

Energy and Environment Engineering

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Energy and Environmental Engineering CEME106

ENVIRONMENT AND ECOSYSTEMS

Introduction: Concept of an ecosystem- structure and functions of ecosystem. Components of ecosystem - producers, consumers, decomposers, Food chains, food webs, ecological pyramids, Energy flow in ecosystem. Bio-geo- chemical cycles, Hydrologic cycle Components of Environment and their relationship, Impact of technology on environment, Environmental degradation. Environmental planning of urban network services such as water supply, sewerage, solid waste management.

ENVIRONMENTAL POLLUTION

Water, air, soil, noise, thermal and radioactive, marine pollution: sources, effects and engineering control strategies. Drinking water quality and standards, Ambient air and noise quality standards

GLOBAL ENVIRONMENTAL ISSUES AND ITS MANAGEMENT

Engineering aspects of climate change. Acid rain, depletion of ozone layer. Concept of carbon credit. Concepts of Environmental impact assessment and Environmental audit. Environmental life cycle assessment

Environmental Impact Assessment (EIA)

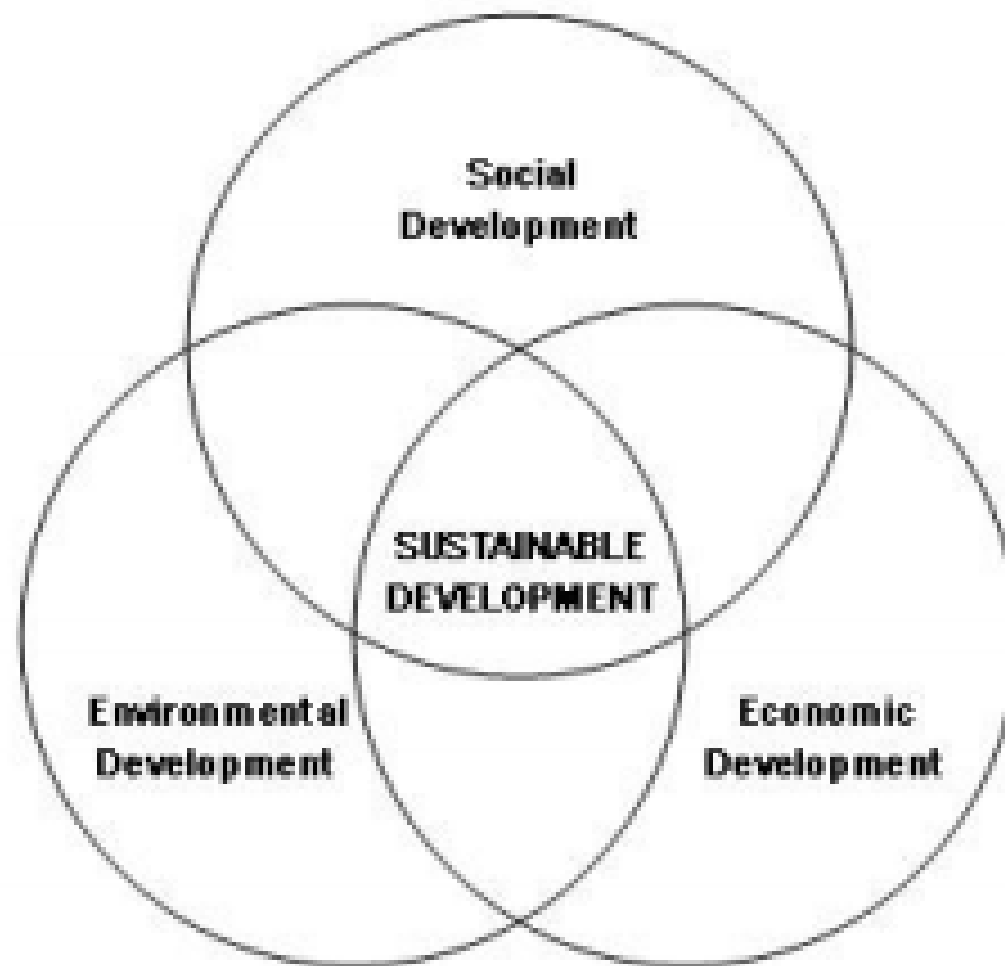
Environment Impact Assessment or EIA can be defined as the study to predict the effect of a proposed activity/project on the environment.

A decision making tool, EIA compares various alternatives for a project and seeks to identify the one which represents the best combination of economic and environmental costs and benefits.

EIA is intended as an instrument of preventive environmental management. It provides a framework and an information basis for decision making on activities affecting the environment.

EIA – Three core values

1. Integrity: The EIA process should be fair, objective, unbiased and balanced
2. Utility: The EIA process should provide balanced, credible information for decision making
3. Sustainability: The EIA process should result in environmental safeguards



Environmental Impact

The impact of an activity is a deviation (a change) from the **baseline situation** that is caused by the activity.

Types of impacts

- 1) Nature – Direct and Indirect.
- 2) Severity – High, moderate and low.
- 3) Types – Environmental, Social, Socio-economic.
- 4) Reversibility – Reversible, irreversible.
- 5) Occurrence – Low likelihood, high probability.
- 6) Significance – significant, insignificant.
- 7) Extent – Local, regional, transboundary, global.
- 8) Duration – Temporary, Permanent.

Purpose of EIA

1. To encourage productive and enjoyable harmony between man and his environment;
2. To promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man;
3. To enrich the understanding of the ecological systems and natural resources important to the Nation.”
4. To allow government officials, business leaders, and all concerned citizens to understand the likely environmental consequences of proposed actions
5. To cooperate in making wise decisions that restore and maintain the quality of our shared environment for future generations.”
6. To LOOK before you LEAP!

Need of EIA

EIA is intended to prevent or minimize potentially adverse environmental impacts and enhance the overall quality of a project. The main benefits and advantages of EIA are:

- ❖ Lower project costs in the long-term
- ❖ Increased project acceptance
- ❖ Improved project design
- ❖ Informed decision making
- ❖ Environmentally sensitive decisions
- ❖ Increased accountability and transparency
- ❖ Reduced environmental damage
- ❖ Improved integration of projects into their environmental and social settings

Projects where EIA is required

- ❖ Agriculture
- ❖ Construction (Road networks, Malls, Townships, Dam etc)
- ❖ Industries
- ❖ Electrical projects
- ❖ Waste disposal
- ❖ Any developmental projects around Protected Areas / Nature Preserves
- ❖ Clean Development Mechanism CDM projects

Categories and criteria for categorization

The Ministry of Environment, Forest and Climate Change (MoEFCC) has developed the criteria of categorization of industrial sectors based on the Pollution Index which is a function of the emissions (air pollutants), effluents (water pollutants), hazardous wastes generated and consumption of resources.

For this purpose the references are taken from the the Water (Prevention and Control of Pollution) Cess (Amendment) Act, 2003, Standards so far prescribed for various pollutants under Environment (Protection) Act, 1986 and Doon Valley Notification, 1989 issued by MoEFCC.

Categories and criteria for categorization

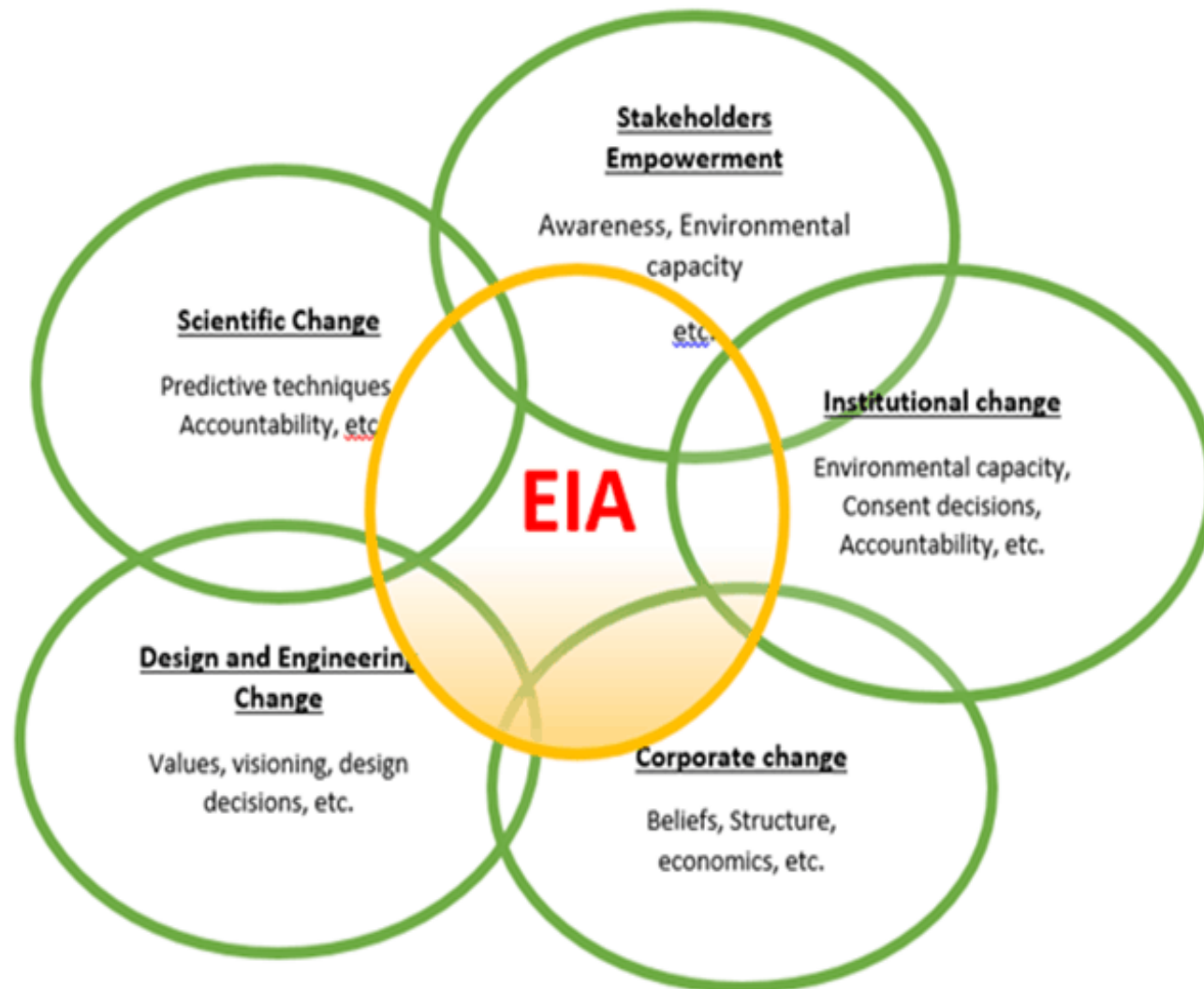
The Pollution Index PI of any industrial sector is a number from 0 to 100 and the increasing value of PI denotes the increasing degree of pollution load from the industrial sector. The following are the criteria on 'Range of Pollution Index' for the purpose of categorization of industrial sectors.

- Industrial Sectors having Pollution Index score of 60 and above - Red category
- Industrial Sectors having Pollution Index score of 41 to 59 – Orange category
- Industrial Sectors having Pollution Index score of 21 to 40 – Green category
- Industrial Sectors having Pollution Index score incl.& upto 20 - White category

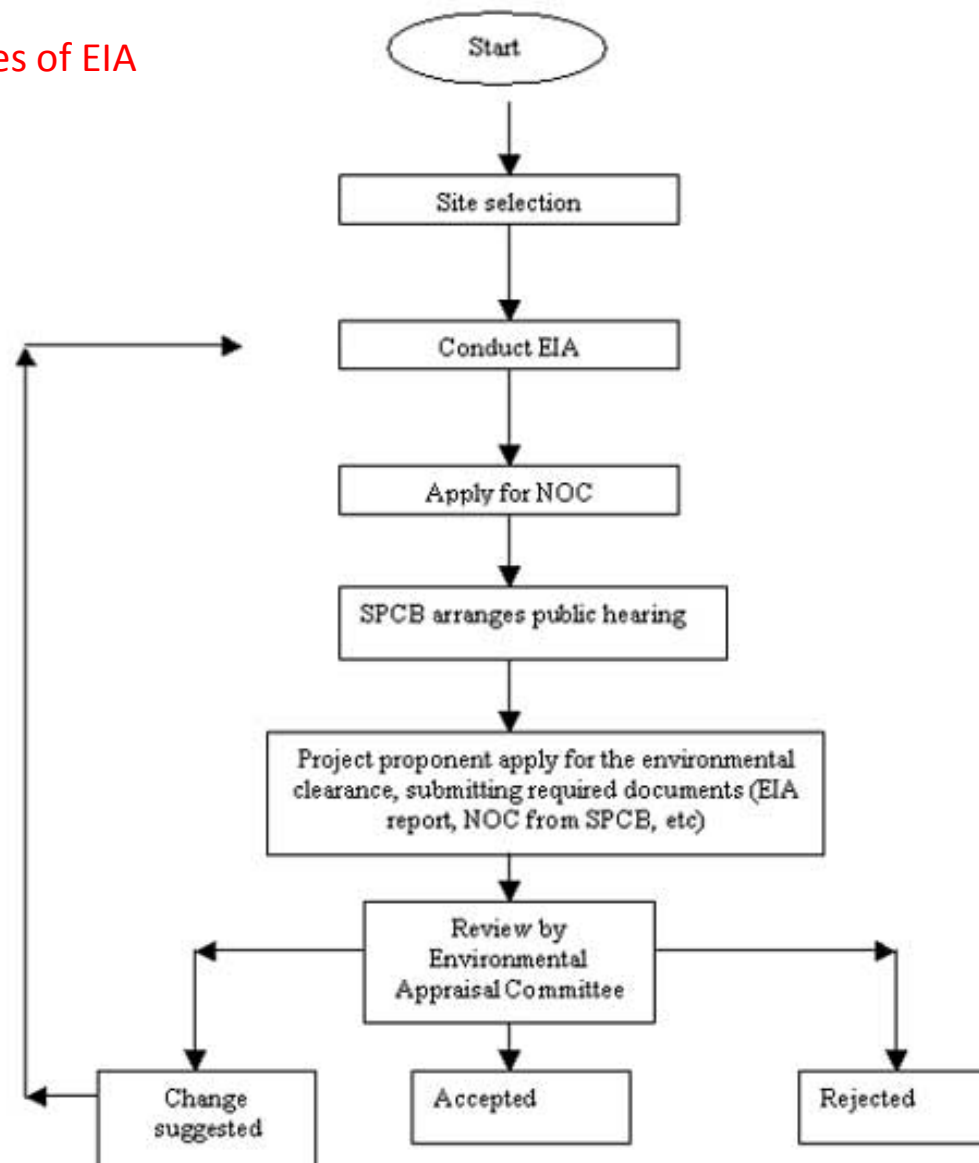
Implications of categorisation

- ❖ There shall be no necessity of obtaining the Consent to Operate for White category of industries. An intimation to concerned SPCB / PCC shall suffice.
- ❖ No Red category of industries shall normally be permitted in the ecologically fragile area / protected area.

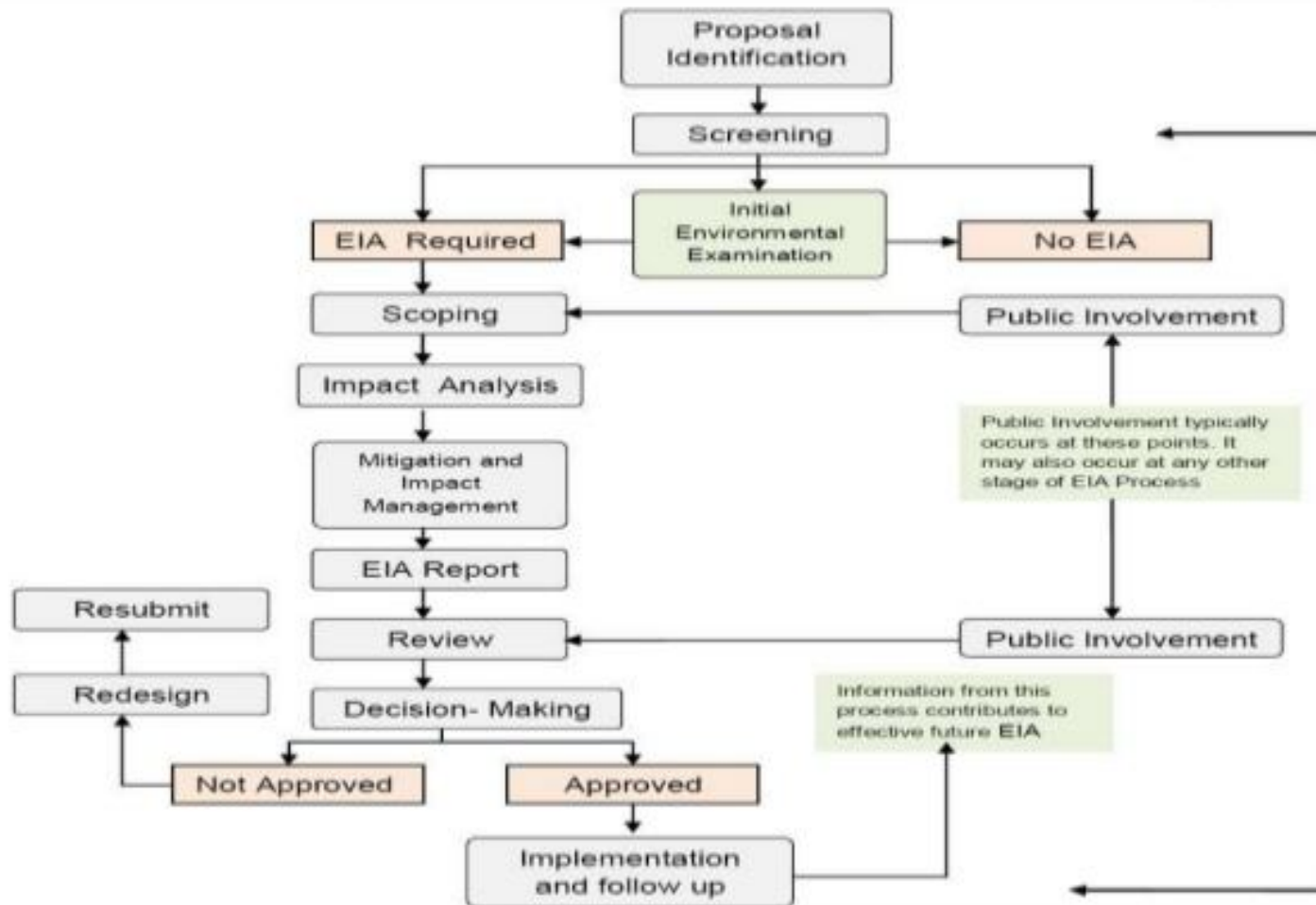
White category of industries pertains to those industrial sectors which are practically non- polluting, such as Biscuit trays etc. from rolled PVC sheet (using automatic vacuum forming machines). Cotton and woolen hosiers making (Dry process only without any dying/washing operation)

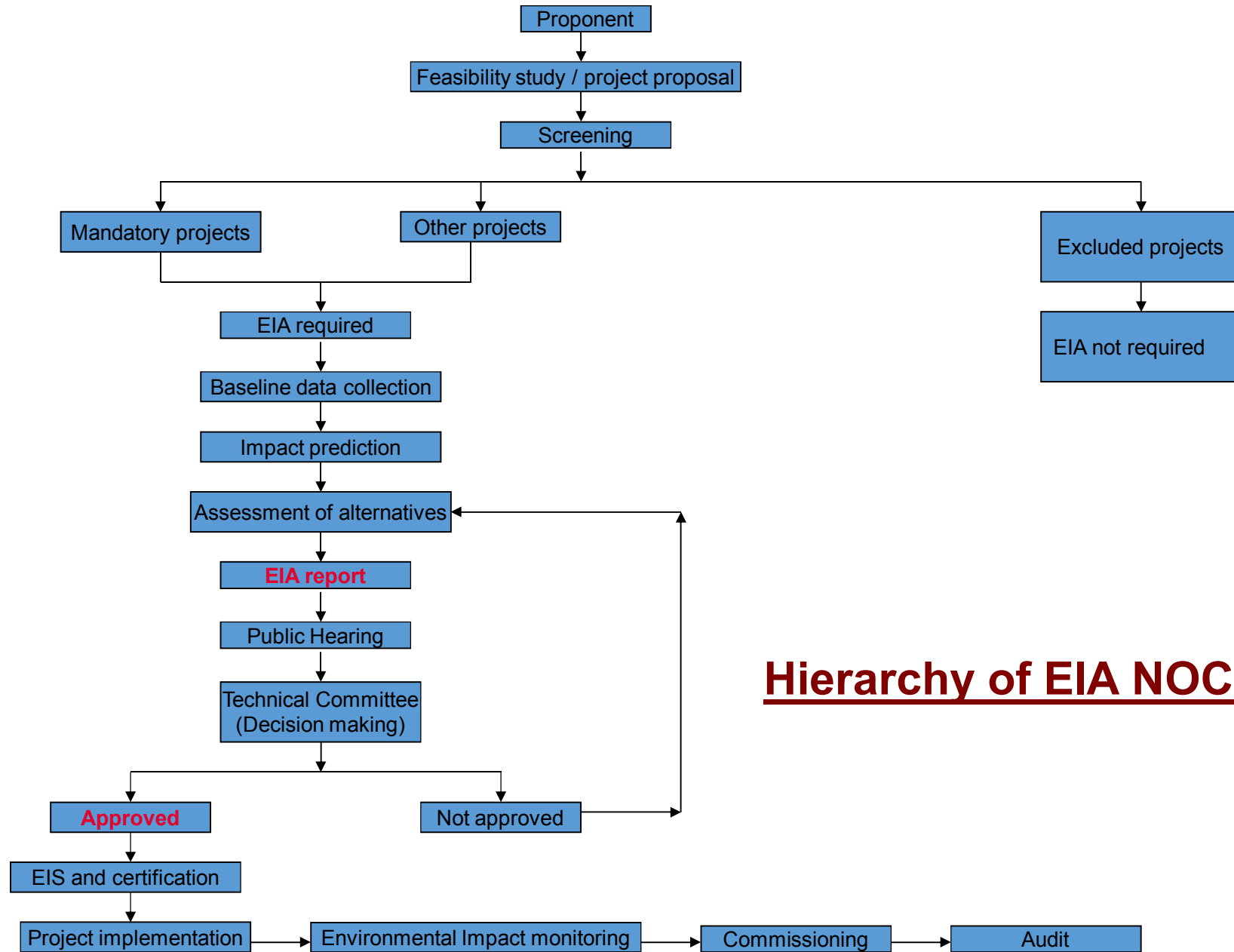


Stages of EIA



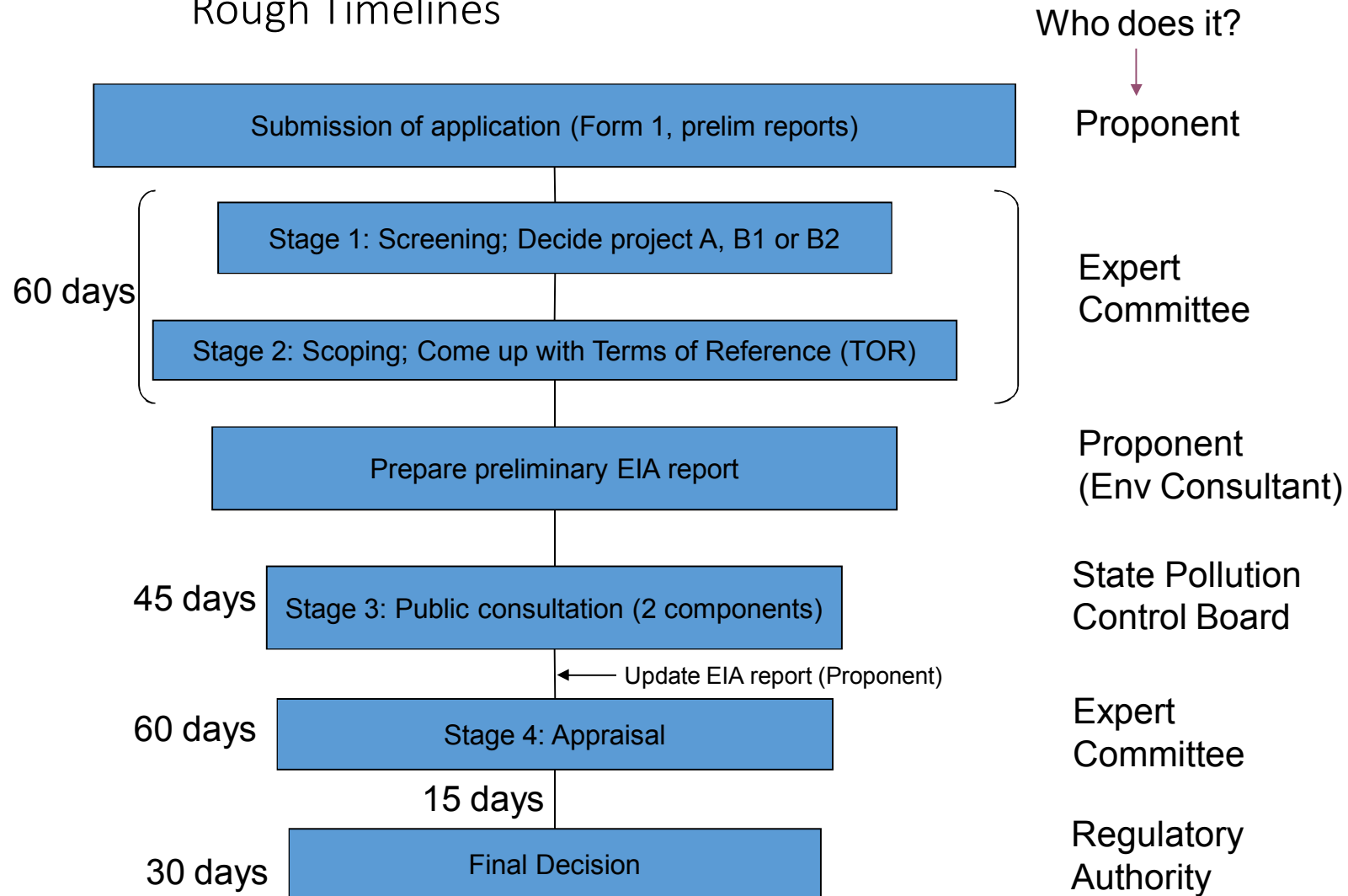
EIA Process

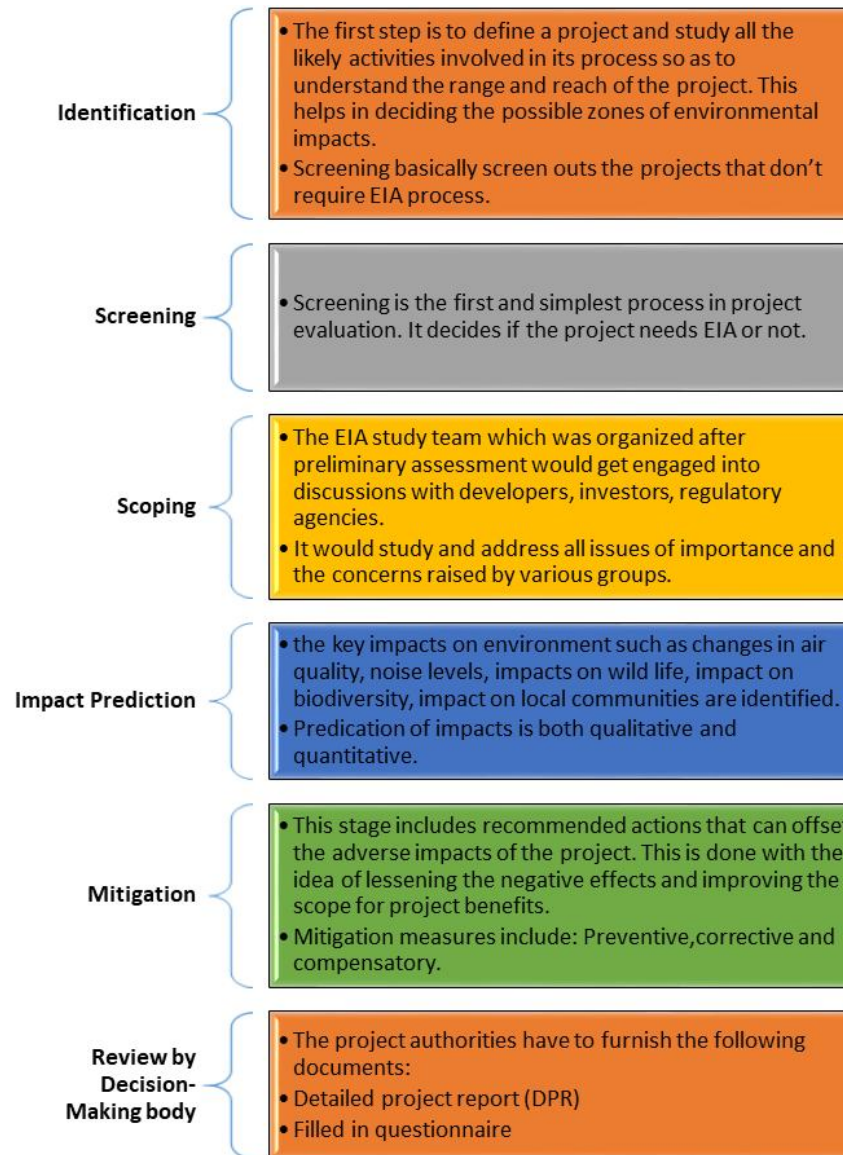




Hierarchy of EIA NOC

Summary of EIA process and Rough Timelines



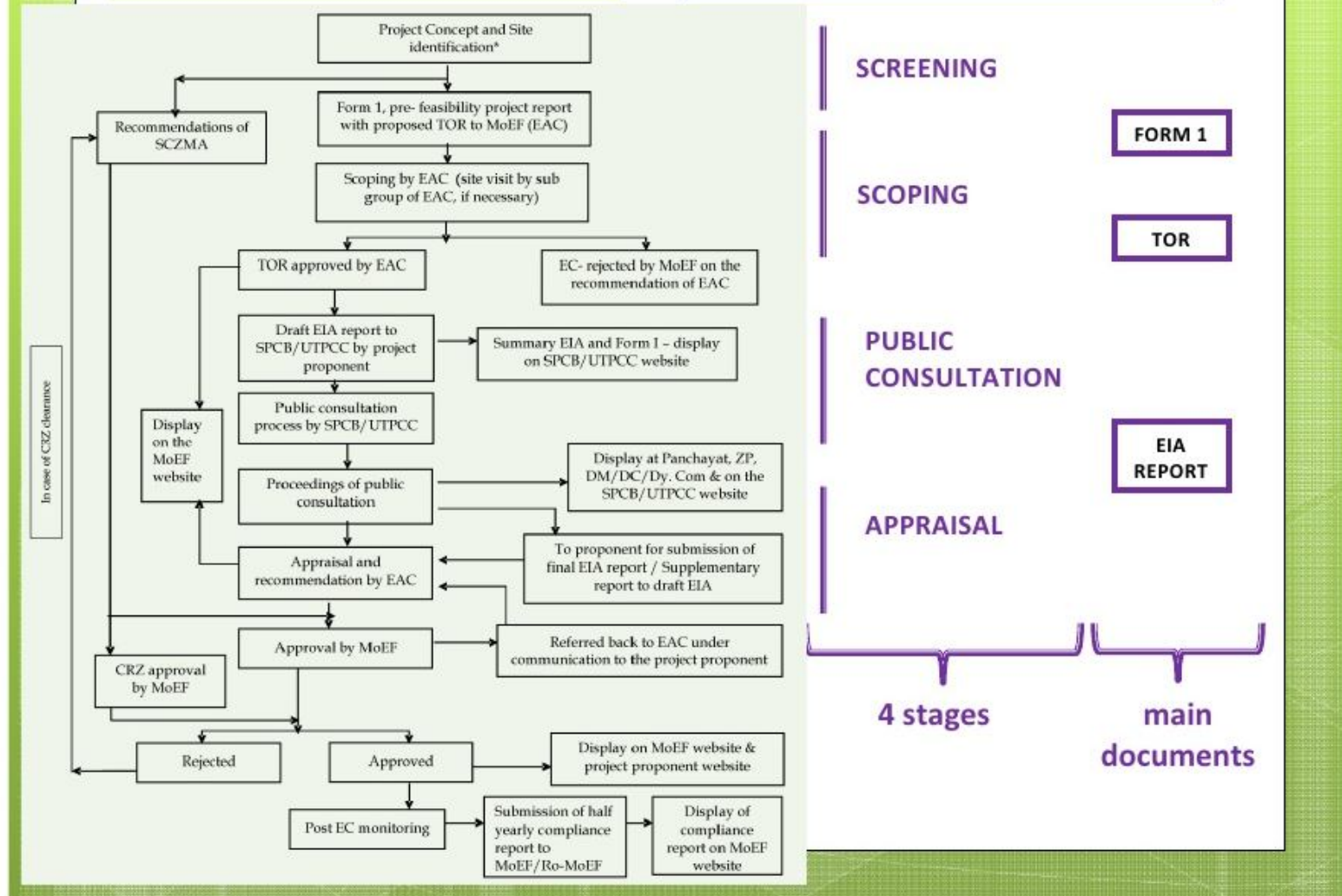


EXPERT COMMITTEE FOR ADMINISTERING EIA



Source: <https://www.slideshare.net/TanmayMishra2/eia-15098863>

EC process



Projects in Schedule classified based on potential impacts in 'Category A' and 'Category B1 & B2'

➤ Category A cleared at Central level (MoEF)

➤ Category B1, B2 at State Level (SEIAA/ SEAC)

Category A projects require mandatory environmental clearance and thus they do not undergo the screening process. **Category B projects** undergoes screening process and they are classified into two types. **Category B, projects** (Mandatorily requires EIA). **Category B2 projects** (Do not require EIA).

List of projects / activities requiring prior Environmental Clearance as per revised Notification – Sept 14, 2006.

Sr. No.	Main project or activity	Project / Activity
(1)	Mining, extraction of natural resources and power generation	(a) Mining of minerals (b) Offshore and onshore oil and gas exploration (c) Nuclear power projects and processing of nuclear fuel (d) River valley projects (e) Thermal Power plants
(2)	Primary processing	(a) Coal washeries (b) Mineral beneficiation
(3)	Materials processing	(a) Petroleum refining industry (b) Coke oven plants (c) Asbestos milling and asbestos based products (d) Chlor-alkali industry (e) Soda-ash industry (f) Leather / skin / hide processing industry.
(4)	Materials production	(a) Metallurgical industries (ferrous and non-ferrous) (b) Cement plants.
(5)	Manufacturing / fabrication	(a) Chemical fertilizers (b) Pesticides industries and pesticide specific intermediates (c) Petro-chemical complexes (d) Man made fibres manufacturing (e) Petrochemical base processing (f) Synthetic organic chemicals industries – dyes and dye intermediates, bulk drugs and intermediates (g) Distilleries (h) Integrated paint industry (i) Pulp and paper industry (j) Sugar industry (k) Induction / Arc furnaces / cupola furnaces – 5 TPH or more.
(6)	Service sectors	(a) Oil and gas transportation pipeline (crude and refinery) passing through national parks / sanctuaries / coral reefs / ecologically sensitive areas including LNG terminal (b) Isolated storage and handling of hazardous chemicals (as per threshold quantity indicated in Column 3 of Schedule 2 & 3 of MSIHC Rules
(7)	Physical infrastructure including environmental services	(a) Air ports (b) All ship breaking yards including ship breaking units (c) Industrial estates / parks / complexes / export processing zones / special economic zones (SEZ) / bio-tech parks (d) Common hazardous waste treatment, storage and disposal facilities (TSDF) (e) Ports, harbours (f) Highways (g) Aerial ropeways (h) Common effluent treatment plants (CETP) (i) Common Municipal Solid Waste Management facility (CMSWMF)
(8)	Building / Construction projects / Townships / Area development projects	(a) Building and construction projects (b) Townships and area development projects.



National Green Tribunal

- The National Green Tribunal Act (NGT) was established in 2010 under India's constitutional provision of Article 21, which assures the citizens of India, the right to a healthy environment

An Act to provide for the **establishment of a National Green Tribunal** for the **effective and expeditious disposal of cases relating to environmental protection** and conservation of forests and other natural resources including **enforcement of any legal right** relating to environment and **giving relief and compensation for damages** to persons and property and for matters connected therewith or incidental thereto.

- Began functioning on 4th July 2011 with the initial support of the MoEF
- Headquartered in Delhi, the tribunal has four circuit branches in Bhopal, Pune, Kolkata and Chennai

Thanks