

# Sustainability Research and Training Program

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## Planned Communities with a Sustainability Focus: Egyptian Case Studies

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**Sustainability Research and Training Program (SRTP)**  
**“Promoting a Culture of Sustainability at *The Sustainable City*”**  
**A joint project of UC Davis and AUC**

**Project Report Number 2.**

**PLANNED COMMUNITIES WITH  
A SUSTAINABILITY FOCUS:  
Egyptian Case studies**

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## Executive Summary

This is the second report of the project “Promoting a Culture of Sustainability in *The Sustainable City*.” The previous report examined best practices for achieving sustainability in planned development communities internationally since the 1980s. This report narrows the focus and examines in detail three planned development communities in Egypt that claim to have a sustainability focus. Each Egyptian community has employed different approaches and faced different challenges, in its journey towards sustainability. On their own, the three case studies presented here are of significance, because they illustrate the diverse approaches and challenges to building sustainable communities in the Egyptian and Middle Eastern Context. In a more narrow sense, however, we selected these cases as comparisons for the case of The Sustainable City (TSC) being developed in Dubai, United Arab Emirates. The third report will focus primarily on TSC and how relevant findings from the previous reports may be applied to promote a culture of sustainability within the emerging TSC community. Like the cases presented in this report, TSC is a mixed-use, but primarily residential, community planned and developed with a strong focus on sustainability. In contrast to these cases, however, the sustainability focus at TSC was a goal driving the physical, economic, and social designs for the community from the beginning. In this sense, TSC continues to be unique in the region. In the Egyptian cases, sustainability was clearly subordinate to other concerns when the developments were in the planning stages, although sustainability was later adopted as a hallmark of success by each during their implementation phase. Another contrast with the Egyptian cases is that TSC is young, and the first residents are only now entering their second year of living in TSC. The youngest of the Egyptian cases has had residents since 2008 and the oldest since 1990.

This report starts with an introduction that links the first report titled “Characteristic Features of Planned Communities with a Sustainability Focus” and this report. The introduction explains our approach and data collection methods, which relied on collecting primary data through direct observations and interviews. We present our approach towards analyzing each case study and the main questions that we addressed in our fieldwork. A few examples are: Who is leading the sustainability efforts? What specific initiatives are underway? How do the residents perceive the community? And what sustainability issues does the community face?

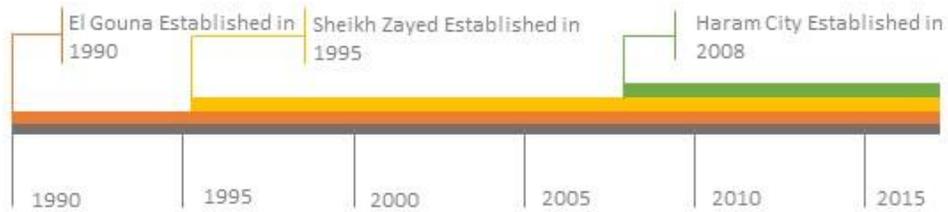
The first community is “El Gouna”, a coastal town that was developed in the early 1990s and continues to be managed by the same private real estate development company. The report tracks how the town adopted a sustainable vision during its first decade of operation. The key to the sustainability strategy of El Gouna is the strategic shift from being a resort destination community to being an integrated community of permanent residents. Given its geographic location, it is not surprising that El Gouna has a strong focus on resource management, and the operators track and analyze residents’ water use, energy consumption, and waste production closely. The report describes the different perceptions of sustainability and its significance to their daily behavior and lifestyles of a diverse population. We also look into the question of

community integration and social engagement among different social groups and categories in the community.

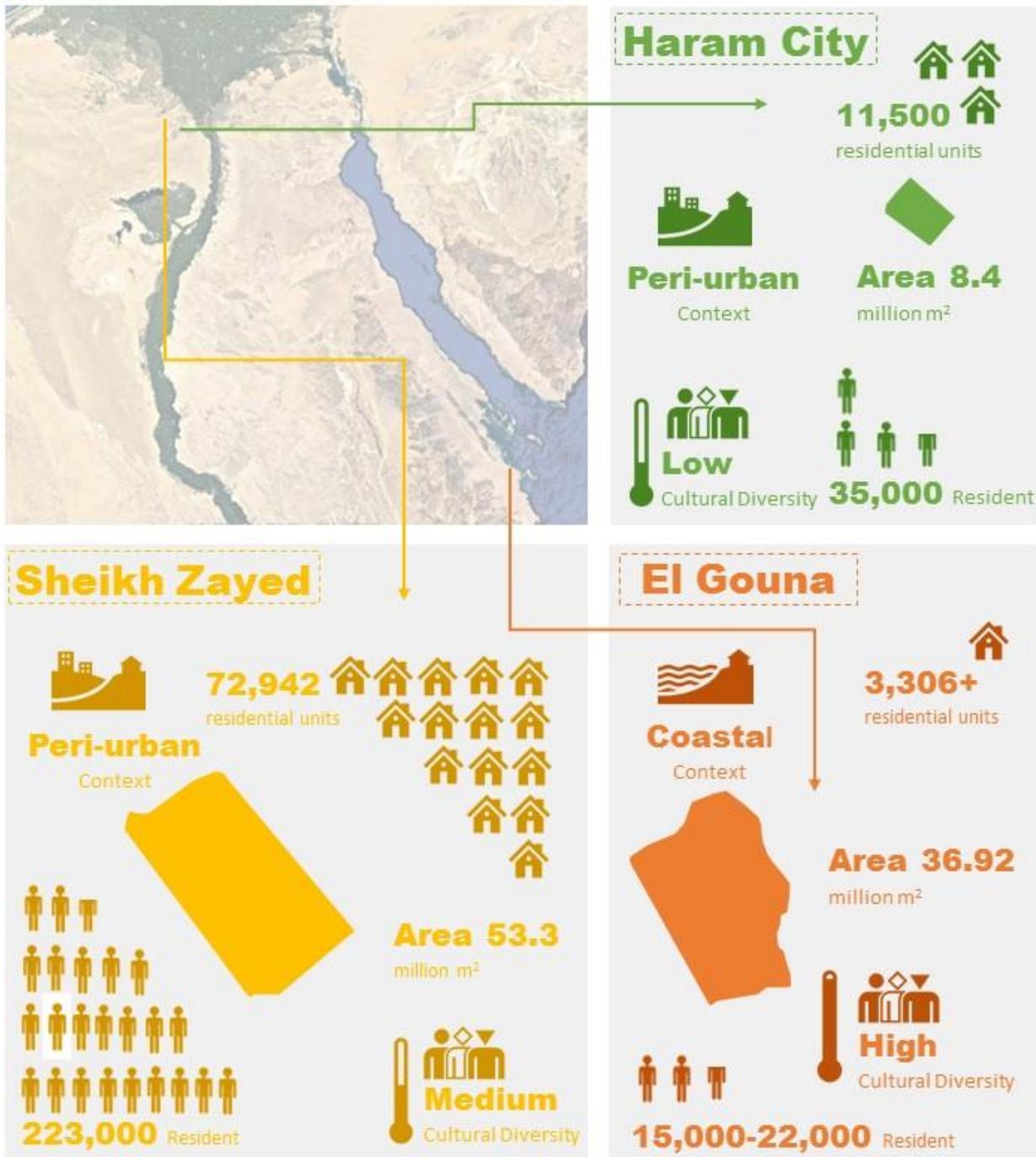
The second community examined is “Sheikh Zayed” City. It was developed in the late 1990s by the New Urban Communities Authority, a national government entity. The report tracks how the city reacted positively and forcefully to a national policy shift in the direction of sustainable cities. The case illustrates how government sustainability efforts emphasize the provision of basic services and spreading awareness within the community. It also highlights the challenges faced in reaching out to and engaging with different segments of a community with considerable socio-economic diversity.

The third community “Haram City”, is special because it combines features of the other cases. It is Egypt’s first private sector social housing project, built as a gated compound where low and low –to medium-income earners can enjoy an improved lifestyle than would otherwise be available to them. Since the private developer is from the same group of companies and the developer of El Gouna, Haram City has many of the same distinctive features, including attention to sustainability. However, in contrast to El Gouna and also Sheikh Zayed, the dimension of sustainability of most significance in Haram City is the social dimension, as opposed to the environmental or economic dimension. Perhaps ironically, we found that in Haram City, which includes low-income families as residents, sustainability is closely connected to creating local employment and income generation opportunities along with the provision of basic services.

Finally, we compare and contrast the three communities in terms of their visions, the role of the management, the socioeconomic compositions, and the challenges they face. None of the communities emerged exactly as planned but they all managed to adapt to the setbacks and challenges while maintaining their visions of sustainability. However, it is clear that in each case sustainability is a vision and program of change originating from the governing entity that was imposed on the community members. Management-led sustainability sometimes failed to create a durable base of active residents that could contribute to maintaining sustainability initiatives or initiate new ones. All three communities faced problems making the transition from a period of growth and expansion to a sustainable, steady-state situation. In all three cases, management initially followed a business model based on financing community growth through real estate sales. In each case, this business model has proved to be unsustainable in the long run, and community managers are now devising alternative strategies to engage with the community members themselves in finding solutions to longer-term sustainability concerns.



## Egyptian Planned Communities With A Sustainability Focus



## Introduction

This report is the second of a series for the research project “Promoting a Culture of Sustainability in The Sustainable City”. The project is supported by a grant from the Sustainability Research and Training Program (SRTP) at the University of California, Davis. The SRTP is funded by Diamond Developers, the creators of The Sustainable City in Dubai. The research is jointly implemented by UC Davis and the American University in Cairo through its Research Institute for a Sustainable Environment (RISE).

The first report surveyed over 20 international communities that claimed to include sustainability in their design features. The team identified a list of best practices relating to sustainability in those communities and made some general observations concerning sustainability goals and indicators used by communities planned with a sustainability focus. The present report provides detailed case studies of three Egyptian communities that have adopted a sustainability focus. Egypt and the Gulf are the two regions of the Middle East and North Africa in which sustainability is receiving increasing prominence in development and community planning in both private and public domains. The Egyptian case studies were selected to serve in complementary comparison with The Sustainable City in Dubai and other recent communities planned with a sustainability focus in the Gulf. The Egyptian cases share a similar culture, social values, climate, and governance conditions with their Gulf counterparts. The three Egyptian case studies represent a diversity of visions, objectives, and implementation strategies on the part of their developers and planners. They also represent a range of financing and governance arrangements.

The first case is a gated mixed-use community operated by a private sector developer with a clear business plan. The second case is a new town developed by the central government that contains a diversity of residential neighborhood types. The third case is a purpose built gated community operated as a public-private partnership in the form of a BOOT project (Build, Own, Operate, and Transfer). These communities represent a diversity of purposes. The different purposes are reflected in the noticeable variations among and within each community in terms of the socioeconomic composition of the residents and community members. Similarly, the conceptualization and content of each community’s pursuit of its sustainability goal are different, although there are a number of common themes across all three cases.

The report describes how each developer envisioned sustainability and how the vision and implementation were affected by factors such as governance, wealth and income, social status, and cultural cohesion of the planned community. Each of the three cases lays claim to a goal of sustainability. While each community has a master development plan with a reasonably clear and well-articulated vision of what it wants to become and what purposes it will serve, and while each community has a fairly clear method for achieving its goals, none of the communities actually has a specific sustainability plan.

Sustainability objectives and best practices followed in Europe and North America, as reviewed in the first report in this series, while providing useful guidelines, may not necessarily apply to the Middle Eastern environmental, economic, and social contexts. Studying communities in their regional context is essential. Sustainability is about understanding and adapting to local conditions. Local conditions include environmental factors, economic circumstances, cultural and value systems. Specific cultural content influences how communities perceive and implement sustainable behavior. According to David Brocchi, “sustainable development means the change of the dominant monoculture of globalization into a diversity of cultures of sustainability”<sup>1</sup>. UNESCO’s Universal Declaration on Cultural Diversity emphasizes the importance of strengthening the relationship between cultural diversity and sustainable development<sup>2</sup>. Understanding local beliefs and values are pivotal to achieving sustainability objectives.

Our approach was first to understand the targeted communities’ basic cultural, social, and economic fabric (see annex 1). Since we found no published articles describing life in these communities, we relied on collecting primary data through fieldwork observations and interviews<sup>3</sup>. Secondary information, where available, is footnoted in the text.

For each case study, we briefly describe its history, the circumstances of its development, and the goals and objectives of the developer. We include general parameters regarding physical environments, population size, and relation to other communities (see annex 1). For each case, we explore who is leading the sustainability efforts and the specific initiatives underway. Moreover, we examined the residents’ perception of the community and the sustainability issues they face. Finally, we looked for the emergence of sustainable behaviors in these communities through specific actions.

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<sup>1</sup> Brocchi, D. (2008). The Cultural Dimension of Sustainability. *Sustainability: A New Frontier for the Arts and Cultures*, 3, 26–58. Retrieved from [http://davidebrocchi.eu/wp-content/uploads/2013/08/2008\\_newfrontier.pdf](http://davidebrocchi.eu/wp-content/uploads/2013/08/2008_newfrontier.pdf)

<sup>2</sup> UNESCO. (2002). *Universal declaration on cultural diversity*. Johannesburg. Retrieved from <http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Universal+Declaration+on+Cultural+Diversity#3>

<sup>3</sup> In addition to participant observation in each case we interviewed community managers, government officials, NGO’s, private developers, and residents.

## Case Study 1: El Gouna

El Gouna is a resort development located on the Red Sea coast, about four hours drive from Cairo. It was launched in 1990 by Orascom Hotels Development (OHD), a private company owned by the Sawiris family, one of the richest in Egypt. Twenty-six years later, El Gouna is a well-established integrated town of about 15,000 full-time residents and a seasonal population that can reach twice that number. It is a self-contained community that includes all the basic services, education and healthcare facilities, and commercial outlets. It boasts many leisure and sports facilities, restaurants, and international hotels. El Gouna is coming from the Arabic word “*goun*” which means a small creek or inlet.

Different stories are told about the reasons behind establishing the town of El Gouna. The most common myth is that Engineer Samih Sawiris, founder and owner of OHD, was once fishing with his friends in the Red Sea. He saw the location of El Gouna from his boat and thought it might be a good idea to acquire land and turn into a place where he could spend vacations and go fishing with his friends. From this initial idea of a holiday retreat, the project of building an entire integrated community emerged.

El Gouna was developed in phases. Although OHD acquired rights from the central government to a large tract of land, the landscape required considerable re-organization and terra-forming from an essentially featureless, flat coastal plain into numerous lagoons, islands, and beaches around which residential, commercial, institutional, recreational, and touristic facilities were built. The development started with the “downtown” node which contains some commercial activities and residential units to house a permanent population. El Gouna gradually expanded one neighborhood at a time, and it is still expanding. In addition to the hotels and resorts, most of the new neighborhoods house seasonal occupants, including time-share properties. El Gouna offers many different options in terms of residential accommodation, from secluded villas on private islands to time-shares in multi-unit apartment buildings. Because of the extensive re-ordering of the natural landscape, most residential areas have extensive views of water and green landscapes (see figure 1).



Figure 1: El Gouna Layout

The OHD vision for El Gouna has evolved through time. The town was initially developed as a holiday resort with a relatively small full-time residential population made up of employees and small business owners. OHD built housing for the residents and also residential units to sell to outsiders who were looking for holiday homes and real estate investments. The development was designed to be a fully integrated community that is offering a high-quality of life for its full-time residents of all income groups. A special neighborhood, called El Bustan (the garden) was built for OHD employees who were given the options of renting or purchasing homes. As El Gouna continued to grow, OHD continued its management function. El Gouna has no government, as such. Instead, OHD provides residents with all the usual municipal services.

Over time, OHD has modified its original business plan for El Gouna. In the 1990s, the expectation was one of continuous growth based on expanding construction and sales of real estate. Real estate sales were complemented by hotels and associated touristic properties that were built and owned by OHD but operated by other companies under contracts. In the early 2000s, the model of unlimited growth was modified. OHD began to market El Gouna as a community concerned with the environment and sustainability. A new business plan based on increasing the numbers of permanent, as opposed to seasonal residents, emerged. While construction and real estate sales continue to be prominent, revenues from operating El Gouna as a community began to figure in the financial strategy. OHD began to emphasize environmental sustainability and eco-tourism to capitalize on the beauty of the location's natural and engineered landscape. Moreover, management that included environmental sustainability was regarded as more cost efficient than unlimited growth. For OHD, "sustainability" served two purposes: increased cost efficiency and a powerful marketing tool. Accordingly, Engineer Samih Sawiris, the founder of El

Gouna advocated a green agenda for El Gouna. In 2002, OHD launched the Green Gouna initiative<sup>4</sup>. In 2014, El Gouna was granted the Global Human Settlement Award for being a global green town, which is an award created by the United Nations Environment Program. In the same year, El Gouna signed an agreement with Egyptian and Italian officials to conduct a carbon footprint study of El Gouna and make plans to transform El Gouna into a carbon neutral city<sup>5</sup>.

The current vision of El Gouna is to promote sustainability while simultaneously continuing to provide residents and visitors with a high quality of life. As one resident stated, “here in El Gouna we are constantly reminded to enjoy our life, but remember that there will be someone after you who wants to enjoy this land too.” Thus sustainability in El Gouna is inseparably linked to a high-quality lifestyle. Although certainly not everyone in El Gouna can be considered wealthy, it is not an inexpensive place in which to live.

### **The Structure**

The sustainability agenda of El Gouna was mainly determined by Samih Sawiris and the management team of OHD. At the same time, the diverse population of El Gouna, which includes many non-Egyptians, has welcomed the idea of sustainability, and the residents have started initiating some activities of their own. El Gouna management is divided into 27 divisions (including marketing, security, utilities, maintenance, etc.) under a general manager. The unit managers and employees are all part of OHD, this means that El Gouna was developed and is now managed by the same entity, although OHD has contracted a number of functions, such as waste management, for example, to other companies. Having a developer who continues with the management role is not generally the case in planned developments since developers are not in the business of facilities management nor in administering communities once the real estate has been built and sold. However, El Gouna is different, and from the beginning, the plan was for OHD to manage a living, growing community. There are agreements with various entities representing the Egyptian government that give OHD an especially privileged position vis-à-vis its relations with the community of residents, on the one hand, and the government and its service agencies, on the other.

The residential community of El Gouna can be described as consisting of four main categories. The first are the salaried professionals and their families who work for OHD and its contractors, including the hotel sector and other contracted companies. The second category consists of independent settlers who have homes and operate small businesses in El Gouna. This group includes both Egyptian and non-Egyptian property owners and business operators serving the community and the seasonal visitors. A not insignificant part of this group are retirees who

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<sup>4</sup> Eakin, B. (2012). Gouna: Egypt’s No. 1 eco-friendly destination? | Egypt Independent. Retrieved November 6, 2016, from <http://www.egyptindependent.com/news/gouna-egypt-s-no-1-eco-friendly-destination>

<sup>5</sup> El Gouna officials signed an agreement to implement a plan to make the city carbon neutral. (2014). Retrieved November 6, 2016, from <http://sawirisfed.org/News/Details/2d40cead-1102-410c-be37-c702cd8cb7ff>

bought homes and moved to El Gouna from elsewhere in Egypt or abroad. The third group of residents is the “blue collar” workers who work in the businesses, large and small, that support OHD, the contracted companies, and the independent enterprises. OHD built a residential zone called El Bustan area on the outskirts of El Gouna to house workers, offering modest rents and low-cost services, but none-the-less of a higher standard than found in most Egyptian small towns. The fourth group is more transient than the others. It consists predominately of young adults who are attracted to El Gouna by the combination of employment opportunities, the lifestyle, and recreational amenities. Most of them do not intend to settle permanently in El Gouna, but they cannot be classified as seasonal visitors, either.

Depending on the time of year, seasonal visitors can constitute up to two-thirds of the total population in El Gouna. The peak seasons are the main holidays in Egypt, the Muslim feasts ‘Eid al-Fitr and ‘Eid al-Adha and the Coptic Christian Christmas and Easter. During these holidays, the owners of the villas and apartments that constitute most of the neighborhoods and gated developments of El Gouna come to the resort to occupy their properties and enjoy the holidays. The market for holiday rental property is not as well developed in El Gouna as in other international resort destinations. OHD does not directly concern itself with the tourist or holiday maker rental market. There are a few independent rental agencies in El Gouna that cater to the rental market, but foreign tourists tend to stay in the hotels while Egyptians who come to stay for short periods of time tend to be owners, or relatives of owners, or perhaps friends of owners. There are also some properties that have been sold as time-shares.

Over the years, El Gouna has assumed the character of a privately managed, exclusive, self-sufficient town. It offers medical, educational, and cultural services, there are recreational activities including open areas and parks, and 463 commercial outlets. There are 18 international-standard hotels (17 are owned by El Gouna but operated by different partners), three boat marinas and around 3,000 villas and apartments. Even by international standards, let alone Egyptian practice, the town is markedly clean. Little or no rubbish is in evidence in the residential, commercial, and public spaces. All the residents remark upon and are proud of this fact. The landscaping is environmentally appropriate and well-maintained. Irrigation in the hyper-arid environment is water-use efficient.

Real estate developments, including green spaces and roads, cover about 15.64 million m<sup>2</sup> within El Gouna’s total area of 36.92 million m<sup>2</sup>. The remainder is for future development<sup>6</sup>. Until recently, the economic driver for El Gouna was building and selling additional residential and commercial units. While this strategy has maintained the financial viability of El Gouna for twenty-five years, it surely will not assure its survival once the undeveloped land has been developed and sold. Therefore, the business plan of OHD and its El Gouna management is evolving in the direction of making money from providing services to a community of rather than

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<sup>6</sup> ORASCOM: El Gouna, Red Sea - Egypt. (2016). Retrieved September 6, 2016, from <https://www.orascomdh.com/en/projects/existing-projects/el-gouna.html>

selling real estate. Of course, these services include collecting rents for commercial properties, especially hotels and other business catering to permanent residents and seasonal visitors. In the long run, El Gouna management hopes that the proportion of permanent residents will increase and the dependence on tourism and holiday makers will decrease. In 2015, OHD recruited a new general manager for El Gouna, and he was given instructions to find ways to improve the sustainability of El Gouna as a community, including increasing the proportion of permanent residents vis-à-vis the seasonal population.

### **Environmental Sustainability Initiatives**

The goal is to attract permanent residents who appreciate the advantages of living in a community in which they can simultaneously enjoy a high-quality lifestyle and live in harmony with the environment. El Gouna's slogan is "Life as it should be." In essence, this is El Gouna's sustainability vision. Sustainability targets the social, environmental and economic sectors. Initiatives vary from the basic environmental service utilities of water and electricity to promoting green environment awareness and community social engagement.

Energy, water, and waste management utilities in El Gouna are entirely managed by OHD, which buys electricity and, to a lesser extent, water from government agencies and then sells and redistributes them to residents. Householders and businesses in municipalities elsewhere in Egypt buy electricity from regional branches of the national distribution company at prices fixed nation-wide that vary according to the category of customers and amount purchased. Electricity prices are subsidized, although in recent years the subsidies have been lifted to an extent. El Gouna is not a municipality and has a special license to purchase from the government and then resell within El Gouna through its own private distribution system. El Gouna charges its customers at a rate higher than the government price schedule. El Gouna's private electricity grid imparts several advantages in terms of sustainability. It allows the monitoring of real-time consumption and has the capacity to give customers detailed information about their own consumption patterns. All the houses have smart meters that transfer data to a central computer run by OHD. In addition to their monthly bills, residents can have access to information about their daily consumption if they are concerned through the head office. In theory, this feature allows residents to understand what behaviors contribute to their energy consumption, and these behaviors could then be adjusted to reduce consumption and improve energy use efficiency.

El Gouna's seasonal variation in population means considerable seasonal variation in electricity consumption. More people present means higher electricity demand. Higher ambient temperatures mean more use of air conditioning and higher electricity demand. Through careful attention to historical consumption patterns, management of the power supply at the level of the community can enable greater resource use efficiency.

Plans for integrating renewable energy sources are currently being developed. El Gouna is in a prime location for solar energy, and the company signed an agreement to invest in a 50-megawatt solar power plant to feed into their electricity network, using PVC technology. The

solar power plant will be without batteries as they are planning to use a net metering system. Utilizing solar energy has been considered since the 1990s, but the heavy subsidies to electricity consumption previously provided by the Egyptian government have had the effect of discouraging investment in solar energy. The government is also implementing policies to encourage private generation of electricity from renewable sources such as solar radiation, and a range of actions such as feed-in tariffs and net metering are being discussed and developed that will certainly encourage enterprises such as El Gouna to introduce their own power generation facilities.



Figure 2: A sign of El Gouna Electric Company Station



Figure 3: Trials of El Gouna Solar Production

El Gouna management encourages private homeowners to use solar water heaters and requires hotel operators to install solar water heaters. The hotel policy aligns with the Green Star Hotel Initiative, a national certification system that was developed in coordination with the Egyptian Ministry of Tourism to assess the environmental performance of hotels and resorts. The program is internationally recognized by the Global Sustainable Tourism Council, which focuses on environmental management, waste, water, energy, capacity building, and related topics<sup>7</sup>. Hotels in El Gouna take pride in being a part of the Green Star program. There are currently 17 hotels operating with 2,683 guest rooms, making this sector an important contributor to the overall sustainability performance of El Gouna. It should be noted that the Green Star initiative is financially supported by German development assistance to Egypt.

The water supply in El Gouna is based on wells located within the boundaries of the community. Being on the coastal plain, the groundwater is brackish. Therefore, El Gouna relies on desalination for its potable water supply. The system uses reverse osmosis technology powered by electricity purchased from the national grid. The reverse osmosis system was selected instead of the alternative distillation process because it requires less energy<sup>8</sup>. The brine by-product from desalination is diluted with waste water and used in fish ponds.

<sup>7</sup> Fritz, B. (2010). Green Star Hotel Initiative.

<sup>8</sup> Wade, N. M., & Hornsby, M. R. (1982). Distillation and reverse osmosis energy consumption and costs, 246–257.



Figure 5: Green Star Sustainable policy Announcements



Figure 4: Green Star Idle Free Zone Sign

El Gouna maintains a central sewerage system with two wastewater treatment plants. The treatment plants supply secondary treated wastewater effluent to the irrigation system. The central El Gouna laundry uses tertiary treated water. Perhaps surprisingly, most of the water used in El Gouna is for irrigation instead of domestic uses. The average daily irrigation consumption reaches 7,000 m<sup>3</sup>. This is because during most of the year there is low occupancy in the residential units. The situation will no doubt change if the permanent population expands dramatically, but at present El Gouna has had to import treated wastewater from the city of Hurghada (over 30 km distant) through a specially constructed pipeline in order to obtain sufficient irrigation water supplies. The significance of irrigation demand, as opposed to potable water requirements, is dramatically illustrated by satellite images of the coastal areas around El Gouna. Whereas El Gouna, with its leafy neighborhoods, tree-lined streets, and golf courses appear as a green anomaly in an otherwise sand-colored coastal plain, the much larger nearby city of Hurghada is colored primarily by the dull gray of concrete buildings, with very little greenery in evidence.



Figure 6: El Gouna Water Osmosis Station



Figure 7: El Gouna Fish Farm

Reusing and recycling are not only applied to the water management system, but to the solid waste management system, as well. El Gouna claims that 85% of its solid waste is recycled<sup>9</sup>. Ertekaa (Arabic word meaning “to evolve” or “become better”) is a waste management company located on the El Gouna periphery that is responsible for collecting and recycling all the solid waste in the community, apart from construction waste. The company, which is also owned by members of the Sawiris Family, developed two schemes for waste bins located throughout the public areas of El Gouna. The first scheme includes separate bins for glass, metal, cardboard, paper, and plastic. The second scheme has only two bins, one labeled food waste and the other simply non-food. The idea is to encourage residents to sort waste at the source. Ertekaa has facilities for processing for recycling the five items collected separately in the first waste bin scheme. It also composts collected food and other organic wastes.

The company collects waste from El Gouna three times a day. The (re)sorted waste is compacted at the Ertekaa facility for sale to other companies specialized in waste recycling. There are also special machines for shredding and pelletizing various types of plastic waste for recycling. However, the largest waste stream by volume is landscape waste, primarily plant material such as branches and leaves, dead plants, grass cuttings, etc. Some of this can be shredded and composted along with other organic materials, but the larger, woody items pose a bit of a problem. Ertekaa maintains a small exhibition at its facility to demonstrate how wood waste can be used in furniture and other items manufactured for household use. The food waste is sent to El Gouna Farms, composted and utilized in cultivation. The whole process of sorting waste, selling compacted waste and manufacturing new products is a win-win situation, generating money for Ertekaa, producing fertilizers to be used in El Gouna Farms and promoting the culture of consumer waste sorting and awareness.



Figure 8: El Gouna Divided Bins



Figure 9: El Gouna Compacted Aluminum Cans

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<sup>9</sup> ORASCOM: El Gouna, Red Sea - Egypt. (2016). Retrieved September 6, 2016, from <https://www.orascomdh.com/en/projects/existing-projects/el-gouna.html>

El Gouna Farms which are also owned by the Sawiris family is located near the waste processing facility. The farm produces small livestock and poultry to supply to El Gouna's community and surrounding areas, particularly to restaurants within the gated community. Residents also buy poultry directly from El Gouna Farms outlets, in preference to frozen poultry transported from Cairo. The farms also produce a limited range of crops, such as olives. The main source of irrigation water is groundwater, which over time has increased in salinity, thereby limiting the production. Local food production remains an important part of the sustainability vision. By producing food locally, imports from Cairo are reduced, therefore minimizing the transportation impact on the environment, but finding a sufficient source of water for their agricultural activities remains the biggest challenge for El Gouna Farms. The technology to desalinate groundwater using solar energy exists, but as yet the economic feasibility of such a scheme is not established.

In terms of sustainable transportation, the shaded and quiet streets of El Gouna are suitable for transportation alternatives to private automobiles. According to interviews, most of the residents prefer to work in places that are within walking distance of where they live, while others cycle daily to their work. An established system of Tuk-Tuks (motorized rik-shaws) is currently functioning in El Gouna that offer rides to anywhere inside El Gouna for a fixed rate. OHD management provides a free bus with a regular schedule to workers that stops in different areas of El Gouna. A biodiesel station was also established to encourage alternative fuel for those who prefer to use their cars. There are bicycle lanes on the main streets as well as bike racks in front of the university premises provided by TU El Gouna. Management is currently discussing a proposed project of bicycle rental system that can be available to the community. Such new initiatives and transportation alternatives are all part of the vision to lower dependence on automobiles, therefore, reducing CO<sub>2</sub> emission and the need for non-renewable energy.



Figure 10: Bike Racks in front of Technische Universität (TU) El Gouna Campus



Figure 11: El Gouna Biodiesel Station

### **Social and Behavioral Aspects of Sustainability**

In addition to initiatives that focus on environmental resources, El Gouna encourages initiatives that develop better community bonding and the formation of an active and well-integrated network of community members. OHD was instrumental in bringing a branch of the Bibliotheca

Alexandrina to El Gouna, as well as a school and hospital following international standards. In addition to these essential services, OHD persuaded the Technical University of Berlin to establish a branch campus in El Gouna. The construction and staffing were financed by OHD, and TU El Gouna currently offers three Masters Degree courses in urban development, water engineering, and energy engineering to around 90 residential students. The three programs were carefully chosen to tackle topics that are of concern to the development of El Gouna in particular and Egypt overall. Establishing a branch campus of the Technical University of Berlin inside El Gouna is part of the strategy to increase the size and diversity of the permanent residential community, by creating an international group of university professors and students living in the community throughout the year.

The presence of a university campus did not only help in attracting younger age group but formed a base for community discussions and awareness. The management is always open to listen to the voices of the community through a hotline that receives all the residents' concerns, they also set up a regularly scheduled community forum in collaboration with the Technical University in which community members are encouraged to share their thoughts on different topics. At the time of our visit, the biggest issue facing El Gouna was maintaining a wide range of permanent residents with different age levels. El Gouna was becoming too quiet of a community, losing its appeal to youth. The El Gouna management sought ideas to attract younger residents. It initiated different festivals and events throughout the year in order to market the image of El Gouna as a vibrant and active community. Public lectures regarding different topics are held regularly, discussing problems like energy and water. Moreover, most of the applied research happening at the university focuses on solving existing problems in El Gouna –providing accessibility for the disabled, better water management and developing an energy efficient building models. For instance, some of the operating hotels in El Gouna fund research projects for TU students to study the efficiency or sustainability the hotels' water or energy management. This is an example of having integrated efforts that target sustainability through the collaboration between the tourism sector and the education.

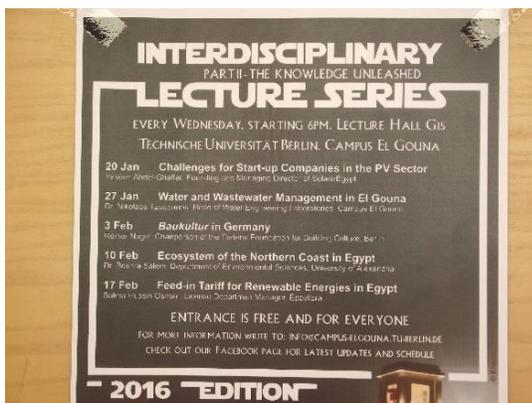


Figure 13: Public Lecture Announcement in TU El Gouna

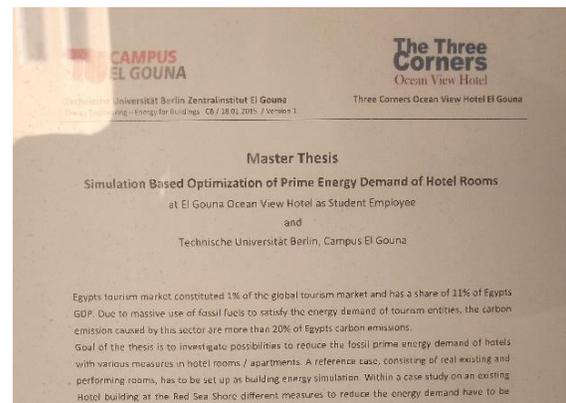


Figure 12: Energy Efficiency Research Announcement in TU El Gouna

The TU El Gouna is not the only social entrepreneur. Residents have started several different initiatives. Few examples are projects with a focus on community vitality, waste, and animal rights. Restaurants and cafes offer weekly scheduled events and gathering nights, where each day of the week all members of the community are invited to gather in one of the local restaurants. An active resident and business owner initiated Earth Week activities, in collaboration with the management. The local community is active in organizing beach clean-ups and searching for ideas to reuse disposed materials. During the last Earth Week 2015, the community collected all the glass waste to build a glass house out of empty glass bottles as a showcase for reusing products. Similarly, a bar owner developed the whole interior design of the bar from reusing old car parts. A junior employee in the fish farm also started using old wooden containers to construct various furniture pieces to be used in the fish farm. The culture of waste sorting and reuse and was observed in El Gouna and mentioned in interviews when residents described the sustainability of their community.



Figure 14: Benches Made from Reused Wooden Containers in the Fish Farm



Figure 15: Glass House Built by the Community out of Reused Glass Bottles

While OHD management certainly was the first to articulate the idea of sustainability, community residents are now actively pursuing sustainability-related initiatives. They have succeeded in establishing a welcoming and enabling environment for different initiatives led by institutions like TU El Gouna, junior employees with creative ideas or even individual community members.

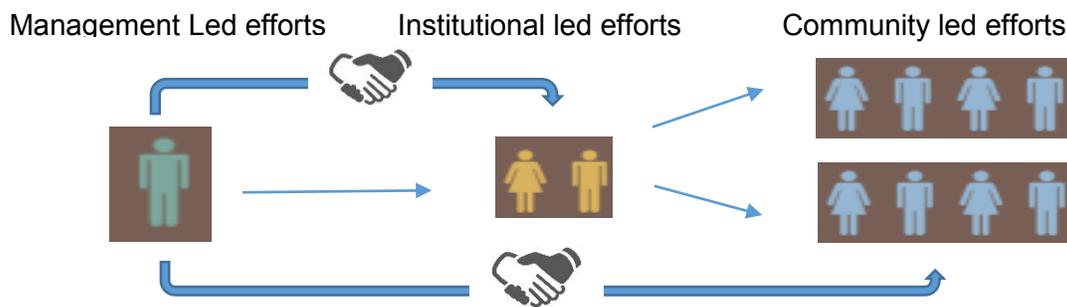


Figure 16: Entities Behind Different Sustainability Initiatives in El Gouna

Management-Led Efforts	Institutional-Lead Efforts	Community-Lead efforts
<ul style="list-style-type: none"> <li>- Reusing grey water brine</li> <li>- Establishing solar plants</li> <li>- Contracting waste management and recycling company</li> <li>- Green Star hotel initiative</li> <li>- Studying carbon footprint</li> </ul>	<ul style="list-style-type: none"> <li>- TU hosting public lectures focusing on water, energy, and waste.</li> <li>- TU partnering with hotel managements launching thesis topics focusing on energy uses of local hotels in El Gouna</li> </ul>	<ul style="list-style-type: none"> <li>- Establishing Earth day</li> <li>- Reusing old material to construct furniture in the fish farm.</li> <li>- Reusing car parts as the interior of a bar</li> <li>- Hosting weekly events in different cafes</li> <li>- Establishing cat corners for stray cats</li> </ul>

Constant engagement of OHD management with the community has been instrumental in spreading ideas of sustainability and fostering community engagement. El Gouna publishes its own monthly magazine through which management updates readers about different news and events happening inside El Gouna. An online 24/7 live TV channel developed by OHD is also constantly transmitting what is happening around the town. The TV channel and the magazine are used to advocate for ideas related to the sustainability of the community such as announcements for Earth Day and beach clean-up events and discussing community problems. Print and broadcast are used as a tool for advocating sustainability, they constantly repeat the two El Gouna’s mottos of “Life as it should be” and “A state of mind”. These mottos reflect the town’s aim of providing a high quality of life and its mission of setting a high standard of expectations when it comes to life in El Gouna.



Figure 17: El Gouna Magazine Covers

### Community Perceptions

The idea of enjoying a high standard of life as advocated by the management has succeeded in reaching the residents of El Gouna. A sample of permanent residents all stated during interviews that El Gouna is different from any other place in Egypt, citing specific criteria. Safety was the number one feature emphasized by all the people interviewed in the town. A shop owner stated

that he can leave his shop open all night without getting worried. In a meeting with a librarian, he expressed how he never worries about locking his car in El Gouna because he knows how safe it is. The manager of the fish farm noted that most of the people who live in El Gouna work inside it. According to the fish farm manager, if you live and work in the same place your sense of ownership increases and you are fully dependent on the place, hence you protect it as if it were your own home.

From the walk in the streets of El Gouna, one can easily notice how the streets are very clean in comparison to any other town in Egypt. Multiple interviewees stated that El Gouna's cleanliness attracted them to live there. One interviewee attributed the cleanliness of El Gouna to the strong sense of identity and ownership among its residents. Residents of El Gouna refer to themselves as Gounies. A mother laughed about the fact that her son used to say "I am a Gounie" when being asked about his nationality. One resident stated that he learned how to sort waste in El Gouna and he would have never done that if he didn't live here. Multiple interviewees stated that the security is very active and constantly reminding people that they should not litter. Another interviewee stated that the community is small in size, so people normally know each other. This makes people avoid littering, as they are afraid of public judgment or peer pressure by their acquaintances. A German interviewee said that one time he threw food in a bin for plastic and he was approached by an Egyptian resident reminding him that he should throw it in the organic waste bin. Other Egyptian residents stated that El Gouna is one of the few places where they feel equal to foreigners as the rules apply to everyone, so when they see a foreigner disobeying any rule they quickly approach them and give them advice.

The high percentage of foreigners living in El Gouna brings an international quality to the place where one can always learn new languages, eat different cuisines and celebrate international events. A waiter in one of the restaurants stated that he learned French and Italian by taking private classes with French and Italian residents of El Gouna. A librarian stated that in El Gouna you can always meet people from a different culture offering something new to learn all the time, according to him El Gouna is a place where you can constantly learn and develop yourself. One interviewee stated that in order to build a sustainable town, a high quality of education is necessary. He explained that the most important thing that El Gouna has achieved is establishing a school with a strong academic reputation, stating that this will attract more permanent residents with their families.

By spending some time in El Gouna one quickly understands that establishing a sustainable community is not about setting a plan or just building the right infrastructure and technology gadgets. It must engage people with different perceptions, and behaviors according to their backgrounds and culture. The challenge here is to set a sustainable plan that is adaptable to different circumstances to be an ongoing process whenever it is faced with challenges, whether it is economic challenges, rules, and regulations or community preferences.

## **Challenges and Sustainability as an Ongoing Process**

The El Gouna management has started various initiatives in order to promote sustainability. Not all of them evolved as planned. Sometimes, the behavioral or cultural preferences of the residents interfered or other times the plan was not economically feasible or needed new laws and regulations. For example, the Ertekaa waste management company stated that they need to re-sort all the waste coming from El Gouna. Despite installing divided waste bins all over El Gouna, the community does not always succeed in sorting the waste right or fully grasp the sorting culture, therefore the company needs to resort everything. Repeated awareness raising campaigns in the community have failed to achieve the desired results. This might be attributed to the presence of seasonal visitors and temporary residents, as they may not be affected by community efforts to train people to sort waste, and therefore their behavior can interrupt the whole sorting system.

Sometimes the challenge is not about the tourists' habits and perceptions but comes from the permanent residents. The resident's mistaken perceptions regarding the term "bio" can sometimes interfere with their choices. For example, Oil-Libya, a gas station operating in El Gouna tried to sell biodiesel in El Gouna but faced low demand. According to one of the employees inside the station, the residents were concerned that the bio-oil may harm their car engines. Accordingly, the bio-oil station shifted back to selling non-renewable fuel.

Another plan that did not go as expected was the use of treated wastewater for irrigation. Due to the low occupation level in some seasons, the amount of wastewater produced was insufficient to cover the irrigation needs, therefore, the management needed to buy water from the government to use it for irrigation. In addition, when El Gouna Farms was established, it was hoping to cover the agricultural and poultry needs of El Gouna, but their output turned out to be very limited due to the lack of fresh water and the high salt content. Moreover, the poultry production could not supply the hotel sector inside El Gouna due to tourism laws that ban the use of fresh poultry products and require instead frozen products. Hence, they focused on providing chicken for restaurants and households. Such circumstances indicate that laws and regulations can sometimes be an obstacle in the efforts of achieving sustainability.

Moreover, in regards to the management's goal to establish a lively vibrant community, the parties and numerous social events being held in El Gouna was not always favored by the residents. As sometimes the residents of the units overlooking public plazas or restaurant would complain about the noise levels of the events and music playing in the restaurants. The residents in El Gouna tend to hate the high seasons of El Gouna and the festivals that attract more tourists. Some of the residents stated that they leave El Gouna during the high seasons to avoid the congestion, as they value a quieter and emptier place, not a jammed party venue. It appears that El Gouna's efforts to establish a vibrant lively community is sometimes affected by the lifestyle and preferences of the Gounies who prefer a quieter environment.

Although the concept of sustainability is still evolving in El Gouna, it has become clear that El Gouna is facing problems similar to sustainability-minded communities in North America or Europe, Like BedZED or Whistler (which were covered in the previous report in this series). The efforts of sustainability are still very fragile and dependent on how the community deals with it and the lifestyle of the residents. Sometimes, the perceptions of the community may impact the success and failure of some of the initiatives like the case of the biodiesel. Other times the laws and regulations may force certain initiatives to change its scope like the case of selling poultry to the hotels in El Gouna. Yet the case of El Gouna is still unique in the Middle East setting an example for the private sector that has managed to develop an independent sustainable vision that deals and adapt with the community's evolving problems. The case of El Gouna proves that the effort to become sustainable is an ongoing process that keeps changing and adapting to match the needs of the community.

## Case Study 2: Sheikh Zayed

The City of Sheikh Zayed was launched in 1995 by the New Urban Communities Authority (NUCA). NUCA is an Egyptian governmental authority established in 1979 under the Ministry of Housing, Utilities, and Urban Development. The mission of NUCA is to create economically prosperous communities in the desert areas outside the Nile valley and delta. The new communities are expected to attract investors and settlers from the existing overcrowded cities and thereby reduce urban congestion and encroachment on agricultural lands. NUCA is developing new cities in a sequence of stages, dividing them into first generation cities, second generation cities, and third generation cities. They are currently working on developing the fourth generation cities. Sheikh Zayed City is among the second-generation new cities along with New Cairo and Obour City sited outside the greater Cairo ring road.<sup>10</sup> The City got its name from a very generous donation from the Abu Dhabi Fund for Development, on directions of Sheikh Zayed Bin Sultan Al Nahyan.

New cities like Sheikh Zayed are under the control of NUCA and administered by local development Authorities (*jihaz tanmiya*) independently of the Ministry of Local Development and Governors that manage urban and municipal administration in Egypt's established cities, towns, and villages. New city Authorities are assisted by appointed Boards of Trustees consisting of technical experts and prominent citizens who advise on strategic issues regarding the development of the city according to its mandate and master plan. The intention is that once a new city has passed through its development phase and is fully mature, its administration will pass to the Ministry of Local Development, and governance will assume the standard format of municipalities within governorates and the Ministry of Local Development. To date, none of the numerous new towns under NUCA administration has been passed on. NUCA manages the new settlements under the assumption that they face different needs and challenges relative to older developed communities. Each of the new cities has its own set of objectives, characteristics, and master plan reflecting these attributes. Sheikh Zayed, for example, was designed to be above all a desirable residential community with mixed use institutional, recreational and commercial features, but without industrial or specialized governmental activities planned for other new cities. The adjacent 6<sup>th</sup> of October new city, for example, was designed to house the industrial and manufacturing facilities that would provide employment opportunities for people living in it in addition to people living in Sheikh Zayed.

Sheikh Zayed is located 38 km from Cairo's downtown and is bordered by the Cairo-Alexandria desert highway from the north and the 26th of July Corridor coming from central Cairo on the

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<sup>10</sup> New Urban Communities Authority. (n.d.). Retrieved September 21, 2016, from [http://www.newcities.gov.eg/english/aboutUs/About\\_Authority/default.aspx](http://www.newcities.gov.eg/english/aboutUs/About_Authority/default.aspx)

south. To the north, across the Cairo-Alexandria highway, is the rapidly developing Smart Village, Cairo's high-technology business district. To the west and south is the 6<sup>th</sup> of October City, a first generation new town. The city occupies an area of 53.37 km<sup>2</sup> on desert land, consisting of 17 residential districts and a city center for commercial activities and services. Sheikh Zayed's intended identity is a residential and recreational community with full services but dependent on the Smart Village and the industrial, commercial, and institutional areas of 6<sup>th</sup> of October as sources of employment. Sheikh Zayed was never planned to be self-contained. Instead, the planners and developers of Sheikh Zayed from the beginning expected that a large proportion of the working population residing in the city would commute to workplaces outside the city boundaries. It was assumed that Sheikh Zayed would serve as desirable residential area complementing the industrial and commercial zones being development in adjacent 6<sup>th</sup> of October City. Although they might work in other parts of greater Cairo, the residents of Sheikh Zayed were expected to enjoy a better living environment for themselves and their families than elsewhere. In that sense, Sheikh Zayed was intended as a relatively affluent suburban location with a focus on comfortability and a pleasant environment and lifestyle. Within this overall scheme, however, the master plan for Sheikh Zayed anticipates considerable socio-economic diversity among its various neighborhood populations.



Figure 18: Google Map Image Showing Sheikh Zayed in Relation to Cairo and 6th of October

According to NUCA officials, the current population of Sheikh Zayed is 233,000 residents. The projected number when all residential areas are developed and occupied is 675,000, or about 12,650 people per square kilometer. This is 35% lower than the overall average population density of greater Cairo which is 19,376 persons per km<sup>2</sup>, although the congested areas are older parts of the city, and many of the informal popular areas have far greater densities. The total number of completed housing units is 72,942, with 15,000 units constructed by the NUCA as part of public housing schemes and the remaining units provided by the private sector. Residential

neighborhoods make up 60% of the total area, divided into 53% for luxury residential housing, 25% for middle-income housing, 15% for low-income housing, and 7% for youth.<sup>11</sup> The city was initially planned to provide a higher proportion of affordable housing for low and middle-income citizens, but during implementation, the site attracted private developers who preferred to invest in luxury housing because of the higher profit margins from sales. This change left the city with less than half of its housing considered affordable to middle and low-income households.

Residential neighborhoods are of different types. The luxury housing areas are gated communities, often managed by the developer company with payments made by the property owners. These gated communities often include a private social and recreational club for residents, and sometimes also commercial centers and mini-malls for the convenience of residents. Public access to these neighborhoods is controlled by the management. A number of these neighborhoods include golf courses and other facilities, and it is possible for non-residents to join and have access by paying the requisite fees.

Other neighborhoods are not gated, and access is open. In contrast to the gated neighborhoods, these open neighborhoods usually consist of multi-household dwellings and apartment buildings. These neighborhoods represent a mixture of socio-economic status groups. Some of these areas were built by private developers who then sold the real estate. Others consist of housing built by private individuals who purchased the plot and arranged to have the dwelling building built by a contractor. Often, these buildings contain apartments occupied by members of the same extended family.

NUCA built neighborhoods of low-income housing are called “social” or “youth” housing, depending on the entitlement scheme to which it belongs. This is housing targeted to specific groups of people who meet certain qualification requirements, such as income level, age, education attainments, marital status, etc. Prospective recipients of social housings, if they meet the qualifications, purchase their homes on a long-term installment plan during which they must continue to adhere to certain requirements. These types of housing are almost always apartments in buildings whose architecture usually reflects is public institutional nature.

There are 37 government institutional buildings in Sheikh Zayed, including 13 public schools and a number of hospitals, health centers, markets, places of worship, utilities, and other public services. Another 51 buildings were implemented by the private sector ranging from recreational services and venues for commercial activities<sup>11</sup>. Sheikh Zayed also hosts branches of the faculties of engineering and commerce (English section) of Cairo University. There are also several private international schools, private hospitals, and the private Nile University.

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<sup>11</sup> Metwally, M., & Abdalla, S. (2012). Impact of Gated Communities on the Urban Development of New Cities in Egypt. *Center of Planning and Architectural Studies CPAS*, 1–13.

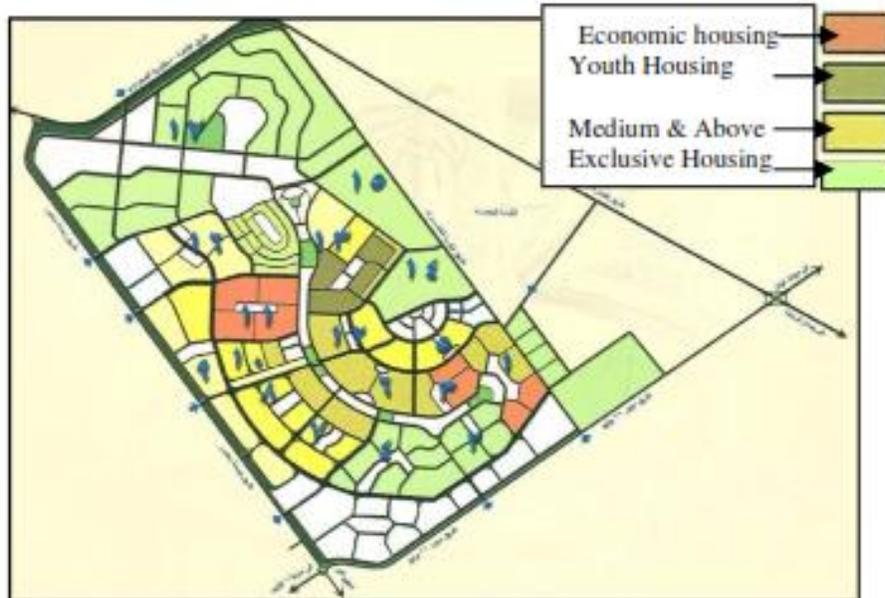


Figure 19: Different Housing Levels in Sheikh Zayed (Metwally & Abdalla, 2012)

### The Introduction of Sustainability

The founding vision of Sheikh Zayed focused on establishing a prosperous urban center that attracts a stable community. Sustainability, *per se*, was not part of the founding vision. In 2013, the Sheikh Zayed Authority launched a 3-day event proclaiming Sheikh Zayed a “Green City”. The initiative was in response to an earlier announcement by the Minister of Housing, who announced that all the next generation of new settlements should be sustainable cities. He also initiated plans to work on the existing new settlements to turn them into sustainable cities. The local NUCA officials administering Sheikh Zayed decided to seize the opportunity to embrace the sustainability vision announced by the minister. The Ministry of Housing issued decree no 512/2014 to establish a central unit implementation unit within NUCA for promoting sustainable cities and renewable energy. The unit was headquartered inside NUCA’s administrative building in Sheikh Zayed. It focuses on achieving energy and water efficiency, waste management, sustainable transport, and green low-cost construction systems. Its objectives are to propose and activate strategies and plans to achieve sustainable green urbanization standards in NUCA’s new cities and provide relevant technical support, consulting and research in both existing new cities and cities to be built in the future<sup>12</sup>. With NUCA’s sustainability unit located on their premises, it was natural and convenient for the Sheikh Zayed Authority to adopt and espouse the sustainability theme.

The Ministry of State for Environmental Affairs and the Ministry of Housing have signed a cooperation protocol for the study and implementation of pilot projects to make the new cities green, sustainable, and environmentally friendly. Not coincidentally, the pilot project started by

<sup>12</sup> Farouh, H. (n.d.). Sustainable Cities Unit. Retrieved September 26, 2016, from [http://www.newcities.gov.eg/english/Cities\\_Unit/About\\_Unit.aspx](http://www.newcities.gov.eg/english/Cities_Unit/About_Unit.aspx)

focusing on Sheikh Zayed<sup>13</sup>. The cooperation was jointly funded by The Ministry of Environment with 500,000 EGP and the Board of Trustees of Sheikh Zayed providing 1,200,000 EGP<sup>9</sup>. With government backing and funding, a number of initiatives began to take shape. Numerous Sheikh Zayed NUCA administrators and managers received formal training in the concept and practice of sustainability in Egypt and abroad.

### **Services and Sustainability Initiatives**

According to Sheikh Zayed Authority officials, sustainability is defined as securing enough resources for future generations by preserving the environment and using all available resources in the most efficient way, minimizing waste. Efforts to establish Sheikh Zayed as a sustainable community have followed two paths: first, increasing awareness of sustainability issues among community members, and second, developing pilot demonstrations to serve as models for future projects. The Sheikh Zayed Authority worked with the Ministry of Environment to collect information and data about Sheikh Zayed relevant to sustainability and to develop awareness among their own members and staff. The collaboration between NUCA and the Ministry of Environment resulted in an action plan that included:

- Collecting and measuring different data and environmental indicators within the pilot area.
- Building the capacity of the staff to address sustainability issues.
- Preparing local environmental and urban guidelines that present standards for rehabilitation of a green neighborhood.
- Initiating a prototype for integrated solid waste management.
- Establishing a model of solar energy to increase the public awareness and importance of renewable energy.
- Rehabilitating of public areas and green spaces in the third district of Sheikh Zayed.
- Establishing a center for environmental awareness.
- Establishing different awareness and training programs<sup>13</sup>.

The project took the Third District of Sheikh Zayed as the pilot area for implementing its sustainability measures. The Third District includes public housing areas developed by NUCA. The awareness and training programs started by measuring the level of environmental awareness of residents in the pilot area through different questionnaires and surveys. The surveys focused on local environmental issues and were used to identify the most critical environmental problems in the area. A public hearing was also held in Sheikh Zayed's Youth Center, located in the pilot area, to discuss the different views of different groups concerned with the development of Sheikh Zayed. In addition, the program focused on increasing the awareness of communities about different environmental topics such as energy, carbon footprints, waste sorting, etc.

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<sup>13</sup> Ministry of Environment - EEAA - Urban Communities. (n.d.). Retrieved September 27, 2016, from <http://www.eeaa.gov.eg/en-us/topics/management/development/urbancommunities.aspx>

Presentations stressed the importance of reducing consumption and waste, improving efficiency, and reducing economic costs.



Figure 20: Brochures Explaining Types of Sorted Waste ("Ministry of Environment - EEAA – Urban Communities," 2016.)



Figure 21: Brochures Distributed on Sorting Waste ("Ministry of Environment - EEAA - Urban Communities," 2016.)

The project developed a set of workshops and sessions for staff working on the project and for community members, as lectures were held inside schools and youth centers. The lectures targeted topics like renewable energy resources, energy consumption, noise pollution and air pollution. A series of seminars were held in public schools under the topic health and the environment<sup>13</sup>.

The cooperation between the unit for sustainable cities in NUCA and the Ministry of Environment also focused on collecting more data in order to get an insight on the current situation of environmental indicators in the Third District. This cooperation resulted in installing multiple stations in the pilot area measuring noise and air pollution levels. The results were then presented in public lectures using noise and air pollution contour maps of the Third District.

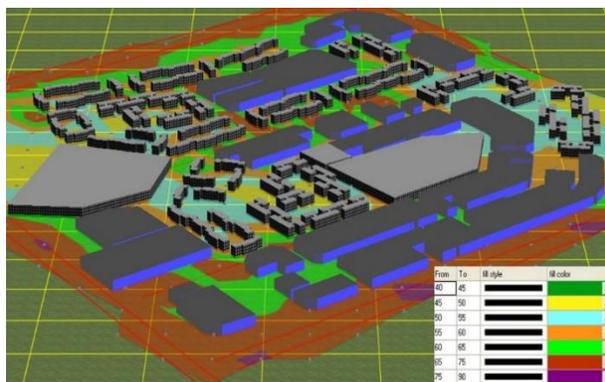


Figure 22: The Noise Contour Map Developed for the Third District in Sheikh Zayed (Farouh, 2016)



Figure 23: Measuring Air Pollution in the Streets of Shiekh Zayed (Farouh, 2016)

For its part, NUCA worked on implementing other points in the action plan that included 5 main sectors:

1. Energy efficiency and renewable energy
2. Waste management
3. Sustainable transportation
4. Water efficiency
5. Green buildings

NUCA decided to install a 50 KW solar energy plant on its Sheikh Zayed office building. According to the head of the central unit for sustainable cities, the panels were installed on a level that can be visible from the street to act as a statement that represents the building and increases awareness of passers-by. NUCA also replaced all regular building lamps with LED lamps, to save energy. Replacing the light bulbs inside the NUCA building alone achieved 76.5% power saving and 69,943 EGP annual cost savings. Sheikh Zayed underwent a partial replacement of street lamps too, solar panels were installed above some street lamps and others were replaced with LED. 1500 LED lamps were installed, lighting the main street of Sheikh Zayed<sup>14</sup>. Such initiatives were all done by governmental entities on a small scale due to the limited resources. The Authorities hopes to include the private sector in such initiatives to spread awareness further and widen the scope of exposure.



Figure 24: NUCA Building in Sheikh Zayed with Solar Panels Installed on its Roof (Farouh, 2016)



Figure 25: Solar Panels Installed over NUCA's Building (Farouh, 2016)

The Head of the unit explained that NUCA understands that the private sector represents the largest portion of the residential housing in Sheikh Zayed. Therefore, it is important to collaborate with the private sector to achieve sustainability goals for Sheikh Zayed. NUCA approached the owners of different private gated communities to explain the advantages and the long run return on investment of pursuing different energy efficiency strategies. NUCA also got partial grants from international organizations like UNDP to support different applications targeting energy efficiency inside the gated communities. NUCA convinced the stakeholders of one of the gated communities to change all the lighting in the public spaces of the community to LED lighting as

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<sup>14</sup>Farouh, H. (n.d.). Sustainable Cities Unit. Retrieved September 26, 2016, from [http://www.newcities.gov.eg/english/Cities\\_Unit/About\\_Unit.aspx](http://www.newcities.gov.eg/english/Cities_Unit/About_Unit.aspx)

one of the pilot projects. The occupants' union inside the gated community covered 75% of the costs while a grant from UNDP funded the remaining 25%. After the change took place the community witnessed a 70% reduction in the electricity bills of lighting in public spaces. This instant change in the electricity bills motivated NUCA to start convincing more private entities by showcasing the pilot project. A public hearing was held by NUCA in which they invited the gated community stakeholders to talk about the success of this gated community in saving energy and costs, which inspired the other gated communities to follow the same track<sup>15</sup>.

Other initiatives that targeted energy consumption were a part of bigger governmental plans. For example, South Cairo Electricity Distribution Company Is now installing prepaid electricity meters in the new residential units of Sheikh Zayed. The electricity meters work with rechargeable credit cards that need to be recharged in advance for their electricity consumption. Such systems have proven to make the users more aware of their energy consumption.<sup>16</sup>



Figure 26: Prepaid Electricity Meters Distributed to Residents of Sheikh Zayed

The waste management efforts focused on awareness campaigns in schools, youth clubs, and public lectures. In the schools, students were encouraged to sort the waste of their house daily and bring the sorted waste back to school. Students with the biggest amount of sorted waste received prizes. Meetings with different waste management companies were conducted to learn best practices. The aim is to partner with the private sector to handle the waste of Sheikh Zayed.

In the area of sustainable transportation, NUCA focused on developing solutions to issues associated with commuting between Sheikh Zayed and downtown Cairo. The residents of Sheikh Zayed and 6th of October City suffer from the lack of efficient transportation systems. The regional road networks that link these new cities with the rest of Greater Cairo suffer from severe

<sup>15</sup> Farouh, H. (n.d.). Sustainable Cities Unit. Retrieved September 26, 2016, from [http://www.newcities.gov.eg/english/Cities\\_Unit/About\\_Unit.aspx](http://www.newcities.gov.eg/english/Cities_Unit/About_Unit.aspx)

<sup>16</sup> Farag, M. (2015). Electricity Ministry cancels tender ... replaces with another. Retrieved September 29, 2016, from <http://www.dailynewsegypt.com/2015/08/25/electricity-ministry-cancels-tender-for-50000-smart-electricity-metres-replaces-with-another/>

traffic congestion. About 238,000 residents travel every day from and to the 6th of October and Sheikh Zayed to reach the urban center of Cairo. The 26<sup>th</sup> of July Corridor that is the main highway linking Sheikh Zayed to the urban center now carries 1.2 times its maximum capacity.<sup>17</sup> Private cars are the predominant form of transportation used by commuters between Sheikh Zayed and Cairo. Decreasing the use of private cars and increasing the use of public transportation is a crucial necessity, according to Sheikh Zayed NUCA authorities. Currently, they are working on developing a transportation project that will provide four bus lines from Sheikh Zayed to Tahrir Square in downtown Cairo to reduce the use of private cars. Sheikh Zayed is planning to launch a unified ticket for the bus lines and the metro system so that the residents can ride the bus from Sheikh Zayed to Tahrir and take to metro from Tahrir to any place in Cairo with only one ticket. The project planning is finalized along with the bidding. The project aims to provide clean new public buses and attempt to have a comprehensive transportation network in the area. It plans on having frequent bus stop stations and lines from the new cities to Tahrir Square, where commuters can transfer to the metro.

The water consumed in Sheikh Zayed is provided through the Abu Rawash purification and treatment plant, which produces 575,000 m<sup>3</sup> of potable water a day from the Nile River and is located about 10 km to the east. The plant also processes wastewater from a number of municipal sources. All the water used for irrigation in Sheikh Zayed is treated wastewater coming from the Abu Rawash facility. Because of health concerns, decorative water fountains in the streets use potable water. NUCA can monitor water consumed in irrigation and public fountains because the Authority manages these amenities, but domestic water consumption is outside their direct purview. Water meters are installed in every house, but these are read and billed by the water company and not by the Authority.

In the sector of green buildings, The Central Unit for Sustainable Cities and Renewable Energy collaborated with the Academy of Scientific Research and Technology and Arab Academy for Science, Technology & Maritime Transport in a research project focusing on green building development. The initiative focused on developing a prototype for a green and sustainable social housing project. With the aim of reaching the most energy efficient, water efficient, and building material efficient social housing model. The project has not yet produced any published results.

Sheikh Zayed Authority in collaboration with NUCA and the Ministry of Environment planned a model building to be a showcase for the green building initiatives. Under this collaboration, the “Hadeqat al Bee’a,” (Arabic for “Environmental Garden”) was developed. The garden is designed to be an environmental knowledge hub for children, accessible to students in the neighboring public schools. A building was constructed inside the garden for awareness sessions and activities. Children learn about renewable energy, waste management, pollution, techniques to preserve the environment, and sustainability best practices. The project aims to employ water

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<sup>17</sup> GOPP. (2012). *Greater Cairo Urban Development Strategy: Part I: Future Vision and Strategic Directions*. Cairo

and energy efficient features to showcase all the sustainability efforts in one location. The project is built with local materials and using construction waste coming from Sheikh Zayed. All the furniture inside the building is manufactured from recycled and reused materials. Solar panels are installed on the roof and the energy use of the building. A gray water treatment unit in the garden illustrates the water treatment process in an interactive way.



Figure 28: Showing the Environmental Garden with the Solar Panels Installed on the Roof (Farouh, n.d)



Figure 27: Illustrative Lecture in the Environmental Garden (Farouh, n.d)



Figure 30: Showing the Interactive Grey Water Treatment Unit in the Environmental Garden (Farouh, n.d)



Figure 29: Children Sitting on Recycled Furniture Inside the Environmental Garden (Farouh, n.d)

The garden is currently a hub for sustainability within the community, hosting public events and awareness campaigns. It attracts school children, adults and all sectors of the community. The success of the environmental garden is a living demonstration that open areas and public spaces can be used for promoting sustainability and developing a well-integrated community. The local Authority envisioned gardens as a tool helping to solve emerging social problems. Sheikh Zayed is one of the several communities in greater Cairo receiving large numbers of Syrian refugees, and the Authority believes integrating the refugees into the community is one of their challenges needing immediate attention. The local Authority is collaborating with the UNHCR to improve

the state of open areas and public school courtyards and playing fields in Sheikh Zayed. The UN initiative focused on improving open areas in schools that have enrolled refugee children. Initially, it was only funding for rehabilitating the gardens, then the Authority organized awareness campaigns that took place within the rehabilitated spaces.

Although there is an impressive number of sustainability and community-oriented activities taking place in Sheikh Zayed, almost all of them appear to be initiated by government authorities. These include the Ministers of Housing and the Environment, the local Sheikh Zayed Authority, and the NUCA central unit for sustainable cities and renewable energy. Although most initiatives focus on awareness and community engagement, it appears that rarely, if ever, it happens that the community itself starts an initiative. Sometimes, private individuals or groups donate money to support public sustainability initiatives, but this is not common practice. Private sector actors got involved in some of the projects, but only after these were organized by government entities and at their urging. This leaves the notion of community engagement an open-ended question. Will the community and the private sector develop and implement different sustainability initiatives on their own? Or will leadership always come from government in a top-down way?<sup>18</sup>

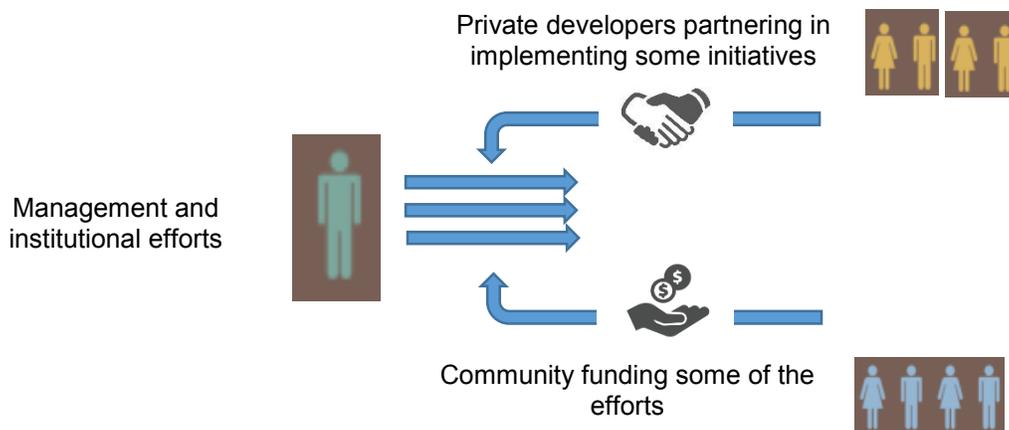


Figure 31: Entities behind Different Sustainability Initiatives in Sheikh Zayed

Management and institutional efforts	Private developers led efforts	Community led efforts
<ul style="list-style-type: none"> <li>- The ministry of environment initiatives.</li> <li>- NUCA and the unit for sustainable city plans</li> <li>- The local authority implementing different plans</li> </ul>	<ul style="list-style-type: none"> <li>- Private compounds installing LED lights in public spaces (under the guidance of the local authority)</li> </ul>	<ul style="list-style-type: none"> <li>- Only funding efforts</li> </ul>

<sup>18</sup> In other communities, we addressed these questions through interviews of private citizens. But in Sheikh Zayed we were not able to use this method because of its size and diversity. For Sheikh Zayed we address these issues in the following section relying on the expert opinions of managers and private developers.

## **Challenges and Sustainability as an Ongoing Process**

The range of initiatives that emerged or currently being processed in Sheikh Zayed are all under the vision of turning Sheikh Zayed into a green city, yet not all initiatives have progressed as planned. Some initiatives struggle to get community approval and support, while others lack funding or proper implementation.

Much of the awareness raising effort in Sheikh Zayed focused on waste management, but the implementation of waste management practices faced many difficulties. According to interviews done with NUCA representatives, the waste management education in schools was effective for the first two years. However, it was on a small scale and did not continue after monitoring was halted. The effort to partner with a private company that can handle waste collection and sorting in Sheikh Zayed do not seem to be succeeding. NUCA officials met with several companies to take over waste management functions, but the private sector was not motivated because their profits would be questionable. The companies also complained about the presence of informal garbage scavengers (pickers) who tamper with the waste and take what's valuable before it reaches the company collectors.

The waste management initiatives also faced struggles in reaching a deal with the community. Once the waste management pilot project was launched and the representatives initiated public sessions with the community members to talk about the value of their waste, resistance appeared from the community in terms of handling and sorting their waste. Such issues reflect the struggles of implementing initiatives that tackle behavioral changes. According to the director of the NUCA unit for sustainable cities, pilot projects involving only technological changes tend to succeed because they do not require people to change their behavioral patterns or attitudes, but waste management projects or waste management components in larger projects, tend to fail because they require a cultural and behavioral change in the way people deal with and understand waste. Although NUCA conducted awareness sessions and public hearings to come up with incentives for sorting, not much has changed at the household and neighborhood level. The failure to change is compounded by the lack of waste management companies and waste management systems.

Waste management was not the only sector that faced struggles due to social behavior. During several interviews with the Authority representatives, it was repeatedly emphasized that sustainability can be achieved through increasing awareness among community members, and that awareness will enable them to change their behavior to a more sustainable lifestyle. The Sheikh Zayed Authority has been addressing the issue of residents overusing electricity in their homes, by keeping appliances and lights on most of the time. The Sheikh Zayed Authority continues to attribute unsustainable behavior to lack of awareness amongst residents. According to NUCA's plans for the years ahead, Sheikh Zayed will exert greater efforts to increase environmental awareness among the population. Authority officials, however, tend to agree that dramatically increasing electricity prices charged to residents might influence wasteful behavior and encourage the reduction of needless electricity consumption.

Struggles with behavioral change are common within any community that aims to implement sustainability initiatives. Success would appear to lie in the quality of management, willingness to adapt, and persistence and continuity rather than simply launching a myriad of new projects. The entities leading the sustainability initiatives in Sheikh Zayed are aware of the importance of flexibility in the face of economic and cultural constraints to achieving their sustainability goals.

There are some considerations related to the overall planning of the city that may affect the performance of the city and need to be reconsidered. Despite Sheikh Zayed's impressive infrastructural development, residents are heavily dependent on neighboring cities, such as 6th of October, the Smart Village, and downtown Cairo for employment opportunities. Sheikh Zayed was designed to be a fully integrated mixed-use residential community, however, it will always be part of a larger socio-economic system. The interviewed officials made an observation about the population size variation between daytime and night in Sheikh Zayed. The population of Sheikh Zayed is larger at night because during the day people leave the community to go to work. At night, people return because there are a lot of services and recreational activities. They prefer to commute rather than live closer to their workplaces because Sheikh Zayed offers quieter and more pleasant surroundings. However, commuting in Greater Cairo is stressful, expensive, and time-consuming. Public transportation linking Sheikh Zayed to the rest of greater Cairo is an issue that will not go away. The problem will not only be solved by figuring out sustainable transportation alternative, but also by focusing on the future development in Sheikh Zayed in terms of job creation that may lessen the need for mass commuting.

It is clear that in Sheikh Zayed, establishing a sustainable community is not only about launching different initiatives, but also maintaining the sustainability of the initiatives themselves once they are started. The situation in Sheikh Zayed is harder than the two other cases of El Gouna and Haram City due to four reasons. First, Sheikh Zayed is an already established community that is trying to transform into a sustainable community, so initial sustainability goals were not existent. This means that infrastructure and urban planning was not implemented with a sustainable urban design. This can be the case in El Gouna too but the difference in scale might be a plus for El Gouna. Second, Sheikh Zayed, unlike the other two cases, is not a private gated community. This makes all initiatives harder to implement as controlling an open community is challenging when it comes to monitoring and being self-sufficient. Third, since Sheikh Zayed is managed by governmental authorities, investing and launching different initiatives will always be limited by the financial and managerial capacities of the authority. Fourth, all of the initiatives currently happening are initiated by the authority, making sustainability in Sheikh Zayed a top-down affair with minimal pro-active community participation. This makes continuity and ownership of the initiatives questionable. Yet with all the above obstacles, Sheikh Zayed is the only public ungated community in Egypt that encompasses sustainability within its agenda, and it offers a valuable set of lessons to other communities seeking sustainable futures.

## Case Study 3: Haram City

Haram city is the first private sector affordable housing project in Egypt. It is a gated community for middle and low-income families and was formed as a result of a public-private partnership between the government and Orascom Housing Communities (OHC). OHC was established in 2007 with the objective of creating sustainable urban communities that provide a desirable alternative to the informal housing areas that dominate greater Cairo's housing market. The OHC mission is to build affordable housing units of high-quality design and construction within sustainable and fully integrated local communities that take the form of gated compounds. The key concept is "affordable." Cairo has been experiencing a housing crisis since the 1980s, but the reason is not lack of built housing. The reason for the crisis is a lack of affordable housing for the average Egyptian wage or salary earner. Consequently, millions of Cairenes (estimated at about 65% of the population) live in informal (unlicensed, unofficial, and outside most government services) and substandard housing. The environmental conditions of informal settlement areas are poor and people suffer from lack of utilities and services. There is a well-developed market for accommodation like Haram City because of its affordability relative to formal housing built under government licensing and according to municipal development plans and services. The Haram City project has received international recognition for its vision to provide a sustainable alternative to informal housing in one of Africa's largest and fastest growing cities. In addition to affordable housing unit prices, new residents are attracted by a scheme to provide subsidized financing to prospective homeowners. UNDP and the World Bank have backed the scheme: "Haram City is one of the flagship projects for the new UNDP/World Bank drive to securitise lower-middle income potential homeowners in the [Global] South through subsidized mortgages."<sup>19</sup>

The location of Haram City (haram means pyramid) is in the desert urban development area east of Cairo. The site is on the southern outskirts of 6<sup>th</sup> of October City, not far from the new gigantic Mall of Egypt and the Magic Land entertainment and recreational development. Haram City and Sheikh Zayed are less than 10 kilometers apart, being separated by the 6<sup>th</sup> of October commercial district. But the two developments are much further apart in terms of size, planned purposes, government investments, and the social and economic characteristics of their respective residents. Both are about 35 kilometers from Tahrir Square in central Cairo, but the configuration of the road network is such that it takes considerably longer to travel there from Haram City than from Sheikh Zayed. The two also differ in terms of governance. Whereas Sheikh Zayed is a new town and under the administration of NUCA, Haram City is considered a private development project and operates under arrangements very similar to those enjoyed by El Gouna. In fact, this is far from coincidental. OHD, the El Gouna developer and operator, and OHC Haram City, the

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<sup>19</sup> Simcik Arese, N. (2015). A Compound in Common: the case of 'Little... Retrieved November 10, 2016, from <http://caiobserver.com/post/109309257939/a-compound-in-common-the-case-of-little#.WCQ3kfI961t>

Haram City developer and operator, are Orascom companies owned by the Sawiris family. OHD owns 35.25% of OHC.

Like Sheikh Zayed, Haram City is built to a master plan, but the site is smaller (8.4 km<sup>2</sup>) and more compact. The master plan includes 70,000 housing units and a projected population when fully completed and occupied by 400,000 residents. This is a planned population density of almost 48,000 people per km<sup>2</sup> and a density almost four times that of Sheikh Zayed. Since the housing is all low-rise, Haram City achieves this density by reducing green spaces. There is provision for some recreational facilities and sports fields, and there are some grassy squares among the blocks of housing, but there are no open parks or private green spaces (or golf courses) as there are in Sheikh Zayed. Green spaces comprise less than 10% of the area, and commercial and institutional space is perhaps another 7-10%.

The standard housing unit is modest: living room, two bedrooms, kitchen, and bath. There are also studio apartments. Most units are in two or three story buildings with ground floor units and upper floor units. The ground floor units have a small garden. There are some detached units with the possibility of adding an additional room on the roof. Although the floor plans are much the same, there is some variation in size, but all units are modest. The first residents had settled by the end of 2008. By 2012, there were about 35,000 residents and 11,500 residential units and 89 commercial outlets constructed.<sup>20</sup> OHC has launched two more developments complementing Haram City called Haram Life and Qena Gardens. Haram City follows the same basic unit design as Haram City, but the buildings are up to four floors. Qena Gardens has larger units with up to four bedrooms and more detached houses.

All OHC developments follow the same eligibility requirements. Prospective owners must be between 21 and 50 years old and have monthly incomes limited to EGP 1,750 per month for individuals and EGP 2,500 per month for a family. Considering that the average minimum wage in Egypt during 2012-16 was EGP 1,075, then OHC and its government partners are targeting earners of modest incomes. A further condition is that the prospective owner must not already own a house nor rent accommodation that is subject to rent controls or subsidies. If eligible, a purchaser has a variety of options for financing the purchase. All require a reservation down payment of 10% of the purchase price, but there are different options for indicating an amount of initial payment with length and condition of loan repayment on the mortgage. The conditions are such that the government Housing and Development Bank is subsidizing the purchase of homes in Haram City, as opposed to purchases on the open market. In 2015, prices for units in Haram City were reported at between EGP 140,000 and EGP 200,000.

In contrast to informal housing neighborhoods, it is meant to replace, neighborhoods in Haram City are well equipped in terms of infrastructure. The Haram City website describes a typical neighborhood area as including roads, hardscape, planting, plumbing pipes, water, and fire pipes,

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<sup>20</sup>OHC. (2012). Haram City. Retrieved November 10, 2016, from [http://www.orascomhc.com/project\\_details.aspx?Type=false](http://www.orascomhc.com/project_details.aspx?Type=false)

and medium and low voltage cables, in addition to the construction of several service buildings including electric substation, police station, an Orascom-supported language school, and places of worship.<sup>21</sup>



Figure 32: Examples of Envisioned Haram City's Residential Units

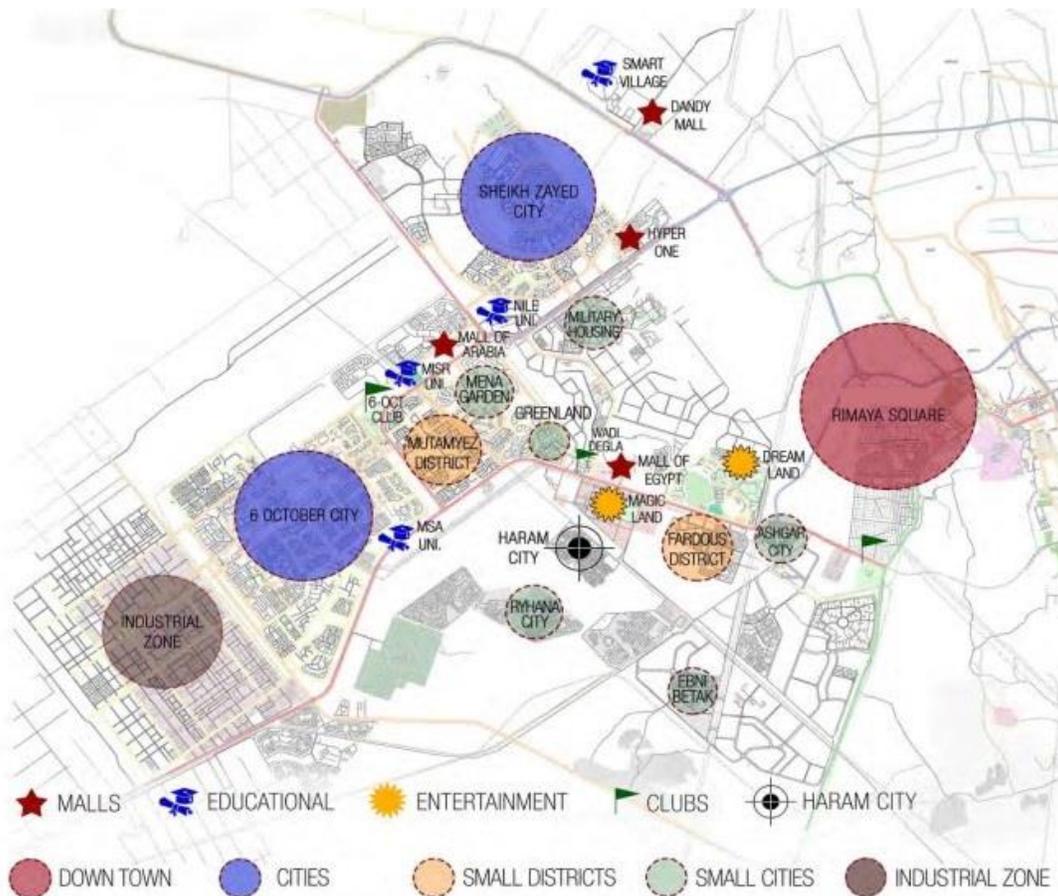


Figure 33: Map the Context of Haram City (El Sheikh et al., 2014)

<sup>21</sup>ORASCOM. (2008). Haram City, 6th of October - Egypt. Retrieved November 10, 2016, from <https://www.orascomdh.com/en/destinations/operating-destinations/haram-city.html>

## The Structure

According to Omar El Hitamy, the managing director of OHC in Haram City, "Greater Cairo needs 2 million new housing units within the next 10 years...that demand can be met only if private companies like Orascom create a sizable volume of new homes at low cost." OHC affordable housing projects are designed around private - public partnerships (PPPs). In this case, the government sold OHC the land for a relatively cheap price, whereas OHC contributed all other forms of investment. Upon completion, the project should be handed to the government to be managed as a public project. "It's not charity, it's a longer-term vision," Mr. El Hitamy said. "The project has to provide quality of life."<sup>22</sup> According to Sahar Nasr, the Lead Financial Economist for the Middle East and North Africa region at the World Bank "the project will alleviate pressure on the government to subsidize housing for middle and low-income households by tapping into the banks' liquidity. It will also play an instrumental role in addressing high unemployment problem by creating job opportunities for the growing young labor force in the building of new houses."<sup>23</sup>

The present residents of Haram City can be divided into two categories: the first is made up of low and medium income earners as originally intended, but the second category consists of who are in effect refugees from an informal area in eastern Cairo called Duwaiqa that was destroyed by a rockslide in 2008. The homeless refugees were not allowed to rebuild because of continuing geological dangers, and the government sought to resettle them in nearby areas where many of them worked and had jobs. However, the resettlement efforts proved unsatisfactory, and eventually many of them relocated to Haram City, far from their original place of settlement and also far from their places of employment. The Duwaiqa people accounted for about 2,000 housing units in Haram City in 2016 with a population of about 6,000 people. Some of the units were purchased on their behalf by the government, some of them were donated by OHC, and some of them are occupied by squatters. Most of the Duwaiqa refugees reside in one neighborhood in Haram City that has acquired the informal name "Little Duwaiqa."<sup>24</sup>

The arrival of the Duwaiqa refugees presented a challenge to the vision and identity of Haram City. The refugees could not afford the purchase price of housing in Haram City, even with the financial subsidies being offered. Even before they lost their homes and sources of income, they had lower income than what was expected of homeowners in Haram City. Those who still had jobs near to the old Duwaiqa found that the cost of the daily commute from their new homes in Haram City was often prohibitive. OHC did its best to provide local employment opportunities on construction sites in Haram City or providing commercial units for the new arrivals to open their

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<sup>22</sup>Cambanis, T. (2010). To Catch Cairo Overflow, 2 Megacities Rise in Sand. Retrieved November 10, 2016, from [http://www.nytimes.com/2010/08/25/world/africa/25egypt.html?\\_r=0](http://www.nytimes.com/2010/08/25/world/africa/25egypt.html?_r=0)

<sup>23</sup> The World Bank. (2013). Affordable Housing Brings Hope for Low Income Egyptians. Retrieved November 10, 2016, from <http://www.worldbank.org/en/news/feature/2013/12/06/affordable-housing-brings-hope-for-low-income-egyptians>

<sup>24</sup> Arese, N. (2015) A Compound in Common: the case of Little Duwaiqa, Haram City. Retrieved February 16, 2017 from <http://www.cairoserver.com>

own small businesses. In fact, over the years many of the Duwaiqa people have found a means to make a living in Haram City, often by local employment, operating a small business, or providing services to the other residents of Haram City.

### **Community Services and Sustainability Initiatives**

Haram City’s vision is an integrated community that focuses on providing for the basic needs of its residents while developing parallel initiatives to establish a culture of sustainability. According to Lilian Awad, the manager of an environmental NGO within Haram City, targeting urgent, basic needs first for the residents, such as health care, education, employment, will allow people to be more open in the future to other initiatives like environmental sustainability. “We cannot tell a resident to act sustainably if he can barely provide his basic needs, or to buy A-rated electric appliances if they can barely afford normal electric appliances,” she states.

The vision of an integrated community is evident in the existence of services such as schools, nurseries, a police station, clinics, pharmacies, supermarkets, a mall, and a cinema. Most of these are centralized within the main area, with more small supermarkets, kiosks, barbershops to mention a few emerging as resident-initiated businesses, most notably in the Little Duwaiqa area. These outlets are either fully owned by the operators or leased from OHC or a third party.



*Figure 34: Administrative and Commercial Areas Overlooking the Main Open Space in Haram City*

Unlike El Gouna, with its unified management under OHD, or Sheikh Zayed with its government authority structure, services and sustainability initiatives in Haram City come from a variety of sources. In the main, there are four sources: OHC management, Egyptian government entities, non-governmental organizations (NGOs), and private-sector companies. “Beyond ensuring the town’s self-sustainability through employment opportunities in commercial and industrial sectors, the city hosts various projects designed to stimulate job creation and benefits the overall

community as well as underprivileged segments” (Orascom)<sup>25</sup>. Haram City has numerous initiatives for the social and economic development of low-income communities. Some claim to contribute to economic and environmental sustainability. Notably, Ertekaa, the waste management company that has a branch in El Gouna, manages Haram City’s solid waste collection and recycling processes. In fact, Ertekaa was established first in Haram City and its headquarters are still located at the site. A notable national NGO, The Association for the Protection of the Environment (A.P.E), is also well established in Haram City and works on social and economic development through health education, leading and advising on small scale income generating projects. Banaty, an orphanage and rehabilitation center for girls, is an important social and educational charity institution. In addition, there are various projects to serves the needs of residents, public awareness centers, and healthcare units.

Energy and water facilities are regulated by Haram City’s OHC managers. OHC purchases electricity from the government and redistributes it among residents in a fashion similar to that found in El Gouna. Recently a number of residents have installed their own meters and begun monitoring their electricity consumption independently from Haram City and purchasing directly from the government controlled energy lines. In terms of water management, OHC began in 2009 to operate a sewage treatment plant to cater to the entire project land area. The treated effluent from the plant is used for landscape irrigation around and within Haram City to maintain its green spaces.

While internal informal microbus stations exist within Haram city, transportation remains an issue for most residents. Most cannot afford a private car or expensive bus tickets, especially for residents who work outside of Haram City. A bus service initiated by OHC previously functioned to take residents to areas near Haram City where they could transfer to another mode of transportation, but this has been halted because passenger fees could cover operational costs.

The OHC management has established and funded Resident Service Centers in Haram City that are one of the most effective community engagement mechanisms, since the employees are also residents of the community, and there is a familiarity with the nature and legitimacy of the social problems and cases brought to them by local residents. The Resident Service Centers work in affiliation with the Ministry of Social Solidarity to provide pensions for single women, old people, and families of veterans and prisoners. Moreover, they try to find scholarships to fund college education for local students. They have many charity and relief projects such as collecting and distributing donations of clothes, meals, toys and blankets. OHC’s support to improve the quality of education provided by the public schools located in Haram City has been previously mentioned. In particular, OHC has provided funding to enable English and German language instruction in these schools.

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<sup>25</sup> ORASCOM. (2008). Haram City, 6th of October - Egypt. Retrieved November 10, 2016, from <https://www.orascomdh.com/en/destinations/operating-destinations/haram-city.html>

The Ministry of Social Solidarity operates a Social Affairs unit in Haram City that works closely with OHC and the company's corporate social responsibility program. According to Mrs. Faten Mohamed, the Social Affairs Manager, Haram City's corporate social responsibility sponsors a financial support unit for single mothers. Benefits include significantly cheaper rent and free provision of all maintenance services and monthly bills such as water and electricity for these women. Moreover, while most Haram city residents are given subsidized school fees within the compound, single women receive significantly higher subsidies for the OHC built government schools. The management has also set up a temporary retirement home for homeless people until they are matched with their families and organizes free medical campaigns from external hospitals. Another initiative is the Malayka embroidery factory and school for women which allows low-income residents to learn a skill and generate an income.

Haram City has a health unit with doctors and nurses hired by the Ministry of Health and it caters mainly to the segment of people that cannot afford any other type of healthcare. It includes a family planning specialist, regular health awareness sessions, vaccinations, etc. The main issue is the high demand for these services and the absence of the capacity and funding to meet this demand. The health unit also offers daily awareness session on different medical and hygiene topics.

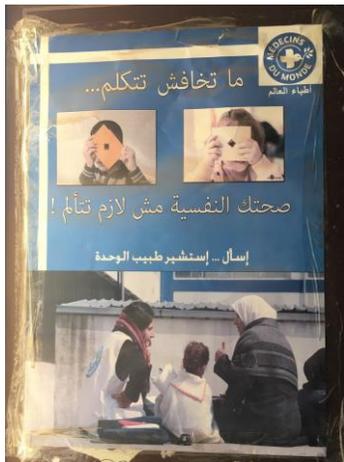


Figure 35: Signs of the Medical Unit in Haram City

The Association for the Protection of the Environment (A.P.E.) is an Egyptian non-governmental organization established in 1984 and registered with the Ministry of Social Affairs under license number 3255 and operates in Haram City, in addition to many other locations in greater Cairo. While A.P.E.'s main target is environmental development, its mission in Haram City is being altered to fit local priority needs which are mainly social and economic, given the socioeconomic status of its residents. A.P.E. serves mainly the most vulnerable members of the community, such as women and children, by providing health care and education opportunities. For example, education is tackled through the creation of a nursery and preschool that run with a Montessori curriculum, thereby focusing on developing creativity and skills rather than following a basic and static curriculum. For underprivileged women, this comes in the form of literacy and awareness

classes and sessions. The organization markets its initiatives through street surveys and word of mouth from former residents involved.



*Figure 36: Subsidized Nursery Founded by APE in Haram City*

The project has gone through three phases, and after each phase, A.P.E. conducts studies and surveys for 4 to 5 months to determine what issues should be addressed next. Phase 1 targeted poverty and environmental awareness and aimed at linking between the service providers and service recipient and minimizing the gap between them. Phase 2 focused on treating anemia, which was prevalent among kids due to malnutrition, they targeted this through nutrition sessions and encouraging regular medical checkups. Moreover, it introduced small-scale projects and craft making. As the end of the project nears the organization finds for someone from the locals to adopt, manage and develop it further to ensure its sustainability. Phase 3 targeted unemployment, addiction, and diabetes. According to the initiative managers, drug use rates were observed to have increased significantly, especially after the revolution. On a similar note, diabetes was seen as a major concern due to the fact that 15% of the Egyptian population already suffers from diabetes.

The organization's economic component targets structural unemployment through the establishment of a hiring office to match job seekers with vacancies in companies and factories within and outside Haram city. Besides job creation and offering vocational training in handicrafts, A.P.E. offers business support in the form of small loans, cost-sharing schemes, technical advice, and expense tracking to help some residents manage their small scale business startups.



Figure 37: Signs for APE Projects in Haram City

Another principal initiative is providing quality education to fill the gaps in regular schooling curriculums or teaching methods. Moreover, the organization conducts regular health checkups and awareness sessions, with a focus on addiction and diabetes. Psychological health is also a primary concern that is targeted through support groups for youth for issues like self-confidence and channeling emotions. It is clear that the Association for the Protection of the Environment emphasizes the maintenance and development of social responsibility and sustainability projects within Haram City. One of the association’s main advantages is its flexibility to address issues that arise within the community rather than functioning with a rigid and limited pre-established agenda that dictates project components and does not cater to the residents’ needs and concerns.

Banaty (Arabic for “my daughters”) is a Non-Governmental Organization established in 2012 that works with homeless girls to provide a safe and healthy environment. The NGO aims at improving their physical, psychological and social wellbeing and targets an age range of 1-18 years old. It works on providing them with a home where they can receive an education, prosper and develop their mental and creative skills. The organization regularly visits areas with homeless children to recruit the girls through year-round data collection concerning the most vulnerable communities. Banaty then makes a complete psychological assessment of the girls and directs them to professionals if needed. It also provides them with medical care, skills development workshops,



Figure 38: Banaty Rehabilitation Center

clothes, a healthy diet and psychological support throughout their stay in their rehabilitation center.

“The Enhancement of Integrated Services and Waste Recycling Company “Ertekaa” was established in Haram City in 2008. It is a waste management company that aims at achieving zero waste sorting, which means utilizing all waste in either compost, reuse of recycling and having no waste to throw in landfills. In addition to all the neighborhoods in Haram city, Ertekaa has contracts for waste management, in the Pyramid Hills residential compound, 7 individual companies, 1 hotel, 1 mall, 2 mega supermarkets, 1 charity foundation and 1 aquarium in the 6<sup>th</sup> of October area. The headquarters of Ertekaa is located in Haram City with a labor force of approximately 900 employees. In addition to a salary, employees are provided housing, a daily meal at work and social, health and life insurance. Of course, the company also operates its branch in El Gouna.



*Figure 39: Ertekaa Waste Collection*

Ertekaa proudly claims to be the only company in Egypt practicing integrated waste management. There are other waste collection and disposal companies operating in the country, but Ertekaa argues that they do not truly practice sustainable waste management. Ertekaa offers a variety of services to meet consumer needs in solid waste management and environmental conservation. Ertekaa deals with the entire process of a solid waste management system for three types of waste: industrial waste, municipal waste, and medical waste. It is also participating in eight different LEED (Leadership in Energy and Environmental Design) projects through which it helps companies meet standards and environmental requirements to be eligible for international certification in waste management. The company collects waste from 33 different locations in greater Cairo, including residential areas, institutions, hotels, factories, etc.

Ertekaa is considered the only integrated waste management system, their success could be attributed to focusing on the sustainability of the system. The company makes sure they have mapped out all the waste collection points, and they advertise these through campaigns so that people are aware of the sites. The company is always following-up to encourage adoption of the

system. The system involves sorting stages, one basic stage at the source separating organic from inorganic waste and the other at their facilities that are more detailed. Waste is sorted into 34 different categories at the Ertekaa processing center in Haram City, and at each stage, the trash is monitored and weighed before going to the next step. Moreover, they collect municipal construction waste. Organic waste is made into compost and utilized in a 2.5 ha (6 acres) organic farm situated behind their sorting facility. Moreover, Ertekaa is involved in some field research projects in relation to biomass and biodiesel. They also recycle E-waste. Ertekaa records the weight of garbage in each truck and where the waste comes from, in addition to the weight of each category of sorted waste. This data contributes to cost-benefit analyses of Ertekaa operations.

The company focuses on social sustainability by maintaining close ties between managers and employees through bonding activities. Accordingly, the company ensures a clean community for residents and generates employment opportunities. "Employees at the recycling facility have access to residential units at Haram City, as well as food and transportation." On the other hand, most of Ertekaa's employees are residents in Haram City, where they provide a job for the residents who are willing to work after giving them an intensive training. Moreover, Ertekaa's social responsibility program works on teaching children the basics of sorting and recycling. According to Ertekaa, 60-20% of the residents sort from their homes, a figure that varies with the frequency of waste management awareness sessions. However, the accuracy of the sorting is rarely guaranteed. However, they have mentioned the difficulty of enforcing the sorting at source culture to Haram City residents as it is not ingrained in their culture. As a private - public owned city, Haram City could be a potential showcase of a sustainable affordable housing community. According to the CEO of Ertekaa, "we can see how people's behaviors in areas such as Haram City have changed through the past years, people are now keen on keeping their area clean."

Through the review of different services and initiatives happening inside Haram City, it was clear that most of the initiatives are initiated by the OHC management. Since the private management encourages civil society, in particular, NGOs, to operate inside Haram City, this provided the optimal environment for NGOs to function inside Haram city and initiate several sustainability initiatives adding to several services. Various public services are provided within the city which reflects the authority's willingness to partner with the private sector. Haram City's management financially supports the public sector by providing them with already established buildings for free, where the public authorities can move in and establish the system for their service. This reflects the private management's leadership in most of the initiatives and services taking place inside Haram City. Even the civil society and the public sector government agencies are supported by the private sector, with almost no initiatives initiated from the community side.

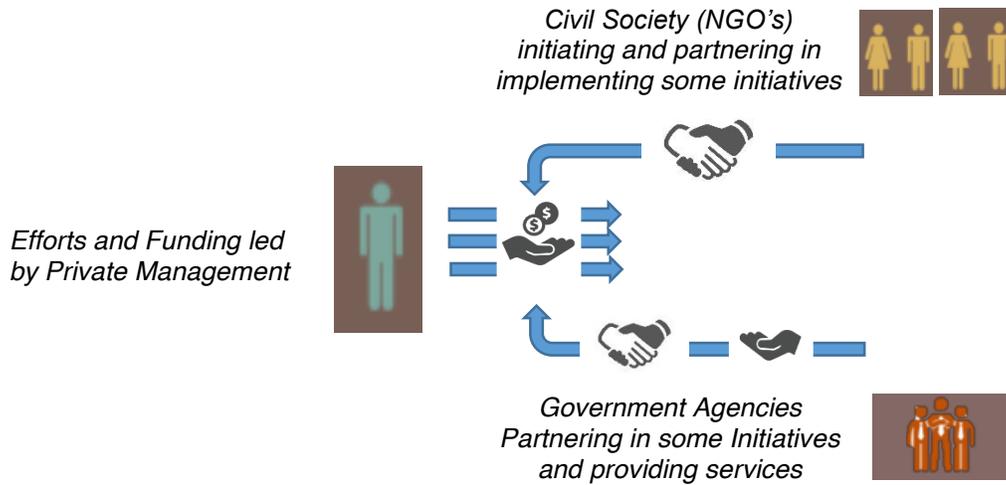


Figure 40: Entities Behind Different Sustainability Initiatives in Haram City

Some of the Management efforts	Some of the Civil society efforts	Government agencies
<ul style="list-style-type: none"> <li>- Funding and building structures to be accommodated by NGO's and government agencies.</li> <li>- Partnering with APE and Ertekaa.</li> </ul>	<ul style="list-style-type: none"> <li>- APE leading environmental and job generation's programs.</li> <li>- Banaty foundation hosting street children.</li> </ul>	<ul style="list-style-type: none"> <li>- Providing and running public health units, social solidarity units, and schools inside the community with public workforce.</li> </ul>

## Community Perceptions

According to interviews conducted in Haram City, several keywords emerged while talking about Haram City. What attracted the residents to Haram City ranged from privacy, services, and safety to green spaces, which are lacking in most Egyptian urban communities with low-income residents.

Privacy was one of the main benefits brought up by the interviewees, as residents indicated that low-income housing in Egypt means compacted housing, which often decreases the feeling of privacy in between the residents. For the residents, Haram City succeeded in offering a low-income housing that is low in density, thereby giving a spacious unit to the residents. Every building is self-standing and only consists of four residential units divided into two floors along with private gardens provided for ground floor units, allowing residents to have their own comfortable space.

Safety was another characteristic brought up by the residents as they also highlighted that Haram City is one of the few gated communities that target low-income housing and offer a 24-hour security service which increases the sense of security within the city. One resident stated that

due to feeling secure, she can let her children commute independently in Haram City, which is something she wouldn't do elsewhere.

A resident who works for an NGO in Haram City mentioned the availability of diverse services in Haram City and stated that she hardly needs to go outside to get anything. Appreciation of green spaces and cleanliness was mentioned by many interviewees. Residents and employees indicated that they appreciate the presence of Ertekaa because they keep the streets clean. This cleanliness allows residents to appreciate the luxury of open green spaces within the desert. Four of the residents interviewed were working in Haram City. They all said that once they started working in Haram City they decided to move in with their families. In contrast, many residents started working in Haram City due to the convenience of working close to their homes.

Interestingly, upon moving to Cairo, a number of former El Gouna residents relocated to work or live in Haram City. Due to their familiarity with the similar building style, cleanliness, and feeling of being in an integrated community there, they referred to Haram City as an emerging, but a slightly altered example of El Gouna to match lower income levels.



*Figure 41: Residential Units in Haram City*

### **Sustainability as an Ongoing Process**

The unplanned arrival of the Duwaiqa refugees certainly led to a change in the social fabric of Haram city. The city was planned to be occupied by lower middle-class families (as indicated by the income eligibility guidelines) but the above circumstances changed its social composition. As noted by Cambanis, "Haram City was conceived as an affordable neighborhood for lower-middle-class professionals, but the government has bought hundreds of units and is filling them with some of Cairo's poorest inhabitants leading to a lot of social class tensions." This dilemma caused many problems to the original residence of Haram city, feeling unsafe in their own homes, as the rate of theft increase after the Duwaiqa residents moved in. Some of those challenges remain to date. In the beginning, many residents disliked this idea, blaming the government and Haram City management for advertising the city for middle-income professionals and then allowing it to be inhabited by lower-income families. The residents asked for a fence between the area where the original inhabitants lived in and the areas that were inhabitants by the Duwaiqa families.

However, this request was refused by the management as this would have been against the social inclusion values of the city. The situation improved over time and took a lot of effort from the management through community meetings and integration workshops between the two sectors of the society. The presence of the low-income families proved to be beneficial as with time they opened small service business and vocational businesses inside the city. This type of services and business helped in reviving the business sector inside Haram city, it was also presenting services to the middle-income professionals that they could not provide themselves, leading to a better-integrated community.

In addition to the major challenge of social composition, minor challenges appeared. Management succeeded in adapting to some of them and failed to overcome others. For example, the health unit established in Haram City planned to conduct regular awareness sessions to the residents. The unit initially faced problems in attracting the residents to the awareness sessions. Accordingly, it decided to move the sessions to the waiting area in the clinic in an informal way, where the patients get to hear the session informally while they are waiting for their turn.

Unlike many other communities, during the construction of Haram City, certain building techniques and structure systems were adopted to have a minimal impact on the environment. The first phase included buildings of two floors built with a bearing wall system to reduce the cost of building in order to offer the units at the lowest price possible. Bearing wall systems are also linked with low heat absorption materials. This lowers air conditioning use, while at the same time, limits the use of steel and concrete. However, after the completion of the second phase, many structural errors appeared. Fixing these problems lead to an increase in cost. Moreover, it was proven that the normal steel and concrete column structure would have been more economic efficient within the local market circumstances. Because of this, the second phase of Buildings in Haram City consisted of four-floor buildings called “Haram life”, built with beam and column system (no load bearing walls).

Currently, the main source of income for Haram City is maintenance fees. This is a major financial issue. The fees are only EGP 50 per unit per month and many residents are unwilling to pay. Currently, there is a deficit of EGP 13 million due to these maintenance fees. It appears that revenues from property sales and maintenance fees are not sufficient to cover the costs of building and operating Haram City. OHC management continues to rely on funding from its parent companies and private foundations. New strategies need to be adopted to ensure financial sustainability. On the long run, OHC will transfer management of Haram City to the government, but it may also be transferring a financial burden.

Despite the management’s best efforts, resident-led initiatives and meaningful public participation in the life of Haram City are almost non-existent. The opinion has been voiced that residents who can afford to buy units are still not well off enough to afford the time to volunteer in community engagement and support. Nevertheless, some interviewees stated that behavior in the community started changing after residents became more used to the culture of Haram

City through learning more about waste sorting and recycling and seeing the activities of the Association for the Protection of the Environment. If compared to the emerging sustainable communities in the world, Haram City is clearly not offering any sustainable infrastructure or targeting renewable energy. This may lead to the conclusion that Haram City has no environmental sustainability vision or focus. Yet Haram City has managed to adapt the concept of sustainability to address many of the social and economic needs of its low-income residents. This primarily social version of a sustainability strategy is reflected in the focus on training, awareness, job creation, and basic services along with encouraging an inclusive community that embraces all social levels. As stated by the OHC management, the ability to provide these basic needs is, in fact, the cornerstone for establishing a sustainable community in Haram City.

## Conclusion

Sustainable communities have been evolving in Europe and North America for over 30 years, so in comparison, it is not surprising that Middle Eastern communities appear less comprehensive and more basic in their approaches to sustainability. Although sustainability in these Egyptian cases seems underdeveloped as a concept and method in comparison with cases presented in the previous report on best practices internationally, each of the three has managed to define sustainability to serve its own needs and aspirations and has pursued a program of initiatives to meet those goals. Four factors emerged as shaping each community's unique approach: the founding vision, the form of governance, social composition, and adaptive response to challenges.

The founding vision sets the direction of sustainability for the community. For El Gouna, sustainability initially served the purpose of attracting real estate purchasers and lowering operating costs. For Sheikh Zayed, sustainability served the purpose of creating a showcase of government-guided development. For Haram City, sustainability was a means to improve the social and economic circumstances of low and middle-income families and provide a desirable alternative to living in informal settlements.

The form of governance heavily influences the kinds of sustainability initiatives adopted in the community. In El Gouna, which is owned and managed by a private company, profit is the bottom line and sustainability is a way of improving the bottom line. As a government planned new resettlement community, Sheikh Zayed is a showcase for national policy, gaining political support, and attracting investment in development projects. In Haram City, which is a public-private partnership, the key attributes of sustainability initiatives were resource mobilization and social inclusion.

The socioeconomic composition each community influenced how management embraced sustainability. In El Gouna, which relies on tourists and seasonal residents, the management focused on highlighting the community's cultural diversity, international character, and quality of life. In Sheikh Zayed, with a diversity of income groups, the management focused on the provision of municipal services and public awareness campaigns to pursue its sustainability goals.

In Haram City, sustainability for management meant promoting social cohesion and creating employment opportunities.

Despite their differences, the three communities share one sustainability challenge: making the transition from a business model that essentially depends on selling land and real estate to sustain itself to establishing something else that can sustain the community from many different sources. The managers are aware of this problem and each has created their own interpretation of a sustainable outcome for their community. In El Gouna, the solution is a permanent resident population that exceeds the transient population. In Sheikh Zayed, the solution is integration with the surrounding metropolitan area. In Haram City, the solution is providing employment and services to the community.

## Annex 1

Table 1 General parameters of the three communities

	El Gouna	Sheikh Zayed	Haram City
<b>Years of operation</b>	26 years	21 years	10 years
<b>Population Size</b>	15,000 – 22,000	233,000	35,000
<b>Number of residential units</b>	3,306 + residential units <sup>26</sup>	72,942 residential units	11,500 residential units
<b>Area</b>	36.92 million m <sup>2</sup>	53.3 million m <sup>2</sup>	8.4 million square meters
<b>Governance structure</b>	Private	National Public	Public Private Partnership
<b>Cultural Diversity<sup>27</sup></b>	High	Medium	Low
<b>Targeted Residents</b>	High and upper Middle income	Different percentages of low, middle and high-income	Middle and low income
<b>Context</b>	Coastal	Peri-urban	Peri-urban
<b>Management</b>	The developer	NUCA, Ministry of Housing	The developer – will be handed to the local authorities

Table 2 Sustainability features

	El Gouna	Sheikh Zayed	Haram City
<b>Solar features</b>			
<b>Water recycling features</b>			
<b>Environmental Awareness campaigns</b>			
<b>Waste sorting from the source</b>			
<b>Waste recycling facilities</b>			
<b>Affordable housing program</b>			
<b>Community connected to mass transit</b>			

<sup>26</sup> Orascom Hotels and Development El Gouna - Orascom Hotels and Development. (n.d.). Retrieved December 14, 2016, from <http://www.orascomhd.com/el-gouna/>

<sup>27</sup> Relative number of nationalities among residents

