Smarter. Greener. Together.

Delta Electronics Powering Thailand 4.0

Delta Thailand Innovation Review

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About the Author

Mr. Curtis Ku, Delta Thailand Regional Business Senior Director, heads Delta's data center, renewable energy, energy storage solutions, EV charging solutions, indoor air quality solutions and building automation businesses in Thailand. Delta is pioneering smart city solutions with a current focus on installing and servicing UPS, data center solutions and EV charging stations across Thailand.

Introduction

As the largest electronics company listed on the Stock Exchange of Thailand (SET), Delta Electronics (Thailand) PCL. is an industrial powerhouse and solutions pioneer powering the nation's Thailand 4.0 development. This article outlines the key roles Delta plays in Thailand 4.0, Eastern Economic Corridor (EEC) project, Energy 4.0 and Digital 4.0. It also describes how Delta is pioneering green energy infrastructure, smart digital infrastructure and smart city solutions to add value for stakeholders and contribute to Thai society with the brand promise: Smarter. Greener. Together.

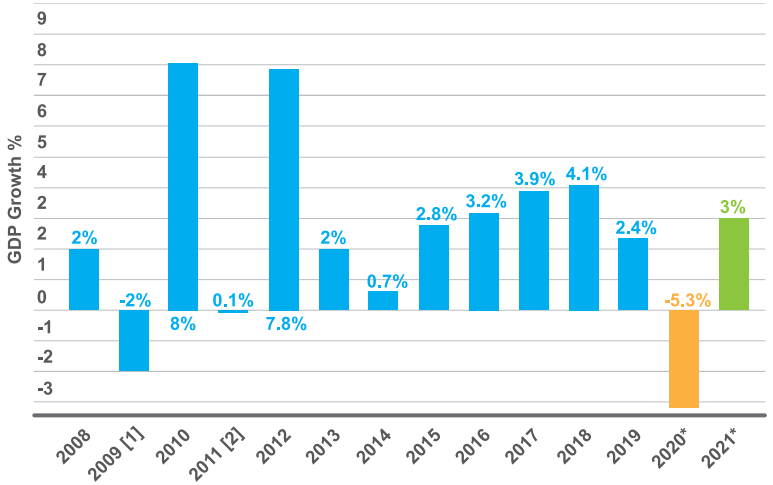

Figure 1: Thailand's GDP Growth with Forecast Impact of COVID-19 by the Bank of Thailand ; **Source:** Thailand Business News

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As a key manufacturer and exporter, Delta Thailand has helped to develop the nation's electronics industry and over the past 30 years has played an outsized role in the country's growth story. Currently, Delta sees the government's prudent development policy, including the Thailand National Strategy and Thailand 4.0, steady FDI, healthy domestic market growth and sustainable GDP as good indicators to continue investment and expansion in this promising market.

Yet despite favorable conditions and growth opportunities, Thailand faces some internal risks that threaten to impede its development including skilled labor shortage, rising labor costs, political instability and a rapidly aging population. In addition, recent external shocks like the US-China trade war and this year's Covid-19 crisis are negatively affecting the economy. While maintaining growth momentum in the short- term will be challenging, Delta is confident in its core competencies and unique ability to exploit opportunities stemming from disruption and ultimately contribute to the success of the Thailand 4.0 policy.

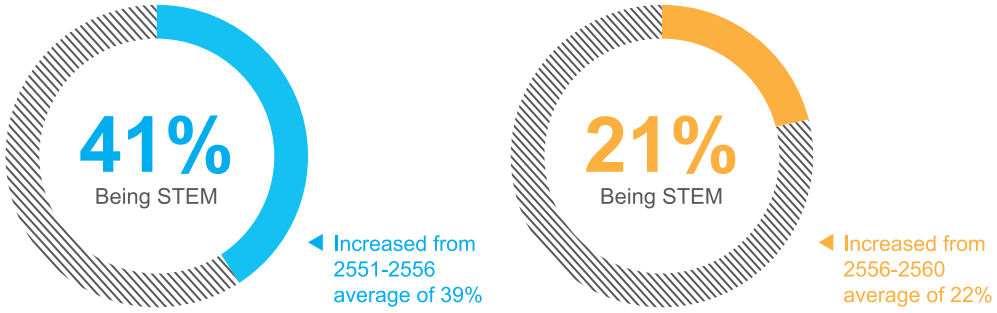

Figure 2: Mismatch in Thailand's Labor Market; **Source:** MPG Economic Review

2. Thailand 4.0

Thailand 4.0 is the government's economic model which aims to unlock the country from several economic challenges including the "middle income trap", inequality trap and industry imbalance. Key parts of Thailand 4.0 emphasize "security, wealth and sustainability."

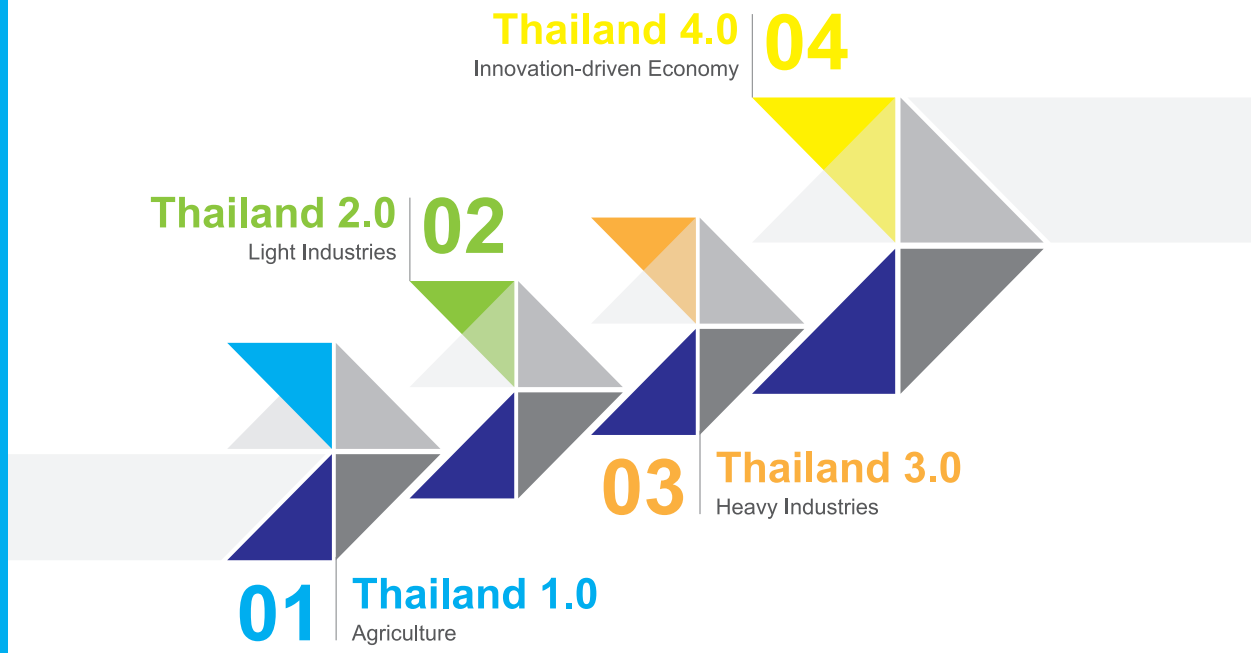

Figure 3: Thailand's Economic Development Models; **Source:** Thailand Board of Investment

Policymakers believe the strategy will result in the Kingdom graduating to high-income country status. While business media and analysts have focused on the industries that the Eastern Economic Corridor (EEC) will attract, the government is also determined to make the area a zone for green living with smart, environmentally friendly cities and towns.

- Economic Prosperity: aiming to increase R&D expenditure to 4% of GDP, increase economic growth rate to full capacity rate of 5-6% within five years and increase national income per capita from 5,470 USD in 2014 to 15,000 USD by 2032.
- Social Well-being: aiming to reduce social disparity from 0.465 in 2013 to 0.36 in 2032, completely transform to a social welfare system within 20 years and develop at least 20,000 households into “Smart Farmers” within five years.
- Raising Human Values: aiming to raise Thailand HDI from 0.722 to 0.8 or the top 50 countries within 10 years and ensure that at least five Thai universities ranking amongst the world’s top 100 higher education institution within 20 years.
- Environmental Protection: aiming to develop at least 10 cities into the world’s most livable cities and reduce terrorism risk etc.

Figure 4: Thailand 4.0 10 Target S-Curve Industries; **Source:** Thailand Board of Investment

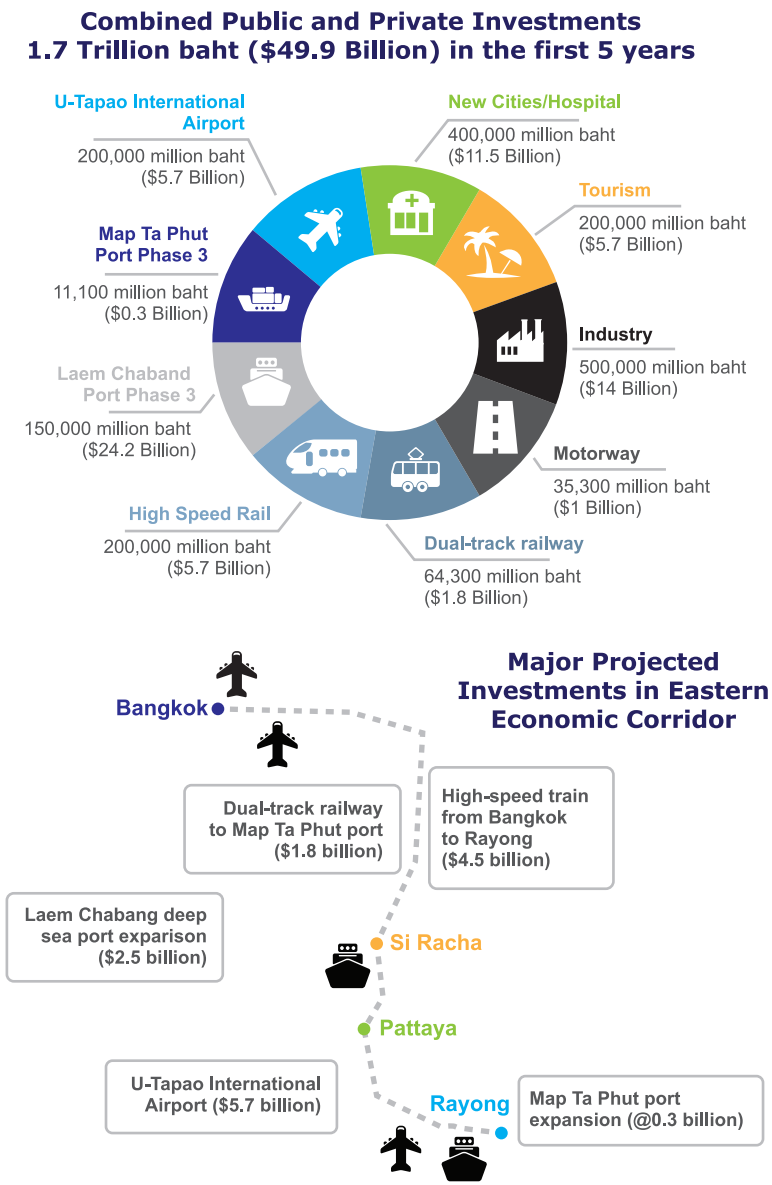

Figure 5: Overview of Eastern Economic Corridor Projects

2.1 EEC

Delta sees major infrastructure in the EEC development zone as an important catalyst to spur domestic demand. As a key pillar of the Thailand 4.0 strategy, EEC projects can play an important role in scaling up public infrastructure investment and boosting growth in the short and medium term. The EEC covers three provinces along the eastern seaboard —Chonburi, Rayong, and Chachoengsao—that have successfully supported Thailand's manufacturing base for the past 30 years.

The ambitious EEC plan's objective is to upgrade and expand the region's connectivity and transform the country into a strategic gateway to Asia. It covers 15 groups of infrastructure and development projects spanning five years (2018-2023) for a total investment of about US$50 billion. Up to 60% of public infrastructure investment is expected to be from public–private partnership (PPPs), with government and state-owned enterprises contributing 30% and 10% respectively.

2.2 Energy 4.0

The Ministry of Energy's Energy 4.0 policy aims to use energy efficiently while taking into account cost and service of electricity generation. Priority is on development to combine clean energy use for environmental protection and energy conservation to make a clean environment for citizen's happiness.

- Electric vehicle (EV): the ministry's Energy Blueprint focuses on the transportation sector as the highest energy consumption sector, aiming to achieve a target of 30% energy intensity reduction by 2036. By then Thailand aims to have 1.2 million EV passenger vehicles on the roads, at least 690 public charging stations, EV smart charging and Vehicle to Grid (V2G) technologies.
- Energy storage (ES): technological advances and falling cost of batteries is spurring development worldwide in energy storage for grid security to protect power during natural disasters, ensure continuity in industrial estates and integrate with EV charging infrastructure or renewable energy systems and micro-grids in remote areas.

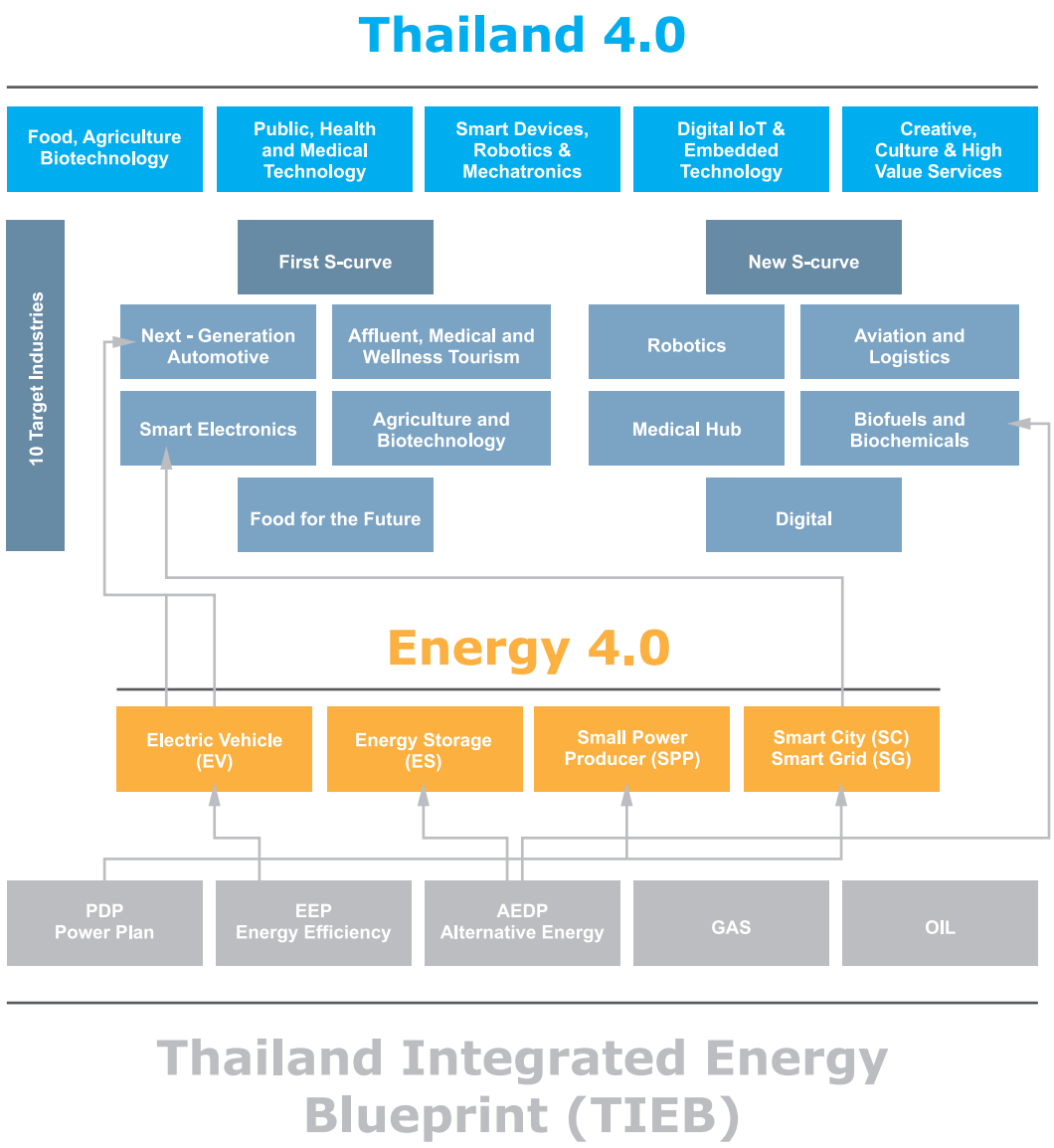

Figure 6: Thailand 4.0 and Energy 4.0; **Source:** Thailand Ministry of Energy

- Small power producer (SPP): power generation from a combination of power plants from renewable sources (PV, Wind, Hydro) and bioenergy power plants (Biomass, Biogas, MSW) will help to decrease fluctuation and create stability to the power system.
- Smart city + Smart grid (SC+SG): infrastructure improvements will create a more secure and flexible smart grid to support smart cities across the country. This includes increasing renewable energy electricity generation to cut the contribution from fossil fuel power plants. The national grid will be managed by the National Control Center and Demand Response Control Center while micro-grids will have integrated energy storage, energy management system (EMS) and demand response.

2.3 Digital 4.0

Since 2016, the government's Digital Thailand initiative encourages Thais to make use of digital technology for better career and training opportunities. Digital technology provides greater convenience and efficiency to reduce costs and eliminate restrictions in all aspects for the public and private sectors.

- The Village Internet program aims to set up a nationwide digital infrastructure to bring access to 75,000 villages throughout Thailand. Each village will have one free 30/10 Mbps Wi-Fi hotspot, all schools and local hospitals will link up online and community digital learning centers will be open for the public.
- The National Digital ID program aims to digitize identification cards to increase security and convenience for all Thai citizens.

Digital Government unveils a broader scope of opportunity for the both the public and private sector, as the government is expecting to see all Thai people own portable devices for efficient and convenient access to public information and services. As more users participate in digital government initiatives, the increasing volume of data and traffic will present new challenges and opportunities for growth in the digital economy that includes infrastructure vendors and a vast hardware/software supply chain.

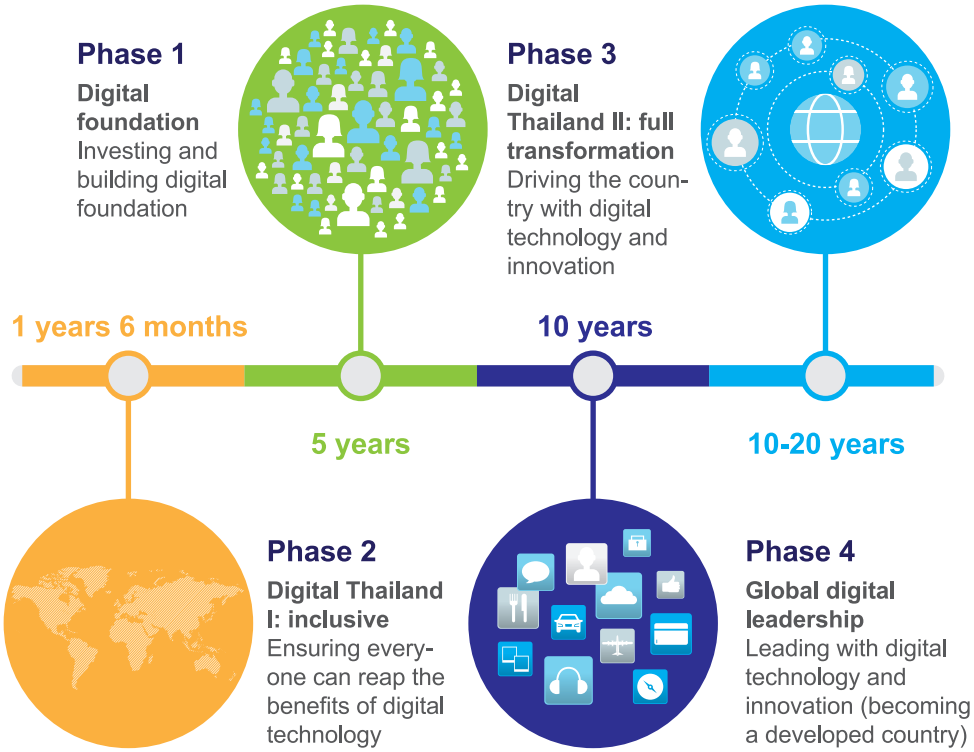

Figure 7: Digital Thailand and Roadmap 2016-2036
Source: Thailand Digital Government Development Agency (DGA)

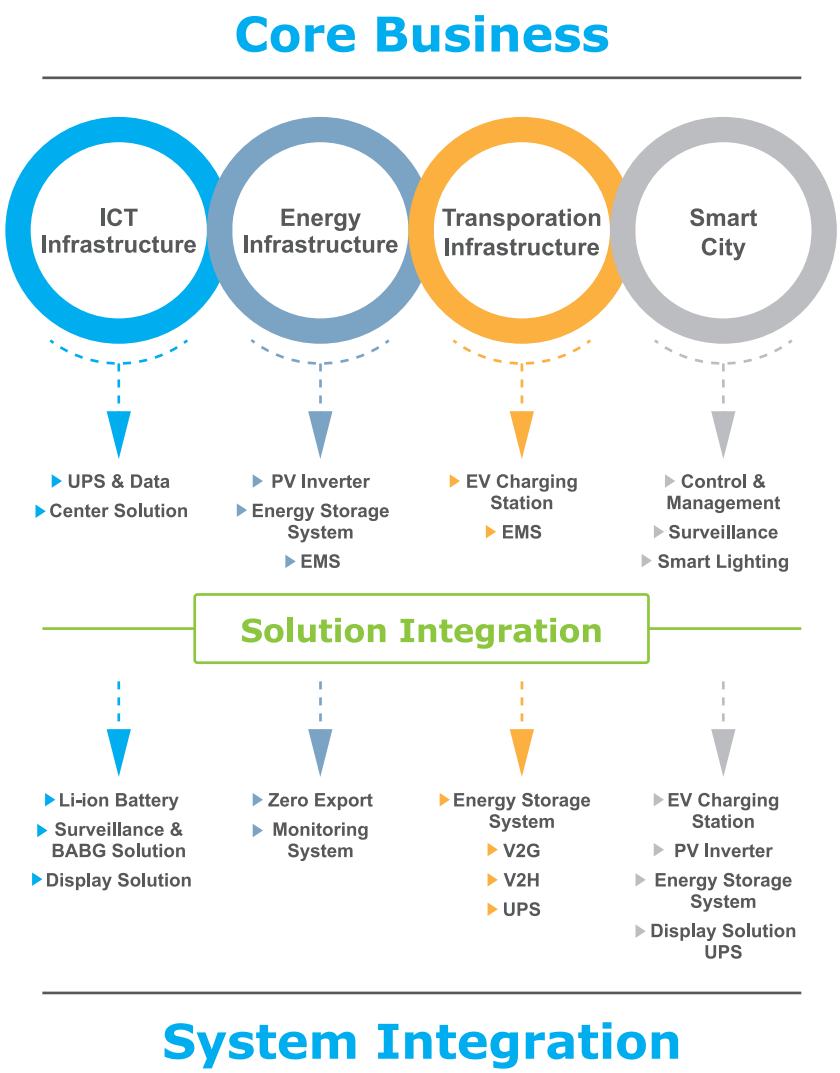

Figure 8: Delta Thailand Market Segments and Offerings for Thailand 4.0 Development

3. Delta Electronics Thailand

Since establishing in 1988, Delta Electronics Thailand listed on the Stock Exchange of Thailand (SET) and is now the Delta Electronics Group regional headquarters for manufacturing, R&D and sales in the Southeast Asia region and beyond. As Delta Electronics Group transitioned from its primary role as a manufacturer of ODM electronic products for global brands to a provider of original branded solutions, Delta Thailand began pioneering smart green solutions in the Thai market targeting 10 key industries: Agriculture and Biotechnology, Smart Electronics, Affluent Medical and Wellness Tourism, Next-Generation Automotive, Food for Future, Biofuels/Chemical, Digital Economy, Medical Hub, Automation and Robotics, Aviation and Logistics. Delta's strengths of global R&D capabilities, a regional manufacturing base and local engineering sales and service give the company a distinct advantage compared to other multinational competitors in developing and delivering a broad range of power-related products integrated as smart green solutions.

3.1 Green Energy Infrastructure

Delta's world-class power conversion expertise drives development of a diverse PV inverter portfolio with energy efficiency of up to 98.8%. In Thailand, Delta focuses on utility floating solar farms and commercial/residential solar rooftop solutions to help the government reach its target for 20% renewable energy by 2036. The 3.2 MWp capacity rooftop solar solution at Delta Thailand's LEED-certified green building headquarters can generate around 4.7 million kWh of energy per year saving around 20 million baht annually. This is approximately 10% of total energy usage and a reduction of up to 2,722 tons of CO2 per year. Our solar energy total solutions combine PV string inverters with cabinet to container size energy storage systems (ESS) and energy management system (EMS). Delta is currently partnering with utility and major energy consumers on selective ESS projects to develop utility applications such as micro-grid, capacity firming or solar farm retrofit.

3.2 E-mobility

Delta Thailand is one of the first manufacturers in the country to start producing of EV onboard charging modules and parts for top global car brands. At the same time, the company supplies its original energy-efficient EV charging solutions including AC chargers (7-22kW), DC quick chargers (25-150kW), and Site Management Systems. Delta's EV chargers offer high-performance power efficiency, support OCPP communication functions for system integration and have global safety certifications such as UL, IEC, CHAdeMO, CQC and CNS. By focusing on delivering world-class performance with local engineering sales and service, Delta has gained solid partnerships with global automotive makers, utility companies like the MEA and organizations like the Thailand Automotive Institute and Electric Vehicle Association of Thailand to develop and promote electrification in the country. Currently, Delta and its system integrators (SI) are working with automotive and property developers to install charging stations at locations around the country alongside offering home charging options for EV owners.

Figure 9: Delta Thailand agreements with Nissan in Thailand and the MEA

3.3 Smart Digital Infrastructure

Delta's core strength has always been developing ultra-efficient power supplies and the company helps data center operators get best value in terms of power protection, power usage effectiveness (PUE), reliability and total cost of ownership (TCO) with a broad uninterruptible power supply (UPS) portfolio (1kVA-1200kVA) and precision cooling (5.6kW-180kW) solutions. In addition, Delta offers turnkey data center solutions that combine its best products with original ancillary products for power distribution, power and thermal management, security, racks and wiring and display. As its reputation as power protection and energy-saving experts in Thailand grew, Delta installed more and more UPS and cooling systems in the mission critical systems of key companies in Thailand's telecom, finance, medical, infrastructure and manufacturing industries. In recent years, the company's information and communications technology (ICT) partner development has enabled steady expansion into Thailand's Infrastructure, Medical, Manufacturing and Education business verticals. The arrival of 5G technology, internet of things (IoT) for Industry 4.0 and smart city development and growth in edge computing makes this a particularly high-growth sector in Thailand and Southeast Asia.

Figure 10: Delta Thailand Cultivating Data Center Solutions Channel Partners

3.4 Smart City Solutions

Delta Electronics Group's acquisition of leading European and US building automation companies has presented Delta Thailand with an impressive war chest of integrated hardware and software solutions to stake a claim in the burgeoning smart city market. Delta Thailand already leverages building automation control and management at its smart green factories to save energy and offer more effective water treatment, HVAC, smart lighting and surveillance. Meanwhile, Delta is partnering with to top Thai research institutions and industrial partners like AMATA Corporation to develop prototype smart city sites as references for future infrastructure projects. Delta works with a select list of key account and partners along with a core group of SIs to integrate Delta's EV charging stations, PV inverters, ESS, display solutions and UPS as smart city total solutions.

Figure 11: Delta Thailand Smart City Solutions in Thailand

4. Summary

Although Thailand's weakening economic outlook, brought on by the double shock of the US-China trade war and Covid-19 crisis, may pose temporary challenges to the progress of the Thailand 4.0 policy, Delta Thailand remains committed to the country's development goals. As an established leader in sustainable business and smart green solutions in Thailand, Delta offers innovation that adds value for customers, empowers local enterprises and uplifts our communities. Delta Thailand believes in the power of synergy with partners to build on core strengths in product development, manufacturing and servicing that offers full-range solutions with technology leadership for best customer experience. By offering greater value for stake-holders Delta contributes to Thailand 4.0 development and creates a more prosperous, healthy and happy society.

Figure 12: Delta Thailand Smart City Solutions in Bangkok

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