## Environmental Management Operations

The Company has developed a sustainability standard for its hotel business, called "Centara EarthCare," which serves as a mandatory operational framework for all hotels and resorts within the Group. This standard has been certified with GSTC-Recognized status by the Global Sustainable Tourism Council (GSTC). Additionally, an environmental data collection system, managed through the Greenview Portal, enables monthly, quarterly, and annual reporting and tracking of environmental performance for comparison with the previous years.

In 2024, 39 properties under Centara Hotels & Resorts, representing 92.8% of all operational hotels, were assessed and certified as sustainable tourism hotels by the Global Sustainable Tourism Council. The assessments were conducted by Vireo SRL and Bureau Veritas, two leading global providers for auditing sustainability operations in the tourism industry.

In addition, one property has been certified under the Green Key standard, a globally recognized tourism sustainability standard that has also received GSTC-Recognized status. This aligns with the Company's goal of obtaining sustainability certification for all properties under Centara Hotels & Resorts by 2025.

## Energy Management

**Challenges**    A lack of energy management or improper operations can lead to higher costs and long-term impacts on business revenue. In a global scenario where all businesses are adapting, ignoring this issue may lead to missed business opportunities, such as being overlooked by investors or financial institutions.

**Opportunities**    Increasing the use of renewable energy, such as installing solar panels, can help reduce long-term costs. Additionally, upgrading equipment or integrating technology to enhance energy efficiency not only reduces energy consumption but also improves service quality and enhances the customer experience. Furthermore, implementing energy efficiency plans supports the achievement of Net Zero targets, creating competitive advantages and increasing the likelihood of receiving support from financial institutions.

Overall, the Company consumes a total of 372,377,854.99 kilowatt-hours (kWh) of energy, with the majority coming from purchased electricity, amounting to 262,656,248.91 kilowatt-hours (kWh). Other significant energy sources include liquefied petroleum gas (LPG), diesel, and purchased chilled water for air conditioning systems. Additionally, the Company has increased its use of alternative energy by installing solar panels, generating 2,740,627.66 kWh of electricity, which contributes to reducing greenhouse gas emissions.

## Performance Results on Energy Use

### Hotel Business

Energy consumption
266,365,611.27 kWh/Year

Currently, a total of 8 hotels have installed solar panels.

Energy consumption per occupied room has decreased by 8.23%.

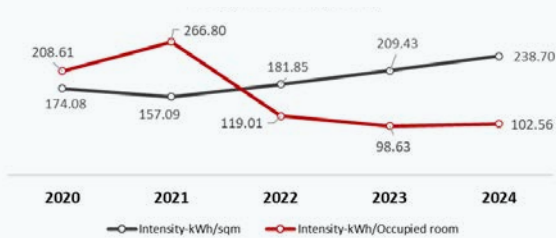Currently, a total of 65 EV charging stations have been installed.
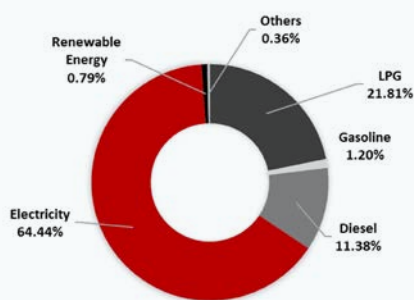
### Food Business

Energy consumption
106,012,243.72 kWh/Year

Currently, a total of 16 locations have installed solar panels.

# Hotel Business

## Total Energy Usage (kWh)



| Year | Value |
|------|-------|
| 2024 | 266,365,611.27 |
| 2023 | 243,231,593.63 |
| 2022 | 174,457,455.98 |
| 2021 | 79,014,585.43 |
| 2020 | 87,562,357.69 |

## Energy Intensity



Intensity-kWh/sqm: 174.08 (2020), 157.09 (2021), 181.85 (2022), 209.43 (2023), 238.70 (2024)

Intensity-kWh/Occupied room: 208.61 (2020), 266.80 (2021), 119.01 (2022), 98.63 (2023), 102.56 (2024)

## Energy Usage 2024



- Others 0.36%
- Renewable Energy 0.79%
- LPG 21.81%
- Gasoline 1.20%
- Diesel 11.38%
- Electricity 64.44%

## Targets:

- To reduce energy consumption* per occupied room by 40% by 2029 compared to the base year of 2019.
- In 2024, energy consumption* per occupied room decreased by 4% compared to the previous year.

### Note:

*Energy use targets are set to apply specifically to the hotel's facilities only, for comparison with other hotel businesses, based on the Cornell Hotel Sustainability Benchmark (CHSB) report.

For the full-year operations, the hotel business consumed energy* at 97.58 kWh per occupied room, achieving an 8.23% reduction from the set target and a 26.59% reduction compared to the baseline year. In total, the hotel business used 266,365,611.27 kWh of energy, primarily from purchased electricity for hotel operations, followed by liquefied petroleum gas for cooking and diesel for power generators and vehicles.

In addition to the corporate energy reduction targets, each hotel has set specific goals for reducing electricity consumption per occupied room (kWh/occupied room) to raise awareness and create cooperation across the organization in collectively achieving energy reduction objectives.

## Renewable Energy Use in Hotel Business

Given the 24/7 nature of hotel operations, energy is consumed continuously throughout the day. To reduce reliance on fossil fuels, which contribute to greenhouse gas emissions, the Company promotes the use of renewable energy by installing solar panels on hotel rooftops to generate electricity.

In 2024, the installation of solar panels was expanded to five more hotels, bringing the total to eight hotels since 2019. In 2024, the Company generated 1,777,115.07 kilowatt-hours of electricity, accounting for 1.15% of total electricity consumption. This resulted in a reduction of 1,008.76 tons of carbon dioxide equivalent (tCO2e) in greenhouse gas emissions and cost savings of 7.67 million Baht. In 2025, a plan has been developed to expand the installation of solar panels on the rooftops of additional hotels to increase the use of renewable energy, reduce electricity purchase costs, and lower greenhouse gas emissions that significantly contribute to climate change.

**Solar Panel Installation in Hotel Business (2019–2024)**

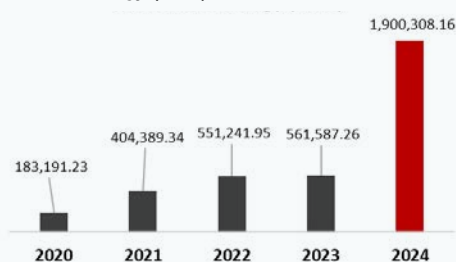| Hotels | Capacity (kWp) | Solar Cell Usage (kWh) | Reduce Emissions (kgCO2e) | Investment cost (MB) |
|---|---|---|---|---|
| Centara Ras Fushi Resort & Spa Maldives | 334 | 480,254.00 | 361,631.26 | PPA |
| Centara Watergate Pavillion Hotel Bangkok | 52.8 | 65,110.00 | 32,489.89 | 1.1 |
| Centara Life Hotel Bangkok Phra Nakhon | 180.4 | 232,750.44 | 116,142.47 | 4.42 |
| Centara Ubon | 101.9 | 144,958.34 | 72,334.21 | 2.2 |
| Centara Grand Beach Resort Phuket | 571 | 639,132.71 | 318,927.22 | PPA |
| Centara Ao Nang Beach Resort & Spa Krabi | 100.05 | 126,438.23 | 6,3092.68 | 1.8 |
| Centara Anda Dhevi Resort & Spa Krabi | 100.62 | 69,481.73 | 34,671.38 | 1.8 |
| Centara Life Lamai Resort Samui | 34 | 18,989.62 | 9,475.82 | 0.8 |

*Note: Power Purchasing Agreement (PPA) refers to an electricity purchase agreement between the installation investor and the company, with no investment required from the company.*
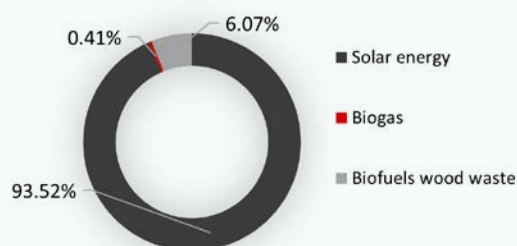


## Biogas Production from Organic Waste

The hotel business has implemented T.O.B.Y. (Turn Organic By You) system, which converts organic food waste into biogas, utilizing the generated energy in staff cafeteria kitchens. Currently, three hotels including Centara Life Maris Resort Jomtien Pattaya, Centara Reserve Samui, and Centara Grand Beach Resort Phuket, have installed this system. Together, these machines have produced a total of 7,820.87 kilowatt-hours of biogas, reducing greenhouse gas emissions by approximately 3.24 tCO2e. Additionally, at Centara Grand Beach Resort & Villas Hua Hin, biomass fuel derived from wood scraps is used to power the pizza oven.

**Renewable Energy (kWh)**



| Year | Value |
|---|---|
| 2020 | 183,191.23 |
| 2021 | 404,389.34 |
| 2022 | 551,241.95 |
| 2023 | 561,587.26 |
| 2024 | 1,900,308.16 |

**Renewable Energy 2024**



- Solar energy — 93.52%
- Biogas — 0.41%
- Biofuels wood waste — 6.07%
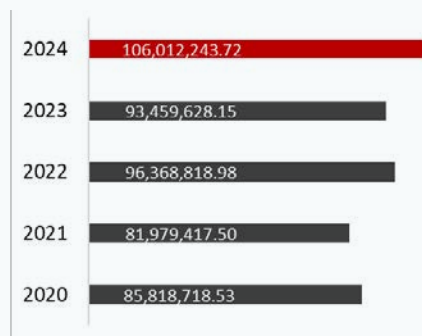
## EV Charger Station Service

To support the transition to a low-carbon society and enhance guest convenience, hotels and resorts under Centara Group have expanded their EV Charger stations. A total of 65 EV Charger stations have been installed across more than 30 hotels, promoting the use of environmentally friendly energy.
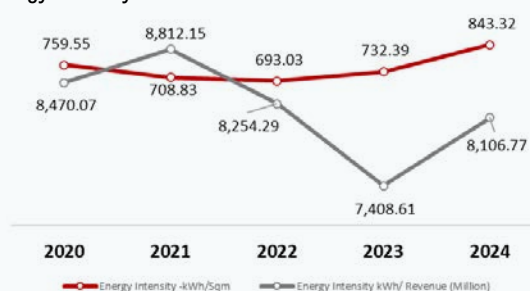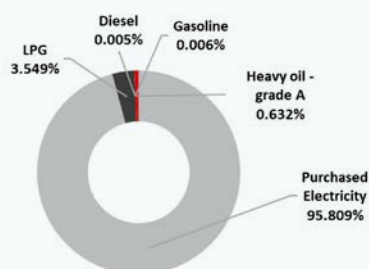
# Food Business

## Energy Usage (kWh)



| Year | Energy Usage (kWh) |
|------|-------------------|
| 2024 | 106,012,243.72 |
| 2023 | 93,459,628.15 |
| 2022 | 96,368,818.98 |
| 2021 | 81,979,417.50 |
| 2020 | 85,818,718.53 |

## Energy Intensity



Energy Intensity - kWh/Sqm: 759.55 (2020), 708.83 (2021), 693.03 (2022), 732.39 (2023), 843.32 (2024)

Energy Intensity kWh/ Revenue (Million): 8,470.07 (2020), 8,812.15 (2021), 8,254.29 (2022), 7,408.61 (2023), 8,106.77 (2024)

## Energy Usage 2024



- Diesel 0.005%
- Gasoline 0.006%
- LPG 3.549%
- Heavy oil - grade A 0.632%
- Purchased Electricity 95.809%

## Targets :

- In 2024, to reduce energy consumption per revenue (million Baht) by 3.5%.
- In 2024, to reduce electricity consumption per revenue (million Baht) by 3.5%.
- In 2024, to increase the proportion of alternative energy at least 50% for newly expanded branches operating as stand-alone or non-mall locations.

For the full-year operations, the food business consumed 8,106.77 kilowatt-hours of energy per revenue (million Baht), reflecting a 5.24% increase from the target and a 1.56% increase compared to the previous year. In total, the food business used 106,012,243.72 kilowatt-hours of energy, the majority of which came from purchased electricity.

Electricity consumption was 7,696.46 kilowatt-hours per revenue (million Baht), representing a 3.60% increase compared to the target set for the same year. In addition to electricity and liquefied petroleum gas, the CRG Manufacturing plant also utilizes diesel and fuel oil for the production of ice cream, frozen goods, and distribution to various locations.

## Renewable Energy Use in Food Businesses

The Company is committed to developing renewable energy usage guidelines through the installation of solar panels in collaboration with experienced business partners. In 2024, the installation was expanded to include three additional solar panel systems at KFC and Salad Factory branches. To date, a total of 16 solar panel systems have been installed, covering 44.44% of Stand-Alone and Non-Mall branches, which comprise 36 locations (33 KFC branches, 1 CRGM branch, 1 Salad Factory branch, and 1 Somtum Nua branch). These installations generate 963,512.59 kilowatt-hours of electricity, accounting for 0.96% of total energy consumption, and contribute to a reduction of 481.66 tCO2e in greenhouse gas emissions. This initiative enhances renewable energy efficiency, reduces environmental impact, and aligns the business with ESG goals.

## Solar Panel Installation in Food Business (2021–2024)

| Branch | Capacity (kWp) | Solar Cell Usage (kWh) | Reduce Emissions (KgCO2e) | Investment cost (MB) |
|---|---|---|---|---|
| CRG Manufacturing plant | 233.55 | 308,977.60 | 154,457.90 | PPA |
| KFC Tiwanon Branch (Muang Thong Thani) | 36.90 | 50,449.14 | 25,219.53 | PPA |
| KFC Caltex Tiwanon Branch | 25.92 | 34,813.30 | 17,403.17 | PPA |
| KFC Tiwanon Branch (Talad Khwan) | 29.16 | 39,319.01 | 19,655.57 | PPA |
| KFC Thai Watsadu Chiang Rai Branch | 29.16 | 35,051.27 | 17,522.13 | PPA |
| KFC Home Works Pattaya Branch | 37.26 | 52,971.54 | 26,480.47 | PPA |
| KFC Hathairat 37 Branch | 25.38 | 33,489.14 | 16,741.22 | PPA |
| KFC PTT Sai Mai 56 Branch | 19.44 | 27,463.13 | 13,728.82 | PPA |
| Central Kitchen Factory (SF), Sam Khok, Pathum Thani | 140.80 | 201,132.22 | 100,546.00 | 3.19 |
| KFC Bang Rak Market Branch, Nonthaburi | 33.48 | 47,716.35 | 23,853.40 | PPA |
| KFC Lotus Mai Lap Branch | 22.32 | 18,451.58 | 9,223.94 | PPA |
| KFC Pu Chao Saming Phrai Branch | 27.90 | 33,527.91 | 16,760.60 | PPA |
| Somtum Nua Ratchaphruek Branch | 33.48 | 31,273.70 | 15,633.72 | PPA |
| KFC PT Ratchada Branch | 19.80 | 20,911.67 | 10,453.74 | PPA |
| KFC ESSO Pradit Manutham Branch | 31.32 | 20,965.03 | 10,480.42 | PPA |
| KFC Bueng Kum Le Marché Branch | N/A | 7,000.00 | 3,499.30 | PPA |

*Note: Power Purchasing Agreement (PPA) refers to an electricity purchase agreement between the installation investor and the company, with no investment required from the company.*

### Solar Cell Usage (kWh)

| Year | Solar Cell Usage (kWh) |
|---|---|
| 2021 | 32,564.58 |
| 2022 | 314,842.03 |
| 2023 | 312,133.57 |
| 2024 | 963,512.59 |

# Energy Efficiency

To achieve its energy reduction goals, the Company conducts regular energy audits and assessments through internal departments from the Head Office. These evaluations help monitor energy consumption performance, provide recommendations, and enhance the efficiency of various equipment. The Company has also adopted and implemented various technologies to optimize energy use across different operational areas. These efforts are carried out through the following projects:

# Hotel Business

1. To optimize the cooling system by implementing Magnetic Oil-Free Chillers, which operate without an oil lubrication system, ensuring consistent efficiency. These chillers adjust their operation based on load demand, making them more energy-efficient than conventional systems. When running at low speeds, they can reduce energy consumption by up to 30% compared to standard chillers.
2. The use of heat pumps for hot water production in hotels involves extracting heat from the atmosphere and transferring it to the system's heat source. Simultaneously, this process releases cool air, which can be utilized as an alternative to air conditioning. The extracted cool air can be directed to common areas or the hotel's backyard, optimizing energy efficiency. This approach can reduce fuel consumption and lowers costs.
3. Opt for an Inverter Split-Type air conditioning system to enhance energy efficiency. The Inverter system regulates compressor speed to maintain consistent cooling. Additionally, the split system allows for independent operation, enabling units to be turned on or off as needed for greater efficiency.
4. Installation of HVAC (Heating, Ventilation, and Air Conditioning) systems to control and adjust temperature, humidity, and air circulation systems for efficient energy management within buildings, together with building management systems (BMS).
5. A solar water heater system is installed to convert solar energy into heat for water heating.
6. Motion sensor light bulbs are installed in the hotel's common areas, hallways, public restrooms, and backyard areas to control electricity usage. Additionally, sensors are installed on balcony doors in guest rooms. When a door is left open, the system cuts off power to the air conditioner.
7. For customers with electric vehicles, the hotel has installed charging stations, with a total of 65 stations available across 30 hotel locations nationwide.
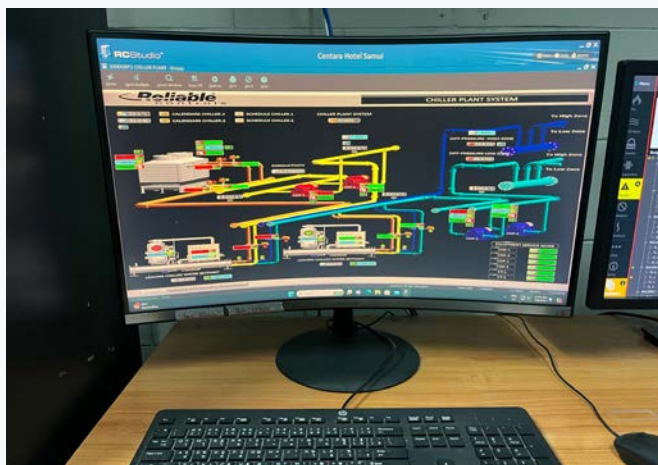






## 60+ Earth Hour

Centara Hotels & Resorts, both domestically and internationally, totaling 44 properties, participated in the "Turn Off the Lights for 1 Hour to Reduce Global Warming" (Earth Hour) event on March 23, 2024, by turning off unused and unnecessary lights to symbolically save energy and reduce greenhouse gas emissions. This initiative saved 9,934.33 kWh of electricity and reduced greenhouse gas emissions by 4.37 (tCO2e) with 3,511 hotel guests and 1,975 employees participating.

## Food Business

1. **Smart Internet of Things (IoT) Lighting Project:** This IoT-based system enhances lighting management within work areas. Its key features include:
   - **Motion Sensors** automatically turn lights on and off based on actual usage, reducing energy consumption in unoccupied areas.
   - **Adaptive Dimming** adjusts brightness levels to match the environment and time of day, reducing energy consumption without affecting work efficiency.
   - **Real-time Monitoring & Analytics** is a system that connects to a central platform to analyze energy usage behavior and enhance electricity management practices.
   - **Remote Control & Automation** allows technicians to manage lighting systems from a central location via an application, reducing the management burden and enhancing convenience.

2. **Smart IoT Air Conditioning Project:** A smart air conditioning control system utilizing Internet of Things (IoT) technology to enhance energy efficiency, precisely regulate temperature, and reduce greenhouse gas emissions. The key features are as follows:
   - **Occupancy Sensors** can automatically turn the air conditioner on and off based on the number of users in the area, reducing unnecessary energy consumption.
   - **Smart Temperature Control** is a system that can analyze the environment and user behavior to adjust the temperature to an appropriate level, enhancing comfort and reducing energy consumption
   - **Real-time Monitoring & Analytics** can monitor air conditioner energy usage through a central platform, analyze usage trends, and send alerts when abnormally high energy consumption is detected.
   - **Remote Control & Automation** allows the air conditioner to be operated remotely via the application, enhancing management convenience and reducing operating costs.

3. **Smart Variable Speed Drive Project:** This project applies Variable Speed Drive (VSD) technology to electric motors and machinery, allowing rotational speed adjustments based on workload. This helps reduce unnecessary energy consumption and lowers the Company's energy costs in the long run. It offers the following key features:
   - Adaptive Speed Control: The system analyzes and adjusts the motor's operating speed based on actual usage requirements, minimizing energy waste caused by running at unnecessarily high speeds.
   - Reduction of Electrical Load and Increased Machine Life: By appropriately controlling the motor speed, the system minimizes wear and tear on both the motor and equipment. This enhances operational efficiency, extends the machine's lifespan, and reduces maintenance costs.
   - Real-time Monitoring & Analytics: Energy usage data of motors and machines can be tracked through the IoT system and Cloud Platform, enabling the analysis of usage trends and precise improvements in operational efficiency.

4. **Block Zone Project:** This project is one of the key strategies focused on the flexible management of store space through zoning management and smart store sizing.

## Climate Change and Greenhouse Gas <span style="color:red">Emissions</span>

**Challenges**
- Business expansion leads to an increase in greenhouse gas emissions. Without clear measures or control plans, this may impact global sustainability goals and regulatory requirements or measures set by the European Union (EU) that failure to comply may result in a loss of competitive opportunities, particularly impacting revenue from travel agents and European customers who prioritize partnerships with businesses that disclose reports, follow sustainability operational guidelines, and adhere to international standards. Furthermore, carbon tax measures imposed by government agencies may inevitably result in higher costs. Therefore, businesses operating in areas that rely on natural resources as tourist attractions may also be affected by climate change, experiencing impacts such as monsoons, coastal erosion, and coral bleaching, etc.

**Opportunities**
- Disclosing information on climate change and greenhouse gas emissions, including goals and operational plans, enhances opportunities to access green bonds from financial institutions, secure loans at special interest rates, and build trust with investors, business partners, and customers. As customer behavior shifts towards supporting businesses committed to reducing greenhouse gas emissions, having an operational plan can create a positive experience and help expand the Company's customer base in the future.