MSc Program Environmental Technology & International Affairs

Improving methods for developing and analyzing alternatives in the framework of Environmental Impact Assessments in Europe

A Master's Thesis submitted for the degree of
"Master of Science"

supervised by
DI Dr. Klaus Rapp

Matthias De Moor

1025392

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Affidavit

I, **MATTHIAS DE MOOR**, hereby declare

1. that I am the sole author of the present Master's Thesis, "IMPROVING METHODS FOR DEVELOPING AND ANALYZING ALTERNATIVES IN THE FRAMEWORK OF ENVIRONMENTAL IMPACT ASSESSMENTS IN EUROPE", 75 pages, bound, and that I have not used any source or tool other than those referenced or any other illicit aid or tool, and
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Abstract

Alternatives analysis is at the core of environmental impact assessments, but its implementation in Europe is being impeded by several obstacles. When conducted in an adequate way, this analysis leads to informed decisions that are beneficial for both the environment and the project developers. In practice, problems with the timing of the assessment, high costs, lacking public participation and the private interests of the project developer prevent this analysis to be carried out in an objective and thorough manner. This paper looks at the theoretical ideals of alternatives analysis and then turns to practice in Europe and the United States. While theoretical ideas are not always applicable to practical exigencies, European lawmakers can take steps to ensure that alternatives analysis moves closer to theoretical and international best practices. Alternatives analysis in EIAs can be optimized by ensuring the consideration of alternatives in the earlier strategic stage and by involving the public as much as possible in this exercise. Giving alternatives analysis more attention in assessment reports will in turn result to more comprehensive impact assessments and better decision-making.

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Part I: Introduction

"History teaches us that men and nations behave wisely once they have exhausted all other alternatives." This quote by Abba Eban shows us that decision makers have a freedom of choice, but that this freedom does not necessarily result in the best outcome. On the contrary, it seems to him that the worst choices are being made first. It is clear that having a range of alternatives comes with a certain responsibility to choose the one that has the most benefits and the smallest number of disadvantages.

1. Sustainable development

Today, the environment is the topic of daily conversations in the living room, on the market place as well as in international conference halls. A lot of people have realized that any kind of human progress finds its roots in the environment we live in, but that in the past this advancement came at the expense of our surroundings. The concept of "sustainable development" has been introduced as a result of this realization. The idea of being sustainable refers to the premise that the needs of the present should be met without compromising the ability of future generations to meet their own needs. (United Nations, 1987) Climate change, natural disasters and animals being faced with extinction have engendered a certain sense of urgency in the world, and in Europe more specifically. Sustainable development thus became a buzz term, garnering widespread attention and support.

The concern for the environment can be no reason to stop further progress in the economic and scientific spheres. Human progress can only be achieved through new ideas, plans, proposals and projects. Sustainable development is all about the idea of finding some balance in this game played between an ever-growing human race and planet Earth. It is clear that one of the prerequisites of successful sustainable development is the reduction of the burden of environmental impacts. An important principle in this regard is the precautionary principle, which has two components: preventive action in the face of uncertainty and the reversal of the burden of proof. (Tickner & Geiser, 2004) Instead of having to prove that a certain action has an impact on the environment, the contrary has to be clearly shown: that a proposal will have no significant negative environmental effects.

2. Environmental impact assessment

A standardized work method in demonstrating that a proposal has no significant environmental impacts is necessary. This is where the environmental impact assessment (EIA) has the potential to play a major role. Principle 17 of the Rio Declaration states the following: “Environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority”. (UNCED, 1992) Thus, the role of environmental impact assessments in the bigger scheme of developing sustainably has been formally and internationally recognized. Environmental impacts are complex and occur on a large scale, making impact assessments both important and costly at the same time. Because of these costs, project developers could forget about the importance and decide not to conduct these studies or do it only halfheartedly. For EIA practice to be successfully integrated in decision-making, effective laws are necessary to avoid too many irresponsible decisions.

The International Association for Impact Assessment defines an impact assessment as follows: “Impact assessment (…) is the process of identifying the future consequences of a current or proposed action”. (IAIA, 2012) In the environmental assessment the focus would then lie on consequences for the environment. The University of the United Nations provides the following definition: “EIA is a systematic process to identify, predict and evaluate the environmental effects of proposed actions and projects.” (UNU et al., 2006) The term “environment” could be interpreted in a broad way, by also looking at economic, cultural, social and health effects. Including these factors turns an EIA into a more general “sustainability assessment”.

The aim of environmental impact assessments is to minimize negative environmental consequences. Environmental impact assessments are designed to help in reaching an environmental optimum. It has to be noted that despite this, decisions that are unsatisfactory from an environmental point of view can still be made, even after conducting an EIA. Regardless of this, the added value of the assessment is in any case that there is full knowledge of the environmental consequences. The best results

can only be achieved given the timely identification of these effects at an early stage of project development. But the effects of the project itself are not the only ones that should be considered.

In order to make sure that compliance with EIA regulations leads to environmentally sound decisions, an accurate and unbiased analysis of alternatives to the project is necessary. (Steinemann, 2001) The Institute of Environmental Management and Assessment (IEMA) established that EIA practitioners should refer to development alternatives during the assessment process and that the influence of these considerations on this process should be made clear. (Kirkpatrick, 2012) Options analysis gives a new direction to environmental science in such a way that it is no longer focused on characterizing problems, but instead engenders a solution-based approach. If more attention would be given to alternatives analysis, the precautionary principle would be put into practice to a greater extent, through stimulated innovation and the placement of the burdens on those who create the risks. (Tickner and Geiser, 2004) Ideally, these arguments would result in a new, extended definition for environmental impact assessment that includes this addition, with EIA being a process to identify and predict the environmental effects of proposed projects as well as their reasonable alternatives.

3. The role of alternatives in environmental impact assessments

Referring back to the quote by Abba Eban, the time to exhaust suboptimal alternatives is running out and in today's world there is little room left for mistakes. The environmental challenges in the areas of climate change and biodiversity are growing faster than before.

The first step in making a choice is making sure one knows which options there are to choose from, which is why the identification of alternatives should be a prerequisite for all evaluation methods, such as environmental impact assessments. Comparison of alternatives is especially important when a region is under environmental stress or where severe competition for scarce natural resources is to be expected. An evaluation that only investigates one option can provide some information on how viable that particular option is, but that does not necessarily mean that it should be implemented, because other options could be superior. (Ricci

et al., 2008) Before the actual alternatives analysis, where merits and demerits of certain options are looked into, alternatives development has to take place. In this step, alternatives are created, identified and selected for further analysis.

It is best to introduce the environmental impact assessment as early as possible into the decision-making process and to encompass all of the projects of a certain type or within a certain area, so that it can be assured that alternatives are considered more comprehensively. (European Commission, 1999) This is the first and one of the main problems of EIA: it occurs at the stage of project assessment. The number and range of alternatives is therefore more limited because of preceding decision-making at higher levels or decisions inspired by private interests. This decision-making does not necessarily take environmental effects into account.

In light of the importance to conduct this assessment at a stage that comes as early as possible, the idea of a Strategic Environmental Assessment has been introduced. The definition goes as follows:

> "Strategic environmental assessment (SEA) is the term used to describe the environmental assessment process for policies, plans and programmes which are approved earlier than the authorization of individual projects. More specifically, SEA can be defined as the formalized, systematic and comprehensive process of evaluating the environmental impacts of a strategic action and its alternatives, including the preparation of a written report on the findings of that evaluation, and using the findings in publicly accountable decision making." (Therivel et al., 1992)

The mentioning of the evaluation of alternatives in this definition already shows how helpful the introduction of SEA is in taking alternatives analysis to a higher level in impact assessments.

Policy makers and authors are beginning to realize how important alternatives analysis is, by including concrete references to it in legislative texts and emphasizing its importance in studies on EIAs. It is perceived as one of the most critical elements of the assessment process. From the policy side, the American Council on Environmental Quality coined the alternatives analysis as "the heart of

environmental impact assessment". (CEQ, 1978a) Some authors also described the analysis of alternatives as the cornerstone of an EIA. (van Breda and Dijkema, 1998)

Despite the dawn of this realization, the alternatives analysis in the framework of EIA is more often than not a superficial exercise, especially in the private sector, where the requirements for alternative analysis are usually less stringent. In order to make this procedure more meaningful in the view of the ultimate goal that is sustainability, both the legislation covering this requirement and its implementation have to mature. (UNU et al., 2006a) The bottom line of the problem is that despite the fact that alternatives are essential, they are inadequately handled.

4. Overview

The main goal of this research is to see which problems arise with the study of alternatives in EIA, how these problems undermine the goals and spirit of these assessments, and how these problems can be addressed on a European level.

A hypothesis in this study will be that the main goal of an environmental impact assessment is the attainment of environmentally sound decisions. Even though other factors are at play, such as costs and benefits in spheres other than the environment and the economic cost of the studies, these elements will not be put to the foreground. As this is a study on EIA, it is a logical consequence that these considerations are set aside in favor of environmental considerations.

In this regard, it has to be noted that the more stringent the rules on alternatives analysis become, the more expensive an EIA study will prove to be. This is especially important for smaller projects, where the costs and delays of extensive impact assessments can easily outweigh the benefits of the exercise. Alternatives analysis has many benefits, but often comes with considerable delays in the EIA procedure due to the uncertainty and difficulties surrounding it. (GHK and Technopolis, 2008)

In the second part, following the introduction, an overview of the theories surrounding the analysis of alternatives is given. This overview is based on a desktop literature search study of relevant EIA studies. These studies include Commission Reports, studies of the International Association of Impact Assessment and journals

such as the Journal of Environmental Law and the Environmental Impact Assessment Review. Basic definitions and useful theoretical distinctions between different kinds of alternatives will provide the background for this paper. Before looking at the problems surrounding the analysis of alternatives, it's important to cover the fundamentals that are already in place and widely accepted. This literature review centers on the so called exploratory analysis, meaning the identification of key issues in the development and analysis of alternatives. There is more than one way to approach alternatives in EIA assessments. There are however some theoretical models and concepts, developed by authors and international institutions, that can serve as general guidelines. The structure of this second part is inspired by some of these theoretical ideas.

The third part will start with a short introduction on what laws govern environmental impact assessments and where and how they are applied. After shortly describing most of the general problems with EIA, the focus will turn to the specific problems related to the alternative studies. This is the content analysis, where the alternatives considered for EIA on a European level are explored. This part will be structured around case studies, each giving attention to a certain country. Given the main objective of this thesis, most attention will be given to the European Union (EU). Legislation on a European level concerning the analysis of alternatives in EIAs is the starting point, after which the text turns to analyzing how the European Directives' guidelines on alternatives analysis are translated on a national basis. The latest jurisprudence of the European Court of Justice (ECJ) also gives an indication of the importance of alternatives analysis in the European Union. The ECJ rulings could shed light on how the requirement for alternatives analysis in the EIA Directive should be interpreted, but no cases have been found on the subject. One interpretation of this is that it can be considered as an indication that alternatives analysis is not given due attention in practice. The European countries and regions that will be discussed are Flanders (region of Belgium) and the Netherlands. The reason for the choice for these countries is on the one hand because they have been part of the EU long enough to adapt their legislation in such a way that it has overcome childhood diseases and is now confronted with more structural problems. These countries have historical and practical knowledge when it comes to

implementing the regime of environmental impact assessments. On the other hand the availability of data permitted a more rigorous study of these countries. European Member States receive a certain degree of discretion when it comes to the implementation of the EIA Directive and the SEA Directive, the main legislative documents dealing with environmental impact assessments on a European level. This means that there can be significant differences between them and thus each country warrants separate attention. This way, national experiences can be compared, and ideally shared, across the EU. Outside of the EU, the approach of the United States to alternatives analysis is discussed. The reason for the choice for this country is its progress in prioritizing alternatives analysis. The enactment of the National Environmental Policy Act in 1969 marked the beginning of national EIA systems. Many countries use the NEPA as an example and establish systems with NEPA as its source of inspiration. This way the progress NEPA makes provides a comparison ground that enables policymakers to see where the European practice is lacking in this regard. The easy access to data also helped with the choice for the United States. An example of this is the easy access to major cases in federal courts, dealing with the interpretation of the Policy Act. Comparison of the national legislations and implementations results in an identification of problems with alternatives analysis, as well as best practices. The way legislation is implemented in every country is mainly studied by means of implementation guidelines.

The fourth part gives an overview of these problems and best practices and provides the reader with a richer understanding of the development and analysis of alternatives. It shows the way forward for the EU, based on the case studies and the literature review.

The last part is the conclusion, where the most important findings are summarized. Alternatives analysis plays a central role in EIAs. The way this analysis is approached in Europe shows that policy makers are aware of its importance, but it also shows that these policy makers encounter problems in enforcing the necessary emphasis on alternatives in practice.

Part II: Alternatives analysis in theory

1. Definition, purpose and categories of alternatives

A. Definition and purpose

An alternative can be defined as “a possible course of action, in place of another, that would meet the same purpose and need”. (DEAT, 2004) This general definition already has the clear implication that, when considering alternatives, the need and purpose of an action always have to be kept in mind. Alternatives are options, choices, and ultimately they are means to accomplish ends. Instead of objectives of a plan, alternatives can also all aim at dealing with a certain environmental problem, the aspirations of a local community or other kinds of issues. (Department for Transport, 2004)

This means that the purpose and need, of whatever kind, are to be regarded as the constant during the process of identifying alternatives. In order to start looking for alternatives, there has to be agreement on the objectives that need to be reached or the problem that needs to be solved. This can be a complicated exercise, because the objectives should not only include the aspirations of the project developer, but ideally also the goals of society as a whole.

Based on the objectives, the best alternative can be chosen. The better the selection process is, the higher the chance of choosing the best alternative becomes. Even though there is no objective criterion to decide what the best option is, it can be assumed that it is the alternative that the decision makers would pick if they would have an overview of all the alternatives possible, and full information about them. (European Commission, DG Tren, 2005)

It is important to note that alternatives are not the same as alternative scenarios. Alternative scenarios have the aim of illustrating uncertainties associated with future trends of factors that cannot be controlled. An example of this is the alternative climate change scenarios developed by the Intergovernmental Panel on Climate Change, where these scenarios are not designed so that they all reach the same objective, but reflect different possibilities of future outcomes.

The purpose of alternatives analysis is “to provide a framework for subsequent decision-making by a competent authority”. (Glasson et al., 1999) This does not include the decision-making itself, which is up to the competent authorities. The importance of such a framework for alternatives in environmental impact assessment studies has been shortly clarified in the introduction. It leads to more robust decision-making by broadening the evidence base and reducing the risk of unexpected problems arising during the implementation phase. Secondly, the impact assessment becomes more effective and when alternatives are assessed in a transparent and honest way, it also gains more legitimacy. Thirdly, after alternatives analysis has been conducted, the decision-maker has a better idea of the environmental performance of every option, and can take this information into account when making a decision. (Jurkeviciute and Ricci, 2008)

B. Categories of alternatives

Alternatives come in many shapes and sizes. There are several types of alternatives which can be considered at different stages of the assessment process. The list hereunder is largely based on the Information Series of the South-African Department of Environmental Affairs and Tourism (2004) and the IIED Guidelines (Donnelly et al., 1998), with some additions.

- Activity or project alternatives

  This entails the consideration of different activities. Since this is the more general kind of alternative putting the activity itself into question, this consideration normally occurs on the strategic level of planning. The difference between the alternatives is substantive and requires a strategic consideration.
- Location alternatives

  This is self-explanatory: the consideration of a different location for a given activity, or a part of this activity. These alternatives can be geographically very close to each other, but they can also (theoretically) be oceans apart. These alternatives deal with the question: “Where?”

- Process alternatives

  These constitute alternatives that achieve the same goals, but use a different technology or equipment. The difference with the activity alternatives is that the nature of the activity remains unchanged. This difference is more theoretical and less practical in some cases, as it is often arbitrary to decide on what constitutes the ‘nature’ of an activity. On a smaller scale, when dealing with specific processes or a part of the process chain, the distinction becomes clearer.
- Demand alternatives

  This alternative is closely related to the economic notion of “substitute goods and services”. When a certain demand is given, one can identify different ways of meeting this demand.
- Scheduling alternatives

  When an activity can be broken down into different components, these components can be executed in a different sequence, or at a different time. These alternatives deal with the question: “When?”
- Input alternatives

  For a given process, one can use different energy sources or raw materials.
- Routing alternatives

  This category is closely linked to the location alternative, but is not entirely the same. This kind of alternative applies to linear developments specifically, such as power lines. In this case not only the location of the central activity needs to be decided on. The questions here are how to get the service to the end-users or through which way to get input material to the activity generation.
- Site layout alternatives

  For a given activity and location, there can be different spatial configurations. Such configurations can highly influence the impacts on the surrounding environment and go beyond aesthetic considerations.

- Scale alternatives

  When an activity consists of several smaller components, these smaller activities can be undertaken separately and on a smaller scale. The amount of smaller components becomes a quantitative measure for the activity, and this amount can be reduced or augmented, thus changing the scale of the activity. The impact on the environment is usually directly dependent on the scale.
- Design alternatives

  Design refers to the look and feel of a certain activity. Choices can be made out of both aesthetic and functional considerations.

Another way of distinguishing between different types of alternatives is to see at which level of planning they are considered. This way a hierarchy of alternatives, revolving around four central questions, can be established. (ODPM, 2004) These questions are the following:

- Is it necessary?

  In this step, the "no-go"-alternative is considered. Are extra developments and a new infrastructure truly needed, or is there a way to render these unnecessary, by for example managing demand in a different way? As negative environmental impacts are usually associated with additional infrastructure, it is valuable to consider non-infrastructure alternatives, such as regulations, economic instruments or information dissemination. A second question is how accurate the demand forecasts are.
- How should it be done?

  Which methods or technologies are more sustainable and inflict less environmental damage?
- Where should it go?

  This is equivalent to the location alternative mentioned earlier.
- When, and in what sequence, should it be done and how do we implement it in more detail?

In other versions of this “sustainable” hierarchy, there is also the question of what existing infrastructure could be used to meet the demand. This is closely linked to the assessment of input (or supply) alternatives, dealing with questions on how to power or feed a certain activity. (Department for Transport, 2004)
The following factors point either in favor of the one or the other:

	New infrastructure	**Expand existing infrastructure**
Possibility of selecting new technologies that are less harmful for the environment	+	?
Possibility of selecting new sites that minimize environmental impacts	+	-
Possibility of minimizing the number of production sites (and corresponding environmental impacts)	-	+
Minimizing construction works (and corresponding environmental impacts)	-	?
Limiting the needs of network expansion (and corresponding environmental impacts)	-	+
Optimizing the size of the plants (thus reducing associated environmental effects)	+	?

(Ricci et al., 2008)

The above distinctions for alternatives are quite detailed. Broader distinctions are the following:

- “Alternative approaches” and “Alternative designs” (Steinemann, 2001)
  Alternative approaches aim at achieving certain objectives in a functionally different way, with a different activity.
  Alternative designs consider a certain activity of which the specifications can be altered in more detail.

- "Discrete alternatives" and "Incremental alternatives" (DEAT, 2004)
  Discrete alternatives are the major development alternatives, where the nature and location of a project are compared to activity alternatives and location alternatives. These alternatives are best identified as early in the process as possible.
  Incremental alternatives can be analyzed at a later stage, in order to counter negative effects that come up during the assessment. These alternatives can form part of the project proposal itself and don't necessarily require a separate evaluation. Mitigation measures can be considered as an example of these alternatives.

It is evident that it depends on the project or plan which types of alternatives should be considered, as it would be impractical and unnecessary to investigate all of them for every assessment. A clear example of this is a mining operation that has to be based in the location where the raw material can be extracted. In this case investigating location alternatives make no sense.

There are two more types of alternatives that deserve separate attention because of their importance in the context of environmental impact assessment.

C. The "no-go" alternative

The first is the 'no-go' alternative, also called the 'no action' or 'no activity' alternative. (Glasson et al., 1999) It is also referred to as the "business as usual" option or the baseline description. Even though these terms are not perfectly interchangeable, they all point to an alternative functioning as a reference point. (Ricci et al., 2008) In general, this is the option where the proposed activity does not go ahead. It describes what is likely to happen if proposed investment projects are not endeavored. (World Bank, 1996) This means that not only the negative environmental impacts of the activity are avoided, but also possible benefits. The consequence of this is that the 'no-go' alternative is not necessarily the best option from an environmental point of view. (DEAT, 2004)

This kind of alternative is important for several distinct reasons. The first reason is that this alternative provides for the baseline description. It describes the current situation in detail, providing a basis for comparison of all the other alternatives and

their impacts. At the same time, it describes the problems, if any, of the current situation, how big these problems are and who is affected by them. This way the alternatives can be better evaluated with regards to their environmental, social and economic impacts, as well as with regards to how well they fix certain problems. (World Bank, 1996) It serves as a reference for impact assessment on the one hand, and it provides the framework for evaluation on the other hand, by indicating the level of detail that is necessary and which indicators can be used. This way the baseline description helps to ensure comparability between all alternatives considered. (Ricci et al., 2008)

In most cases it can be interesting if the 'no-go' option describes more than merely the current state. The 'business as usual' scenario depicts the future state of the environment in the absence of the proposed alternatives. As with every scenario, this kind of forecast comes with uncertainties that need to be taken into account. For other alternatives there's also an element of future forecasting implied, making this kind of approach preferable in that it provides for a better basis for assessment. The 'business as usual' option and the 'no-go' alternative are thus not necessarily the same. This is especially true in the case of examining continuing activities, where the meaning of the 'no action' alternative is ambiguous. It can mean that one should examine the results either in case the ongoing activity is discontinued (no activity), or in the case that the activity is continued without any modification (business as usual, 'no change' alternative). Both examinations are useful in environmental impact assessments of continuing activities and provide a clearer picture of the impacts of the other alternatives. The alternative where the activity is continued without modification forms a baseline from which to assess the costs and benefits of changes to this activity. The 'no activity' option provides a baseline to compare the current activity with, so that its costs and benefits can be identified. (McCold and Saulsbury, 1998) Therefore, it is generally to be recommended that both forms of the 'no-go' alternative are examined in the case of continuing activities.

A benefit of the 'no-go' alternative is that it can always be considered, even when other alternatives are not, or do not seem to be, available. Both because of its usefulness and its universal applicability, the inclusion of this alternative in environmental assessments is usually made mandatory by law.

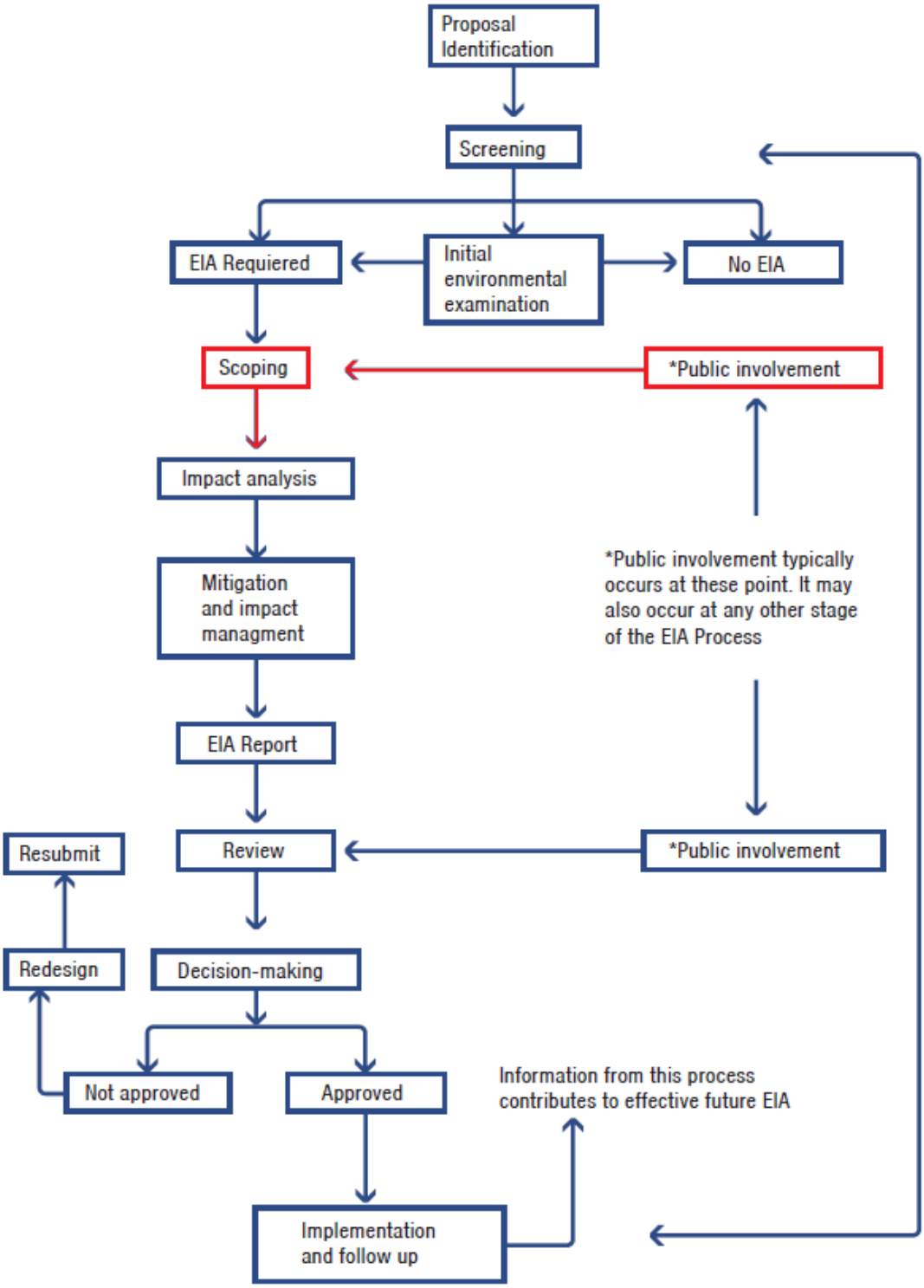
D. The best practicable environmental option

The other important kind of alternative is the so-called “Best Practicable Environmental Option” (BPEO). It is defined as “the option that provides the most environmental benefits or the least environmental damage.” (IEMA, 2009) It is the outcome of a decision-making procedure where the emphasis is on environmental protection. Criteria such as environmental impact, safety risk, resource use, public acceptability, technical feasibility and costs are considered when identifying this alternative. A combination of qualitative and quantitative assessments measures the performance in each criterion, and after weighting of the relative influence or importance of the criteria, the options are scored and ranked. By giving more weight to the environmental criteria, without neglecting the others, one finds the BPEO on the top of the ranking. This assessment considers both the short term and the long term. (RCEP, 1988) Moreover, the cost for the developer should still be “acceptable”, in order for the alternative to comply with the requirement of being practicable. Its purpose is to establish the overall environmental impacts of every alternative considered. During the search for the BPEO, the environmental performance of each option is compared to that of other options as well as the project’s environmental goals. In some countries, there are slight variations to this kind of alternative. In the Netherlands for example, the law used to prescribe that the “alternative most favorable to the environment” needs to be included in the alternatives analysis. This alternative prevents adverse effects on the environment or at least reduces them as much as possible. This is achieved by using the “best means available”. (Pölönen, 2006) These are also called Best Available Techniques and take the balance between the costs and environmental benefits into account. (The Environment Agency, 2012)

2. Alternatives in the EIA Process

A. Stages in the standard EIA and SEA Processes[1]

Figure 1: Stages in a standard EIA Process

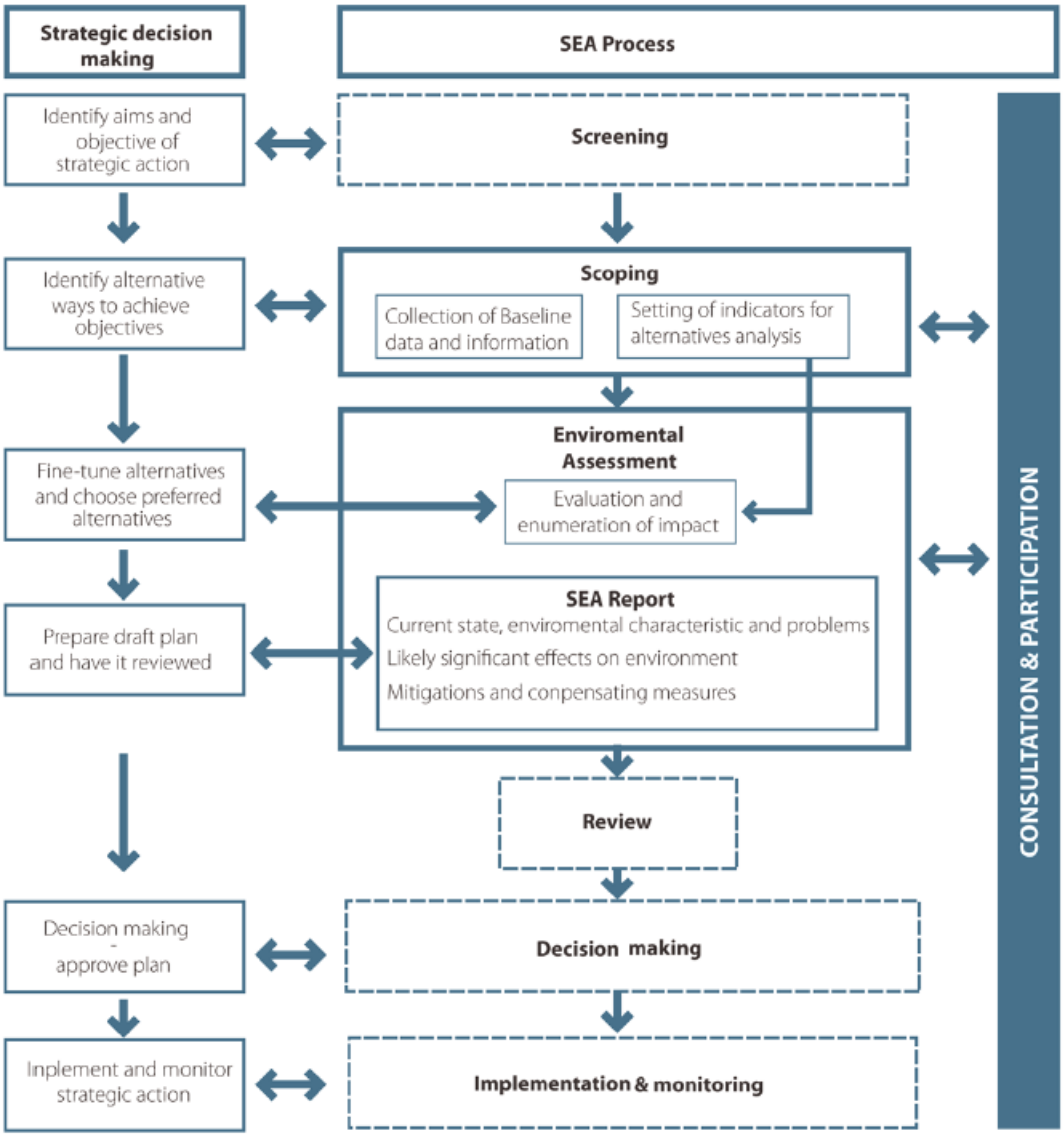


(UNU et al., 2006b)

[1] In this segment, when EIA is mentioned, this extends automatically to SEA as well, unless specified otherwise. The distinction between them will be made in the next segment.

In order to frame the alternatives within the EIA process, it is necessary to look into the structure of the EIA process itself. Figures 1 (above) and 2 give examples of how these processes can be structured.

Figure 2: Stages in strategic decision making and environmental assessment



(BEACON, 2005)

The development of alternatives normally occurs in the scoping stage of the environmental impact assessment. (Sadler and McCabe, 2002) Some authors place the alternatives development as a separate step that even precedes the scoping phase. (Donnelly et al., 1998) The general idea is that this exercise should start as early as possible. Scoping is a “narrowing” exercise referring to the “process for determining the spatial and temporal boundaries and key issues to be addressed in an

environmental assessment." (DEAT, 2004) This stage is one of the earliest in the EIA process, just after the decision has been made that an EIA is required (which occurs in the screening process). Scoping ensures that EIA studies are centered on a manageable number of important questions, so that time is not wasted on unnecessary investigations. Importance is a subjective and general term, but it's useful in the way that it refers to the precondition that the issues and alternatives considered should have a certain degree of magnitude, relevance and significance.

It's in this scoping stage that the broad contents of the EIA report are defined, such as which alternatives will be assessed during the next steps and the indicators that will be used to do that. It is best done early in the EIA process, because the likelihood of finding alternatives becomes smaller the further in the process one is. Additionally, new alternatives at a later stage can disrupt project preparation because studying them is too time-consuming and expensive. (World Bank, 1996) The type and range of options that will be considered are identified with reference to the problems that need to be addressed and the objectives that have to be reached. This is why the scoping phase sets off by identifying the need and purpose of the proposal, and by developing indicators to measure the extent to which these are reached. (BEACON, 2005)

After this stage, when the alternatives have been identified, developed, screened and selected, they are to be assessed and evaluated throughout all of the stages of the rest of the process.

An important element in the flowcharts above is the public involvement. Public consultation ensures that all stakeholders are included in the process, making it a participatory assessment. These stakeholders include national, regional and local authorities, neighbors, private enterprises, environmental groups, NGO's, etc. Public involvement allows the project developer to obtain and distribute information, thus engendering consensus-building. That's why scoping should involve all interested parties, including members of the public. (IIED, 2007) The public has a role to play in alternatives development during the scoping stage. Civil society can assist in the identification of alternatives that would otherwise be missed or actively ignored by the proponent and the environmental authorities. The result of involving the public is that the project will be more widely accepted and the relationship between citizens

and project developers improved, contributing to a more constructive and comprehensive EIA. (Shepherd and Bowler, 1997) It should be the aim to include the public in the development of the alternatives, and not to constrict them to reacting to alternatives that have already been selected by the project developer. Therefore, participation of the public ideally occurs as early in the EIA process as possible. (Steinemann, 2001)

The way the alternatives are developed and later analyzed is discussed in the following two segments.

B. Alternatives Development

Alternatives development refers to the process of creating, identifying and selecting alternatives that will later be analyzed in more detail. This development occurs in the scoping phase. There is no uniform method to develop alternatives, as every plan or project requires a custom approach. Nevertheless, some unifying starting points can be recognized. One of the earliest guidance documents on alternatives development dates back to 1994. (Commission for EIA, 1994) It describes three steps for identifying alternatives:

Step 1: Determine the preconditions for the alternatives:

- environmental characteristics
- objectives of the proposer
- technical feasibility
- juridical framework

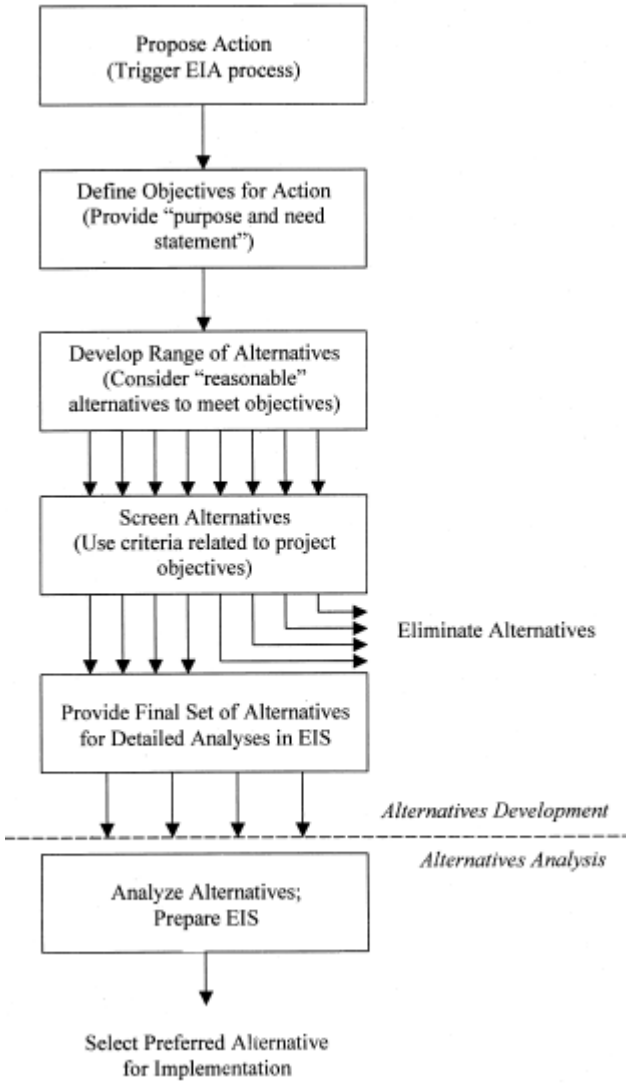
Step 2: Split up the project in different stages, and identify alternatives for each stage. These alternatives need to mitigate negative environmental impacts while taking into account the preconditions. Discussions on alternatives need to occur on an interdisciplinary basis.

Step 3: Bundle the proposed measures for each stage together into an aggregating alternative proposal.

(Commission for EIA, 1994)

Figure 3 gives an indication of how more recent views on alternatives development look like.

Figure 3: Alternatives development (under the US NEPA Process)



(Steinemann, 2001)

This figure describes how alternatives development should be conducted in the United States, and provides an example for other countries. The first step is that the action itself is proposed, as an answer to a certain problem or demand. This sets the EIA process in motion. The next step is to produce a statement of purpose and need, where the objectives of the proposed activity are clarified. It specifies the underlying purpose and need to which the project developer is responding in proposing the alternatives as well as the proposed action. (CEQ, 1987) As the definition of "alternatives" has shown earlier, the purpose and need for a proposal is to be the

starting point for identification of alternatives. (DEAT, 2004) Based on these objectives, criteria are developed that enable the project proposer to broadly evaluate the alternatives in a first stage.

After this, a range of reasonable alternatives is developed. Not all available alternatives need to be considered, in order to ensure that the differences between the options under investigation are sufficiently big. But a decent amount of alternatives should be strived for in order to be able to obtain conclusive evidence before reaching a decision. (Ricci et al., 2008)

A first limitation to the number of alternatives considered is their reasonableness. Theoretically, this means first and foremost that the alternatives have to be technically, economically and politically feasible. In practice, "reasonable" can be defined in more narrow ways, which will be seen later.

The following stage involves the screening of the alternatives. Based on this screening process, a final set of alternatives is selected for detailed analysis, through the elimination of those alternatives which would not meet the stated need and purpose. The feasibility of the alternatives is explored in more detail in this stage. It is important to note that an alternative is not infeasible just because the project developer himself cannot implement or doesn't want to consider the option. (Steinemann, 2001) Reasons for eliminating alternatives at this stage have to be provided in a transparent way, in order to avoid a bias from the developer's side.

After this stage a final set of so-called "preferred alternatives" is provided, alongside the 'no action' alternative. These alternatives will be further treated in the next step: alternatives analysis.

C. Alternatives Analysis

Alternatives analysis is the process where the environmental impacts of each alternative are identified, predicted and evaluated in detail. (Steinemann, 2001) The inclusion of health and social impacts is generally welcomed as well. Aside from the impact analysis, the institutional and technical feasibility of the alternatives is evaluated. (World Bank, 1996) This level of detail in the analysis requires that the alternatives are described in all their aspects: technical, ecological, economic and social. (Scott and Ngoran, 2003)

Analysis of alternatives entails two aspects: firstly, the alternatives should be assessed relative to certain thresholds regarding their impacts and according to the degree in which they reach the goals that have been defined earlier. Secondly, the alternatives have to be compared to one another, which is the comparative analysis.

For this to occur efficiently, indicators are required to measure impacts and they have to make sure that the results for each alternative are comparable. These indicators are the decision criteria that can be placed on one axis, with the alternatives on the other axis. This way a summary can be made that gives all the qualitative and quantitative information that has been gathered about the alternatives. (World Bank, 1996) This qualitative and quantitative information should give a clear picture about both the positive and the negative environmental impacts, and possibly also the economic and social impacts. The result is a matrix which enables the identification of the preferred alternative.

The indicators have to be chosen carefully. An indicator can be defined as a "quali-quantitative variable that is selected for representing the critical behavior of the system under observation". (Ricci et al., 2008) In order to ensure comparability, the dimensions and scale of every indicator should be applicable for every alternative, meaning it should be transferable. For example, the baseline data, base year and future year of reference should be the same for every option examined. Second, indicators should help to guide decisions. To achieve this, data on the indicators should be easily available, so that information obtainment does not become too costly.

Aside from this, the following qualities should be expected of an indicator (BEACON, 2005):

- Robust
- Transparent
- Coherent

- Understandable for the public
- Avoiding a bias
- Regularly measured

To ensure good comparability, all of the alternatives have to be studied on the same level of analysis. This means the scale and level of detail should be the same or at least as similar as possible to ensure adequate comparison. (DEAT, 2004) Often it's the case that the project proposal receives a lot more attention and the other

alternatives are only looked at superficially. This practice does not present a fitting framework for comparative analysis.

The objective of comparative analysis is to sharply define the advantages and disadvantages of the alternatives, so that decision-makers and the public have a clear understanding of what choices they have and what they represent. (World Bank, 1996) This way, the decision is guaranteed to be more objective. The analysis should be evidently correct and represent important complexities, but at the same time it should be kept simple, so that non-technical decision-makers don't get overly confused.

There are several methods for comparing alternatives in a way that the results are clear for non-specialists. These methods range from descriptive, non-quantitative comparisons to fully analytical, mathematical and quantitative methods. (COWI, 2009) In between there are ways with varying levels of quantification. (Glasson et al., 1999) The interaction between the different impacts and possible cumulative effects should also be analyzed. Important information that should be provided for every alternative is:

- Description of the impact
- Magnitude and significance of the impact
- Duration
- Direct or indirect
- Reversibility of the effects
- Sensitivity of receiving environment
- Mitigation possibilities
- Uncertainty

There are several methods to compare alternatives regarding their impacts. The following list is not exhaustive but gives a clear idea of what can be expected from such an analysis. (European Commission, 1999)

- Expert opinion
- Consultations and questionnaires
- Checklists
- Spatial analysis (Geographical Information Systems)
- Network and systems analysis
- Matrices
- Carrying capacity analysis
- Modeling (analytical)

Each method has its advantages and disadvantages. The trade-off is mostly between simplicity and the inclusion of all relevant data. A checklist provides a systematic way to ensure that all likely events from a project are considered, but can still allow for missing indirect and cumulative impacts. Matrices provide a good summary of all impacts, but can become too complex and difficult to use. This complexity is a problem for most multi-attribute decision-making techniques. (European Commission, 1999)

After all information about the alternatives is given, they can be scored, so that the alternative with the highest score can be selected as the preferred option. The techniques are the following:

- Scaling: assignment of numeric scales to the impact of every alternative on each indicator.
- Rating: the significance of each indicator is weighted for each option, after which the alternatives are rated according to a pre-defined scheme. This method involves importance weighting.
- Ranking: ordering alternatives from best to worst, based on their potential impacts.

(World Bank, 1996)

This is alternatives analysis in its narrow definition. Future references to it refer to the entire process, including alternatives development. The way the narrow sense of analysis is done technically gets little attention in environmental legislation, because it is highly dependent on specific characteristics of the assessment and the project.

D. Tiered analysis

The World Bank states in its sourcebook that environmental considerations should be brought upstream in the stages of development planning, as this enhances the cost-effectiveness and environmental performance of the outcome. (World Bank, 1996) This can be achieved through tiering, which minimizes various limitations of project-level assessments, such as insufficient alternatives analysis.

The idea of tiering means that there is a certain sequence at different planning levels agreed upon for environmental assessments and alternatives analysis. (Arts et al., 2005)

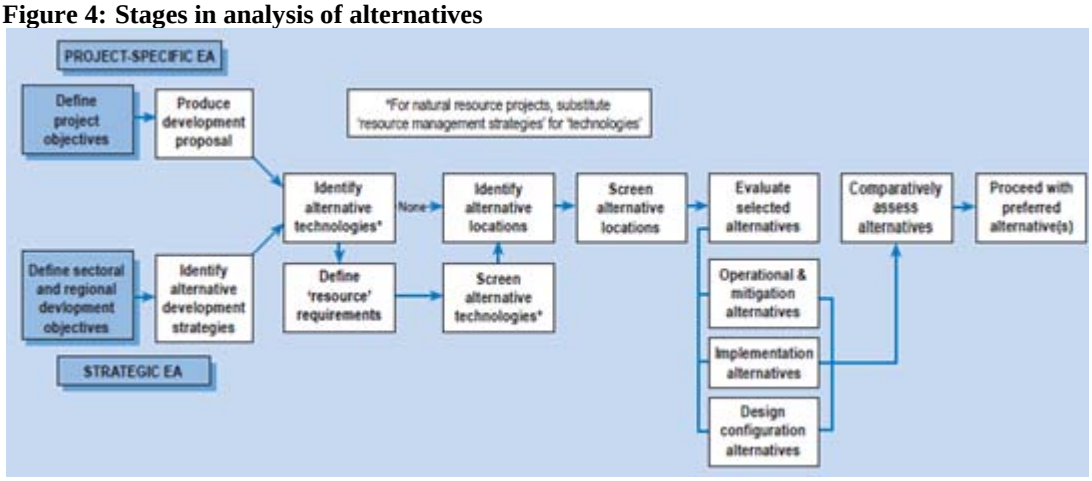
These different levels of planning are:

- Policy: general course that is pursued, functioning as inspiration and guidance
- Plan: forward-looking strategy with a clear purpose and priorities
- Program: a schedule of proposed commitments, activities and instruments within a particular sector or area
- Project: development and implementation of a specific product or service

(Arts et al., 2005)

The way this tearing could be implemented in a process is shown in figure 4.

Figure 4: Stages in analysis of alternatives



(World Bank, 1996)

The strategic environmental assessment starts with the definition of sectoral and regional development objectives, after which alternative development strategies are identified. The project-specific environmental assessment starts by defining project objectives, after which a development proposal is produced. In the figure above, there is no clear relation between the two levels of analysis, apart from the idea that after the first two steps, a similar process trajectory should be taken. A certain sequence is implied though, with alternative strategies being analyzed before alternative technologies and locations. (World Bank, 1996) The more to the right one goes in this process flow, the more sense it makes to analyze these alternatives on a project-specific level.

The idea behind this tiered approach is sound in its motives. It aims to ensure that both higher and lower levels of decision-making are taking environmental effects, and by extension alternatives analysis, into account. Project-level decision-making

rarely takes broad sustainability objectives into account, while the strategic level does not put a lot of weight on local and specific problems. An example of such a local problem is the “not in my backyard” phenomenon. Local adverse outcomes are not relevant on a strategic level that deals with the ‘greater’ public good on a higher level. However sound the motives are, there are some problems with its implementation.

The main problem is the gap that can exist between the two levels of analysis. The model above, and theory involving tiering in planning in general, assumes the existence of a linear planning process. In reality, this is not the case. (De Roo, 2003) Planning processes are dynamic and involve a lot of projects, impacts and actors. The idea that strategic analysis always precedes project-level research is false. In practice plans do not necessarily precede programs, and programs don’t necessarily precede projects. Even if they do, the project proposal doesn’t necessarily take the plan into due account. This can be due to lack of competencies and influencing power of plans and their accompanying strategic assessments.

Another possibility is that by the time a project proposal is launched, the strategic plan has been replaced by a new one. This replacement can be inspired by information resulting from a project-level study, in effect reversing the flow of information that is portrayed by theory. (Arts et al., 2005)

An additional complication is the limited shelf life of environmental assessment information. (Arts et al., 2005) The environment changes constantly, making environmental studies time-specific. The more time passes between the two levels of investigation, the less valid the data will be that the second analysis bases its results on. Therefore, there is no unlimited stream of information flowing from the higher level to the lower, because the information has an expiration date and these studies take time, resulting in a time-lag between plan, project and impacts. To address this problem, validity checks of earlier studies should become an assessment habit. (Arts et al., 2005)

Tiering involves the splitting up of work in different levels and stages. A latent danger that is unavoidable in this kind of procedure is that there is duplication,

leading to lower cost-effectiveness. When implementing a tiering approach this should be avoided as much as possible.

The above overview makes it clear that a lot of challenges remain in linking the strategic level with the project-specific level. This also holds true in legislative practice.

E. Problems and recommendations in alternatives development and analysis

General obstacles for analyzing alternatives are either of a technological nature, or present themselves as resource limitations. Another barrier can be political unwillingness and intellectual limitations. All these factors can lead to a lack of sufficient quality in the assessment of alternatives.

One of the main problems that need to be avoided is the creation of "sweetheart"-reports, which have no other goal than to promote and defend the proposed project, regardless of certain impacts or better alternatives available.

Problems with the investigation of alternatives during the EIA process mostly already occur during the development stage. The following problems in the development of alternatives have been observed (Steinemann, 2001):

- Narrow definition of the problem constricts the range of possible alternatives.
- The proposal comes first, and then a problem is constructed to justify the proposed solution.
- Alternatives are subject to the personal agenda and autonomy of the project developer.
- Research on alternatives is not innovative enough and reverts back to so called stock solutions which have been tried in the past.
- An existing problem can be framed differently, and solved differently, depending on the lens of the project developer. This perspective does not always lead to optimal results.
- Alternatives can intentionally be made less attractive compared to the proposal.
- Alternatives that don't require extra infrastructure are not given serious consideration.

- The criteria on which the selection of alternatives is based do not always include environmental factors.
- The selection itself may not be based on objective criteria at all and be arbitrary.
- Public participation occurs too late, after the alternatives already have been developed.
- Alternatives tend to focus on symptoms (design issues), rather than sources (structurally different approaches).
- The alternative development occurs too late, so that certain strategic options can no longer be considered because the plans have moved too far ahead.

Additionally to these observations, the following can be noted:

- Alternatives are not analyzed on similar levels of detail or at the same scale. More resources are spent on the project proposal analysis, and other alternatives are only looked at superficially. (DEAT, 2004) This makes these alternatives less comparable. A minimum should be that for all alternatives the environmental impacts are assessed. Additionally, there should be an environmental goal, to which these impacts can be compared. (Lund and Hvelplund, 1997)
- The theoretical prerequisites of alternatives having to be practical, feasible, relevant, reasonable and viable are a good basis but are mostly too vague and their interpretation is too subjective to be put into practice.
- The theoretical prerequisite of alternatives having to be relevant presents a problem. Relevance partially refers to the fact that alternatives considered should fall under the jurisdiction of the authority that decides on the development consent. However, reasonable alternatives may exist that are not in the jurisdiction of this authority. (Steinemann, 2001) This is mainly a problem in project-level EIAs, which are conducted on regional, restricted levels. Alternatives that extend the geographical boundaries of a regional authority are therefore not considered, preventing serious analysis of possibly better alternatives. (Lund and Hvelplund, 1997)
- Alternatives analysis costs resources, energy, time and money. These costs entail monetary expenses as well as costs related to delays and procedural

requirements. (Oosterhuis, 2007) Despite the importance of alternatives analysis, this cost-side should not be overlooked. Especially in the case of small projects with small environmental impacts, there is a limited opportunity and scope to add value to the assessment by considering alternative projects in detail. In these cases, a simplified assessment would be more appropriate. The issue then becomes where the project and impact size threshold should lie to warrant such a simplified approach. (GHK and Technopolis, 2008)

- The 'no-go' alternative should always be part of the analysis, even though it is not necessarily a realistic option. The problem is that it is not included in some assessments. Ideally, both the 'no-change' and the 'no-activity' options are considered, but this is rarely the case in practice.

A big problem lies in the timing of the EIA process. No matter how big the emphasis on alternatives analysis is, the EIA process itself usually occurs too late to allow for strategic alternatives to be considered. Somehow forcing the EIA process to start earlier makes little sense, because in order for such an assessment to occur, a project proposal has to have been developed. The tiering approach provides the basis for a solution in this sense, as it includes the strategic levels of decision-making in the assessment process. Difficulties in the implementation of this idea remain, as it can be difficult to link both assessment levels.

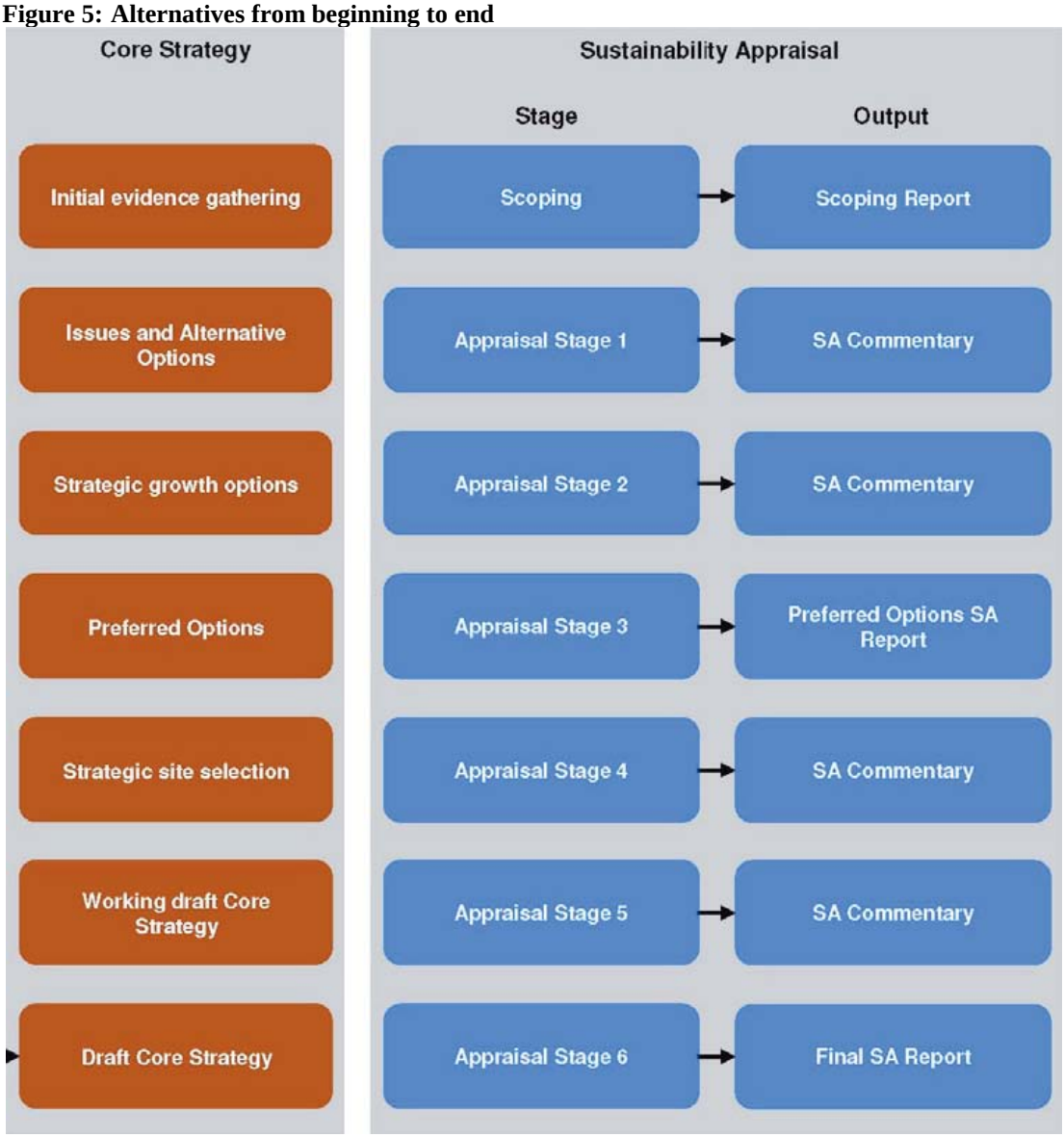
Another major problem is the centrality of the project developer in the process of alternatives development, especially at the project-level. The developer has an undeniable interest and preference for the project he proposes. From his perspective, this makes alternatives analysis only interesting if his project comes out as the best option, or if he's capable to implement the chosen alternative himself and still reach his objectives. In project-level assessments, which are financed by the project developer, this means that alternatives have to reach the goal of the project proposer and have to be technically and economically feasible for him. These prerequisites narrow the range of alternatives considerably, possibly preventing to reach the best option from an environmental perspective. Ways to address this problem are to involve the public in the alternatives development, and to have a strategic assessment

before the project-level assessment, so that the societal and environmental goals can be examined on this level first.

Ideally, environmental considerations would already be present at the very root of the process, namely the policy development, ensuring that alternatives can be considered in this early stage. Then the results of these investigations would be working their way through the next stages, namely the plan, program and project assessments. Every stage would have its lasting impact on the next stage, and ultimately on the final outcome.

An example of a procedure that comes close to the ideal is given in figure 5 on the next page. It comes from an environmental assessment which has been considered to be particularly well executed because its structure clearly demonstrates how all requirements are met, including the requirement to explain 'the reasons for selecting the alternatives dealt with'. (Levett-Therivell, 2011)

Figure 5: Alternatives from beginning to end



(Fessey & Longworth, 2011)

As can be seen from the current problems with tiering, there are challenges that currently stand in the way of achieving this ideal flow of information and decision-making. The next part will turn to how legislation tries to overcome these obstacles, or blatantly fails to do so.

Part III: Alternatives analysis in practice: laws and implementations

1. European Union

A. Legislation

EIA Directive

In Europe, the central legal document dealing with environmental impact assessments for individual projects is the Council Directive on the assessment of the effects of certain public and private projects on the environment. This is usually called the EIA Directive or is referred to with its reference code 85/337/EEC. It came into force in 1985 and has been amended three times since. These changes were aimed at better aligning the Directive with other legal documents such as the UN ECE Espoo Convention (adding a transboundary context) and the Aarhus Convention (dealing with more and better public participation), as well as including more types of projects into the assessment process. The changes of 1997, 2003 and 2009 have been codified in Directive 2011/92/EU, which is currently the most actual European legal document on EIA and has been in force since February 2012. (European Commission, 2012)

At the source of the European EIA legislation is the idea that environmental policy should be principally aimed at preventing pollution at the source, rather than counteracting the effects of these nuisances. In order to achieve successful prevention, effects on the environment have to be taken into account at the earliest possible stage in decision-making processes. European legislation and the EIA Directive help to define the way these effects need to be identified, assessed and evaluated.

The goal of the EIA Directive is to introduce and harmonize general principles for the assessment of environmental effects of projects. (EIA Directive, 1985) Projects are defined in the Directive as “the execution of construction works or of other installations or schemes, or any other interventions in the natural surroundings and landscape including those involving extraction of mineral resources”. (EIA Directive, 2011) In order to assess these effects in a meaningful way, a minimal amount of

information concerning the project needs to be supplied. This information also includes the study of alternatives.

Article 5 of the EIA Directive specifies which information needs to be included in the EIA. Paragraph 3 of the Article states that amongst other information, the following needs to be put in the report: “an outline of the main alternatives studied by the developer and an indication of the main reasons for his choice, taking into account the environmental effects”. (EIA Directive, 2011) This requirement was introduced in the 1997 amendment and has garnered more importance since then.

In 2010, the EIA Directive has been the object of public consultation. This was done with the aim of collecting opinions on whether and how the Directive should be amended. This way the functioning and effectiveness of the EIA Directive could be improved. All stakeholders (including citizens and NGOs involved in EIAs) were welcomed to give their views in an online consultation, which could then be used by the European Commission as one of the sources for possibilities for improvement of the Directive. (European Commission, 2010b) This public consultation exercise was concluded in a conference in Leuven for the 25th anniversary of the EIA Directive in 2010. (European Commission, 2012a)

The EIA Directive was generally reviewed positively in this consultation and most replies stated that they didn’t want any radical changes, but at the same time a majority of the respondents believed that measures were necessary to improve the EIA process. The result of this public consultation pertaining specifically to the alternatives studies in EIA was that the majority of the respondents (55%) agreed with the idea that the assessment of reasonable alternatives should be mandatory. In addition, it was widely agreed upon during the targeted consultation of 200 stakeholders during the closing meeting, that the ‘no go’-alternative is usually, but not always, relevant. (Environment DG EU Commission, 2010) During this closing conference in Leuven, several workshops were held. The workshop dealing with “the scope of the EIA Directive” stated that with regards to alternatives assessment the SEA could possibly take over this role, as it is naturally more concerned with strategic decisions. (European Commission, 2010) Another workshop dealing with the “quality of the EIA process” stated that as of yet the requirement for alternatives analysis is not clear, and also recognizes the significant role the SEA Directive can

play in alternatives analysis. Therefore it is necessary to clarify the legal requirements with respect to consideration of alternatives on the one hand, and clarify the relationship between the SEA Directive and the EIA Directive when it comes to the study of alternatives on the other hand. In addition, the public should be involved into the EIA process at a stage where they can give meaningful comments on possible alternatives, at a time where these comments can still be taken into serious account. (European Commission, 2010a) The element of public participation will therefore be given specific attention, as it can and should play a crucial role in alternatives development.

SEA Directive

The EIA Directive deals with individual projects, but this is incompatible with the idea of accounting for environmental effects at the earliest possible stage. When a certain project is being proposed, several stages have already passed in which environmental impact assessment would have been useful. For example, by the time an EIA is initiated, the site of the project may already have been set in stone, excluding any location alternatives. When the EIA procedure sets in motion, it is already too late to consider strategic alternatives. In this regard, another important legal document on the European level is Directive 2001/42/EC of the European Parliament and of the Council of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment. Instead of individual projects, this so called SEA (Strategic Environmental Assessment) Directive focuses on public plans and strategies. The plans which are likely to cause significant effects on the environment of the Member States need to be made subject to an environmental assessment before being approved. (SEA Directive, 2001) This way plans can still be adapted at a very early stage if necessary. The SEA Directive provides a minimum basis, an environmental assessment framework so to speak, enabling the adoption of common procedures throughout the whole of Europe. Member States were to implement this Directive by mid-2004. The most important element of the assessment framework is the obligatory environmental report. In this report the following information needs to be given according to Article 5 of the SEA Directive: identification, description and evaluation of the likely significant effects on the environment of implementation of the plan and of the reasonable alternatives taking into account the objectives and geographical scope of the plan. In Annex I of the

SEA Directive it is further clarified that “an outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies and lack of know-how) encountered in compiling the required information” should be provided. (SEA Directive, Annex I par (h) p.36) According to the guideline document, all information listed in this Annex I should also be given for the alternatives considered. (European Commission, 2003a) This shows that there is a strong emphasis on alternatives analysis. This inspired Glasson to state the following: “Assessment of alternatives is at the heart of the SEA process”, a quote similar to the one on EIA. (Glasson et al., 1999)

An important fact to note from the outset is that this Directive does not expect a SEA to decide which alternative should be preferred. It asks for identification, description and evaluation, but not a decision. The role of a SEA report is to provide information for those making the decisions.

EIA and SEA compared

A lot has been written about the relationship between the EIA and the SEA Directive, which have their similarities and differences. There are potential areas of overlap, and at the same time both Directives have the potential to be considered complementary. Questions are raised about when the SEA Directive applies and when the EIA Directive should be considered. Certain projects could be subject to both EIA and SEA, in which case there could be a parallel procedure or a joint procedure, depending on what is most appropriate. (Sheate et al., 2005) In general, it can be said that the SEA Directive only applies in the public sector. There are different interpretations as to what its relation is with EIA. Some authors state that SEA relates to environmental assessment for anything that is not a project, and thus is not covered by EIA. (Annendale et al., 2001) Thus SEA would in essence be an extension of project EIA. Another interpretation is to see SEA as a means for policy development, generating sustainability ideas that find their way into the EIA process. (Arts et al., 2005)

Despite their obvious similarities, there are some differences between the two Directives. The SEA Directive is generally considered more demanding since proposals and their viable alternatives have to be more systematically assessed against environmental criteria to determine their likely effects. (European Commission, 2003a)

SEAs and EIAs are not carried out in the same planning arena. SEAs occur in a political context, with normative, subjective arguments spicing up the objective facts. It's a non-linear process with a lot of fluctuations, leading to possible sudden changes during the process. In EIAs quantitative data and analysis are more important, and the process occurs more linearly in the direction of an optimal solution. In short, EIAs can be considered to be more product-oriented, with a focus on preparing a report and developing a project. SEAs are process-oriented, focusing on a well-balanced planning process. (Arts et al., 2005)

The SEA Directive is generally welcomed due to the limitations of the EIA Directive. The EIA is linked to the very last step of decision-making, where it is too late to consider strategic alternatives. (Partidario, 1999) For this reason, the transport sector, among others, is quite advanced in implementing SEAs, as they allow for the investigation of alternative modal and route options. (EEA, 2011) SEA allows for an early scoping phase, which helps to ensure that environmental information is used in all levels of decision-making, so that all environmental effects of the proposed plan can be taken into account. Additionally, the plan initiator is invited to think about strategic alternative solutions and put certain presumptions into question. (BEACON, 2005) This way, the SEA sets the framework for future development consent of EIA projects. (Arts et al., 2005)

One of the major drivers for the development of SEA was the theoretical idea of tiering, discussed earlier in part II. SEA represents the strategic level of analysis (dealing with policies, plans and programs) and EIA the project-specific level (dealing with projects). Thus all layers of decision-making are covered by these two legal documents together. While it is a good idea to have different planning levels, for reasons given throughout this paper, there is also the possibility of gaps between these levels. (Annendale et al., 2001)

The main point of interest in the comparison between EIA and SEA in this context is how the study of alternatives is approached. In the SEA Directive the need for an alternatives analysis is considered to be a fundamental element to the assessment of strategies. (Noble, 2000) The comparison of alternatives is in fact one of the main goals of SEAs, and therefore the scope and range of alternatives under consideration is generally bigger. (ECMT, 2000) Reasonable alternatives have to be included in the environmental report of every plan or programme. In the EIA Directive the requirement for alternative analysis is more lenient, asking only for an outline of the main alternatives. The EIA Directive thus leaves more up to the decision of the project developer when it comes to the range of alternatives which are going to be considered. It also requires less detailed analysis compared to the SEA obligations. (Sheate et al., 2005)

The analysis of alternatives in SEA is not meant to be restricted to comparing environmental effects, but is used to enable the planner to balance objectives in the economic and social areas as well. This way a least-cost option can be chosen, taking account of environmental, social and economic costs. (World Bank, 1999)

Another important difference is that the SEA Directive literally mentions the need for the study of the "no action" or "no project" alternative in Annex I, whereas the EIA Directive does not necessarily require this. The SEA Directive states the following information needs to be included: "the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme". (SEA Directive, Annex I par (b) p.36)

A logical idea resulting from this comparison between EIA and SEA is that they could strengthen each other. For alternatives analysis SEA can make subsequent EIAs more efficient by excluding or significantly reducing the number of alternatives, which in turn reduces costs and time necessary to conduct an EIA. (COWI, 2009a) This mutual enforcement can be achieved in several ways, by either doing a SEA before an EIA, or by combining both approaches simultaneously.

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Other legislative documents on EU level

The two documents mentioned above are the most important ones that deal with environmental impact assessments, but other legal documents on the level of the European Union touch upon the subject of environmental impacts and provide their own specifications when it comes to the analysis of alternatives. Two such examples are the Habitat Directive and the IED (Directive on Industrial Emissions), formerly the IPPC Directive. For a good execution of these Directives, alternatives need to be considered, albeit in a quite limited way. (Schauvliege, 2010) In the IED the application for an emission permit has to include "the main alternatives to the proposed technology, techniques and measures studied by the applicant in outline". (European Parliament and the Council, 2010) Also in this regard there is room for improvement on the European level. The EIA or SEA could play an important role in biodiversity if it would be integrated more with the Habitat Directive, with alternative studies playing a larger role.

B. Implementation

Implementation of the EIA Directive

The way European Directives such as the EIA and SEA Directive are implemented is not up to the European Union as a whole, but up to the Member States who transpose it into their national legislation. The way Flanders and the Netherlands do this, each in their own way, will be discussed later in this paper.

The latest jurisprudence of the European Court of Justice (ECJ) should be able to give an indication of the importance of alternatives analysis in the European Union, and show how the legal texts covering this topic should be interpreted. Through ECJ rulings the official interpretation of the requirement for alternatives analysis in the EIA Directive could be clarified, but no cases have been found on the subject. There is an alphabetical table of subject-matters available, listing the legal questions dealt with in the decisions of the Court of Justice, the General Court and the Civil Service Tribunal and in the Opinions of the Advocates General. In this list there is an extensive amount of cases on EIA (only one case on SEA), but none are about the consideration of alternatives. (ECJ, 2009) One case dealing with the content of the environmental assessment report (C-332/04) also does not mention this subject. This is either an indication that alternatives analysis is not given due attention in European

practice, or that the transposition of the requirements concerning alternatives has been conducted faultlessly so far. It must be noted that the table does not include court cases of the last three years.[2]

The European Commission does provide several guidance documents such as the EIA Guidance document, to assist with the national application of the EIA procedure. According to a survey in 2009, the EIA guidance is used to only a limited extent. Old Member States such as the ones that will be discussed below prefer to use national guidelines that have been developed by local authorities. (COWI, 2009) On the specific topic of alternatives analysis, the European EIA guideline documents provide little information to begin with. But new Member States such as Malta, Estonia and Latvia apply these guidelines either directly or as an important source of inspiration. (COWI, 2009)

Later guideline documents concern three specific stages in the EIA process, namely screening, scoping and the review of the impact statement. (European Commission, 2001) Screening deals with whether or not an EIA is necessary for a certain project, and is thus irrelevant in view of alternatives analysis.

The aim of scoping is to identify issues that are to be addressed in the EIA and to focus the assessment on the most potentially significant impacts. (European Commission, 1999) It is "the process of determining the content and extent of the matters which should be covered in the environmental information to be submitted to a competent authority for projects which are subject to EIA". (European Commission, 2001a) This scoping phase can either be mandatory or voluntary, depending on what Member States decide. It aims, amongst other things, to make sure that relevant information on the alternatives of the project is included. Even though the focus is more on the impacts of the project, it is also during this scoping process that it can be decided which, if any, alternatives will be considered. Thus the scoping stage provides the direct input for the selection of alternatives. In this guideline document a list provides examples of alternatives and mitigation measures that could deserve consideration. It is noted in the guideline that this consideration is not necessarily required by law, but that it is considered good practice.

[2] The CURIA search engine was unable to produce any results on finding cases in this recent time span that cover alternatives analysis in EIA or SEA.

The types of alternatives and mitigation measures are listed, by way of example, as follows:

- Measures to manage demand for goods or services
- Measures to conserve or reduce wastage of resources
- Different approaches to meeting demand
- Locations or routes
- Processes or technologies
- Working methods
- Site plans and layouts
- Design of structures
- Types and sources of materials
- Product specifications
- Timetable for construction, operation and decommissioning including any phasing of the project
- Start and finish dates
- Size of the site or facility
- Level of production

- Responsibilities for implementation
- Pollution controls
- Waste disposal arrangements including recycling, recovery, reuse and final disposal
- Access arrangements and routes for traffic to and from the site
- Ancillary facilities
- Management methods and systems
- Environmental management responsibilities and procedures
- Employment and staff training
- Monitoring and contingency plans
- Decommissioning arrangements, site restoration and after-use
- Do Nothing or Do Minimum

(European Commission, 2001a)

It is of significance that mitigation measures and alternatives are put together in the same table. This choice of lumping them together threatens to ignore the important distinction that exists between them, with an alternative being of a more structural character. Mitigation measures differ from alternatives because of the fact that they are applied within the same proposal, whereas an alternative constitutes a new proposal altogether. On the other hand, it is characteristic for the EIA stage that mainly incremental alternatives, such as mitigation measures, are considered. In the

table one can recognize the different categories of alternatives explained in part II. The ‘Do Minimum’ alternative is a variation on the ‘No Action’ alternative in the case where a pertinent problem within the current state needs to be solved. In this situation doing nothing is not an option.

The guideline document on reviewing an environmental impact statement (EIS) on its quality includes the clear discussion of alternatives in its checklist for a good report. (European Commission, 2001) People drawing up or reviewing an EIS should ask the following questions:

- Is the process by which the Project was developed described and are alternatives considered during this process described?
- Is the baseline situation in the No Project situation described?
- Are the alternatives realistic and genuine alternatives to the Project?
- Are the main reasons for choice of the proposed Project explained, including any environmental reasons for the choice?
- Are the main environmental effects of the alternatives compared with those of the proposed Project?

(European Commission, 2001)

However, this checklist includes the option to indicate that a question is not considered relevant for the report. If the reviewer or drafter of the report considers alternatives analysis irrelevant, no further explanation is required according to these guidelines. There is no need for the project developer to motivate this decision from his part.

Another guideline document on the assessment of indirect and cumulative impacts as well as their interactions deals with how impacts of a project can be identified and assessed, and in extension deals with how alternatives can be compared to this project with respect to these impacts. This document is more practical in nature and offers the reader with a range of possibilities rather than strict guidelines. According to these guidelines, checklists, expert opinions, spatial analysis, questionnaires, threshold analysis, matrices, network analysis and systems analysis all enable the comparison of alternative options. (European Commission, 1999) Several possibilities have been treated more in detail in Part 2. For instance, checklists can

allow for relatively easy comparison of alternatives for a project already at the early stages and network analysis can be very useful in the assessment of site and route alternatives.

As can be seen from the above discussion, the guidelines provide an idea of how alternatives can be approached in practice, but these documents remain rather vague. The fact that it is up to Member States on how to implement the EIA Directive explains this general lack of instructiveness, and this lack of clarity in turn explains why Member States have expressed that they prefer to follow national guidance in this respect. It also has to be noted that these guideline documents are more than ten years old, meaning that they do not take account of conclusions made in the last years about the importance of alternatives analysis. This makes them naturally less relevant for Member States. Updating EU Guidance would both assist in making these documents more helpful in standardizing EU wide implementation as well as in emphasizing the importance of the practice of alternatives analysis.

Studies agree that implementation of alternatives analysis within the EIA Directive is lacking. An evaluation of the Directive states that the lack of project/site alternatives leads to reduced added value from EIA. This was a view expressed by industry stakeholders, who are confronted with EIAs in practice. (GHK and Technopolis, 2008) A report by the European Commission already stated in 2003 that one of the main issues with the EIA Directive was the inadequate attention to the consideration of alternatives in a number of Member States. (European Commission, 2003) The fact that an environmental impact statement only needs to consider those alternatives which the developer has studied on his own initiative, points to a watered-down requirement that undermines the spirit of the EIA. (Kloepfer, 2004) In a more recent questionnaire, several countries pointed to “alternatives” as a category that needed amendments in the EIA. Up to this point, environmentally friendly alternatives don’t receive the necessary attention according to some countries. (COWI, 2009)

The way the SEA Directive is implemented will give some indications on how EIA practice can improve.

Implementation of the SEA Directive

The overall picture of the implementation of the SEA Directive across all of the EU Member States also portrays diversity. Just like in the case of the EIA Directive, the EU provided the Member States with guidance documents that give an idea of how the European institutions see how this Directive should ideally be implemented. The SEA guidance does not explain in detail how an environmental assessment should be carried out, but does provide some practical advice on how to adhere to the requirements. (European Commission, 2003a) In this document the alternatives analysis is stressed for its importance and tells the reader that a more comprehensive assessment of alternatives is necessary. This explains why a small chapter in the guideline document is devoted to the topic. It relates the evaluation of reasonable alternatives to the objective of the Directive, which states that the consideration of environmental effects of plans and programmes is to be ensured. An important consequence of this focus on alternatives is that there is no distinction between the assessment requirements for the drafted plan or programme on the one hand and the alternatives on the other. The likely significant effects of the alternatives have to be identified, described and evaluated in equal scope and detail, in order to ensure that the results are comparable. This way decision-makers and the public know about which reasonable alternatives there are, and why they are not considered as being the best option. Same scope and detail also means that the information required by Annex I of the SEA Directive should be given for both the project as well as the alternatives. (European Commission, 2003a) This is in stark contrast with the EIA Directive implementation, where the preferred alternative is more closely examined and only an outline of the other options is given.

More concretely, this means that the analysis of alternatives in SEA should contain the following information:

> (a) an outline of the contents, main objectives of the plan or programme and relationship with other relevant plans and programmes;
>
> (b) the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme;
>
> (c) the environmental characteristics of areas likely to be significantly affected;
>
> (d) any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC;
>
> (e) the environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation;
>
> (f) the likely significant effects(1) on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors;
>
> (g) the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme;
>
> (h) an outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information;
>
> (i) a description of the measures envisaged concerning monitoring in accordance with Article 10;
>
> (j) a non-technical summary of the information provided under the above headings.

(SEA Directive, 2001) Annex I

This has important consequences for the environmental report, as the consideration of each alternative effectively means double the amount of work, money and time necessary to complete it. Alternatives analysis becomes the largest part of the additional work compared to the EIA report. (EU Austrian Presidency, 1998) This presents project proposers with a serious challenge they might rather avoid by using an escape route. Such a route is available to them because of an as of yet unanswered question. The SEA Directive requests the analysis of ‘reasonable’ alternatives, because assessing unreasonable alternatives would be a waste of time and effort. An open question that remains is what is to be considered a ‘reasonable’ alternative, as

this is not specified in the Directive. The guideline provides some directions, but remains largely inconclusive, leaving the decision to the Member States, and ultimately to the plan developer.

When assessing the reasonableness of an alternative, one should first match it to the objectives and geographical scope of the original plan or programme. This implies the definition of an alternative as a different way of achieving the aims of the original plan. The guideline suggests that this is the best way to interpret the Directive. (European Commission, 2003a) However, one could also interpret an alternative as a completely different plan, with different objectives. The feasibility of studying this kind of alternatives in depth is limited, but early in the planning process they should be given some consideration. When the plans have very long-term perspectives, alternative scenario models can be used, which are broader and less detailed in nature. These scenarios come with the problem of less certainty, providing a smaller basis for sound decision-making.

Reasonableness also entails realism. The alternatives should be chosen in such a way that it would at least be conceivable that they could be reducing significant adverse environmental effects, compared to the original plan. In order to make sure the alternative options are not chosen in such a way that they are obviously worse options, the plan developer has to provide reasons for his selection of alternatives under consideration. (European Commission, 2003a)

Alternatives need to be relevant, which means that the alternatives should be appropriately chosen so that their level matches the decision-making level of the authority that considers them. (ICON et al., 2001) They have to fall within the legal and geographical competence of the authority concerned. (Jurkeviciute and Ricci, 2008)

Member States' approaches in answering the question on what is reasonable are very diverse. According to a study on the application and effectiveness of the SEA Directive, most national legislations have no clear definition of "reasonable alternatives". This means that case-by-case assessments have to provide a decision on what is reasonable. Other countries, like Austria and Sweden, have worked out guidelines on how to define reasonable alternatives. (COWI, 2009a)

The alternative that does not necessarily have to be reasonable and has to be assessed in any case is the “no-go” alternative. This is because the “no-go” alternative is not an option that invariably needs to be considered for implementation after the assessment in order to be useful. First of all it makes sense to analyze it in order to show the decision-maker why it is not reasonable, instead of assuming it is not. Secondly, it provides a clearer understanding of the magnitude of the environmental effects of the action alternatives. (McCold and Saulsbury, 1998)

When looking at the implementation of SEA, the transport sector in Europe is an important research ground, since it is the most experienced with it. This sector is quite advanced in implementing SEAs, as they already had practical experience even before the SEA Directive was in place. (ECMT, 2000) A European manual dating from 1999 already specified that an analysis of alternatives should be among the contents of a SEA report for a transport infrastructure plan. (DHV, 1999) The transport sector especially benefits from using SEA because it allows taking into account social, human and economic arguments as well as the environmental ones. This is important because transport plans and policies have objectives that encompass all these areas. Also when it comes to the alterative assessment more specifically, transport has been faced with many challenges. When proposing a plan in transport one has to take into account modal alternatives (road-, rail-, air-, or waterways), infrastructure alternatives (for example: bridge or tunnel) and non-infrastructure alternatives (like fiscal measures). On a more local level, location alternatives also have to be considered. (ECMT, 2000) The Trans-European Transport Network (TEN-T) programme is one of the most important means of infrastructure funding in Europe. It envisages a set of road, rail, air and water transport networks designed to serve the entire continent of Europe. (European Commission, 2011) In the TEN-T Guidelines document, in essence an EU Decision document, provisions in the chapter dealing with environmental protection state that “suitable methods for implementing the strategic environmental impact assessment should be developed, with the objective of ensuring appropriate coordination, and achieving simplification and acceleration of planning processes for cross-border projects and corridors”. (European Parliament and Council, 2010)

In the context of this demand for suitable methods for SEA implementation, the BEACON ("Building Environmental Assessment Consensus") project was initiated by the European Commission.

One of the outcomes of this project was an updated version of the SEA manual for transport infrastructure plans and programmes. This document gives a good indication of how Europe sees the way alternatives analysis should be implemented. Because it comes quite close to a theoretical ideal, it has already been briefly discussed in the second part. This manual regards the appraisal of strategic alternatives as one of the substantive elements of scoping. (BEACON, 2005) The process starts with the identification of the objectives of the transport plan, both in the spheres of environment and sustainable transport. It is crucial that environmental objectives are included as well, even though they are not usually the preoccupation of the plan initiator. These objectives provide the reference framework for assessing the alternatives. In order for this assessment to be practical, indicators that measure (directly or indirectly) the achievement of objectives should be chosen. Simplicity should be strived for in the selection of these indicators, as this allows for better comparisons between the alternatives later on. (BEACON, 2005) In most cases, the indicators represent a certain impact on a relevant environmental variable. An example of an indicator for climate change is the amount of emitted greenhouse gases. This is a direct indicator. An indirect indicator can be the amount of vehicles and the distances these vehicles travel.

In the specific context of transport, the manual distinguishes between three types of alternatives:

- Alternative construction methods, alternative design
- Alternative routing, alternative site
- Alternative modes of transport, measures to influence traffic flows

(BEACON, 2005)

In addition, the manual specifies that both negative and positive effects of alternatives have to be taken into account. The assessment as a whole and the alternatives analysis more specifically has an important degree of uncertainty in it. The extent of this uncertainty has to be communicated clearly within the report. (BEACON, 2005)

This guideline document is but an indication of how far the SEA practice has evolved in the transport sector. Thus, the transport sector provides a good framework to see what place SEA, and more specifically alternatives analysis, gets in the planning of projects. The compliance with the SEA Directive is one of the points that the Executive Agency checks during the evaluation of the proposals submitted. The Agency, however, does not assess the study itself, as this is something that must be done by the national environmental authorities.

Based on studies in the transport sector and other areas in Europe, some general tenets can be identified concerning alternatives analysis in SEA.

The most important and more general problem is that the Member States are faced with difficulties in the identification of appropriate alternatives. (COWI, 2009a) A second problem is that during the selection of alternatives environmental authorities tend to focus on environmental quality objectives while other authorities require technically and economically feasible alternatives. (ECMT, 2000) A serious advantage of SEA over EIA is that in an effort to comply with the SEA Directive, all Member States demand that the do-nothing alternative has to be included in the environmental report on a mandatory basis. (COWI, 2009a)

The EU guidance on SEA implementation and alternatives analysis, in short, centers on the following five elements. Alternatives considered need to be:

- reasonable
- realistic
- relevant
- timely
- distinct

These qualities, despite not being enforced everywhere, are universal and could thus find application in other areas where alternatives analysis is said to be at the heart of things, such as the EIA. But the theoretical problems surrounding these qualities have to be kept in mind in order not to exaggerate their usefulness. The problem with alternatives having to be relevant has already been discussed in part II and provides an example of possible complications.

2. Flanders

In Belgium environmental policies are a regional competence, like many other aspects of legislation. There is no federal law governing environmental impact assessments, but the Flemish government has undertaken efforts to transpose the European SEA and EIA Directives.

A. Legislation

The provisions dealing with environmental impact assessments for public and private plans and projects are contained in several chapters of the Decree General Provisions concerning Environmental Policy (DABM , 1995). This Decree has been adapted numerous times since 1995, and updates in the legislation have also been put in effect through circulars. A complete revision, incorporating these circulars in its codification, is expected by the end of 2012. The articles for environmental plans have been put in the Decision of the Flemish government concerning environmental impact assessment of plans and programmes, following the European SEA Directive. (Vlaamse Regering, 2007)

Flemish legislation is almost a verbatim transposition of European legislation, with some small differences. Some of these differences have been reason for the Flemish government to be called to court. The European Commission brought forward a case against Belgium (C-435/09), stating that the transposition in Flanders did not occur correctly. The European Court of Justice decided in 2011 that the law will have to be adapted. This adaptation does not concern the study of alternatives, however, but the screening process. This shows that the way Flanders has transposed obligations for alternatives analysis is at least satisfactory from the European perspective.

For EIA (the literal translation from the Dutch term would be project-EIA), a short description of the alternatives of the project or parts of the project that have been

studied by the developer needs to be given. The advantages and disadvantages of all these alternatives need to be described concisely, as well as the reasons for the selection of the alternatives that were chosen for further study. It is specified that these alternatives can be, amongst others, alternative objectives, alternative locations, different ways of protecting the environment and alternative implementations. (DABM , 1995) This non-exhaustive list is a specification which is not present in the European EIA Directive. A description of the existing state of the environment needs to be given in as far that the proposal or its alternatives could affect it. This provision refers to the need to provide the baseline conditions. Additionally, the "no action" alternative needs to be investigated in order to assess the expected developments of the environment in case neither the proposal nor its alternatives are implemented. In short, the Flemish equivalent of an EIA Directive has transposed much of the progress that is present in the SEA Directive, and implements its ideas on a project-level. This can also be seen by the choice of nomenclature, as in Flanders both SEAs and EIAs are ultimately considered an environmental impact assessment and are called plan-EIA and project-EIA respectively.

The Flemish transcription of the SEA provision holds few surprises and also boils down to being a literal translation of the SEA Directive in Dutch. In Flanders, this strategic assessment is called the plan-EIA. The provisions concerning the analysis of alternatives are largely the same, especially when reading the general provisions, which are a verbatim transposition of the European Directives. The "reasonable" alternatives and their possible environmental effects[3] have to be assessed for proposed plans and programs. The reasons for choosing these alternatives as well as motivations for preferring an option should be clarified. (DABM , 1995) In the initial transposition of the SEA Directive, Article 4 stated that there should be a description and explanation of the proposed plan or program, and where appropriate, of reasonable alternatives for the plan or parts thereof. (Vlaamse Regering, 2007) The "where appropriate"[4] part marks a difference with the SEA Directive. Where the SEA Directive can be seen as progress towards a better inclusion of the analysis of alternatives as compared to the EIA Directive, this transposition is a possible step

[3] These effects include the direct as well as the indirect, the positive as well as the negative, the permanent as well as the temporary and the cumulative as well as synergetic effects.
[4] In Dutch: "in voorkomend geval"

backwards. The “where appropriate” implies that ultimately it is up to subjective considerations whether or not alternatives should be assessed, as the appropriateness is not clarified in the law. In the Decree which is currently in force, this wording has been left out. (DABM , 1995)

It’s clear that Flemish legislation is up to European standards, definitely after the European court case. The way this legislation is implemented is examined in the next part.

B. Implementation

Several guideline documents are available on the website of the Flemish Department for the Environment, Nature and Energy. The main document that tries to cover all the methodological aspects of environmental impact assessment was made in 1997. An update is underway, as this document is quite old and dates from even before the SEA was introduced. (LNE, 1997)

This older guidance document comes with some pointers which are still useful today:

- Alternatives are discovered through interdisciplinary consultation between the proposer, experts, authorities and the public.
- Alternatives are only considered when they reach the goals of the proposer and if they reduce or eliminate negative environmental effects.
- The selection of alternatives should be based on technical feasibility and safety considerations. Cost calculations can play a role but cannot be decisive.
- The Best Available Practices principle should be adhered to.

(LNE, 1997)

An important element in these guidelines is the centrality the project proposer assumes in the consideration of alternatives. It is stated that only those alternatives should be considered which are technically feasible by the proposer and reach his goals. (LNE, 1997) In contrast, there is very limited attention given to public participation in the process.

There are more recent guideline documents, which do not provide guidance in a general way but give advice for EIA in a specific sector or scientific theme. The most

recent of these documents cover the scientific fields of impacts on air (Antea Group, 2012), water (Sertius and Grontmij, 2011) and noise and vibrations (SGS Belgium, 2011). The most recent sector document is the one on city development (Tritel GDF Suez, 2011). These documents will not be discussed in detail, but the following tenets can be pulled from them:

- Alternatives need to be described in the same way, with the same level of detail, in order to ensure comparability. (Antea Group, 2012)
- For every alternative, possible mitigating measures should also be defined. (Antea Group, 2012)
- For every alternative, the extent in which they meet demand (quantitatively and qualitatively), their feasibility and their direct and indirect effects should be investigated. (Sertius and Grontmij, 2011)
- Tiering of alternatives analysis is recommendable. The way this can be done in practice is diverging. One document distinguishes three tiers: first, a strategic assessment where alternative goals are examined, second, a plan-level assessment where alternative locations and routes are investigated, and third, a project-level assessment, where alternatives that go more into detail are assessed. (SGS Belgium, 2011) The other document only distinguishes between the last two. The plan-level deals with questions on whether or not to start an activity and for which reasons. A project-level investigation deals with how the activity should look like in more detail. (Tritel GDF Suez, 2011) Depending on the tier in which the alternatives are assessed, they require a more or less detailed description.
- Another way of splitting up the development of alternatives is the method of “two sieves”. In the first step, a large number of alternatives are considered globally but not in detail. From this large amount those which have the biggest negative impacts are excluded from further consideration. In the second step, alternatives are compared in more detail and a preferred alternative is identified. (Tritel GDF Suez, 2011) This idea finds its origins in the Netherlands, whose guideline documents will be discussed later. (Ministerie van Infrastructuur en Milieu, 2012a)

- Only alternatives that lead to sufficient reductions in negative environmental impacts should be considered. (Tritel GDF Suez, 2011)

Again, the lack of emphasis on the role of the public in the development of analysis is a striking observation. The public can participate in an EIA process in an advisory and informing role, but has no active part to play outside of this. There are no stipulations on how the public could participate in identifying alternatives.

3. The Netherlands

The Netherlands is considered as one of the leading countries within the EU when it comes to the far-reaching implementation of the EIA and SEA Directives. The emphasis will therefore not be on how the Netherlands manages to live up to EU standards, but how it successfully surpasses those standards and has taken EIA assessments and alternatives analysis to a higher level.

A. Legislation

The laws governing environmental impact assessment are all collected in the "Environmental Management Law", in Chapter 7 on environmental impact reporting. Both the assessment of plans (Articles 7.7 to 7.15) and projects (Articles 7.16 to 7.38) are covered in this legislative text. (Wet Milieubeheer, 2010) The content requirements for both kinds of assessment reports are almost exactly the same.

A report for both plans and projects needs to include at least:

- need, purpose and objectives of the activity
- description of the activity and its implementation, as well as of reasonable alternatives, including a motivation for the choice of these alternatives
- plans, projects, policies decided on earlier that may affect the proposed activity or its described alternatives
- description of the current state of the environment, the way it can be affected by the proposed activity and its alternatives, as well as a description of expected evolutions of the environment in the absence of the proposed activity and its alternatives
- a comparison of this evolution with the evolution of the environment in case the proposed activity or its alternatives go ahead

- the environmental impacts of both the proposed activity and its alternatives (Wet Milieubeheer, 2010)

As can be seen, this is an almost exact repetition of the requirements of the European SEA Directive, apart from that it also applies to projects.

The EIA procedure is not a stand-alone process. Its aim is to integrate environmental concerns into a broader decision-making process. This broad process is called the "mother-procedure", to which the EIA procedure is linked. Aside from the content requirements above, the EIS also has to adhere to the stipulations of this main procedure. Those conditions are contained in a wide range of laws and regulations. An example of such an extra condition is in some cases the need to include the "most environmentally friendly option". (Ministerie van Infrastructuur en Milieu, 2012)

Aside from these terms, the EIA process also has to meet the clauses from the general management law. This includes amongst others stipulations on the way the public should be involved in the process.

There has been an update in 2010 of the Dutch environmental impact legislation, which presents an important innovation compared to the European Directives. This update had the goal to achieve the same environmental objectives with simpler and less rules and with more cohesion between the plan-level and project-level assessments. A second goal was to allow for more flexibility, allowing custom procedures for EIAs, in turn leading to better results.

The innovation entails a distinction between a limited procedure and an extended procedure for EIA. (Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer, 2010) The extended procedure is the one that has applied before, and is to be followed by all plans. Also projects that don't need an environmental permit are still subject to this procedure. The limited procedure is meant for those projects that are applying for an environmental permit. The idea is that in order to get this permit, environmental assessments are already being carried out. This limited procedure prevents double work being done. This distinction has its implications for the analysis of alternatives in the implementation of the law.

B. Implementation

The Dutch implementation guidelines devote a lot of attention to the analysis of alternatives, indicating the importance the government attaches to this topic. The guidelines provide the following general recommendations (Ministerie van Infrastructuur en Milieu, 2012b):

- The range of alternatives considered should be sufficiently high in order to allow for flexibility in the decision-making process.
- The baseline situation needs to be clearly defined: is it a business-as-usual scenario, or is it a description of the current state of the environment, or both?
- Mitigation measures can be considered as a separate alternative, but can also be looked at within a certain project proposal.
- The objectives and preconditions have to be clear from the outset, as these will be the criteria to check whether or not alternatives are reasonable
- The level of detail has to fit the level of decision-making. Project-level assessments thus require more detail.
- Only alternatives which are distinctly different from each other in terms of themes, scenarios or starting principles should be included. If the number of alternatives is too high, the alternatives analysis becomes less useful and more costly.
- Be creative when developing alternatives, and include the knowledge of the public in this process.

Public participation is recommended, but in the case of the limited procedure not obligatory by law. It is assumed that this involvement already took place at an earlier stage during the application for a permit.

In the extended procedure, public participation is only mandatory on the following two occasions:

- Before the start of the development of the EIA assessment.
- When the EIA report is finished.

If the alternatives development starts at an early stage, the public could present its views on the first of these occasions, but this is generally not the case. Therefore, it is recommended to go beyond the legal obligations and include the public more

actively in the alternatives development. The mandatory inclusion of the public in this early stage does present the audience with the opportunity to share its views on the "need and purpose" of the activity. It is up to the project developer however, how this public participation will look like. The developer needs to make clear how views can be expressed, who can express them and any other terms. This law, if further elaborated, would present the public with a far-reaching input in the process, but in its current state, too much is left to the developer to be of any real impact.

In Dutch legislation, the idea that only reasonable alternatives need to be considered is also present. The consideration of the "no go"-alternative is mandatory, and the best environmental option used to be obligatory as well. However, since 2010 this last requirement has been abolished. There are guidelines available for how to interpret the term "reasonable", which are basically the same as the European legislation, referring to the need, purpose, environmental effects and feasibility. The guidelines state that on the project level the alternatives need to be technically feasible and cost-effective for the developer. On the plan-level the inclusion of other actors is motivated, thus enabling the consideration of more alternatives. In the limited procedure the technical and financial flexibility to consider alternatives is normally much smaller. Despite this reality, alternatives analysis is still stimulated, even though it is more conceivable under these circumstances that an alternative is considered unreasonable. (Ministerie van Infrastructuur en Milieu, 2012c) What has to be taken into account in this regard is that another procedure preceded this limited one, where alternatives have already been considered in depth by following the stipulations of the mother-procedure.

4. United States

The enactment of the National Environmental Policy Act in the United States in 1969 was the first national EIA system. Other countries, also the European ones, followed this example later. This makes the United States a pioneer in the field, making it an interesting country to consider as a possible example for how the European Union should evolve in this respect.

A. Legislation

The US Environmental Protection Agency (EPA) summarizes the environmental policy act as follows: "The National Environmental Policy Act (NEPA) requires

federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions." This definition is much like the extended definition for EIA proposed in the introduction. The consideration of alternatives thus immediately gets an important place within the process.

This law refers mainly to federally-financed projects, but the broad language of the statute extends NEPA's reach to privately financed projects as well. Even though they don't really fall under "major federal actions", they must obtain approval on a federal level in case their impacts are expected to be sizable enough. (Hayes and Hourihan, 1985)

The NEPA itself is quite concise, certainly compared to the other legislative texts that have already been covered. (NEPA, 1969) Sec. 102 [42 USC § 4332].C of NEPA presents the following on what should be included in the assessment reports:

> (i) the environmental impact of the proposed action,
>
> (ii) any adverse environmental effects which cannot be avoided should the proposal be implemented,
>
> (iii) alternatives to the proposed action,
>
> (iv) the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and
>
> (v) any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.

In addition, according to Sec. 102 [42 USC § 4332].E all agencies of the Federal Government are required to:

> study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources

The fact that after all this time the wording has remained rather superficial indicates that the European Union might be headed the same way in its legislation. Turning to the implementation side of things, it could be possible that given the United States' experience, this is not necessarily a problem.

Regional offices for Environmental Review are responsible for implementing NEPA. In their documents, it is easy to find quotes like: "The central element in the environmental review process is a rigorous evaluation of alternatives including the

"no action" alternative." (EPA, 2012) This allows the best hope for the extent in which alternatives will be analyzed in the reports.

B. Implementation

The Council on Environmental Quality (CEQ) oversees NEPA. It is also in charge of developing and promoting national policies to improve environmental quality. It has published regulations for implementing NEPA, which provide a good idea to see how alternatives analysis is seen in the eyes of this government body. (CEQ, 1978)

Part 1502 on the Environmental Impact Statement (the detailed evaluation of the proposed action and its alternatives) has a chapter devoted to alternatives, which states:

> **Sec. 1502.14 Alternatives including the proposed action.**
>
> This section is the heart of the environmental impact statement. Based on the information and analysis presented in the sections on the Affected Environment (Sec. 1502.15) and the Environmental Consequences (Sec. 1502.16), it should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining the issues and providing a clear basis for choice among options by the decision-maker and the public. In this section agencies shall:
>
> (a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.
>
> (b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.
>
> (c) Include reasonable alternatives not within the jurisdiction of the lead agency.
>
> (d) Include the alternative of no action.
>
> (e) Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.
>
> (f) Include appropriate mitigation measures not already included in the proposed action or alternatives.

As far as public involvement goes, the same rules apply as the ones that have been mentioned for the Netherlands, minus the requirement for the proposer to specify the modalities through which comments on the need and purpose of the proposal can be given. Despite its earlier pioneering status, the United States is lagging behind in this regard.

The section in the CEQ regulations on public involvement states the following (CEQ, 1978):

> **Sec. 1503.1 Inviting comments.**
>
> (a) After preparing a draft environmental impact statement and before preparing a final environmental impact statement the agency shall:
>
> 1. Obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved or which is authorized to develop and enforce environmental standards.
>
> 2. Request the comments of:
>
> (i) Appropriate State and local agencies which are authorized to develop and enforce environmental standards;
>
> (ii) Indian tribes, when the effects may be on a reservation; and
>
> (iii) Any agency which has requested that it receive statements on actions of the kind proposed.
>
> (...)
>
> 3. Request comments from the applicant, if any.
>
> 4. Request comments from the public, affirmatively soliciting comments from those persons or organizations who may be interested or affected.
>
> (...)

It is later specified that these comments "may address either the adequacy of the statement or the merits of the alternatives discussed or both." (CEQ, 1978) This means that all of the parties mentioned above can influence the analysis of alternatives in the process, as the lead agency (the project proposer) must take all comments made by the public into consideration.

Another indication of the importance of alternatives is the rating system that EPA has devised for environmental impact statements. The reviewer (EPA) gives much attention to the alternatives, so it is in the lead agency's best interest to takes this analysis seriously if it wants the statement to be accepted. There are three ratings for the adequacy of the EIS:

- **Adequate**: The EIS adequately presents the environmental impact(s) of the preferred alternative and those of the reasonable alternatives. No further analysis or data collection is necessary.
- **Insufficient Information**: The EIS does not contain enough information, as the reviewer has discovered new reasonable alternatives that are within the spectrum of alternatives analyzed in the EIS, which could reduce the environmental impacts of the proposal.

- **Inadequate**: The reviewer has identified new, reasonably available, alternatives, that are outside of the spectrum of alternatives analyzed in the IS, which should be analyzed in order to reduce the potentially significant environmental impacts. A full public review of the new information is necessary.

(EPA, 2011)

The EPA reviewer should consider the following questions:

- Is the proposed action clearly defined?
- Is a reasonable range of alternatives analyzed in the document?
- Has sufficient information been presented to explain the elimination process?
- Are the environmental impacts of alternatives presented in a comparative form to sharply define the issues and provide a clear basis for choice among alternatives?
- Enough info to allow evaluation of the differences among alternatives?
- Is the No Action alternative clearly identified and described in sufficient detail so that its scope is clear and potential impacts can be identified?
- Are the impacts presented in a manner which allows comparison and evaluation of the comparative merits of the alternatives?
- Are the alternatives treated fairly and in an even handed manner?
- Do the proposed action and alternatives achieve the stated purpose and need?

(EPA, 2005)

EPA reviewers of environmental impact statements have commented extensively on alternatives. Some of the concerns noted in these previous reviews were:

- lack of identification of a preferred alternative
- consideration of an unduly restrictive range of alternatives
- alternative presentation didn't allow for comparative evaluations
- the preferred alternative might not achieve its intended goal

When it comes to implementation guidelines, there is a huge range of them provided by the different Federal Agencies, which provide procedures for implementing NEPA. This means that close to a hundred implementation guidelines are available,

each covering a specific sector. (CEQ, 2012) The practical way alternatives development is seen under NEPA has been discussed earlier in the theoretical part.

IV. Recommendations for the EU

The first thing that can be seen is that most of the problems are not specific to the European Union. A lot of these problems have been described in theories, based on case studies from all over the world. Even the United States, the country that has the most experience, has to tackle with some shortcomings that persist in the alternatives analysis and which need to be addressed.

1. Specific EU problems

A problem specific to the European Union is the lack of emphasis on the importance of alternatives analysis in the EIA Directive. Requesting an outline of alternatives does not imply a lot of importance given to the issue. A definite improvement for the EIA specifically would be to move more towards the direction that SEA has taken concerning alternatives analysis. Both in Flanders and the Netherlands the requirements for alternatives analysis are roughly the same on the plan-level and the project-level, so on the European level this should be possible as well.

A second problem on the European level is the fact that the guideline documents are outdated. For older Member States this is not necessarily a problem since they use their national documents which are usually more recent, but for new Member States who have little experience with EIA guidance and rely on the EU, an update of the guideline documents would be recommended. This update can use the more developed national documents as a source of inspiration. The national guideline documents have shown to be more detailed and up-to-date when it comes to the analysis of alternatives.

The large amount of discretion the Member States are getting for the implementation of the directives can be considered another problem on the level of the EU. (Pölönen, 2006) This discretion stems from the vagueness of the legislation in a lot of respects, amongst others the requirements for analysis of alternatives. This leads to the requirements for alternatives analysis not being clear. (European Commission, 2010a) It can be seen however that a country like the United States chooses for the same

kind of vague wording in its legislation, as well as Flanders and the Netherlands. A notable example of this vagueness is the use of the term “reasonable” in legislation. This term has been used in all regions considered. Implementation wise, this discretion for Member States has not been a problem in the transposition of the Directives. The discretion given to the project developer is more problematic.

The following problems are not specific for the European Union but exist and persist everywhere to a certain extent, because they are more structural in nature.

2. Role of the developer

The first main problem is the central role the project or plan developer assumes in alternatives analysis. In a way this can be considered a natural course of events, as he is the initiator of the whole process. But this central position does come at a cost.

It starts with the definition of the need and the purpose of the project. Ideally, this need and purpose is an answer to a real problem. This is not always the case, as the project developer may have had a profitable project in mind first, and then set out to define a problem to match it.

A way to counter this is to include the public and the authorities when defining the need and purpose of a project. This way it can be assessed if the needs are real to a great enough extent, in order to warrant eventual costs, environmental and otherwise, incurred because of the project implementation. The goals of the project then are guaranteed to also reflect societal goals instead of only narrow agency goals. For this to occur effectively, the public needs to be involved at a very early stage. An additional problem that has been observed is that public involvement usually occurs too late to influence alternatives development, let alone the definition of the purpose and need.

A second problem of the project developer’s amount of discretion in considering alternatives is that he has an undeniable bias in favor of the project he proposes. This bias can be expressed in several ways. Alternatives may be approached in such a way that they are intentionally made less attractive compared to the original proposal. The criteria used for alternatives screening can be chosen so that they favor the original proposal but not necessarily a better outcome. Again, public involvement would be

part of a solution. Third parties are generally in a better position to identify alternatives that might not seem very interesting for the project developer.

The problem, definitely on a project-level, is that it might prove difficult to persuade a developer to investigate alternatives that are not interesting for him to execute. The fact that it's the developer who needs to pay for the assessments does not help the matter. But out of an environmental perspective it is of the utmost importance that these alternatives are considered, even if they fall outside of the jurisdiction or expertise of the proposer. For this to happen, the monopoly of the project developer over the decision on which alternatives to consider needs to be broken. There could be some possible ways out of this situation, each coming at a certain cost.

The first possibility is not to persuade the project developer to consider environmentally friendly alternatives, but to simply force him by law. This entails stricter legislation than the one that is currently in place. These laws should be stricter in the sense that they clearly specify the mandatory inclusion of environmentally friendly alternatives (including non-infrastructure solutions). In this case, vague concepts like "reasonableness" would have to be explained in more detail or dropped altogether, in order to ensure less flexibility from the developer's side. This way, these environmentally friendly alternatives would get the same status as the 'no go' alternative in the sense that they don't necessarily have to be executed, but that they are still useful in providing a basis for comparison. This logic would also make project developers more willing to investigate these alternatives. A result of this would be that environmental factors would become more explicit criteria for screening alternatives. The development of these environmentally friendly alternatives would need to happen in consultation with the public, experts and specialized governmental and non-governmental bodies, which can also assist in their analysis. More specific requirements on which alternatives to consider should then be developed. This development of requirements can be organized according to project categories already established in the Directives' annexes, as every category comes with specific characteristics. It could be based on existing national guideline documents which cover only a certain sector, to see which categories of alternatives are generally relevant for which categories of projects, plans and programmes. These

specific requirements then in turn give more practical guidance and a stronger legal basis for alternatives development.

A second possibility does not entail a more stringent law. After a project has been proposed, and reasonable alternatives have been identified by both the public and the project developer himself, the burden of the alternatives analysis could be distributed. One part is done by the project developer himself, who investigates all the alternatives that he would be willing and capable to do, as well as the mandatory 'no go' alternative. The other part could either be done by a government agency or a private institution specialized in environmentally friendly alternatives. This way the original developer will be more open to include these alternatives in the alternatives development stage, as he won't have to pay for the costs of their investigation. Alternatively private competitors of the project developer could propose competing projects that are possibly more environmentally friendly. Then the deciding body compares all the alternatives proposed by all parties with each other. These solutions do come with their own problems. First of all, comparability of all alternatives across the two separate investigations needs to be ensured. This will require far-reaching communication between all the investigating bodies, which can be a problem when they are competitors. Second, there need to be competitors present to make this work. When the project is based on the private property of the project developer this will be impossible to implement. Thirdly, in the case of the government agency or specialized institution, there will be considerable costs involved for the public. Depending on the height of these costs, it remains to be seen if the public is able and willing to carry them in return for the consideration of, and not necessarily the choice for, environmentally friendly solutions.

3. Timing of the assessment

The second main problem revolves around the timing of the environmental impact assessment. Because the EIA occurs on a stage when certain elements have already been decided on, the range of alternatives that can be considered is more limited. Usually this means that the several options under consideration focus on symptoms rather than sources. The alternatives are developed too late to consider more strategic ideas. Instead of investigating alternative approaches, the analysis is restricted to alternative designs. This is partially because of the unwillingness of the developer

himself, which has been discussed above. But partly this is also because of the suboptimal timing. Solutions have already been suggested throughout this text. One of these solutions is the tiering of the analysis, splitting it up in a strategic level and a project-level. This is what the European Union tried to do by installing the SEA Directive, with the aim of incorporating environmental considerations earlier in the assessment process. In reality, this is only helpful in some measure. When there is a policy in place, existing environmental policy goals can be compared to the estimated impacts of the project. The case that presents the biggest problem is the one where a project is proposed, but no policy, plan or program covers it. In this case, no strategic assessment has preceded the project-specific one.

A possible solution to this problem would be to have a compulsory simplified strategic assessment, before beginning the EIA. The strategic assessment would need to be simplified out of reasons of time and cost-effectiveness. It would also be preferable if this strategic assessment would not be done by the project developer himself, but by an independent body in order to ensure objectivity. Again, this kind of solution comes with additional costs for society. But it is conceivable that these costs would decrease after a while, since the more strategies are developed and stored in some “library of strategies”, the more these strategies can be used as a framework for future projects. The introduction of this mandatory strategic assessment would make the actual decision-process more linear, and thus more akin to the theoretical ideal that provides the basis for the idea of tiering.

4. High costs

Especially in the case of smaller projects, all these requirements could prove to be a burden that is too high compared to the benefits that these requirements bring. In this case it is advisable to simplify the procedure and minimize the alternatives analysis. A prerequisite for such a simplified procedure would be that these smaller projects also come with limited environmental effects. In the case of small projects with tremendous environmental effects, the developer should reconsider his activity to begin with.

5. Public participation

This topic has already been covered to a certain extent but deserves separate attention. As stated before, public involvement should start as early as possible, and the public should play an active role in the development of alternatives. The question that remains is which role this should be. There are three possibilities:

- Deciding: the public gets an actual say in which alternatives have to be considered by the developer.
- Advising: the public can make suggestions on which alternatives could be considered.
- Reacting: the public can respond to alternatives that have already been developed beforehand.

It is clear that the third role would be unsatisfactory, partially because of the problem described above dealing with the monopoly role of the project developer. The advisory role is what usually is given to the public now, but the extent to which this advice is taken into account by the developer is ultimately still up to the project developer. This advisory role is still useful however, because when evaluating the assessment report, the reviewer can take the possible lack of attention to public opinion into account when deciding on whether or not to accept the project or plan. Ideally, the public would have a role in which it can actively decide on which alternatives to consider. Obviously, this role has to be clearly defined and limited to a certain extent, in order not to paralyze the developer in his activities. Proposed alternatives of the public would need to meet objective requirements before being forced into the assessment.

V. Conclusion

It is clear that alternatives analysis plays a central role in environmental impact assessments. Yet its implementation is strongly related to what is expected from the EIAs themselves. The fundamental goal of EIA regulations is to prevent pollution at the source. A secondary goal, through which the fundamental goal should be reached, is to contribute to the integration of environmental considerations in decision-making processes. This is done by identifying appropriate alternatives and mitigation measures. This hierarchy of goals leaves several options for interpretation that can result in three different views on how alternatives analysis should be implemented.

The first view is that EIAs have a merely informing role. Environmental impacts and alternatives are considered and published, but do not have an effect on the decision that is taken. This would result in the automatic acceptance of the proposed projects or plans in assessment reviews, but with full information about the environmental effects and the available alternatives. Environmental considerations are therefore included, but do not affect the decision. The analysis of alternatives would merely serve as an extra source of information, with lower content and quality requirements as a result. This view is, given the fundamental goal of EIAs, not widely supported. Only the project developers would see the assessments costs drastically reduced and therefore have an interest in this view. Society as a whole would benefit only marginally by obtaining information about the project and its environmental effects. The main issue is that in this view, nothing will be done about these environmental impacts. In this case, the balance of the scale tilts in favor of human development and at the expense of the environment.

The second view is that the project developer is the central figure in the process, but that he has the responsibility to seriously consider the environment. This perspective results in an alternatives analysis of which the content is largely up to the project developer, but which is also guided by a governing authority. Ideally this idea results in the selection of the best environmentally practicable solution, executed by the original developer. His willingness to perform this action is a prerequisite for the selection of that action as the preferred option. Current practice is close to achieving the ideals of this view, but obstacles remain. The main problem related to this perspective is the continued central role for the project developer, which despite

being logical needs to be curtailed. The greater the liberty given to the developer, the lower the probability of environmental concerns being seriously and objectively considered. Therefore clear guidance, legal and otherwise, remains necessary, in order to ensure that the secondary goal of integrating environmental considerations in decision-making in a meaningful way is reached. The main advantage of this perspective is that it balances human needs and the environment as much as possible.

The third view is that the best environmental solution has to be chosen, given the fundamental goal of EIAs. In this case, the project developer is only a secondary actor compared to the environmental lobby. The merits of this view are that the fundamental goal of EIAs would be reached, through a rigorous analysis of environmentally sound alternatives and a choice for the best environmental option, regardless of the role the original project proposer would play after this choice. The main problem would be that it would stifle project development on a larger scale, as it heightens investment risks for project developers. The balance would therefore tilt in favor of the environment, with little to no concern for human development needs.

In conclusion, the second view is the one most akin to the idea of sustainable development, balancing the environment with human development needs. In relation to this perspective, the current practice of alternatives analysis in EIAs is still in development, but on the right way.

The main problems that persist revolve around the position of the project developer in the assessment process, the inadequate timing of the assessment, the high costs related to the assessment and the lacking public participation. Most of these problems are related to the alternatives development, as opposed to the actual alternatives analysis. For Europe specifically there are some problems with the legal texts that can be solved relatively easily, but the problems listed above are of such a nature that they require more creative and structural solutions.

Alternatives analysis in Europe is on the right track, but this track is not without its remaining obstacles. Recognition of these hindrances, national practices and creative ideas like those suggested here, should provide the means for practitioners to swerve around the obstacles on the path to improved alternatives analysis in EIAs.

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