

# Eco-neighbourhood Planning in Greece

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## ABSTRACT

The research examines the viability and feasibility of eco-neighbourhood planning in Greece. Eco-neighbourhoods demonstrate a holistic approach to sustainability with a threefold objective: contribution to tackling climate change, meeting the increasing housing demand, and promoting innovation by fostering 'green' entrepreneurship. To date these environmental, social and economic benefits have not been fully explored. The paper sets standards for the eco-neighbourhood scale, location and performance characteristics and reveals the main barriers to such eco-developments. Furthermore, a national strategy is proposed for their uptake, which includes policies that could facilitate the coordination between social, government, administrative and scientific bodies, along with a portfolio of specific actions to channel the project management.

*Keywords: Eco-neighbourhood planning, sustainability, buildings, government policy, financial mechanisms, green technologies, public awareness.*

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## 1. INTRODUCTION

Sustainable urban communities in Europe are gradually considered as a core component of strategic urban planning aiming to reduce the carbon footprint and boost well-being and business opportunities. German cities, such as Freiburg, Berlin, Heidelberg, and Hamburg; Swedish urban areas, such as Malmö, Växjö, and Hammarby Sjöstad, as well as, Copenhagen, the Eco-Viikky district in Finland, the London Borough of Sutton, Leicester, and the UK eco-town initiative [1,2] are only few examples planned to enhance sustainability at local level incorporating green buildings; reduced automobile dependence and eco-friendly public transportation modes; waste and water management systems; agricultural land conservation and biodiversity; and the proximity of community facilities, such as health service, food supply and schools [3,4]. In this context, this paper focuses on a pilot implementation of eco-neighbourhood planning in Greece and the subsequent government strategy for a successful delivery.

## 2. METHODOLOGICAL APPROACH AND JUSTIFICATION FOR RESEARCH

Little research has been conducted into the potential of sustainable communities in Greece to date. The eco-neighbourhood model attempts to add value in two areas. First, it introduces eco-neighbourhoods as a step further than existing 'eco-houses' or 'zero-carbon homes', following community-based schemes to promote sustainability. Second, the motivation of this work is to keep a record of all existing eco-projects run in a community-based context and to justify how Greece will be benefitted by integrating eco-neighbourhoods into its urban planning policies. For these two reasons, a descriptive methodology is employed relying mostly on qualitative data. The initial step is a literature review focusing on European best practice, followed by fieldwork in Greece to gather data from different stakeholders<sup>(1)</sup>. Thereafter, data analysis leads to the formation of the eco-neighbourhood model, the barriers and the government strategy for such eco-development.

At present, there are 4.5 million houses in Greece with an average annual addition of 250,000 new-builds [5]. There has been also a recent reduction in household size to 2.6 people and an annual growth rate in the total population of around 1.3% [6]. In addition, 35% of the current building stock needs modernisation as it was constructed before 1970 and renovation in buildings is also mandatory to comply with the European

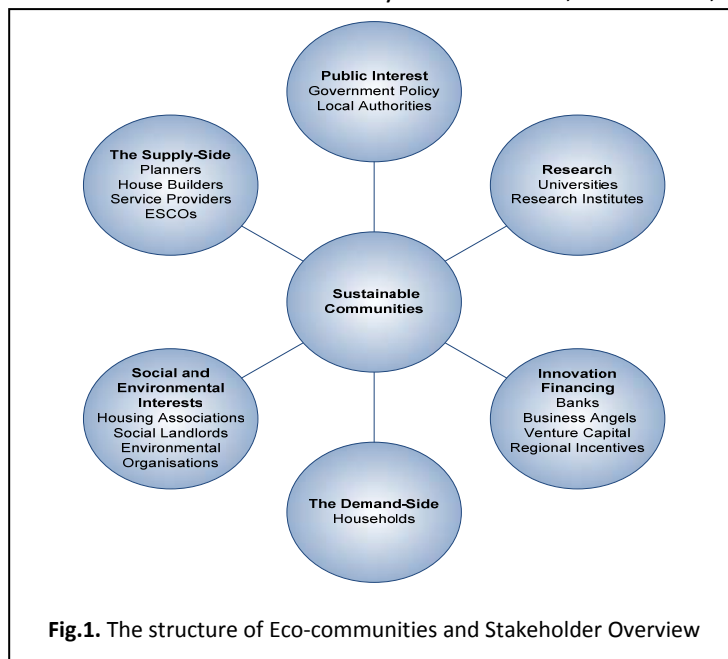
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<sup>(1)</sup> A portfolio of interviewees was selected from positions in universities, research institutes, advisor bodies, government departments, companies and non-governmental organisations during March 2009.

Performance Building Directive (EPBD) 2002/91/EC [7,8]. The Government should ensure quality standards to meet the ongoing housing demand and promote new technologies to upgrade the built environment. The eco-neighbourhood model could have added-value by contributing to the challenge of climate change and facilitating the transition to a 'green' economy through energy efficiency and new market prospects. Eco-neighbourhoods could become a 'next generation' product in the real estate market boosting employment and collaborations between private and public interests.

### 3. LITERATURE REVIEW: EUROPEAN BEST PRACTICE

Freiburg and the UK eco-town plan have been selected as case studies in a comparative analysis, which highlights the key stakeholders involved and the effective policy drivers in sustainable communities. An eco-town is defined as a community of between 5,000 and 20,000 residences [3], following the rule of the four



Rs: 'reduce; re-use; recycle; and recover' [9]. Eco-neighbourhoods are miniature eco-towns with size and location being principal factors in planning. Eco-neighbourhoods of around 1,000 homes is a scale parameter that brings greater economies of scale to the system, namely space for centralised planning of energy uses, transport, waste and water networks, proximity to jobs and community facilities [10,11]. There are six groups of stakeholders formulating the structure of an eco-community (see Fig.1). European best practice demonstrates win-win partnerships between the delivery stakeholders. Political leadership, innovative thinking and top-down policies stimulates a bottom-up approach that provides homes for all types of residents and has created a balanced community [12]. Financing of eco-

projects is secured through robust Public-Private Partnerships (PPPs) and the importance of Small-Medium Enterprises (SMEs), and especially service companies, in launching financial incentives for households is also highlighted.

### 4. THE ECO-NEIGHBOURHOOD CONCEPT IN GREECE

#### 4.1 Background and Policy Drivers to Urban Built Environment

The Greek building stock accounts for around 40% of total energy consumption and has a greater deficiency in energy performance than the transport and industry sectors [5,13]. Until 2008, Greece had only two basic pieces of national legislation to regulate the building stock: the *Thermal Insulation Regulation (1979)* and the *General Building Code (1985)*. The former identifies the minimum insulation standards for all types of buildings; the latter indicates best practice for construction methods [14]. In 2008, Greece managed to incorporate the EPBD 2002/91/EC into national legislation [15], after a three-year grace period given by the EU.

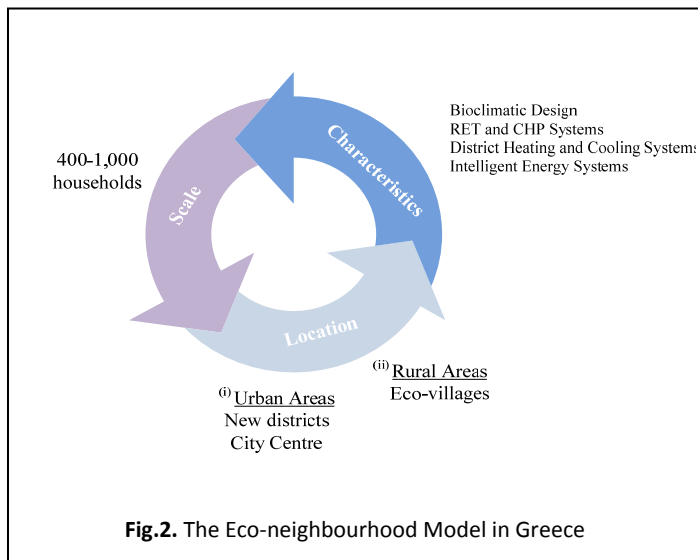
#### 4.2 Existing Eco-community Projects

Fieldwork results suggest that Greece has, primarily, individual eco-buildings to date. The few existing community-based projects concern eco-villages, urban eco-neighbourhoods, cities with district heating systems or green building blocks, which represent the individual efforts of local authorities and not parts of a central action plan.

The *Solar Village 3 (SV3)* in Pefki, a suburb of Athens, is a social housing estate of 435 homes, 30 buildings and approximately 1750 tenants, built in the 1990s. SV3 was an intergovernmental agreement between Greece and Germany with the Greek Workers' Housing Association as contractor, namely the main public body responsible for social estate policy. All houses employed bioclimatic architecture principles (south-facing facades and high insulation) and innovative solar systems, which were aimed at reducing energy demand for heating, cooling and domestic hot water. The village included a solar information centre, commercial and community facilities [16]. To date, this has been the only substantial effort towards eco-neighbourhood planning of this scale in Greece.

### 4.3 The Eco-neighbourhood Model

Eco-neighbourhoods have different scales; projects may constitute fractions, whole or multiple neighbourhoods. Fig.2 illustrates the key issues of scale, location and features of such projects in Greece. A



sufficient size would be between 400 and 1,000 residences. Eco-neighbourhoods would fit better close to urban areas, where the largest bulk of buildings exists and air quality should be improved [9]. The first projects could be developed in greenfield areas, usually suburbs of the city plan, as it would be cheaper to apply eco-neighbourhood standards to new-builds [17]. In addition, planners should consider a regenerated district model by retrofitting housing estates in more central locations, so that to provide options and deliver homes to different types of residents. The regeneration of brownfield areas should also be promoted, especially in degraded rural districts with low income inhabitants [16]. Although air quality in

such areas is significantly better than in the urban environment, there are fewer constraints on land use, which facilitate their demonstration phase. Planners and developers should take advantage of the thermal mass of buildings through passive solar building design, use of new materials, high levels of insulation in walls and roofs, and high-quality glass in windows and openings. Apart from district cooling and heating systems, and microgeneration with the use of Renewable Energy Technologies (RET) and/or Combined Heat Power (CHP) plants, eco-neighbourhoods should also be linked to the promotion of the digital city and smart growth via Information and Communication Technologies (ICT). Clusters of 'green' buildings offer an opportunity for energy management systems. For instance, smart metering bundled with complementary services could be an effective way of monitoring the energy consumption of the building stock [16] with direct benefits for the consumers, such as fuel bill reductions, remote metre control, accurate data and consumption records.

## 5. BARRIERS TO ECO-NEIGHBOURHOOD PLANNING

The barriers that Greece would most likely face in its effort to deliver eco-neighbourhoods are similar to the ones encountered with the roll-out of RET. Fieldwork results reveal that bureaucracy ranks first, as a result of an ambiguous government policy, accounting for 36% of all eco-neighbourhood planning issues. The second hurdle, with a share of 31%, is the lack of guaranteed financing in both the public and private sectors, especially in an era of economic recession. A deterrent for private investments is based on the high risk factor of the 'eco-neighbourhood' novelty and Greece needs time to obtain the know-how needed, so such projects will have long time-to-market periods. Another key factor, holding a level of 16%, is the need for standards or amendments to existing regulations in buildings. Greece still has a mindset of merely complying with the EU obligations and not surpassing them showing low priority to issues related to the building sector.

Lastly, modern standards of living have influenced Greek society, causing people to become individualistic and to adopt a Not-In-My-Back-Yard (NIMBY) syndrome and there is also an ambiguity in defining the assigned roles between government authorities, land owners, the financing sector, contractors, service companies, landlords and tenants.

## 6. POLICY RECOMMENDATIONS

### 6.1 Overall Government Strategy

The insights gained during the fieldwork and the general structure of the Greek Public Administration were the primary data in formulating a strategic plan for the accession of eco-neighbourhoods to the Government's agenda. The strategy is based on four pillars: (i) targets of sustainable development, (ii) the organisational structure of eco-neighbourhood planning at national-level, (iii) a specific set of actions for local authorities, and (iv) the bodies that will carry out the projects. A target of delivering zero carbon buildings facilitated by the eco-neighbourhood development should be set with a planning horizon of at least by 2025. The social goal should be to deliver affordable homes to meet the increasing housing demand and the economic target would be to promote new technologies and boost the local economy. A decision-making unit should be established with the participation of the Ministry of Environment, Energy and Climate Change and the regional agents. This body will trigger a social debate with local authorities and environmental or social Non-Governmental Organisations, to ensure the common short- and long-term objectives of eco-neighbourhood planning. The holistic character of eco-neighbourhoods stresses the importance of collaboration, thus the social debate should also facilitate the creation of robust partnerships. It is essential that the demonstration projects are directed towards social housing, via a fixed percentage, as this will ensure the provision of affordable housing, render eco-neighbourhoods cost-effective, and simultaneously secure the environmental and scientific character of the projects. The Government should establish a 'Sustainable Housing Authority' (SHA)<sup>(2)</sup> to coordinate the eco-neighbourhood development and should pledge that projects meet [5]:

- Standards and sustainability metrics by enforcing new legislation and housing policies.
- Community involvement and social capital via the provision of social and affordable housing.
- The priorities of the Greek building sector and its overall energy and environmental performance.

Lastly, policy makers should consult experts from science and technology bodies to assess the feasibility and impact of their measures.

### 6.2 Specific Policies

There are six areas of policy-making that the overall strategic plan should promote. In each field, specific sets of action represent a change away from current policies and affect local authorities that will deliver eco-neighbourhoods.

1. Eco-neighbourhood initiative: A Planning Policy Statement (PPS) should be launched, announcing the demonstration phase of twenty eco-neighbourhoods delivered in six municipalities<sup>(3)</sup> by 2025. The PPS should give details on the list of projects, scale, location and characteristics, followed by an impact assessment of costs and benefits.
2. Municipal Sustainable Housing Corporation: In each recommended municipality, a local body supervised by the SHA should be established so that to direct the roll-out of the projects. The Municipal Corporation should commission to house builders and local Energy Service Companies (ESCOs) the construction and energy management of the eco-neighbourhood projects and will also be responsible for monitoring the energy performance of the entire local building sector.

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<sup>(2)</sup> The SHA should be categorised within the newly-established Ministry of Environment, Energy and Climate Change, as it is the most appropriate body to oversee eco-developments.

<sup>(3)</sup> The proposed municipalities to carry-out the eco-neighbourhood projects are Athens, Thessaloniki, Komotini, Volos, Kozani and Iraklion and their selection is a result of their background in terms of housing policies, natural resources and technical capabilities.

3. *New Technologies Initiative*: The eco-neighbourhood planning is bolstered by the competitive advantage of a Mediterranean climate that facilitates the deployment of RET, as their exploitation could contribute substantially to energy security and diversification of supply [5]. Therefore, the Government should mandate a percentage of electricity generation deriving from RET in the proposed municipalities. In parallel, the link between green buildings and ICT should become mandatory through smart meters (or similar strategies) fitted in all homes and commercial buildings within eco-neighbourhoods and all existing or newly-built public buildings in the selected six municipalities.
4. *Financing Mechanisms*: With regard to public subsidies, some local authorities have 'Local Development Funds' to subsidise eco-neighbourhoods partially or wholly. Nevertheless, since Government funds are limited, alternative funding sources have to be explored via collaborations with private companies or European funding programmes. Specific financial vehicles concern: (i) the provision of standard market conditions, such as a fixed-price scheme given the inflation rate, to social housing organisations and house builders; (ii) the mandatory participation of local ESCOs, where the Government should set the exact percentage of their involvement in the eco-neighbourhoods projects and facilitate capturing third-party financing for ESCOs through favourable banking loan schemes; (iii) further participation in relevant European pilot projects.
5. *Green Building Code*: All new buildings (both residential and commercial) and all existing public buildings of the recommended municipalities should achieve eco-neighbourhood building standards. This will render cost-effective the exploitation of RET and construction of central energy networks, and also foster the uptake of housing policies in conventional buildings demonstrating the sustainable character of the area. In addition, the delivery of new city master plans for these areas should be speeded up, so that the general building guidelines are aligned with the eco-neighbourhood development.
6. *Promotion of Eco-neighbourhoods*: The Government should advertise the benefits of the new housing models so that to capture the interest of other municipalities, fostering motivation for such settlements via network effects.

## 7. CONCLUDING DISCUSSION AND FUTURE WORK

The proposed model makes three unique contributions and represents an opportunity for launching an eco-innovative concept in the Greek building sector. Initially, eco-neighbourhoods are a step further than existing individual eco-houses following community-based schemes to promote sustainability. These settlements could address the ongoing housing demand and help the country meet and surpass its European building obligations. In addition, there are new market prospects through PPPs and the involvement of ESCOs in such projects. 'Green' entrepreneurship could bolster local economies and also save money for residents through energy efficiency. In parallel, the need for high building standards could facilitate the commercialisation of new technologies in the Greek market. Lastly, the proposed strategy has a long-term perspective and aims to create in-house know-how on sustainable communities via 'learning-by-doing'.

There are uncertainties due to the project's novelty, which could threaten the viability of the proposed strategy, especially in the cost assessment of the policy recommendations. Moreover, similar models with specific targets and milestones should be drafted for the other components of the eco-neighbourhood model; namely transport systems, water and waste management, as this work mainly focuses on the building sector. Thereafter, an effective integration of all areas should be pursued in order to achieve the most appropriate and effective policy mix for Greece. Therefore, this work is the first step in a series of actions to meet the eco-neighbourhood challenge, setting the foundation for its gradual planning and emphasising the need for further multidisciplinary research.

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