## EA's Business Activities

EA recognizes the importance of carbon-constrained environment and how this concept is crucial in shaping low-carbon economy. Consequently, EA constantly explores and innovates new projects through various strategies and technologies to mitigate the impact of climate change. As an electric utility company, EA offer a cost-efficient strategy that postpones the necessity for additional power sources by distributing energy consumption more evenly.

## Distributed Energy

| EA's Activities | Description & Benefits of the Activity | Outcome |
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| **Replacement of PV Module**<br><br>*(Energy Efficiency : energy management services)* | EA Solar Nakornsawan Company Limited (ESN) and EA Solar Lampang Company Limited (ESL), subsidiaries of Energy Absolute PCL (PCL), have undertaken a significant upgrade by replacing their existing installed PV modules with bi-facial PV module technology which is a type of solar panel that can capture sunlight on both its front and back surfaces. Unlike traditional mono facial PV modules, which only convert sunlight that strikes the front surface, bi-facial modules can absorb and convert light from both sides, thereby increasing the overall energy generation potential. The replacement involved 121.26 Mwp of bi-facial PV modules for ESN, accounting for 100% of the solar plant, and 77.08 Mwp for ESL, representing 67% of the solar plant. The replacement projects were successfully completed on March 2, 2022, and December 13, 2021, for ESN and ESL, respectively. In 2023, ESL have replace remaining 51.316 Mwp to completed 100% of the solar plant and EA Solar Phisanulok Company Limited (ESP) replace 133.92 Mwp, accounting for 100% of the solar plant. | As a result of this upgrade, the plant performance in 2023 demonstrated notable improvements compared to 2022. ESN experienced an increase of 18.33 GWh (gigawatt-hours), while ESL observed an increase of 24.99 GWh and ESP observed an increase 29.22 Gwh. These improvements in energy generation correspond to an estimated reduction of 43,426 tons of CO2 emissions per year. |

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| **Distributed Generation**<br><br>*(Distributed Generation : Distributed Generation)* | EA offers renewable energy technologies and digital solutions by producing and distributing solar and wind electric power generated from renewable energy according to the government policy that promotes the production of electricity from renewable energy for reducing the dependence on import of energy and to stabilize the energy security.<br><br>● Solar Energy (Solar PV): Solar power plant will directly convert solar energy into electricity through the use of essential devices consisting of Solar panel, Inverter, and Power Distribution System.<br><br>● Wind Energy: Wind energy generated from rotational motion when wind blows through the turbine the kinetic energy is transferred to the turbine blades to cause the turbine to rotate. This energy from the rotation can be utilized. The amount of the electricity produced is depended on the speed of the wind, the length of the blade, and the location of the wind turbine. | ● Solar Power Plant: 4 Projects with total production capacity of 278 megawatts<br><br>● Wind Power Plant: 8 Projects with total production capacity of 386 megawatts |
| **Lithium-ion Battery**<br><br>*(Distributed Generation : Home storage systems)* | The company established a subsidiary to develop, manufacture, and distribute lithium-ion batteries with a capacity of 1 GWh in 2021. The company is currently expanding its capacity to 2 GWh by 2024 and has plan to further increase production capacity to 4 GWh. It is a type of rechargeable battery that utilizes lithium ions as the primary carrier of electrical charge between the positive and negative electrodes. It contains chemicals that allow reversible reaction with recharging capability by such a device as "charger", making it a high electric power storage capacity. The Company has redesigned the new type of battery to possess distinctive properties with higher energy storage capacity, lighter weight, longer | From lithium-ion battery business, EA was able to<br><br>● Increased revenue growth by 71% from 2022<br><br>● Reduce greenhouse gas emissions by enabling the transition to electric vehicles and renewable energy by 1,916 tCO2e from October to December 2022. In 2023, the data is currently under verification by a third party |

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| | useful life, and better response to demand for fast charging which can be used in diverse applications as follows:<br>● Electric Vehicles (Electric cars, electric ferry, electric truck, etc.)<br>● Energy Storage System (ESS) | |
| **Electric Charging Station**<br>*(Fuel Switching : Charging network)* | The Company has expanded its business to large-scale electric vehicle charging stations to serve electric vehicles under "EA Anywhere" brand, operated by Energy Mahanakhon Company Limited, its subsidiary. The charging is available for direct current and alternating current. The alternating current can be charged up to 44 kWh, depending on the onboard charger of each automotive model. The direct current charger can charge up to 150 kWh for passenger car and DC chargers for passenger buses, trucks and passenger ferry can be charged a maximum of 300 kWh.<br>Besides, the group Company has developed the charger with modern technology, variety of styles according to the electrical power to support the battery size of all types of vehicles. The size of the battery can be divided into 3 models as follows:<br>● **Ultra-Fast Charge**<br>✓ DC 360 kW and DC 300 kW, the fastest charger that can serve large battery electric vehicles such as electric ferries, electric buses.<br>✓ DC 150 kW chargers can serve mid battery electric vehicles (BEV) only, for example, electric buses and electric vehicles.<br>● **Super-Fast Charge**<br>✓ DC 40 kW chargers can serve for Electric Vehicles car only. | At year-end 2023, chargers had been installed at a total of 499 electric charging stations for all types of electric vehicles, comprising of 2,515 electric chargers.<br>• **Electric ferry: – 10 stations / 116 electric chargers**<br>The Group has completed construction of one more charging station for electric ferries, i.e. Rama 3 –Bukkhalo charging station, located in the area on the bank of the Chao Phraya River being adjacent to Krung Thep Bridge and Rama 3 Bridge, Samre Subdistrict, Thonburi District. Altogether 12 electric chargers with 360 kW capacity have been installed at the station. In addition, the Group has expanded charging capacity in the area of Wat Salaree with installation of another 5 electric chargers with 360 kW capacity.<br>• **Public land transport : - 63 stations / 610 electric chargers**<br>The Group has invested in construction of large-sized electric charging stations for electric buses on a total of 125 routes. It has completed construction work as planned for 2023 with installation of 268 electric chargers with 360 kW capacity for 20 stations (200-Year Rangsit Bus Depot, Bueng Kum, Wat Rai Khing, Salaya, |

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| **Electric Charging Station**<br><br>*(Energy Efficiency: tariff measures)*<br><br>*(Load Optimization : tariff measures)* | • **Normal Charge**<br>✓ AC Normal chargers can serve electric vehicles car both Plug-in Hybrid (PHEV) and Battery Electric Vehicle (BEV).<br><br>EA together with MEA (Metropolitan Electricity Authority) has made an agreement to operate EV charging station 24 hours under the concept of "EV low priority" where charging power will be adjusted based on the availability of electricity. Therefore, EA was able to offer tariff incentives for users with lower electricity rates during off-peak hours. The charging stations are accessible for 24 hours, ensuring convenience for electric vehicle (EV) users at any time of day. This approach enables users to pay rates that align with real-time prices, as well as raise awareness about electricity consumption patterns. EA Anywhere mobile application provides users with real-time pricing information, encouraging sustainable energy efficiency behavior. Moreover, EA was able to offer flexibility for users to use the charging service during off-peak hours. The agreement deal assists EA to alleviate the strain of generating electricity during periods of high demand and lessens the workload for electricity providers to produce power during peak hours. | Samae Dam, Minburi, Rangsit Bang Phun, Ekkachai, Thonburi Community Housing, Phra Pradaeng Roundabout, Taling Chan, Ram 2, Bang Phlee Community Housing, Kanchana Phisek – Phran Nok, Nonthaburi Bypass, Paknam, Taling Chan – Borom Ratchachonnanee, Phutthamonthon Sai 2, Ramkhamhaeng 74, Tha It). Besides, the Group has invested in installation of two electric chargers with 360 kW capacity in the areas of the Royal Thai Army, i.e. 11th Military District Command and Army Transportation Department.<br><br>• **Electric tractor: – 6 stations / 44 electric chargers**<br><br>The Group has invested in construction of three electric charging stations for electric tractors with installation of a total of 22 electric chargers with 360 kW capacity, comprising Bo Din station, BlueTech City station and ThaiNamthip station.<br><br>• **Electric passenger car: – 420 stations / 1,745 chargers**<br><br>The Group has set up one electric charging station at Ramathibodi (Rama Hospital) -Energy Absolute Smart Parking Building with installation both AC Normal Charge systems, sized at 7.3 kW with a total of 576 chargers, and DC Fast Charge systems at 360 kW, with a total of 2 chargers, covering 100% of all parking spaces in the building. It is regarded as the electric charging station with the greatest number of chargers in Thailand and ASEAN. |

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| **Energy Efficiency**<br><br>*(Energy Efficiency : Smart appliances, Home systems, Prosumer Services)* | EA and Rama Hospital jointly launched the "EV Smart Building," the first prototype building in ASEAN with the highest number of charging stations, totaling 578 chargers. The Rama Hospital Parking Building project marks another significant step towards elevating the country to an EV Hub by EA Anywhere, aiming to develop spaces for various types of buildings including condominiums, offices, and large-scale buildings such as department stores, hotels, condominiums, mix-use complexes, and community malls. These developments enhance the efficiency of existing spaces by promoting the use of cost-effective, sustainable, and highly efficient electrical energy. In every charging unit, there will be integration with the company's Smart Monitoring system via real-time communication to monitor operational status and control energy distribution. EA's advanced Energy Management System (EMS) efficiently handles the substantial power demands of multiple electric vehicle (EV) chargers within a building, overcoming traditional energy constraints. By continuously monitoring and analyzing energy usage, prioritizing power distribution based on real-time consumption and user needs, and dynamically adjusting the power supply, the EMS ensures optimal energy use. This system supports simultaneous EV charging without overloading the building's electrical infrastructure, reduces peak energy demand and associated costs, and enhances overall energy efficiency, making sustainable and efficient energy management feasible. | Currently, the charging stations within the EA Anywhere network are providing service to over 499 stations nationwide.<br><br>By the end of 2023, the project "EV Smart Building" at Ramathibodi (Rama Hospital) has provided services with installation both AC Normal Charge systems, sized at 7.3 kW with a total of 576 chargers, and DC Fast Charge systems at 360 kW, with a total of 2 chargers, covering 100% of all parking spaces in the building. |

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| **Phase Change Material (PCM) Development**<br><br>*(Fuel Switching : Heating systems)* | EA worked on innovation and development through integrating the use of phase change material (PCM). Phase Change Material (PCM) is a substance which releases/absorbs sufficient energy at phase transition to provide useful heat/cooling. PCMs can be incorporated into heating systems to enhance the performance by using in thermal energy storage systems where they absorb excess heat during periods of high energy availability (e.g., daytime when the sun is shining) and release it when needed (e.g., during the night or when there is less sunlight). This can improve the efficiency and effectiveness of heating systems by providing more consistent and controlled heating. In addition, PCM benefits in term of energy saving. For the industries, PCM was used in the buildings and construction, transportation, cooling industry, clothes, and others in order to maintain temperatures. Furthermore, some PCM has bio base which friendly to environment, using PCM for heat storage option are particularly attractive because they offer high-density energy storage. | In 2023, EA invested in developing academic research related to the PCM product and deliver knowledge with technology to customers for expanding the market. |

## Demand-Side Management

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|---|---|---|
| **Design, Procurement, Construction, Installation and Project Management**<br><br>*(Energy Efficiency : energy management services)* | EA offer demand-side management services under Energy Solution Management Company Limited including monitoring, engineering design, procurement, construction, installation, commissioning of its products/services. The company also provides consulting service providing additional solutions to meet customer needs. The details of our services are as follows:<br>1. The power plants of its subsidiaries, divided into Solar Power Plant for 4 projects which has 278 MW energy production in total, and Wind Power Plant for 8 projects, which has 386 MW energy production in total, also including governance for operation and maintenance for entire power plants of the Company and contractor services for Solar Power Plant system.<br>2. Battery Manufacturing Factory which has production capacity at 1 GWh per year including co-developing for engineering design of Battery Energy Storage System.<br>3. Charging Stations for electric vehicles including operation and maintenance for charging stations. | Services business from Energy Solution Management Company contributed in. saving energy by exploiting daytime price variations and cutting additional costs generated by energy use during peak periods. |

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| **Energy Storage System (ESS)**<br><br>*(Load Optimization : Large-scale storage (>100 kWh))* | Energy Absolute PCL (PCL) has provided an innovative energy storage solution in the form of an Energy Storage System (ESS) with a capacity of 2.6 MWh. This ESS is housed in an air-conditioned container and serves as a vital component of an ESS hybrid system, working in conjunction with a diesel engine. The purpose of this system is to support CPC Corporation (Taiwan) installations in substations and facilitate the balancing of power supply. By combining the ESS with the diesel engine, this hybrid system offers flexibility and reliability in managing power fluctuations and ensuring a stable electricity supply. The ESS serves as a sustainable energy storage solution, capable of storing and discharging electricity as needed. Its integration with the diesel engine enables efficient power generation when additional support is required to meet demand or address grid imbalances. | In 2023, EA's Energy Storage System was able to store energy capacity of 6.77 MWh, which in compared to 2022, 2.6 Mwh. |
| **Alternative Energy For Communities Project**<br><br>*(Load Optimization : Micro-grids)* | EA developed micro-grid solution projects for communities by giving and installing solar panels in public areas for reducing the energy cost of local communities. The project could raise awareness of alternative energy by demonstrating the process of energy production. In addition, the project could help the community understand the company's business and operation. | The result of this Alternative Energy for Communities Project contributed to the reduction of external electricity consumption. |

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| **Distribution Grids**<br><br>*(Load Optimization : Smart grid technology)* | EA constantly invests in infrastructure of distribution grids, aiming to enhance the flexibility and capacity of the grid to accommodate the increasing number of distributed generation source, and connection with new user. The Company integrated smart grid technology such as usage of smart meter, allowing real-time monitoring of operational data on production and consumption of electricity. Smart meters also help improve energy efficiency and ensure grid stability. | At the present, the Company operates 12 projects with 98.80% usage of Smart Meters from our total plants, as detailed below: 1) Solar Power Plant 4 Projects with total production capacity of 278 megawatts. 2) Wind Power Plant 8 Projects with total production capacity of 386 megawatts. |
| **Smart City – Phuket**<br><br>*(Energy Efficiency : Lighting, appliances, HVAC systems, CHP)* | EA signs MOU with the Federation of Thai Industries Phuket (FTI Phuket) and established EA Waste Management Phuket Co., Ltd. to jointly create Green Island; Low Carbon City, a prototype world-class eco-tourism destination. The Company is committed to help Thailand moves toward carbon neutrality and sees Phuket as a suitable city to promote such initiatives. The strategies for supporting Phuket to become Green Island involved the collaboration of public sector, private sector, and Federation of Thai Industries. Together, the innovation of hybrid solar and battery, the use of EVs, and high-efficiency waste-to-energy power plant will help build a more sustainable, smart city, and promote the expansion growth of tourism and business industries in Phuket. | In the upcoming year, the target is to install charging units and initiate the operation of a waste-to-energy power plant, moving towards carbon neutrality in Phuket. |