Gaps in EIA Incorporating Climate Change

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Abstract

The Environmental Impact Assessment (EIA) Directive, 85/337/EEC, requires that in the implementation of EIA, effects of projects on climate (Article 3) and climatic factors (Annex IV) should be examined. It is unclear exactly what the term "climate factors" means in assessment practice. Meanwhile, a review of the literature suggests that the temporal boundaries for EIA need to be expanded, but there is little agreement concerning the appropriate time-window for climate change related assessment to be taken into account. The ambiguity in the policy's language and the lack of clear theoretical foundation may be related to uncertainty in climate research. The effects of this ambiguity may be associated with poor EIA practices and can lead to inconsistency in assessments.

Using housing development projects as the case studies, this paper explores a gap between the policy provision and the way in which the current EIA are undertaken in the UK with a focus on climate change considerations, By using a cluster sampling method, EIA data of residential development schemes in 29 cases were collected from January 2010 to November 2011 at the Institute of Environmental Management and Assessment. When compared, the data shows that assessments vary in their coverage with regards to climate change mitigation issues and that there is little consistency in setting temporal boundaries for the assessment, resulting in weak links between projects' energy strategies and the assessments.

Key words: Environmental Impact Assessment (EIA), Climate change, housing development, United Kingdom

1. Introduction

Climate change is one of the key challenges facing worldwide sustainable development today (IPCC 2007). However, there is a gap between scientific knowledge and decision-making at the project-level. For example, climate change is still perceived as a distant phenomenon by planners and it is not yet prominent issue in the planning process (Byer et al. 2009: 40-41; Hamin and Gurran 2009). For this reason, there is a growing interest within the Environmental Impact Assessment (EIA) community to use EIA as a tool to fill the gap and support decisions either to adapt or mitigate climate change (Agrawala et al. 2010; Bell et al. 2002; Bell et al. 2003; ME 2009; Wilson and Piper 2010). More specifically, with regards to EIA's role and contribution to sustainable development of urban planning in the context of climate change, Alberti and Susskind (1996: 219) argue that together with Cumulative Impact Assessment, EIA is a crucial tool for setting and achieving a project's climate change and other sustainability targets. The Organisation for Economic Co-operation and Development's environmental working paper on 'Incorporating climate change impacts and adaptation in Environmental Impact Assessments: Opportunities and Challenges' states that EIA could be an efficient tool to "climate proof projects" because it is a well established environmental decision-making tool in many countries, it is promoted by many bilateral and multilateral agencies, and incorporating climate change into existing modalities such as EIA instead of standalone measures can ensure efficiency in the use financial and human resources (Agrawala et al. 2010: 10).

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In the European context, the EIA Directive (85/337EEC) requires that in the implementation of EIA, effects of projects on climate (Article 3) and climate factor (Annex IV) should be examined. The UK government has introduced the necessary legal provisions to ensure that these requirements are achieved in practice, which are summarised in 'Environmental impact assessment: guide to procedures' by the Department for Communities and Local Government (DCLG 2000). Despite the requirement for climate change to be considered, it is unclear exactly what the term "climate factors" means in assessment practice (Wende et al. 2012: 91). Existing EIA guidelines in the EU and its member states do not provide specific advice on how to consider climate adaptation or mitigation; thus, these issues still receive little attention. This shortcoming has been recognised in the Commission's 5 year review report on the 'Application and Effectiveness of the EIA Directive', which concludes that climate change should be incorporated in project level decision-making as a mean of risk management (EC 2003: 5-6). According to this report, even though climate change is considered in many EIAs, this is not because it is an EU requirement, but because of obligations imposed through the implementation of national policies.

Furthermore, when considering climate change in assessment, it introduces additional uncertainties. Although there is strong evidence that the climate is changing, understanding and knowledge of the precise nature, extent and rate of these changes is evolving (IPPC 2007: 60). Due to the uncertainties surrounding projections of climate change, the complex relationships between climate change and its local impacts and difficulties in estimating various parameters related to greenhouse gas (GHG) emissions, it is challenging to incorporate climate change into EIA (Padgett et al. 2008). While there has been limited discussion on methodological principles for EIA of climate change, there is a more substantial body of literature on incorporating climate change into environmental assessment at the strategic level (Brooks and Adger 2003; Füssel 2007; Noble 2008; Patz et al. 2005; Sjöholm 2009; Therivel and Ross 2007). The situation now exists where regulations impel practitioner to perform climate-aware EIA; however little practical guidance is provided as to how this should be achieved.

In the context of climate change, housing developments are at the forefront of attention. Considerable percentage of GHG emissions have hitherto been generated by buildings and transport in urban areas. In the UK, for example, homes are contributing 27% of the national total emissions (Killip 2008). It is likely that escalating climate change severity will increase the vulnerability of not only the biophysical and the built environment but also population's exposure to climate change impacts (Hacker et al. 2005: 28). The focus of this paper is to explore the gap between regulatory requirements particularly to EIA and current practices in addressing various climate change related issues for housing development projects in the UK. In the following section, the research method is outlined, and preliminary findings are presented.

2. Methodology

The principal methods employed in this study are the use of sampling to select EISs for analysis, outlining suggested assessment principles, development of the evaluation criteria and document review.

By using the cluster sampling technique (Teddlie and Yu 2007: 79), a sample of 29 Environmental Impact Statements (EISs) in housing developments, which were submitted between January 2010 and November 2011 to their local authorities, were selected for this study[2] (see Table 1). EIS held at the

[2] The particular sampling period has been determined for the following reasons: (a) the work has been discussed in this paper is a part of PhD research entitled "Ex-ante Project Assessment Incorporating Climate Change: Housing Development Case Studies from the UK and South Korea." The start of sampling was set as the same as that for South Korea (b) a collection of

IEMA library[3] was used with the assumption that it can be possible to achieve a good sample by focusing on naturally occurring clusters of the particular phenomenon that is being studied (Denscombe 2007: 16).

Table 1.Reviewed EISs

1. (N) North West Cambridge* , September 2011	16. (R) New South Quarter, July 2010
2. (N) Little Heath, Coventry, September 2011	17. (R) Bath Road, Reading, July 2010
3. (N) The Crown Estate and Kilverstone Estate Thetford SUE*, June 2011	18. (R) Boundary Hall, Basingstoke, June 2010
4. (R) Dartford Gateway*, March 2011	19. (R) Aberfeldy Village*, London , June 2010
5. (N) Greenwich Peninsula*, December 2010	20. (R) Vauxhall Cross, June 2010
6. (R) Bicester Eco-Town, November 2010	21. (N) Land at Clackers Brook East Melksham , June 2010
7. (R) Chelsea Barracks, November 2010	22. (N) Hatch Farm Dairies, June 2010
8. (N) Newlands*, Waterlooville, November 2010	23. (N) Golf Road, Mablethorpe, May 2010
9. (N) Courtwich, Littlehampton, October 2010	24. (R) Harold Wood, May 2010
10. (N) Land at Hambrook, October 2010	25. (N) Land at Commonhead Swindon, May 2010
11. (N) Starvehall Farm, Cheltenham, September 2010	26. (N) Kentwood Farm East, North Workingham Strategic Development, April 2010
12. (R) Tipner Regeneration, August 2010	27. (N) New Airfield Neighbourhood Weston Park, April 2010
13. (N) Kirkcaldy*, August 2010	28. (N) Dawley and Malinslee Regeneration, March 2010
14. (R) Portdownie, July 2010	29. (N) Carr Lodge*, February 2010
15. (N) Klilnwood Vale*, July 2010	

(N) - New Settlement, (R) – Regeneration * Projects involving more than 1,000 homes

The EISs for the 29 project were reviewed in stages. First, a broad scan was undertaken to determine the general coverage and how it is organised. In the next stage, to determine whether climate change was addressed in the main EIS, a search of each statement was done using the terms "climate", "climatic", "carbon" and "GHG". To identify the extent to which the EIA has promoted the projects towards mitigation of GHG emissions and climate-proofing, a checklist has been developed. Such checklists are useful for determining the quality of EISs (European Directive 2001). Successful assessment practices incorporating climate change requires a holistic approach that integrates all interacting parts and processes in tandem rather than isolation (Agrawala et al. 2010), therefore suggesting that the checklist review approach may not be wholly appropriate. Notwithstanding the weakness of checklist-based review, a strong advantage is that it provides a systematic and consistent approach to the evaluation of data (Genter et al. 2008).

There are generally accepted sufficient guidelines for suggesting exactly how EIA should account for climate change at the project-level. Thus, a review was undertaken to integrate recommendations from both environmental assessment literature covering climate change issues and publically available guidance documents from the Organisation for Economic Co-operation and Development (OECD), Canadian Environmental Assessment Agency (CEAA), Institute of Environmental Management & Assessment (IEMA) and the Ministry of Environment of the Republic of Korea (ME). The literature was analysed and the key recommendations were classified as either climate change adaptation or mitigation, or both. From this, ten recommended implementation principles for a more climate-aware EIA have been identified (see Table 2).

the most recently available data was November 2011 (as of December 2011). During the determined time, 212 EISs were filed at the IEMA library and this study merely focused on EISs in housing developments.

[3] IEMA, the UK's largest environmental professional association representing over 20,000 practitioners, keeps the one of the largest databases of ESs and EIA-related literature.

Table 2. Recommended implementation principles for EIA

Implementation Principles	Source
1. Review the relevant policies and regulations for GHG mitigation and climate change adaptation	A, B
2. Develop climate change related objectives	A, B
3. When developing climate change baseline, take account of both the current climate and projected climate change scenarios	B, C
4. Identify the current baseline and projected future changes in GHG emissions	B
5. Assess the whole-life effects of the project, including embodied energy, emissions related to construction and operational emissions	B
6. Assess direct/indirect GHG emissions and effects on emissions sinks	A, D
7. Identify climate change impacts on the project and risks to public and the environment	A
8. Identify cumulative effects related to climate change	B, F
9. Seek opportunities to ensure the integration of mitigation and adaptation measures in project design	B, F, G
10. Include monitoring and follow-up plans in relation to climate change	A, B, C, D

A.(CEAA 2003: 7); B. (IEMA 2010); C. (Agrawala et al. 2010); D. (ME 2011); E. (Wilson and Piper 2010: 154); F. (Byer et al. 2009: 35); G. (MER 2009)

Based upon the principles, the evaluation criteria were selected by which to assess climate change treatment in the EIS sample. In the criteria, integration between adaptation and mitigation was excluded since it is difficult to evaluate without knowing the project design details that are usually presented in master plans and development plans. Instead, the existence of a stand-alone climate change-related chapter within EIA was checked to estimate the degree to which the presence of stand-alone chapter may provide the evidence pointing toward a potential shift in climate change-aware EIA.

3. EIA review results and key findings

The first stage of brief review indicated that four climate change terms-"climate", "climatic", "carbon" and "GHG" were presented in all 29 EISs, despite no statistical analysis being carried out to the amount of climate change-related contents. Each EIS included a summary of relevant policy and regulations while only 13 EISs set specific objectives or targets related to climate change. Of those samples, about 70 percent included a stand-alone chapter on climate change. This demonstrates that it is more likely to treat climate change as a subject of study for EIA and to have project oriented goals to achieve policy requirements when having a stand-alone chapter. Meanwhile, no significant relationship appeared between the main development features (e.g. project size and type) and the incorporation of climate change in EISs.

Three out of the eleven projects, which included information on direct GHG emissions analysed the projected emissions quantitatively by using a scenario building method. The remaining eight did not discuss direct emissions in a rigorous manner, and only indicated concerns over the global climate change and projects' contribution to the GHG emissions. Furthermore, two projects took uncertainty into account when measuring GHG emissions since indirect emissions, such as the emissions from the consumption of water, waste and those involved in the processing of goods that are consumed and purchased at the project site are hard to measure. Meanwhile, issues on emission sinks that removes GHG emissions from the air and could potentially be protected with the intention of offsetting emissions occurring elsewhere, were not predominately appreciated or recognised in any EISs, except for the Aberfeldy Village Regeneration project, which included qualitative commentary about positive aspects of green-space on climate change mitigation. The three most recent projects estimated the projected GHG emissions during the main phrase of development process. Among those projects the Thetford SUE project carried out the most systematic assessment with emphasis on the construction

period and choices on building materials. In terms of changes in baseline emissions, only three projects perceived to have positive influence due to stringent policy requirements in the future.

None of the projects identified significant impacts with regards to climate change and four projects addressed the potential impacts by referring to the data from the national climate change scenarios, UK Climate Projections. In general, climate change impacts and the local vulnerability issues were not sufficiently analysed and most projects only addressed the issues of absence of data uncertainty and challenges in determining possible impacts. Cumulative effects were lightly addressed in five projects while the rest of the projects did not take into account this issue at all. There are three projects that include follow-up plans for monitoring and evaluating of GHG emissions along with future management plans.

4. Conclusions and reflections

Incorporating climate change into EIA is still in its infancy. The results of the review reveal that climate change has not been adequately acknowledged or addressed across EISs: EISs lack scientific rigour and fail to predict and evaluate GHG emissions from the project and climate change impacts with regards to the project.

In addition, there was inconsistency in the treatment of climate change in those EISs examined in this paper. This might be seen as the "missing link" between policy plans and development projects. To ensure the consistency and content validity of EISs, standard protocols and guidance to help practitioners identify an appropriate coverage of the assessment should be provided.

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