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ENVIRONMENTAL IMPACTS AND THEIR ASSESSMENT

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ABSTRACT

EIA is essentially a technique for drawing together, in a systematic way, expert qualitative assessment of a project's environmental effects, and presenting the results in a way which enables the importance of the predicted effects, and the scope for modifying or mitigating them, to be evaluated by the relevant decision-making body before a decision is given.

According to these definitions EIA should be used as a planning tool and as a decision-making instrument, but in reality EIA has not been used as a decision-making instrument at all. So, the main objective of this document is to provide information and guidance on Environmental Impact Assessment (EIA) such as Principles, Objectives, Benefits and History.

Screening is the most common method used to determine whether or not a project should be subject to an EIA. In this case, a sequenced approach is always appropriate to determine EIA requirement. If EIA is needed then scoping permits to decide which are the most relevant impacts, how to predict them and how to measure them.

To identify, measure and predict relevant negative environment impacts there are numerous models and procedures for the assessment of impacts on the environment or any of its factors. Some models are general with pretensions of universality, others are for specific situations or specific aspects; some are qualitative, others operating with large databases or sophisticated calculation tools, with static character, or dynamics, etc.

Finally, one thing that can be done in conjunction with identifying significant negative impacts is to consider appropriate mitigation measures to reduce negative impacts within reasonable environmental and economic constraints.

1. INTRODUCTION

During the past decade, there have been continuing efforts to improve coherence in the adoption of EIA practices and to identify basic principles and standards of good practice and guidelines on elements of an integrated approach between projects and environment.

In this case, the concept of Environmental Impact Assessment (EIA) evolved in a short period of time as a result of a fundamental change in the way of thinking about environment and development. A couple of years ago many attempts were made to replace the economic growth approach by the concept of sustainable development "that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Report 1987).

One of the basic premises for sustainable development is the recognition that environment and development are not mutually exclusive but complementary and interdependent and actually, in the long term, mutually reinforcing.

In defining sustainable development and environmental quality, the level at which decisions have to be taken is important as well and this document presents essential definitions and important practical points about EIA process. EIA report and EIA methods are described as a brief overview of this topic.

2. WHAT IS AN ENVIRONMENTAL IMPACT ASSESSMENT (EIA)?

Although it is known that development is a term related to growth, stability and modernization, we must recognize that it is a very complex concept. To move toward the state in which human beings needs are fully meet, it is necessary a stable and healthy environment, since this is the source of environmental resources we use and also the effluents receiver (emissions, discharges and unwanted waste). A project or activity is part of sustainable development when its effects do not exceed renewal rates or consumption, or the environmental components assimilation capacity.

In order to target projects with a sustainable development focus, the term Environmental Impact Assessment (EIA) appeared (more detail is considered in a brief history of EIA in section 2.1). Even though Environmental Impact Assessment (EIA) is nowadays a widely used term, it results convenient to write down a couple of definitions that will help us to understand relationships, methods and techniques commonly used in geothermal development EIAs.

One of the most complete definitions is the formal description of EIA by the UK Department of the Environment that Wood (1995) quotes:

"EIA is essentially a technique for drawing together, in a systematic way, expert qualitative assessment of a project's environmental effects, and presenting the results in a way which enables the importance of the predicted effects, and the scope for modifying or mitigating them, to be evaluated by the relevant decision-making body before a decision is given. Environmental assessment techniques can help both developers and public authorities with environmental responsibilities to identify likely effects at an early stage, and thus to improve the quality of both project planning and decision-making".

Another important definition is the one taken from a legal framework, so in this case a definition from General Law of Environment of El Salvador (Parliament of El Salvador, 1998) is written as follows:

"EIA is a set of actions and procedures to ensure that activities or projects that have a negative environmental impact on the environment or on the life quality of the population are submitted, from the preliminary stage, to procedures to identify and quantify those impacts and recommend measures in order to prevent them, to mitigate them, to compensate them or to potentiate them, as appropriate; selecting the alternative that best ensures the protection of the environment."

According to these definitions EIA should be used as a planning tool and as a decision-making instrument. It also should be viewed as a key mechanism to the abandonment of environmentally unacceptable actions and to the mitigation to the point of environmental viability of each proposed projects. However, practical experience from El Salvador shows that out of several thousands of

evaluated projects, during almost two decades, most of them were approved by authorities and if there were a few denied projects, the reason was not completely environmental.

It means that EIA has not been used as a decision-making instrument at all. Maybe, in some cases it has been used as a planning tool but in most of the cases the EIA represents just the way we turn a non-viable project into an authorized project. In other words, EIA has become a tool to authorize projects with knowledge of their environmental consequences.

2.1 Basic principles for EIA

There are some basic principles for EIA:

- *Purpose*: The EIA should report the intention and purpose for its execution, decisions taken in this regard and the results at a level of detail according to the budget of the environmental purpose.
- *Importance*: The EIA should provide and consider systematically all relevant, sufficient, reliable and usable information of the affected environment, the proposed alternatives and their impacts as well as the necessary steps to detect, clarify and investigate residual effects.
- *Credibility*: The EIA must be credible and believable, being carried out with professionalism, rigor, honesty, objectivity, impartiality and balance, ensuring controls and subject to independent verifications.
- *Transparency*: The EIA should be transparent and clear, with easily understandable content requirements, ensuring public access to information, identifying the factors that will be considered in decision-making and recognizing the constraints and difficulties encountered.
- *Utility*: The EIA should be effective and useful, helping to solve problems, getting acceptable decisions and conclusions, and feasible to be carried out by the promoter as well.
- *Efficiency*: The EIA should impose the minimum cost barriers in terms of time and funding for developers, project owners and the public, participants and other interested people, besides being consistent in meeting the requirements and approved objectives.
- *Completeness*: The EIA should be comprehensive and contemplate the interrelationships between biological, social and economic physical aspects.
- *Participatory*: The EIA should be participatory and provide appropriate measures to inform and involve the interested and affected public, incorporating their inputs and concerns in documentation and decision-making opportunities.
- *Flexibility*: The EIA must be adaptable and adjusted to the realities, results and circumstances that may appear throughout the process.
- *Achieving targets*: The EIA should achieve its goals and objectives within the limits of information, time, resources and available methodology.
- *Multidisciplinary*: The consulting team of an EIA should be interdisciplinary and multidisciplinary to ensure the use of appropriate techniques in technical disciplines, physical, biotic and socioeconomic.

2.2 Objectives of EIA

It is considered that EIA has two main objectives along time:

- The immediate objective (short-term) of the EIA is to ensure that environmental factors are considered in the decision-making process along with the traditional economic and technical factors.
- The ultimate goal (long-term) of the EIA is to promote sustainable development by ensuring that the project avoid or mitigate potential adverse environmental impacts and identify opportunities for beneficial impacts.

2.3 Principal benefits of EIA

If used properly, EIA can help to achieve the following benefits:

- Transparency and public participation in a decision - making process;
- Avoiding conflicts and increasing project acceptance;
- Identifying and forecasting significant negative effects of the project;
- Setting monitoring methods and processes;
- Integrating today needs with future generations goals;
- Improving project design considering alternative proposals; and
- Reducing capital and operation costs.

2.4 History of Environmental Impact Assessment

Environmental Impact Assessment (EIA) was first mention in the National Environmental Policy Act (NEPA) prepared in the United States in 1969 and signed into law by the President in 1970. It was the first legislation for EIA, requiring analysis of the environmental impacts of major actions significantly affecting the environment.

Australia, Canada, Colombia, New Zealand, France, Thailand, Ireland and West Germany soon introduced EIA provisions as part of their planning process and many international agencies have incorporated EIA in their development programs since that time, such as:

- In the UN Conference of the Human Environment in Stockholm in 1972, governments of many developing countries recognized the importance of environmental management.
- In 1974 the Organization for Economic Corporation and Development (OECD) recommended the member governments to adopt EIA procedures and methods, in order to grant aid to developing countries.
- In 1988 the European Commission (EC) introduced a set of guidelines on EIA, urging member countries to incorporate them in their national legislation.
- The World Bank introduced in 1989 its operational directive on environmental assessment.
- In El Salvador, the required legislation and setting up of appropriate institutions were completed in 1998.

2.5 Environmental impacts or effects

There is no doubt that each human activity makes changes in the environmental conditions and those may have positive or negative consequences, which are called impacts.

Some authors use the terms “impact” and “effect” as synonymous, but there is a difference between effects and impacts. It can be said that an effect just implies a change in the environment with no measure of how positive or negative is, and an impact includes the idea of the consequences (measurement of how positive or negative) of those changes caused by any human activity. This means that an impact affects quality of the environment, according to this definition every impact is also an effect but every effect isn´t an impact.

No matter how the words are defined, an environmental impact implies a human judgment/evaluation of environmental changes and the consequences of those changes. So an impact can be described in terms of its magnitude and significance.

3. EIA PROCESS

Whatever the scope and extent of an EIA, this must necessarily go through a series of phases in addition to fulfilling the objectives that were indicated in the definition of the EIA.

The EIA procedures used by different countries and agencies follow a more or less similar pattern as the original EIA process from National Environmental Policy Act (NEPA).

A general framework of the EIA process is represented in Figure 1 and is compound of a series of iterative steps:

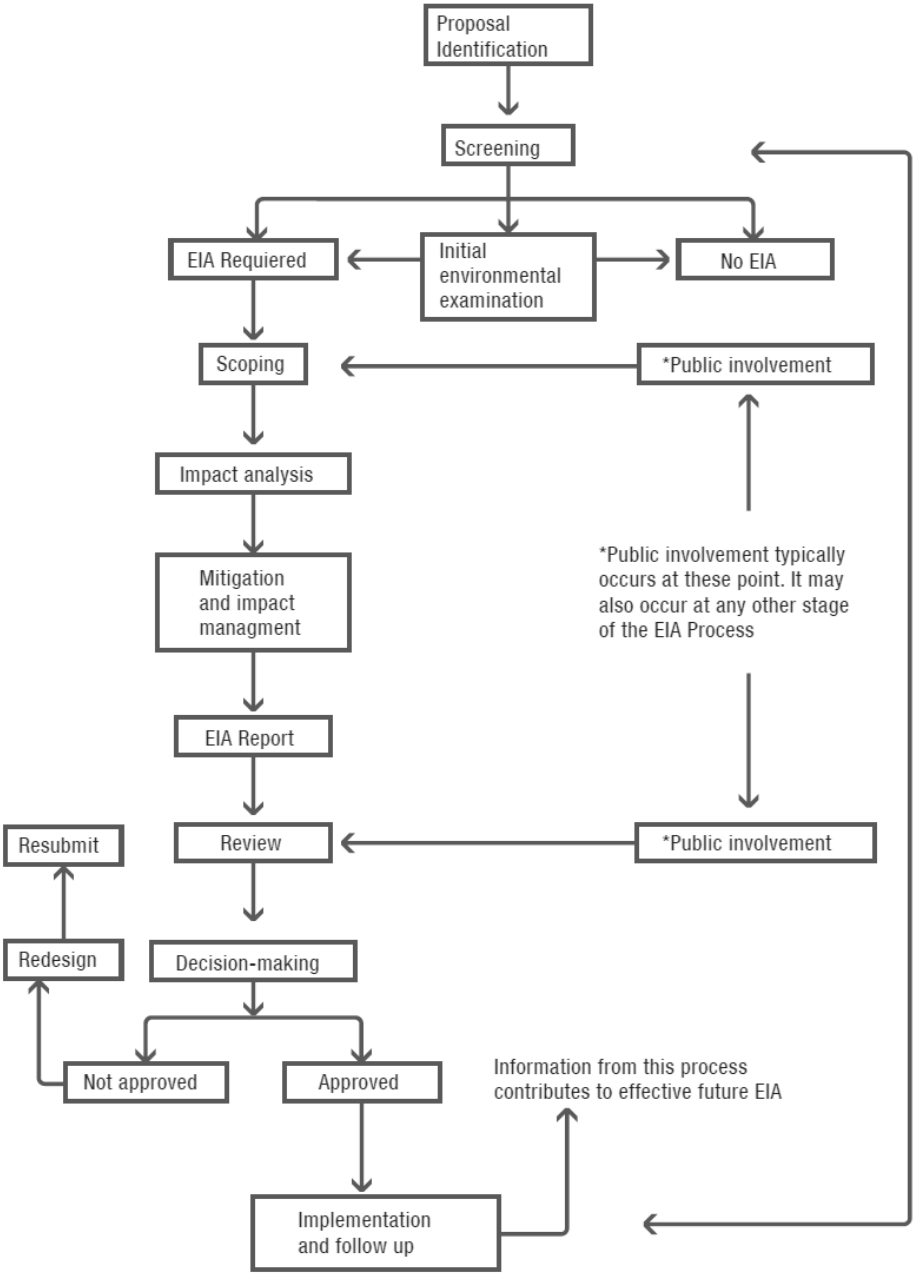

FIGURE 1: General EIA process

- Designing the selected proposal (proposal identification). This step includes various options to be analyzed in order to select the best one for achieving economic, social and environmental objectives of the project.
- Determining whether an EIA is necessary (screening).
- Deciding on the topics to be covered in the EIA report (scoping).
- Preparing the EIA report (i.e. describing the proposal and the environment affected by it and assessing the magnitude and significance of the impacts, designing mitigation and impact management system).
- Reviewing the EIA report on its adequacy.
- Making a decision on the proposal, using the EIA report and the opinions expressed in public involvement stage.
- Monitoring the impacts of the proposed activity if it is implemented.

In El Salvador EIA process can be divided into three phases well delimited. The first one is called "initial environmental evaluation" that includes screening and scoping steps. The second one is called "environmental impact assessment report evaluation" that includes impact analysis, mitigation and impact management, review, and resolution. Finally the third one is called "implementation, control and follow up" in which authorities conduct environmental inspections or audits to know the level of compliance for environmental impact mitigation proposals.

In this process, phases 1 and 2 (steps to obtain an environmental permit) commonly require between 20 and 160 weekdays to be completed, depending on the nature/complexity of the proposed project and if it requires EIA or not (Figure 2). These times do not include the time taken by the proponent to prepare all of the documentation to be submitted to the environmental authority.

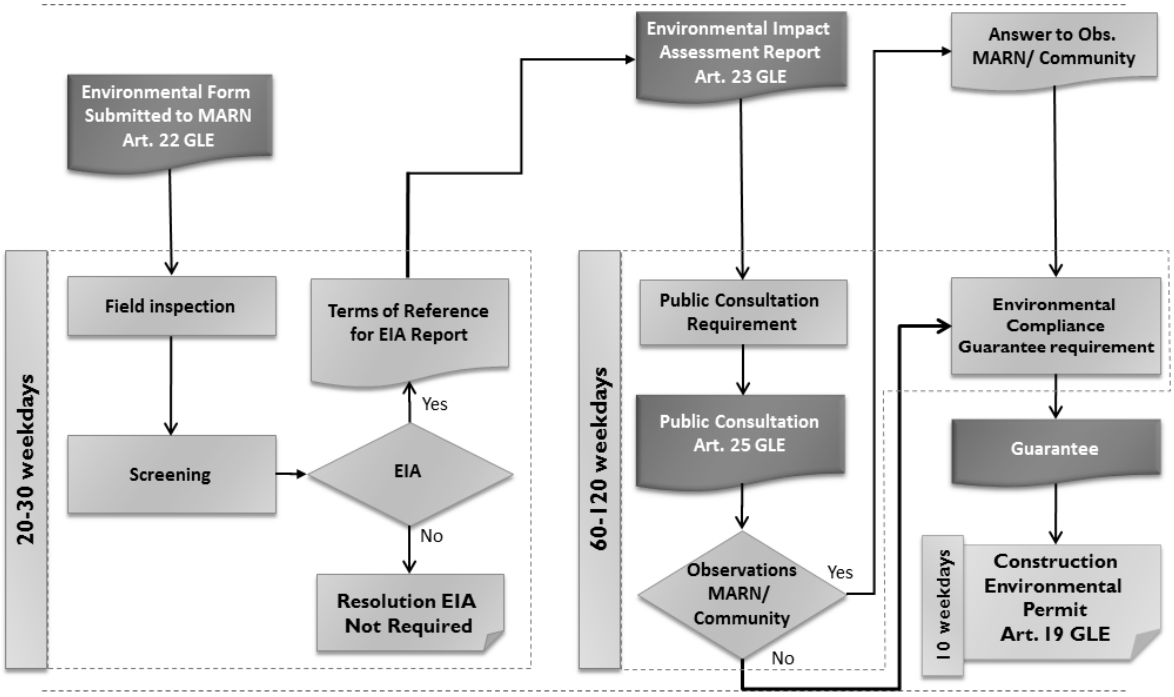

FIGURE 2: Steps of EIA process in El Salvador to obtain Construction Environmental Permit, adapted from MARN 2013

4. SCREENING: IS EIA NEEDED?

Screening is the most common method used to determine whether or not a project should be subject to an EIA and, if so, to define what level of detail is required. Screening has two main objectives:

- To identify projects that require EIA; and
- To make a quick and easy selection in order to avoid unnecessary delay in the process.

According to this, screening is the first fundamental decision of EIA process. Some sort of selection procedure is necessary due to the large number of projects and activities that are potentially subject to EIA. Screening criteria relate primarily to the magnitude and characteristics of the project and the environmental sensitivity of the environment, in Table 1 and Table 2 the detail of those criteria for Salvadoran geothermal projects are presented.

Screening consists in making a preliminary determination of the expected impact of a proposal on the environment and their relative importance. A certain level of basic information is required on the proposal and its location. The time required to complete the selection process depends on the type of project, the environment and the level of experience or knowledge about its potential effects.

Most of the proposals can be screened very quickly (within one hour or less) but some take longer, and some require an extended screening or initial environmental assessment. Similarly, most of the proposals may have little or no impact and will be screened out of the EIA process. Fewer proposals require further evaluation. Only the analysis of a limited number of issues (usually in large projects) ensure a full EIA because it is known or considered to have potentially significant adverse effects on the environment; for example, human health and safety, endangered species, protected areas, fragile or valuable ecosystems, biodiversity, air quality and water, or the lifestyle and livelihoods of local communities.

A sequenced approach for screening is always appropriate (Canter, 1999). A sequenced approach considers several levels in determining the potential significance of impacts from a proposed action. A sequenced approach is achieved by applying the following questions in the order shown (the answers to any question can be used to determine if an EIA report/EIS should be prepared):

1. Does the proposed project, plan, program, or policy cause impacts that exceed the definition of significant impacts as contained in pertinent laws, regulations, or executive orders?
2. Is a quantitative threshold criterion exceeded in terms of project, plan, or program type, size, or cost?
3. Is the project, plan, or program located in a protected habitat or land-use zone, or within an exclusionary zone relative to land usage? Is the environmental resource to be affected a significant resource?
4. Is the proposed project, plan, program, or policy in compliance with environmental laws, regulations, policies, and executive orders?
5. What is the anticipated percentage change in environmental factors from the proposed project, plan, or program, and will the changes be within the normal variability of the factors? What is the sensitivity of the environment to the anticipated changes; or is the environment susceptible or resilient to changes? Will the carrying capacity of the resource be exceeded?
6. Are there sensitive human, living, or inanimate receptors to the environmental stresses from the proposed project, plan, program, or policy?
7. Can the anticipated negative impacts be mitigated in a cost-effective manner?
8. What is the professional judgment of experts in the substantive areas, such as water quality, ecology, planning, landscape architecture, and archaeology?
9. Are there public concerns due to the impact risks of the proposed project, plan, program, or policy?
10. Are there cumulative impacts (this definition is shown in 7) which should be considered, or impacts related to future phases of the proposed action and associated cumulative impacts?

Another important point is that screening process can have one of four outcomes:

- EIA is not required;
- A complete and thorough EIA is required;
- A more limited environmental impact assessment is required (often called preliminary or initial assessment); and
- Further studies are needed to determine the level of EIA required.

In El Salvador screening process classifies geothermal projects into one out of three categories or groups. T. The specific criteria for geothermal projects can be seen in Table 2.

TABLE 1: Screening structure for geothermal projects in El Salvador

Group A	**Group B1**	**Group B2**
Low potential of environmental impact	Slight potential of environmental impact	Moderate potential of environmental impact
EIA not required	EIA not required	EIA required
Proponent asks for screening note	Proponent gets environmental authorization by receiving a Not EIA required Resolution	Proponent gest environmental Permit by receiving EIA report Approval Resolution

5. SCOPING: WHICH IMPACTS TO CONSIDER?

Scoping serves to identify expected results and important impacts in order to establish the terms of reference (ToR) for EIA. Thus, scoping is needed to decide what are the most relevant impacts, how to predict them and how to measure them. But not all these potential effects are important for the decision making. The scoping may differ in each environmental situation. In other words scoping ensures that the environmental impact assessment report focus on the significant effects so time and money is not wasted on unnecessary investigations as a result.

The purpose of scoping is to identify:

- Important issues to be considered in an environmental impact assessment;
- The limits of time and space appropriate for Environmental Impact Assessment Report;
- The information needed for decision making; and
- The effects and important factors to be studied in detail.

One thing that has to be considered in the scoping step is the stakeholder and public involvement. In this case each country has developed its own approach to include third parties opinions into official ToR prepared by the environmental entity. Considering that reality, there are four points that should be taken in count in each country:

- Each interested party should take responsibility for scoping. It's more than give an opinion.
- Authorities should notify and inform interested parties about ToR.
- Authorities should obtain views and concerns from participants in scoping.
- Involvement of interested parties should be as early as possible in the EIA process, it may be before scoping starts.

6. EIA REPORT / ENVIRONMENTAL IMPACT STATEMENT (EIS)

The outcome of the EIA process is usually a formal set of documents unified in one which is called "Environmental Impact Assessment Report" or "Environmental Impact Statement (EIS)".

The EIA report is the technical document, interdisciplinary, which incorporated in the EIA procedure, is intended to predict, identify, assess and correct the consequences or environmental effects that certain actions could cause to the quality of life of man and his environment.

TABLE 2: Activities and criteria for geothermal projects screening

Activities	**Criteria**		
Group A		**Group B1**	**Group B2**
Reparation or cleaning of well, equipment and pipelines	**Localization**	• In an operating geothermal field • Out of protected natural areas	• Out of an operating geothermal field • Out of protected natural areas
Replacement of pre-installed equipment, pipelines and distribution lines.	**Atmospheric emissions**	• Up to 100 t CO_2/day • Up to 10 t H_2S/day	• More than 100 t CO_2/day • More than 10 t H_2S/day
Production wells becoming reinjection wells	**Area**	• Up to 3 Ha inside geothermal field • Up to 5 Ha out of geothermal field	• More than 3 Ha inside geothermal field • More than 5 Ha out of geothermal field
Production or reinjection well testing	**Vegetation**	Up to 30 trees/Ha with 20 cm of diameter or more	More than 30 trees/Ha with 20 cm of diameter or more
Well startup operations and exploitation	**Access way**	Project does not require roads or requires less than 500 m of new roads to access project area (inside geothermal field)	Project requires new roads out of geothermal field or requires more than 500 m of new roads to access project area (inside geothermal field)
Stabilized hillsides smaller than 50 m and lower than 5 m	**Volume of dirt eviction**	Up to 10000 m^3 per platform	More than 10000 m^3 per platform
Superficial Exploration inside concession area including whole-drilling within 6 inches of diameter with no production goals.	**Slope**	Up to 30%	More than 30%
	Number of wells to be drilled	Up to 4 wells in existing platform	Any well drilled in a new platform inside operating geothermal field or geothermal concession.
	Capacity of generation	Setting up back pressure units with a maximum of 5 MW capacity of generation.	Includes the installation of units which capacity exceed 5 MW.
	Natural hazard	Natural hazards have been evaluated with a slight potential to occur (A2).	Natural hazards have been evaluated with a high (A3) or very high (A4) potential to occur.

The EIA report is to be used by all interested and affected parties in order to facilitate environmental decision-making.

This report is to be submitted, by the holder of the project, to make a statement or an estimate of the environmental impact. This study should identify, describe and assess in an appropriate manner all the foreseeable remarkable effects that the project would produce on the various environmental aspects. A general structure of an ideal EIA report is presented:

Cover page

- Title of the proposed project;
- Proponent(s);
- Lead consultant(s) – EIA coordinators;
- Contact address;
- Decision-making authority (where the report is submitted); and
- Date of submission.

Non-technical executive summary

- Brief concise overview in clear understandable language/terms; and
- Major findings and recommendations.

Table of contents

- List of sections and sub-sections;
- List of tables;
- List of figures; and
- List of appendices.

Introduction

- Background of the study (problem and aim);
- Status;
- Justification for the EIA; and
- Structure of the report (how to read the report).

Description of proposed activity

- Location;
- Construction phase; and
- Operation phase.

Description of present environment

- Site description (environmental aspects or themes); and
- Expected autonomous developments.

Identification, prediction and assessment of potential impacts

- Nature and magnitude of effects;
- Criteria scores;
- Assessment methodology (incl. assumptions/limitations); and
- Mitigation measures.

Public consultation

- Public participation and information programme.

Gaps in knowledge

- Incomplete or unavailable information.

Conclusions and recommendations

References

Appendices

7. EIA METHODS AND TECHNIQUES

Impacts resulting from proposed actions can be considered in one or more of the following categories:

- Beneficial or detrimental;
- Naturally reversible or irreversible;
- Reparable via management practices or irreparable;
- Short or long term recuperation;
- Temporary or continuous;
- Construction or operational phase;
- Local, regional, national, or global;
- Accidental or planned (recognized beforehand);
- Direct/primary, or indirect/secondary; and
- Cumulative or single.

Two essential terms from the categories above listed are direct/ indirect and cumulative; their definitions are as follows according to Council on Environmental Quality (1987):

"Direct effects are caused by the action and occur at the same time and place while indirect effects are caused by the action and occur later or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial."

"Cumulative impact: The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time."

Based on these categories of impacts, several options can be used to identify and determine the impact significance. Once all significant impacts have been identified, their potential magnitude and characteristics can be predicted. Impact prediction or forecasting is a technical exercise that uses

physical, biological, socio-economic and cultural data to estimate the likely characteristics and impact parameters (eg, magnitude, spatial occurrence etc.).

There are numerous models and procedures for the assessment of impacts on the environment or any of its factors, some models are general with pretensions of universality, other are for specific situations or specific aspects; some are qualitative, others operating with large databases or sophisticated calculation tools, with static character, or dynamics, etc.

It notes that most of these methods were developed for specific projects, thereby making it difficult to generalize, but are valid for other similar projects to those that gave origin the method in question.

In Table 3 is shown a summary of different EIA or techniques commonly used with its advantages or disadvantages. Based on the information in Table 3, the following observations can be made:

a) Each type of method has potential usefulness in more than one EIA study activity. In Table 4 can be seen a comparison between different methods applied to different activities.
b) In a given EIA study, several types of methods will probably be used even though the study may not completely document all of the methods used. Several reviews of actual method adoption in the EIA process have suggested lack of widespread usage; however, this usage probably reflects a focus on a few of the types of methods (such as matrices or checklists), and not the more inclusive list of methods contained in Table 3 and Table 4.
c) Each of the types of methods has advantages and limitations.
d) While numerous types of methods have been developed, and additional methods are being developed and tested, no universal method can be applied to all project types in all environmental settings. An all-purpose method is unlikely to be developed due to lack of technical information as well as the need for exercising subjective judgment about predicted impacts in the environmental setting where the potential project may occur. Accordingly, the most appropriate perspective is to consider methods as tools which can be used to aid the impact assessment process. In that sense, every method should be project and location specific, with the basic concepts derived from existing methods. These methods can be called ad hoc methods (e.g. MEL-ENEL method).
e) Methods do not provide complete answers to all questions related to the impacts of a potential project or set of alternatives. Methods are not “cookbooks” in which a successful study is achieved by meeting the requirements of them. Methods must be selected based on appropriate evaluation and professional judgment they must be used with the continuous application of judgment relative to data input as well as analysis and interpretation of results.
f) Methods which are simpler in terms of data and personnel resources requirements, and in technical complexity, are probably more useful in the EIA process.

One thing that can be done in conjunction with identifying significant negative impacts is to consider appropriate mitigation measures to reduce negative impacts within reasonable environmental and economic constraints.

Relative to practice in the United States, mitigation includes (Council on Environmental Quality 1987):

1. Avoiding the impact altogether by not taking a certain action or parts of an action;
2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
3. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
4. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
5. Compensating for the impact by replacing or providing substitute resources or environments.

These measures should be used in sequence or ease of application, beginning with avoiding the impact.

TABLE 3: Summary of different EIA or techniques commonly used

Types of Method in EIA	Advantages	Disadvantages	Examples
Checklists	- Easily to use and understand. - It is a very good method for selecting location and priorities definitions. - Simple classification and weighing.	- It does not make a difference between direct or indirect impacts. - It does not establish a link between action and impact. - Weighing process can be controversial.	- Simple - Descriptive - Scaled - Scoring
Matrices	- It links action and impact - It is a very good method to present results	- It is difficult to differentiate between direct and indirect impacts - It exists the possibility of duplicating impact scores	- Leopold - Stepped - Scoring - WB method - Moore - Clack - Canter - ESCAP
Network systems	- It links action and impact - Useful to simplify secondary studies	- It could become complex	- Sorensen - Applied networks - Impact trees and chains
Overlay mapping (GIS)	- Easily to understand - It is a very good tool for locating projects and impacts - It is used to approach closely and show potential impacts	- It could be overwhelming - Inadequate for evaluating occurrence probability	- Transparent superposition - Tricart - Falque - Mc. Harg
Indicator based methods	- It is more accurate	- It requires trained environmentalist or specific specialists	- Holmes - Georgia University method - Davies - Global Index
Simulation methods	- It admits a temporary variable. - It permits a very accurate forecast	- It requires trained environmentalist or specific specialists	- Systems analysis
Quantitative methods	- Allows to describe affected environment - It permits impact prediction	- Communication of results can be complex.	- Batelle-Columbus
Ad-Hoc methods	- Based in one or more methods		- Teresa Estevan Bolea Domingo Gómez Orea - Vicente Conesa Fernandez- Vitora

TABLE 4: Comparison between different EIA methods applied to different activities

Types of Method in EIA	**Scoping**	**Impact Identification**	**Describe Affected Environment**	**Impact Prediction**	**Impact Assessment**	**Decision Making**	**Communication of Results**
Checklists		X	X				X
Matrices	X	X		X	X	X	X
Network systems		X	X	X			
Overlay mapping (GIS)			X	X	X		X
Indicator based methods			X	X	X	X	
Simulation methods			X	X			
Quantitative methods			X	X			
Ad-Hoc methods	X	X		X	X		

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