Procuring green energy in the construction sector

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Abstract: This paper intends to explore the opportunities for procuring renewable energy in the construction sector through impact assessment (IA). The paper draws attention towards a significant instrument called green procurement (GP). GP involves buying of services, products and also energy that meet environmental requirements. The paper is based on a study, which was carried out in order to envisage the link between IA and GP. The purpose of the study was, therefore, to gain an understanding on the potentiality of this link. The paper indicates that the link between IA and GP could facilitate the discussion on renewable energy procurement at the IA phase. The study also investigated various innovative partnership systems and made an attempt to understand how such partnerships could strengthen the link. The paper highlights that new partnering arrangements between the government, market and the public, which could ensure the delivery of commitments made during the IA stage, need to be adopted during such a linkage. Further, the construction sector, as a significant consumer of energy, could play the potential role of prime movers. Prime movers are actors who facilitate the diffusion and development of a new technology. Such a capacity could be tapped through linking IA and GP. The prime movers need not be restricted to one player; it could also be a constellation of partners. This network needs to be investigated in the future. Future research is imperative also in terms of the strategic mechanisms required to develop the connection between IA and GP.

Keywords: impact assessment, partnerships, green procurement, renewable energy

1. Introduction

The construction sector consumes a substantial amount of energy during manufacturing and transportation of building materials, installation, construction activities (Yan et al., 2010) and operation. Although studies show that the energy use and the environmental impacts during the occupation phase account for a majority of the total (cf: Adalberth, 2000; OECD, 2003), the energy required for construction, and for material production has also started gaining attention. This is because the materials selected for the building construction determines the energy required for the construction and the environmental consequences as well (Dimoudi and Tompa, 2008). Thormark’s (2006) study concludes that in order to reduce the total energy consumption in buildings, it is of utmost importance in the design phase to not only reduce operational energy requirements, but also to pay attention to the choice of building materials. Also the significant consumption of non-renewable energy by the sector has resulted in emissions of greenhouse gases (Sterner, 2002). The construction sector needs to take a leap forward towards a sustainable energy path. According to Hennicke and Fischedick (2006), “sustainable energy paths” should be based on principles such as effective conservation of resources and protection of environment, social acceptability, low risks and contribution to mitigate international conflicts, and fair collaborations with developing countries. The implementation of such a system by the sector would certainly need a decrease in the dependency on oil and other fossil fuels, reduction in CO₂ emissions, interventions to curtail social costs, adequate attention on material choice, and a transition towards green or renewable energy.

Such a sustainable energy path and green energy interventions involves challenges not only within the ambit of technology development, but also in the area of policy making. The two important policy instruments, highly relevant to the construction sector, primarily from environmental and sustainability perspectives, are environmental impact assessment (EIA) and green procurement (GP).
EIA has been evolving to develop as a positive process that intends to seek an accord between development and the environment (Glasson et al., 2007). The reach of impact assessment could go beyond the prediction and evaluation of impacts to planning mitigation measures and “promoting environmental enhancement of positive impacts” (McCluskey and João, n.d). GP involves the integration of environmental performance considerations into the procurement process including planning, purchase, use and disposal (PWGSC, 2006) and can go to the extent of prioritizing on green and renewable energy (CEC, 2008). It can also involve the procurement of low energy consuming materials for construction.

This paper is based on a study, which was carried out in order to envisage the link between EIA and GP. The paper arises from our attempt to initiate the discussion on planning for green energy procurement at the stage of EIA by conceptualizing the link between EIA and GP. In the process, the paper focuses on partnership arrangements and analyzes how partnerships could strengthen the EIA and GP linkage.

2. The linkage between EIA and GP

The conceptualization of the linkage between energy inclusive GP and EIA can be developed further by the identification of various stages in the EIA process where discussion on GP can be integrated. EIA has three phases: predecision, post decision and transition (Morrison-Saunders and Bailey, 1999). The phase that can be of particular interest is the predecision phase, which involves designing, developing the EIA report, its review and decision-making. For instance, Dutch experiences on intertwining the tracks of procurement and EIA shows that the EIA has three stages at which the linkage may start: the Notification of Intent (definition phase, where the scope of the EIA study is defined), the EIA (study phase, where impacts are assessed across alternatives), and the decision (wherein the contract is awarded to the winning bidder). This intertwining is especially manifested when procurement is concerned with services and contractor procurement. The Dutch procedure thus calls for an early involvement of contractors, where the market parties are involved before the final consent decision, in the preparation of the EIA report (Arts et al., 2006). Further, it has to be noted that the comprehensive specification made by the client before the contractor is procured results in a gap between design and construction (Eriksson and Laan, 2007). For instance, it may not be advisable for the client to develop specifications on green procurement before appointing and consulting the contractor, which might lead to contractor failing to implement the planned procurement practices. Therefore, the type of contractual systems within which the EIA GP integration could occur needs research. The lessons from the Dutch experiences reveal that the coordination of the economically feasible bid from the procurement track and the alternative most favorable to the environment proves to be challenging (Arts et al., 2006). In order to address such challenges, intertwining procurement and EIA requires a different attitude and understanding from all the stakeholders involved, and a collaborative partnering framework for delivering environmental outcomes.

3. Envisaging partnerships in the EIA and GP linkage

3.1. A revitalized agenda

Bendell et al. (2010) discuss the features of a revitalized agenda on partnership. They envisage that it could include being interdisciplinary, particularly capturing insights from political science and development studies into management aspects; integrative, through linking focal points such as organization, issue and governance; critical, so that existing practices are questioned and new and difficult questions are asked, and should explore these features in different settings rather than relating new research to existing traditions.

In order to contemplate the linking of EIA with GP, it is beneficial to consider this evolved agenda and further discuss the apparatus of partnering from the perspectives of sustainability. This paper comprehends the partnering mechanism using certain concepts such as partnering flower (Nyström, 2005) and differentiated partnering (Gadde and Dubois, 2010), and attempts to identify opportunities for the EIA and GP linkage.
3.1.1. Partnering flower

Nyström (2005) applies Ludwig Wittgenstein’s idea of family-resemblance to the partnering concept. He describes the resulting analysis using a partnering flower (ref Fig.1), wherein the centre contains the two common components to all partnering arrangements: trust and mutual understanding. The remaining components are represented in petals. There is no specific petal or set of petals that needs to be present. Linking different sets leads to several variants of partnering. Thus different designs of partnering projects can be accommodated within the same structure. The flower as an entirety forms the base for illustrating, understanding and describing the whole family of all partnering variants. He concludes that the partnering flower may prove to be useful in the procurement phase of a construction project, both as a description of the concept, if necessary, and as an initiating point for discussions between the client and the contractor on framing a specific partnering project (i.e. which petals to add). The partnering flower could thus facilitate discussions on green procurement by adopting it as a component or a partnering petal. For instance, as in Fig.1, one of the petals could represent sustainability, and instruments such as GP could be integrated within. The input to this component could be based on the investigation made during the EIA process. The EIA process could be benefitted from the partnering flower (through petals such as trust building, regular meetings) and reciprocally EIA could add value to the sustainability component in the flower. This combination of the partnering flower might aid the EIA and GP linkage. However, the combination needs to be tested and evaluated.

![Fig.1. Partnering flower](source: adapted from Nyström (2005))

3.1.2. Differentiated partnering approach

The root causes for economic inefficiency in the construction industry have been directed to its fragmented nature, the divorce between planning and implementation, the role of consultants, procurement methods, and adversarial relations (Naoum, 2003; Kadefors et al., 2007). These causes may also have implications on the environmental performance of the construction sector. For construction projects that are filled with inherent complexity and uncertainty and thereby seek to achieve a partnering relationship, contracts that value relationships, trust, and communication have been suggested to be appropriate (Cheung et al., 2006). Partnering intends to re-cast relations between actors in projects by encouraging a collaborative approach, which is more open, less managerial and unburdened by hierarchy (Alderman and Ivory, 2007). However, owing to the hindrances to
cooperation and trust, analysis concerning the blackbox of partnering relations has been carried out (Kadefors, 2004). Gadde and Dubois (2010) explore the reasons for the difficulties encountered in realizing the potential partnering benefits on a strategic level. They identify that construction relationships, unlike high-involvement relationships (that served as role model for construction partnering), has limited interaction among firms and intense interactions at sites to address specific project issues. The expectations concerning the future have no effect on the outcome of a current episode. This has resemblance to the problem faced in the context of EIA, where the translation of planned measures (at EIA phase) into action (at the implementation phase) is an issue of concern. This issue is a key reason that motivates the conceptualization of EIA and GP linkage. Therefore, in order to address such an issue, the EIA and GP linkage needs to be established in a trust and commitment-based “collaborative climate” (Eriksson and Westerberg, 2011).

Further, Gadde and Dubois (2010) recommend the differentiated approach to partnering that emphasizes on collaborative efforts. Their approach differentiates between three levels of partnering and is an extension of current project partnering. Firstly, local partnering, where better conditions for local performance would be attained if the interaction between the parties is extended in time, and less reliance on competitive tendering would make long-term relationships effective. The second is central level partnering, which involves long term contracts with specific suppliers for standardized products that are used across a wide range of projects. The third level is intermediate partnering. This concerns agreements, for instance, regarding the supply of prefabricated systems. Partnering on the intermediate level would promote interaction between parties, thereby creating a permanent network through long-term and regular contracts with these suppliers. The long term interaction might also enable joint product development or innovation (which is discussed in the subsequent section). Eriksson and Westerberg (2011) indicate that for partnering to function well, a good collaborative climate is imperative. However, in practice, as Bresnen and Marshall (2000) point out, more attention needs to be paid to identify the conditions (economic, institutional, technical and organizational) that encourage or inhibit partnering.

4. The role that the construction sector could play

The differentiated partnering approach has the potential to facilitate the creation of a network of key actors required for the development and diffusion of a technology. Such a network can be called as prime movers. Prime movers are actors or a network of actors who are technically, financially and/or politically so influential that they can trigger or strongly contribute to the promotion of a new technology (Jacobsson and Johnson, 2000; Johnson and Jacobsson, 2001). Considering their financial and political capacities, the construction sector could play the role of prime movers and contribute to the diffusion of green energy. The construction sector as one of the large energy users would need to strengthen its network with the energy suppliers. Networks are also essential with suppliers, who have expertise in substitute materials that can lead to considerable reduction in “embodied energy” (Thormark, 2006). As Barrett (2008) argues, clients can also have a significant impact, both in terms of their projects, and as drivers to policy changes shaping the context within which others work. In the latter case, the government, as the major client in most countries, has a responsibility to use its influence to a great extent, and thus can form a part of the prime mover network.

5. Planning for future research

Future research has been proposed in order to explore the link between EIA and GP. A case study approach will be adopted to investigate the development of environmental criteria that would be considered during the procurement process for the selected case(s). The proposed research will attempt to understand how partnerships have facilitated the transfer of information between EIA and the procurement phases. The future research will pay special attention to energy, and investigate the extent to which the EIA and contract procurement processes have dealt with energy issues in the case(s). The research will finally examine whether the GP process in the selected case(s) has helped in consolidating the link between the planning and the construction phase, and also identify a strategic mechanism, with focus on a collaborative process, to improve the coordination between EIA and GP.
References


http://www.sciencedirect.com/science/article/B6V9G-50TJNPS-1/2/982d0ef0570fc22a2247c0597bced90d.

Morrison-Saunders, Angus, and John Bailey. 1999. Exploring the EIA/Environmental Management


