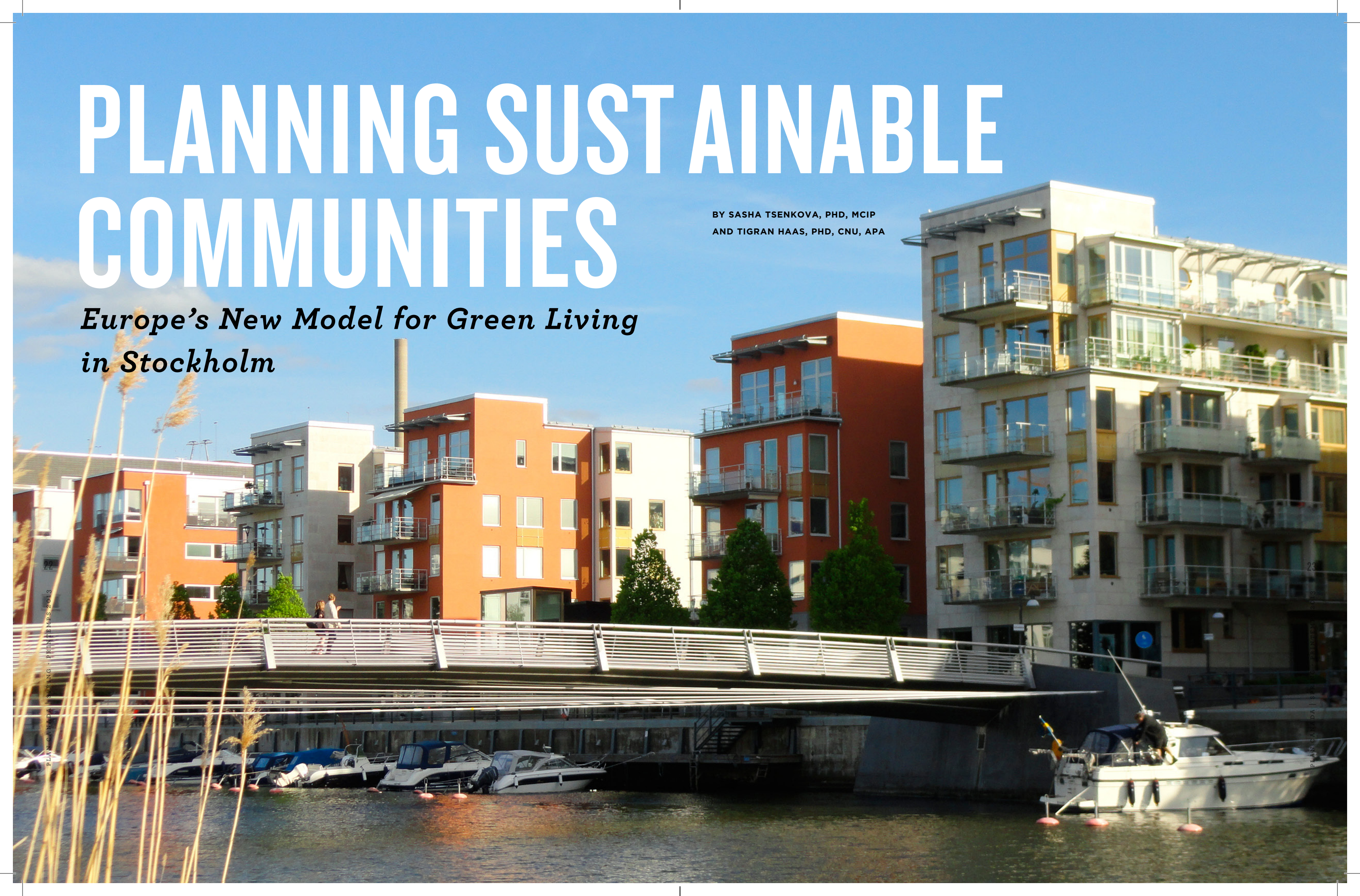


# PLANNING SUSTAINABLE COMMUNITIES

BY SASHA TSENKOVA, PHD, MCIP  
AND TIGRAN HAAS, PHD, CNU, APA

*Europe's New Model for Green Living  
in Stockholm*



**SUMMARY** Hammarby Sjöstad is globally recognized as a model for green living, sustainable resource use, ecological design, and low-carbon transport. The integrated planning approach has a strong environmental focus on a closed-loop system of local energy, waste, water and sewage provision. This eco-city model maximizes the efficient use of all types of waste to generate energy and to minimize the impact on the environment. While the achievements of environmental sustainability tend to be high, the social aspects are much more challenging. The neighbourhood excels in green building practices, sustainable urban design and efficient social infrastructure, but lacks social diversity and affordable housing. The practical implementation of the eco-city model adopts a decentralized approach to energy production, requires significant coordination of infrastructure systems (energy, water, waste and transport), substantial public investment and effective municipal institutions to coordinate, plan and implement development. While such synergies between all urban systems are beneficial for sustainable community planning, the practical adoption of such policies and principles in Canadian municipalities may encounter significant regulatory and fiscal barriers.

**RÉSUMÉ** Le quartier Hammarby Sjöstad à Stockholm est reconnu à l'échelle mondiale comme un modèle de mode de vie vert, d'utilisation durable des ressources, de conception écologique et de transport à faible teneur en carbone. L'approche de la planification adoptée privilégie l'utilisation d'un système en circuit fermé respectueux de l'environnement intégrant énergie locale, eau, déchets et eaux usées. Ce modèle d'écoquartier maximise l'emploi rationnel de tous les types de déchets dans le but de produire de l'énergie et de réduire les impacts sur l'environnement. Si les réalisations en matière de durabilité écologique sont généralement importantes, les avantages sur le plan social sont plus discutables. Ainsi, le quartier excelle sur le plan des méthodes de construction écologique, de l'esthétique urbaine durable et des équipements collectifs efficaces, mais il lui manque diversité sociale et logements abordables. L'application pratique du modèle de cité écologique prévoit une approche décentralisée de production d'énergie, exigeant un travail considérable de coordination du système des infrastructures (énergie, eau, déchets et transport), d'importants investissements publics et des institutions municipales efficaces pour assurer la coordination, la planification et la mise en œuvre du développement. Bien qu'une telle synergie entre tous les systèmes urbains soit bénéfique pour l'aménagement communautaire durable, l'adoption concrète de ces politiques et principes dans les municipalités canadiennes pourrait être freinée par des obstacles réglementaires et fiscaux majeurs.

**E**xperiments with sustainable community planning are an integral part of Canadian planning practice in the last decade, driven by a commitment to green developments, healthy living and renewed emphasis on environmental protection. Many provinces have provided supportive policy frameworks and planning guidelines to assist their municipalities in preparing for community sustainability. Municipalities have responded with development and implementation of sustainable community plans with immense variety in the scope and scale of these efforts.

**Opening Spread:** Example of market and social rental housing integrated with condominium developments.

**Facing:** storm water canal

Despite such positive momentum, examples of comprehensive and integrated models of sustainable communities are limited (e.g., Waterfront Revitalization Project, Toronto or South East False Creek Development in Vancouver).<sup>1</sup> Studies point to many barriers for effective implementation such as inconsistent and less integrated land use and transportation planning procedures, municipal investments in infrastructure that do not support alternative energy

supply technologies (renewable, waste energy and district heating), regulatory by-laws (drainage control, subdivision and development control, development agreements) that impede desired sustainable development patterns and result in cumbersome approval processes.<sup>2,3</sup> While many of the "building blocks for sustainable communities" include a variety of planners' tools, fiscal barriers for effective implementation relate to lack of economic incentives and sustainable



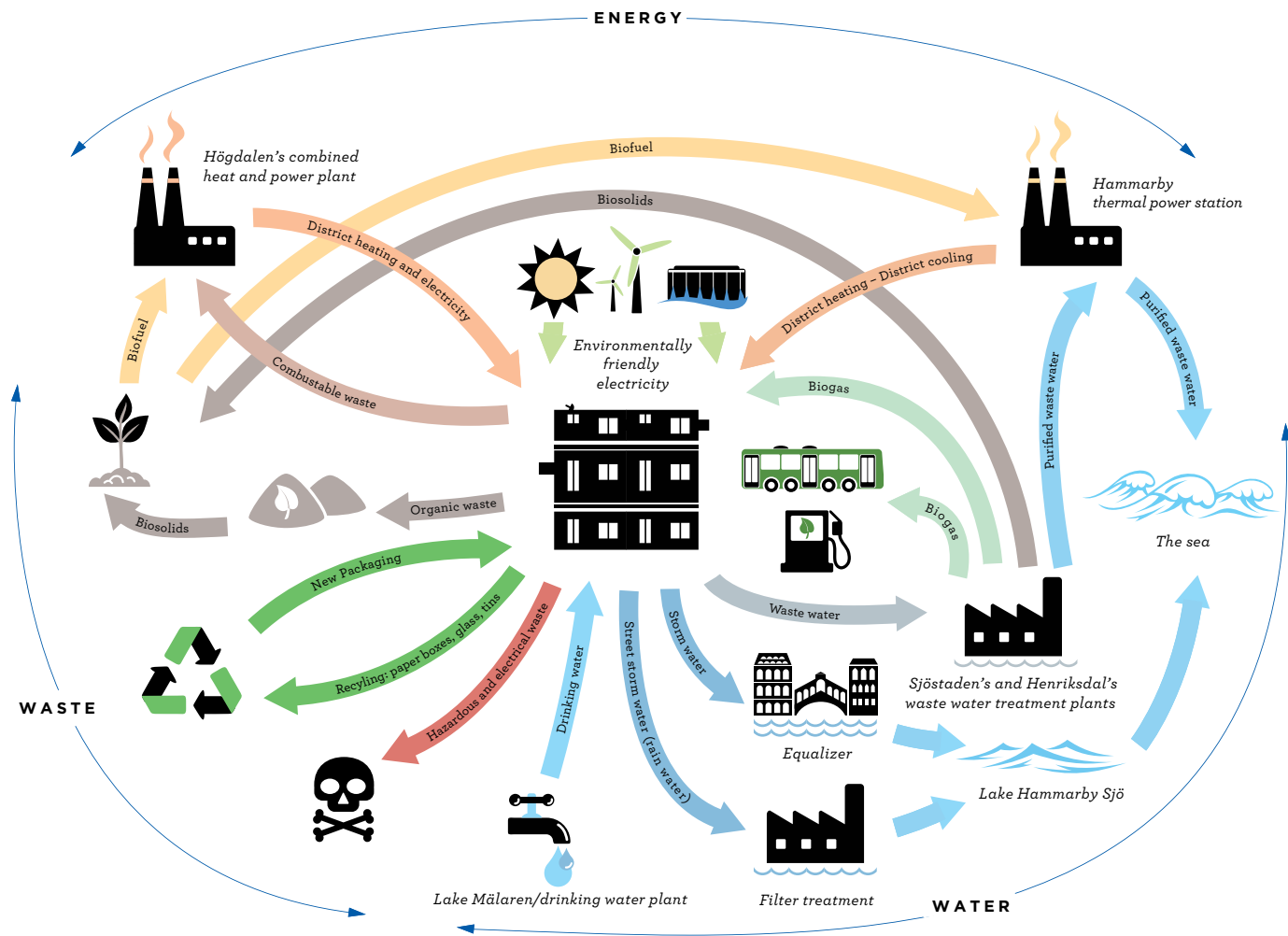


Figure 1: Hammarby Eco-City Model

funding to implement sustainable community plans. In a context of budgetary restrictions, short-term economic interests over long-term sustainability considerations often take precedent.

The objective of this article is to explore the development of Hammarby in Stockholm focusing on achievements in environmental and social sustainability. It highlights key features of its integrated planning process that has inspired sustainable community design in France, England, Canada, Russia, China and India. The development offers important lessons on ways to overcome some of the regulatory and fiscal barriers for implementation in Canadian municipalities. Critical to its success is the presence of a long-term vision for sustainability (economic, environmental and social), strong political will and leadership from the municipality, collaboration with municipal infrastructure companies on effective implementation of sustainable technologies to reduce, reuse and recycle natural and energy resources, as well as a clear hierarchy of design guidelines that promote high-density, mixed-land uses, social integration and high quality urban design. The research builds on the work on sustainable community planning at the University of

Calgary, directed by Sasha Tsenkova, and her collaboration with colleagues from the Royal Institute of Technology in Stockholm, where the Hammarby model was designed. Research findings draw on interviews with Hammarby's planners and architects while Sasha Tsenkova was a visiting professor at Södertorn University, Stockholm in the summer of 2012.

#### PLANNING FOR ENVIRONMENTAL SUSTAINABILITY—THE ECO-CITY MODEL

Hammarby Sjöstad is a former industrial harbour area converted into a sustainable community through a holistic approach to planning. It has taken 15 years to develop and is close to its target of 11,000 residential units with 25,000 residents on 130 hectares of land.

Hammarby uses an integrated, holistic, closed-loop system operating at the neighbourhood/community scale. This eco-city model maximizes the efficient use of all types of waste to generate energy and to minimize the impact on the environment (see Figure 1). High urban densities of 150 people per hectare and land use mix also enhance the effectiveness of the system.

The integrated energy-waste-water system has resulted in a reduction of non-renewable energy use by 28-42% and in reduction of CO<sub>2</sub> emissions by 29-37% compared to Stockholm average. A number of planning strategies and design features reduce water consumption by 41-46%, while recycling systems divert 90% of the waste from the landfill.<sup>4</sup> With respect to energy production, the Hammarby Sjöstad plan ensures that half of the energy supply is from renewable resources. A district heating system, powered by waste and biofuel, is complemented by biogas and heat produced by the water treatment plant. Embedded in the design of buildings are micro-generating technologies—PV and roof solar collectors and solar cells. All aspects of the water system including storm water, urban runoff, and sewage use close-loop principles. Storm water and runoff are handled through a series of canals and catchment basins, which allow local treatment by filtration and sedimentation, along with natural processes of attenuation and infiltration.<sup>5</sup> Green roofs and landscaping minimize runoff and reduce the building heat effect. A wastewater treatment plant services the community, removing 95% of the phosphorous, while extracting biogas and biosolids. Sewage is turned into biofuel, used to heat and

cool homes, as well as run water treatment facilities. A pneumatic system for collecting solid waste and refuse leads to a more flexible street design and space savings for waste management facilities. Residents separate waste at the source, while the pneumatic system deposits the waste in a central facility. Although initial investment costs are almost twice that of conventional waste collection systems, operational costs can be reduced by two-thirds.<sup>6</sup> An environmental centre—GlashusEtt—runs educational campaigns for residents, enhances energy-water-waste conservation behaviour and is a vital community resource promoting sustainable lifestyles.

#### PLANNING FOR SOCIAL SUSTAINABILITY

The planning approach in Hammarby Sjöstad emphasizes a commitment to healthy living, social integration and equity. The implementation is facilitated by a strong governmental role in planning and a political climate favouring equity in Sweden, a country with a long-standing system of socialist democracy and commitment to sustainability. The plan relies on creating a land use mix in high-density urban blocks, on integrating employment opportunities to minimize

Above: Pneumatic waste collection systems.





Public realm design encourages healthy living and social interaction.

the work commute, as well as on providing a diversity of housing options (rental vs. owner-occupied) to enhance a social mix.

Public spaces include parks, plazas, educational institutions, recreation and health care facilities, as well as child and senior amenities. These elements of neighbourhood social infrastructure are integrated with the waterfront and a system of green spaces (40% of the land), including a linear park, forest reserve, courtyards and playgrounds. The community is walkable with a permeable system of streets and pathways that connects a number of places for social interaction and large-scale, multi-functional buildings built along major tram and bus routes. Hammarby Sjöstad strives to be a healthy place for residents, with emphasis placed on “delight” as a commodity.<sup>7</sup> The neighbourhood is designed to balance public and private life and offers many therapeutic spaces through public art, quiet zones, arts and cultural centres. Substantial investments have been made in public transport as part of the overall objective of creating an eco-friendly neighbourhood that is affordable to residents. Over 95% of residents commute to work by public transport, on foot, or by bicycle. The eco-friendly adaptation involves investments in a new tram line (Tvärbanan), ferry, cycling and pedestrian infrastructure.<sup>8</sup> In line with sustainable modal choices in Stockholm, the neighbourhood operates a car sharing program and a number of bicycle sharing facilities.

The provision of housing options to enhance a social mix in Hammarby Sjöstad has been less successful. The plan aims for equal distribution of rental and owner-occupied apartments. Such targets are implemented through municipal ownership of the land and negotiations with private and public housing developers, common in the Swedish planning system. For example, the policy of the left-green coalition is to allocate 50% of the land to companies building rental housing (market and social housing), as an instrument enhancing affordability and social mix.<sup>9</sup> Some of the newly built social housing is for students and households with special needs. Changes in government subsidy policy, in addition to developments in Stockholm’s housing market, have affected the price of new housing and its affordability. The neighbourhood today has an upper middle class profile without the social

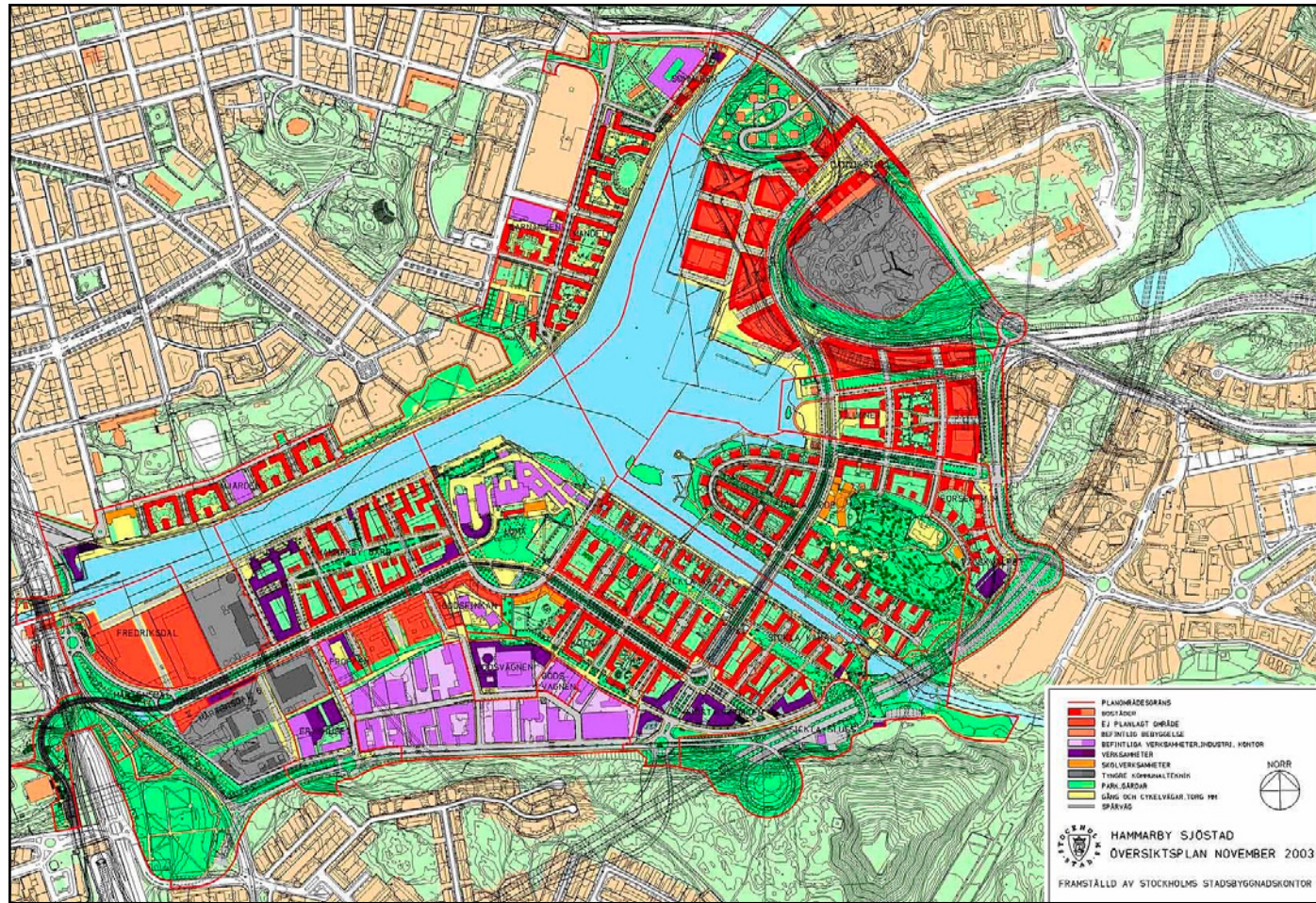


Figure 2: Hammarby Sjöstad Master Plan

diversity necessary to enhance social sustainability. Compared to the rest of Stockholm, average income is 20% higher and the percentage of immigrants is 50% lower.

#### INTEGRATED PLANNING POLICIES FOR SUSTAINABILITY

The development of Hammarby Sjöstad would not have been possible without the political will and the effective leadership of municipal planning institutions. Hammarby's planning process is led by an interdisciplinary team responsible for the financing, design and implementation of development in the area. The team is also responsible for soil decontamination and the construction of bridges, utility services, streets and parks. The planning and development process includes a variety of regulatory instruments (municipal ownership of the land, master plans, detailed plans and developer agreements) as well as subsidies and incentives. Master plans are drawn up, building permits given and contracts signed in line with environmental objectives and planning targets. The stakeholders compete, negotiate and co-operate to implement new methods and solutions in the development process.<sup>10</sup>

The design process has a high degree of municipal leadership, which permeates all phases—from the Master Plan to the design control of individual buildings. The design process starts with a strategic Master Plan by Stockholm's City Planning Bureau. This is followed by a competitive design process of "parallel sketches" by three to four architects/planners used to develop detailed Master Plans for each of the 12 districts. To complement the detailed plan, the City planning and design team then prepares a comprehensive design code for each sub-district, in close partnership with the chosen developers and architects. The aim is to establish a level of quality for the development that both the City and developer agree on.

The development uses subsidies from the Local Investment Program offered by the Swedish national government that encourage municipal engagement in an ecologically sustainable society, while at the same time providing jobs. Stockholm received SKK 678 million (67 million Euros), to support eco-city projects, SKK 200 million of which was designated for Hammarby. The subsidy is a small share of the total investment in the neighbourhood estimated at SKK 5.7 billion.<sup>11</sup> Municipal housing companies invest in social housing, which is about 20% of the total housing stock.

Such socially responsible developers allow the municipality to implement effectively its environmental and design guidelines as well as to leverage municipal infrastructure investment through public-private partnerships.

#### LESSONS FOR CANADIAN PLANNING PRACTICE

The brownfield project of Hammarby Sjöstad is internationally recognized as a good practice in sustainable community planning, mostly due to municipal planning coordination of different urban systems to achieve a common goal. The goal is to create a residential environment based on sustainable resource use, where energy consumption and waste production are minimized, and resource saving and recycling are simultaneously maximized. The practical implementation of the eco-city model adopts a decentralized approach to energy production, requires significant coordination of several infrastructure systems (energy, water, waste and transport), substantial public investment and effective municipal institutions to coordinate, plan and implement development. Such goals are often encountered in the sustainability plans of many Canadian municipalities, but the approach tends to be less comprehensive and to some extent embedded in the rhetoric of New Urbanism, Transit Oriented Development and Smart Growth policies.

While it might be challenging to achieve the metrics of environmental sustainability embodied by the closed loop eco-city model, many municipalities can adopt the integrated approach of holistic planning for more sustainable development. Well-functioning institutions and strong municipal leadership are crucial in this respect as well as coordination of public and private sector investment. The eco-city concept is systemic, emphasizing the importance of synergies between all parts that make up a sustainable community—energy, waste management, water, transport, landscape planning, sustainable architecture and urban design. These sectors typically live their own lives independent of one another, while an integrated approach finds links between the sectors and their system investments in order to optimize the development results. Such synergies between all urban systems in the city support more effectively a vision of a modern, people-focused, prosperous, climate-neutral and environmentally sustainable society. The practical adoption of such policies and principles in Canadian municipalities, however, may encounter significant regulatory and fiscal barriers.

The planning concept is linked to ecological thinking in terms of reforming water and sewage technology, recycling, keeping environmentally sound materials in mind, and heating buildings with renewable fuels. This may require significant upfront

investment in such systems, as well as provision of extensive transit services, a high quality public realm and affordable housing to enhance social sustainability. Municipalities, public authorities, planners, universities, private developers and other networks need to come together to share knowledge, skills, and organizational muscle. Questions of legislation and its implementation, of decision-making, of new targeted fiscal incentives for effective implementation need to be addressed. Such a collaborative approach can identify relevant synergies and lead to more cost-efficient results. ■

**SASHA TSENKOVA, PHD, MCIP**, is Professor of Planning at the University of Calgary. She is the author of six books and many articles on comparative planning issues and Director of the Cities, Policy & Planning lab (<http://www.ucalgary.ca/cities/>). Her current research interests include planning of sustainable communities, green urbanism and affordable housing. She can be reached at: [tsenkova@ucalgary.ca](mailto:tsenkova@ucalgary.ca)

**TIGRAN HAAS, PHD, CNU, APA**, is Associate Professor of Urban Design and Planning at the School of Architecture and Built Environment of KTH Royal Institute of Technology in Stockholm. He has published extensively on green urbanism and urban social sustainability. He can be reached at: [tigran.haas@abe.kth.se](mailto:tigran.haas@abe.kth.se)

#### REFERENCES AND NOTES

- Tsenkova S, editor. *Planning Sustainable Communities: Diversity of Approaches and Implementation Challenges*. Calgary: Faculty of Environmental Design, University of Calgary, Cities, Policy & Planning Research Series; 2009. Available at: <http://www.ucalgary.ca/cities/>
- Blais P. *Perverse Cities. Hidden Subsidies, Wonky Policies, and Urban Sprawl*. Vancouver: UBC Press; 2011.
- Grant J. Theory and practice in planning the suburbs: challenges in implementing new urbanism, smart growth, and sustainability principles. *Planning Theory and Practice* 2009;10(1):11-33.
- Svane Ö. Situations of opportunity—Hammarby Sjöstad and Stockholm's city process of environmental management. *Corporate Social Responsibility and Environmental Management* 2008;15(2):76-88.
- Pandis S, Brandt N. *Utvärdering av hammarby sjöstads miljöprofilering—vilka erfarenheter ska tas med till nya stadsutvecklingsprojekt i Stockholm?* Research Report. Stockholm: The Department of Industrial Ecology, Royal Institute of Technology; 2009.
- City of Stockholm. *City of Stockholm Development Office, Hammarby Sjöstad—a unique environmental project in Stockholm*. Produced by GlashusEtt; 2007. Retrieved from Hammarby Sjöstad at: [http://www.hammarbysjostad.se/inenglish/pdf/HS\\_miljo\\_bok\\_eng\\_ny.pdf](http://www.hammarbysjostad.se/inenglish/pdf/HS_miljo_bok_eng_ny.pdf)
- Iverot S, Brandt N. The development of a sustainable urban district in Hammarby Sjöstad, Stockholm, Sweden? *Environment, Development and Sustainability* 2011;13:1043-64.
- Foletta N. Case Study: Hammarby Sjöstad. *ITDP. Europe's Vibrant New Low Carbon Communities* 2011:30-45.
- Vestbro DU. Conflicting perspectives in the development of Hammarby Sjöstad, Stockholm. Retrieved from: <http://www.infra.kth.se/bba/HamSjostad.pdf> Recent phases have almost 100% rental accommodation, while earlier ones include predominantly condominiums. A condominium flat built during the first phase was sold for SEK 8,000 per sqm compared to SEK 30,000 per sqm in the most recent phases.
- Crewe K, Forsyth A. Compactness and connection in environmental design: insights from ecourbs and ecocities for design with nature. *Environment and Planning B: Planning and Design* 2011;38(2):267-88.
- Maleitzke AS. *Sustainable Development in the Case of Hammarby Sjöstad, Stockholm*. Stockholm: MN SPAN Association; 2007.