

## Climate change aspects in the strategic environmental assessment in Serbia

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### ABSTRACT

Environmental protection legislation in Serbia is harmonized with EU legislation since 2004. Objectives of this paper are to present outputs from the study that investigated and reviewed main features of legislation implementation with respect to planning document type and SEA reports characteristics. Specifically, paper summarizes review results to which extend climatic factors and climate change issues are included in these reports. For the period from 2006 to 2012 243 SEA reports are evaluated based on proposed methodology that comprises of 3 main steps. The results indicate increase in number of SEA per year. However, only 30 reports address climate features and climate changes. The great number of reports focuses mainly on GHGs emissions and incorporation of climate and other global changes aspects in SEA reports is still pending.

**Key words:** SEA, Serbia, planning documents, climate change

### INTRODUCTION

New set of legislation that address environmental protection in Serbia is harmonised with EU legislation and includes, among the other Acts and by laws, Environmental protection Act (Official Gazette of RS, 135/2004) and Strategic Environmental Impact Assessment, hereafter SEA Act (Official Gazette of RS, 135/2004). According to SEA Act for strategies, plans and programs relevant for 14 sectors (spatial planning, energy, water management, transport, waste management, etc) strategic impact assessment is compulsory. This Act denotes strategic tool for environmental management since environmental protection issues judged at the highest decision making levels should be addressed, evaluated and communicated in The Environmental Report. This report that includes information and data on significant environmental issues and constrains has to be part of planning documents, with proposed alternative measures that would reduce potential adverse effects. Climate parameters are specified as on of the factors with likely significant impact that need to be considered and judged along with other issues and constrains of relevance for soil, water, air, biodiversity, population, health, etc. Therefore, the integrations of the broader aspects of the climate in the SEA secure suitable incorporation of climate factors in the natural resources management and encourage proactive approaches in climate and other changes assessment.

Recently, SEA is mainly applied in the field of spatial and urban planning, due to explicit requirements in the Planning and Construction Act (LPC, Official Gazette of RS, 2009). Besides, The Water Act (WA, Official Gazette of RS, 2010) specify that SEA is mandatory for Strategy, River Basin Management Plans and for the special water management plans.

The Republic of Serbia has been a member of the United Nations Framework Convention on Climate Change (UNFCCC, 1992) since 2001, and the Kyoto Protocol to the UNFCCC since 2008, as a non-Annex I Part. The Initial National Communication to the UNFCCC is submitted in 2010 and final version of Second National Communication is under development. Information on national GHG emissions, climate change impacts, vulnerability assessment, mitigation and adaptation measures, and climate-related policies of relevance for various sectors are included in reports. Moreover, numerous of projects have evaluated climate and other changes (land use, socio-economic) on specific sectors and environment in generally. Recently published ICPDR (International Commission for the protection of the Danube

River - DRB) Strategy on Adaptation to Climate Change constitutes an important step towards adapting the DRB to climate change (Mair et al., 2013). However, integration of climate change issues into the SEA Act is still pending and planned activities have not been completed, although they are very important for the implementation of mitigation and adaptation measures.

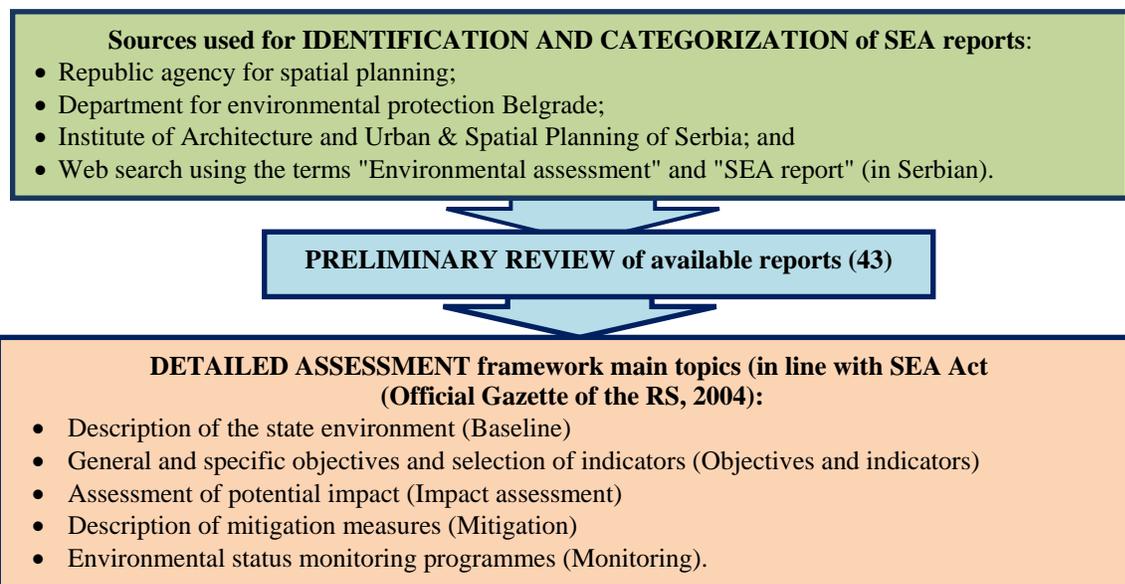
A number of studies have explored consideration of climate change in practice of the strategic environmental assessment (Posas P., 2011; Wende W. et al., 2012; Larsen S. et al., 2012; Larsen S. et al., 2013). Besides, there are examples of practical guidance for incorporation of climate change in the SEA, for instance by Levett-Therivel Sustainability Consultants (2007), OECD (2008) and European Commission (2013). In Serbia, a few articles have reviewed a climate change issues in the SEA in a limited extent (Crnčević et al., 2011; Stojanović et al., 2013).

The purpose of this paper is to present the main characteristics of the ten-year implementation of the strategic environmental assessment in Serbia, and summarizes results of reviewing how climatic factors and climate change are addressed in the SEA reports. The total number of 243 SEA reports were identified and reviewed, covering period 2006-2012. The study had three parts: identification of the SEA reports, a preliminary examination of available reports and detailed analysis of relevant reports in relation to climate change.

## METHODOLOGY

Methodology presented in this paper is based on Serbian SEA legislation (SEA Act, 2004; SEA Guideline, 2007) and corresponds to approaches presented in previously published articles that amplified SEA and climate change (Posas P., 2011 and Larsen S., 2013). The constituent parts of methodology applied in SEA reports review and analysis are depicted schematically in **Figure 1**.

**Identification and categorization of SEA reports** to be evaluated are based on data and information obtained from *different* sources, since the registry of SEA reports do not exist at the national level due to different sectoral jurisdictions and planning levels. For the period 2006-2012 total number of 243 SEA reports are identified and categorized based on planning document type and year of report development, **Preliminary review of available SEA reports** comprises of two steps. Firstly, reports are characterized with respect to institution that developed SEAs and length of document. Secondly, reports that contain at least one climate feature are selected for detailed **assessment of** available SEA, namely 30 reports. The assessment framework includes 5 major topics as presented in Figure 1.

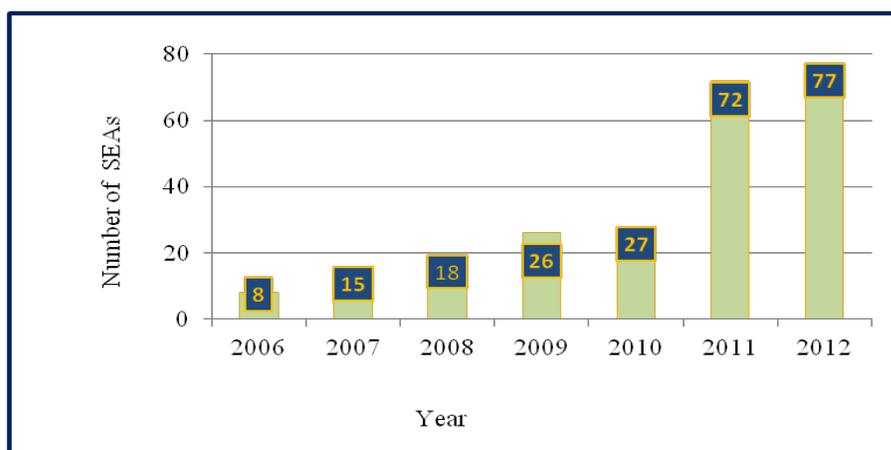


**Figure 1** Schematic of the methodology applied in assessment of CC features in the strategic environmental assessment in Serbia

## RESULTS

### *SEA reports categorization*

The SEA Act came into force in 2005, and first reports were published in 2006. As presented in Figure 2 the slight increase in number of published SEAs is identified within the first few years. In comparison to that significant rise in number of published SEAs after 2010, i.e., over 70 reports per year are noticeable. Similar trend in SEA implementation is documented in Denmark from 2004 to 2009 as reported by Larsen S. et al., 2012/2013.



**Figure 2** SEAs development per year in Republic of Serbia

In Table 1 SEAs evaluation results are presented with respect to publishing year for particular type of plan. Majority of reports addressed spatial and land use planning (239) and only four are focused on waste management. Out of 239 reports 75% are relevant to spatial plans, and 25% to local land use plans.

Table 1 – Number of SEAs by type of plan and by year of preparation

Year of publishing	SEA per Plan type					Number of plans
	Regional spatial plan	Sectoral spatial plan	Municipal spatial plan	Local land use plan	Waste management plan	
2006	-	1	2	5	-	8
2007	-	-	6	9	1	16
2008	-	2	6	10	-	18
2009	-	6	8	12	-	26
2010	2	6	14	4	1	27
2011	3	5	54	8	2	72
2012	1	12	51	12	-	76
Total	6	32	141	60	4	243

Based on the literature review (Posas, 2011; Wende et al. 2012; Larsen et al. 2012) that evaluated particular plans contribution in SEA evaluations it is perceived that majority of SEA focus on regional, spatial and local plans. It corresponds to results presented in Table 1.

### *SEA reports preliminary review*

Preliminary review is comprised of 43 reports. Majority of them e.g., 63% are prepared by 16 institutions and consulting companies. More over, six institutions prepared 79% of all reports. Given the number of SEA reports pages it varies from 41 for local regulation plans to 217 pages for spatial plan for infrastructural corridor. The average number of pages is 96. Evaluation of climate factors incorporation in SEA emphasized 30 (70%) reports that include one or more data and information on climate or climate change. These findings are similar to case studies in UK. As presented in Posas (2011), 39 % (14/36) of reports are developed by consultants with average number of pages is 62, and 33 reports out of 36 addressed climate changes.

### *SEA reports detailed analysis*

Analyses of reports that include climatic factors are presented in Table 3 with respect to climatic factors in each plan type and particular topic area. Different percentile ranks exist with respect to climate data and specific topic area, e.g. for waste management plans climatic factors are included in the most topic areas (90%), in regional spatial plans 59%, in municipal plans 51%, in local land use plans 48%, and in sectoral spatial plans 46%.

Table 3 Percentage of SEAs addressing climatic factors by type of plan and topic area

Type of plan	No. of SEAs	Baseline	Objectives/ indicators	Impact assessment	Mitigation	Monitoring	Average (%)
Regional spatial	3	67	100	67	30	30	<b>59</b>
Sectoral spatial	5	80	60	60	0	30	<b>46</b>
Municipal spatial	13	85	77	31	31	31	<b>51</b>
Local land use	5	80	40	40	40	40	<b>48</b>
Waste management	4	100	50	100	100	100	<b>90</b>
Average (%)	<b>100</b>	<b>82</b>	<b>65</b>	<b>60</b>	<b>40</b>	<b>46</b>	<b>59</b>

Integration of climate factors into particular SEA topic area varies with respect to percentage of included climate data and parameter type. Majority of climate data and indicators, i.e., 82 % addressed current environmental circumstances with respect to basic meteorological data.

Within topic area "objectives and indicators" climate change aspects are mentioned in 65% of reports. The main objectives are reduction of greenhouse gas emissions, following by increase in energy efficiency and renewable energy use expand. Based on defined target indicators are selected for achievement assessment and the most common are the level of GHG emissions consumption of non-renewable energy sources and traffic load.

In 60% reports impacts of development plan to climate factors were assessed by prediction of impact and evaluation of its significance. Predicted impacts arise from implementing the plan and its alternatives,

including “zero alternative”. These changes are identified by considering the key elements of the plan against a set of assessment criteria, e.g. SEA objectives. The main negative impacts of climate change come from the GHG emissions from the energy production and consumption, transport, industry, agriculture and waste.

Climate change mitigation was elaborated in 40 % of SEAs that underlined the potential for reduction of GHG emissions by switching to alternative energy sources and supporting efficiency improvements, particularly in buildings. Renewable energy is one of key priorities connected to climate change mitigation.

Monitoring of climatic factors and climate change indicators was underlined in 46% reports. The most indicators were taken from the topic area objectives and indicators.

Results presented in this paper are comparable with results from other studies Posas (2011) that evaluated eight predefined criteria for assessment of climate change incorporation in SEA reports. Three criteria are excluded from review in Serbia e.g. policy statement, adaptation and consultation. Other five corresponded to topic areas for detailed assesment presented in Figure 1. Correlation between results for Serbia as presented in Table 3 and corresponding results in percentile (Posas, 2011) depicted in table 7, are following: (1) baseline (82/50), (2) objectives and indicators (65/86), (3) impact assessment-alternatives (60/78), (4) mitigation measures (40/89), and (5) monitoring (46/58).

On average, climate factors are addressed in 59% and 72% of SEA in Serbia and UK, respectively. Data presented here are partially comparable with study by Larsen et al. (2012) that evaluated climate factors integration in SEA reports in Denmark. Based on their results assessment of 3 criteria (mitigation, adaptation and baseline adaptation) in SEA reports indicated that climate changes are addressed in 85 out of 149 reports, e.g., 57%.

## Conclusions

Application of strategic environmental assessment in Serbia is improving after the adoption of the SEA Act 2004. In addition, climate change impact assessment for plans is becoming increasingly important in the planning procedures in Serbia. In particularly, as an instrument for control of environmental sustainability implementation in planning documents within the framework of environmental impact assessment.

The results presented in this paper demonstrate achievement of two objectives. Current practices in SEA implementation in Serbian planning procedures are summarized and climate change issues incorporation in SEA reports is elaborated. Review of 243 SEA reports indicated upward trend in number of produced SEA reports in Serbia recently. Majority of reviewed reports refer to the spatial and land use planning at various planning levels. Preliminary review of 43 SEA reports demonstrated that approximately 70% of them have incorporated one or more data on climatic factors or climate change parameters. Climate change factors integration into SEA reports indicates considerable variations with respect to plan type. In terms of individual SEA topics there are also considerable variations. The percentage of SEAs with respect to five topic area indicated that in three of them (baseline, objectives and assessment) climate factors are acceptable addressed, while in mitigation and monitoring they are not adequately represented. In general, it can be stated that consideration and integration of climate change aspects in the SEA have been insufficient, and that in future is necessary to include climate change in more comprehensive and systematic manner. The Water Act indicates list of planning documents that require SEA in water management, but process is still pending. This is of particular interest given the potential CC influences on hydrological cycle and uncertainty associated with future projections.

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