

## Forest city

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**Year of commitment** : 2017

**CO2 Impact** : Actively promote public transportation and shared services from different levels of the transportation system strategy, reduce the use of private cars, therefore, significantly reduce CO2 emissions. At the same time, grow green plants in the three-dimensi



84 750 000 000

**Digital services** : Cloud data solutions, Automation

**Sustainable mobility** : Intra-urban mobility, Mobility services, Carpool

**Biodiversity & Ecosystems** : / Urban ecosystem, Preservation, Green roof /

### GENERAL INFORMATION

Forest City is located in Iskandar Malaysia Special Economic Zone, covering approximately 20 square kilometers. It faces Singapore across the sea with a straight line distance of only two kilometers, as the "bridgehead" connecting Malaysia and Singapore. The project is a novel green and smart city pilot project jointly developed by Country Garden Group(Country Garden Holdings) and the Malaysian-government-backend Esplanade Danga 88 Sdn Bhd (EDSB).

Forest City comprises three human-made islands, with a total construction area of nearly 65 million square meters and a capacity of almost 700,000 people. This project has formulated strategies and visions for coordinated urban development, three-dimensional traffic stratification, green and low-carbon construction, healthy living communities, as well as a unique urban image. It is positioned as a local integrated economic link to undertake industry and consumption, a regional integration strategic highlands to serve new technology applications and headquarters bases, the international green smart city models to cultivate industrial chain ecology and services, and create a sustainable and livable city. Eight major industries were planned in the project, including tourism and exhibition, health care, education and training, foreign enterprise hub, offshore finance, E-commerce base, emerging technology, green and smart technology.

The three islands had their planning characteristics, respectively focusing on industrial collaboration, business and tourism, duty-free foreign trade, upscale health care etc., to provide diversified urban services for high-quality living, work, leisure, and health care through organic combination.

The project successfully applied advanced concepts of multi-dimensional greening, sponge city design, smart city, resilient city, TOD mode, building industrialization, multi-layered transportation; adopted measures such as mangrove ecosystem protection, seagrass protection, embankment protection, and real-time water quality monitoring for environmental protection. All these help achieve intensive use of land, ecological sustainability, biodiversity protection and create a green, smart, compact, and harmonious livable urban environment.

All walks of life have widely recognized the green wisdom concept that appeared in the Forest City project. The project received the commendation Certificate of Corporate Social Responsibility Contribution issued by the Prime Minister of Malaysia; also won several international awards such as the Boston Society of Landscape Architects (BSLA) Merit Award (one of the most prestigious design awards in the U.S.), the UN Sustainable Cities and Human Settlements Award (SCAUSA), as well as "The Best Futura Mega Project" award in MIPIM Asia, etc., which set a model of international industry-city integration.

## Data Reliability

Self-declared

## Funding Type

Private

## Sustainable Development

### Attractiveness :

Excellent geographical location. Forest City is located in three different radiation areas of the rapid development circle. The first is the Iskandar Special Economic Zone, a bridge and hub between Malaysia and Singapore, which is able to undertake Singapore's spillover industry, personnel and consumption. The second is the Southeast Asia circle, where the flight distance of 2-4 hours can cover the Southeast Asian market with a population of more than 800 million to serve the Southeast Asian headquarters. The third is the Asia Pacific region, the flight distance of 6-8 hours can cover most APEC countries, including China and India, two of the largest economies in the world.

Enormous social benefits. Forest City cooperates with SASAKI planning, Arup, McKinsey and other international enterprises to jointly create a new model of industry and city. On the basis of the overall plan of Iskandar, it seeks innovative and differentiated routes, develops digital financial services, intensive high-tech service training, tourism, convention and exhibition economy and other industries, promotes the complementary and coordinated development of industries with the existing industrial-city integrated towns in Malaysia, shaping a new image of Iskandar.

Comfortable and convenient life experience. Various ecological design and services such as three-dimensional greening, natural wetlands, waterfront commercial and residential places, tax-free shopping, leisure and entertainment, business culture, three-dimensional transportation, smart travel, 5-minute living circle, hotel-style property services etc., provide people with forest-like green experience, fun tourism and ecological landscape experience, convenient travel and quality consumption experience, multicultural and colorful life experience, which creating a livable, prosperous and more vibrant cultural, social and natural environment.

### Well Being :

Fresh air. There is no heavy pollution industry on the site; therefore avoids the pollution sources. Landscape parks, vertical green walls, sky gardens, roof gardens, and multi-dimensional greening systems were built to purify the air and form a natural oxygen bar.

Water safety. To reduce the impact of sewage on the ecological environment and physical health, the project has set up 18 decentralized sewage treatment systems with a daily treatment capacity of 459,000 cubic meters, which are used for irrigation and landscape water demands.

In this project, the three-dimensional greening combined with the waterfront landscape provides people with a wonderful visual field; the three-dimensional traffic system realizes the separation of pedestrians and vehicles, which improves the safety and reduces the traffic noise at the same time; the barrier-free and coherent walking system provide sufficient places for outdoor recreation and fitness; the 5-minute living circle and transportation cards connect all travel services to greatly facilitate people's lives; the building automation system ensures sufficient indoor fresh air and a comfortable thermal environment; the hotel-style property services are equipped to improve life quality; the international medical center provides professional protection for people's health. Therefore, Forest City is not only favorable in its healthy natural environment, but also combines the perfected water treatment system, building automation system, three-dimensional landscape and transportation system, intelligent management and medical services to ensure the health and well-being of users.

### Social Cohesion :

Forest City is positioned as an international industry-city integration project, supported by the Malaysian government, upholding an open attitude to welcome enterprises and citizens from all over the world to invest, work, and live, providing equal opportunities for employment and education. Malaysia, where the project is located, has a racially diverse foundation as well as a rich and diverse culture with Malays accounting for 48%, Chinese 36%, Indians 9%, and foreigners 7%.

Forest City provides a large area of activity space to promote people's communication. Taking Island 1 as an example, theme parks, stadiums, cultural communities, and open spaces account for 22% of the total construction area. In addition, the project will build a training base offering professional technical training to improve the skills of local and professional personnel. In terms of attracting outstanding talents, the government will provide green channels with rapid approval and entry services; implement "My Second Home" plan to provide entry convenience and medical security for retirees. It will also establish a central monitoring system to ensure the timely detection and treatment of potential safety hazards, creating a safe environment for residents. In terms of language communication, it provides Chinese and English courses for surrounding residents, and also Malaysian language and culture Class courses to promote the integration and communication of people from different backgrounds into Malaysian society. Forest City project has also implemented a campus renewal plan to repair the Tanjung Adang primary school with a history of 100 years; at the same time provides funding for school supplies for surrounding school students (Back to School Plan).

### Preservation / Environmental Improvement :

Forest City is built on islands, facing great challenges like seaweed protection, construction energy and sewage discharge.

The Island 1-3 in Forest City surrounds the central seaweed area. In the early stage of development, the project team cooperated with Malaysia's top sea grass research team, the University of Putra Malasia (UPM), to study sea grass protection and cultivation measures, setting up protection area, subsidize environmental

protection activities such as residents' environmental awareness promotion and garbage cleaning, and land in the ecological museum to provide popular science teaching base.

Forest City adopted the prefabricated construction method on the site to reduce the energy consumption during the construction phase. According to the overall assessment, the prefabricated construction method can save water by 50%, reduce mortar by about 60%, save about 80% of wood, reduce the construction energy consumption by about 20%, and reduce construction waste by 70%.

From the early stage of project construction, the project have cooperated with Indah Water Konsortium to commission wastewater treatment. At present, four sewage treatment stations have been built on Island 1 for sewage treatment and recycling. In terms of site rainwater treatment, the overall ecological design was carried out, and the strategies of throttling, storage/reuse, interception, filtration, and penetration absorption were adopted.

Forest City adopts a multi-dimensional greening system from the ground to the roof. Island 1 has a greening maintenance area of 1.1 million square meters and a vertical greening planter with a length of 235,000 linear meters. The selection of these greening plants takes into account the landscaping and ecological benefits, and adapts to Malaysia's climate, strong resistance and easy maintenance. The final selection of country vines and bougainvillea is easy to reproduce, high cutting survival rate, short cultivation time, and vivid in color, drought-tolerant green plants with relatively little water demand can realize three-dimensional vertical greening of urban buildings. In addition, the maintenance of three-dimensional greening plants is mainly watering (drip irrigation, spraying), and pruning is supplemented (pruning once every 2 months). Drip irrigation and sprinkler irrigation are controlled by the central control system to scientifically control the time of sprinkler irrigation and reduce water consumption (drip irrigation once every two days, and spray once a day). The source of water for irrigation is the reclaimed water that is treated by the domestic sewage through the water circulation system, which directly meets the needs of green irrigation and saves a large amount of drinking tap water originally used for irrigation, which has a significant water saving effect and fundamentally realizes a virtuous cycle of water ecology, to ensure the sustainable use of water resources.

#### Resilience :

Ecological resilience. Adopting a multi-dimensional greening system from the ground to the roof, the greening area of Island 1 is 1.1 million square meters, and the length of the vertical greening planter is 235,000 linear meters. A wetland ecosystem covering an area of 31,000 square meters was constructed on Island 1 to protect biodiversity, regulate runoff, increase the carrying capacity of the water system, improve water quality, regulate the microclimate, configure the ecological space on the island, and build a resilient and safe island Ecological base.

Shoreline resilience. Ecological offshore wave elimination, mangrove ecological trails, tidal pools, seawalls, urban promenades, artificial beaches, and embankment facilities are combined with the floating island development model. The 20-meter waterfront corridor reserved on the embankment is integrated into the green shared space while enhancing the resilience of the coastline; it also strengthens the connection between the city and the waterfront and creates a water platform.

Traffic safety resilience. Adopt a three-dimensional transportation system, promote a public transportation-oriented strategy, and create an intelligent, convenient, efficient, and green public transportation system. At the same time, this project provides a coherent, green and supporting infrastructure for the slow traffic system, encourages walking and cycling, effectively connects various development units, therefore improves the resilience of the urban built environment.

#### Responsible use of resources :

Multipurpose exploitation and intensive land utilization. The Forest City project is located on three islands and designed through a three-dimensional layered strategy: the upper layer is the EV system, residential atrium, and parkland; the middle layer is the light rail transit, commercial blocks, urban squares, and parking lots; the bottom layer is the main road, parking lot, and urban green space to optimize the development and utilization of space.

Energy optimization through BAS Building Automation System . This project adopted a grid-style BAS to monitor the air conditioning system, water supply and drainage system, intelligent lighting system, air supply and exhaust system, and elevator system to avoid operation failures. The BAS also carried out multi-mode control, optimize energy use and reduce consumption. In the next stage, intelligent BAS is planned to apply in other public facilities such as international schools.

Open-air ground garage making full use of natural lighting and reducing the need for lighting and mechanical ventilation. The garage of each plot was set above the ground. There are open-air garages that range from two to four floors with a ventilation area greater than 40%, which promotes the natural ventilation in the garage and reduces the energy consumption required for mechanical ventilation. At the same time, the open side facade introduces natural light, greatly reducing the lighting requirements for the three-dimensional garage.

Domestic sewage and wastewater reuse. Domestic sewage and wastewater are treated by sewage treatment station, purified and disinfected by wetland system, and used for plant irrigation and landscape water supplement. Rainwater is filtered and collected and stored in the water system for irrigation in the dry season. The irrigation water on the whole island can realize at least 90% utilization of rainwater and reclaimed water.

## Testimony / Feedback

- *Expert: The large-scale construction along the coast poses a huge challenge to the local environment. The protection of air quality, the construction of large-scale sewage treatment facilities, the protection of marine animals and plants, and the selection of construction methods in the Forest City project can effectively reduce the environmental impact and protect the local ecological balance.*
- *Constructor: We have considered what kind of life should be created for the occupants from the beginning of construction. The construction method of Forest City has brought closer the relationship between human and nature, as if being in the real forest. The heat island effect caused by the concrete steel bars is reduced in this project, the sense of living, working, and exclusive experience is greatly improved.*
- *User: It's like a garden here. I cannot feel the space pressure brought by large-scale construction. Here, life becomes more convenient because of intelligence.*

## Governance

Country Garden Holdings

Holder Type : Private Company

Forest City is jointly developed and constructed by Country Garden Group and Esplanade Danga 88 Sdn Bhd (EDSB). The Country Garden Group is mainly responsible for investment, project construction, and operation management, while EDSB is in charge of the permits application, media, and government affairs etc.

Sasaki Associates planned this project; strategic planning analysis was done by McKinsey & Company; Arup conducted traffic strategy research; Guangdong Boyi Architectural Design Institute Co., Ltd. conducted architectural design.

Local consulting and design company arranges on-site RE for project supervision. The local companies participating in Island 1 mainly include AKIPRAKTIS ARCHITECT, Aeon Services, Perunding JYT Sdn. Bhd; Perunding Wepco Sdn Bhd, etc.

#### Business Model :

Forest City cooperates with McKinsey, the internationally renowned management consulting company, determined the planning and positioning of the integration of industry and city, planning and developing eight major industries including tourism and exhibition, medical care, education and training, foreign enterprise residence, offshore finance, E-commerce base, emerging technology, green and smart technology. Taking advantage of geographical advantages across the sea with Singapore, Forest City can undertake Singapore's offshore financial services, electronic financial services, and exhibition economy spillovers, carry out vocational and technical education and training, develop diversified tourism and leisure projects, and attract global investment in the development of elderly care and healthcare industries, where is expected to become the future leader of the Southeast Asia Headquarters Base.

## Sustainable Solutions

Convenient life

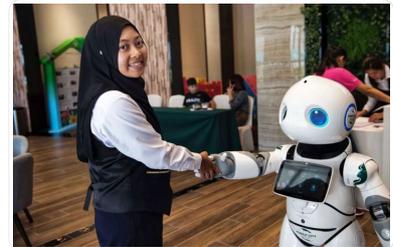
#### Description :

Infrastructure solutions for this project focus on the following two aspects:

**Water recycling.** Forest City actively explores water resources utilization strategies to achieve 100% collection and treatment of domestic sewage and wastewater and prevent any form of sewage from entering the water body of the island or polluting the environment outside the island, which achieves maximizing the use of water resources. The project plans 18 sewage treatment stations distributed on the three islands. At present, Forest City has completed four sewage treatment stations (STP1, STP2, STP3, and STP4), with a designed maximum treatment capacity of 33,200 cubic meters, using international advanced biological treatment technology (BioAX and MBS combined process). After that, the wastewater undergoes deep purification through a constructed wetland system to decompose organic matter in the water, and then it can be used for green plants irrigation or supplement landscape water after disinfection. After treatment, the reclaim water quality is superior to the indicators in the A-level drainage standard issued by the Ministry of Environment of Malaysia, closing to the Class II B standard in the classification of natural water bodies in Malaysia (water body for leisure use with skin contact). After infiltration and filtration, the clean rainwater is stored and reused with the rainwater of each plot. The pump house is used to build vertical greening irrigation. The excess rainwater will be collected in an organized way and stored in the water system for green plant irrigation in the dry season. At present, at least 90% use of the irrigation water for the entire island is rainwater and reclaimed water.

**Biodiversity protection.** Given the situation that Forest City Island 1~3 surround the central seagrass area, the Country Garden Group conducted seagrass research, organized environmental protection activities, built an ecological museum, and adopted various methods to protect the seagrass ecosystem in the sea area where the project is located. The Group and the top seagrass research team in Malaysia launched a 4-year seagrass conservation plan at the University of Putra Malaysia (UPM) to establish a seagrass protection zone to study the protection and cultivation of seagrass under the influence of multiple factors such as water depth and water quality, including monitoring the growth of seagrass, installing temporary silt barriers in adjacent waters, launching an online ecological monitoring system, conducting regular ecological research every quarter, testing the growth of animals and plants, and monitoring the deposition and erosion of the coastline every quarter, etc. At the same time, the Group sponsored Kelab Alami, a local environmental protection organization, to organize residents' environmental awareness-raising, seagrass conservation, garbage cleaning and other environmental protection work to assist and support seagrass protection. In 2020, the first phase of the Forest City Ecological Museum was officially opened to the public, including exhibition halls, laboratories and some ecological corridors. There are a total of more than 100 biological samples on display in the exhibition hall. The laboratory will serve as a scientific research and teaching base for cooperative scientific research institutions and universities to carry out work, and will also serve as a popular science classroom to provide popular science teaching lectures for surrounding residents.

- Quality of life :
- Proximity services
- Infrastructure
- Digital services

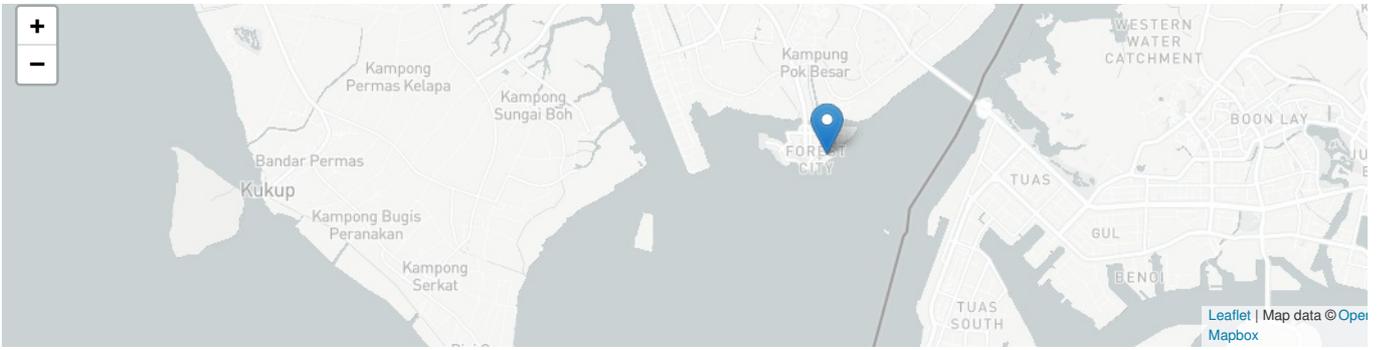


## Photo credit

Country Garden

## Contest





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