

# **Promoting New Industrial Layout and Net-zero Transformation**

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## **I. Overview of Taiwanese Industry**

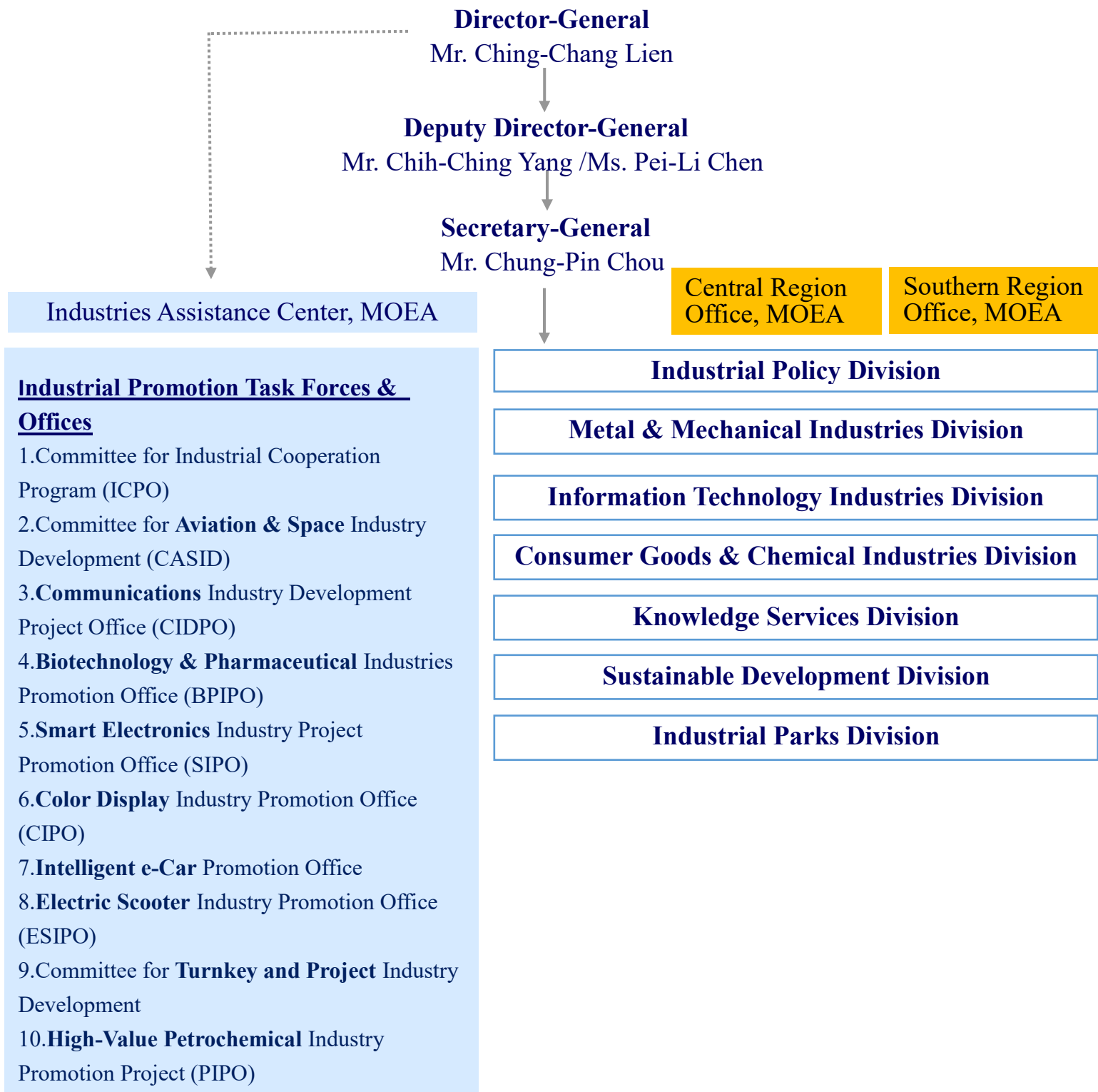
### **1. Organizational Structure and Responsibilities of the Industrial Development Bureau, Ministry of Economic Affairs**

The Industrial Development Bureau (IDB) is in charge of the task of industrial development nationwide, upholding the spirit (core value) of professionalism, efficiency, proactive and innovative services in providing the industry with comprehensive services according to its needs. IDB is devoted to guiding Taiwan industry to innovatively upgrade and transform, and actively assists manufacturers to strengthen their business operations and raise their productivity and international competitiveness, so as to better be able to respond to changes in the environment.

IDB has seven divisions, under which are several industrial promotion task forces and offices, and an Industries Assistance Center. Their main tasks include the following:

- i) Formulation of industrial development policies, strategies and measures
- ii) Promotion and implementation of industry upgrading-related programs and plans
- iii) Development and management of industrial parks
- iv) Formulation of taxation and financial measures related to industry development
- v) Industrial pollution prevention and control, industrial safety guidance and assistance, and plant management
- vi) General industry administrative management

IDB's industrial parks division, in addition, is in charge of 61 industrial park management and service organizations, 11 environmental protection centers, as well as the Mailiao Industrial Harbor Administration and the Hoping Industrial Harbor Administration.



## 2. Chronology of Taiwan's Industrial Development

The steady development of Taiwanese industry over a period of several decades has given rise to Taiwan's per capita gross national product (GNP) to increase from under US\$200 in 1951 to US\$28,469 in 2021. Over this same period, industrial sector's share output value of gross domestic product (GDP) rose from US\$260 million in 1951 to US\$293 billion in 2021.

After more than 50 years of industrial development, Taiwan has now solid foundations and has become an important part of the global economy. Taiwan became a member of the World Trade Organization (WTO) on January 1, 2002 (under the name of "Chinese Taipei"), and has since been working actively to sign economic collaboration agreements with other countries. At present, Taiwan is working towards the goal of securing membership of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP).

While Taiwan is proactively growing its external economic and trading links, also takes up the very important task of building up the country's domestic capabilities. In this respect, numerous important industrial measures – from the *Statute for Upgrading Industries* of 1991, through the initiative to promote development of knowledge economy in 2000, the promotion of six emerging industries in 2009, the implementation of *the Statute for Industrial Innovation* in 2010, to the *Industrial Upgrading and Transformation Action Plan* in 2014 – have taken shape based on careful analysis of international trends and of the then-current state of industrial development in Taiwan. In 2016, the Taiwanese government launched a new industrial development policy to expedite industrial transformation upgrade. This policy was called *Five plus two Industrial Innovation Plan*, which was to become the core in driving industrial growth in the next generation of smart machinery, Asian Silicon Valley, biotech & pharmaceutical industry, green energy, national defense, new agriculture and circular economy. In 2020, with the foundation of the previous policies, "six core strategic industries" -- information and digital industry, cybersecurity industry, precision health

industry, national defense and strategic industry, green and renewable energy industry, and strategic stockpile industry were mapped to drive new looks to the industry, while at the same time, linking the *Investing in Taiwan's Three Major Plans* of 2019 to further enhance Taiwan's overall industrial development and to create a better investment environment to achieve industrial transformation, upgrading and innovation.

**Table 1 \_ Chronology of Taiwan's Industrial Development**

| <b>Period</b> | <b>Development Strategy</b>       | <b>Key Measures</b>                                                                                                                                                                   | <b>Manufacturing Sector GDP (US\$100 mil.)</b> | <b>Per Capita GDP (US\$)</b> |
|---------------|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|------------------------------|
| <b>1950s</b>  | <b>Import Substitution</b>        | 1951 – Land reforms implemented<br>1953 – Economic development plan launched<br>1960 – Investment incentive regulations implemented                                                   | 1.77→2.76                                      | 137→122                      |
| <b>1960s</b>  | <b>Export Expansion</b>           | 1966 – Export processing zone established                                                                                                                                             | 3.28→14.32                                     | 143→320                      |
| <b>1970s</b>  | <b>Infrastructure Improvement</b> | 1971 – Ten Major Construction Projects launched<br>1974 – ITRI established<br>1979 – Science and Technology Development Plan initiated<br>1980 – Science-based industrial park set up | 16.54→119.26                                   | 360→1,758                    |
| <b>1980s</b>  | <b>Economic Liberalization</b>    | 1982 – Strategic industries promoted<br>1985 – Economic liberalization promoted                                                                                                       | 149.19→515.35                                  | 2,189→7,097                  |
| <b>1990s</b>  | <b>Industrial Upgrade</b>         | 1991 – Statute for Upgrading Industries implemented                                                                                                                                   | 533.49→717.61                                  | 7,556→12,324                 |

|              |                                                       |                                                                                                                                                                                                                                                                                                                                                               |                                 |                               |
|--------------|-------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------------------------------|
|              |                                                       | <b>1991 – Six-year National Development Plan launched</b><br><b>1993 – Restrictions on indirect investment in mainland China relaxed</b>                                                                                                                                                                                                                      |                                 |                               |
| <b>2000s</b> | <b>Global Deployment</b>                              | <b>2000- Knowledge-based Economy Development Plan initiated</b><br><b>2002 – “Challenge 2008” National Development Plan launched</b><br><b>2006 – “Big Investment, Great Warmth” industry development plan implemented</b><br><b>2008 – i-Taiwan 12 infrastructure projects launched</b><br><b>2009 – Development of six key emerging industries promoted</b> | 763.24→936.99                   | 13,299→14,271                 |
| <b>2010s</b> | <b>Participation in regional economic integration</b> | <b>2010 - Statute for Industrial Innovation implemented</b><br><b>2010 – Cross-strait ECFA signed</b><br><b>2010 – Development of ten key service industries and four emerging smart industries</b><br><b>2013 - Taiwan-New Zealand economic cooperation agreement (ANZTEC) signed</b><br><b>2013 – Taiwan-Singapore economic partnership</b>                 | 1,302.51→1,890.5<br>(2010→2019) | 16,563→22,351<br>(2010→2019 ) |

|       |                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |                               |
|-------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------------------------------|
|       |                                                                                                      | <p>agreement (ASTEP) signed</p> <p>2014 – Industry Upgrading and Transformation Action Plan launched</p> <p>2015 – Productivity 4.0 project</p> <p>2016 – Promoting the development of the “Five Innovative Industries” - Smart machinery, Asian Silicon Valley, Biotech &amp; pharmaceutical industry, Green energy, and National defense – along with “New materials and circular economy”</p> <p>2017 – Promoting international linkage and Forward-looking Infrastructure Development Program</p> <p>2019 – Promoting the Investing in Taiwan’s Three Major Plans</p> |                                 |                               |
| 2020s | Create a new model of economic development, promote industrial transformation upgrade and innovation | <p>2020 – Promoting the Six Core Strategic Industries: Information and Digital Industry, Cybersecurity Industry, Precision Health Industry, National Defense and Strategic Industry, Green and Renewable Energy Industry, Strategic Stockpile</p>                                                                                                                                                                                                                                                                                                                         | 2,137.41→2,538.4<br>(2020→2021) | 24,557→28,469<br>(2020→2021 ) |

|  |  |                 |  |  |
|--|--|-----------------|--|--|
|  |  | <b>Industry</b> |  |  |
|--|--|-----------------|--|--|

note: i) New method of calculating GDP used from 1981 onward

ii) The year 2006 is used as the base period for calculations after 2009; while 2001 is used as the base period for data prior to 2008

iii) Data compiled by the Industrial Development Bureau

### 3. Current State of Industrial Development in Taiwan

#### 3.1 Changes in Industrial Structure

Taiwan's nominal GDP can be divided into three sectors: agriculture, forestry and fisheries industry, industrial industry, and service industry. As a result of the transformation of Taiwan's industrial structure, the share of total nominal GDP held by agriculture, forestry and fisheries industry has fallen to well under 2%, and in 2021 downed to 1.49%. The share of overall nominal GDP in manufacturing industry, however, has been rising steadily in recent years, reaching its peak at 32.85% in 2021.

**Table 2: Contribution to GDP by Sector**

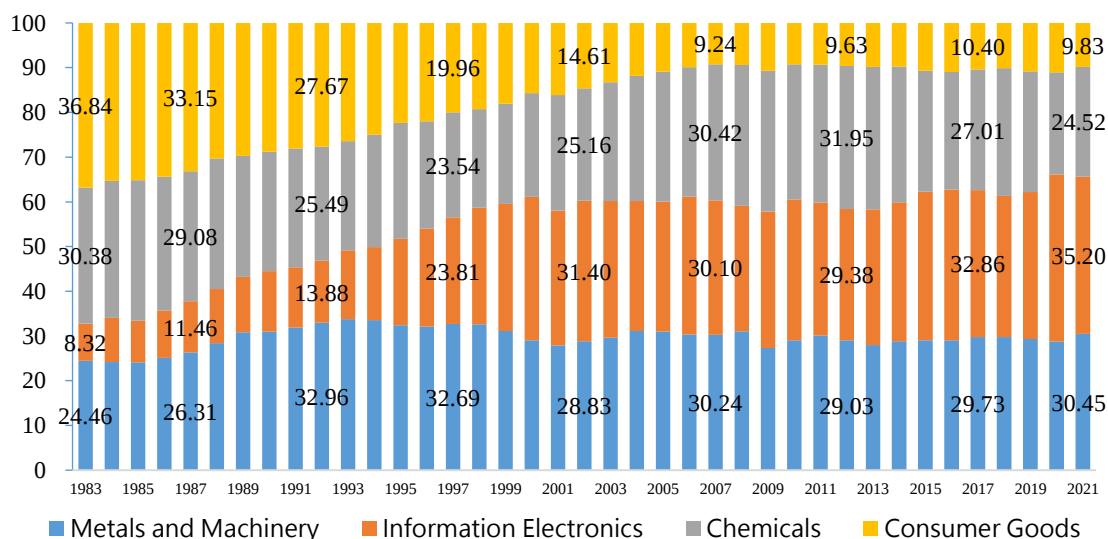
| Sector \ Year                                             | Percentage of GDP |              |              |              |              |              |              |              |              |              |              |
|-----------------------------------------------------------|-------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                                                           | 2011              | 2012         | 2013         | 2014         | 2015         | 2016         | 2017         | 2018         | 2019         | 2020         | 2021         |
| <b>Production Source</b>                                  | 100               | 100          | 100          | 100          | 100          | 100          | 100          | 100          | 100          | 100          | 100          |
| <b>i) Agricultural, forestry, fisheries and livestock</b> | 1.72              | 1.70         | 1.73         | 1.85         | 1.76         | 1.87         | 1.82         | 1.69         | 1.68         | 1.59         | 1.49         |
| <b>ii) Industrial</b>                                     | 33.02             | 32.66        | 33.72        | 35.57        | 36.29        | 36.87        | 36.83        | 36.31        | 35.46        | 37.12        | 37.92        |
| <b>Manufacturing</b>                                      | <b>28.66</b>      | <b>28.33</b> | <b>29.12</b> | <b>30.94</b> | <b>31.42</b> | <b>32.22</b> | <b>32.53</b> | <b>32.13</b> | <b>30.96</b> | <b>32.07</b> | <b>32.85</b> |
| <b>iii) Services</b>                                      | 65.27             | 65.64        | 64.54        | 62.57        | 61.95        | 61.27        | 61.35        | 62.00        | 62.86        | 61.29        | 60.59        |

(note: data compiled by DGBAS, Executive Yuan)

#### 3.2 Current State of the Manufacturing Sector

The International Standard Industrial Classification (ISIC) divides the industrial sector into manufacturing industry, water, electricity and gas industry, construction industry, and mining and quarrying industry. Manufacturing industry accounts for by far the largest share of Taiwan's industrial sector. In 2021, due to the continued impact of the dramatic

increase in global demand, manufacturing production values rose by 26.31% to NT\$16,756 billion. The structure of Taiwan's manufacturing sector was also transformed from mainly commodity industry in 1983 (36.84%) to information electronics industry in 2021 (35.2%). The electronic parts and components industry alone accounted for 29.54% of total output. The individual industries holding the next largest shares of total output were chemical materials industry (12.77%) and basic metals industry (11.43%). These make up the largest three production values in secondary industries. Furthermore, the total number of people employed in the manufacturing sector in 2021 was approximately 2,857,700 people, thus providing abundant employment opportunities for the people of Taiwan.



**Diagram 1: Changes in the Structure of Production Value in Taiwan's Manufacturing Industry**

|      | Metals and Machinery | Information Electronics | Chemicals | Consumer Goods |
|------|----------------------|-------------------------|-----------|----------------|
| 1983 | 24.46%               | 8.32%                   | 30.38%    | 36.84%         |
| 1984 | 24.20%               | 9.86%                   | 30.62%    | 35.33%         |
| 1985 | 24.13%               | 9.31%                   | 31.42%    | 35.14%         |
| 1986 | 25.08%               | 10.62%                  | 29.93%    | 34.37%         |
| 1987 | 26.31%               | 11.46%                  | 29.08%    | 33.15%         |
| 1988 | 28.42%               | 12.05%                  | 29.23%    | 30.30%         |
| 1989 | 30.83%               | 12.42%                  | 27.04%    | 29.71%         |
| 1990 | 30.96%               | 13.58%                  | 26.67%    | 28.78%         |
| 1991 | 31.88%               | 13.50%                  | 26.57%    | 28.06%         |
| 1992 | 32.96%               | 13.88%                  | 25.49%    | 27.67%         |
| 1993 | 33.75%               | 15.41%                  | 24.43%    | 26.42%         |
| 1994 | 33.55%               | 16.33%                  | 25.13%    | 24.98%         |
| 1995 | 32.41%               | 19.32%                  | 25.91%    | 22.37%         |
| 1996 | 32.10%               | 21.90%                  | 23.99%    | 22.01%         |
| 1997 | 32.69%               | 23.81%                  | 23.54%    | 19.96%         |
| 1998 | 32.60%               | 26.08%                  | 22.06%    | 19.26%         |
| 1999 | 31.14%               | 28.40%                  | 22.43%    | 18.03%         |
| 2000 | 29.08%               | 32.01%                  | 23.21%    | 15.70%         |
| 2001 | 27.90%               | 30.11%                  | 25.84%    | 16.15%         |
| 2002 | 28.83%               | 31.40%                  | 25.16%    | 14.61%         |
| 2003 | 29.63%               | 30.52%                  | 26.58%    | 13.27%         |
| 2004 | 31.10%               | 29.11%                  | 28.00%    | 11.79%         |
| 2005 | 30.98%               | 29.08%                  | 29.04%    | 10.90%         |
| 2006 | 30.31%               | 30.86%                  | 28.94%    | 9.89%          |
| 2007 | 30.24%               | 30.10%                  | 30.42%    | 9.24%          |
| 2008 | 31.07%               | 28.06%                  | 31.47%    | 9.39%          |
| 2009 | 27.30%               | 30.53%                  | 31.49%    | 10.68%         |
| 2010 | 29.08%               | 31.43%                  | 30.20%    | 9.28%          |
| 2011 | 30.10%               | 29.72%                  | 30.83%    | 9.34%          |
| 2012 | 29.03%               | 29.38%                  | 31.95%    | 9.63%          |
| 2013 | 28.01%               | 30.33%                  | 31.87%    | 9.79%          |
| 2014 | 28.82%               | 31.09%                  | 30.34%    | 9.75%          |
| 2015 | 29.07%               | 33.21%                  | 27.05%    | 10.67%         |

|      |        |        |        |        |
|------|--------|--------|--------|--------|
| 2016 | 29.02% | 33.72% | 26.31% | 10.95% |
| 2017 | 29.73% | 32.86% | 27.01% | 10.40% |
| 2018 | 29.74% | 31.57% | 28.57% | 10.11% |
| 2019 | 29.36% | 32.81% | 26.99% | 10.84% |
| 2020 | 28.75% | 37.41% | 22.78% | 11.07% |
| 2021 | 30.45% | 35.20% | 24.52% | 9.83%  |

(note: data compiled by Department of Statistics, MOEA)

**Table 3: Manufacturing Industry Production, 2021**

|                            | <b>% of<br/>Manufacturing<br/>Industry's Total<br/>Production</b> | <b>Production<br/>Index (the year<br/>2016= 100)</b> | <b>Production<br/>Value<br/>(US\$1mil.)</b> | <b>Total Workforce<br/>(10,000 persons)</b> | <b>Per Capita<br/>Annual<br/>Production<br/>(US\$)</b> |
|----------------------------|-------------------------------------------------------------------|------------------------------------------------------|---------------------------------------------|---------------------------------------------|--------------------------------------------------------|
| <b>Manufacturing</b>       | <b>100</b>                                                        | <b>133.86</b>                                        | <b>573,670</b>                              | <b>285.87</b>                               | <b>200,677</b>                                         |
| Metals and<br>Machinery    | 30.45                                                             | 113.79                                               | 174,659                                     | 103.02                                      | 169,532                                                |
| Information<br>Electronics | 35.20                                                             | 163.10                                               | 201,939                                     | 87.51                                       | 230,771                                                |
| Chemicals                  | 24.52                                                             | 102.15                                               | 140,665                                     | 46.75                                       | 300,907                                                |
| Consumer<br>Goods          | 9.83                                                              | 109.81                                               | 56,407                                      | 48.59                                       | 116,088                                                |

(note: data compiled by DGBAS, Executive Yuan; and Department of Statistics, MOEA)

#### **4.Taiwan's Major Industrial Clusters**

For more than 50 years, industrial districts designated by the Industrial Development Bureau have provided first-class environment for business enterprises to invest in factory establishment and attracting industries to develop in clusters, thus forming industry clusters in each region with their own particular sources of comparative advantage. In recent years, with the government's industrial upgrading and transformation policies and related guidance measures, as well as the various investment incentive measures, there has been a gradual progress in transformation and adjustment of industrial development in industrial parks and industry clusters, and close integration of special characteristics of local industries with local resources. It is anticipated that this new trend will help to stimulate further upgrading and continued growth in Taiwan's manufacturing sector.

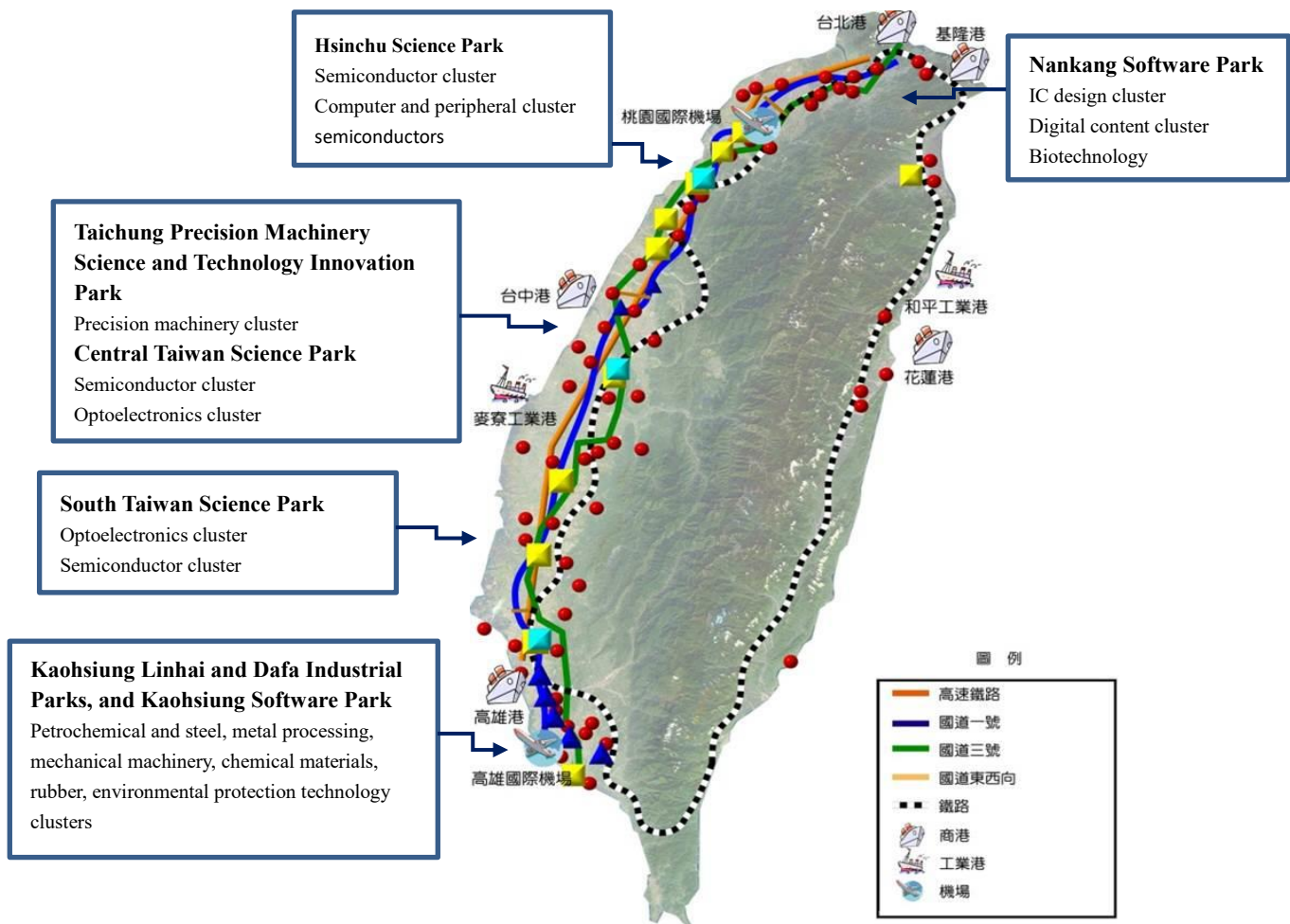
Northern Taiwan is the main cluster development area for high-tech industries, with electronic parts manufacturing, computer, electronic product and optical product manufacturing as the main industrial development categories. In addition to the development of hardware, within the capital center is smart industrial area with the most comprehensive and advance software development environment. With abundance infrastructure and academic/research institutions, this region is alive with frequent industrial-academic cooperation and interaction. In this environment, high-tech industry, software, and biotechnology clusters grow rapidly, driving the innovation and development of the parks and the growth of emerging industries.

In central Taiwan, fabricated metal products, mechanical equipment, opto-electronics, other means of transportation and component manufacturing are the main industrial development categories. These lay the foundation for the development of domestic manufacturing. Under the development trend of high-value and intelligent industries, key metal materials, components and precision machinery industry clusters grew,

connecting academic and research entities and legal person counseling institutions around the industrial parks, aiding to the enhancement of innovation energy, while at the same time strengthening the construction of software environment, promoting the intelligent development of the industry, and creating a new wave of growth momentum.

In southern Taiwan, petrochemicals, chemical materials and basic metal manufacturing are the main industrial development categories. In recent years, high technology and emerging industrial clusters such as electronic integrated circuits, opto-electronics, and environmental protection technology are gradually taking shapes, driving the transformation and development of local industries. In the future, regional industries will integrate with circular economic development model, and emerging industries will link with the abundant academic and research resources to enhance innovation and R&D energy. Through the establishment of an upstream-downstream industrial value chain collaboration mechanisms, the development of an emerging manufacturing ecosystem in southern Taiwan will be promoted.

**Diagram 2: Taiwan's Industry Clusters**



note :

1.



Science parks: 13

( 3 agencies established to manage the parks )



Export processing zones: 10



IDB-designated industrial zones: 62

(3 management agencies; 46 service centers; 1 environmental protection center)

Local government-designated industrial zones: 47

Privately developed industrial zones: 70

Industrial ports: 2

2: Data source: IDB

## II. Annual Special Topics

US-China trade conflicts and impact from the pandemic have expedited supply chain regrouping the world over. Enterprises are placing more emphasis on decentralizing markets and risks, and hastening the transfer of production base. Taiwan uses this opportunity to propose overall economic policy to facilitate investments in Taiwan. This policy is the Three Major Programs for Investing in Taiwan, calling for manufacturers to return to Taiwan to invest or take roots in Taiwan.

On the other hand, with consideration of the increased awareness in automation of key industries worldwide, the introduction of emerging technology, and the institution of supply chain net zero emission goal, on top of which the penetration of emerging technology such as IoT, Big Data, and AI in every domain, cross-domain cooperation will be the key factor to industrial growth in the future. Taiwan is taking a step further toward major industrial policies. In addition to actively promoting new industrial layouts in semiconductor, 5G, and electric vehicles, Taiwan is also assisting industries in upgrading and transformation for the expedition of optimize productivity and development of new business models.

The world over now faces the trends and regulations to carbon reduction. By improving production processes, changes to energy source, and circular economy strategies, we can enhance our energy efficiency and reduce manufacturing emission. Therefore, the themes of this year's Industrial Development are focused on expediting investments in Taiwan, new layouts in key industries, industrial upgrade and transformation, and net zero emission in the manufacturing sector.

### **1. Expediting Investments in Taiwan – Three Major Programs for Investing in Taiwan**

In view of changes to international conditions and transfer of global supply chains, Taiwan began to implement three major plans to assist enterprises to expedite their return to invest and take roots in Taiwan, as well as to encourage domestic enterprises to upgrade and transform. These three plans are *Welcome Back to Taiwan Investment Action Plan*, *Root Enterprise Expedite Investment Action Plan*, *SME Expedite Investment Action Plan*, together known as the Three Major Programs for Investing in Taiwan. These three plans are to be implemented to the end of 2024. With these plans in place, we hope to upkeep private investment momentum while at the same time remodel the comprehensiveness of industrial supply chain for a stronger support to the economy.

To be eligible for the Three Major Programs for Investing in Taiwan, investments in Taiwan or partial production line in factory expansion must be equipped with smart technology elements or functions, and must meet one of the following conditions: within the domain of 5+2 industrial innovation, within the domain of high add-on value products and key components, holding key position in international supply chains, having international marketing for self-owned brand, investment categories are related to the nation's key industry policies. Furthermore, to encourage enterprises to invest in net zero emission to be in line with global carbon reduction, enterprises must submit concrete carbon reduction plan and approach, e.g., using green energy or establishing reuse energy equipment, adopting energy-saving or low carbon equipment, heat recovery or circular recovery, planning green architecture, etc.

Three Major Programs for Investing in Taiwan is directed at the needs of enterprises with land, water, electricity, tax, and capital measures. The Invest Taiwan serves as a one-stop window aiming to shorten administrative processes by providing customized services and related consultation. With respect to land use, the Office supplies information on available land in industrial parks and assist enterprises in finding suitable land, and to also strengthen land use efficiency through the floor area incentive mechanism of the Program for Vertical Expansion of Industrial Parks. With respect to human resources, the Office utilizes policy instruments and provide recruitment matching services to help enterprises fill their human resource needs. With respect to financing, low-interest loans are provided to enterprises for factory expansion, equipment purchases, and mid-term working capitals; the maximum amount of loan that can be granted is no more than 80% of the enterprise's total investment plan.

All measures provided by the Taiwan government are beneficial to create a friendly investment environment that allow Taiwan to become an optimal location choice for additional investments, as well as one with peace of mind. In future, IDB will continue to strengthen its capacity to attract businesses and capitals, manifest Taiwan's advantages, enhance competitiveness and sustainable development for a solid industrial outlook.

## **2. New Layouts in Key Industries: Fostering developments in semiconductor, 5G, and electric vehicles**

Structural transformation of Taiwan's technology industry was from that of a low added-value hardware OEM to high gross margin semiconductor and electronic component supply chains, and also from applying its solid ICT foundation to every industry. As electric vehicles

and other emerging technologies such as 5G are trending the world over and becoming the new blue ocean where businesses compete to invest, Taiwan is placing emphasis to support the development of semiconductor, 5G, and electric vehicles. In addition to continue securing the internationally leading position of Taiwan's semiconductor, at the same strengthen the development of 5G and electric vehicles to allow for more outstanding industries to rise to key roles on the world stage.

## 2.1 Purpose

Continue to strengthen Taiwan's key position in global supply chain to ensure key industries' competitive advantages

## 2.2 Content

### a. Semiconductor

With the development of 5G and electric vehicles, the needs for semiconductor chips will continue to be in demands in the future. Taiwan is actively attracting semiconductor material equipment manufacturers to invest in Taiwan, making Taiwan the advance semiconductor manufacturing process center and perfecting Taiwan's supply chain and ecosystem to better serve global customers.

### b. Electric vehicles battery and parts and components supply chain

In response to international movement toward net zero emission which mobilizes the development of electric vehicles, internationally known car makers are actively deploying their electric cars. Taiwan has over ten years of experience in developing and supplying key components for electric vehicles. Car electronics such as motor power, vehicle body system, vehicle electric system, battery system, and charger system are in full capacity and have entered many global car manufacturers' supply chain system. Taiwan has now become an impartible cooperation partner of international car manufacturers.

### c. 5G industry

Post-pandemic demand for cloud and remote service has become a major driver for growth in the information and communication supply chain. Countries around the world have also expanded their infrastructure in order to revitalize their economy affected by the pandemic. Given Taiwan's comprehensive ecosystem ranging from semiconductor, key components, network communication equipment to terminal equipment, Taiwan is well-positioned as a reliable partner in the global supply chain for 5G.

The Ministry of Economic Affairs has also launched a 5G Open Networking Lab to strengthen cooperation with advocates for open networking (such as TIP) to validate solutions from Taiwan, and bridge

them with global vendors to explore more business opportunities in the marketplace.

### **3. Responding to Development in Emerging Technology**

#### **Application: Assisting industrial upgrade and transformation**

In consideration of different industries having different development stages, difficulties and bottlenecks (i.e., technology innovation, manufacturing process upgrade, management and operation, etc.), Ministry of Economic Affairs, with the collaboration from industrial organizations and associations, pinpoints industrial needs and combines professional capacities to assist industries in investing in product R&D, counseling manufacturers in technology upgrade, and assisting in developing innovative applications.

#### **3.1 Purpose**

Taiwan aims to build on the foundation of conventional industries through ICT or other new technology domains and innovative business models to enhance growth in these industries and transform them into new and dynamic industries. Furthermore, doing so would simultaneously upgrade peripheral SMEs and relevant service industries, and in turn, would become the driving force to Taiwan's economic advancement.

#### **3.2 Content**

##### **a. Introduction of smart upgrade**

Taiwan aims to expedite the introduction of smart manufacturing and enhancement of digital management capability by facilitating guidance to Smart Machine Box (SMB), providing consultation diagnosis through the Smart Manufacturing Consultation Team, and introducing AI smart applications.

##### **b. Provision of R&D subsidies**

Utilizing the R&D subsidy mechanism, Taiwan has two resource platforms (Industrial Upgrade and Innovation Platform, CITD) to help enhance intellectualization and digitalization through new product R&D subsidies, while at the same time utilizing the capability of legal entity research institutes to help improve product quality or business management models.

##### **c. Guidance to digital transformation**

In addition to providing industries with digital transformation

strategies, IDB also assists manufacturers in incorporating new digital instruments such as AI and Big Data. Furthermore, IDB collaborates with legal entities and technological services to network with industrial organizations and associations to establish the Digital Transformation Service Group, providing industries with customized guidance.

#### **4. Realizing the Goal of Net Zero Emission: Transformation strategies and approaches to net zero emission in manufacturing sector**

While we are now faced with the international demands for green supply chain and the EU's Carbon Border Adjustment Mechanism, transformation to net zero emission has become a requisite for industries to maintain their international competitiveness. IDB's net zero emission transformation plan will assist enterprises to enhance their energy efficiency, improve their manufacturing processes, incorporate smart management, and facilitate renewable energy, carbon capture, utilization and storage (CCUS) technologies, so as to enhance their green competitiveness for a sustainable development.

##### **4.1 Purpose**

In line with net zero emission transformation plan, IDB joins hands with leading manufacturers in each industry and industrial organizations and associations to promote and actively assist manufacturers in establishing green supply chains, as well as leading SMEs to uphold their performance in checking, carbon footprint, and carbon reduction work, so as to systemically implement net zero emission transformation.

##### **4.2 Content**

###### **a. Strategies for net zero emission transformation in manufacturing sector**

###### **i. Improving manufacturing processes**

For short term, focus will be on replacing old equipment and incorporating smart energy management. In the long run, focus will be placed on R&D of hydrogen technology and its application, as well as the development of innovative technology on reducing fluorinated gas.

###### **ii. Energy conversion**

For short term, focus will be on expanding the use of regenerative heat such as biofuel. In the long run, focus will be placed on converting to 100 percent green energy and

carbon-free energy.

iii. Circular economy

For short term, focus will be on alternative raw materials, utilizing solid recovered fuel (SRF), and integrating energy and resources. In the long run, focus will be placed on R&D and application of carbon capture utilization (CCU) innovative technology.

b. Approaches to net zero emission transformation in manufacturing sector

- i. In 2021, the Ministry of Economic Affairs collaborated with the Chinese National Federation Industries (CNFI) and seven major industrial organizations and associations of iron and steel, petrochemical, electronics, cement, pulp and paper, textile, etc. to formulate the Net Zero Emission Working Group. The purpose of which is to have state-owned businesses and leading private enterprises taking initiatives to set goals and approaches to 2050 net zero emission.
- ii. In July 2022, MOEA also joined forces with CNFI to collaborate with 30 industrial organizations and associations of iron and steel, petrochemical, cement, pulp and paper, manmade fiber, filament fabrics printing dyeing and finishing, etc. to establish the Industrial Carbon Neutral Alliance. With the help of industrial organizations and associations, as well as business members to adopt a so-called follow-the-lead model, where large enterprises taking the lead in assisting smaller ones with supply chain and industrial chain, and passing on carbon reduction technologies and experiences to achieve 2050 net zero emission together.