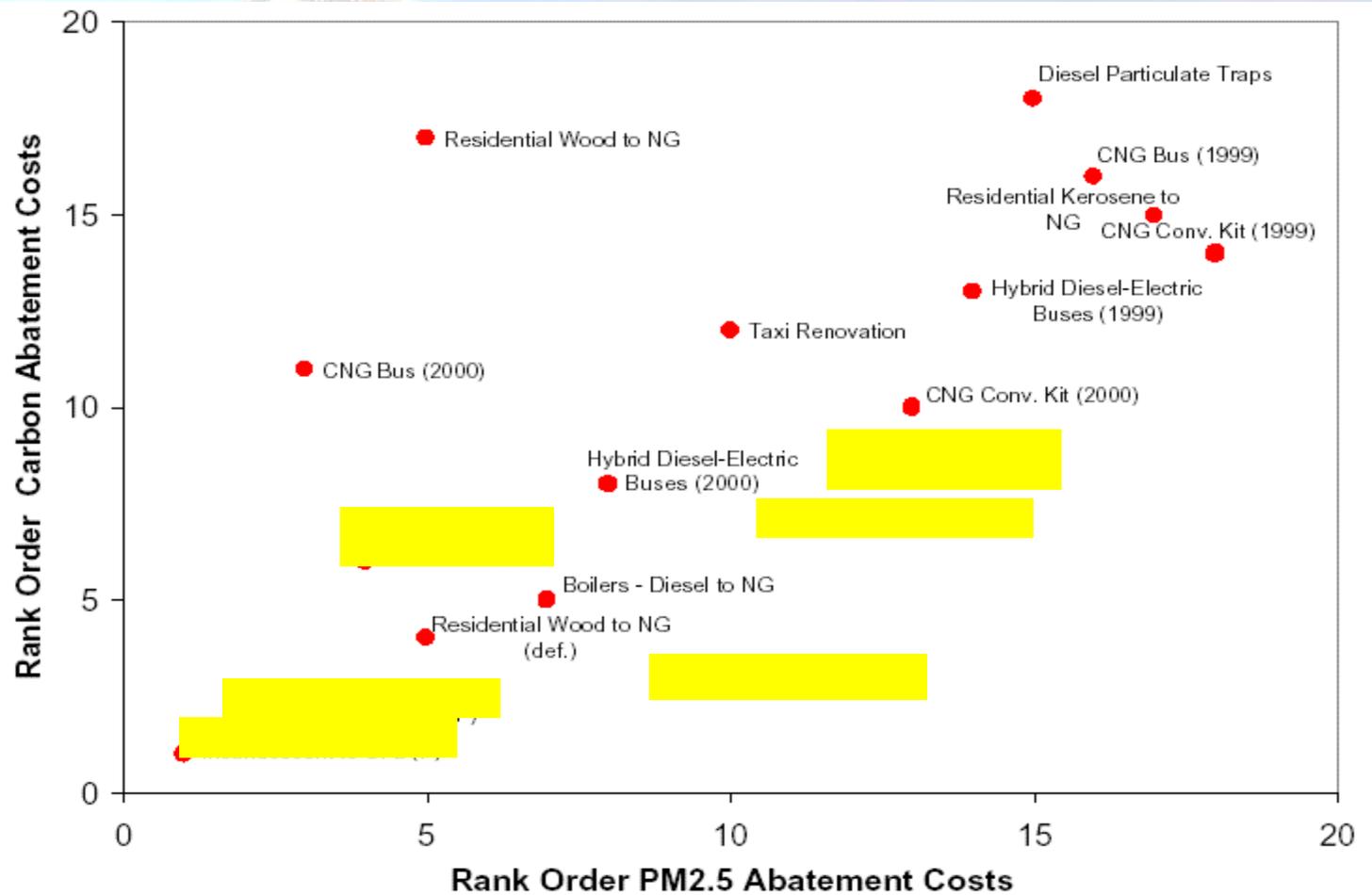


- IES is characterized by:
 - Flexibility
 - Stakeholder involvement
 - Rigorous analysis and quantification of benefits
 - *Informing the policy making process*

EE Case Study: Santiago, Chile

- Integrated Measures
 - Developed from the Chilean National Environmental Commission's Santiago Decontamination Plan.
- Co-Benefits Analysis
 - Compared business as usual scenario against climate policy scenario with integrated measures. Projected out 20 years.
- By switching to more efficient technologies the Chile team realized significant reductions in all emissions (i.e., GHGs and air pollutants) from energy generation.
- Of the measures analyzed, energy efficiency measures were the most cost-effective during peak hours of energy consumption for GHG and air pollutant emissions.

EE Case Study: Santiago, Chile (2)



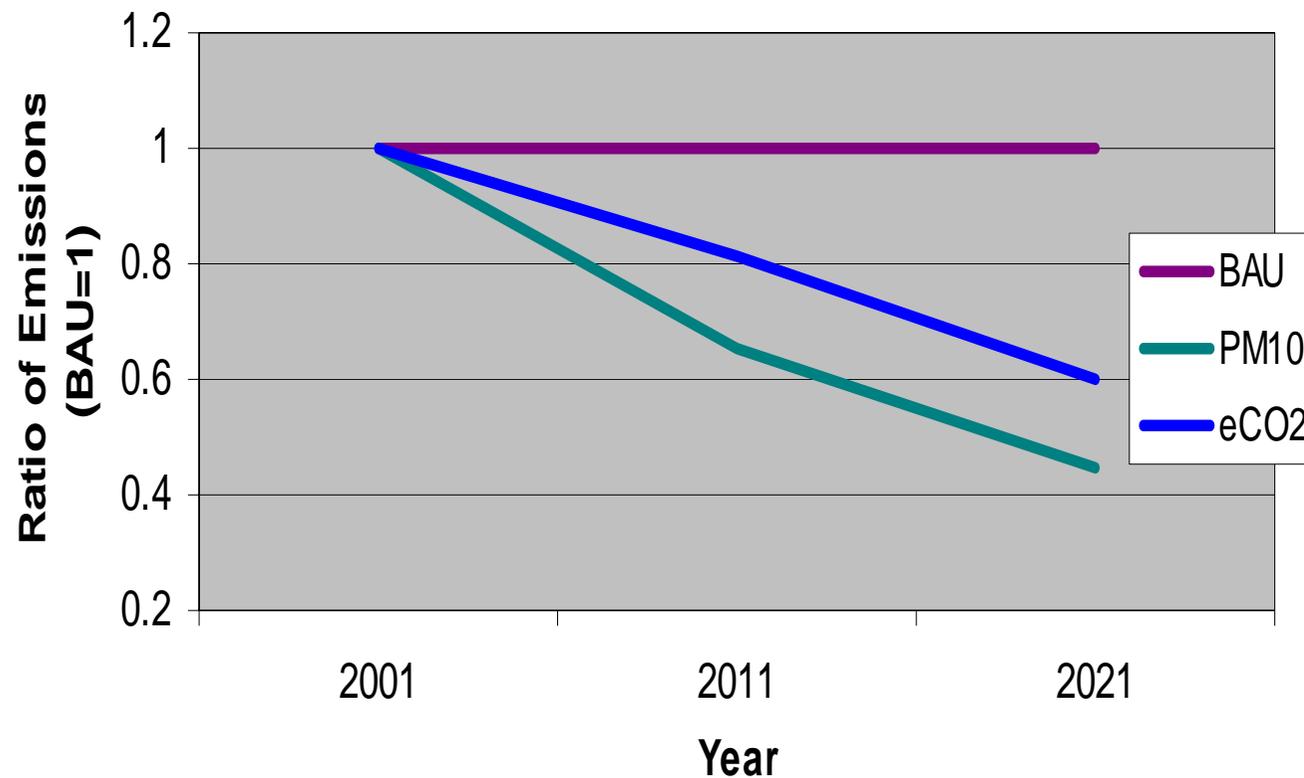
Transportation: Hyderabad, India

- Integrated Measures
 - Hyderabad looked at transportation and stationary sources to determine the most cost-effective measures for GHG and air pollutant abatement.
- Co-Benefits Analysis
 - Compared business as usual scenario against several mitigation scenario with integrated measures. Projected out 20 years.
- Since transportation is the largest emitter of GHGs and air pollutants, it was the sector where integrated measures would yield the most benefits.

India Transportation Measures
More effective public transit service (i.e., bus, rail, footpaths)
Traffic management and measures to improve traffic flow
Maintenance and operation training programs for two-stroke vehicles

Transportation: Hyderabad, India (2)

**Impact of More Effective Bus Service Scenario:
Ratio of BAU to More Effective Bus Service Scenario Emissions**

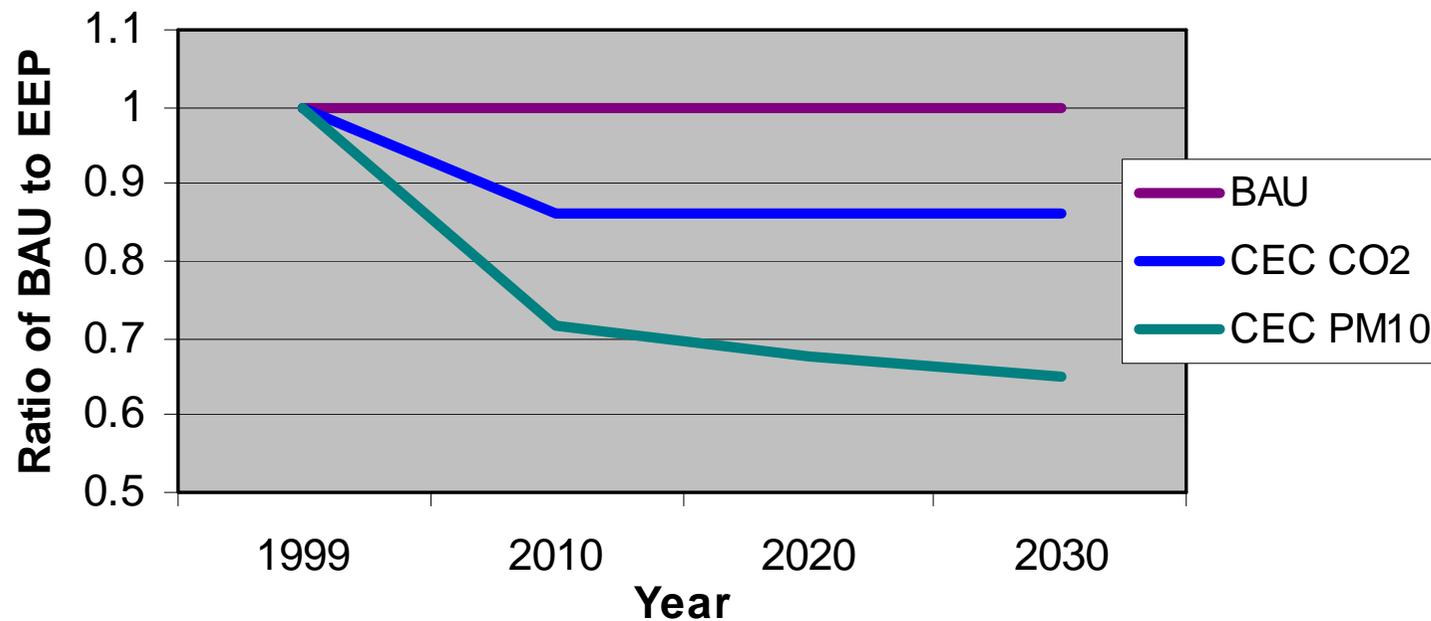


Stationary Source Fuel-Switching: Beijing, China

- Integrated Measures
 - Developed from Beijing Olympic Air Quality Action Plan.
 - Stationary source fuel-switching policies in the Clean Energy Consumption scenario include: changing industrial coal-fired boilers to natural gas, LPG for cooking in rural residences, and expanded natural gas power in the electrical grid.
- Co-Benefits Analysis
 - Compared business as usual scenario against three scenarios with measures. Projected out 30 years.
- Analysis indicated that if all measures were to be implemented, SO₂ and NO_x goals could be reached by 2008 and Beijing's Green Olympics.

Stationary Source Fuel-Switching: Beijing, China (2)

CO2 and PM10 Emissions Under the Clean Energy Consumption (CEC) Scenario Relative to BAU Emissions



Lessons Learned

- Integrated measures provide substantial local and global benefits in the long and short-term.
- Energy efficiency measures often offer the easiest and most cost-effective policies to reduce CO₂ and local air pollutants – *at the same time*.
- Policies that target transportation usually have the greatest impact since that sector contributes the largest portion of, and is the fastest growing sector for, GHG emissions and local air pollutants in developing countries.



IES-Shanghai results were incorporated into the air quality portion of Shanghai's 10th five-year plan; IES-Beijing's findings are informing energy, infrastructure, and emissions policies for the 2008 Olympics.

Conclusions

- Co-benefits analysis provides policymakers with information critical to environmental and energy management.
- The IES framework enables countries to quantify and compare potential benefits in a credible way.
- Governments can benefit from incorporating GHGs into their consideration of specific policy options.
- Energy efficiency measures can cost-effectively boost the environmental and economic bottom line.



To help inform policymakers, the IES-South Korea team tailored its analysis to include policy options included in the Seoul Air Quality Management Plan

IES: Supporting the International Co-Benefits Community

- IES Web site launched Fall 2004 – features information on methodology, country profiles, final country reports and other documents, presentations and publications. Available at <<http://www.epa.gov/ies>>
- *The IES Handbook: A Resource Guide for Air Quality Planning* – The *Handbook* is intended to serve as a resource to support the development of co-benefits analysis projects in developing countries. Available at <<http://www.epa.gov/handbook.htm>>

IES: Supporting the International Co-Benefits Community (2)

- International version of manual for EPA's Environmental Benefits Mapping and Analysis Program (BenMAP) software.
- Training Module for developing countries interested in performing co-benefits analysis with IES methodology.
- IES can be used for mitigation analysis, with results feeding into National Communications under the United Nations Framework Convention on Climate Change (UNFCCC).

The Future of IES

- IES seeks international partners to leverage resources, integrate co-benefits analysis into air management and planning
- Moving from municipal to broader national-level and regional focus
- Raise the profile of co-benefits:
 - Publication of peer-reviewed articles
 - Participation in international meetings and conferences
 - Networking with local and national governments, funding organizations, other interested parties

Thank you • Arigatou gozaimashita

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