

# Climate Change Mitigation and the Role of Industrial Parks

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## 1 ABSTRACT

In the strive for climate change mitigation within industrial parks, Flemish Government adapted a co-financing mechanism for the development and revitalisation of industrial parks to comply with tightening CO<sub>2</sub> emission requirements.

This paper presents the summary of a doctoral research performed on low carbon industrial parks.<sup>1</sup> To support businesses to reach for corporate social sustainability, the development of sustainable industrial parks focuses on spatial care, park management, utilities and facilities, and interfirm cooperation. The integrated approach of energy related carbon emission reduction is studied and evaluated in the various development stages of a business park. Five key issues from literature, reviewed through examination of case studies are distilled.

## 2 LOW CARBON ENERGY INDUSTRIAL PARKS

Climate change is a driving force for a radical reduction of greenhouse gas emissions. In a context of growing "CO<sub>2</sub>" awareness, an increasing number of companies in the West claims activities in the field of *carbon neutrality*. Worldwide, governments and park developers stimulate companies and industrial parks to implement low carbon entrepreneurship so as to attract innovative businesses in view of changing local markets and international competitiveness in a growing low carbon economy.

The Flemish co-financing mechanism for the development and revitalisation of industrial parks in their process towards sustainability was adapted in 2007 to comply with tightening CO<sub>2</sub> emission requirements. Apart from general qualitative guidelines concerning the development, issuing and management plan of business parks, companies are enforced to comply with a *carbon neutral electricity consumption*.

The development of sustainable industrial parks focuses on spatial care, park management and interfirm cooperation. It's about supporting businesses to reach for corporate social sustainability, with added value in terms of ecological, social and economic performance.

It is clear, however, that many developers and managers of industrial parks foster higher ambitions than the prescribed minimum requirements. In order to embed *carbon neutrality* principles into a sustainability policy, the reduction of electrical and thermal energy consumption is of prime importance, followed by the use of renewable energy (*trias energetica*). Irrespective of the economical sector, general energy measures in buildings, processes and in renewable energy production provide a set of simple energy guidelines, part of the issuing conditions that a growing number of park developers and managers prescribe. It draws the attention towards energy provision and its environmental impact, and forces companies to take action. A balanced set of "carrot and stick" measures, even challenging guidelines, is searched for, although park developers and managers also focus on personal guidance so as to prevent simple early stage measures from remaining idle.

Business park developers traditionally take up a facilitating role; in this context it holds priority, in particular by providing a performing business context. As greenhouse gas emissions get more penalised, industrial parks face a growing competition concerning their energy provision. From a physical as well as social framework, a business park defines the opportunities as well as the threats of its companies in view of *carbon neutral* energy provision.

A site specific approach of energy related carbon emissions starts in the early stages of the park development, i.e. by selecting a proper location onsite. In line with the spatial and urban design, the park can be geared towards energy efficiency and decentralised renewable energy provision. Later on, the facilitating role of the park developer/manager is effectuated when a balanced committing as well as stimulating,

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<sup>1</sup> More information in Maes T., Van Eetvelde G., De Ras E., Block, C., Pisman A., Verhofstede B., Vandendriessche F., Vandeveld L., 2011. Energy management on industrial parks in Flanders. *Renewable and Sustainable Energy Reviews* 15, 1988-2005.

supporting and eventually participating park management is in place. These settings are considered necessary during the issuing phase of a park as well as in the operational phase. Energy management indeed proves its relevance on multiple aspects and levels: in buildings, in processes, in balancing with renewable energy production, and finally verifying the *carbon neutrality*. Most business parks in Flanders are mixed industrial parks, hosting a variety of small and medium enterprises. Yet precisely SME's are known to lack time, knowledge, expertise and capital in order to detect and implement of energy efficiency measures. This causes a fundamental problem, hence a structural solution is necessary to ground a sustainability strategy with regard to energy efficiency. A clustered approach, e.g. of energy monitoring, may enable cost efficiency and encourage onsite interfirm cooperation in non-core activities. This is materialised by onsite central sustainable energy provisions, with smart electricity and heat networks and concerted/central energy production as specific applications, built at site and/or zone level.

The reduction of carbon emissions unfolds as a fundamental guiding ambition in all phases of the development of industrial parks: as a management principle for spatial planning and urban design, as an orienting principle for the park design, as a committing/stimulating/supporting/participating principle for the issuing and management of the park. Five key issues from literature, reviewed through examination of case studies, are:

- Formulating an evolving carbon emission ambition and reviewing the entire development of the park in all phases.
- Locating activities in correlation with the renewable energy capacity of the site.
- Providing efficient energy utilities and a spatial compatibility for local energy production, storage and exchange.
- Reducing energy consumption and preventing carbon emissions at company level and in the realisation of the industrial park.
- Encouraging and facilitating interfirm cooperation to enable optimisation of the energy and emission performance of companies.

In order to pursue the added value of industrial parks with regard to carbon emission reduction, park developers and managers should be supported and encouraged, potentially even challenged towards a sustainable park design. Likewise, an important role is awarded to regional planning departments in view of supporting the energy oriented site selection of an industrial park, and enabling renewable energy sources on the business park. Equally desirable is a solid support of local government actors to comply with potential difficulties when developing the park and to bear possible consequences paralleling the stated and necessary ambition level. The circle is closed since businesses' motivation is indispensable in order to reach for public support and onsite implementation. An active role of companies in the cluster management of industrial parks is considered a key issue to the process of sustainable development of industrial parks. The delineated energy and emission policy can be tailored to the needs of entrepreneurs, and companies require an active role in identifying strategies and implementing measures for reducing carbon emissions at the industrial park.

