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Article

Garden Cities of the 21st Century: A Sustainable Path to Suburban Reform

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Abstract
The garden city is often presented as a low-density, unsustainable and space-consuming archetype of suburbanization (Duany, Roberts, & Tallen, 2014; Hall, 2014; Safdie & Kohn, 1997). It has been deliberately also misused by property developers for gated communities (Le Goix, 2003; Webster, 2001). But these projects have little in common with the original concept of garden cities. We argue that the original garden city, as a theory (Howard, 1898) and as experiments (Letchworth and Welwyn Garden Cities), is a precedent that can be used in a sustainable approach that addresses a range of issues and concerns, such as housing, governance, the economy, mobility, the community, agriculture, energy and health. The recent Wolfson Economics Prize (2014) and the many new garden cities and suburbs projects currently planned in the UK have demonstrated the resurgence of this model in the planning world, both in terms of theory and practice. In this paper, we explore its potential in the light of environmental challenges. We therefore suggest that as a model, it can in particular underpin the evolution of suburbs in an era of energy transition, since these areas require an ecosystemic rather than sectoral approach to design.

Keywords
density; eco-systemic approach; energy transition; garden cities; model; suburbs; Wolfson Economics Prize

Issue
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1. Introduction

The term "suburb"—and its French equivalent "périurbain"—is used in the Anglosphere to describe the peripheral urbanization that came about in the main English and American cities since the late 19th century. Suburbs are characterized by the development of low-density housing where a wide range of social groups lives. Boosted by the democratization of cars and by consecutive housing crises, considered to be the cause of monotonous urbanization, suburbs have received renewed interest from public authorities (George & Fernand, 2013, p. 419), and from professionals seeking to limit or to "repair" them (Tachieva, 2010).

Beyond mere urban form, suburbs are related to many of the urban and environmental issues of 21st century's urbanization. Furthermore, they are sometimes associated with the garden cities model (Hall, 2014, p. 8), which finds its origins in the England of the late 19th century. However, this connection is often based on a misinterpretation of the original project of Ebenezer Howard (1850–1928), or on only a few characteristics of the first garden cities, which were materializations imagined by some architects based on the original theoretical model.

Before going further in our considerations, it seems important here to define the word "model" as we use it, in order to understand clearly the following and to explain why it seems interesting to mobilize this term when we evoke the garden cities. In a previous article, Anne Coste explains that, in the realm of architecture—and by extension that of urbanism—a model can serve many purposes: it can be used to design, to represent

or to understand. Subsequently, she specifies that it can also be of many types: "the archetype, which will be imitated or interpreted through the work of creation; the model or the small scale or otherwise representation or of an object…and, lastly the simplified representation of a process or system" (Coste, 2010, pp. 76–77). Therefore, the models studied can be written, drawn or built.

Based on this point of view, the garden cities model can be considered comprehensive as it combines all these characteristics (Figure 1). Howard's book *Tomorrow: A Peaceful Path to Real Reform* (1898)[1], consists of a written manifesto (theoretical archetype) and various synthetic diagrams (simplified representations). It aims at helping to capture the complexity of the ideas expressed by the author (understanding), and at formalizing a project (representation) using the tools of the architect to create (design) new human settlements (examples that may be considered as new physical archetypes). We may also add that the garden cities model is comprehensive in terms of its complexity and variety of scales, but also in relation to the extent of its diffusion (Sadoux & Novarina, 2017), the number of projects that it generated around the world and its longevity (see Stern, Fishman, & Tilove, 2013).

The aim of this article is therefore to evaluate the way the garden cities model sets a precedent which, through its historical evolution and the projects it has inspired, can be used to see beyond the usual issues attributed to suburban areas, in order to imagine a more sustainable path for the suburbs in the 21st century. In a first diagnosis, we will put into perspective the common history of these two urbanization models so as to better understand the aspects they effectively share, while attempting to deconstruct some of the misunderstandings commonly attributed to the garden cities model. Here, we will concentrate on the British context, and more particularly on London and its surroundings, where the long story of the garden cities begun with the publication of the original theory and the construction of the first garden cities. We will then evoke, along a second part, the usage of the model as a precedent. To do so, we will describe the work of two planning agencies that used the garden cities model to develop new theories and to question the urban form of suburbs. In a third part, more forward-looking, we will explain the theoretical foundations on which our researches are based, and we will present some keys to understand the potential of the garden cities model for conceiving sustainable alternatives for the contemporary suburbs.

2. Historical and Social Reasons for Suburbs

2.1. The Emergence of Suburbs in Great Britain

In Great Britain, the first nation to undergo the transformations related to the industrial revolution, the culture of suburbs is built upon a number of administrative and technical developments. As is the case with the garden cities, the origin of suburbs was established in Victorian England in the late 19th century, stemming from a vision of the city that came to light in the 18th century, at the crossroads of hygienist and social concerns. The portrait of London by Andrew Saint gives us some historical insight into the emergence of British suburbs (Saint, 1991).

By 1840, London's immensity, with a population approaching two million, started facing organization, health and transportation problems. And so, the Metropolitan Board of Works is created in 1855 to handle various public responsibilities (roads, sewerage, slum clearance, housing regulations). In 1889, the London County Council (LCC), responsible for defining the urban prospects of London and its surroundings, came to existence (although its ambitions would be diminished by the State around 1900 as more power was given to local governments). Through the creation of a polycentric urban organization, the growing mass of London absorbed certain communities such as Kensington and Hampstead[2]. This urban phenomenon was gradually am-

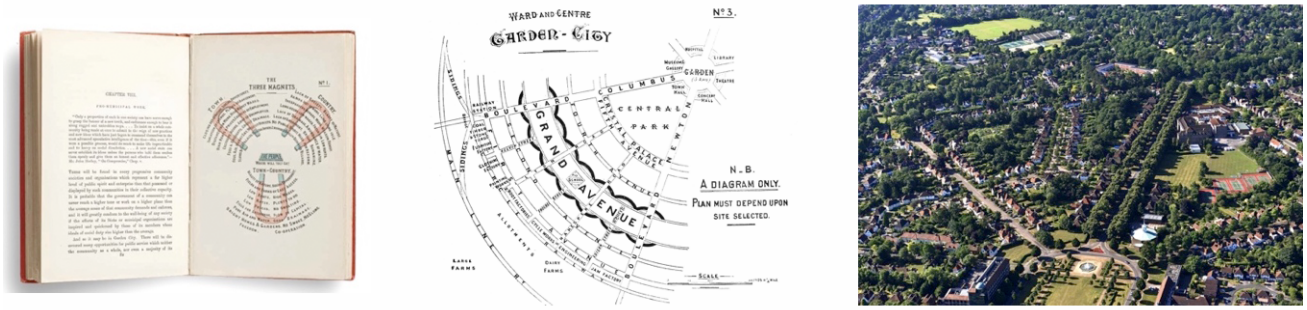

Figure 1. The garden cities model: as a theoretical archetype (left), as a model of intelligibility (centre) and as an example (right). Sources: Howard (1898); Letchworth Garden City Heritage Foundation, 2016.

[1] Reedited three years later, with the title *Garden Cities of To-morrow* (1902).

[2] That's the principle of conurbation defined by the biologist and sociologist Sir Patrick Geddes (1854–1932) when he proposes to name "these city-regions, these town aggregates…this new form of population-grouping, which is already, as it were subconsciously, developing new forms of social grouping and of definite government and administration by and by also" (Geddes, 1915, p. 34).

plified by the strong development of transport systems from the second half of the 19th century[3]. At that time, London faced correlated health, housing and density challenges. As the Metropolitan Board of Works did not have the power to implement the construction of new housing, it was necessary to wait for the responsibilities of the LCC to be extended in 1893 for the city to begin taking hold of the situation.

Despite being attracted to the apartment building, the British middle class still preferred long commutes between home and work in order to maintain a quality of life materialized as an individual home and garden, along with a bucolic fondness for the English countryside. The daily journeys achieved by foot, by bus and later by tramway, rail or automobile were ultimately limited only by the evolution of technology and by transport related costs. During the development of the first train lines serving the suburbs, Londoners increased their average daily commuting distance by 15 to 25 km. Around 1900, many would make the journey from downtown London to smaller cities, up to 50 km away. Little by little, this way of life is extended to popular classes and facilitated by the reduced fees offered by railway companies in exchange for the inconveniences caused by the construction of train stations and rail networks. These recurrent home-to-work commutes are particularly characteristic of the interactions between economic centres and their suburban areas, which often serve a mainly residential purpose.

2.2. A Dispersion Strategy for Greater London Inspired by the Garden Cities Model

It is in this context that politicians take hold of this dispersion phenomenon, relying in particular on the Garden City Movement, inspired by the reformist ideals of Ebenezer Howard and more specifically his book *Tomorrow*, in which he describes the "Social Cities" principle, that can be defined synthetically as a network of new and interconnected cities (Figure 2). And so, the LCC adopts a new strategy and commits to the creation of low-cost houses on the outskirts of London, inspired by the urban planning methods and the so-called "picturesque" urban forms developed by Richard Barry Parker (1867–1947) and Raymond Unwin (1863–1940), and implemented in the Hampstead Garden Suburb district, from 1907. These two architects are none other than the town planners of the first English garden city, the construction of which had started a few years earlier, in 1903[4]. These urban forms, defined by series of cottages, become more popular, supporting urban sprawl, which at the time was regarded as beneficial from the hygienist ideology standpoint and fit London's demographic decongestion needs. The LCC, however, had no influence on the establishment of industries, and the dispersion of factories and manufacturing facilities did not follow the migration of population as quickly as hoped. Between 1919 and 1939, London saw its population increase by 30% and its surface area multiplied by three (Sadoux, 2007) and, correspondingly, in 1931 the population density of the County of London remained almost as problematic as in 1901.

The garden cities model serves the evolution of suburbs once again, although this time urban planners of the interwar period intend to contain urban sprawl and encourage the dispersion of industries toward the economically weaker peripheral regions. After Howard's death in 1928, his former associates (Raymond Unwin and Frederic J. Osborn, in particular) pursued his work, but let go of the strategy of voluntary action originally meant to support a government-led urban planning project at the regional scale. Inspired by a report co-written by Raymond Unwin in 1933, the Greater London Regional Planning Committee set up a large metropolitan "greenbelt" around London. Its main function was to control the development of suburbs, thus enabling the implementation of a new urbanization strategy. The latter takes shape as the Greater London Plan devised by urban planner and architect Sir Patrick Abercrombie (1879–1957), applying the greenbelt concept over an area of more than six miles in width. Beyond this limit, he implemented an alternative urban development strategy, echoing a tradition of deconcentration, humanist in inspiration, based on the idea of a return to small-scale communities and traditional urban forms (Sadoux, 2007).

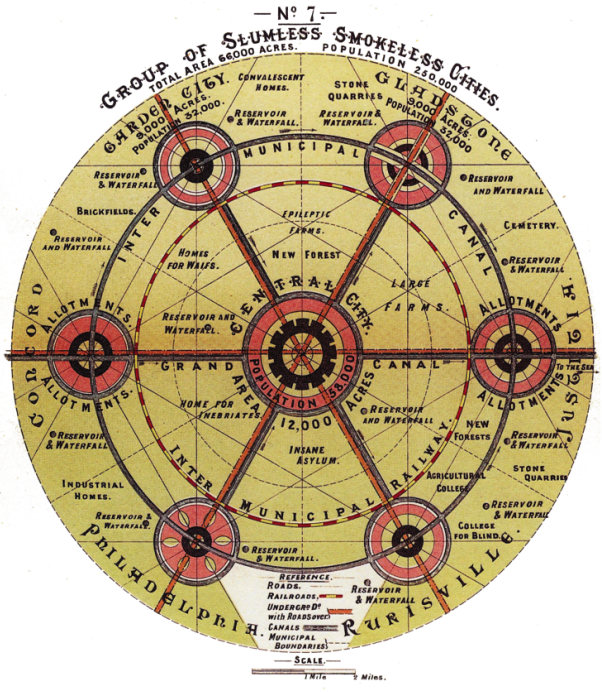

Figure 2. Diagramme no. 7: "Social Cities". Source: Howard (1898).

[3] More specifically the rail network around 1840 and the underground networks from 1900 onward.
[4] The two partners apply the urban and architectural principles developed by Unwin for the industrial city of New Earswick, in 1902.

2.3. New Towns Planned as Alternatives to Suburbs

The limitation of London's periurbanization through the adoption of the greenbelt principle would symbolically represent the state's awareness of suburban issues. Yet, the principle of deconcentration through dispersion requires a strategy of relocation of the population to avoid the reproduction of past errors. In his Greater London Plan, in addition to suggesting the relocation of migrant populations from London in existing towns, Abercrombie designates ten peripheral sites to build new towns capable of accommodating part of the latter (Alexander, 2009, p. 28).

Inspiration for this project is found explicitly on the satellite cities proposed by Howard. The original master plan of the Greater London Plan distinctly shows their perfectly circular shape, contrasting with the organic growth of London. It mobilizes several principles of urban organization defining the garden cities. New towns are accessible by a train and are surrounded by their own greenbelt as a means to limit urban sprawl. They feature an industrial area located on the outskirts, with direct access to the railway system. Finally, residential density is set at a maximum of 30 to 50 inhabitants per acre, in tune with the Tudor Walters report published in 1918. This report, produced by a parliamentary committee of which Unwin was a member, is based on some of his previous theoretical and practical works as an urban planner (Sadoux, 2015a), and draws on his experiences on the design of New Earswick, Letchworth Garden City and Hampstead Garden Suburb. A basis on these emprises and reflections led to the publication of the first New Town Act in 1946 (Fishman, 1979), formalizing government action for a planned suburbanization in the form of new human settlements.

Between 1946 and 1970, some of the core principles behind the garden cities model served as reference for the creation of thirty-two new towns. These principles would be gradually put to test and invalidated as they confront regulations and urban developments of the 20th century. As urban planning projects are handled by Development Corporations, private property and land speculation are favoured, in contrast with the collective land ownership principles advocated by Howard. The diversity of traditional architectures in the Arts and Crafts style is gradually replaced, in parallel to the emergence of theories of modernist urbanism, sacrificing urban quality and leading to the monotonous uniformity of housing structures. Also, the spatial segregation of activities combined with the democratization of cars leads to divisions of functional but also economic and social natures.

Consequently, urban dispersion strategies moved away from the principles behind the traditional city and the values borne by the original garden cities model, and gradually moved closer to the most problematic suburb characteristics mentioned above (privatization, monotony, monofunctional zoning, automobile dependency), and so, to this day, public opinion and professionals continue to associate garden cities with the problems posed by new towns and suburbs (Barkham, 2016; Holliss, 2017).

2.4. The Social and Environmental Downsides of Affinity Urbanism

More generally, negative perception of suburbs was built upon the gradual standardization of a way of life influenced by individualism and a quest for social ascension that tainted the urban evolution of industrialized countries during the last century. Contemporary suburban development, considered as unsustainable in principle, is mainly the result of a thought process that legitimizes individual responses to the collective organization of the inhabited space. In the 19th century, the peripheral city appears as a solution to the social problems caused by industrialized cities, affected by both population density and pollution. It emerges as a response to the serious challenges affecting the health and finances of the working classes, as denounced by several physicians and economists of the time, ingraining this era with hygienist and socialist values (Ragon, 2010, pp. 35–56). The following century is then marked by the rise of the middle classes and the consumer society.

New urbanization strategies are thus designed in opposition to the characteristics of the traditional city, which is rejected. This translates into a shift of morphological characteristics: built structures become discontinuous and scattered on their territory. The urban fabric loses its density. The private road impedes free circulation in the public space. Facades no longer determine the position of roads, as they back away behind barriers and gardens. A functional mix gives way to a fragmented urbanism, conditioned by automobile dependency, and organized according to different social functions: production, business, leisure, rest (Donzelot & Epstein, 2009, p. 7).

Economically, the suburb is the consequence of the rise of a society advocating the principle of freedom through property. The suburban ideal stems from the financial possibility granted to people of the middle class to satisfy its desires to dwell—or rather what they are offered to desire—within the limits of what they can afford. Individual houses are thus longed for in order to avoid the hassle of social interaction imposed by collective housing, completed with a garden that will grant access to a tamed sample of the natural world, surrounded by barriers for protection and peace of mind, and last but not least, a car as the symbol of a newly-acquired privilege.

The social consequences of these material considerations are even more insidious. The idea of a possible upgrade from social to residential housing is increasingly precarious. The consequence of this tendency is materialized in the form of an opposition between the different social classes, rejecting cohabitation for fear of relegation. An "affinity urbanism" (Donzelot & Epstein, 2009,

pp. 42–45) is then created, sustained by a quest to live surrounded by peers, and legitimized by an idealized image of the village. But this communitarian vision is illusory and in complete contradiction to a lifestyle based on individualism, which is responsible for the isolation and dependence of the most vulnerable members of society (the elderly, single individuals, single parent families), while the main challenge of urban planning is precisely to achieve a social mix by creating gathering places in order for inhabitants to reconcile with the city.

2.5. Garden Cities, Suburbs or Gated Communities?

Due to its evolution over the course of the 20th century, the garden cities model has often been partially interpreted or reduced to its morphological drifts, even by planning professionals (Hall, 2014, p. 8). In order to better understand the ways garden cities and suburbs are confused, it is necessary to deconstruct the idea that the theoretical model developed by Howard is at the origin of the evils usually attributed to suburbs; more generally speaking, it is necessary to point out the gaps, in the sense defined by François Jullien (2012), between the initial concept and the various projects that claim a connection with it, in order to compare the initial model with its evolution (temporal, spatial, ideological). Professor Dennis Hardy summarized the reasons for this misinterpretation: "Paradoxically, it was the Garden City movement that fanned the flames of suburban idealism. For, although Garden City purists could not accept anything less than self-standing settlements beyond the metropolitan boundaries, others were happy to adopt terms such as 'garden suburb' and 'garden village' and even, in cases, 'garden city', for their own ends…Gillian Darley has noted, 'soon the misused term Garden Suburb, Village or City began to be synonymous with suburbia'" (Hardy, 2005, p. 43).

Let us take a second example of affinity urbanism as referred to above: one that tends to assimilate garden cities to gated communities. According to Evan McKenzie, the influence of Howard's theory on urban planners and American architects in a culture centred on the importance of private property is at the origin of this confusion. In his book *Privatopia*, however, he points out that "the dominant ideology of privatism worked against important aspects of Howard's plan" (McKenzie, 1994, pp. 7–9). For his part, Renaud Le Goix considers that "garden cities may have inspired the development of gated communities, based on two major points: the self-contention intended as part of the ideal city project, and the conception of local politics" (2003, p. 71). However, if the spatial confinement materialized by the greenbelt gives the impression of creating an isolated urban entity (Le Goix, 2003, p. 72), the initial purpose seems, according to the initial theory, as a means to maintain social cohesion within the community, encouraged by an incentive to develop cooperative initiatives. Also, the Social Cities principle (if the addition of a semantic proof of this desire to provoke interaction was needed) ensures, according to the author, "the planning and building of town clusters" (Howard, 1902, p. 128), in other words, urban settlements both connected and open to the outside world. Chris Webster's analysis sheds new light on Howard's work. It suggests that there is some incoherence between the socialist and humanistic ideals sustaining his project and the fact that garden cities are "new settlements, privately built" on a private site, bought by private investors, and, moreover, "privately governed". Webster also points out that the model was brought to proportions that Howard could not have imagined, also noting that "in one sense, modern gated communities might seem to have little to do with Howard's vision" (Webster, 2001, p. 150). This example of gated communities encourages us to differentiate between the initial theoretical intentions and the appropriation of these ideas by other actors in history whose intentions may be opposite.

3. The Legacy of the Garden Cities Model Confronted with the Culture and Challenges of the 20th Century

3.1. Learn from the Past to Build the Future

Our research method is based on the analysis of a model and its history, considered as a precedent, in order to draw inspiration from it to tackle contemporary issues. This approach does not aim at copying its principles, which would obviously be inappropriate in a radically different historical and cultural context, but rather at analyzing its characteristics and its evolution in a prospective will. That is what Hall and Ward call "the wisdom of the past" (2014, p. 170), considering that method as valuable to seek innovation as exploring academic research or analyzing good contemporary working examples. This methodology also fits Howard's thinking logic as he also had his own models: in an approach that could be considered as scientific, he clearly describes the works that were used to compose his project, which he defines himself as a "a unique combination of proposals" (1902, pp. 101–113). Many leading thinkers of urban planning had the same methodology, which is at the core of many architectural and planning practices. Camillo Sitte, for example, whose work was a reference for both Howard and Unwin, questioned the planning model of the European historic city in order to understand its underlying rules of urban composition (Sitte, 1889/2015). In a similar approach, the study of pre-existing models is fundamental to Unwin's theoretical and practical work (Neal, 2004, p. 124), more specifically in his well-known book *Town Planning in Practice: An Introduction to the Art of Designing Cities and Suburbs* (Unwin, 1909), which is "a true architectural and urban design manual, incorporating all the canons of the traditional and picturesque city implemented in Letchworth" (Sadoux, 2015b, p. 32).

It must be realized that, while this is not always clearly expressed, the garden cities model served as ref-

erence in a great number of urban reflections carried out throughout the 20th century, specifically dealing with urban planning and the design of new human settlements. The post-Howardian heritage thus impacts Anglo-Saxon thought in particular, giving rise to a number of founding theories on contemporary urbanism, mainly in the United States. One example is the Neighbourhood Unit principle, formalized by the American planner Clarence Perry in 1929, who considered at the time that the residential unit best adapted to the automobile age is composed of a concentration of 750 to 1500 families in residences distributed around an elementary school, located within a five-minute walking distance (a quarter of a mile), surrounded by businesses and main roads, complete with community services and a set proportion of public spaces (Neal, 2004, pp. 129–130)—which brings to mind the spatialization of elements in Howard's garden city, but at the scale of a neighbourhood. On a different scale, Regional Planning conceptualizes a vision of urban planning beyond the limits of the city, considering the territory as an integral part of a global economic and ecological entity (Calthorpe, Fulton, & Fishman, 2001, pp. 16–22). Lastly, from a more functionalist standpoint, Transport Oriented Development (TOD) principles, codified in the late 1980s by Peter Calthorpe, founder of the Congress of New Urbanism, shape the design of walkable urban communities grouped around transportation infrastructures so as to foster proximity and reduce car dependency (Calthorpe, 1995).

In parallel to these theoretical conceptualizations inspired by garden cities across the Atlantic, the model is no longer referred to in Britain since the implementation of the last new towns in the 1970s. It was not until 2014 that the coalition government of David Cameron tried to face the housing crisis by expressing his support toward the creation of a new wave of garden cities and garden suburbs, thus reinvesting the socialist garden cities model. It is also in 2014 that the Policy Exchange think-tank organized the prestigious Wolfson Economics Prize competition, with the objective to rethink Howard's model and design a "visionary, viable and popular" garden city project. Let us now focus on the work of URBED (United Kingdom) and Duany Plater-Zyberk (USA), two urban planning agencies that participated in the competition, and whose reflections propose innovative updates of the garden cities model regarding suburban issues, and more generally urban crises of nowadays.

3.2. URBED's Interpretation: Rupture and Action

Based on the assumption that modern urban planning principles do not lead to urbanization results of sufficient quality, the Wolfson Prize-winning team formed by the urbanism agency URBED[5], led by David Rudlin and Nicholas Falk, stand against the ex nihilo creation of new towns and propose an urbanization based on the natural growth of ancient cities, relying on their adaptability, their historical identity and their already present economic attractiveness. This way, the Uxcester project (Rudlin & Falk, 2014) addresses the shortage of housing in England by creating a new type of urban configuration able to double the size of forty major cities across the country.

Rudlin and Falk also challenge "the idea of the garden city as an autonomous human settlement" (Rudlin in Novarina, Artis, Parham, Ames, & Sadoux, 2016), which is the core of much of the theory behind garden cities. Instead, their project is inspired by the territorial system as imagined by Howard when he evokes the polycentricity principle with the Social Cities scheme. This reference is clearly used in the "Snowflake plan" diagram (Figure 3), which identifies urban units as neighbourhoods rather than cities. Their proposal is based on an urban development composed of both urban densification of under-exploited sites (brownfields) and addition of localized greenbelt extensions (greenfields).

Regarding this last point, the reactions to their proposal are strong. Architect and planner Richard Rogers criticized the project (Booth, 2014) as it contradicted his own investigations carried out in the context of the Urban Task Force (1999), for whom this project deflects the attention from the big challenge of urban renewal (Sadoux & Novarina, 2017, p. 11) and infringes upon rural and natural areas that have to be protected from urbanization (Rogers, 2014). Even the British government rejects the results of the Wolfson award on the grounds that the winning proposal could not be validated by English housing policies due to non-compliance with the green belt principle, intended to contain urban sprawl (Department for Communities and Local Government, 2014).

In fact, their strategy is meant to be comprehensive, and is firstly based on the same densification logic as Rogers. Following the British government's recommendations (Department of the Environment & Welsh Office, 1995), Rudlin and Falk support a brownfield-first approach to serve housing needs by up to 60% (2014, p. 12)—a strategy already proved valuable and necessary in their book *Tomorrow: A Peaceful Path to Urban Reform*, subtitled "The feasibility of accommodating 75% of new homes in urban areas" (Rudlin & URBED, 1998), on which they already based their reflections for the reinterpretation of the garden cities model.

For the remaining part, they propose to take "a good confident bite out of the green belt". But their goal is not to create dormitory suburbs disconnected from their environment, but rather to design "sustainable urban extensions that can support a tram service and a range of facilities", surrounded by protected natural areas, rehabilitated and made accessible to inhabitants (Rudlin & Falk, 2014, p. 12). Their solution to reduce the need for housing is based on principles similar to those supporting Howard's garden cities, but operates a change of scale. The network of new towns becomes a set of neighbour-

[5] Urbanism Environment and Design (www.urbed.coop).

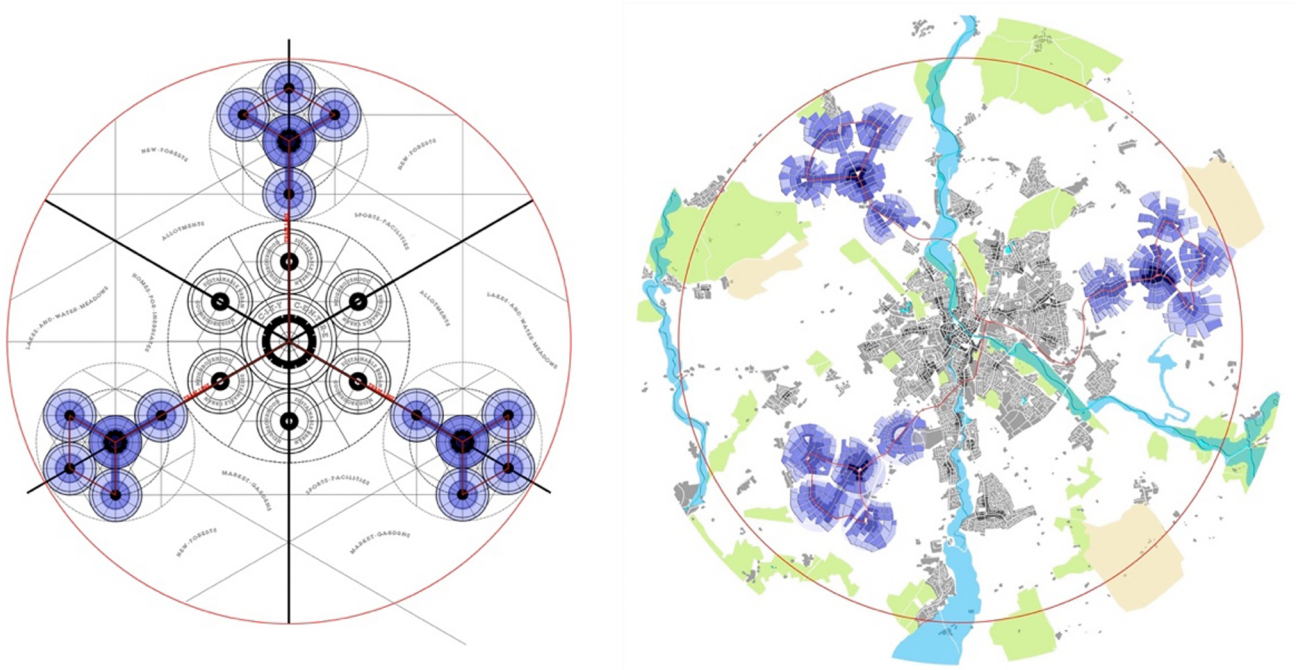

Figure 3. The Snowflake's diagram and its application on the periphery of the fictitious town of Uxcester. Source: Rudlin & Falk (2014).

hoods connected to an existing urban centre. Thus, the town-country magnet—in other words, the garden city—is no longer an alternative to the city and the countryside, but it is the urban neighbourhood, which becomes a solution to overcome the defects of suburban sprawl and the inner city.

Through the Uxcester project, Rudlin and Falk synthesize a good part of their vision of the garden cities model adapted to 21st century, containing ideas from several previous works. Among them, we can mention the Cambridgeshire Quality Charter for Growth (Falk, 2008), and their book *Building the 21st Century Home: The Sustainable Urban Neighbourhood* (Rudlin & Falk, 1999) that advocates the struggle against urban sprawl through a sustainable urban regeneration strategy, including high density and mixed-use developments. In addition to the Wolfson Prize, their professional approach is characterized by a long-term strategy that aims to combine two main challenges: the improvement of urban quality on the basis of their practical experience, and a specific attention to the environment through sustainable architectural and urban design. URBED thus seeks to design and develop more physically connected urban spaces (development of open urban fabric, public transport systems, soft mobility), as well as socially (diversification of communities through greater economic, social and inter-generational mixing). They also aim to make their projects more resilient to climate change through sober approaches (Falk, 2017) and conducive to the territorialized development of a balance between production and consumption (Dodd, 2008).

3.3. The New Urbanism Approach: Balance and Repair

Before turning our attention to the Wolfson proposal of Duany Plater-Zyberk (DPZ), let us first take a broader view in order to clarify how the garden cities movement and the New Urbanism (NU) are related. The New Urbanism movement emerged in the United States in the mid-1990s, and gathers a group of professionals from the United States willing to rethink the low-density model of American suburbs characterized by urban sprawl, single-family housing and zoning principle (Ghorra-Gobin, 2011, p. 87). According to Stephenson, it "has invigorated city planning history by invoking the tradition of American civic design to solve the conundrum of suburban sprawl" (2002). It therefore proposes new urban approaches and practices that have been reclaimed and synthesized in the 27 principles of the *Charter of the New Urbanism* (Congress for the New Urbanism, 2000), and which are based on previous proposals important to be included in the New Urbanist lineage, including, among others, Ebenezer Howard's garden cities model, but also garden suburbs materialized by Raymond Unwin and Barry Parker through Howard's vision (Talen, 2006). In the New Urbanist mythology, these movements symbolize a "timeless wisdom" of how to build communities (Rutheiser, 1997, p. 117), so it is not surprising that, for Fishman, Howard "stands at the end of the century as the oldest and wisest of the New Urbanists" due to the fact that "his Garden City embodied all the ideals now championed by the New Urbanists" (Fishman, 1998).

In the early 20th century, the model was promulgated in the United States by Ebenezer Howard himself, as

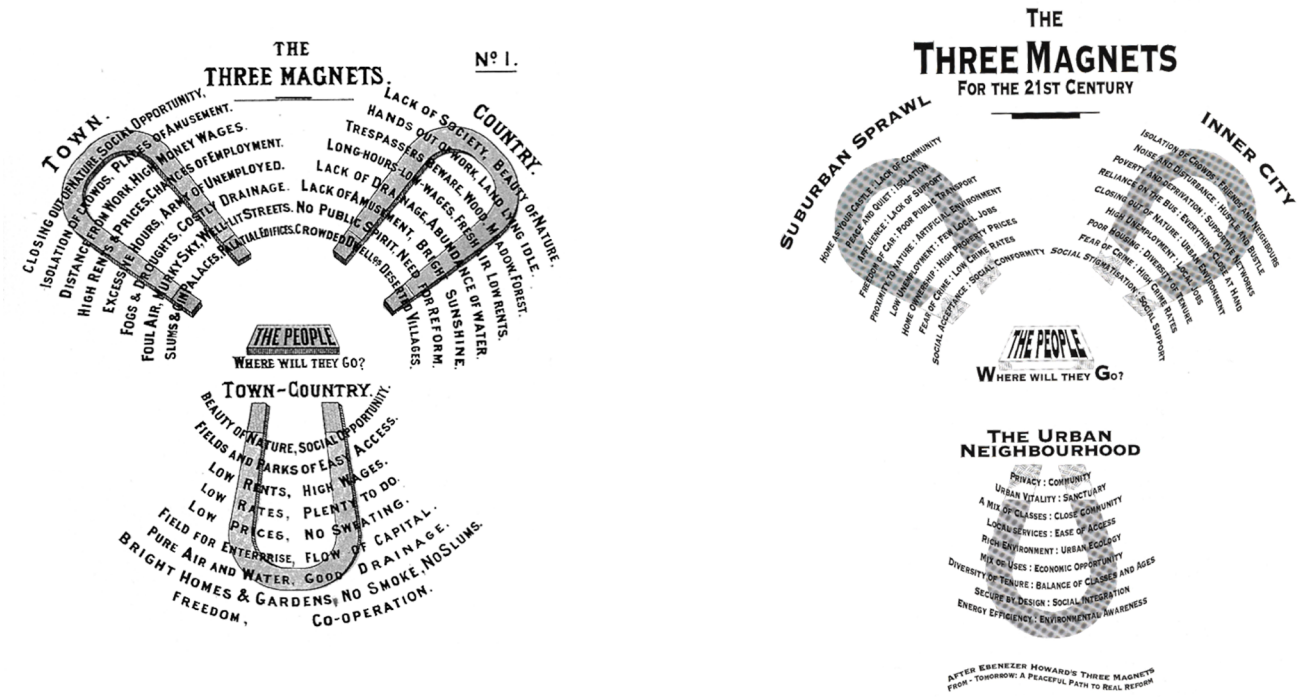

Figure 4. Howard's Three Magnets (left) and URBED's Three Magnets for the 21st century (right). Sources: Howard (1898); Rudlin & URBED (1998).

he founded the Garden City Association of America in 1906, through which a first production came into existence: the garden suburbs of the Forest Hills Gardens in New York. This project has gathered professionals whose practices were largely influenced by Howard's model, namely Clarence Perry, Clarence Stein, Henry Wright, Lewis Mumford and Raymond Unwin, among others (Sadoux & Novarina, 2017). Many of the striking features of this reference project inspired New Urbanism, especially the "compact, walkable, transit oriented designs and their inclusion of diverse housing types" (Talen, 2006, p. 90). New Urbanism and garden cities approaches are so connected that they are also similarly criticized. The neighbourhoods designed by the New Urbanists are, for example, regularly taken for affluent communities due to their neo-traditional look, considered to be caricatural, and the confining but still intentional quest for a "sense of community" as part of their design—in the sense of a "community of place" and not of a "community of interests" (Ghorra-Gobin, 2011, p. 82).

Undoubtedly, the most important contributions made by the movement come from the complementary approaches of Peter Calthorpe on the one hand, and the couple formed by Andrés Duany and Elizabeth Plater-Zyberk on the other. Calthorpe's design philosophy, based on alternative forms of transit to the automobile and consideration of the regional contexts, was initially theorized by Patrick Geddes (1915). His concepts of Pedestrian Pocket and TOD, on the other hand, find inspiration in the ideas from Ebenezer Howard and Lewis Mumford (Rutheiser, 1997, p. 125). The approach of Duany and Plater-Zyberk can be summed by the concept of Traditional Neighbourhood Development (TND), which aims to replace suburban sprawl with neighborhood-based planning, emphasis on well-designed and self-contained human-scaled communities, with a pedestrian-oriented urban pattern, including public spaces and architectural diversity (Ghorra-Gobin, 2014). For their part, they take as models the projects of the town planners of the 1920s, and more particularly Clarence Perry, Raymond Unwin, and John Nolen (Rutheiser, 1997, p. 121; Sharifi, 2016, p. 8).

We can mention that several studies document specifically the similarities between the plans of Nolen and works of DPZ, so that the well-known plan by DPZ for Seaside (Florida) is considered as a revival of the art of traditional town planning (Stephenson, 2002, p. 105). Nolen was also a close friend of Unwin, whose plans of Letchworth Garden City (1903) and Hampstead Garden Suburb (1909) greatly influenced him. If his master-plan for Mariemont (Ohio) can be considered a garden suburb, the one of St. Petersburg (Florida), where Nolen held a much wider area, aimed to conceive a true garden city, of which "the plan marked Nolen's most comprehensive adaptation of garden city principles in America" (Stephenson, 2002, p. 107). In 1931, Nolen even replaced Unwin as president of the International Federation of Housing and Town Planning, a post Howard had occupied before, until his death in 1928.

According to Duany, the relationship between his work at DPZ agency and English garden cities relate more of imaginary (Sadoux & Novarina, 2017) and of educa-

tion when he received from British professors at the Planning and Architecture School of Princeton during the new towns movement in Britain the late 60s (Hetherington, 2006). But DPZ do not only refer to the past of garden cities, they are equally invested in their future. In 2008, with the University of Hertfordshire, they explored the idea of new garden villages and garden cities for the *Hertfordshire Guide to Growth 2021* (DPZ, 2009). More recently, in addition to the many garden cities, garden towns and garden villages announced by the British government since 2014, other initiatives are equally being undertaken by private landowners, some of whom have requested the involvement of DPZ to design new neighbourhood-based garden towns in Scotland[6] (Doughty, 2017).

Another important concept links the two movements: that of equilibrium (social, political, economic), a core notion in Howard's reference book, symbolized by the Town-Country magnet of the famous Three-Magnet diagram. With Paul Roberts and Emily Talen, Duany responds to the call for proposals of the Wolfson Economic Prize on the base of this main theoretical principle. The team proposes to redefine the theoretical principles that characterize the garden cities model in order to adapt to contemporary urban issues. Through their contribution titled *A General Theory of Urbanism* (Duany et al., 2014), they construct a method of analysis based on the balance of ideal urban characteristics, which are later tested on the towns of the county of Hertfordshire, in Southern England. This method grants them the possibility to carry out a quantitative evaluation of the "deviations" that affect the balance of studied urban spaces. An analysis at different chronological periods makes it possible to understand and interpret urban evolutions according to historical events (crises, technical evolutions, national policies, etc.), but also to imagine future scenarios and direct city policies leading to the restoration of an ideally balanced situation.

In the field of architecture, the same notion of equilibrium is used when evoking "net zero energy" buildings, not defined by a total lack of energy consumption but instead by a rather low consumption which is compensated by a controlled quantity of production. This example, therefore, seems to be particularly relevant for developing a sustainable planning method capable of supporting the energy transition at the urban and territorial scales. Moreover, as suggested by Duany's team concerning energy and water, other aspects could be taken into account to achieve a balance between urbanization and the natural environment, beyond mere urban characteristics.

This method of evaluation, applied to zones of the regional transect, allowed them to highlight the need for action in the most problematic areas: the suburban territories. It is in this perspective that planner and urban designer Galina Tachieva proposes, in her *Sprawl Repair Manual* (2010) to confront the suburbs in a more direct fashion. Through a more operational approach, she devises a strategy for the "repair" of urban sprawl by completing the already established sprawl areas to recompose whole and dynamic communities based on the urban elements already present. She relies on an incremental approach and targeted interventions aimed at rehabilitating, intensifying and improving existing infrastructures.

Lastly, if garden cities and new towns implemented during the 20th century are associated with the suburbs, this is due to their shared characteristics, resulting from their simultaneous emergence during a historical period that has profoundly changed the urban landscape of our cities. In addition, it can be noted that thanks to the reinterpretations made the URBED or the New Urbanists described above, among others, the theoretical model is more widely used for its ability to conceptualize innovative solutions and adapt to contemporary challenges. It is this approach that we wish to explore through the last section of this article.

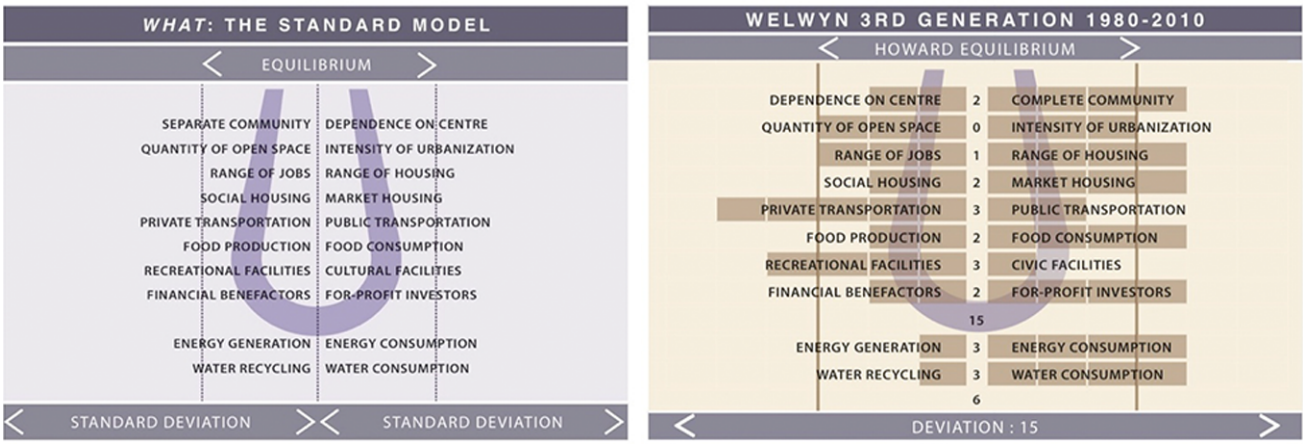

Figure 5. The DPZ assessment model inspired by garden cities: the standard model and its application on the 3rd generation of Welwyn Garden City. Source: Duany et al. (2014, pp. 15, 39).

[6] Chapelton (Aberdeenshire), Tornagrain (Inverness-shire) and Grandhome (Aberdeenshire).

4. Garden Cities, a Complete Model: Transcalar, Holistic and Systemic Approaches

4.1. Toward a Sustainable Path for Suburbs

As we previously explained, we consider that the garden cities model, while primarily advocating the development of a network of interconnected cities, has also served as an inspiration for the creation of a great number of suburbs throughout the world (Schuyler, 2002). But while its core principles may have only been interpreted partially, or used to sustain other ideological purposes, we stand that this model was originally ground in a pragmatic legacy, defined by a certain theoretical coherence. We therefore assume that both its theoretical evolution and its historical longevity are sources of potentialities capable of challenging urban planning through contemporary aims of sustainability and more specifically of energy transition. As with neighbourhood planning, recent projects that claim the heritage of the garden city tradition in order to conceive new towns and suburbs have evolved their preoccupations in order to integrate environmental and energy issues, and "Howard's visionary principles of efficient, self-reliant, and equitable communities are still among the major challenges in the way of achieving neighborhood sustainability" (Sharifi, 2016, p. 12).

Let us now see how the garden cities model provides a path for the sustainable renewal of suburbs. In order to do so, we rely on the global coherence of its original vision, which we consider to be complete as we explained in the main introduction, but at the same time chronologically distant from contemporary urban issues, which led us to keep a critical distance from possible transpositions or adaptations to our times. Based on the negative characteristics of suburbs identified at the beginning of the article, and applying some of the remedies described in the previous chapter, how can we build a new urbanization strategy to contribute to the energy transition?

As suggested by the URBED agency through its theoretical model Uxcester, we assume that the development of suburban areas is potentially virtuous if properly planned, but above all that it is not in contradiction with other forms of urbanization, such as the urban renewal or the development of new towns, all of which are cumulative scenarios that must be analyzed according to context (DPZ, 2009). We further assume that, ultimately, and in spite of the implementation of intensification policies on already urbanized areas, the construction of new human settlements will remain necessary. Thus, suburban planning should not be forgotten at the risk of remaining in its anti-urban position, but rather thought—and rethought—in combination with other forms of urbanization, in order to respond more efficiently to a seemingly endless housing crisis.

In addition, in previous works (Coste et al., 2015), we have highlighted the need for a territorialized approach for planning, both systemic and transcalar, to overcome technical macro-systems. This approach led us to work on the concept of territorial energy ecosystem, which enlarges the possibilities of sustainability considerations regarding human settlements—no matter their type—taking in account both their environmental and social resources. Thus, in the last part of this article, we will come back to the origin of this concept, which will allow us to question the notion of density that is considered today by many urban planners as a key for sustainable cities. We will then evaluate the extent to which a number of levers for action based on the original model, that is to say on its theorized and constructed heritage, can constitute paths for reflection (theory) or action (practice). In doing so, we will try to demonstrate how the garden cities model set a precedent that could be used today, with a sustainable approach, to design human settlements in the 21st century.

4.2. From Territorial Metabolism to the Territorial Energy Ecosystem

Metabolism, a concept often used in territorial ecology, is characterized by fluxes of matter and energy within a given territory and by the concept of environmental footprint (Barles, Buclet, & Billen, 2011). Sabine Barles demonstrates that natural—but also social—processes determine the metabolism of territories, and identifies three main material fluxes: the flux linked to building materials "whose consumption appears to be correlated with urban sprawl", the flux of agricultural and food products, and the flux of fuels (Barles, 2014).

Consubstantial to the concept of metabolism, the concept of the ecosystem is essential to the emergence of ecology in the 1970s. The concept of the (territorial) energy ecosystem is largely applied in connection to territorial ecology. This was put into practice in our previous study on the spatialization of the energy transition in a rural mid-mountain region of France (the territory of the Massif Central), in a pragmatic perspective (Coste et al., 2015). The concept of territorial energy ecosystem allows us to integrate the dimension of space design, that is to say, to add a qualitative dimension to the analysis of fluxes (already very complex) and a reflection on practices, bringing us closer to the socio-ecological approach of Marina Fischer-Kowalski and Helmut Haberl (2007). In the realm of living matter, within an ecosystem, interactions are what enriches the model. The same goes for the notion of energy ecosystem: it is this dimension of interactions that gains importance in terms of spatialization. Behind the notion of territorial energy ecosystem is therefore a holistic and systemic approach, embedded locally, which was proposed, trying to integrate the technical, human and social dimensions of energy through a spatial project.

Finally, when one considers sustainable development of human settlements through the concept of the territorial energy ecosystem, considering the notions of energy balance (consumption/production ratio), food, access to

water and health, the notion of density—mentioned previously regarding suburbs and garden cities—needs to be re-examined. Rather than a quantitative approach, we propose a qualitative and spatial approach by the use of a precedent.

4.3. Density as a Tool to Analyze the Equilibrium of the Urbanized Territory

Density is used as an index of human occupation based on land use: usually, population density (inhabitants/area) refers to territory, when urban density (dwellings/area) is related to the city. But density is also a design tool at the service of urbanization. The density of the urban block informs us about its form, the density of the neighbourhood integrates public space areas and associated services and finally the density of the city includes the large infrastructures required for its habitability. There are also densities that relate to uses or functions, such as those that indicate the economic activity of a territory, (for example jobs/area).

In 1912, Unwin published *Nothing Gained by Overcrowding* for the Garden Cities and Town Planning association. He explained, through calculus and urban form analysis, how the traditional by-law housing layout of English cities between 1870 and 1910 was inefficient because of excessive street length, and how it could be optimized in order to reduce surface use, cost and daily commute to work (Town and Country Planning Association, Hall, & Clarke, 2012). So as Unwin did in his time, the concept of a territorial energy ecosystem leads us to question the notions of scale and density, and at the same time, the good practices related to energy and resources usage. The dense city, for example, is supposedly virtuous because it consumes less space, but also because collective housing is less energy-consuming and travel distances are shorter or more easily achieved through soft modes of transport. But the paradox of the dense city has long been highlighted: while it consumes less space and energy, thanks to the compactness of built structures, it produces very small quantities of resources (renewable energy, food and water) and the amount of sunlight received per person is lower than in less dense environments. Not to mention low summer comfort due to heat islands, and pollution problems caused by the concentration of people and activities.

It is therefore necessary to consider other indicators to understand our territories, other ratios allowing us to analyze in a systemic way, and to determine the proper use of resources in order to better understand urban quality influential factors. These indicators, comparable to the concept of the ecological footprint (Wackernagel et al., 2002), could help us to recognize and fix some unsustainable aspects of urban operations: the influence of territorialized employment on commuting, the optimization of land capture value reinvested in community services, the improvement of transport networks and flows, or the balance between production of territorial resources (material or intangible) according to its needs.

4.4. From the Unexploited Potential of Rurality to the Sharing of Territorial Resources

If Howard considered rural territory as the ideal place for the establishment of his garden cities, it is not by negation of this space, but on the contrary by desire to reconcile the urban space with it. This approach, symbolized by the diagram featuring the three magnets, is present in his project at all the levels. The well-balanced management of territorial resources generated by the garden city through the synergy between the urban and the rural is one of the key points behind the original theory. The viability of the model thus lies in the exchanges between these potential resources and the opportunity for the local populations to benefit from it, in order to achieve greater autonomy, but also to enhance health and the quality of social life.

These resources, both economic and social, respond to the different needs that Howard had theoretically identified for the future inhabitants of the garden city, sustaining all aspects of his project. Matters related to population numbers and surface amount were no more than the tip of the iceberg, and this could justify the absence of density requirements, an indicator that was not so relevant for the strategy he tried to implement. He focused on the necessary inputs for the equilibrium of his urban model, and he searched to find the right balance between the spatial assets that he could take advantage of, and what they may potentially generate. Thus, Howard aimed to combine numerous factors that compose city and, beyond the city, the territory: the rural and the urban, the consumption and the production, work and leisure, built spaces and natural spaces, polluting industries and health.

We also believe that the possibility of an urbanization of the rural space—in other words, the development of "rurbanization" (Bauer & Roux, 1976)—should be considered as an opportunity to develop new and sustainable solutions for today and tomorrow, to incorporate and defend a natural and productive space, respectful of what makes a territory fruitful, and to integrate rather than destroy. For the 21st century, the garden cities model could also become more productive in terms of renewable energies, thus contributing to the self-sustainability of cities and their surrounding territories. Planning projects could become something else: no longer the irrevocable consequence of demographic and urban growth, but a place of experimentation and progress, used to explore new possibilities.

4.5. From Spatial Expansion to Social Planning

While today's urban context is not directly comparable to that of the industrial revolution of the 19th century in Great Britain, similar challenges must be faced: the land is

scarce, prices rise dramatically, social inequalities widen, and the urban sprawl ever increases (Sadoux, 2015a). The reflections of town planners are then seen as ways of improving social organization through spatial organization.

It is with this in mind that Howard, as a journalist and stenographer, draws on the expertise of urban planning professionals to turn his ideas into reality. The design work of the associated architects Unwin and Parker for the Letchworth Garden City marks a first spatial interpretation of the garden cities model. As early as 1906, by continuing their investigations on the Hampstead Garden Suburb project, they operate a first break with the theoretical model in the form of a suburb, thus setting aside the principle of an autonomous city. This is followed by a gradual abandonment of several structuring characteristics of the original urban model, particularly on economic and social aspects. These successive deviations from the original model will thus deprive garden city-inspired urbanization of major principles that are perfectly compatible with current energy transition scenarios (Henderson & Lock, 2012), which we should reintegrate in nowadays planning practices.

In planning, architectural diversity, for example, not only avoids the monotony of repeated urban forms and aesthetics, but also ensures social diversity. By guaranteeing the proximity between homes, services and a significant number of local jobs, the functional mix recommended by the garden cities model avoids an important part of the individual traffic flows imposed by daily life in residential areas. The concept of greenbelt, on the other hand, materializes a boundary that avoids the nibbling of the rural by suburbs, but above all keeps residential space within a walkable distance from the activities located in the city centre. In addition, municipal parks, individual and collective gardens provide residents a direct access to leisure, public spaces and socializing areas that are beneficial to their physical—but also mental—health. Last, the territorial division into wards makes it possible to ensure the proper operation and management of all services associated with the neighbourhood community, as proposed by the neighbourhood unit and the TODs mentioned previously, ensuring respectively the presence of schools and public transportation.

Finally, beyond the suburban area, the importance of urban renewal must also be taken into account in Howard's vision. The dispersal strategy aimed at relieving London's congestion intended to act as a lever for the refurbishment of the capital, but also more generally to reduce land pressure on poor households in the city (Howard, 1902, pp. 146–151). This strategy once again brings the theoretical model closer to today's ecological and social approaches.

4.6. From the Individual Carbon Footprint to the Collective Production of Energy

At the global level, an increasing need for resources and energy is driven by constant population growth and multiplication of personal energy needs. In 2012, a WWF report alerted on the overconsumption of resources and the degradation of global natural capital (biodiversity, ecosystems and ecosystem services), pointing to strong economic and social disparities regarding the ecological footprint (Grooten, Almond, & McLellan, 2012). The suburbs of countries with the highest incomes tend to accumulate a large number of individual behaviours that are problematic for the environment, particularly with regard to energy consumption. The construction of scattered residential habitats, particularly voracious in space, requires large networks to supply them with flow resources coming from delocalized production areas (for electricity, gas, water, sewers, etc.). Long distances, combined with the absence of public transportation systems and soft mobility infrastructures to facilitate walking and cycling, force inhabitants to own one or more automobiles that they use daily, and which are symbols of their dependence on fossil fuels.

At the time of the emergence of the first garden city, the main energy resource was coal and some of Howard's contemporaries, like Stanley Jevons, already predicted its end (Jevons, 1866), just as the end of oil that is evoked today. Rail transportation technologies like trains and tramways are already well developed, while the democratization of the automobile has not yet taken place. It can also be noticed that the early urban theories developed by Unwin in his book already address bioclimatic issues linked to housing (Unwin, 1909, pp. 310–314). Still, the sustainable aspects that could be attributed today to the garden cities model seem more conjunctural than visionary, but the values advocated by Howard for social and hygienist purposes remind us the ecological issues of our time, which explains why we can find comparable strategies such as circular economy, mutualisation of services, frugality, optimization of resources or local self-production.

According to Howard's theoretical model, and as advocated by the New Urbanists' response to the Wolfson competition presented above, consumption and production should be balanced within the garden city. The local production of energy is therefore one of the requirements to achieve a reinterpretation of a new garden cities model ready to tackle housing crisis in the energy transition context. In targeted urban areas, a process of replacing imported and centralized energy resources (oil, gas and nuclear power), responsible for among other things pollution and climate change, must therefore be initiated in order to replace these by a territorialized production of renewable energies that should be varied and adapted to the natural characteristics of the site. Ultimately, the objective is to define the modalities of a new territorialized energy ecosystem model, promoting interactions between the latent territorial resources and the capacities of local actors to generate individual and collective projects for the benefit of a common autonomy, and thus a shared habitability.

4.7. From a Delegation of Powers to a Complementarity of Actors

In France, as in England, the time has come to transfer political power to metropolises and municipalities, especially in regard to urban planning, through laws such as the adoption of the Localism Act[7] by the British Parliament in 2011. The government's devolution initiatives are generally seen as a disinvestment of the state in the future of rural and suburban areas. On the contrary, for a human settlement based on garden cities principles, such an initiative represents an opportunity, due to the fact that the economic and political system inspired by this model is local-based. Municipal and participative governance as devised by Howard allows residents to develop a collective identity through their personal involvement, but also to maintain attractiveness (economy, services) within the garden city itself.

This inclusive model also works through the complementarity of different stakeholders: it proposes to mobilize all political players (private, public or associative), as well as the rules and strategies that enable the city to function properly. It relies mainly on optimized management at the local level, in accordance with the principle of subsidiarity, of the participation of local populations in the governance of the city, and on the functional diversity of stakeholders within the garden city. Cooperation is also strongly encouraged: it plays a main role in the formulation and implementation of collective actions, and therefore potentially projects to meet the transition challenges (social and solidarity-based economy, housing and energy cooperatives, etc.).

To ensure the responsiveness of local authorities and a more efficient use of allocated means, it is important to define the role of businesses and the civil society. As the scenarios of the actors imagined by Gille Debizet's team show, the initiatives of positive energy territories will necessarily be led by all the actors capable of acting in a more global and mutually supportive way. (Debizet & Dupuy, 2015).

4.8. From Economic Dependence to Energy Autonomy

Conscious of the strong social disparities of his time, Howard designed his urban model on innovative economic grounds, initially imagined to support social and community initiatives, but that unfortunately got lost in the twists and turns of the 20th century urban sprawl. But contrary to dormitory suburbs, where local economic dynamics are barely existent, the presence of jobs and services within the garden city itself is meant to guarantee, in part, the attractiveness of this urban entity.

Howard was also aware of the large disparity in agricultural land prices compared to the value of land in urban London. It is on this basis that he defined a strategy of acquiring the space necessary for the foundation of the first two garden cities (Letchworth Garden City in 1903 and Welwyn Garden City in 1920). Faced with widespread privatization of land and properties, he proposed on this financial aspect of the model, a new compromise aimed at reconciling individual aspirations and cooperation principles. Based on the proposals of Thomas Spence and Herbert Spencer, he imagined and set up an equitable land-use system capable of limiting and controlling speculation on land value, the land being considered as a collective property and a common good for the inhabitants of the city, who in return pay a rent used to finance facilities for the community[8].

For us as well, economic flow principles used by territorial stakeholders, but too often absent from urban reflections, must become part of the equation in a successful energy transition. A territorialized economy allows greater attractiveness and resilience of the cities in the face of economic crisis on a larger scale. More interestingly, value capture systems, such as the one described as part of the theoretical garden cities model regarding real estate management, could be an interesting tool to guarantee a windfall able to contribute to the financing of some necessary infrastructures during the energy transition process (housing renovation, establishment of production sites, etc.). In that way, it could contribute to the financial independence of the city as well as to its energetic autonomy.

5. Conclusion

Since the publication of *To-morrow*, considered as a key moment in the history of contemporary town planning (Choay, 1965), and up until its recent resurgence through both national and private initiatives, the garden cities model has consistently inspired urban theories and practices. Howard's particularly comprehensive approach to urban complexity beyond spatialization, as well as the influence of theory and artifacts constructed through the history of urban planning, explains the continuous interest about the precedent of garden cities for more than a century. For their part, sprawling territories and the suburbs crystallize the major stakes of the social and ecological crisis currently experimented by our societies.

This article aims at giving a brief overview of the links between both histories of garden cities and suburbs, two urbanization models that have shaped the urban landscape of the 20th century on a global scale. We have tried here to understand their relationship in order to better

[7] The Localism Act is a law that changes the power of local governments in England, facilitating a transfer of powers from the central government to local communities and individuals.

[8] The Land Capture Value system, still in place in Letchworth Garden City, provides funding for recreation and transportation services for the elderly, as well as hospital services. It was also implemented at Welwyn Garden City until 1948, when it became a New Town, together with the City of Hatfield, and its property assets were transferred to the Welwyn Garden City Development Corporation. This system has never been implemented again, not even in the new Garden Cities supported by the British government since 2014.

evaluate the strengths and weaknesses of the first, and to devise solutions for fixing the second's defects. In the previous section, we have tried to extract the aspects of the garden cities model that we consider most relevant to the challenges of energy transition. Thus, notions such as the territorial energy ecosystem, density, cooperation, or financing through land capture value are all points to be explored in order to strengthen our future urbanization models and trace a more sustainable path to a (sub)urban reform.

The garden cities model has been diverted throughout the 20th century for ideological reasons, but above all because of historical and societal changes (politics, technology, living standards). For us, the remobilization of a precedent that has withstood other major periods of transition in the past seems relevant to support reflections about the future of our industrialized cities and territories, whose reflections need to be projected over a particularly long period of time, specifically in this time of energy transition. Not to mention that the potential of this research is also important for developing countries to avoid making the same mistakes regarding energy choices. Although it is difficult to anticipate the next big changes, especially when dealing with the urban question over time, our future investigations will try to strengthen the adaptive capacities of a new model of urbanization inspired by garden cities to face the changes—and more precisely the energy transitions—that will radically transform the 21st century.

Finally, the garden cities model is a way for us to question history through the lens of our present preoccupations, to take a new look at contemporary practices in order to bring out original potentialities and to imagine the future by relying on experiments implemented over a long period of time, at the scale of human realities.

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Conflict of Interests

The authors declare no conflict of interests.

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