CANDIDATE CODE : RWVW7

BARC0147 : Urban Physics
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Environmental Impact Assessment (EIA)
COURSEWORK

INTRODUCTION:

A key factor essential to any built structure is for it to efficiently fulfil its purpose while leaving the least possible impact on the environment. This can be ensured by a tool know as the 'Environmental Impact Assessment (EIA)'. As defined by the UNEP, the EIA is 'used to identify the environmental, social and economic impacts of a project prior to decision-making. It aims to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision-makers.' *(Ministry of Housing, Communities & Local Government, 2014a)*. Simply defined, the EIA process helps identify the possible environmental effects of a proposed activity and how those impacts can be mitigated. By using EIA both environmental and economic benefits can be achieved, such as lowered costs and time of project implementation, avoiding excessive repair work and impacts of laws and regulations. *(Cbd.int, 2011)*

IMPORTANCE OF AN EIA:

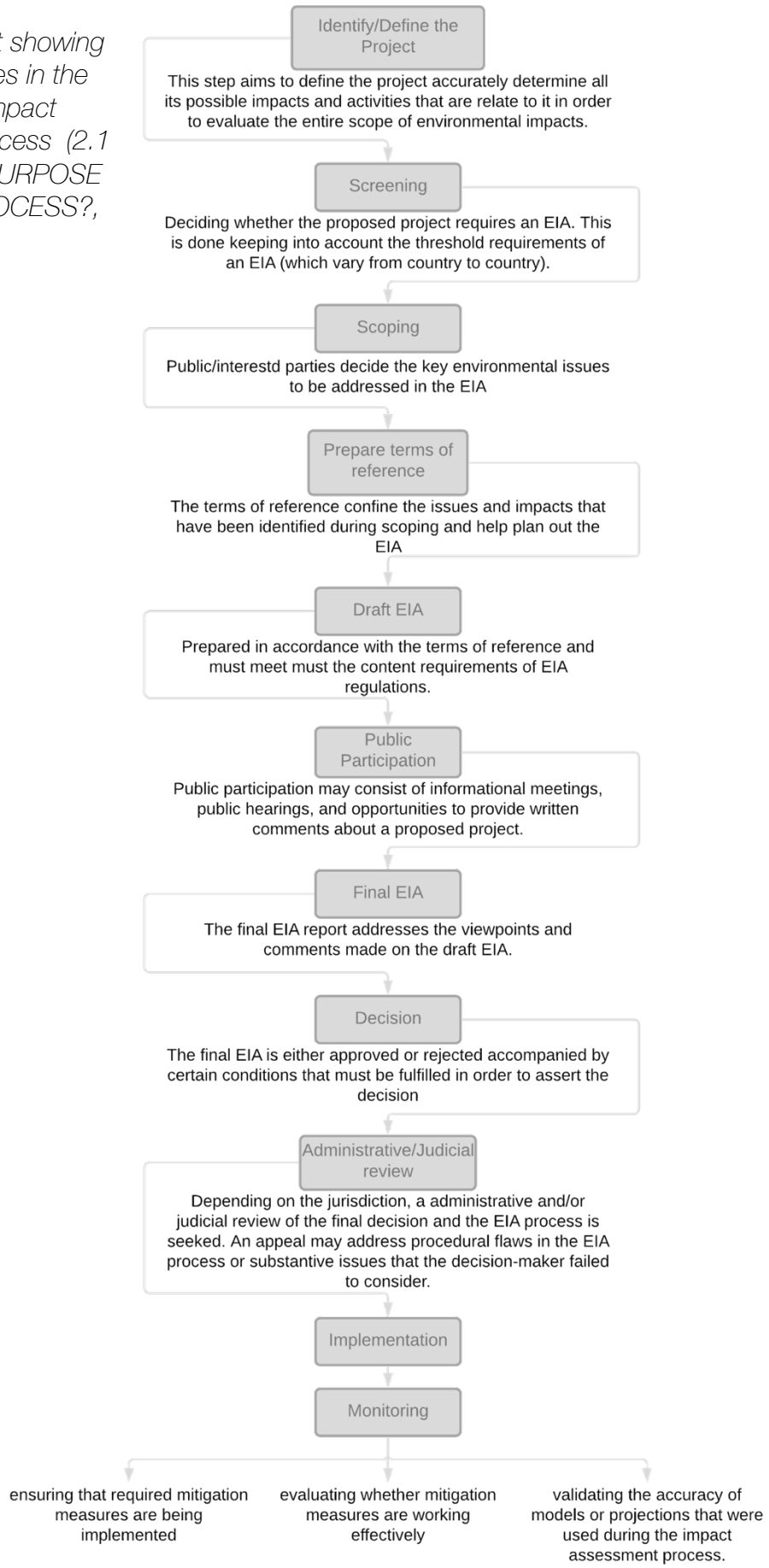
Human well-being is closely connected to environmental sustainability. As a result, all forms of human development, such as building infrastructure (i.e., roads and pipelines, mines, and tourism facilities etc.) have an impact on the surrounding natural environment and vice versa. Because of the complex relationship between the natural and human environments, it is very important to try to predict the environmental and social impacts of programs, projects and planned developments that may alter the quality of the environment and impact well-being. As the human population continues to increase and natural resources become more limited, the importance of improving the sustainability of development and identifying mitigation measures—and thus the importance of creating high-quality EIAs—becomes greater. *(IISD org, n.d.)*

STAGES OF AN EIA:

The entire EIA process consists of procedural steps that culminate with the EIA report. This report informs the responsible decision maker whether to approve or reject the project. These steps are illustrated in *figure 1*.The legal requirements of an EIA depend on the region of the proposed project. For instance, the United Kingdom follows the EIA law of "Town and Country Planning Act 1990" with regulations from the "Town and Country Planning (Environmental Impact Assessment) Regulations 2017", which only apply for England. It should be put into light however, that implementation and monitoring are the most essential steps as they govern the final outcome of the project. An important example is the case of the 'Timarpur-Okhla WTE incinerator' that failed in execution. The plant disregarded most of the guiding factors of the EIA presented prior to the project and because of lack of a proper system of implementation

and monitoring, it did not face any serious action even though it continues to cause harm to its social and ecological environment. The discrepancies between the approved project and the implemented project gave been summarised in *Table 1*. *(New Delhi Waste Processing Company Private Limited, 2006)*

Fig. 1: Flowchart showing the various stages in the Environmental Impact Assessment process (2.1 WHAT IS THE PURPOSE OF THE EIA PROCESS?, 2010)



Proposed Project	Deviations from Proposal
"The plant at Timarpur will process 650 TPD of garbage to produce 225 TPD of RDF. The Okhla site will process 1300 TPD of mixed garbage into RDF, and burn this together with the 225 TPD of RDF from Timarpur to supply 16MW of power."	The Timarpur plant was never made. All the RDF production and combustion (2050 TPD) now occurs only at Okhla.
"The Okhla plant will include a biodigester for 100 TPD of green waste."	Bio digestion isn't included.
"The power plant will have single boiler"	The power plant now has 3 boilers.
"There will be provision in the plant for firing methane gas produced from bio-methanation plant."	The bio-methanation plant is not included in the new plan. 100 TPD of green waste is reported to be burned directly to produce power.
"Depending on many factors, the gross calorific value of the fuel should be around 2600 cal/kg."	The gross calorific value of the fuel is now estimated to be 1100 - 1500 kcal/kg.
"For reducing moisture in the waste, a hot air generator will be provided."	The altered plan now has a drying mechanism built into the boilers which needs 45-60 minutes to reduce the moisture.

Table. 1: Deviations of the 'Timarpur-Okhla WTE Plant' from its proposed EIA

ASPECTS OF AN EIA:

An EIA discusses a range of factors that vary depending upon the nature of the proposed project considering its individual impact on the environment. This could be explained by taking the reference of the 'Okhla-Timarpur WTE Plant' which discussed the impact with regards to the soil, meteorology, ambient air quality, noise environment, traffic pattern and density, water environment, biological environment as well as predicted sources of emissions. It first outlined what activities are set to affect these factors, their predicted impacts and the extent of these impacts. Then it outlined an 'Environment Management Plan' to tackle these impacts. This shows how an EIA is an essential tool to combat ambient and ecological issues. *(New Delhi Waste Processing Company Private Limited, 2006)*

CLIMATE CHANGE:

The EIA helps assess how the proposed project and its surrounding environment might be impacted by climate change. It hence allows assessment of how these implications impact the performance and environmental consequences of the project. Finally, appropriate adaption and resilience measures can be put into place to address the issues of climate change outlined. A case study to illustrate this function of EIAs is the guidance put in place by the 'Canadian Environmental Assessment Agency'. The guidance indicates that, where the risks associated with climate change are associated with the private sector only, the project proponent can choose to absorb this risk. However, if the risks could potentially impact the project, they must be accounted for (and possibly mitigated) in the EIS. *(The Federal-Provincial-Territorial Committee on Climate Change and Environmental Assessment, 2003)*

AIR FLOW AND AIR QUALITY:

Controlling the quality of the ambient air is essential as it contributes towards human health and consequently towards climate change. This is affected by many factors that include location, traffic, industry and so on. In the 'Okhla-Timarpur WTE Plant' EIA report it was predicted that due to the particulate emissions from the RDF plant, the ambient air quality inside the premise would be below prescribed limits. To minimise the extent of this impact the provision for proper air pollution control equipment was made. *(New Delhi Waste Processing Company Private Limited, 2006)*

WATER:

It is inevitable that any industrial project requires abundant water availability and can reduce water quality caused due to potential effluent pollution. An EIA assesses a projects needs and

damaging potential and makes room to minimise it. The Indian case study revealed that the EIA outlined the plants high water requirements. Due to this high demand, it was decided to not use ground water. Instead it was decided that the plant's entire domestic requirement would be fulfilled from DJB (Delhi Jal Board) supply and the Plant's water requirement would be entirely from treated STP (Sewage Treatment Plant) water. Further, a treatment plant was set up for all the effluent release from the site for it to meet the quality criteria for disposal into a water body to not cause any adverse impacts. *(Shah, 2011)*

ACOUSTICS:
Any project must accommodate general standards of human comfort which include optimum noise in the environment. In the Indian case study, the EIA mentions that in the power plant, major noise producing equipment such as turbo generator, compressors will be provided with suitable noise abatement enclosures *(New Delhi Waste Processing Company Private Limited, 2006).* Equipment will be statically and dynamically balanced to eliminate any vibration that can lead to noise generation. Blow off valves, discharge pipes, relief valves and other noise producing static equipment will be equipped with silencers. Pipelines will be suitably sized to avoid excess velocities that can lead to noise generation. Wherever necessary, insulation will be provided for reducing heat loss and noise pollution. *(Shah, 2011)*

LIGHTING:
It is common knowledge that light pollution from urban cities has an impact on the ecological environment and affects mainly nocturnal organisms that are light sensitive. A baseline study, conducted during the EIA, could analyse the environment and identify the presence of such organisms and make the necessary adjustments to the project. The CIBSE Society of Light and Lighting (SLL) Lighting Guide 6: The External Environment, is one such source that lists regulations in terms of safety of organisms against light pollution *(Ministry of Housing, Communities & Local Government, 2014b)* and such sources inform the

DISTRICT HEATING/COOLING SYSTEMS:
To quote "the European Union has set an ambitious target for greenhouse gases emission saving (from energy production) in order to reduce the impact on global warming, of 40% in energy consumption by 2030 and 80 - 95% by 2050" and "the residential sector is responsible for 40% of the current total energy demand". And so district heating and cooling play an important role as centralized management for space heating / cooling has proven to be an effective way to reduce energy intensity (CO2 / kWh) *(Baltic Sea Region, 2020)*. The EIA, ensures that the water used and emissions of these systems are declared and hence, acts as an essential means to reach these environmental goals.

CONCLUSIONS AND RECOMMENDATIONS:

The EIA is a useful tool to map a project's social, ecological and energy impacts before its inception to produce something with a communal and environmental conscience if done with the proper legal and administrative measures in place. This is done through a series of processes that carefully analyze its environment and involve public participation. The EIA process, however, only sets guidelines that pilot its edifice. If the implementation is not monitored properly, as was seen in the case of the 'Timarpur-Okhla' case study, which majorly disregarded the proposed EIA, it can lead to failure i.e., a project that does not satisfy the community and deters the environment. This is also attributed to the difference in legislation

and legal processes of different regions. Through the process of research, it was also observed that the EIAs have been more successful in developed countries as compared to developing countries. Climate change and issues related to the environment are alarming issues the world face today and it is duty of all countries alike and tools like the EIA are one step to reducing our footprints on the planet and should be implemented more earnestly.

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