DIVERSITY GUIDELINE
How to celebrate diversity in business parks design and use?

Author: Lille Métropole
Date: October 2014
## Introduction: How to celebrate diversity in business parks design and use? A guideline for diversity

1. **Cradle to Cradle® definition:**

2. **Cradle to cradle principles:**

3. **The C2C BIZZ Project**

4. **Lille Metropole Charter on 21st century business parks**

---

## Cradle to cradle and diversity: a methodology for quality rather than a strict definition

1. **Cradle to Cradle and Diversity**

2. **Cradle to cradle and diversity in business parks**

3. **Goals and challenges of a diversity guideline for business parks.**

   - **Key words:** ambition, adaptability, flexibility

---

## A guideline to design and build business parks, respecting diversity as Nature

1. **Diversity and density: the design of a business park as a way to think optimization and sharing**

   - **Context and challenges**
   - **Added value**
   - **Financial incentives**
   - **Recommendations**

2. **Diversity with integrated programs to build the business park as a real eco-system in its environment**

   - **Context and challenges**
   - **Added value**
   - **Financial incentives**
   - **Recommendations**
<table>
<thead>
<tr>
<th>3.3</th>
<th>Diversity of mobility in the park</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.3.1</td>
<td>Context and challenges</td>
<td>19</td>
</tr>
<tr>
<td>3.3.2</td>
<td>Added value</td>
<td>19</td>
</tr>
<tr>
<td>3.3.3</td>
<td>Financial incentives</td>
<td>19</td>
</tr>
<tr>
<td>3.3.4</td>
<td>Recommendations</td>
<td>20</td>
</tr>
<tr>
<td>3.4</td>
<td>Biodiversity to think of the business park as an ecological tool</td>
<td>22</td>
</tr>
<tr>
<td>3.4.1</td>
<td>Context and challenges</td>
<td>22</td>
</tr>
<tr>
<td>3.4.2</td>
<td>Added value</td>
<td>22</td>
</tr>
<tr>
<td>3.4.3</td>
<td>Financial incentives</td>
<td>23</td>
</tr>
<tr>
<td>3.4.4</td>
<td>Recommendations</td>
<td>23</td>
</tr>
<tr>
<td>3.5</td>
<td>Diversity in energy</td>
<td>27</td>
</tr>
<tr>
<td>3.5.1</td>
<td>Context and challenges</td>
<td>27</td>
</tr>
<tr>
<td>3.5.2</td>
<td>Added value</td>
<td>27</td>
</tr>
<tr>
<td>3.5.3</td>
<td>Financial incentives</td>
<td>27</td>
</tr>
<tr>
<td>3.5.4</td>
<td>Recommendations</td>
<td>28</td>
</tr>
<tr>
<td>3.6</td>
<td>Diversity governance: a peaceful governance for a diversity of stakeholders</td>
<td>30</td>
</tr>
<tr>
<td>3.6.1</td>
<td>Context and challenges</td>
<td>30</td>
</tr>
<tr>
<td>3.6.2</td>
<td>Added value</td>
<td>31</td>
</tr>
<tr>
<td>3.6.3</td>
<td>Recommendations</td>
<td>31</td>
</tr>
<tr>
<td>3.7</td>
<td>Social and cultural diversity: developing diverse uses of the park</td>
<td>34</td>
</tr>
<tr>
<td>3.7.1</td>
<td>Context and challenges</td>
<td>34</td>
</tr>
<tr>
<td>3.7.2</td>
<td>Added value</td>
<td>34</td>
</tr>
<tr>
<td>3.7.3</td>
<td>Recommendations</td>
<td>34</td>
</tr>
<tr>
<td>4</td>
<td>Conclusion and perspectives</td>
<td>36</td>
</tr>
</tbody>
</table>
INTRODUCTION: How to celebrate diversity in business parks design and use? A guideline for diversity

1.1 Cradle to Cradle® definition:

Cradle to Cradle® (C2C) is an innovation platform for generating positive impacts by improving the quality of products, systems & services. C2C designs positive economic, cultural and environmental qualities into materials, buildings, neighbourhoods and regions to give them holistic value.

C2C integrates chemistry with design based on the expertise of its co-founders; a chemist and an architect. Developed by Michael Braungart, William McDonough et al. based on a protocol published in the 1990s by the institute EPEA which won The Oce van der Grinten Prize for Economics and the B.A.U.M. award. C2C was later awarded the U.S.E.P.A. Presidential Challenge Award. C2C applications began in the 1990s by designing positive social and economic impacts into innovative water systems in developing economy neighbourhoods, as well designing buildings and products in advanced economies.

To achieve holistic quality the C2C Protocol framework consists of:

- Philosophy describing why C2C exists e.g. to generate positive impacts.
- Principles translating Philosophy into qualitative guidelines i.e. what is the right thing to do.
- Tools describing how to measurably apply the Philosophy and Principles.

Cradle to cradle is, as applied to spatial development, a business and design model distinguished by its aspiration to integrate biodiversity and diverse architectural and land use designs into spatial developments.
It utilizes environmentally enriching and healthy building products whose component parts are eventually cleanly separable into organic and inorganic materials in order that the organic materials may be reintroduced safely into a biological system, whilst the inorganic components are reconfigured or made available for use as new materials. It focuses on materials as a service and ensures that materials that retain some toxicity are returned safely into the technical cycle. It also ensures that every part of the development life cycle is dependent entirely on an economically viable energy source that derives ultimately from the sun whilst protecting, cleansing and enriching the air and water supplies to the development.

1.2 Cradle to cradle principles:

According to C2C philosophy, three basic principles have to be considered in all developments, in order to be beneficial to humans and the environment.

1 The principle “Everything is designed as a Resource for Something Else”

Cradle to Cradle® distinguishes between two planned pathways for products; Consumption pathways where products are designed to safely enter biological systems, and Service pathways where products safely enter technical systems to be part of new future product generations.

■ The Biosphere

Consumption Products are distinct from “consumer” products. Consumption Products are designed so that by-products generated during their use support the biological systems they enter. Through those biological systems, by-products become resources for next generations of products. Examples are biodegradable textiles, cosmetics or pharmaceuticals.

■ The Technosphere

Service Products are designed to be chemically stable during use and get dismantled into technical resources, known as ‘nutrients’ after they fulfil their function. The ingredients in these renewed technical nutrients are carefully defined so they can be resources for producing next generations of service products. Examples of technical nutrients are electronic appliances and cars.
2 The principle “Use Current Solar Income”

The use of solar radiation as an energy source makes it possible to renew energy as it is used. And this without jeopardising the environment and thus the future of humans, as is the case with fossil or nu-clear energy. Sunlight can be used directly (photovoltaic or solar ther-mal) or indirectly, for example in the form of wind.

Theoretically, only a small part of the energy provided permanently by the sun is needed to cover the entire energy needs of mankind. The technology for the use of sources for conversion into the required forms of energy and its distribution needs to be further developed. Hence, C2C related energy concepts do also aim at the optimal effective utili-sation of solar energy (smart grid, energy-saving and energy storage concepts). What is more, a C2C development should be energy positive.

3 The principle “Celebrate diversity“

Diversity makes ecosystems more responsive and resilient in changing conditions. In imitation of a multiplicity of healthy (complex) eco-systems, various forms of variety based systems such as biodiversity, social-cultural and conceptual diversity, are promoted and combined. /18/

The consideration of conceptual and socio-cultural diversity connotes:

- Being conscious of a variety of concepts, uses and cultures.
- Adapting the local circumstances.
- Use of the endogenous potential while designing any process that will support human activity (be it a product, a building or a business site), enhancing the adaptability and resilience of the design.
- Especially at business sites the promotion of a various mix of business sectors.

Biodiversity consists in an abundance of plant and animal species. A C2C-inspired business site should contribute to enhance the natural diversity of the local environment. This may be e.g. through plants im-proving indoor air quality, or a green roof providing habitat for indige-nous species, or a constructed wetland treating water and enhancing the ecological quality of an area.

So, diversity is one of the principles developed by Michael Braungart and William McDonough and this is the specific purpose of this guide.
This guideline has been developed by Lille Métropole in the framework of the C2C BIZZ project, with the objective of supporting and developing the implementation of diversity in business sites according to the C2C approach. Its main focus lies on how to access an optimal natural, economic and social diversity in the design and use of parks.

The explanation of C2C Bizz project and diversity can be found in chapter 1. In chapter 2, the goals and challenges of this diversity guideline are described. Finally, chapter 3 explains how to celebrate diversity in design and development of business parks with different lines of inquiry and recommendations.

1.3 The C2C BIZZ Project

C2C BIZZ is an Interreg IVB project that aims to develop C2C methods on business sites of North-West Europe (NWE). The European consortium for the project C2C BIZZ consists of public institutions, researchers, NGOs and economic stakeholders from Belgium, Germany, France, Luxembourg, the Netherlands and the United Kingdom. Each partner contributes to the project in terms of its knowledge and expertise.

The three C2C principles should be applied to the entire process of business area (re)development, so that C2C business sites have a positive impact on environment, society and economy, and lead as an example of best environmental practices.

Some of the major contributions to the environmental degradation are the lack of diversity in business sites which become rapidly obsolete. Therefore a change of strategy is also needed for business sites regarding diversity.

1.4 Lille Metropole Charter on 21st century business parks

Lille Métropole was approached by the Region of Eindhoven, on the basis of the 21st century business parks study. Lille Métropole has started for two years, an approach to increase quality on its business parks, to meet the needs and requests of companies of the territory but out of the territory in order to strengthen attractiveness of the territory. This charter was coproduced with all the private, semi-public and institutional partners with two key words: ambition and pragmatism.

Therefore, this diversity guideline was worked out in the spirit of the charter on 21st century business parks. It is an implementation of the charter and it goes deeper into it but it is adapted to the Cradle to Cradle approach.
2 CRADLE TO CRADLE AND DIVERSITY: a methodology for quality rather than a strict definition

2.1 Cradle to Cradle and Diversity

William McDonough and Michael Braungart explain the 3rd principle: Celebrate Diversity, as follows:

“Celebrate diversity. From a holistic perspective, natural systems thrive on diversity. Healthy ecosystems are complex communities of living things, each of which has developed a unique response to its surroundings that works in concert with other organisms to sustain the system. Each organism fits in its place and in each system the fittingest thrive. Needless to say, long term perspective is needed since even the introduction of an invasive species can enhance diversity for the immediate term while virtually destroying that diversity over time.

Nature’s diversity provides many models for human designs. When designers celebrate diversity, they tailor designs to maximize their positive effects on the particular niche in which they will be implemented. Engineers might profit from this principle by considering the cradle-to-cradle maxim,”

“all sustainability is local.” In other words, optimal sustainable design solutions draw information from and ultimately “fit” within local natural systems. They express an understanding of ecological relationships and enhance the local landscape where possible. They draw on local energy and material flows. They take into account both the distant effects of local actions and the local effects of distant actions. The point is this: Rather than offering the one-size-fits-all solutions of conventional engineering, designs that celebrate and support diversity and locality grow ever more effective and sustaining as they engage natural systems.”

Environmental Science and Technology, December 1, 2003
As W. McDonough and M. Braungart described in 2003 the C2C principle “Celebrate diversity”, Nature is the most inspiring source of ecological design. Applying it to business parks design implies thinking first about the way Nature would develop it.

The 3rd principle “celebrate diversity” is a very broad principle. In fact, it includes diversity of design, conception, and management, but also, economic, social cultural and ecological values and eco-systems.

The diversity in area and building design will be developed in three ways:

- **ECONOMIC:** Both area and building designs should be multifunctional and flexible, and be able to accommodate different economic functions. C2C business sites and buildings can easily be changed over time and embrace the C2C design principles.

- **ECOLOGICAL:** In the C2C philosophy building and area designs should be beneficial to their (ecological) surroundings by supporting biodiversity, for example by incorporating plants and animal life in design and functioning.

- **SOCIAL:** Embrace social diversity on business sites: by admitting diverse business sectors and leaving room for social interaction, culture and nature. Make room for out-of-the-box thinking, creativity and innovation on a small scale. It involves attracting visitors, offering promotion and amenities.

This broad definition, although it is implemented with defined tools, leads us to say that the third principle is more a methodology for quality rather than a strict definition.
2.2 Cradle to cradle and diversity in business parks

Diversity in business parks should follow a defined strategy for its integration to achieve the best solution for each case. In fact, diversity is not limited to make some flowers or trees grow and to integrate industry in the urban environment.

Today, innovation in business parks development is essential to make them:

- **Beneficial**, ecologically, economically and socially speaking
- **Attractive** for companies
- **Innovative** in their design, development, management and governance
- And **ambitious as well as aesthetic** in their architectural shape and facilities

The objective of this guideline is also to show the added value brought by C2C diversity. Actually with this principle, we go further than a simple form of sustainability of business parks. The C2C guideline diversity enables to have an integrated, comprehensive and non-compartmentalized reflection on a business park.

It is necessary that these sites adapt to their environment in order to really become part of the landscape they blend into, and no longer peripheral from the city heart. In addition, nature should be an integral part of the business park; being enhanced and celebrated through the lifetime of the park.

C2C diversity also brings added value for enterprises that will develop a favorable brand image to consumers, increasingly concerned by environmental considerations of companies. As a result, companies will gain a reputation they didn't have before. In terms of energy savings, the application of the C2C diversity will enable them to improve their energy use patterns and make substantial savings. Finally, having a business park celebrating diversity and applying the C2C principles provides added value to employees who can work but also live in a better quality and a more pleasant area, and that fosters work which has a indirect impact on companies by increasing productivity of their employees.

Diversity as major aspect of a business park allows companies to be one step ahead for attractiveness and competitiveness. It gives differentiating qualities, particularly in a crisis context with economic transformations.
2.3 Goals and challenges of a diversity guideline for business parks.

Key words: ambition, adaptability, flexibility

The guideline for diversity is a transnational tool that has to be adaptable to all different issues of NWE territories (environmental context, ambitions, legal and political context, economical context and perspectives...).

The goals of the guideline are various. It will be a “nest for ideas” in the conception and use of a business park. It can be used either by local authorities or by promoters, developers, associations of parks (and maybe even businesses) and this guideline is not fixed, it must evolve with time.

A guideline for diversity should gather many things to be applied, which can be summarize in 3 main points:

- First, describe the ambitions of “celebrating diversity” in a C2C concept of a business park.
- Being pragmatic and useful with clear and operational elements and ambitions to have good examples and initiatives.
- Finally, being adaptable to all kinds of business parks projects with capacity to fit with the direct environment of the park and not be limited to a strict framework.

The methodology used to construct this diversity guideline relied on three information sources:

- Transnational inputs from the partners through a survey (2012)
- Results of the local Charter about 21st century business parks (Lille Métropole - 2013)
- 3 brainstorm sessions on C2C diversity in conception of business parks (2013).

The collection of data, feedbacks and exchanges allow us to finalize a transnational tool, co-constructed by all partners.
3 A GUIDELINE TO DESIGN AND BUILD BUSINESS PARKS, RESPECTING DIVERSITY AS NATURE

3.1 Diversity and density: the design of a business park as a way to think optimization and sharing

Context and challenges

Land is a non-renewable resource. Due to this, overconsumption and non-optimized consumption of land have to be stopped for different reasons: environmental of course, but also social and economic reasons. Developing dense and intense business parks allowing optimized and smart land consumption is essential.

Furthermore, the obsolescence of business parks (technical, legal and economic reasons…) feeds parks’ inactivity which becomes dead and unattractive places for companies. Brownfield and obsolete installations lead to an “old-fashioned” image for the business park. A business park of the 21st century is a place where activities reinvent themselves, where land can have diverse functions during their entire life cycle.

This context leads to 2 main questions:

- How should C2C help to design business parks that will not lead to brownfields anymore?
- How could diversity of nature be an example to optimize land consumption?

Added value

This enables companies to grow and live in an attractive park that is not polluted by industrial wastelands spreading out all over the park. Activities are intensified and optimized in terms of land use and this gives an image of a park respecting its environment and the place in which it sets up, particularly within the context of the land shortage with which the major agglomerations are or will be confronted.
Financial incentives

Organizing sharing and rationalization create economy of scale.

- Functional areas (car parks, rainwater collection...) can be shared as well as integrated to create an economy of scale.
- Green spaces can also be shared to create an economy of scale as a way to create a real biodiversity space instead of green spaces as ornamentation without any natural functions. Thus, quality evolves and the business park is more attractive.
- If organized in a smart way those measures permit increased density and selling more land for development while still generating positive impacts.

Recommendations

- **Using and optimizing all spaces to avoid waste land.** Applying floor area ratios (FAR) to make the business park dense. In France, for instance, there is no negotiated FAR for business parks. Negotiating in a density objective allows to know better the land potentialities and to use the maximum. Moreover, maximising land use and maximising floor space use are distinct from each other. For example, Park 2020 reduced floor space ratio and made the buildings smaller instead of maximizing it but still met the requirements of the customer and maximized land use by using the added space to provide biodiversity services.

Source: EAI DEGW for Lille Métropole
Thinking about density in a smart way taking account the living-environment. It means in a same business park, imagine centrality points / central areas around public transports stops with a higher density and a lower density clothe to inhabitants or to natural spaces.

Having diversity in land consumption with an optimized management of companies’ land reserves. They can be used in a transitory way (before the company extends) via for instance, afforestation intended to heating, agricultural crop, storage, temporary buildings… to guarantee their final use, the local authority or managing authority of the business park remain the land owner or become again after a period negotiated with the company. In that way, if the company does not use the land for extension, it can be used for another installation/settlement.

Rationalizing and sharing some uses, particularly car parks, or canteens, meeting rooms, kindergarten, etc.

Greenfield to Greenfield. No brownfield anymore: it implies anticipating the recycling of the business park to have a constant living and regenerating business park, as C2C principles allow to do. By temporary, flexible, multipurpose or modular buildings for example.

Source : Katalyse report for Lille Métropole
3.2 Diversity with integrated programs to build the business park as a real ecosystem in its environment

Context and challenges

Business parks were built very often in cities’ periphery, isolated without any connections to the city.

The actual challenge is to make business parks:

- areas open on their neighbourhood
- permeable spaces
- true living areas for companies, employees and inhabitants

Bringing economy back into the town and creating conditions to realize this diversity has to be at the basis of business parks design. The business park should be designed to be itself an eco-system, i.e. a group formed by an association of stakeholders, responsibilities, uses, services in symbiosis with its close environment. The intention is to create a business park as a part of a town.
Added value

It is economically interesting for a company to be integrated to the city, this enables it to attract other potential customers, to live really as a business district and no more only as a grouping of enterprises. The mix between the different stakeholders, business managers, employees, inhabitants, can create real group cohesion by integrating each of the parts into the business park decisions, from its conception to its creation. Involving quality of business parks and imagining them as a part of the town is a way to change peoples’ opinion on economic activities (instead of e.g. not in my backyard). Business Park become a place to work, a place to live. Business Park can disappear physically, it becomes a part of the town with many economic activities.

Financial incentives

Increased diversity in a business park is a way to improve the quality of life and to make the park attractive. Diversity of use is utilised for example to extend operating times. For example it attracts more customers at different times. Those result in better cost-effectiveness and rate of return on investments for local shops and services.

Diversity of use, mixing companies and housing is also a way to improve the financial balance sheet of a project, the land price for housing is more expensive than the land price for economic activities.

However, in some cases, additional costs generated could be too much (landscaping, technical solutions to reduce noise, pollutions...).

Recommendations

- **Making business parks as part of the city.** A business park is a place to work, a place to live. The idea can be to avoid specific areas with specific uses (sleep, work, eat).

- **It is possible to imagine diversity of functions integrating economy with housing and vice versa.** Urban program of a business park can include housing. A ratio of housing can be defined. and adapted to each situation, in order to answer to sites’ issues. Otherwise, for each big housing program as well, a percentage of activities could be defined to realize a true diverse city.

- **Creating services.** To allow diversity of functions in a business park is a way to create services like laundry, nursery, restaurant and leisure areas as cycleway... It is a real advantage for employees. It means also creating conditions for a continuous living place. A business park is a part of a town and lives everyday even on the weekend and at every time (working hours, morning, evening). Security problems could be avoided also because Business Park is never empty.
Taking care of the design of the business park and buildings:

- Conceptual diversity should be celebrated with innovation. Innovative elements must be integrated, because architectural approaches of quality can define an identity to the « park » item (conception and follow-up by a business park architect, charter to be respected during the park lifetime, even architectural competition for companies settlement)

- Having modular systems for buildings. Indeed, conception and realisation of reversible and upgradeable areas allow a gradual mutability to the needs.

The building should be designed for assembly and disassembly. The building should be adaptable without demolition waste. A plan to deconstruct building elements, products or materials without demolition waste must be made.
Promoting diversity of economic functions. Industries and businesses could be mixed but also all types of businesses: productive, logistics, social economy... It can create economic value (economy of scale), natural clusters (partnerships / waste is food), synergy between R&D and industry.

Creating the whole chain of real estate facilities to support companies in each step of business life (incubator, XS building to XXL building, modular buildings),

Having local capacity of adaptation to the economic context that is to say promoting high skilled jobs as well as lower skilled jobs → Social value. The future business park can be imagined in sync with inhabitants’ qualifications in order to allow them to access to jobs, thus the future business park is rooted in its environment. Local wealth give strength to the business park. The business park can be created with existing activities or with neighbourhood.

By selecting companies and organizations that contribute to achieving the intentions and goals of the C2C area, the area becomes attractive for investors. By only contracting with the right organisations, the Memorandum of Understanding (MoU) can be used.
3.3 Diversity of mobility in the park

Context and challenges

Mobility is defined as the mobility of people, goods but also mobility of data. These are the most important to act in order to make the business park an efficient place, a showcase of diverse mobility. This mobility diversity will generate therefore facto a diversity of people but also stakeholder diversity on and in the business park environment.

Having a park accessible by all for all (workers, customers, providers, inhabitants) is today a fundamental necessity for the parks. A park can only be attractive if people and goods can easily go in and out. More than accessibility for all, the park has to be accessible in a sustainable way i.e. by encouraging the use of soft modes, by developing the use of public transport, by organizing the mobility of goods in order to foster rationalization of flow and multimodality.

In addition, current society highly encourages the use of new Technologies of Information and Communication, and again, the business park has to meet this requirement by the development of data mobility via the connection of all the parks to the high-speed internet network and by the development of digital uses to the service of companies and workers.

Added value

An accessible park both for workers, providers and customers enables companies to attract people as much as possible: there is no restriction in terms of distance or difficult access and this particularly attracts customers willing to optimize their time and money.

Financial incentives

Mobility can be organized and optimized to be efficient but also to be environmentally and economically positive (car-sharing, goods shared transports...). Features like preferred parking for electric vehicles at charging stations make business parks increasingly attractive to progressively minded enterprises. Regarding the mobility of goods, organizing freight collectively and utilising spare capacity of carriers like postal services in diverse ways leads to costs optimization.
Recommendations

Human Mobility

- **Offering services dedicated to soft modes and to alternative mobility** by developing cycling paths, bike terminals, spaces for the parking of bikes, providing sanitary facilities, (showers...). Also by providing electric bikes within business parks but it is necessary to make a study first, in order to assess the need.

- **Giving priority to business parks especially in the tertiary sector in the areas served by public transport** and to help with this process, restricting car parking capacities in order to encourage the use of provided public transport.

- **Creating a partnership on the territory scale** in order to implement additional innovative mobility services and sharing on the business park scale.( transport on demand, « private » shuttles, collective taxi...)

- **Informing workers with efficiency on mobility solutions** offered by the park thanks to continuous and interactive information for all parks employees : newsletter on mobility, thumbnail on mobility on the website, applications, direct communication within companies....

- **Creating a real « mobility » governance** on the park scale with a company mobility plans inter-company mobility plans integrating as many enterprises as possible within the park in order to optimize the transport supply.

- **Optimizing the use of road** by the park users to reduce pollution (car sharing,...) good signage, parking guide
Mobility of goods

- Having knowledge of the flows of goods, metalizing mobility solutions and rationalizing road flows. Carrying-out of de a transport assessment in order to analyze and understand flows as much as possible.

- Implementing shared solutions on the logistics chain at the park scale or even beyond.

- Taking innovative actions regarding optimization of traffic and filling-up of good transport vehicles.

- Organizing of the parking of heavy good vehicles shared next to the site or within it.

- Organizing and preserving multimodality thanks to other solutions than road transport in link to the general context of the park via waterway or railway.

- Creating a real management for mobility of goods, to think and to organize freight and costs optimization. Creating an ecosystem around urban logistics (centralized services). It can be initiated and promoting by local authorities and organized by an association of companies, or by companies themselves.

Data mobility

- Developing business parks connected to the high-speed internet networks, for an optimum use of advantages than can be provided by New Technologies of information and communication.

- Implementation of services dedicated to these new functionalities: cybercafé, digital signalling...
3.4 Biodiversity to think of the business park as an ecological tool

**Context and challenges**

In a C2C perspective, taking into account environment and natural resources is essential, especially to preserve biodiversity. Biodiversity is the diversity of livings and ecosystems in which they live. This is related to fauna, flora but also human kind. It is the result of several billion years of evolution. Biodiversity has essential functions for all forms of life and provides fundamental services: it provides food, raw materials and contributes to the maintenance of quality of water, air, and soils and stops or prevents the spread of diseases. The diversity and maintenance of biodiversity rely on fragile interactions between different species and natural environments in which those same species live. The more an eco-system is various, the more stable it is and ensures natural balances.

This has to be taken into account since the very beginning of an urban project, in order to make it concrete during the development and implementation of a project. Biodiversity conservation is one of the main challenges for earth. Today, improving nature diversity in business parks is necessary.

**Added value**

The quality of the biodiversity is linked to the quality of life of tenants: biodiversity increases good air so that people are healthier. Green makes people more happy, no heat stress, etc. The biodiversity development can, provide to the companies, a better quality of life in and around the site, but also a higher motivation from the staff with a possible improvement of the productivity. Thus, companies can strengthen their brand image to all stakeholders (local population, consumers, socially responsible investors ...). Recent experiences show important successes in favour of biodiversity, where the manager knows how to take advantage of assets and functions of eco-systems around which ensures his maintenance and his development for his own benefit.
Financial incentives

The economic opportunity for urban planning is to enhance quality of life with biodiversity by designing urban plans to integrate spaces managed by individual owners. Instead of ornamental green spaces isolated among individual owners, green spaces become a network with a biodiversity benefit. As well through such an approach landscape design and gardening costs can be shared between owners, reducing costs with economy of scale and using sustainable gardening (e.g. create a meadow instead of just grass...).

Waste is food, means also that companies both reuse their biological residues and reduce their landscape costs; it is an economic advantage to companies to take place in a business park with a bio-materials recycling strategy.

Biodiversity can take place in “lost spaces” (roof, wall), it means that it is not necessary a decrease of square metters selling.

Recommendations

- **Biodiversity** needs spaces for preservation and development of fauna and flora.

- Building in different phases a new business park is a way to preserve empty spaces to the existing fauna and flora during almost several years. Then, biodiversity is integrated to the urban plan.

- Some projects can both increase biodiversity and land use optimization. E.g.: vertical building with green houses, roofs and walls or farming)
More “green” added to the site (trees, plants etc.), but also using canals for fish and roofs for bee keeping for example. It will allow ecological niches, which is occupied space by specie (physical space and functional role). Local authorities can show by example: increasing biodiversity in public spaces to invite companies to do the same.

Positively designing the introduction of new ecology (fauna) into the business site which would enhance key factors e.g. useful production. It is important to think biodiversity as an opportunity rather than a constraint. For example, introducing bee hives for honey production so that these products can be reutilized. This will also be adapted to improve air quality continuously. In addition, the observed disappearance of these pollinating insects is a threat for eco-system stability. Bees are affected by a significant mortality due to the intensive use of pesticides. The impact on all eco-systems could be considerable if the insects are not protected.

Optimizing ecological performance by using the potentialities of the business park and its environment, as a true ecological tool and thus to reduce the park’s carbon footprint. This can be done for instance by realizing a carbon balance with a follow-up each 5 years. Indeed, monitoring emissions and pollution is necessary by building and implementing measures and indicators. Improve the park’s positive CO2 footprint rather than just reduce it. As an ecosystem a business park captures and re-uses CO2 as nutrients. Generally, in future, buildings will focus on capturing and re-using CO2 with e.g. building-integrated greenhouses, CO2 for energy storage and using CO2 as a solvent and cleaner.
Creating a biodiversity business model (costs, benefits), i.e. Showing the advantages and benefits for companies in a long term vision, whereas companies think in short term (e.g.: differentiated management costs less to companies). New public finance or funding for some biodiversity actions in private areas could be decided, less taxes for companies if they increase biodiversity.

Intrinsic ecological value of existing natural core areas and increased ecological connection zones à interconnected to a functioning ecological network. Important is to know all the species in the BP (and build ecological bridges / corridors).

Having a shared biodiversity management: for example, to share gardening costs, management costs, resources costs. Cheaper to do it together, one plan instead of separate designs, one policy for the whole business site. The plan can be in favour of biodiversity, promoting green spaces as meadow instead of grass lawn. Costs are also reduced.
Having a business park well integrated in its environment for a better acceptability of inhabitants by green environment, aesthetics, offer benefits for inhabitants, avoid nuisance. Example of Park 2020 creating biodiversity on site to re-integrate with local ecosystems and add value for stakeholders

Maximizing the use of existing design to declare a specific percentage of exterior areas and interior areas as biodiversity zones (green roofs, green external / internal walls).

The historical identity (archaeological and cultural) of the landscape can be reinforced, liveable and add value to the familiarity of the area as well as for territorial attractiveness.

Rain water can be captured, re-used and purified so that the site can be 90% self-sufficient for example.

Food for the cafeterias and restaurants could be cultivated on site with an own “site yard”. Ideally, through bio-agriculture.

Link various areas of the site with natural connections, like attractive walking ways or bicycle routes in order to improve employees’ mobility and to promote soft transports.

Providing waste management and re-utilisation sharing systems. See Case study of Irisphere.
3.5 Diversity in energy

Context and challenges

A C2C diverse business parks includes diverse sources of energy. Indeed, a C2C business parks can be energy self-sufficient by using the different renewable sources in the location. Energy can be from solar, water, from waste of companies... Therefore it is energy from nature but also from the technosphere.

The challenges related to the diversity of energy sources are:
- Energy efficiency: low energy use to support scaling up of renewables
- Producing renewable energies

Added value

Having innovative, adaptable, energy-producing buildings makes huge savings for companies in the long term. Environment benefits from low energy consumption include making it easier to use renewable energy (see. Energy tool).

Financial incentives

Energy is an important cost for companies. Stable energy generation and use under the control of users allows companies to make savings and have security of pricing and supply. Moreover, using waste to produce their own renewable energy with a C2C approach is a long-term investment which can help to reduce energy costs.

Energy conservation for new buildings and renewable energy equipments are long term investments and are payed off by lower consumption costs and cost control. A business park is a good place to do such investments because it is possible to mutualize equipments, investment costs.

Business park can be also a good place to establish a network for use/reuse produced energy (industrial ecology) in a win-win partnership.
Recommendations

- Financial instruments to make renewable energy and other C2C measures cost-competitive could be integrated over the use period of a building.

- **Fostering diversity of energy sources** in order to optimize the energy consumption of the business parks and to aim at a certain energy sobriety. The long-term goal is to build a park producing its own energy. Aiming to have an energy positive business site is consistent with the goals of Cradle to Cradle and means that the energy produced on the site is higher than the energy consumed in the same area. With such a strategy a business site can even become an energy exporter. Promoting the performance of energy audits and the renovation of buildings (in line with thermal regulations in force)

- Encouraging the performance of energy audits and the renovation of buildings (in line with thermal regulations in force)

- Implementing tools to measure energy use and impose performance monitoring tools (detecting discrepancies between actual consumption and that calculated as well as developments over time)

- Fostering Energy conservation for new constructions

- Using grey energy lower than white energy over an operating period of 40 years

Source: Katalyse Report for Lille Métropole Logistic buildings using passive energy
Measuring and managing energy at various scales (buildings, business park, districts). (See Energy tool).

Identifying opportunities for the supply of renewable energy including an estimate of all energy requirements of the business park (including those linked to processes) in relation with regional resources, and possible sharing (connection to a heating network), and justifying the choices made.

Design buildings or groups of buildings or an area as energy positive: As much energy produced as consumed, in regulatory conditions and non use of fossil fuels and aiming for energy self-sufficiency = excelling in controlling energy use in buildings (setting performance criteria, experimenting with new technologies, anticipating future regulations, developing renewable energies and innovating through experimentation).

Establishing in the business park a network for use/reuse of energy produced by the business park (industrial ecology).

Producing renewable energy and connecting the park and its surroundings to a heating and/or smart grid network; implementing renewable energy supply at the scale of the park and its wider surroundings.

Source: Armstrong Point, "the first zero energy costs business park"

Source: EPEA Paris, Park 20 20
3.6 Diversity governance: a peaceful governance for a diversity of stakeholders

Context and challenges

On a business park, different stakeholders have to live together. They have different point of views, often contradictory ones. However to take the most appropriate decisions to manage the park, they need to collaborate.

A tailored governance means that dialogue shall be organized between multiple stakeholders, with clearly identified skills and responsibilities. This strategy chooses an integrated approach, a coordination of all stakeholders, of all sectors within a multi-level governance and contributes to create local and regional partnerships in order to develop a uniform management, known and acknowledged by all, in a word: shared.

Additionally, the issue of business park acceptability leads to a face-to-face: inhabitants vs. developers and companies. Indeed, this acceptability is very often less important than some years ago. Building a business park has to be done with inhabitants of the town, by making them true stakeholders in the life of the business park, since the very beginning. From now on, this is necessary to help diverse stakeholders to have peaceful relationships from the conception to the development and the recycling of the park.

The challenge is the following:

how can the diversity of stakeholders be turned into an advantage in business parks design and use?
Added value

The diversity of governance will enable a better acceptability from the business park stakeholders, inhabitants in particular. In addition, this will increase speed and adaptability to the needs and problems. Exchange, discussion, the value sharing to the benefit of companies and then for attractiveness of the business park but also the territory will be strengthened as well.

Recommendations

- **Going beyond legal consultation of citizens.** A real dialogue has to exist between the different stakeholders to impulse a new dynamic. First, when the location of the site is decided, it has to be shared with the inhabitants, to reinforce the acceptability and make them actors of the park: explain the reasons of the project. -> building the project together.

- **Anticipating management and animation of the business park** during the conception of the park. Durable management structures responsible for implementation of actions and for committing companies in the direct management of the park are essential. To create a road map

- **Employers, employees, residents and users of the area involved** regarding the development of the business site (conception, development phase and site management). All actors have to be defined at each step (adaptability of the team project). For example, share the economic issues in the governance with associations and population and transform individual benefits into common benefits, increase diversity of expertise.

Source: Lille Métropole, Union site, House of projects
- **Having a “sounding board” of users of the area** who can help implementing new ideas and get the involvement of the users of the area and equal access to all the facilities of the site for all used. This means that tools for collaboration have to be defined between actors so that every one can express themselves.

- **Associating history, patrimony and environment before the beginning of governance**, so that the site is well included in its environment and its story (existing salary associations, specific patrimony...)

- **Creating a business park identity to resonate around it**: process and tools to live together, structure of representation, a common identity for the BP (name for ex), companies meetings and connections (knowing the companies = companies mapping), website, communication tools, linking companies by linking people, a leader, events and celebrations...

Source: Lille Métropole, Euratechnologies
Creating emulation through a leader or a team with vision that will coordinate the action of others: a physical inspiring place and a virtual inspiring one to reach... a good governance is a locomotive for a project, a way to think in a collective way.

Creating a facility place which could be a management place (e.g. house of project – La Lainière site in Lille Métropole).

Thinking the business park not only as a physical site but mainly as an organization between companies (coordination, management for services, trade, loops...). Indeed, the business park is so well integrated to the city that it becomes only a network of companies.

Create tools for the governance:

- Tools for collaboration between actors
- Municipality have to inform what is going to be done → communication tools
- Creating special C2C-card that gives you discount if you implement C2C principles in your own office, building, house, café... this C2C card would encourage economic stakeholders to be involved and to respect C2C principles.
3.7 Social and cultural diversity: developing diverse uses of the park

Context and challenges

Isolated or in an urban continuity, business parks were very often reduced to a unique productive function. They were sidelined, as if the activity was a necessary evil for cities’ daily life. However, as a city centre or a residential area, the business park should answer to the same quality requirements. A business park is a real part of a city or a territory. People daily live in this park and have in common the use of a same area. Business parks must be a district in itself: not only activities areas but also living places in order to add value and to improve the quality for stakeholders.

In short, the social and cultural diversity aims at creating such a district, by integrating people of different social and cultural origins (either for work or housing)

Added value

A business park going further than a simple grouping of companies having a productive function will enable all stakeholders who make this park live, to combine professional and private life and leisure. This is a time and money saving for workers, businesses but also inhabitants. The working conditions and services facilitating that work, will enable workers to feel at ease in their professional environment then to work more efficiently.

Furthermore, a business park living out of working hours enables to develop a marketing and a park advertising which is different from any other working place.

Recommendations

- Developing common services and amenities
  - kindergarten/playground on the site (following the concept of Desso)
  - canteen for all employees on site
  - joint training and sport areas with integrated leisure facilities (restaurants, cinema, playgrounds, walking ways, bicycle lanes...)

- Diversity of uses leading to work well-being. People live the majority of their time on their work place. Making this place the most pleasant ever for a better quality of life and work is essential. An important aspect of diversity is having fun. Most things we enjoy like good gastronomy, great fashion, watching a movie, walking the dog, or having children are inefficient but important for culture and diversity. Le Laboratoire in Paris integrates art with science, and the Children’s Cooking University in Venlo. At Park 2020, Bosch Siemens has a hands-on kitchen for cooking parties which also support its marketing.
Having a common space, common places and rooms to foster exchanges between companies and people, to allow time and money savings by encouraging the mutualisation.

- Having social and fair working conditions for employees.

- Integrating water recycling as an art form (fountains, waterfalls...) so that the community can enjoy this.

- Getting an attractive landscape allowing recreational use for multiple audiences. The business park is not only the workers’ place; this is also the place for inhabitants of the neighbourhood. The inhabitants can use service of the Business parks and enjoy it during the weekend. The business park is a living area even after working time.

Source: EPEA Paris, SIEMENS at Ecopark 20 20
4 CONCLUSION AND PERSPECTIVES

Building business parks which mimic the diversity of Nature is a major challenge that can be solved by applying the C2C diversity principle in business parks, and particularly in the spirit of the INTERREG IVB project C2C BIZZ.

C2C diversity covers 6 points, which we chose to highlight in this tool. Those 6 points cover the essential phases of business parks conception, in design, but also in the integration of business parks in their immediate environment, mobility in the sites, their ability to be the repository of nature and biodiversity, and finally their ability to be full and entire actors in the living environment.

The diversity of stakeholders implies also a strong governance of C2C goals, to make the chosen orientations effective.

This guideline for diversity, aimed at local decision makers and designers of business parks, but also in the end at companies that want to settle in those business parks, is a flexible tool, an evolutionary suggestions box. This work allowed us to define the basis for applying the C2C diversity principle on business parks, to define orientations that should be followed and developed in the conception of a project of C2C Business Park.
As well as the C2C diversity principle appears to be more a methodology than a strict definition, this tool was not designed to be a fixed and static model: it draws the different ways of a C2C conception of business parks, and gives a large place to imagination and also to the fact that decision makers have to make the “good choices”.

This guideline for diversity is meant to evolve in time, to be completed through technical, legal evolutions in each country, and above all through the different experimentations that are those days (and will be tomorrow) settled. The main goal will be to make this tool live, to keep feed it, in an objective of permanent improvement.

That is why we want to stress four keywords:

- IMAGINATION,
- INNOVATION,
- EXPERIMENTATION,
- FLEXIBILITY.

Those keywords will make the guideline for diversity (and in the end C2C diversity) improve and disseminate.

Author

Lille Metropole
1, rue du Ballon
CS 50749  59034 LILLE CEDEX France

Funding

C2C BIZZ has received European Regional Development Funding through INTERREG IV B.