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Report on Mission to the Environmental Protection Commission Manama - Bahrain

FORMULATION OF AN EIA POLICY FOR THE STATE OF BAHRAIN

During the period 7 - 17 November 1995

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The views expressed in this report are those of the author and do not necessarily reflect those of the United Nations Economic and Social Commission for Western Asia.

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Executive Summary

The main objective of Environmental Impact Assessment (EIA) is to provide sufficient information about environmental impacts of a proposed project and/or wide-scale policy plan in order to enable the competent authorities to take environmental sound decisions or to establish environmental sound plans.

It became very clear early in the mission that what was urgently required for the immediate short term was the development of an EIA general policy that can be used as a platform to debate and discuss its applicability within the circles of the government, with emphasis on industrial developmental projects.

This report presumes knowlege of previous efforts, achievements and documents addressing and influencing the management of EIA in Bahrain. It provides a very brief assessment of the current practices utilized by the Bahraini Authorities to license activities of potential environmental impacts. Recommendations designed to upgrade the current Environmental Protection Committee's (EPC) screening practices were provided through technically and administratively feasible instrumentalies.

However, the plurality of the report is dedicated towards the development of an EIA policy to be adopted on the long run by The State of Bahrain. A step-by-step (cook book) approach was utilized to illustrate how the proposed EIA policy can be devised and imbedded into the already functioning institutional framework. The steps included the identification of the country strategy, an analysis of the institutional framework, identification of gateways, commitments categorization, identification of the environmental legislation's in effect, and finally the institutelization of EIA.

Other peripheral issues related to EIA and of matter to the EPC such as the means for strenghtening the EIA local capabilities, criteria for selecting EIA consultants and methods of involving the concerned communities in the EIA process were also addressed as requested by Bahrain EPC.

I. INTRODUCTION

The main objective of Environmental Impact Assessment (EIA) is to provide sufficient information about environmental impacts of a proposed project and/or wide-scale policy plan in order to enable the competent authorities to take environmental sound decisions or to establish environmental sound plans.

The sub-objectives are:

1- To visualize the environmental impacts of proposed major projects or wide-scale policy plans.
2- To identify alternatives and additional environmental provisions and their respective impacts.
3- To identify environmental benefits and drawbacks of the project.
4- To identify the critical environmental problems which require further study (the so called "gaps in knowledge and information").
5- To examine and compare the impact of proposed activity and each of the alternatives.
6- To involve the public in decision making in order to obtain specific local information, and to raise the environmental awareness.

The focus of the mission solicited by the Bahrain Environmental Protection Commission (BEPC) supports an important premise of EIA, that Sustainable Development (SD) is achieved most efficiently when negative environmental impacts are identified and addressed at the earliest possible planning stage.

It became very clear early in the mission that in addition to the "on the job training" officially solicited by BEPC for its staff members involved with EIA, what was urgently required for the immediate short term was the development of an EIA general policy that can be used as a platform to debate and discuss its applicability within the circles of the government, with emphasis on industrial developmental projects. This change in the original mission plan was suggested and agreed upon by The BEPC Vice Chairman and his senior staff members in charge for the EIA program.

This report presumes knowledge of previous efforts, achievements and documents addressing and influencing the management of EIA in Bahrain. (El-kholy, 1993; Feates 1991; Environmental Management in Bahrain 1994; Tortell, 1994; Kuwari and Raveendran, 1990; ESCWA, 1987 and Hamza, 1992. It provides a very brief assessment of the current practices utilized by the Bahraini Authorities to license activities of potential environmental impacts. However, the plurality of the report is dedicated towards the development of an EIA policy to be adopted on the long run by The State of Bahrain. Other peripheral issues related to EIA and of matter to the BEPC such as the means for strengthening the EIA local capabilities, criteria for selecting EIA consultants and methods of involving the concerned communities in the EIA process were also addressed as requested.

II. EVALUATION AND UPGRADING OF CURRENT ENVIRONMENTAL SCREENING PRACTICES IN BAHRAIN

In The State of Bahrain, BEPC is entrusted with the overall protection of the environment to conform with the Amiri Decree No. 7 of 1980. Among its stated responsibilities, BEPC should coordinate between the different Government agencies regarding development activities to ensure environmental considerations during the implementation stages. Based on this specific mandate, BEPC has been favored to sponsor and manage EIA studies in close coordination of other sectors of the Government.

While each government has its own approach to an EIA process, they all tend to start with a simplified environmental screening. Screening should be designed to encourage developers and agencies operating in Bahrain to incorporate environmental considerations into the conceptual stage of project development. It is currently used as a necessary and routine part of the overall planning process in some of (but not all) the government sectors. Through its use, they should be able to identify all potential areas of adverse environmental effects in the very early stages, before irrevocable actions are taken and costly design changes, modifications or mitigation's are required. Due to its relatively high cost, it is very crucial that EIA's be cost-effective. Sound environmental screening of the proposed projects should ensure that "nothing but" only relevant projects are assessed with a full EIA.

As a current practice, BEPC uses questionnaires (Data Form) to be filled by the proposed Project Proponents (PP) or their environmental consultants as a prerequisite for Environmental Licensing (EL). The questionnaire, originally developed for proposed industrial projects, is distributed to the applicants through The Ministry of Oil and Industry (MOI) acting as a Gateway. Once filled and dispatched to BEPC, The Data Form is reviewed and validated by its EIA staff. If no impact is projected, the BEPC grants an EL stipulating appropriate mitigation measures and monitoring programs. If an impact is projected, then BEPC decides on the necessity for a full EIA. The decision is usually reached within less than two weeks from the date the documents are received from the Gateway.

A. Assessment of Current BEPC Screening Practices:

The questionnaire used in the environmental screening process is very comparable to those utilized to environmentally license industrial projects in other countries of the region (GCC 1995) such as Saudi Arabia and Kuwait. It is a typical screening at the conceptual stage of the project development and meant for the basic purpose of determination whether the proposed project requires and EIA or not.

In Bahrain, the decision on whether the proposed project needs and EIA or not, is mostly based on the comparison with adopted regional and/or international environmental standards. However, in many cases the decision stems from the professional judgment, experience and some times the intelligent speculations of the assessors.

Unfortunately, the role of BEPC in this connection stops at the level where decision is taken at the end of the environmental screening process. It should be recognized however, that EIA is a ceaseless process which commences during the project planning phase and concludes by project decommissioning and/or abandonment.

The evaluation process currently utilized by BEPC for deciding on the necessity for a full fledged EIA seems to suffer from the following significant difficulties:

- Inadequate manpower resources;
- Lack of adequate and/or accessible database;
- Lack of conceptual and systematic methods for evaluation and decision making;
- The screening questionnaire is exclusively devised to address industrial development projects only. Land reclamation screening and integrated EIA procedures are being developed with the assistance of UNDP;
- The exclusive reliance on the existing qualified expertise within BEPC without coordination and/or consultation with national leading agencies. Due to the multi-disciplinary nature of the process, it is frequently necessary to deliberate with experts in diversified fields (not available at BEPC) such as archeology, sociology, demography etc. It seems important to develop the network, mechanism, and resources needed to make such coordination, consultation and deliberation possible.

B. Recommendations to Upgrade the Current BEPC Screening Practices:

The following, simple yet meaningful recommendations might be adopted to improve the efficiency and reliability of the existing environmental screening process.

1. Suggested modifications in the Data Form:

(a) In order to avoid any environmental surprises, a "warning statement" should be attached to the last page of the data form to read the following "The developer is liable and will bear the cost of mitigation measures needed to control any unforeseen environmental impacts proofed to be resulting from the proposed project during construction, commissioning, operation and/or abandonment. The risk of ignoring a prescribed mitigation measure means that the subsequent expensive add-on control measures will need to be implemented".

(b) An additional brief section might be added to cover the potential impact of the proposed activity on the socioeconomic aspects, historical and cultural resources of the area.

(c) The Data Form should be titled "Data Form For Environmental Screening of Industrial Projects" rather than "Data Form For Environmental Impact Assessment of Industrial Projects".

(d) The form should be open-ended and not restricted to a predefined list of chemicals only. Blank space should be left for the developer to register all other chemicals to be emitted to the environment in addition to what is being listed.

2. Suggested Modification in the Screening Process:

(a) The role of BEPC is abrupt and expires right after the screening decision is made and the issuance of EL. It is suggested that BEPC should extend its current role to include (at least) one field inspection visit during construction and another during commissioning to verify the compliance of the PP with mitigation measures cited earlier by BEPC as a condition for EL. A statement to this effect should be added to the Data Form following coordination with MOI.

(b) BEPC should compile and publish information on environmentally sensitive location in the country and delineate them on coordinated maps. The list of Environmentally Critical Areas (ECA) should be communicated to the Central Planning Unit (CPU) at the Ministry of Public Work and Agriculture (MPWA) to avoid any further exploitation of these areas.
The ECA in which projects should be subject to EIA includes:

- Soil conservation areas;
- Areas subject to desertification;
- Habitats of value to protection and conservation and/or sustainable use of fish and wildlife resources, particularly wetlands, mangrove swamps and coral reefs;
- Areas of unique interest (historical, archaeological, aesthetic, scientific, etc.);
- Areas of particular social interest to specific vulnerable population groups (e.g. nomadic people).

The same lists and/or maps can be used by BEPC staff as a screening tool to decide on whether the proposed activity should undergo full fledged EIA or not.

(c) BEPC should compile and publish positive and negative lists of EIA exempted activities or activities requiring EIA known as Environmentally Critical Projects (ECP). The ECP that should be subject to EIA studies should include the following:

Heavy Industries

- Non-ferrous metal industries
- Iron and steel mills
- Petroleum and petro-chemical industries
- Smelting plants

Resource Extractive Industries

- Major mining and Quarrying projects
- Major groundwater resources extraction
- Oil and Gas exploitation
- On shore and off shore oil and gas exploration

Infrastructure Projects

- Power plants
- Reclamation projects
- Major roads and bridges
- Airports and harbors
- Wastewater treatment plants
- Major hazardous waste disposal facilities

The lists compiled by GCC countries and the European Economic Community (Appendix I) for EIA can be used as a guiding model. The United Kingdom archetype (Appendix II) of criteria and thresholds used for the identification of ECP can be easily followed by BEPC to compile their own ECP and use them as a screening tool.

C. Tools For BEPC To Carry Out Environmental Screening:

The following segment is furnishing the proper methodologies to carry out an environmental screening as a part of an integrated EIA process. There are several available methods to conduct environmental screening. They include:

- General Assessment Method: It involves a general evaluation of an activity in terms of parameters such as land area affected, total project costs, etc. This method constitutes a part of the Data Form (page 1) prepared by BEPC. Despite, the method is quick and simple, it suffers from relative inaccuracy.

- Sensitive Area Method: There are two approaches commonly used in the sensitive area method. **One** is to assess the capacity of the area concerned in accommodating the activity without adverse environmental impact. **The other** is to study the nature of the area in connection with the proposed activity. For instance, a residential district would be a critical area to noise pollution. Screening can also be achieved by checking if the proposed activity is falling within the ECA list that should had been compiled earlier by BEPC.

- Positive and Negative List Method: It involves the setting up of a matrix with the main project-related parameters along one axis and the environmental parameters along the other. (Guide for Environmental Screening 1978). The environmental and socio-economic interaction of each pair of parameters (one from each group of parameters) is examined for possible adverse impact. If certain areas of potential adverse impact are discovered, a second level matrix is constructed for these areas only. In the end, if there is no adverse impact or such adverse impacts even though exist can be resolved, there will be no need to go into detailed EIA.

- Initial Environmental Evaluation (IEE): If for some reason (such as lack of environmental data needed for screening, unconfirmed likely impacts etc.), all the above methods cannot be used for screening, then, as a last resort, it is advisable for BEPC to undertake a short and focused IEE.

D. Criteria For Making Screening Decisions:

There are several general criteria that BEPC can use when making a decision as to the environmental effect of an activity. These criteria are not mutually exclusive but are very much interrelated.

- Magnitude: This is defined as the probable severity of each potential impact. Question that BEPC's EIA staff should have an answer for are: Will the impact be irreversible? If reversible, what will be the rate of recovery or adaptability of an impact area? Will the activity preclude the use of the impacted area for other purposes?

- Prevalence: This is defined as the extent to which the impact may eventually extend. Each effect when taken separately might represent a localized impact of small importance and magnitude but a number of impacts could result in a widespread effect. Coupled with the determination of cumulative and/or synergistic effects is the remoteness of an effect from the activity causing it. The deterioration of fish production resulting from an industrial activity could affect fish yields in an area many miles away down stream.

- Duration and Frequency: The significance of duration and frequency can be explained as follows: Will the activity be long-term or short-term? If the activity is intermittent, will it allow for recovery during inactive periods?

- Risks: This is defined as the probability of serious environmental or health effects. The accuracy of assessing risk is dependent upon the knowledge and understanding of the industrial activity and its potential impacts.

- Importance: This is defined as the value that is attached to a specific area in its present state. For example, a local community may value a short stretch of beach for bathing or a small marsh for hunting. Alternatively, the impact area may be of a regional, provincial or even national importance.

- Mitigation: Are solutions to problems available? Existing technology might be able to provide a solution to an industrial pollutant emission problem.

E. How BEPC Can Assess The Significance of Impacts?

Once the environmental effects of a proposed action have been identified, the next step is for BEPC's EIA team to decide on whether they are significant. **One group** of impacts is easy to estimate, i.e. impacts for which there are standards, criteria, codes, regulations or objectives. **A second group** have to be estimated on the basis of qualitative judgments, which should be assisted by some of the following:

- Opinions of qualified decision-makers in sectoral ministries;
- Opinion of specialists form national leading agencies (environmentalists, ecologists, geographers, hydrologists, agronomists, sociologists, urban planners, etc.);
- Past precedents and learned experience from similar projects;
- Public opinion;
- Uniformity of the proposed activity with the government's general development policy and objectives.

F. How BEPC Can Identify Alternatives?

BEPC might face a situation where alternatives should be suggested in order to license a proposed activity. The optimum alternative assists the decision maker to achieve a stated objective with the least adverse and the greatest beneficial environmental, social and economic consequences.

Alternatives to be considered for project approval include:

(a) Alternative Locations: By choosing a better location the impact on the environment could be reduced. ECA should be avoided;

(b) Alternative Technology: By choosing the right technology the sustainable use of raw materials, emissions, energy use and land use can be influenced;

(c) Alternative Mitigation: Source oriented mitigative measures are to be preferred to effect-oriented measures;

(d) Alternative Phasing: A stepwise approach can be better than a large development at once. By changing the scale of the project, problems can be avoided;

(e) Autonomous Development: Not doing the project will induce the autonomous development. This alternative is also called the **"Zero Alternative"** can be considered in some cases as a realistic alternative. In most cases however, it is only used as a point of reference with respect to the impacts of the proposed activities or alternatives.

G. How BEPC Can Decide On Mitigation Measures?

After the potential impacts have been identified and then minimized through alternative choices, the BEPC will be faced with the question "What can we do about them?"

A wide range of actions may be proposed to prevent, reduce, remedy or compensate each of the potential adverse impacts as follows:

(a) Design Changes: Changing project sites, routes, raw materials, fuels, methods, design, etc;

(b) Environmentally Sound Technologies (EST): Interfacing BEPC with the UN-EST network clearinghouse (currently under development) will provide free access to EST information. The information can be used to insure the adaptation of the best EST in the proposed project;

(c) Waste Control: Introducing pollution control, waste treatment, monitoring;

(d) Compensation: Offering the restoration of damaged resources, money to affected people.

Impacts for which mitigation is unknown or poorly developed should be identified for scoping EIA studies.

H. Monitoring Measures:

Environmental monitoring might be needed for the following three reasons:

(a) To ensure that legal standards for effluents are not exceeded ;

(b) To check that mitigation measures are implemented in the manner described in the environmental screening report and/or related documents;

(c) To provide early warning of environmental damage so that actions may be taken to prevent or reduce the seriousness of the unwanted impact.

A number of different monitoring activities are relevant as follows:

(a) Baseline monitoring refers to the measurement of environmental parameters during a representative period. It determines the nature and ranges of natural variation;

(b) Impact monitoring involves the measurement of parameters during project construction, implementation and operation in order to detect environmental change which may have occurred as a result of the project;

(c) Compliance monitoring takes the form of periodic sampling of levels of e.g. waste discharge, noise levels or similar pollutant emissions to ensure that conditions are observed and standards met.

I. What Are The Possible Screening Decisions?

Using the given criteria, the possible screening decisions can be as follows:

(a) No-Effect: It should be very obvious when an activity is definitely not expected to have an effect on an area of the environment. For instance, if an industrial project site is at an inland area lacking contact with the marine environment of any description, environmental subject areas such as physical-chemical/marine water, sediment, ecological/aquatic, aesthetic/marine water will be identified as "No-Effect" unless the operation is expected to cause the generation of large volume of wastewater that can reach and impact the nearshore marine environment;

(b) Potential Adverse Environmental Effects are Known But Are Not Considered Significant: It is however the responsibility of the PP and their environmental consultant to develop through their own resources or in coordination with BEPC an acceptable environmental design solution;

(c) Unknown Significance of Potential Adverse Effects: If for any activity there is a lack of knowledge on the possible environmental effects, then the activity should be rated as having "Unknown Significance". For example, if an industrial project leads to some nearshore pollution and the screener does not know the extent of use of that coastal area (fish spawning, migration, coral reefs, etc.), then the effect would be classified as unknown. A network of contacts should be installed in BEPC in an attempt to fill in the information gaps whenever they exist. Such consultation could result in the identification of the adverse effects and environmental design solutions to mitigate them. If data are not available, then, an IEE on this particular aspect of the project would be indicated unless a conservative design is employed to avoid all possible adverse effects. If an IEE is required, the results of the screening would be extremely valuable in converging the IEE and for continued direction of the study to prevent data collection in unnecessary areas. The review of the IEE will indicate to BEPC whether alternative (a) or (d) below should be followed;

(d) Significant Effects: Judgments on the significance of environmental effects are based on scientific/technical factors and/or the potential to create concern and controversy in the public/professional community. This means that a full EIA study is needed.

III. FORMULATION OF AN EIA POLICY IN BAHRAIN

In most of the developing countries, EIA is portrayed as an undesirable additional financial burden, an unnecessary reason of delay to development while, its associated mitigation measures, monitoring routines, follow-up procedures are very costly and require a crowd of qualified and trained cadres. The lack of background data and the shortage in data systems and environmental projection's and assessment's tools are posing additional hurdles towards the of implementation of EIA procedures.

The most logical starting point for the creation of such integrated framework for implementing EIA in The State of Bahrain is the formulation of an EIA policy. The development and execution of this policy is basically the responsibility of the central government authorities. Within the adopted policy, some of the activities will be imposed on investors and developers. The sponsoring of EIA, preparation of EIS, application of project's alternatives, implementation of mitigation measures and performance of regular post-project environmental monitoring programs are some of these imposed activities.

The purpose this section of the report is to portray how Bahrain can devise a policy to imbed EIA procedures into its already functioning institutional framework. This report should serve as a universal base or forum for the country to debate, discuss, amend and draw draft for its own EIA policy and/or use it as a platform to support the EIA policy implementation process. Even though, it is recognized that there is no set recipe for drawing an EIA policy, a step-by-step (cook book) approach (to the maximum possible extent) is attempted to elucidate how an EIA policy can be developed and implemented in Bahrain.

A. How Can Bahrain Devise an EIA Policy?

In order to establish an EIA policy in Bahrain, the following four major aspects considered as pillars for any EIA system have to be fully recognized:

(a) The creation of the legislation's, by-laws and guidelines that govern and regulate the EIA process within the government's circles;

(b) The development of a central EIA decision making authority under the auspices of BEPC that can be responsible for the implementation, control, follow-up and enforcement of EIA;

(c) The systematic development of the essential infrastructure (capacity building) needed for the implementation of EIA. This also encompasses man power appointment, training and skill upgrading of local practitioners;

(d) The appropriation of the financial means for the implementation of the developed policy. This might be achieved by imposing application fees surcharging the EIA cost of the proposed projects to PP.

Step One: Identification of the Country Strategy:

The country strategy and commitment has to be lined-up toward the protection of all natural resources and to their proper management for the interest, security and sustainable socioeconomic development of the country. Statements reflecting these national commitments should be enshrined in the country's constitution.

In Bahrain commitments of this nature do already exist in the country's constitution. However, it seems that difficulties emerge with the transliteration of these commitments into implementation.

Step Two: Analysis and Restructuring of Institutional Framework:

The success of EIA as an instrumentality to ensure that development projects are environmentally valid and sustainable, depends to a large extent on the existing environmental institutions of the country. The purpose of this step is to review the mandates of existing environmental entities in Bahrain, identify their capacity in carrying out EIAs and recommend reforms for their structures and functions. However, the logical starting point is to work with BEPC as the already functioning institution.

- Generally, the government authority involved with EIA procedure could be a fully independent body, especially created for this purpose, or it could be an existing body with other responsibilities such as BEPC. In broad terms, existing BEPC is well situated to take upon the responsibility for sponsoring and steering the EIA processes;
- It is then, the responsibility of BEPC to reform and establish an EIA Division (EIAD) within its organizational structure that is capable to manage, technically sponsor, audit, follow-up and enforce EIA studies;
- Additionally, for each specific EIA a sub-committee has to be created, with expert members attached to it from sectoral or line ministries, universities, research institutions, etc., who possess specific knowledge of aspects involved in the proposed activity. These sub-committee or panel members should not be permanent elements of the panel, but should be contracted for each specific EIA independently as deemed necessary. The organizations represented in this sub-committee should agree to coordinate their actions in dealing with each specific activity. The coordination will emphasize on the aggregation and application of environmental protection measures that are found in discrete legislation's, scattered regulations and sectoral decrees or provisions.

It should be recognized that there is no universal model or set of institutions that will be satisfactory in every situation. In addition, institutional arrangements are usually influenced by the socio cultural and political contexts of country. If dramatic or complex organizational restructuring or changes are deemed necessary in Bahrain, it is preferable to implement them incrementally, allowing personnel and systems to assimilate the impacts of change gradually and providing the time for funding, staffing and training so that the new functions begin as smoothly as possible. Experience does show, however, that institutional rearrangements must be custom-tailored to the socio cultural and political contexts of country and site.

Step Three: How BEPC Can Identify Gateways ?

Under the cooperation agreement reached by all concerned parties within BEPC (sectoral ministries, Councils, Commissions and Authorities), a single and most appropriate governmental agency will be selected for each sector to act as the sole direct interface with the public applying for licensing for specific projects. The selection of gateways should be based on a set of criteria such as their mandates, pertinence, infrastructure and manpower to meet their new obligations with maximum efficiency. The gateways should be efficient and organized to avoid any delays in the licensing process of new developmental projects. However, it is essential to identify gateways to which a developer has to lodge one single licensing application for his proposed project. For instance, the gateway for industrial projects should be MOI, while the gateway for land reclamation is The Central Municipal Council (CMC).

Step Four: Commitments Identification:

All parties involved in the EIA process in Bahrain should pledge their veritable intent to assist the society and developers by using their best available means and vow to meet their legal amenability. The BEPC as the official regulator and sponsor of the national EIA studies should make the following commitments to the public:

- BEPC will coordinate activities to simplify the new project application process, render it impartial, rational, direct and transparent;
- BEPC will provide the proper and fair forum for all concerned parties including the public to actively participate in the EIA process;
- BEPC will provide advises to reduce the environmental impacts of development projects to their minimum possible extent utilizing the best available technology;
- BEPC will deal with new project applications expeditiously and not to slow down the development process unnecessarily;

- BEPC will technically sponsor, manage, supervise, inspect, review, mitigate, monitor, audit, regulate and enforce all aspects of EIA studies for the proposed projects;
- BEPC will reject projects only as a last resort when no alternatives or mitigation measures seems effective to minimize the environmental impacts to acceptable levels.

Step Five: Identify the Environmental Legislation's in Effect:

Existing environmental laws and regulations may provide adequate authority to begin implementation of EIAs with; they may be strengthened gradually as needed or improved by administrative orders as is the case in Bahrain. The purpose of this step is to verify the existence of the proper environmental legislation's with an appropriate framework that can accommodate EIA execution procedures in the country. Guidelines to develop EIA legislation's and by-laws are also provided.

So far, Bahrain is lacking a comprehensive environmental law. A series of ten legal instruments concerned with the protection of the environment and one each for waste disposal and toxic chemicals were found to be scattered among the different sectors of the government. The multitude of acts and fragmentation of responsibilities among different ministries may lead into the overlap, competition, inefficiency and contradiction in the views and concepts within the circles of the same government.

EIA legislation's in Bahrain should be regarded as fundamental to ascertain beyond any perplexity the rights and obligations of the socioeconomic developers, the government authorities and the general public. Subsidiary legislation's or by-laws are also necessary to establish the authority for setting environmental quality and performance standards; for enforcing compliance with regulations; or for acquiring licenses; permits or EIA for certain activities. The introduction of EIA in Bahrain will necessitate the enactment of EIA legislation's and by-laws that realize the following:

- The legislation should identify what proposed activities considered potentially harmful to Bahrain environment and require EIA. Major expansions of existing facilities should not be discounted. The associated by-laws should identify below what capacity or size (production volume, surface area, waste quality and quantity, volume of consumed resources etc.) the requirement for EIA can be dispensed with;
- The legislation should state on the need of protection of environmentally critical areas. The associated by-laws should specify which areas are considered of high value and requiring EIA in Bahrain;

- The legislation should identify the government entities that will assume the role of "gateways" for all applications to license new proposed activities and act as the sole direct interface with the public. The by-laws will stipulate what is the procedural flow within the government circles and what authorities the PP have to deal with;
- The legislation should specify who would fund and execute EIAs studies. It is usually assumed that the developer will bear the expenses involved with EIA studies. The associated by-laws should stipulate the amount of the EIA processing fee and the basis to estimate the Certificate of Compliance (CC) bond value in the form of bank guarantee;
- The legislation should appoint BEPC as the sole competent and capable authority for supervising and following-up the EIA execution process in terms of its procedural requirements, public involvement, methodology, format etc. BEPC should exclusively be appointed by law as the appropriate government authority to decide on the proper actions to be taken in light of the evaluated EIS;
- The legislation should designate who should prepare the guidelines, and evaluate EIS. The associated by-laws will provide the structure of national EIA sub-committees or panels constituted of a group of experts from leading agencies (research institutions, universities, independent consultants, etc.). Representatives from sectoral ministries and legal advisors should be on board. The designated sub-committee will be in charge for the preparation of guidelines and evaluation of the EIS from all aspects;
- The legislation should identify what sanctions or penalties can be imposed in the event of non-compliance. The associated by-laws will identify the enforcement procedures, required legal actions, fines, etc.

In Bahrain, the need for legal backing does not necessarily imply waiting years for the passage of a new, comprehensive national environmental law; frequently much of the needed authority can be extended from already existing legislation's. What are then necessary are regulations to implement particular laws e.g., environmental quality standards, EIA guidelines and procedures, conducts for EIA review and requirements for community involvement. These regulations can be developed and issued through administrative processes, such as ministerial decrees.

Step Six: Institutelize EIA:

EIA is a tool, and not an objective in itself. It is a tool that can be used to support the decision process for new projects. The BEPC should have the supremacy to:

- Impose EIA on a specific activity;
- Prevent the activity from being implemented if unacceptable environmental impacts are revealed;

- Enforce mitigation measures and monitoring procedures.

Therefore, the EIA process should be imbedded in an overall procedure to obtain permission from government authorities to start a specific activity, e.g. it could be a prerequisite for obtaining a building license, or for getting connections to the electricity, telephone, sewage collection networks or the water supply network. This not only requires mere legislation or guidelines, but also allocation of responsibility and authority, and provision of means.

It is important to note that the preparation of an EIS is only one step in the full procedure. It should fit within a total framework which defines the decision process from the start of a project to its environmental evaluation after implementation. Definition and execution of this policy is the responsibility of BEPC. Within this process some activities are imposed on the investor. The preparation of the EIS usually is one of these imposed activities. In this segment we will focus on the procedural flow within the overall framework of EIA process.

B. Application Fee and Performance Bond:

In order to cover for the cost of processing and conducting EIAs, the PP will pay a fee. The value of the fee should be determined by proper Governmental Authorities (Ministry of Finance) in coordination with BEPC.

In addition, the performance bond is a form of insurance that the proposed project will be completed to the satisfaction of BEPC, and is typically equal to 5 % - 10 % of the total construction cost, held in escrow or bank guarantee and put up by the project proponents. If the job is badly completed, or the contractor pulls out before completion, the money is paid out to BEPC. The bond can be released only after the completion of the work and after a Certificate of Compliance (CC) is issued following monitoring and inspection during construction. If any condition or conditions attached to the approval are not adhered to, part or the whole of the performance bond could be used to fund remedial work or as compensation for environmental damage.

C. How EIA Procedure Can Flow ?

In an attempt to simplify the task of explaining the flow process, the procedure was divided into three consecutive phases. The proposed procedural flow of EIA in Bahrain can be summarized in Fig. 1. A, B, and C. The legends used in Fig. 1 are listed in Fig. 1. D.

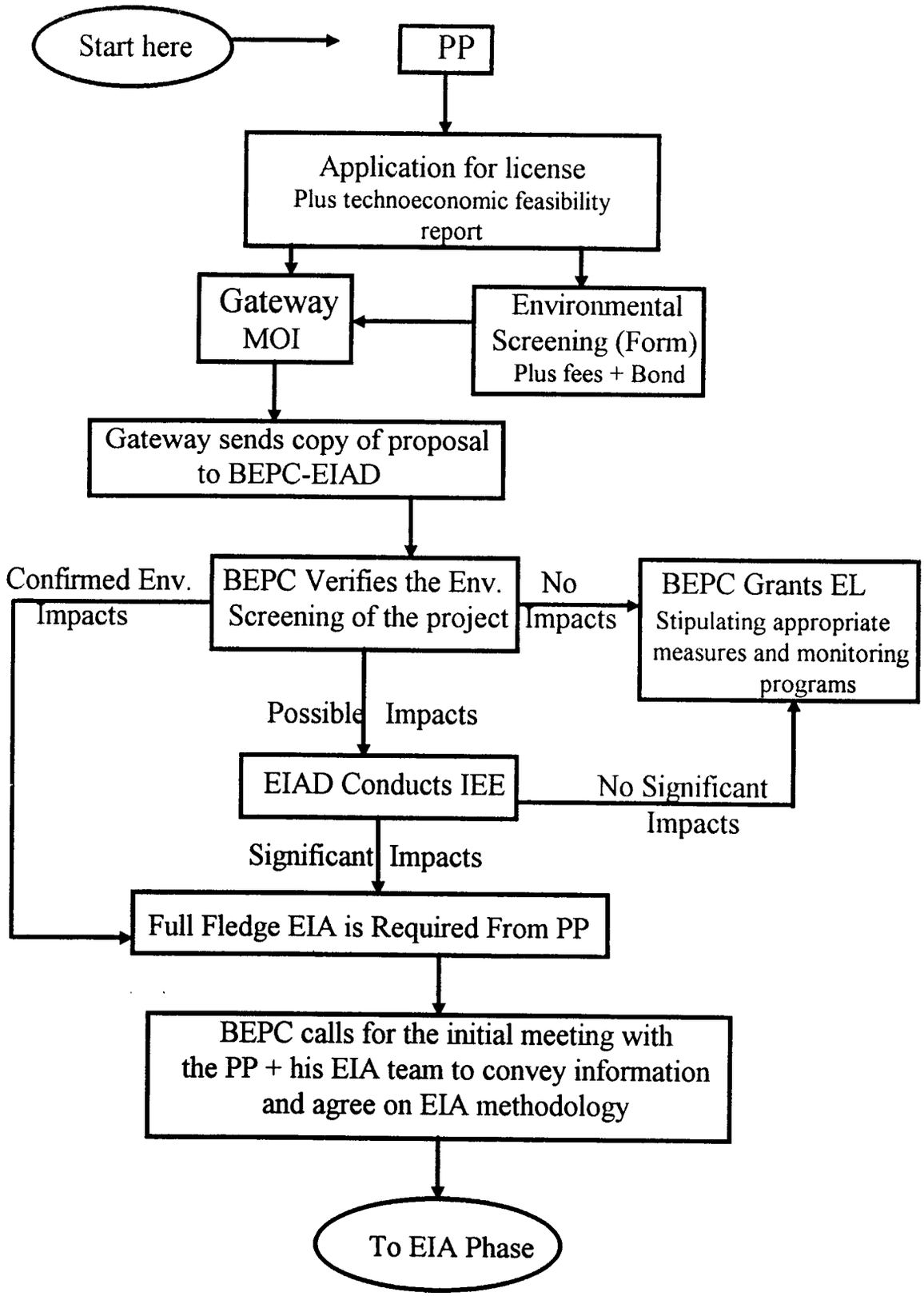

Fig. 1 A. EIA procedural flow for Bahrain (Initiation phase).

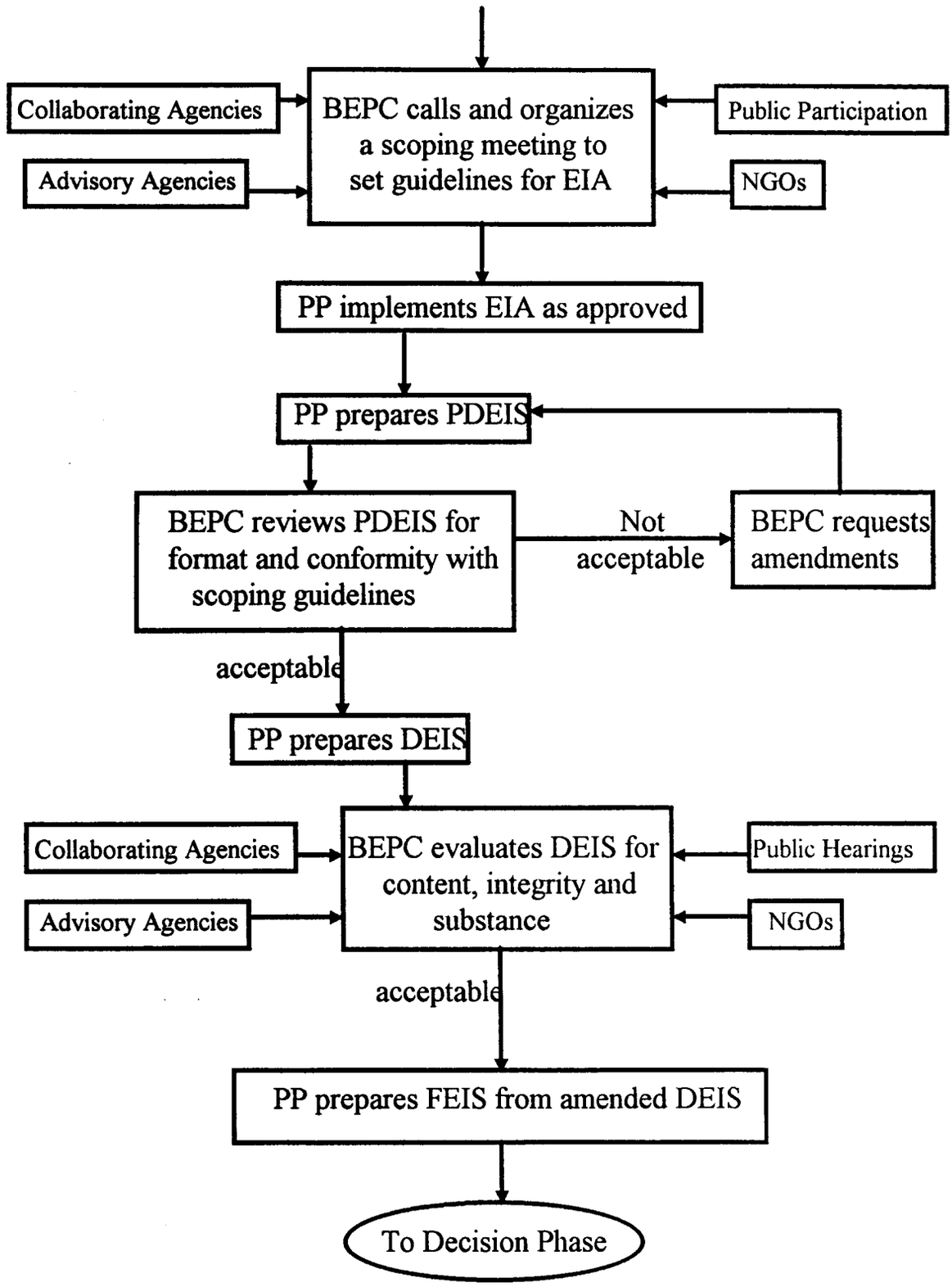

Fig. 1B. EIA procedural flow in Bahrain (EIA phase).

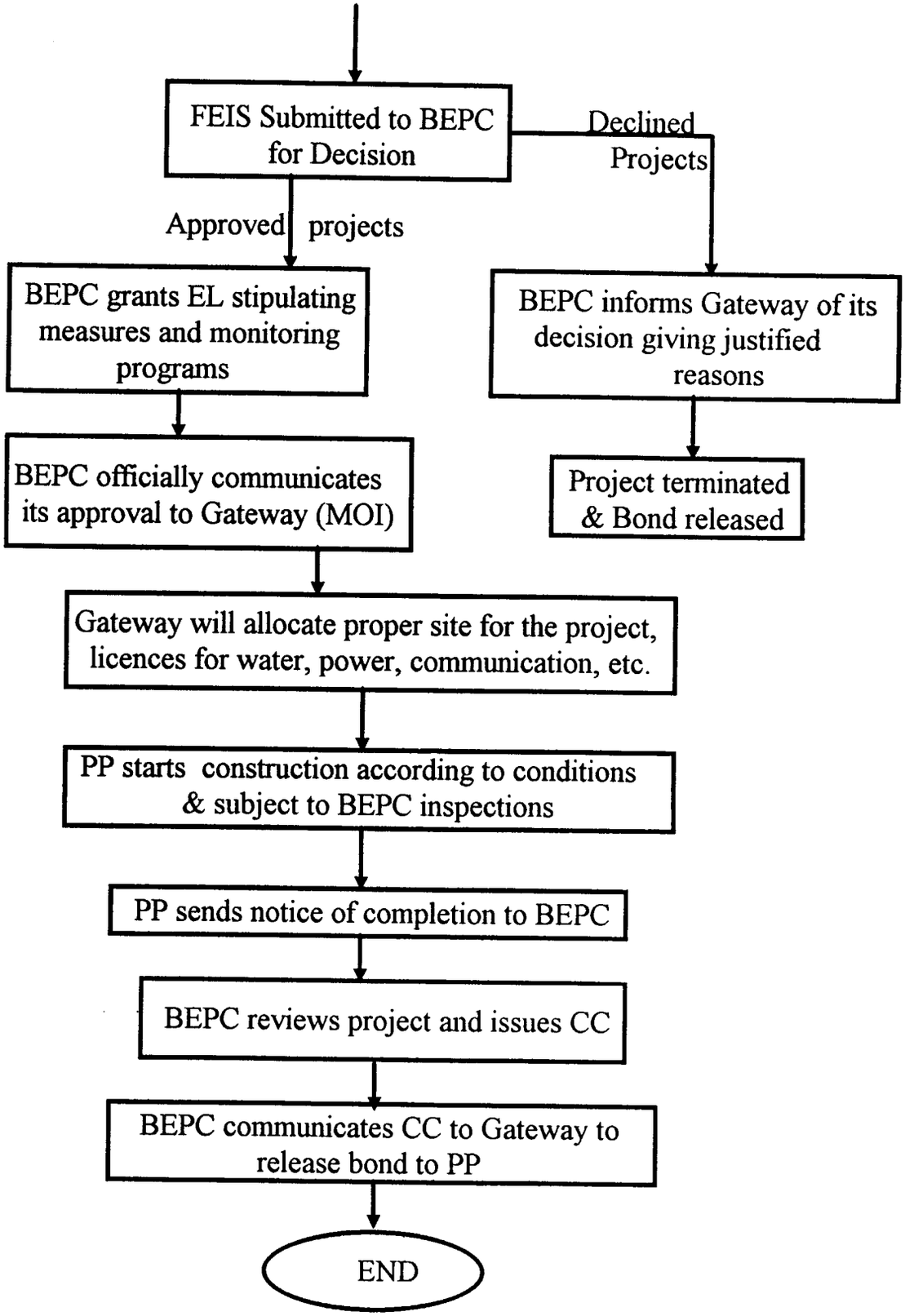

Fig. 1C. EIA procedural flow in Bahrain (Decision phase).

- **Gateway:** can be and not limited to: Ministry of Planing, Ministry of OIL & Industry, Central Municipal Commission, Investment Authority, etc.
- **Collaborating Agencies:** can be and not limited to: Ministries or Authorities for Agriculture, Irrigation and Water Resources, Fisheries, Tourism, Public Work, Natural Resources, Provincial and Local Agencies, Archeological, Historical and Cultural Agencies etc.
- **Advisory Agencies:** can be and not limited to: Departments in Universities, Research Institutions, Museums, Legal advising frames etc.
- **PP:** Project Proponents
- **CC:** Certificate of Compliance
- **EIA**: Environmental Impact Assessment
- **EIS:** Environmental Impact Statement
- **PDEIS:** Preliminary Draft Environmental Impact Statement
- **DEIS:** Draft Environmental Impact Statement
- **BEPC:** Bahrain Environmental Protection Commission
- **EIAD:** Environmental Impact Assessment Department in BEPC
- **EL:** Environmental License
- **IEE:** Initial Environmental Evaluation
- **NGOs:** Non-Governmental Organizations

Fig. 1D. Legend for EIA procedural flow.

First Phase: Initiation

In this phase, the procedures related to the initiation of an EIA to license a project (as illustrated in Fig. 1 A) will be given in definite steps as follows:

(a) All those (PP) wishing to endeavor on an activity of any potential environmental implications are required by law to lodge an application for license to do so;

(b) The application will be addressed to the appropriate gateway agency. Depending on the nature of the development activity, the gateway might be the MoH, MOI, CMC, etc;

(c) Along with the application, the PP should include the following: (1) Processing fees, intended to cover the cost of processing and the cost of review and validation of the environmental screening document (2) Performance bond in the form of bank guarantee intended as a surety that conditions attached to the Environmental License (EL) are upheld by the applicants, (3) technoeconomic study report, (4) A comprehensive environmental screening report (Data Form);

(d) The gateway agency will process expeditiously the application and copies of the package will be sent BEPC. The EIAD will review and verify the validity of the environmental screening report. If no impact is projected, the EPA will grant an Environmental License (EL) stipulating appropriate measures and monitoring programs;

(e) If possible impacts were projected, then EIAD will run a short IEE to decide whether the project needs a full fledged EIA or the potential impact is not significant and EL can be granted with conditional mitigation's;

(f) In case the proposed activity needs to undergo a full EIA study, BEPC will call for an initial meeting with the PP, his EIA consulting team to convey technical information and agree on the EIA approach and methodology.

Second Phase: EIA

In this phase, the EIA study will proceed as follows:

(a) BEPC will call and organize a scoping meeting to set the guidelines to be followed by PP to conduct EIA. Participation of collaborating agencies, advisory agencies, NGOs and the public is fundamental and represent an inherent element of the process;

(b) PP with the help of his EIA consulting team will implement EIA as approved;

(c) PP will prepare a Preliminary Draft EIS (PDEIS) for EIAD at BEPC to review;

(d) BEPC-EIAD will review PDEIS for format and conformity with the scoping guidelines;

(e) If acceptable, PP will be asked to prepare a Draft EIS (DEIS) for EIAD;

(f) BEPC-EIAD with the help of the special EIA sub-committee of experts will technically evaluate and the validate the EIA procedures and its drawn conclusions;

(g) If approved, PP will prepare and submit to BEPC a Final EIS (FEIS) incorporating all valid recommendations and suggestions raised during the evaluation process.

Third Phase: Decision

In this phase a decision will be taken by BEPC regarding the EL of the proposed activity as follows:

(a) Depending on the EIA results, BEPC will either approve or decline the project. In the case of refusal, BEPC will convey its decision to the gateway attached with justified reasons. The proposed project will be terminated and its performance bond released;

(b) In case of approval, BEPC will grant EL stipulating mitigation measures and monitoring program. The decision will be officially communicated to the gateway agency;

(c) The gateway agency will license the allocated site for the specific development activity and will issue licenses for utilities such as water, power, telephone lines, connection to wastewater collection systems, etc. as it is the case;

(d) PP will break ground and start construction according to conditions and subject to inspections by BEPC;

(e) After finishing the project and before commissioning, PP will send a notice of completion to BEPC-EIAD;

(f) BEPC will review the project and issue a Certificate of Compliance (CC);

(g) BEPC will communicate CC to gateway agency to release performance bond to PP;

D. WHO CAN PERFORM EIAS ?

During deliberation with the senior EIA officer in BEPC, questions were raised concerning who might be qualified enough to conduct EIA studies and what are the criteria and/or minimum requirements needed for an EIA consultant to be hired ?

The quality of EIA will greatly depend on the expertise of the analyst; and on the availability and commitment of the people using it.

The preparation of an EIA requires input from several scientific and technical disciplines. In practice some specialist contributions could be short term and the bulk of the EIA preparation could be undertaken by a small team of qualified staff. Not all specialists are capable of this multi-disciplinary approach. The choice of the "core" team, and specially the choice of the team leader, is crucial.

EIAs require interdisciplinary analysis and are therefore prepared by teams, i.e. members working together in the field. The disciplines listed below are generally represented on the core team for any EIA.

- **Project Manager:** Often a planner, social or natural scientist, or environmental engineer; has experience in preparing several, similar EIAs; has management skills and sufficiently broad training and/or experience enabling him to provide overall guidance to integrate the findings of individual disciplines;
- **Ecologist or Biologist:** Aquatic, marine or terrestrial specialization's, as appropriate;
- **Sociologist /Anthropologist:** Has experience with communities similar to that of Bahrain;
- **Geographer or Geologist / Hydrologist / Soil Scientist** as appropriate and
- **Urban or Regional Planner:** Has experience in developing countries and preferably in the Arabian Gulf region.

This core team needs to be supported by various specialties, depending on the nature of the project and its setting.

Generally, the lack of sufficient national manpower, expertise and commitment is acute in developing countries. It is imperative that Bahrain produce local experts to reduce the reliance on expensive foreign expertise to bare the minimum. In Bahrain, many local research centers, laboratories or universities have the advantage of knowing the local conditions (echo-systems, social fabric, culture, etc.) and are in a favorable situation to contribute to the EIA process.

The selection of a consultant to conduct an EIA should be based primarily on technical competence and experience. Under technical competence, the following should be examined:

- Past experience of the firm or joint venture in EIA;
- The adequacy of the proposed work plan in terms of demonstrated understanding of the project, responsiveness to the terms of references, and effective management of the work;
- The qualifications of the personnel to be assigned, in terms of education, training and experience; suitability to perform the duties to be assigned; successful EIA experience in similar situations; experience in developing countries; in the Arabian Gulf Region; or in Bahrain itself.

E. Institutional Problems Hindering EIA in Bahrain :

In his report to UNEP (1993) El-Kholy revealed serious but common institutional environmental management problems in Bahrain. The situation as portrayed in this report remains somewhat the same close to the end of 1995 with trifle progress in human, material and financial resources. BEPC is currently venturing into the field of EIA without clear organizational and legislative framework of authority and responsibility regulating its relation with counterparts in the government. The existing managerial, professional, technical, and administrative manpower is absolutely inadequate in numbers to carry out the designated responsibilities. The institutional EIA problems that could be identified during the mission were as follows:

1. Environmental Policy and Regulation Problems:

- Lack of clear environmental EIA policies and commitments;
- Absence of legal authority to use EIA as a tool for decision making in resources development;
- No legal authority for community involvement in EIA;
- Lack of regulations to implement the national commitments of the Bahraini Government toward the protection of all natural resources and their proper management. These commitments represent the essence of EIA.

2. Organizational Structure Problems:

- Vertical and horizontal fragmentation of EIA responsibilities and authorities among different government agencies;
- Lack of an independent entity that can technically and managerially sponsor EIAs such as EIAD;
- BEPC is isolated and not integrated into the socioeconomic development planning and decision making in Bahrain. Contacts are exercised by the Vice Chairman of BEPC to overcome drawbacks of this nature;
- Institutional structure is not conducive to intersectoral coordination which is considered as a basic element in performing EIAs;
- Absence of sub-committees to perform objective reviews of DEIS. BEPC need to upgrade its material and financial EIA capabilities;
- BEPC is not staffed enough to manage, inspect, follow up, audit, maintain and monitor over lifetime of EIA approved projects;
- BEPC has a very limited authority and restricted power to influence socioeconomic development decision by individual sectoral ministries or to resolve environmental conflicts among them.

3. Financial Problems:

- Lack of fund allocations to EIA process and for its follow-up functions;
- Lack of cost recovery systems to generate funds for EIAs by imposing fees

(extrapolation of the polluter pay principle).

4. Problems in EIA procedures:

- Inadequate criteria and procedures to evaluate and review environmental screenings and DEISs;
- Inadequate monitoring programs to provide baseline data for EIA from various environmental compartments;
- Inadequate national, regional, and international information exchange;
- Lack of follow-up or supervision of approved projects, especially mitigation measures, during construction and operation;
- Inadequate and inconsistent enforcement mechanisms;
- Total absence of public and NGOs involvement in EIAs.

5. Human Resources Problems:

- Severe quantitative inadequacy in manpower to meet the current BEPC commitments;
- Limited facilities and resources for EIA education and training;
- Lack of support in term of equipment, technical information, etc;
- Civil service hiring restrictions by government for budgetary reasons.

IV. PARTICIPATION OF BAHRAINI PUBLIC IN EIA

BEPC should recognize that effective public participation in EIA enhances the probability that a plan will be produced which is technically accurate, economically feasible, and socially and politically acceptable. BEPC should have long term plans for involving the Bahraini public in the scoping and hopefully in the review processes of EIAs. The active public involvement in an EIA project is very desirable for two reasons:

(a) It makes the Bahraini public a partner to the process. Thus, rumors are laid to rest and the public has the actual facts about the proposed project. Inevitably, this lessens public tensions and hostility to the project.

(b) The public often has good suggestions for items to be incorporated or stressed in the EIA. A better product is the result.

According to Bergman and Machenthun (1992), the benefits associated with public involvement include:

- The resolution of conflicts among different groups (fishermen, local settlers, etc.) during project planning;
- The incorporation of a more comprehensive data base due to public input and live observations;
- The more thorough identification and analysis of issues;
- The more comprehensive computation of costs and benefits to societal groups.

A. OBJECTIVES OF PUBLIC PARTICIPATION:

It is the responsibility of BEPC to insure public participation in the early stages of EIAs. The basic objectives of public participation are:

(a) To foster increased dialogue between the national and local environmental protection authorities and the affected parties.

(b) To insure the early anticipation of conflicts and open discussion of differing opinions among affected parties.

(c) To encourage mutual trust between BEPC and the concerned public.

B. What are the Procedures for Public Participation ?

The specific procedures which should be utilized by BEPC to achieve these public participation objectives can be briefly noted as follows:

(a) **Identification of Bahraini parties who may be interested in, or affected by, a proposed activity:** When the project requires an EIA, the scoping process could be used to identify these parties. BEPC should develop a "contact list" and use this list to send interested parties notices of hearings, meetings, field trips or release of project reports.

(b) **Outreach:** BEPC should provide relevant policy, program, and technical information to interested parties as early as possible in the planning process. This information must be made available at places that are easily accessible to these interested parties. Efforts should be made to ensure that the public understands the technical aspects of the program. This understanding could be achieved through the publication of fact sheets or technical summaries, surveys or interviews of community members, public service announcements, news releases, and other educational activities such as workshops and field trips. When announcing for public meetings or hearings, BEPC should give a minimum of 45 day notice.

(c) **Dialogue:** Consultation with interested parties must be undertaken in the early stages of EIA and before any BEPC decisions are made. The techniques for increasing dialogue between BEPC officials and the public include, but are not limited to: 1- Formation of citizen advisory committees; 2- Workshops; 3- Conferences and 4- small group meetings.

(d) **Feedback:** BEPC authorities should provide responses to public inquiries and comments to interested parties regarding the outcome of the public involvement procedures. This feedback must specify the effect that any public comments had on proposed developmental activity.

C. Approach to a Public Participation Program:

In the development of a public participation program for EIA the following questions should be answered by BEPC staff in charge:

Question #1: Who is the public affected by the proposed activity? The public in Bahrain is not a uniform mass. Audience can be identified in terms of demographic and geographic characteristics such as interest groups, employment and profession categories, income levels, social groups, or location.

Question #2: Where do we find the public?
There are several different methods for BEPC to locate members of the affected public. A mix of several of these approaches for public participation tends to be optimal.

Self-Identification: A citizen or group may inject themselves into the planning process via petition, appeal, public hearing, etc. To encourage self identification, the following techniques may be used:

- Newspaper advertisements;
- Radio and TV spots, public service announcements;
- Establishment of telephone hot lines;
- Distribution of brochures and other public information material.

Group Identification: BEPC may make contact with the public defined by geographic location, interests, or social class. Interest groups can be located by consulting lists of local and national associations. Often these lists are maintained by local authorities, university departments and professional associations.

Third Party Identification: Third party identification is similar to group identification, except that it is done by a third party such as volunteer citizens committee, professional consultants and national association of an interest group (fishermen, etc.).
To encourage third party identification, a snowball interview technique can be used. The public participation specialist begins by interviewing a group of persons known to have interest and ask them to identify others whom they expect would have an interest.

Question # 3: What do BEPC wants from the Public ? There are two objectives when soliciting public input. The first objective is a short term objective and consists of information which often includes:

- local perception of issues;
- description of value systems;
- confirmation of background facts and figures;
- and reaction to alternative courses of action.

The second objective is a long term objective and consists of building of positive attitudes toward BEPC and project developer for whom the EIA is being.

Question #4: How can BEPC provides mechanisms for input?
The Bahraini public affected by the outcome of the proposed activity is not necessarily well informed about the mission and role of the BEPC, the purpose of the EIA study, and how the proposed activity fits into the overall regional development. In addition, members of the public may have had little experience with public participation exercises and may need help in overcoming language, culture, or educational barriers. The mechanisms appropriate for input should accomplish two ends:

First: Public Education: Mechanisms may include:

- Dissemination of pamphlets, newsletters, etc.
- Planning a display booth at high traffic public location
- Press release or feature story in local media
- Participation on TV or radio forums
- Central depository of earlier study findings at local libraries.

Second: Information Gathering: Mechanisms may include:

- Public meetings/hearings
- workshop
- opinion surveys
- telephone contacts

It is for BEPC to recognize that each mechanism has significant advantages and disadvantages which must be evaluated in relation to time, funding, personalities involved, number of participants, and the level of communication skills of those undertaking the information gathering task.

Question # 5: Where in EIA study is input needed ?
The earlier in a study that public input is solicited, the greater the likelihood that the study will be completed on schedule and within budget and will also be socially and politically acceptable in the affected community.
There are two situations that call for public participation in each EIA.
First Situation: Mandatory: Mandatory program involves the public in the scoping meeting, usually held about 30 days after the start of an EIA project. The purpose of the meting is to review the work plan for EIA and to make additions, changes or deletions with the public stressing on those areas of interest to them.
Second Situation: Optional: A public hearing that takes place after the Draft EIA is published. The purpose is to obtain comments on the draft. It is the project initiators' decision as to whether the proposed activity is controversial enough to warrant holding a public hearing.

V. HOW TO PREPARE TERMS OF REFERENCE (TOR) FOR AN EIA ?

Although there are countries where environmental government agencies themselves are capable of preparing EIAs, the usual method is for PP to obtain specialist consultants, just as they often do for the technoeconomic feasibility studies. Depending on the conditions, the EIA specialist consultants can be local, national or international. Local and national consultants can be specialized consulting firms, research institutions or department at universities. The selection process should be primarily based on technical competence and experience. In all cases (TOR) should be carefully prepared preferably in close coordination with BEPC to solicit the consultation service. The basic structure and content of TOR designed for EIAs as recommended by the World Bank (1991) should include the following:

(a) Introduction: This section should state the purpose of the TOR, identify the proposed development project to be assessed, and explain the executing arrangements for the EIA.

(b) Background Information: Pertinent background for potential parties who may conduct the EIA, whether they are consultants or BEPC itself, would include a brief description of the major components of the proposed project, a statement of the need for it and the objectives it is intended to meet, the implementing agency, a brief history of the project including alternatives considered, its current status and timetable, and the identities of any associated projects. If there are other projects in progress or planned within the region which may compete for the same resources, they should also be identified here.

(c) Objectives: This section will summarize the general scope of the EIA and discuss its timing in relation to the processes of project preparation, design and execution.

(d) EIA Requirements: This paragraph should identify any regulations and guidelines which will govern the conduct of the EIA such as national or funding agencies regulations on EIA.

(e) Study Area: Specify the boundaries of the study area for the assessment. If there are any adjacent or remote areas which could be affected.

(f) Scope of Work: In some cases, the tasks to be carried out by the consultant will be known with sufficient certainty to be specified completely in the TOR. In other cases, information deficiencies need to be alleviated or specialized field studies or modeling activities performed to assess the impacts. Ask the consultant to exactly define the work needed in more detail for the contracting party review and approval.

(g) Task 1: Description of the Proposed Project: The consultant will provide a brief description of the relevant parts of the project, using maps, where necessary, and including the following information: location; general layout, size; capacity; pre-construction activities; construction activities; schedule; staffing and support; facilities and services; operation and maintenance activities; required off-site investments; and life span.

(h) Task 2: Description of the Environment: The consultant will assemble, evaluate and present baseline data on the relevant environmental characteristics of the study area to include information on the following: (1) *Physical Environment*: geology; topography; climate and meteorology; ambient air quality; surface and groundwater hydrology; coastal and marine environmental quality; existing sources of air emissions; existing water pollution discharges; and receiving water quality. (2) *Biological Environment*: Flora; fauna; rare and endangered species; sensitive habitats; species of commercial values; species with potential to become nuisances, vectors or dangerous. (3) *Socio-Cultural Environment*: Population; land use; planned development activities; community structure; employment; distribution of income; goods and services; recreation; public health; cultural properties; tribal peoples; and customs; aspirations and attitudes.

(i) Task 3: Legislative and Regulatory Considerations: The consultant will describe the pertinent regulations and standards (at the local, regional, national and international levels) governing environmental quality, health and safety, protection of sensitive areas, protection of endangered species, siting, land use control etc.

(j) Task 4: Determination of Potential Impacts of proposed Project: In this analysis, the consultant should distinguish between significant positive and negative impacts, direct and indirect impacts, and immediate and longterm impacts. Identify impacts which are unavoidable or irreversible. Whenever possible, describe impacts quantitatively, in terms of environmental costs and benefits and assign economic values when feasible. Characterize the extent of quality of available data, explaining significant information deficiencies and any uncertainties associated with predictions of impact. If possible give the TOR for studies to obtain the missing information and identify the types of special studies likely to be needed for this project category.

(k) Task 5: Analysis of Alternatives to the Proposed Project: The consultant shall describe alternatives that were examined in the course of developing the proposed project and identify other alternatives which would achieve the same objectives. The concept of alternatives should extend to siting, design, technology selection, construction techniques and phasing, and operation and maintenance procedures. Compare alternatives in terms of potential environmental impacts; capital and operating costs; suitability under local conditions; and institutional; training; and

monitoring requirements. When describing the impacts, the consultant will indicate which are irreversible or unavoidable and which can be mitigated. To the extent possible, he should quantify the costs and benefits of each alternative, incorporating the estimated costs of any associated mitigation measures. Include the alternative of not constructing the project, in order to demonstrate the environmental conditions without it.

(l) Task 6: Development and management Plan to Mitigate Negative Impacts: The consultant shall recommend feasible and cost-effective measures to prevent or reduce significant negative impacts to acceptable levels. He should estimate the impacts and costs of those measures, and of the institutional and training requirements to implement them. The consultant should consider compensation to affected parties for impacts which cannot be mitigated. Prepare a management plan including proposed work programs, budget estimates, schedules, staffing and training requirements, and other necessary support services to implement the mitigation measures.

(m) Task 7: Identification of Institutional Needs to Implement EIA Recommendations: The consultant should review the authority and capacity of institutions at local, provincial/regional, and national levels and recommend steps to strengthen or expand them so that the management and monitoring plans in the EIA can be implemented. The recommendations may extend to new laws and regulations, new agencies or agency functions, intersectoral arrangements, management procedures and training, staffing, operation and maintenance training, budgeting, and financial support.

(n) Task 8: Development of Monitoring Plan: The consultant shall prepare a detailed plan to monitor the implementation of mitigation measures and the impacts of project during construction and operation. Include in the plan an estimate of capital and operating costs and a description of other inputs such as training and institutional strengthening needed to carry it out.

(o) Task 9: Assist in Inter-Agency Coordination and Public/NGOs Participation: The consultant will assist in coordinating the EIA with other government agencies, in obtaining the views of local NGOs and affected groups, and in keeping records of meetings and other activities, communications, and comments and their disposition.

(p) Task 10: Reporting: The EIA report (EIS) should be concise and limited to significant environmental issues. The main text should focus on findings, conclusions and recommended actions, supported by summaries of the data collected and citations for any references used in interpreting those data. Detailed or uninterpreted data are not appropriate in the main text and should be presented in appendices or a separate volume. Unpublished documents used in the assessment may not readily available and should also be assembled in an appendix.

(q) Consulting Team: EIA requires interdisciplinary analysis. Identify in this paragraph which specialization's ought to be hired and included on the EIA team for the particular project category.

(r) Schedule: Specify dates for progress reviews,interim reports, final EIS, and other significant events such as scoping and review meetings.

(s) 0ther Information: Include in under this item lists of data sources, project background reports and studies, relevant publications, and other items to which the consultant's attention should be directed.

VI. APPENDIX

I. European Economic Community :

List of activities in which EIA should be applied in all cases according to the Directive on EIA (85/337/EEC)

1- Major crude-oil refineries and installations for the gasification and liquefaction of coal.

2- Thermal power stations and other combustion installations and nuclear power stations and other nuclear reactors.

3- Installations solely designed for the permanent storage or final disposal of radioactive waste.

4- Integrated works for the initial melting of cast-iron and steel.

5- Installations for the extraction of asbestos and for the processing and transformation of asbestos and products containing asbestos.

6- Integrated chemical installations.

7- Construction of motorways, express roads and lines for long-distance railway traffic and of major airports.

8- Trading ports and also inland waterways and ports for inland-waterway traffic.

9- Waste disposal installations for the incineration, chemical treatment or landfill of toxic and dangerous wastes.

II- Examples of criteria and thresholds for the identification of projects requiring environmental impact assessment (EIA) used in the United Kingdom :

1- Agriculture :

New pig rearing installations will not generally require EIA. However, those designed to house more than 400 sows or 5,000 fattening pigs may require EIA.

2- Extractive industry :

Whether or not mineral workings would have significant environmental effects so as to require EIA will depend upon such factors as the sensitivity of the location, size, working methods, the proposals for disposing of waste, the nature and extent of processing and ancillary operations and arrangements for transporting minerals away from the site. The duration of the proposed working is also a factor to be taken into account.

For oil and gas extraction, the main considerations will be the volume of oil or gas to be produced, the arrangements for transporting it from the site and the sensitivity of the area affected. Where production is expected to be substantial (300 tonnes or more per day) or the site concerned is sensitive to disturbance from normal operations, EIA may be necessary. Exploratory deep drilling would not normally require EIA unless the site is in a sensitive location or unless the site is unusually sensitive to limited disturbance occurring over the short period involved. It would not be appropriate to require EIA for exploratory activity simply because it might eventually lead to the production of oil or gas.

3- Manufacturing industry :

New manufacturing plants requiring sites in the range 20-30 hectares or above may well require EIA.

In addition, EIA may occasionally be required for new manufacturing plants on account of expected discharge of waste, emission of pollutants, etc. Among the factors to be taken into account are the following:

(a) Whether the project involves a process designated as a "scheduled process" for the purpose of air pollution control;

(b) whether the process involves discharges to water which require the consent of the water authority;
(c) whether the installation would give rise to the presence of environmentally significant quantities of potentially hazardous or polluting substances;
(d) whether the process would give rise to radioactive or other hazardous waste.

4- Industrial estate development projects :

Industrial estate developments may require EIA when:

(a) The site area of the estate is in excess of 20 hectares; or
(b) there are significant numbers of dwellings in close proximity to the site of the proposed estate, e.g. more than 1,000 dwellings within 200 metres of the site boundaries.

Smaller estates might exceptionally require EIA in sensitive urban or rural areas, particularly if associated with other Scheduled works (e.g. roads, canalization projects, flood relief works).

5- Urban development projects :

The need for EIA for new urban development schemes on sites which have not previously been intensively developed should be considered in the light of the sensitivity of the particular location. Such schemes (other than purely housing schemes) may require EIA when:

(a) The site area of the scheme is more than five hectares in an urbanized area; or
(b) there are significant numbers of dwellings in close proximity to the site of the proposed development, e.g. more that 700 dwellings within 200 metres of the site boundaries; or
(c) the development would provide a total of more than 10,000 square metres (gross) of shops, offices or other commercial uses.

6- Local roads :

The construction of new motorways will always require EIA. Outside urban areas, the construction of new roads and major road improvements over 10 kilometers in length, or over 1 kilometer in length if the road passes through a national park or through or within 100 metres of a site of special scientific interest, a national nature reserve or a conservation area, may require EIA.

7- Airports :

The construction of airports with a basic runway length of over 2,100 meters will always require EIA. Smaller new airports will also generally require EIA. EIA may also be required for major works such as new runways or passenger terminals at larger airports, the original development of which would have required an EIA.

8- Other infrastructure projects :

A broad indication of likely environmental effect may be given by the land requirement for an infrastructure project. Projects requiring sites in excess of 100 hectares may well be candidates for EIA.

9- Waste disposal :

Installations, including landfill sites, for the transfer, treatment or disposal of household, industrial and commercial wastes with a capacity of more than 75,000 tonnes a year may well be candidates for EIA even when the special considerations relating to hazardous wastes do not arise.

OFFICIALS MET:

Bahrain Environmental Protection Commission:

-	Mr. Khaled Fakhro	Vice Chairman
-	Mr. Mohammed Hassan	Senior Environmental Chemist
-	Mr. E. Raveedran	Senior Chemist
-	Mr. Ali Al-Hesabi	Economist
-	Mr. Abd Al-Elah Wadee	Senior Chemist
-	Ms. Zahwa Al-Kuwari	Senior Environmental Engineer

UNDP (ROWA):

-	Mr. Adel Orabi	Acting Director
-	Mr. Fouad Kanbour	Senior Environmental Affairs Officer

UNDP:

-	Mr. Mohammed Al-Sharif	Program Officer

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AIR QUALITY INDEX FOR BAHRAIN

Chapter 40 of Agenda 21 calls for the development of Indicators for Sustainable Development (ISD). In particular, it requests countries at the national level, and international governmental and non-governmental organizations at the international level to develop the concept of indicators of sustainable development. In its 1995 work programme, the Commission on Sustainable Development (CSD) grouped the desired indicators into four categories, namely, economic, social, institutional and environmental.

It is virtually impossible to collect all of the data generated by the implementation of Agenda 21. Further, even if available, these data might be meaningful for specific activities or sectors, but it is unlikely that they would tell us much about sustainable development without a higher order level of interpretation. Such interpretation requires an understanding of the following:

1. What is important (parameters).

2. What is representative (indicators).

3. How and what can be aggregated (indices).

4. How and what can be interlinked to describe sustainable development.

The information needs of decision makers are described as a pyramid having the following structure:

- Primary data comprises the broad base or foundation information (highly technical).

- Analyzed data the next level (moderately technical - interpreted data)

- Indicators as the third level (slightly technical - indicative data).

- Indices as the last or tip level (slightly technical to mostly descriptive - aggregate data)

The highly aggregated indicators, or indices, which represent the tip of the information pyramid, depend on understanding the linkages among groups of indicators, either within a single cell, or across cells. Aggregating and developing indices reduces the number of indicators and adds analytical and interpretive value to the process. It also, however, increases the value content: in order to design an index, for example, decisions have to be made about how to weigh indicators relative to each other. In sustainable development, with the tensions between environment and development, countries may differ markedly in their approach to relative weights.

In a study commissioned by UNEP, Bakkes et al. (1994) stressed on the need to focus on the quality of environmental subsystems such as soil, water and air. In the air subsystem, air Pollution Indices (API) have the merit to be used independently as excellent tools for the management of air quality. They are extremely useful in compiling and reducing large amounts of date to a simple, and single index value which permits communications between technicians and others. In addition, API can be used to detect trends, compare between different sources of air pollution, classify air according to quality, and finally to determine the degrees of success or failure of national ongoing air pollution abatement programmes. Politically, API can also be used to justify major expenditures, allocate budgets, communicate technical information to masses and decision makers.

Necessity of API in Bahrain:

The primary focus of chapter 40 of Agenda 21 ant the CSD is to furnish indicators to provide an important measure to manage the environment in a simple and comprehensible manner. Several basic uses of API from which Bahrian can profit are as follows:

1. Assist decision makers at the national level in understanding and deciding on air quality management, in developing policies, in evaluating the effectiveness of these policies and in allocating available resources.

2. Provide scientists with a tool to further their understanding of the impact of developmental activities on air quality and trend analysis.

3. Support citizens, either through governmental or non-governmental organizations, with means to focus their data collection, to define their remedial action, and to plan for their lobbying campaign.

4. Supply method for regional or global air quality assessment by zoning, ranking and comparing with uniform national level indicators. This will help developing early warning systems and in designing policies that are truly responsive to the needs of Bahrain.

5. Grant Bahrain the means to facilitate and enhance national reporting to the CSD and other intergovernmental fora.

6. Provide the local authorities in Bahrain with an instrument to develop policies, to monitor performance and raise public awareness in their communities.