



### Central Rayong and Sustainable Environmental Management

Central Rayong, the Company's 21st shopping mall, was launched in 2015. This large, modern shopping mall in Rayong province serves as Thailand's largest hub that drives the national economy and industries.

#### Design, architecture and selection of construction materials

As the province's landmark, Central Rayong drew inspiration from distinctive local arts and literature of world-renowned poet Sunthorn Phu to tell the story of Rayong. The building was designed to conserve energy and the environment. The northern entrance, exposed to sunlight heat, used fewer glass panels than other entrances to project the beautiful, luxurious appearance. Fewer panels also reduced the indoor heat load and the electricity consumption of air conditioning systems. For the building envelope, it selected materials that prevent solar heat, such as 10-mm. laminated Low-E glass, lightweight bricks (Class G2), aluminum foil-coated fiber glass insulation, precast concrete walls, and decorating materials that not only provided shading but

also enhanced an exquisite look. The modern interior appropriately used skylight to bring in natural light, together with LED lights inside the shopping mall. Central Rayong also benefited from the shades of existing and new perennial trees, along with climbers and herbaceous plants that covered surrounding areas. They reduced the heat around the building, thus creating a refreshing and relaxing atmosphere.

#### Electricity management

Central Rayong adopted a centralized water-cooled system with low flow – low temperature to save the costs of equipment and system installation. Furthermore, it sufficiently installed an air-conditioning system and highly efficient chillers, available as backups that can operate based on the actual load for each period. The shopping center was also equipped with an innovative ball cleaning system, which cleans sludge and prevents fouling in condenser tubes. It selected chilled water pumps and coolant pumps with more than 75% efficiency, together with highly efficient motors and automatic variable speed drives (VSDs). As for energy management, Central Rayong introduced a Building Automation System

(BAS) to control ventilation in air-conditioned areas. This included the control and command of the indoor lighting system. For overall energy management, the shopping mall successfully controlled the chiller plant's competency value at an excellent level in compliance with the ASHRAE standard. The competency value of the entire chiller system was 0.66 kW/TR on average.

For the lighting system, the entire shopping center, including common areas, parking lots and surrounding areas, installed energy-efficient LEDs. It also encouraged tenants to change to LEDs to save overall energy consumption and their expenses. This project had 97% of the tenants on board.

Using renewable energy, Central Rayong installed a 998.4-kWp solar system on its rooftop in 2018. In 2019 it generated 1,441,351 kWh of electricity for internal use.



**Water resources management**

Central Rayong installed a Sequencing Batch Reactor (SBR) system. Test results of treated wastewater passed the wastewater quality standard announced by the Ministry of Natural Resources and Environment (Standard setting to control drainage from certain types and sizes of buildings). Furthermore, an ultrafiltration (UF) system was installed in 2018 to reuse treated water. In 2019 Central Rayong reused water in activities where possible, such as watering plants and cleaning the parking lots and toilet bowls. To expand the use, it filled the cooling system of the air conditioner with 93,270 cubic meters of treated water, representing 68.75% of the total water consumption in the project.



**Waste management**

Central Rayong encouraged key stakeholders such as employees, customers, tenants, and communities to reduce their use of plastics and segregate general waste, recyclable waste, and food scrap. By separating the trash, the shopping center recycled as much as possible waste before properly transporting the rest to landfill. In 2019 it segregated 23 tons of recyclable waste, such as plastic bottles, paper crates and foam boxes, and 192 tons of organic scrap like fruit, vegetables and food was processed into organic fertilizer and fermented bio-extracts (EMs). Therefore, Central Rayong reduced 13% of the total waste that would have been sent to landfill. Moreover, the Company implemented waste management projects with the community. First, a volunteer project for environmental development in Choeng Noen Municipality sorted and reduced waste transported to landfill. In collaboration with Rayong Municipality, the shopping center initiated an integrated marine waste management project. Furthermore, it held a project to separate, clean, and donate used plastic straws to turn them into pillows for bed-ridden patients. Central Pattana also carried out a "Zero Hero" project to encourage employees to use less single-use plastics. It also invited employees to have lunch together and bring their own utensils, cutlery, and glasses.

**Indoor air quality management**

Central Rayong provides a separate parking area from the main building to efficiently prevent engine exhaust from being emitted into its air-conditioned areas. It also measures indoor air quality by regularly monitoring carbon monoxide, PM 10, and PM 2.5. Additionally, the shopping center selected R-134a to avoid ozone depletion and reduce global warming directly.

#### Green building management

In 2019 Central Rayong won the SD Environmental Award, presented internally to Central Pattana's shopping centers with excellent environmental management. The consideration criteria comprised 1) GHG reduction, 2) electricity consumption, 3) energy-saving innovation, 4) water management, 5) waste management and

6) employee involvement. Moreover, Central Rayong earned an Excellent Energy Conservation Award under the EE Creative Building - New and Existing Building Category and the Thailand Energy Award of the Ministry of Energy. It also won an ASEAN Energy Award and an ASEAN Best Practices Award for Energy-Efficient Buildings in the category of New and Existing Buildings in 2019.

## 4.6 Ecology and biodiversity management

Valuing the quality of life of humans, plants and animals that coexist in the ecosystem, the Company established a policy on ecology and biodiversity management<sup>28</sup>, which clearly states that it will never develop any projects in restricted or conservation areas. It also complies with the practices that require the Company to explore and study the ecosystem with external experts and preserve the ecology of every new and renovation project. As a result, all areas under Central Pattana's development are located outside restricted or conservation areas. The Company focuses on promoting the local people's quality of life by bringing nature closer to them. It also helps them recognize the value of saving and keeping the environment with communities and society. As a result, it designs landscapes to best harmonize with the city and the original ecosystem. It also increased green areas by planting trees both inside and outside the project. If it is unavoidable to uproot trees, the Company will move them to another nearby project and grow native plants around the project to create a sense of harmony.

In 2019 the Company constructed a new project, Central Village, near Suvarnabhumi Airport. At first the project was located on lowlands. However, landfilling on such a vast plot of land would affect the existing trees, including the original

conditions and surrounding areas. Central Pattana therefore chose to lift the walkway, planter boxes and the entire building on a pillar structure above the ground to keep the large trees on their original land. Then the project selected local trees such as Java Cassia, Anan, White Cheesewood, Indian Oak and Pong Pong, which match Thai architecture featuring modern-style gables. A total of 255 perennials were grouped and planted in different villages to provide shades on a designated green area of 4,278.50 sqm. This implementation followed the project's concept to create an outdoor area with green space for everyone, tourists and customers. For the building's height, it met the standard stipulated by aviation law. For lighting, the project carefully designed lights so that light would not flash up in the sky, disturbing flying planes.

Planning to increase green space, the Company aimed to plant 10,100 trees on the auspicious occasion of HM King Maha Vajiralongkorn's coronation. From July to December 2019, Central Pattana, in collaboration with Bangkok Metropolitan Administration, planted 3,698 trees in four public parks near its shopping centers, namely Wachirabenchatas Park, Watcharapirom Park, Chaloem Phrakiat 80 Phansa Park, and Lumpini Park. Furthermore, it planted 110 Yellow Star trees along Chaloem Phrakiat Road, Srinakarin, and gave away a million sprouts/saplings with auspicious names in the "A Million Sprouts for You" activity between December 2 and 5, 2019, at nine projects across Bangkok.

<sup>28</sup> Further details in <https://www.cpn.co.th/en/sustainability/sustainability-strategy/enhancing-environment>