

Strategic environmental assessment methodologies—applications within the energy sector

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Abstract

Strategic Environmental Assessment (SEA) is a procedural tool and within the framework of SEA, several different types of analytical tools can be used in the assessment. Several analytical tools are presented and their relation to SEA is discussed including methods for future studies, Life Cycle Assessment, Risk Assessment, Economic Valuation and Multi-Attribute Approaches. A framework for the integration of some analytical tools in the SEA process is suggested. It is noted that the available analytical tools primarily cover some types of environmental impacts related to emissions of pollutants. Tools covering impacts on ecosystems and landscapes are more limited. The relation between application and choice of analytical tools is discussed. It is suggested that SEAs used to support a choice between different alternatives require more quantitative methods, whereas SEAs used to identify critical aspects and suggest mitigation strategies can suffice with more qualitative methods. The possible and desired degree of site-specificity in the assessment can also influence the choice of methods. It is also suggested that values and world views can be of importance for judging whether different types of tools and results are meaningful and useful. Since values and world views differ between

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different stakeholders, consultation and understanding are important to ensure credibility and relevance.

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1. Introduction

1.1. Background

The main purpose of strategic environmental assessment (SEA) is to facilitate early and systematic consideration of potential environmental impacts in strategic decision-making (Therivel and Partidario, 1996; Partidario, 1999). It is intended to be used on policies, plans and programmes. The growing significance of SEA as a form of support to decision-making is manifested by the recent EC directive (2001/42/EC) on the assessment of environmental effects from certain plans and programmes (Feldmann et al., 2001). However, a number of challenges need to be overcome for SEA to be an effective tool. In order to be effective, a number of criteria need to be met. The International Association for Impact Assessment (IAIA) has published the IAIA principles that stipulate best practice for EIA (IAIA, 1999).

The principles are: *rigorous, practical, relevant, cost-effective, efficient, focused, adaptive, participative, interdisciplinary, credible, integrated, transparent, and systematic*. While established for EIA, they are of key relevance also for SEA and in a workshop hosted by the [Federal Ministry for the Environment Nature Conservation and Nuclear Safety \(2001\)](#), these principles were adapted towards SEA.

A number of publications have been concerned with how to design an SEA process that can be integrated with the decision-making process (e.g. [European Commission, 1994](#); [Therivel and Brown, 1999](#); [Naturvårdsverket, 2000](#); [ANSEA Project, 2002](#)). Slightly different steps are defined in different sources, although the main features remain the same. The following steps are identified here, also based on ([Nilsson et al., 2001](#)):

1. Definition of objectives.
2. Formulation of alternatives.
3. Scenario analysis.
4. Environmental analysis (including the use of objective and acceptable aggregated indicators, based on more traditional natural sciences).
5. Valuation (including the use of controversial aggregation methods, and political and ethical values).
6. Conclusions, review of quality/follow up measures, etc.

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