Integrate Emission Inventory in Environmental Governance Information Systems

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BASIC

Information for Emission Inventory is useful to other sector of environmental information and that it's possible to give more value to the information sharing data between different environmental sectors and energy sector. This last also reduce the efforts for updating data that can be shared from different experts team.

TOOL

APEX.com, Advanced Pollution Evaluation Computer System is presented. APEX.com is the main component of EnviPlan.com (ENVIronmental PLAnning) system finalized to include air pollutant emission inventory in a more general framework for the Governance of the Environment through use of tools and models.

DPSIR Approach

The system use the DPSIR (Driving forces, Pressure, State, Impact, Response) approach of European Environmental Agency an extension of the PSR framework of the Organization for Economic Cooperation and Development.

The DPSIR Framework for reporting on environmental issues:
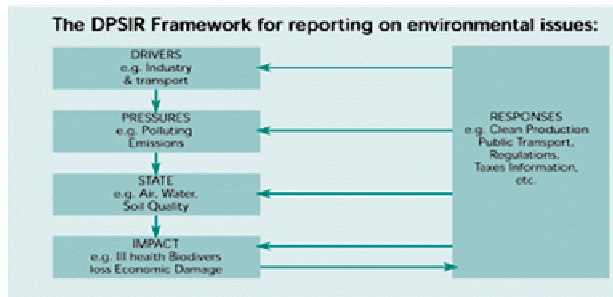
The general approach is based on the concept that human activities exert pressures on the environment and change its quality and the quantity of natural resources (state). Society responds to these changes through environmental, general economic and sector policies. The responses form a feedback loop to pressure through human activities. In a wider sense, these steps form part of an environmental policy cycle that includes problem perception, policy formulation, monitoring and policy evaluation. Driving forces of pressure component are the social, demographic and economic developments in societies and the corresponding changes in life styles and overall levels of consumption and production patterns. The major driving forces are population growth and changes in needs and activities of individuals. The driving forces provoke changes in overall levels of production and consumption and thereby exert pressure on the environment. The exerted pressure may manifest itself in various ways, e.g., the excessive use of natural resources; changes in land use; and emissions (of chemicals, waste, radiation, noise) to air, water and land.

APEX system

Was originally developed as an air pollutant emissions computer system. The release 4.0 of the system extended the capabilities of the original system to allow the emissions estimate, and the sources characterization, in different environmental media (air, water, soil, noise, wastes,…). The new release Apex.com, based on DPSIR approach, was finalized to evaluation and management of driving forces, functional to pressure evaluation (pollutants emissions, GHGs emissions, energy consumptions) and to the preparation of pressure inventories at local scale in different environmental compartments (air, superficial waters, soil, wastes). The system is a base tool to characterize the different pressure sources roles, to produce data for mathematical models of pollutants diffusion, transport and transformation and to support tool for environmental impact assessment and strategic environmental assessment. The system is functional to Energy balances assessment and management and is a base tool for local Energy planning. Special modules allow the management of indicators for the state of the environment (for example air, water, noise, soil quality indicators), for impact (indicators on health, monuments, vegetation impact) and response (plan, investment).
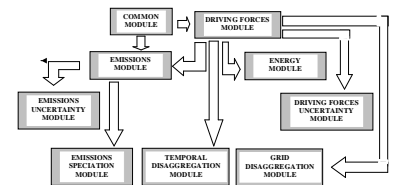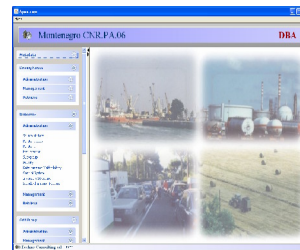
The system was developed in Java environment for user interface and use the Application Container Tomcat, ORACLE, SQLServer or PostGreSQL for data management and MAPINFO or ARCVIEW or GEOMEDIA or MapServer for GIS. The system has been supplied to several national and international institutional users.

Driving Forces

- **Population**
- **Energy Consumption (Power plant, Industry, Domestic, Agric., Transport)**
- **Industrial production (metals, cement, lime, glass, bricks ...)**
- **Storage, handling and transport (mineral & metal products)**

Extraction and distribution of fossil fuels (mining, store, terminals, dispatch, depots, service stations, Gas distribution networks)
- **Paint consumption (automobiles, car repairing, building, coil, wood, ...)**
- **Solvent consumption (Metal degreasing, Dry cleaning, Electronic, ...)**
- **Road transport Mileage (Passenger cars, Light duty & Heavy duty vehicles and buses, Mopeds and Motorcycles <50 cm3 & > 50 cm3; [Highway driving, Rural driving, Urban driving]**
- **Port and cruise ships movements - Air traffic LTO cycles and movementes**
- **Waste treated and disposed (domestic, industrial, hospital)**

Evaluation of pressure

pressure, and in particular emissions, are evaluated for:
- ➢ Point sources (main facilities with emissions greater then fixed threshold)
- ➢ Line sources (in local inventories, the main transport lines)
- ➢ Area sources (all the outer sources) on
  - ➢NUTS0 (national) scale (For LRTAP or UNFCC inventories)
  - ➢NUTS3 (subregional) for national or continental modeling
  - ➢LAU2 (municipality) for zone planning

Area sources (for instance, domestic solvent use and natural sources) and, if no specific data are available, point sources pressures (emissions) are evaluated using driver forces data and pressure (emission) factors

The basic formula to calculate pressures (emissions) is:

$$P(E) = D F$$

where: D, driver forces; F, pressure (emissions) factor expressed in grams per unit of driver force

APEX.com Forms Examples