



TAIWAN



## New Generation Automobiles

Security  
Industry

New  
Generation  
Automobiles

Communications  
Industry

The Internet  
of Things

Semiconductor  
Industry

Biotechnology  
Industry

Smart  
Machinery

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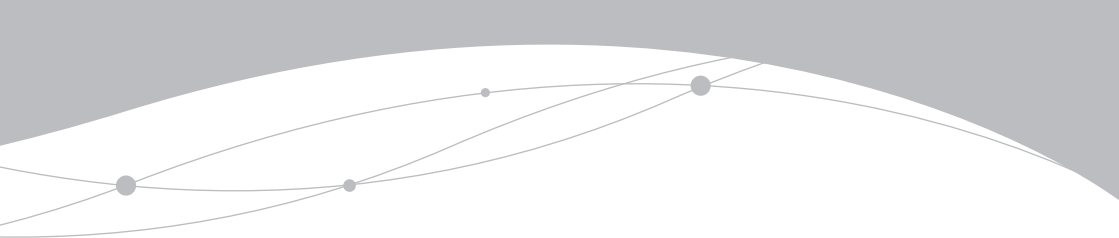
## Policy Initiatives

Mercedes-Benz, the well-known international car maker, in 2016 defined the four core principles of "C.A.S.E." as its development strategy. "C" stands for Connected, "A" stands for Autonomous, "S" stands for Shared & Services, and "E" stands for Electric. Many other car makers subsequently adopted C.A.S.E. as their guide for next-generation development in the car industry.

Every aspect of C.A.S.E. is now under development in Taiwan. For the Electric aspect, the "Smart Electric Vehicle Industry Development Strategy and Action Plan" proposed by the government in 2010 defined strategic development goals, namely: (1) Support the development of smart electric vehicles (EV) through environmental protection, energy efficiency and carbon reduction standards; (2) Promote pilot trials of smart EVs; (3) Increase incentives for consumer car purchases; (4) Provide a friendly user environment for smart EVs; and (5) Advise on industry developments.

Taiwan also introduced more aggressive actions and improvement targets for air pollution management in the interests of public health. The "Air Pollution Control Action Plan" released in 2017 set a goal of halving air pollution by 2019. EVs will also be progressively introduced with the goal of electrifying all government vehicles and public buses by 2030, followed by all sales of motorcycles and cars.

For the Autonomous aspect, the short-term goal is the refinement of Advanced Driver Assistance Systems (ADAS) and related regulations to improve the safety of road users, followed by the development of self-driving vehicles. To keep pace with international developments in self-driving vehicles, the Unmanned Vehicles Technology Innovative Experimentation Act



was passed by Taiwan in 2018. The law draws on the spirit of the regulatory sandbox to provide a legal basis for the experimentation of unmanned vehicles. The law facilitates the development of next-generation automotive technologies and applications by allowing industry, academic and research institutes in Taiwan to engage in innovative experimentation of self-driving technologies, services and business models on a global basis.

Specific promotion strategies include the commissioning of the Taiwan CAR Lab in 2019. This 1.72 ha site in Shalun Science City next to the Tainan HSR Station is the first closed-course self-driving vehicle demonstration facility in Taiwan. The facility is a testing platform for the development of smart vehicles, parts, components and systems. Testing scenarios incorporate the complex traffic conditions unique to Taiwan and Southeast Asia. In addition to serving as a facility for real-world testing and operation of self-driving vehicles, it also allows the general public to try out and learn about self-driving technology.



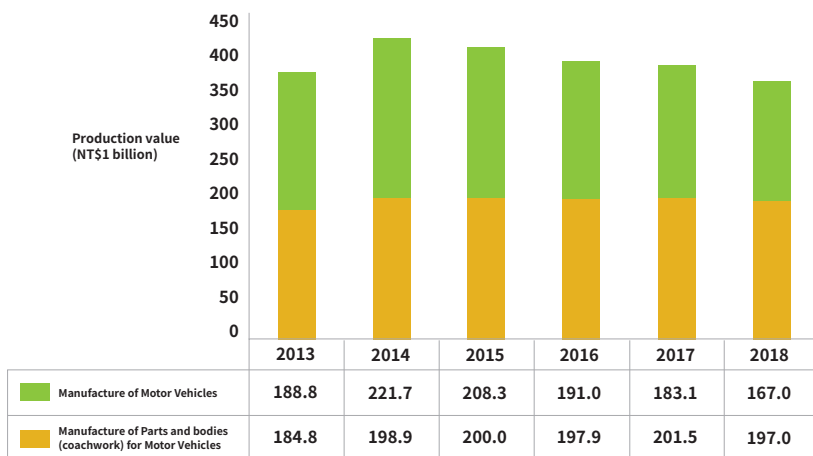


# Overview of Industrial Development

## 1 | Production Value |

The automotive industry in Taiwan has accumulated decades of experience in traditional car manufacturing. A complete automotive industry supply chain has also taken shape in Taiwan thanks to long-term cooperation between car makers and suppliers. In 2018, the "Automobile Manufacturing Industry" in Taiwan had an output value of NT\$167 billion, while the "Automotive Parts and Body Manufacturing Industry" had output of NT\$197 billion. The two industries therefore have a combined output value of NT\$364 billion (see Fig. 1).

In terms of product category, small sedans (under 2,000 c.c.) were the main type of vehicles produced in Taiwan, while manufacturing of automotive parts and components consisted mainly of car lights, bumpers, rear view mirrors, wheel rims and body bumper parts. Taiwan's automotive parts are sold not only in the domestic market but also exported in large quantities to North America, the European Union and other markets. In addition to being a key player in the After-Market (AM) and Original Equipment Manufacturing (OEM) markets, some manufacturers have broken into the supply chain of international car makers (e.g. Tesla, Ford) as well. The entry of Taiwan's ICT and other related industries into the automotive electronics, self-driving technology, energy conversion and other sectors against such a backdrop means that all the basic conditions for the development of next-generation vehicles are present in Taiwan.



Source: Department of Statistics, Ministry of Economic Affairs

Figure 1 Production Value of Taiwan's Automobile Industry in 2013-2022

## 2 | Industrial Clusters |

### 1. Northern Taiwan

The northern cluster, with its complete industry chain, is the home base of the automotive industry. In addition to whole vehicle makers such as GOGORO, Sanyang Motor, Yulon Motor, CMC, RAC, Ford Lio Ho, and Kuozui, as well as vehicle body makers such as Sin Sheng, there are also manufacturers of servo motors, control modules, EV auxiliary systems, EV energy storage and power management systems, other critical EV technologies/system integration, and niche EVs<sup>1</sup> such as Delta Power and Haitec. These companies are distributed across Taipei City, New Taipei City, Taoyuan City, Hsinchu City/County and Miaoli County (see Fig. 2).

1 Niche EVs are EV models designed for specific market segments and are characterized by their variety, personalization, customization, and modular power packages. Electric pallet trucks, electric dune buggies, electric forklifts and electric golf cars all under the niche EV category.

## North District Vendors

Drive motor and control module: **Delta, Teco, Seec, Taigene, Evt, Tatung**

Electric vehicle accessory system: **Teco, Taigene, Delta, DENSO**

Electric vehicle energy storage system & Power management system: **Amita, Simplo, Molice, PHOENIX, WELLTECH, Delta, PIH-SIANG, TAIWAN YUASA, Kneron, LIFETECH ENERGY**

Key technologies and systems integration of other electric vehicles: **Delta, Haitec, Chroma, LIOHO**

Niche electric vehicle: **Elebike, PIHSIANG, Yulon, Advanced**

North District Regions: Taipei City, New Taipei City, Taoyuan City, Hsinchu County, Miaoli county, Keelung City

## Central District Vendors

Drive motor and control module: **Rhymebus, FUKUTA, Adlee**

Electric vehicle accessory system: **Rhymebus**

Electric vehicle energy storage system & Power management system: **EXA, CAEC, MOBILETRON**

Key technologies and systems integration of other electric vehicles: **TPG, Chiau Cheng**

Niche electric vehicle: **MERIDA, TAIWAN HELIO**

Central District Regions: Taichung City, Changhua County, Nantou County, Yunlin County

## South District Vendors

Drive motor and control module: **Hwameei, RICH ELECTRIC, SAC**

Electric vehicle accessory system: **N/A**

Electric vehicle energy storage system & Power management system: **CSCC, Renetronics**

Key technologies and systems integration of other electric vehicles: **JUILI**

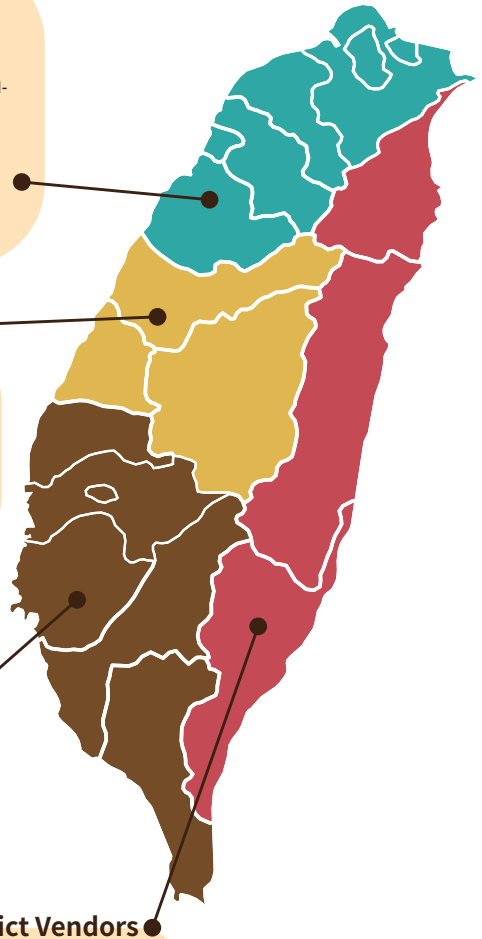
Niche electric vehicle: **e-ton, KYMCO, Pillar Spoke**

South District Regions: Chiayi County, Tainan City, Kaohsiung City, Pingtung County

## East District Vendors

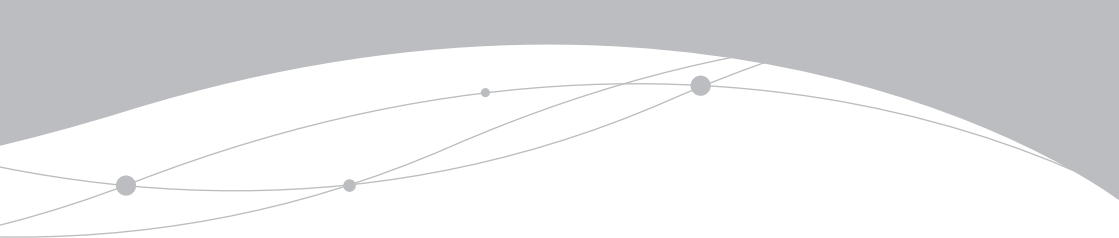
**N/A**

East District Regions: Yilan County, Hualien County, Taitung County



Source: Industry, Science and Technology International Strategy Center, ITRI.

Figure 2 Taiwan's Green EV Industry Cluster

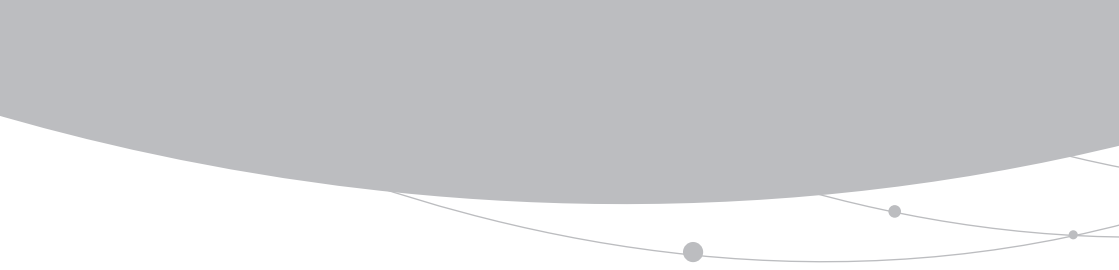


Founded in 2011, Gogoro specializes in the development of smart electric motorcycles, smart energy and battery exchange stations. It is the leading electric motorcycle company in Taiwan, with more than 150,000 vehicles produced as of April 2019. Gogoro actively promotes the battery exchange model and has set up more than 1,200 GoStation® battery exchange stations in Taiwan so far. Gogoro also successfully partnered with Coup (a subsidiary of Bosch in Germany) and the Sumitomo Group in Japan to launch electric motorcycle sharing systems in Europe and Japan. The number of vehicles is continuing to increase.

Yulon Motor was founded in 1953 and its key subsidiaries include Yulon-Nissan, Luxgen and Car-Plus car rentals. The company has focused its efforts on transitioning from a conventional manufacturer to a manufacturing service provider in recent years. Yulon plans to expand its existing business system to create a service system that serves all car brands. It is also cooperating with government policies by investing in the development of smart vehicles that integrate the IT and automobile industries. In addition to boosting the international competitiveness of the automobile industry, Yulon will also help the IT industry enter the electronic automotive parts market and boost the competitive advantage of the Taiwanese automobile industry.





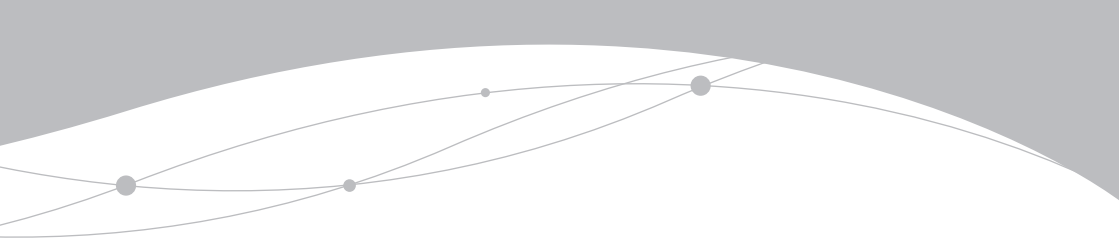


RAC was established in 2005 and the mission of the company is to develop new, innovative and eco-friendly electric vehicles that conform to the government's push on energy efficiency and carbon reduction. It also seeks to establish a benchmark platform for the EV industry. RAC focuses on the development of electric buses, electric trucks and energy storage systems. Its core technical capabilities encompass in-house development of EV chassis, power systems, vehicle control systems, battery management systems, as well as whole vehicle assembly and integration. RAC won the Taiwan Excellence Award in 2013 with the release of the first domestically produced and certified electric bus under its own brand.

Delta Power was established in 1971 and its three key portfolios are power supplies and components, automation and infrastructure equipment. For power supplies and components, Delta is a provider of electric power systems and critical components for EVs and hybrid vehicles. These include high-efficiency onboard chargers and DC/DC converters. For infrastructure equipment, Delta supplies the DC fast chargers, AC chargers and charging station management systems used by EV charging facilities. The supplied equipment has passed safety and standards certification in the EU, the US, China and Taiwan.

Haitec was founded in 2005 as the R&D center of the Yulon Group. It provides a platform for cross-industry technology R&D and integration. The company is actively developing whole vehicle system integration technology for EVs that includes the control system, battery management system, performance simulation and analysis. It has already successfully developed vehicles with 200 hp, 200 Nm of torque and endurance in excess of 300 km. Raitec is also investing in the development of advanced driver assistance system (ADAS) and self-driving technology.

ICT companies in Taiwan have now taken an active interest in electric self-driving vehicles and automotive electronics. Acer and Lite-on are the two most representative companies in the automotive electronics sector.



Acer was established in 1976 and is a well-known Taiwanese tech company. It has been actively positioning itself in the self-driving market in recent years by cooperating with Yulon, the local EV maker, to develop Taiwan's first self-driving EV concept. The move takes the company beyond ADAS into the unmanned self-driving sector. The Automotive Research & Testing Center (ARC) also partnered with 18 companies to form the "Self-Driving Vehicle Alliance." The alliance of bus operators, self-driving vehicle integration, electric integration and body manufacturing industries is aimed at building Taiwan's own SAE Level 4 self-driving electric bus.

Lite-on was established in 1975 and its business portfolio encompasses cloud computing, LED lighting, automotive electronics, smart manufacturing and IoT. In the automotive electronic applications sector, its business can be further broken down into: (1) ys and infotainment products; (3) Internet-of-Vehicle (IoV) applications, such as the T-Box, smart onboard antenna, vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I).





## 2. Central Taiwan

The central cluster is spread across Taichung City, Changhua County, Nantou County and Yunlin County. Central Taiwan has traditionally been the heart of Taiwan's precision machinery industry so it includes manufacturers for servo motors and control modules, EV auxiliary systems, EV energy storage and power management systems, other critical EV technologies and system integration, and niche EVs. An example of these companies is Mobiletron.

Mobiletron was founded in 1982 and distributes automotive electronic parts and components under the "Mobiletron" brand. Key products including electronic engine control systems and vehicle safety systems. To enter the EV market, Mobiletron focused on the development of EV energy storage and battery management systems. It also invested in RAC for the production of electric vehicles and the three key EV systems (battery, electro-mechanical and electronic control); a joint R&D project for self-driving medium buses was also set up with ITRI with the goal of developing new models for mass production in the future.

## 3. Southern Taiwan

The southern cluster contains well-known whole vehicle makers such as Tang En (manufacturer of electric buses), Sincere Bus (vehicle body manufacturer), and KYMCO (motorcycle maker). Vendors for EV parts and components encompass servo motors and control modules, EV energy storage and power management systems, other critical EV technologies and system integration, and niche EVs spread throughout Chiayi City/County, Tainan City, Kaohsiung City and Pingtung County.



# Potential Investment and Collaboration Opportunities in Taiwan

1

## Best R&D and testing facility for next-generation vehicles

Taiwan is densely populated and has a very complex transportation environment. Road traffic is a mix of pedestrians, motorcycles and automobiles compounded by a population where the use of ICT products in everyday life is very common. In the embracing of "C.A.S.E." as the direction for next-generation development, international cooperation can be used by Taiwan in every aspect to enhance the technical capabilities of the industry and make up for its deficiencies. Taiwan is also well-suited to become a demonstration facility for next-generation vehicles through new business models based on inter-disciplinary cooperation, and pilot trials for new energy vehicles. In smart driving for example, Taiwan's more complicated driving environment makes it a more suitable testing environment for the development of autonomous vehicles than other countries that are now doing the same. The passing of the "Unmanned Vehicles Technology Innovative Experimentation Act" will also pave the way for self-driving facilities that will encourage foreign companies to choose Taiwan for product development and real-world testing.

The transportation environment regulatory conditions and industry advantages offered by Taiwan makes it the perfect R&D and testing facility for next-generation vehicles. Self-driving vehicles suitable for highly complex transportation environments developed in Taiwan can be introduced to other Asian countries in the future as well.

In addition, demand for IoV will only grow bigger in response to developments in EV and self-driving vehicles, as well as continued upgrades in automotive electronics technology. Protection of information security then becomes an issue of great importance. Despite the massive market opportunities and development resources possessed by China, as long as the US-China trade war continues to rage the U.S. Government will be quite sensitive to information security issues. Taiwan's extensive experience with information security technologies and protection makes it a more suitable partner for the development and testing of next-generation vehicles.







2

## **Connecting with Taiwan's ICT Industry to exploit next-generation vehicle opportunities**

Next-generation vehicles cover a wide range of industries. EVs and self-driving vehicles are both waiting for breakthroughs in new technologies, so the threshold for R&D is quite high. Traditional car makers can't complete these on their own, and tech companies can't enter the automotive sector without help either. Emerging automotive companies in particular need to look for partners for cross-industry/sector cooperation or engage in multi-national technical cooperation in order to break into the emerging technologies sector. The ICT industry of Taiwan boasts world-class R&D capability and manufacturing expertise. Its many years of experiences in the automotive electronics industry have created a variety of applications for vehicle safety, mobility assistance, communications multimedia, and automotive IC. Its manufacturing capacity is strongly trusted by foreign and local vendors. Faced with a tidal wave of next-generation vehicles, consumers now expect more in terms of environmental protection and safety. Massive increases in demand for car sensing technology indicate that Taiwan can partner with international car makers in the development of next-generation vehicles.



3

### **Taiwan's whole vehicle and component manufacturing capabilities can provide international car makers with a full range of production services**

Taiwanese car makers have invested significant resources in the development and adjustment of production equipment. They are continuing to upgrade their overall manufacturing capabilities to meet emission standards. Some manufacturers have even taken the lead in investing in EV production technologies and have the capability to manufacture whole EVs. The relatively flexible production lines of the Taiwanese automobile industry can provide the full-range of manufacturing services for small lots of specialty vehicles, making them a suitable pilot production partner for international car makers.

Taiwan's manufacturing capability for automotive parts and components is also of high standard. Taiwanese vendors have a strong pool of expertise on servo motors, energy storage systems, power modules, power control systems and other technologies used by EV. A significant number of Taiwanese vendors now supply EV parts and components to international car makers, proof that Taiwanese parts suppliers have achieved international acceptance. Future developments in next-generation vehicle technology should see Taiwanese parts suppliers leverage their exceptional R&D capability to continue supplying international car makers with the necessary products to satisfy the demands of new technologies and fields.



# Investment Incentives

## 1 | Tax incentives |

The corporate income tax rate of Taiwan is 20%. To encourage foreign companies to invest in Taiwan, support industrial innovation, and promote industry-academia collaboration, foreign companies are eligible for the following preferential taxes (Table 1):

Table 1 Preferential taxes

Encouraged operational activities	Incentives
Establishing operational, R&D, or manufacturing sites in Taiwan	<ul style="list-style-type: none"><li>• Up to 15% of the company's R&amp;D expenditures may be deducted from its corporate income tax that year.</li><li>• Imported machinery that local-manufacturers cannot produce is eligible for duty-free treatment.</li><li>• Royalties paid to foreign companies for new production technologies or products imported from overseas that have patent rights, trademarks, or various concessions are exempted from income tax after gaining approval from the Industrial Development Bureau, MOEA.</li><li>• Royalty payments to foreign companies for imported new production technologies or products that use patents, copyrights, or other special rights owned by foreign companies is, with the approval of the Industrial Development Bureau, MOEA, exempt from the corporate income tax.</li></ul>



Encouraged operational activities	Incentives
Investment in smart machinery/5G	<ul style="list-style-type: none"> <li>• Smart machinery: Automatic, flexible, or mixed-model production that utilizes big data, AI, and IoT.</li> <li>• 5G: Related investment projects include 5G communication systems, new hardware, software, technology, or technical services.</li> <li>• For investments of no less than NT\$1 million and no more than NT\$1 billion, either “5% of investment spending deducted from corporate income tax (current FY)” or “3% of investment spending deducted from corporate income tax, if total spending spread over three years” may be selected, but the total amount deducted may not exceed 30% of corporate income tax that year.</li> <li>• The applicable period is from January 1, 2019 to December 31,2021 (smart machinery)/January 1,2019 to December 31,2022 (5G).</li> </ul>
Promoting industrial innovation and industry-academia collaboration	<ul style="list-style-type: none"> <li>• Individuals and creators who receive shares via technology investment, hold the shares for 2 years, and meet conditions for serving in Taiwan may choose to pay taxes based on the price of shares when they were acquired or transferred, whichever is lower.</li> <li>• Limited partnership venture capital that makes a larger lump sum investment may be taxed using the transparent entity concept.</li> <li>• Parent company employees that obtain shares of subsidiaries and vice versa are also eligible to be taxed based on the lower share price.</li> <li>• Companies or limited partnerships that use undistributed earnings to make real investments may deduct it from their undistributed earnings.</li> </ul>
Moving into industrial parks	<ul style="list-style-type: none"> <li>• Companies that move into export processing zones, science-based industrial parks, and free trade zones are exempted from import tariffs on machinery and equipment, raw materials, fuel, supplies, and semi-finished products.</li> <li>• The business tax rate is zero for exporters of goods and labor services.</li> </ul>



## 2 | Subsidies |

### 1. Global Innovation Partnership Initiatives

To encourage foreign companies that complement and mutually benefit Taiwan's industries to engage in R&D and innovation activities in Taiwan, those that: (1) have technologies not yet mature in Taiwan and overseas and will produce strategic products, services, or industries in future industrial development; (2) have potential to let Taiwan produce leading technologies or significantly enhance the competitiveness and increase the added value of important industries; or (3) engage in key and common technology R&D, vertical or horizontal technology integration, and can create an industrial value chain; will be eligible for subsidies of up to 5% of total R&D expenditures after gaining approval from the MOEA.

### 2. Integrated R&D Program

Companies that (1) engage in key and common technology R&D, vertical or horizontal technology integration, and can create an industrial value chain; (2) establish industry standards, protocols, or platforms; or (3) establish applications, services, and innovative business and marketing models with technological content and increase the industry's added value; will be eligible for subsidies of no less than 40% but no more than 50% of total project funding after gaining approval from the MOEA.

### 3. Industrial Upgrade & Innovation Platform Program

The Industrial Development Bureau, MOEA and Ministry of Science and Technology jointly implemented the Industrial Upgrade & Innovation Platform Program” to guide industries to develop towards greater value, and encourage companies to enter high-end product application markets to increase the industry's overall added value. The program provides companies with R&D teams in Taiwan with 40-50% of funding required for theme-based R&D projects, and up to 40% of funding for R&D projects proposed by companies.



# Successful Examples of Foreign Companies

## 1 | Investment in production and manufacturing

Honda Taiwan, a wholly-owned subsidiary of Honda Japan, plans to invest an additional NT\$4 billion over five years starting from 2019. The production equipment at its Pingtung car assembly plant will be upgraded and new models introduced to strengthen its presence in the Taiwan market. At the same time, Toyota not only acquired a stake in Fukuta but is also planning to engage in technical cooperation in automotive motors for EVs, and plug-in hybrids (PHV). NT\$6 billion was also recently invested towards production line upgrades and the introduction of hybrid models.

## 2 | Cooperation in testing facilities

NVIDIA, the American graphic card maker, has signed a memorandum of understanding with Taiwan's Ministry of Science and Technology as well as its subordinate National Research Laboratories to take part in the development of Taiwan's self-driving vehicle industry and to cooperate with Taiwan CAR Lab on technical applications. Magna from Canada has already established an R&D center in Taiwan to develop automotive ultrasonic sensors and associated parking/reverse assistance systems, automotive video and front recognition camera modules/systems. Additional investments are planned for R&D projects in new fields.



### 3 | Cooperation on R&D |

Tesla, the leading US EV maker, established the EIS Center in Neihu, Taipei, in October 2018 as a new venture focusing on "new energy", "new technology" and "energy efficiency." TDK from Japan signed a memorandum of understanding with CPC and Eternal Energy on the launch of the "Smart Green Service Station." A CPC-branded battery will be developed for use in electric motorcycles.

### 4 | Cooperation in talent development |

The German Volkswagen Group has established an education and training center in Taipei City's Xizhi District. The center will be the company's largest training organization in the Asia-Pacific region outside of China. To establish a presence in Taiwan's EV market, the "e-Mobility Center" designed specifically for EVs was expanded to become the training base for EV technicians in Taiwan. VW is cooperating with Delta Power on EV charging infrastructure as well. Honda Taiwan is engaging in industry-academia cooperation with technical and vocational colleges in Pingtung for training technical talent and to provide them with job opportunities.

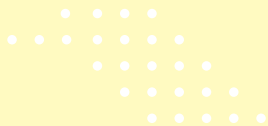


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