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DECISION SUPPORT SYSTEM FOR INDUSTRIAL POLLUTION CONTROL

DSS/IPC

<http://www-esd.worldbank.org/pollution/dss/>

presented by
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UN ESCAP**

MODULE 2.AIR.4



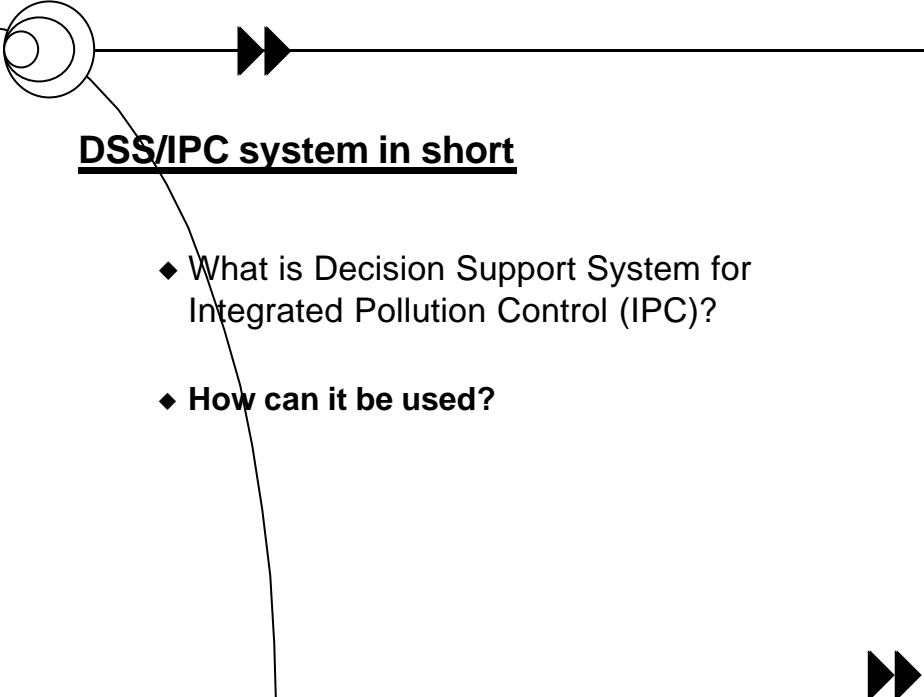
DSS/IPC system in short

A software package for personal computers

developed by

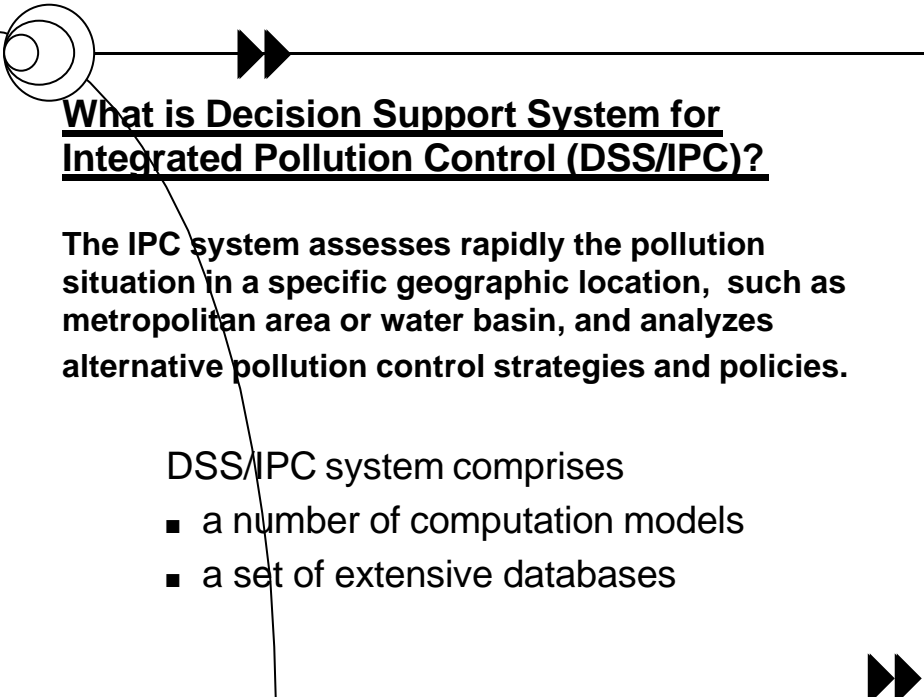
- the World Bank in collaboration with
- the WHO and
- The Pan American Health Organization(PAHO)





DSS/IPC system in short

- ◆ What is Decision Support System for Integrated Pollution Control (IPC)?
- ◆ How can it be used?

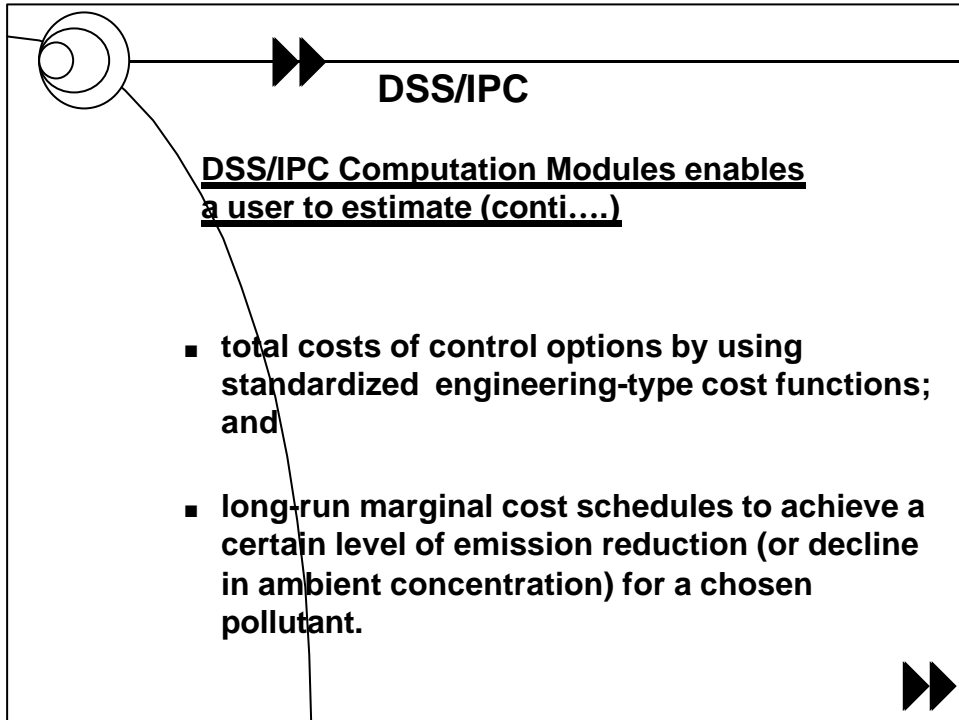


What is Decision Support System for Integrated Pollution Control (DSS/IPC)?

The IPC system assesses rapidly the pollution situation in a specific geographic location, such as metropolitan area or water basin, and analyzes alternative pollution control strategies and policies.

DSS/IPC system comprises

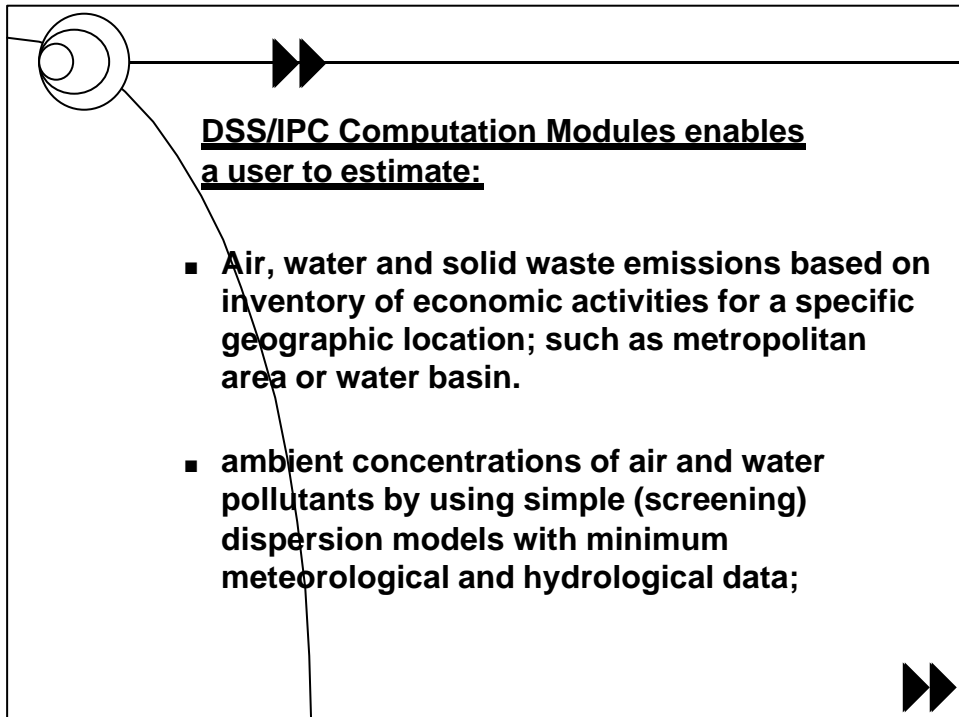

- a number of computation models
- a set of extensive databases



DSS/IPC

DSS/IPC Computation Modules enables a user to estimate (conti....)


- total costs of control options by using standardized engineering-type cost functions; and
- long-run marginal cost schedules to achieve a certain level of emission reduction (or decline in ambient concentration) for a chosen pollutant.

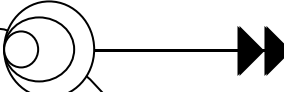


DSS/IPC

DSS/IPC Computation Modules enables a user to estimate:

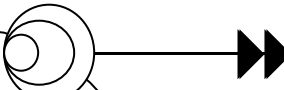

- Air, water and solid waste emissions based on inventory of economic activities for a specific geographic location; such as metropolitan area or water basin.
- ambient concentrations of air and water pollutants by using simple (screening) dispersion models with minimum meteorological and hydrological data;





DSS/IPC Computation Modules enables a user to estimate (conti....)


- total costs of control options by using standardized engineering-type cost functions; and
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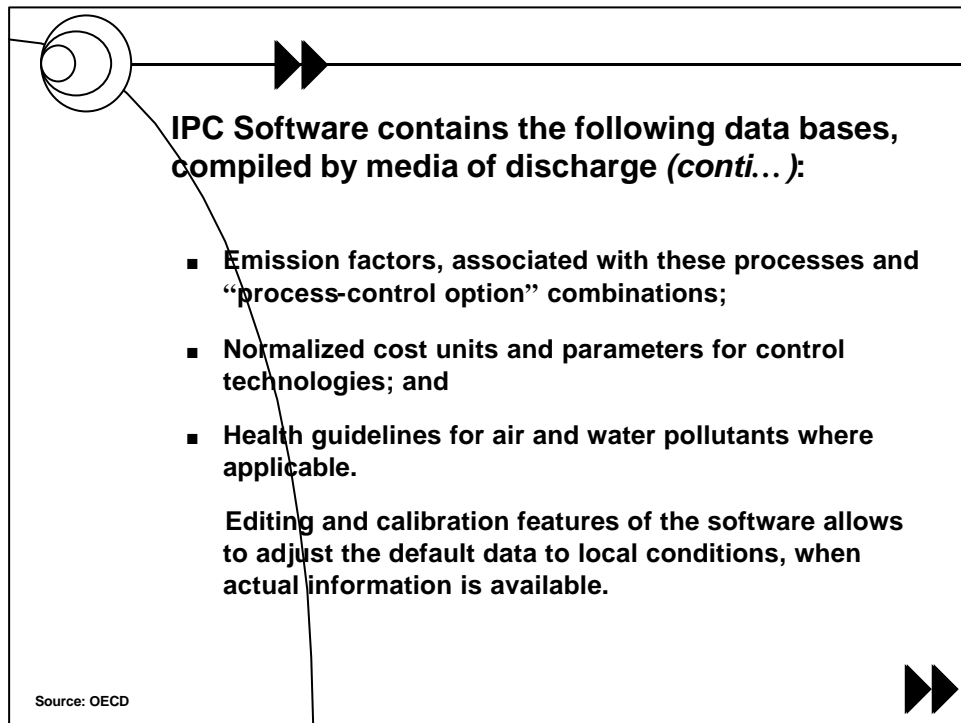


IPC Software contains the following data bases, compiled by media of discharge:

- Pollution –intensive technological processes across all sectors of economic activity, including mining, manufacturing industries, energy, transport and municipal sector according to ISIC at 4-digit level;
- Principal control options available for each process, including “good housekeeping” and waste prevention programs;

Source: OECD



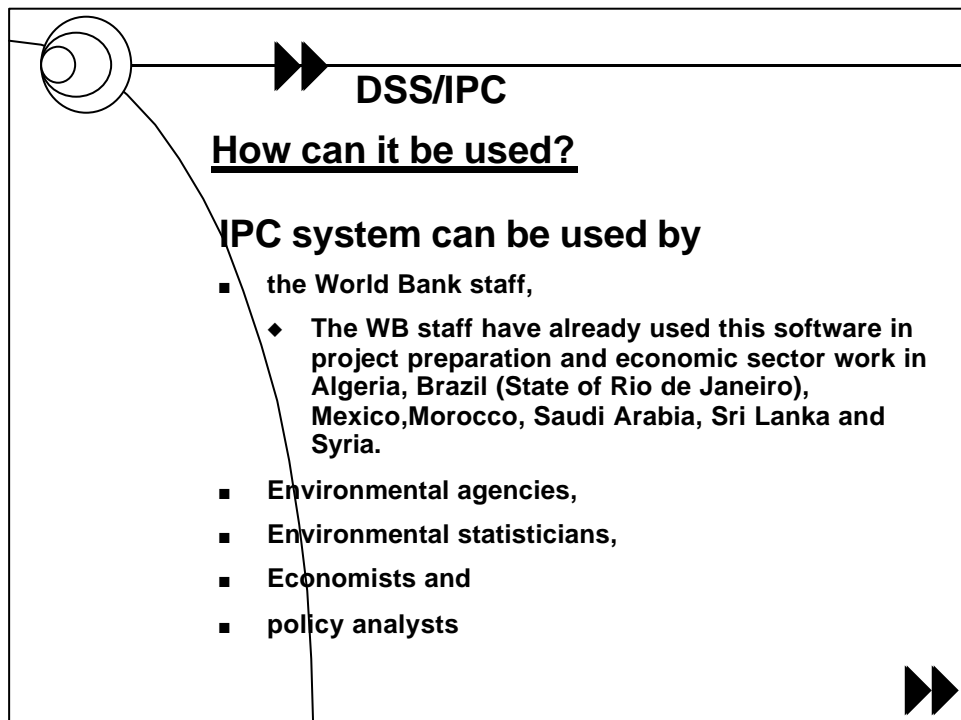


IPC Software contains the following data bases, compiled by media of discharge (*conti...*):

- Emission factors, associated with these processes and “process-control option” combinations;
- Normalized cost units and parameters for control technologies; and
- Health guidelines for air and water pollutants where applicable.

Editing and calibration features of the software allows to adjust the default data to local conditions, when actual information is available.

Source: OECD

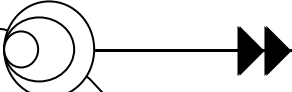


DSS/IPC

How can it be used?

IPC system can be used by

- the World Bank staff,
 - ◆ The WB staff have already used this software in project preparation and economic sector work in Algeria, Brazil (State of Rio de Janeiro), Mexico, Morocco, Saudi Arabia, Sri Lanka and Syria.
- Environmental agencies,
- Environmental statisticians,
- Economists and
- policy analysts


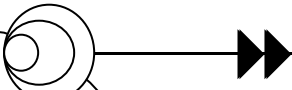


DSS/IPC

How can it be used? (conti...)

IPC system can be used as


- an educational tool in pollution economics and management;
- a screening and data management tool;
- an analytical tool.
 - ◆ Water pollution control
 - ◆ Air pollution control
 - ◆ Analysis of pollution control policies

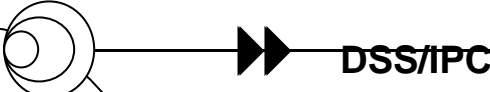



DSS/IPC

as an educational tool

- The IPC makes transparent key issues and “cause-effect” links in pollution management.
- It demonstrates the comparative effect on pollution load and ambient quality of a number of factors that can be affected by sectoral and environmental policies.
 - ◆ These factors include: the scale, composition and density of economic activities in a “study area”;
 - + geographical location of industrial estates,
 - + given spatial variations in cost waste prevention and
 - + “Good housekeeping” programs.


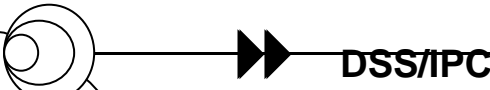




DSS/IPC

as a source of information

- The IPC database and manual, incorporated into the software, provide information on
 - ◆ Toxic pollutants
 - ◆ Emission factors
 - ◆ Dispersion models,
 - ◆ Technological processes,
 - ◆ Control options and
 - ◆ Cost units and formulas that can be independently applied in other models or studies, or
 - ◆ Serve as a reference.





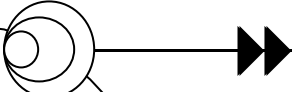
DSS/IPC

as a screening and data management tool,

The IPC system helps

- to assess the pollution situation in the area in the absence of monitored data on emissions and ambient air concentrations,
- To identify major pollution sources
- To highlight deficiencies in the existing system of data collection for the purposes of pollution management,
- To organize the process of gathering relevant information in a systematic way,
- Continuously update and process this information, and
- Quickly present it in a convenient format as a table, chart or map.






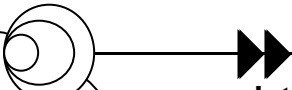
DSS/IPC

as a screening and data management tool (conti..)

In order to estimate pollution loads;

The IPC system requires an inventory of industries for a given area, including

- data on key inputs or/and outputs in physical units, which are directly linked to a medium-specific pollution,
- data on the types of existing controls





DSS/IPC

as an analytical tool,

the IPC system is designed to help

- develop a cost-effective pollution control strategy across various pollution sources for a given area and
- identify priority investments at specific industries and in the municipal sector.
- Particularly, the system estimates the amount of pollution reduction that can be achieved without costly investments, just by improving management, operation and maintenance.
- The software can be also used to support the selection of alternative locations for new industries, industrial zones, urban development and expanded municipal services.
- It can estimate the potential effects on the level of pollution and the associated costs of complying with environmental regulations.



DSS/IPC

as a tool for water pollution control

- The system is designed to support integrated wastewater management and can be applied at both municipal and watershed levels.
- It permits estimation of the total loads of major water pollutants discharged in a watershed (or portions of a watershed) and their relative impact on ambient quality;
 - the shares in these loads of different pollution sources, including municipal sewage; and
 - the total and marginal costs of alternative levels of wastewater treatment (case study of Colombo).

It is a decision making tool,

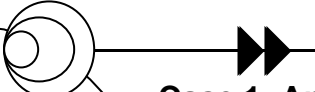
- whether or where to use more sophisticated water quality models and
- which wastewater treatment options at specific sources merit further consideration and analysis.

DSS/IPC

Case 1: Analyzing wastewater treatment options in Colombo, Sri Lanka

- The particular concern of this case study is Kelani Ganga river, which is
 - ◆ the main waterway of the Colombo Metropolitan Area(CMA) and
 - ◆ a major source of water for the capital, receives wastewater from some of the most densely populated areas and a considerable number of industries.

Source: OECD


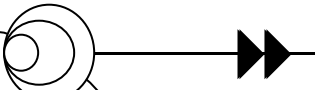


DSS/IPC

Case 1: Analyzing wastewater treatment options in Colombo, Sri Lanka (*conti..*)

- The outcomes of DSS/IPC analysis are that
 - The largest part of organic pollutants generates from households and the municipal sector rather than the industry.
 - Industry is not the main contributor to the deterioration in the biological and bacteriological indicators of water quality.
 - Without improvement in sanitation system, the water quality in the Kelani River might not improve even though the all industries could have the most advanced treatment plants of all industrial discharges. It can, at most, remove only about one-fifth of the total load of BOD₅ (measured over 5 days) going into water.

Source: OECD





DSS/IPC

Case 1: Analyzing wastewater treatment options in Colombo, Sri Lanka (*conti..*)

- The assessment identifies a cost-effective combination of municipal effluent treatment and low-cost abatement options for industry (good housekeeping and primary treatment).

Source: OECD



DSS/IPC

as a tool for air pollution control

The system enables the user

- ◆ to generate an inventory of atmospheric emissions from all significant sources in an urban area and
- ◆ to identify pollution hot spots and worst offenders across multiple sources of urban air pollution.
- ◆ to predict ambient pollution concentrations on the basis of selected control strategies for emissions sources.

■ It permits users

- ◆ to propose least-cost programs of ambient quality control options for industries, and
- ◆ to compare associated abatement costs with the estimated benefits of lowering ambient concentrations for pollutants. (case study for Rio de Janeiro)

▶▶

DSS/IPC

Case 2: Costs and benefits of controlling industrial emissions of particulates in Rio de Janeiro

- The most severe air pollution problem in the Rio de Janeiro Metropolitan Area (RJMA) is about the level of concentrations of total suspended particulates (TSP) in the airshed.
- The concentrations of TSP have been increasing steadily since 1990 and stood at 125 mgs per cm₃ in 1994.

Source: OECD

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DSS/IPC

Case 2: Costs and benefits of controlling industrial emissions of particulates in Rio de Janeiro (*conti..*)

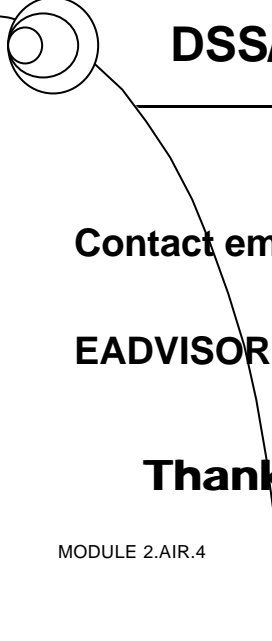
- The Bank group looked at TSP emissions from industries and from such non industrial sources as transport and waste burning.
- The system was used to calculate the costs of control measures that could be adopted by industrial sources and the expected effect of these measures on emissions and concentrations of TSP.
- The results suggest that a very high economic payoff may be obtained from tightening control of industrial emissions of particulates.

Source: OECD

DSS/IPC

Limitations of the DSS/IPC system

- The system is a tool for rapid , rough assessments.
- It can give only an indication of
 - where problems are likely to occur,
 - the relative significance of different pollution sources, and
 - the costs and effects of alternative pollution control strategies.
- Its main advantage is in helping to create a comprehensive picture of the pollution problems in an area and to focus analysis on specific priorities.



DSS/IPC SOFTWARE

Contact email address for advisory services

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Thank you for your attention

MODULE 2.AIR.4

