

Taiwan's Global Supply Chains

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Executive Summary

- Taiwan is a hub of global supply chains which faces the challenges of manufacturing to meet new sustainability regulations and requirements such as the:
 - I. The US Securities & Exchange Commission ESG Rules to Enhance and Standardize Climate-Related Disclosures coming into force December 31, 2023,
 - II. EU Carbon Border Adjustment Mechanism (border carbon taxes coming into force by January 1, 2026),
 - III. China's new Emissions Trading Scheme ("ETS") which will expand coverage to different industrial sectors in the next 5 years coming into force in 2027
 - IV. Multiple global supply chains' net-zero emissions requirements coming into force in 2030-2040 (e.g. Apple, Amazon, Meta, and Google)
 - V. RE100 commitments by various MNC supply chains coming into force by 2050[4]
- The Taiwan Government can only support 20% zero-carbon energy by 2027
- Taiwan government fails to replace 80% of fossil fuel energy with zero-carbon sources
- Therefore, Taiwan's enterprises and supply chains must migrate to secure zero-carbon energy
- China is on its way to becoming the green factory floor of the world by achieving 86% zero-carbon on their energy mix by 2060, if not earlier

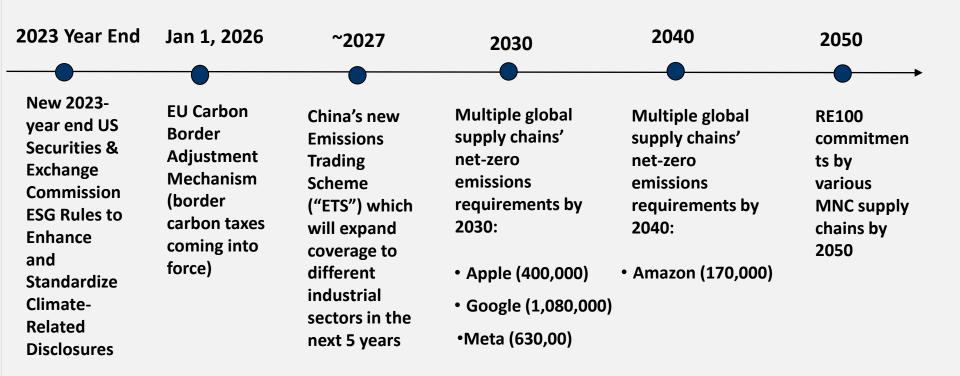
Introduction

- Taiwan is a major global exporter with huge economic turnover. .Many tens of thousands of Taiwan enterprises are part of the world's major global supply chains (i.e., Apple, Amazon, Meta, Microsoft) in consumer electronics, technology and industry. Taiwan enterprises are part of the world's major global supply chains few are stand alone; they are all globally connected and inter-dependent
- Taiwan's supply chains expanded globally over the previous three decades and are now operating everywhere. As a result, in order to stay globally competitive, Taiwan enterprises/supply chains must adapt to meet many/every diverse national, regional and market regulatory sustainability compliance systems in order to:
 - Maintain compliance and competitiveness to continue to integrate with the global supply chains which are increasingly strict in enforcing supply chain, ESG/Equator Principles/IFC Performance Standards and other sustainability criteria.
 - Successfully compete for bank financing by adopting best international banking practices from many markets to continue to qualify for evolving international bank financing requirements such as the Equator Principles and IFC Performance Standards
 - Adopt best practices and implement actual effective operational improvements across the full spectrum of sustainability criteria; much more than on-paper "check the box" reporting, in order to successfully compete for investors and cooperators in the world market.

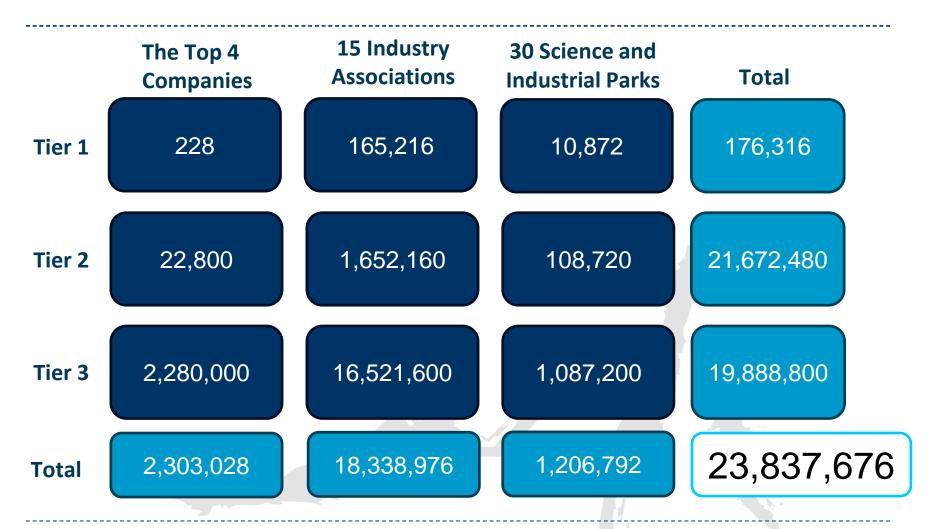
Introduction

- Adopt best practices and implement solutions that will position their businesses to meet and dominate every potential market challenge (including Climate change) that they will certainly face in the future
- They must be ready in the real world and not be restricted by the *de minimis* mindset and limited imagination and experience of bureaucrats and regulators, who have failed to anticipate the scope and pace of waves of changes that threaten life as we know it. The waves include: (i) Inflation, (ii) Geo-political generated stress, (iii) COVID-19 and future global pandemics, (iv) Supply chain disruption and (v) Climate change
- Positioning the business is like preparing to survive and compete successfully at the champion level. It is different than being complacent and settling to meet the minimum standards. Companies need to prepare for the challenges of the 6th mass extinction also known a Holocene or Anthropocene extinction.

Timeline of Upcoming Market Sustainability Regulatory Compliance Systems



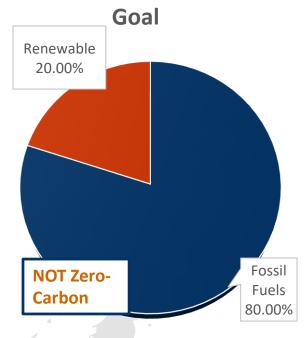
The Total Amount of Companies in Taiwan in Global Supply Chains



The Best the Taiwan Government Can Do is Achieve 20% Renewable Energy by 2027

- The Best the Taiwan Government can do is Achieve 20% Renewable Energy by 2027* this is far behind the UN goal of reducing emissions at least 43% by 2030
- The government has not presented any verifiable, scalable options to replace 80% of fossil fuels with zero-carbon sources after 2027
 - No decarbonization
 - No reduction of emissions
 - NOT carbon-neutral
 - Fails energy transition
- Why is the DDP phasing out nuclear energy from the mix? Nuclear is the only scalable zerocarbon energy source and 59% of voters approved nuclear energy in the 2018 referendum

Electricity Generation 2027



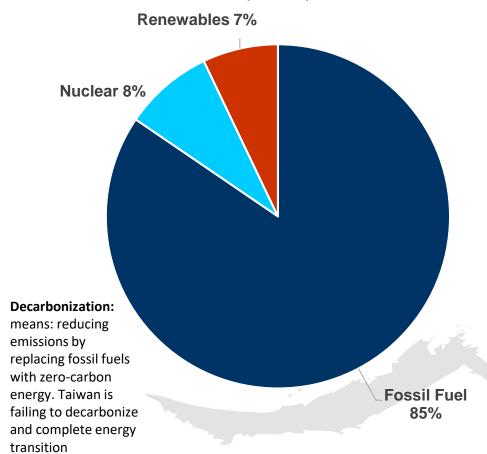
Fossil 2027	Zero-Carbon 2027
Coal: 30% LNG: 50%	Nuclear: 0% Renewable: 20%
Total: 80%	Total: 20%

[•] Source MOEA: https://www.taiwannews.com.tw/en/news/4489552

^{*} Source: https://www.un.org/en/climatechange/net-zero-coalition

The Best the Taiwan Government Can Do is Achieve 20% Renewable Energy by 2027

Taiwan's Current Energy Reality (2022)



The Taiwan Government's claim that it will be "Carbon Neutral" is a lie

- •Removing nuclear from the energy mix makes
 Taiwan dependent on fossil fuel imports
- Taiwan companies (and their supply chains) will lose their access to market share and global supply chains as governments and MNCs in developed markets demand reduced carbon footprints (see slide 19)
- Lack of zero-carbon energy will lead to a mass exodus of Taiwan's supply chains and a complete hollowing out of the economy
- This will result in mass unemployment, stock market collapse, loss of all international competitiveness and missed global leadership opportunity
- Not only will Taiwan suffer but this will cause a global supply chain disruption leading to a huge rise in the cost of all electronics, national security concerns and global economic slowdown

Taiwan Supply Chains Have Two Options: Shut Down or Migrate to a Zero-Carbon Energy Jurisdictions

- If the Taiwan Government is unable to decarbonize and complete energy transition Taiwan supply chains will be left with the choices:
 - Shut down their domestic capacity that cannot secure competitively priced zero-carbon energy to permit continued exports in the face of rising global zero-carbon requirements and carbon taxes
 - Relocate their cutting-edge global manufacturing supply chains away from Taiwan to zero-carbon jurisdictions (China or elsewhere) to preserve their ability to sustainably compete and to export to the world's largest (zerocarbon energy requiring) consumer markets

Manufacturers will be Forced to Migrate to a Green Energy, Zero-Carbon Jurisdiction

China is transitioning into the most competitive zero-carbon energy producer and will once again be the green, go-to low cost manufacturing jurisdiction

- Unlike Taiwan, China is actually implementing and funding its results driven plan to become the green energy zero-carbon factory floor of the world
- Taiwanese manufacturers will choose to migrate to a green energy, zero-carbon jurisdiction to survive
- Chinese zero-carbon exports will comply with the European Union's Carbon Border Adjustment Mechanism ("CBAM") and other similar laws proposed in the US and other low-carbon jurisdictions
- Taiwan is already losing competitive advantage. This is already visible
- How will Taiwan create the market conditions to attract the corporate, strategic, financial, technology partners and Institutional investors that meet, compete for and retain investment for energy transition
- How will Taiwan enterprises export without zero-carbon energy?
- How will Taiwan compete for international and domestic energy technology solution providers and international institutional ESG investors and investment dollars?

Relying Solely on Solar and Wind is Insufficient for Decarbonization

Taiwan's new roadmap calls for a 60%-70% renewable energy goal by 2050

Year	Renewable Energy Generation %	% Increase from 2022
2022	5%	N/A
2050	70%	1300%

- If Taiwan's government cannot deliver a 200% increase to 15% and 300% increase to 20% renewable energy then:
- How can Taiwan achieve a 1300% increase in renewable energy from today's levels to meet the 2050 goal of 70%?
- How can the Taiwan government be trusted to achieve large and long-term goals when the short term goals for renewable energy have failed?
- Taiwan Government's "Carbon Neutral" Roadmap Is a Greenwashing Placebo Failure

Domestic Industry/Business Associations In Taiwan Are Deeply Concerned About The Government's Inability To Supply Enough Zero-carbon Energy



• Matthew Miao- Chairman, Chinese National Federation of Industries ("CNFI") said "the CNFI plays an important role in communicating industry concerns with the government", Mr. Miao said he would "promote, energy conservation, decarbonization, call for the extension of existing nuclear power plants and for the development of new nuclear power plants"



Lin Por-fong (林伯豐), Chairman of the Chinese National Association of Industry and Commerce ("CNAIC") advised the government to accept the nation faces a power shortage and reconsider the use of nuclear power instead of pursuing its "nuclear-free homeland" project at any cost.

International Industry/Business Associations In Taiwan Are Deeply Concerned About The Government's Inability To Supply Enough Zero-carbon Energy



"Arguably, the most important lesson for Taiwan from the war in Ukraine is that it is folly to rely on imports to meet energy needs. Taiwan's ultimate goal should therefore be to achieve a high degree of energy security. And to do this, there is no alternative to the mass deployment of renewable energy and storage."- Duncan Levine ECCT



"AmCham's members are increasingly worried about the Taiwan government's ability to ensure energy security and grid resilience while pushing for a transition to renewables, especially in light of the severe power outages seen in May 2021 as well as this March"-Andrea Wu, AmCham Vice Chairperson

If Decarbonization is Not Achieved, Taiwan is Doomed Economically

Economic Consequences of No Decarbonization:

- Companies cannot export products because border carbon taxes make Taiwan's exports too expensive
- The EU's Carbon Border Adjustment Mechanism ("CBAM") comes into effect in 2026
- China and the US have proposed similar carbon tax bills that will be implemented in the near future
- Taiwan loses ability to export to developed markets
- 52% of export dependent GDP will suffer



If Decarbonization is Not Achieved, Taiwan is Doomed Economically

Economic Consequences of No Decarbonization:

- Industries, supply chains and companies have a choice: close or mass migrate
- Managers, directors and shareholders will exercise best business judgement rule to preserve ability to export and grow
- Entire Taiwanese industry supply chains will mass migrate to green energy jurisdictions
- China is on target to achieve its energy transition goals and reach almost 90% zerocarbon energy (see: China's Strategy and Implementation Plan to Achieve Carbon Neutrality)
- China does not need to use military force to unify Taiwan as economic convergence becomes the most rational market solution (燒餅粘芝麻)

If Decarbonization is Not Achieved Taiwan is Doomed Environmentally

Environmental Consequences of No Decarbonization:

- Longer summers and shorter winters
- Record breaking heatwaves
- Longer and more extreme weather events including intense droughts and floods
- Increased intensity of typhoons and rainfall
- Increased days of hazardous levels of air pollution
- Sea level rise up to 1.2 meters, loss of coastal land
- Reduced harvests up to 20%
- Full-scale biodiversity collapse and habitat loss
- Tamsui River floods central Taipei
- Higher incidences of dengue fever and other tropical diseases
- Increased risk of pandemics

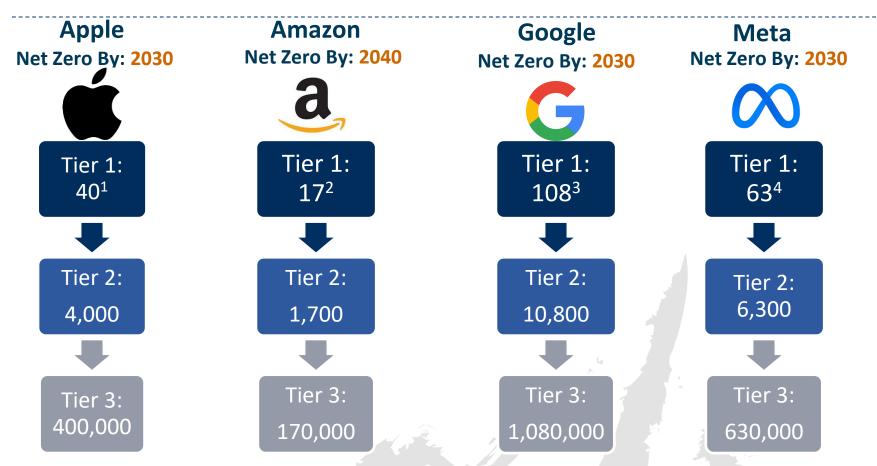
17

If Decarbonization is Not Achieved, Taiwan is Doomed Socially

As Industry Migrates Away from Taiwan, These are the Social Consequences of No Decarbonization:

- With industry leaving, companies and people will follow, loss of tax base and reduced tax revenue
- Job losses, massive unemployment
- Wage stagnation
- Loss of international competitiveness
- Depopulation: decreasing birth rate
- Depopulation: increasing aging population
- Population loss leads to the financial degradation of social welfare, health and labor insurance
- Loss of students for academic institutions
- Fewer youth to populate the armed forces
- Increasing wealth and income inequality
- Young people unable to afford homes
- Negative net immigration
- Food insecurity and increasing food prices

Apple, Amazon, Google and Meta Taiwan Supply Chain



We are assuming that each Tier 1 company only has 100 companies in its supply chain and that each Tier 2 company has only 100 companies in its supply chain.

Total: 2,303,028

^{1.} https://www.apple.com/supplier-responsibility/pdf/Apple-Supplier-List.pdf

^{2.} https://d39w7f4ix9f5s9.cloudfront.net/cb/19/77dfc5b441c892cd6e2be166ba70/final-amazon-supplier-list-2019-11-14-updated-1005am.pdf

^{3.} https://cloud.google.com/find-a-partner/?location=Taiwan

^{4.}https://www.facebook.com/business/partner-directory/search?solution_type=campaign_management&ref=pd_home_hero_cta&countries=TW

List of Apple's Taiwan Suppliers

- Advanced Semiconductor Engineering Technology Holding Co., Ltd.
 Amkor Technology Incorporated
 ams-OSRAM AG
 Analog Devices Incorporated
 Broadcom Limited
 Career Technology (Mfg.) Company Limited
 Cheng Uei Precision Industry Company Limited (Foxlink)
 Cirrus Logic Incorporated
- Compeq Manufacturing Company Limited
- Corning Incorporated
- Delta Electronics Incorporated
- Diodes Incorporated
- Flexium Interconnect Incorporated
- Genius Electronic Optical Company Limited
- Kunshan Kersen Science and Technology Company Limited
- Largan Precision Company Limited
- Lattice Semiconductor Corp

- Lumentum Holdings Incorporated
- Micron Technology Incorporated
- Murata Manufacturing Company Limited
- Nanya Technology Corporation
- NOK Corporation
- Novatek Microelectronics Corp.
- NXP Semiconductors N.V
- ON Semiconductor Corporation
- Parade Technologies Limited
- Pioneer Material Precision Tech Company Limited
- Platinum Optics Technology Incorporated
- Renesas Electronics Corporation
- Skyworks Solutions Incorporated
- STMicroelectronics N.V.
- Taiwan Hodaka Technology Company Limited
- Taiwan Semiconductor Manufacturing Company Limited
- Texas Instruments Incorporated
- Toyoda Gosei Co., Limited

Trinseo S.A.

TXC Corporation

- Unimicron Technology Corporation
- Unitech Printed Circuit Board Corporation
- Winbond Electronics Corporation
- Yageo Corporation

Total: 40

List of Amazon's Taiwan Suppliers

- A Mount Inc.
- Ability Opto-Electronics Technology Co., Ltd.
- Compal Electronics
- Everlight Electronics Co., Ltd.
- Hon Hai Precision Industry Co., Ltd
- Innolux Corp.
- InvenSense
- Kinko Optical Co., Ltd
- Largan Precision Co., Ltd.
- Macronix International Co., Ltd
- Mektec Corporation
- Nanya Technology Corporation
- Pegatron Corporation
- Quanta Computer Inc
- Siward Crystal Technology Co. Ltd

- TA-I Technology Co., Ltd. Sec. 3
- TXC Corporation
- Unitech Printed Circuit Board Corporation
- Walsin
- Wistron Corporation
- Yageo Corporation

Total: 17

List of Google's Taiwan Suppliers

•	Hon Hai Precision Industry (Foxconn)	•	Lite-On Technology	•	Powerchip Semiconductor Manufacturing
•	Pegatron	•	Murata Manufacturing		Corporation
•	Quanta Computer	•	Nuvoton Technology	•	Sunny Optical Technology
•	Compal Electronics	•	Renesas Electronics	•	Luxshare Precision Industry
•	TSMC	•	SiTime	•	Corephotonics
•	Largan Precision	•	Winbond Electronics	•	OmniVision Technologies
•	MediaTek	•	Advantech	•	Inventec
•	ASUS	•	AKM Semiconductor	•	MSi
		•	HiSilicon Technologies	•	TPV Technology
	Acer	•	•	•	Wistron Corporation
	ADATA		Macronix International	•	SK Hynix
•	Chunghwa Telecom	•	Power Integrations	•	AOS Technologies
•	Delta Elecontrics	•	Richtek Technology	• h	Dialog Semiconductor
•	Innolux Corporation	•	Silicon Motion	4 [/])	
•	Silicon INtegrated Systems (SiFive)	•	Unimicron Technology		NXP Semiconductors
•	Microchip Technology	•	United Microelectronics Corporation	•	ON Semiconductor
•	Synaptics		(UMC)	•	Silergy
•	VIA Technologies	و اس	ASE Technology Holding Co.	• 1	Vishay Intertechnology
•	Cypress Semiconductor	•	Nanya Technology	•	Kinpo Electronics (KYOCERA)
•	E Ink	•	SPIL	•	Multi-Fineline Electronix (MFS)

List of Google's Taiwan Suppliers

- **Multi-Fineline Electronix (MFS) Tripod Technology (TTE)** Yung Soon Lih (YSL) Qualcomm **UNISOC (Spreadtrum)** Unisoc **Kingston Technology Phison Electronics** Innodisk SanDisk Samsung **Toshiba** Far EasTone Telecommunications **Taiwan Mobile Asia Pacific Telecom** Mega Broadband **AU Optronics** HannStar
- **LG Display Infineon Technologies STMicroelectronics** Broadcom **Elan Microelectronics Alps Electric** Goodix **Nvidia** Realtek **MStar** Yunnan E Ink Technology **SiPix Imaging Systems Waveshare Electronics Onyx Boox Panasonic** TEAC Yageo **Walsin Technology Taiyo Yuden**
- **EPCOS** Silicon Labs **Espressif Systems TXC Corporation** Abracon **Micro Crystal Technology Vectron International ASPEED** InnTek **Cirrus Logic ESS Technology Wolfson Microelectronics Marvell Technology Group** Innogrit **Powerchip Semiconductor Manufacturing Corporation (PSMC)** Total: 108

CPT

List of Meta's Taiwan Suppliers

Akohub **Fimmick Response Digital Growth** Luna Agency **Madgicx Media** i-Spot Media **AnyMind Group** AdHub **Bango Audiences Tagtoo Punwave** Meekco.Asia Yellowhead Smartly.io MicroAd Taiwan Jinz Digital **Pareto Solutions Webcom Group** JS Adways **LevelUp Agency Vietnam Psquared Publishing Inc Koo Data** Alison.ai **Company Limited Omneky** Starcom MediaVest Group (SMG) TW • Weblisher Co. Ltd. II Star to Asia **Taipei Digital Shopline Bridgewell OXG Media InsCoder Limiter Republic of Media** Ad-Tracker **FINN Partners Singapore Assembly - APAC Digital Advertising Consortium Mainment GBhn Tiger Pistol Inc.** Taiwan **Appier** Dentsu WebChutney Pvt. Ltd. **Carat Performance Team Business Factory SAYA** ComHere Cacafly **Beyond Media Global Group Hello Creative Media Backer Founder 91APP - TWD** SignalSight **InTarget Group Beyond Media Global APAC Global Marketing Ads Liquid Advertising** Atfone, Inc. AdGeek TW 1 **Global Rev Gen iProspect** Jubbit Total: 63 Re:Ad Media Corp. 36 Presents **STARTLab**

228+

Total Amount of Apple, Amazon, Google and Meta's Tier 1
Companies in Taiwan

22,800+

Total Amount of Apple, Amazon, Google and Meta's Tier 2
Companies in Taiwan

2,280,000+

Total Amount of Apple, Amazon, Google and Meta's Tier 3
Companies in Taiwan

Total: 2,303,028

Other Sample Taiwan Technology Corporations

































Other Taiwan Manufacturing and Industrial **Corporations**

Manufacturing and Industrial Corporations:

































15 Largest Industry Associations and Chambers of Commerce in Taiwan

Chinese National Federation of Industries

Taiwan Chamber of Commerce

Chinese National
Association of Industry
and Commerce

Taiwan Federation of Commerce

General Chamber of Commerce of the Republic of China

Industrial Associations of Taipei

Taipei Chamber of Commerce

Taipei Computer
Association

Taiwan Association of Machinery Industry

Taiwan IoT Technology and Industry
Association

Photonic Industry and Technology Development Association

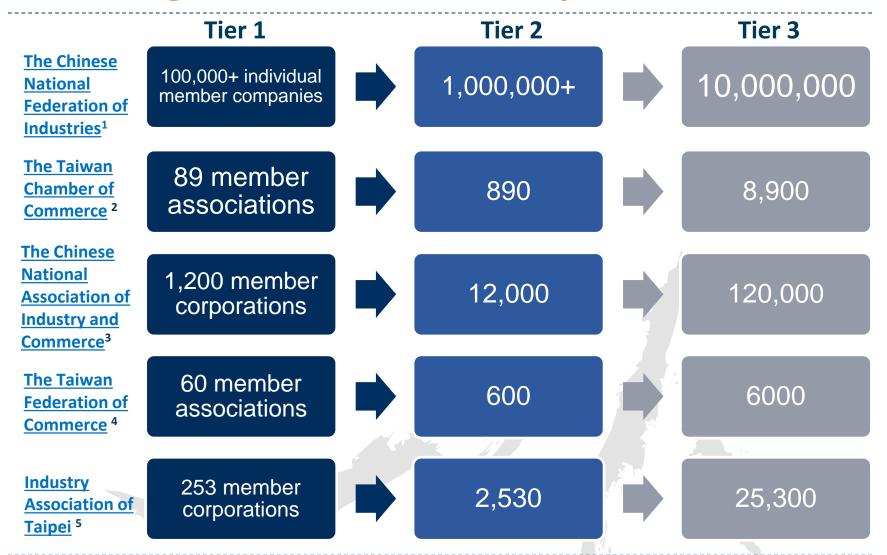
Taiwan Semiconductor Industry Association

Taiwan Electrical and Electronic Manufactures
Association

Taiwan Automation
Intelligence and
Robotics Association

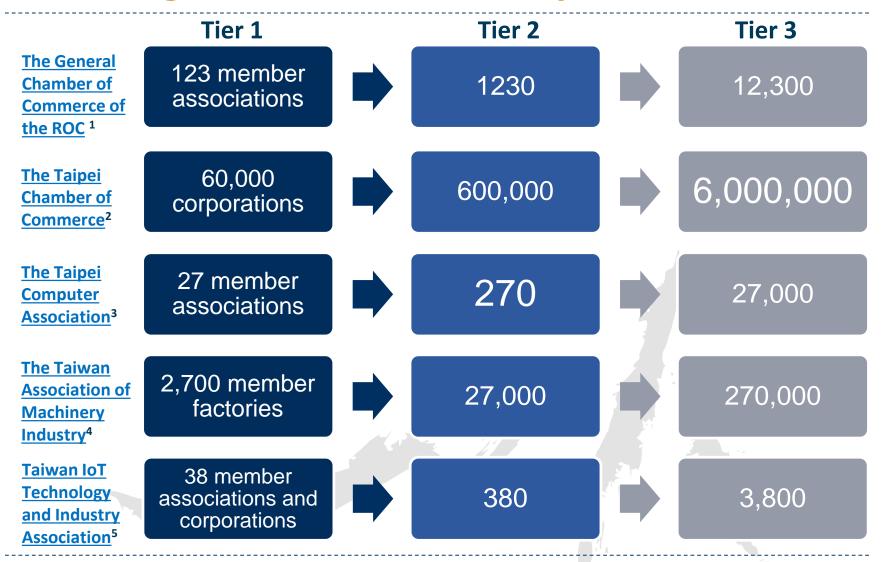
Taiwan Petrochemical Industry Association

15 Largest Taiwan Industry Associations



^{1. &}lt;a href="http://www.cnfi.org.tw/front/bin/home.phtml">http://www.cnfi.org.tw/front/bin/home.phtml 2. https://www.cnfi.org.tw/front/bin/home.phtml 2. https://www.cnfi.org.tw/front/bin/home.phtml 2. https://www.cnfi.org.tw/front/bin/home.phtml 2. https://www.cnaic.org/eng_pages/45d461 4. https://www.tfoc.org.tw/ 5. https://www.iatc.org.tw/

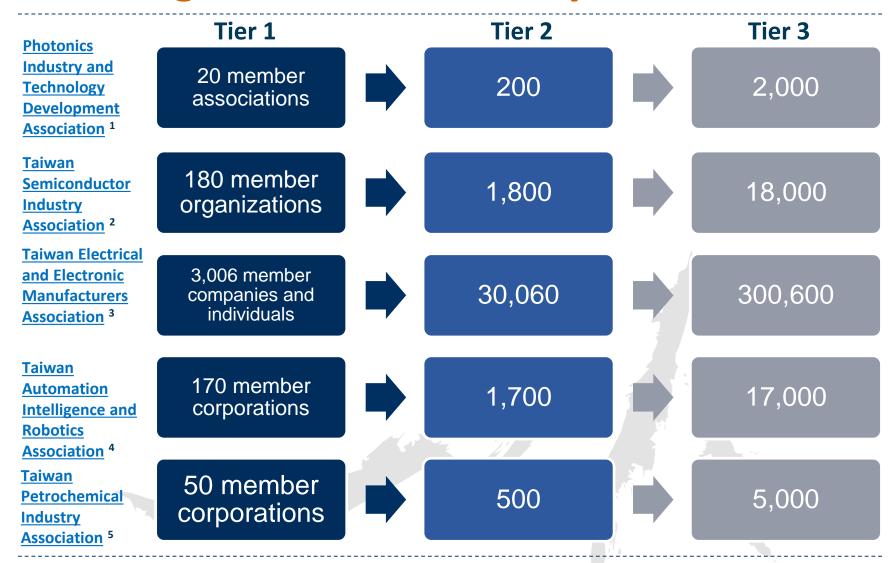
15 Largest Taiwan Industry Associations



^{1.} http://www.roccoc.org.tw/web/index/index.jsp 2. http://www.tpecoc.com.tw/ 3. https://www.tca.org.tw/en/ 4. http://www.tami.org/

^{5.} http://www.twiota.org/en/

15 Largest Taiwan Industry Associations



^{1.} https://en.pida.org.tw/ 2. https://www.tsia.org.tw/EN/index 3. http://www.teema.org.tw/englishnew/index.html 4. https://www.tairoa.org.tw/

^{5.} http://www.piat.org.tw/publication.html

165,216

The Total Amount of Companies in Tier 1 of Taiwan's 15 Largest Industry Associations

1,652,160

The Total Amount of Companies in Tier 2 of Taiwan's 15 Largest Industry Associations 16,521,600

The Total Amount of Companies in Tier 3 of Taiwan's 15 Largest Industry Associations

Total: 18,338,976

Hsinchu Science Park Central Taiwan
Science Park

Southern Taiwan
Science Park

Meilun Industrial
Park

Fongle Industrial Park

Longde Industrial Park

Nangang Software Industrial Park Tainan Technology and Science Park

Tucheng Industrial Park

Shulin Industrial Park

Guanyin Industrial Park

Linkou Industrial Park

Gueishan Industrial Park Pingjhen Industrial
Park

Taoyuan Youth Industrial Park

Dyuan Industrial Park

Jhongli Industrial Park

Hsinchu Industrial Park

Northern Region Industrial Park

Toufen Industrial Park

Taichung Youth Industrial Park

Taichung Harbor Kwan-Lien Industrial Park Taichung Industrial Park

Dali Industrial Park

Chuansing Industrial Park

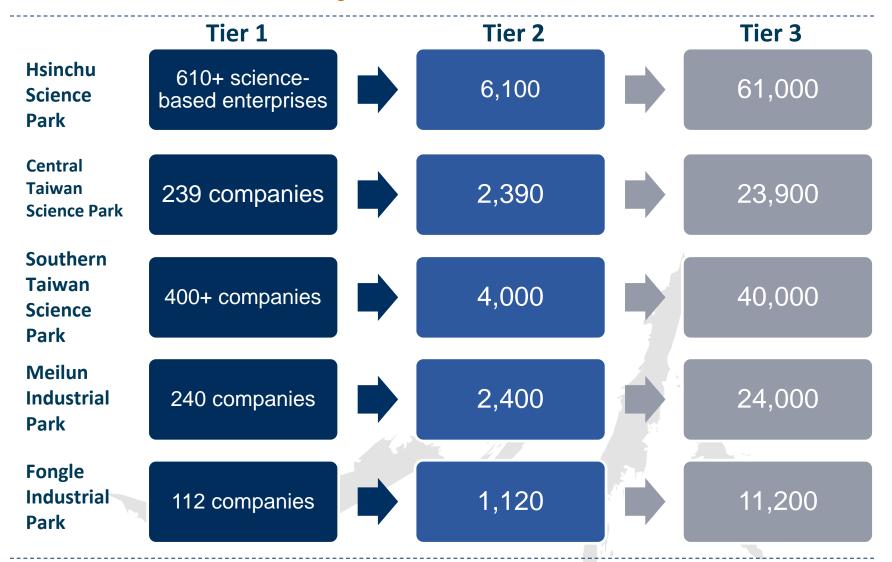
Changhua Costal Industrial Park

Fusing Industrial Park

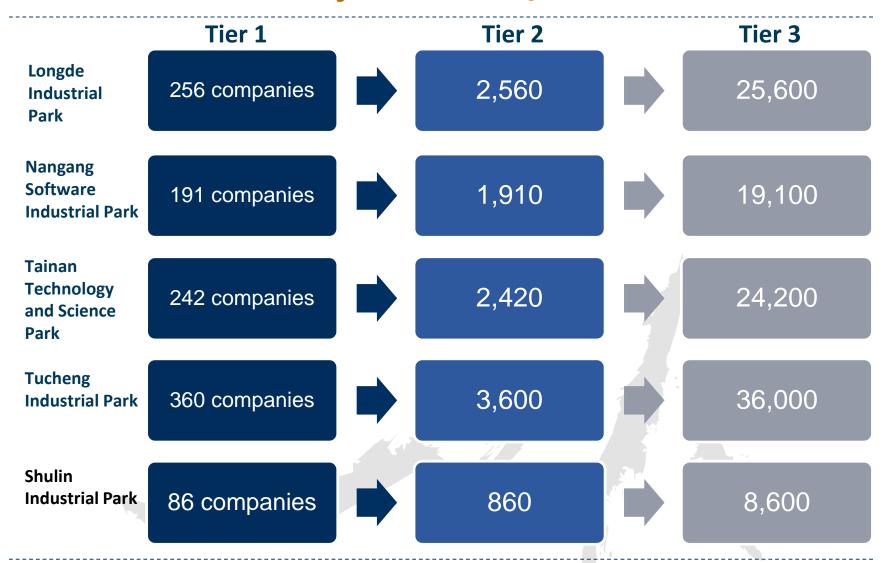
Fangyuan Industrial Park

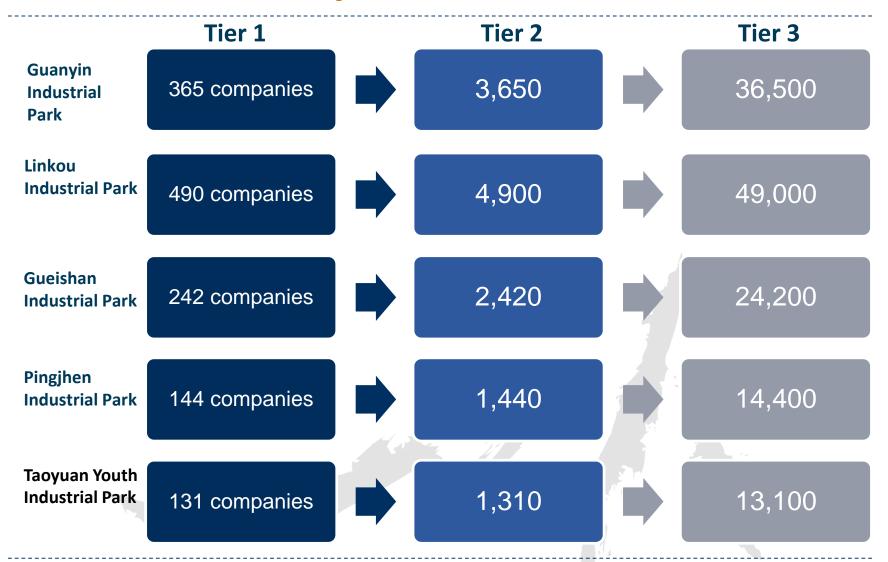
Nangang Industrial Park

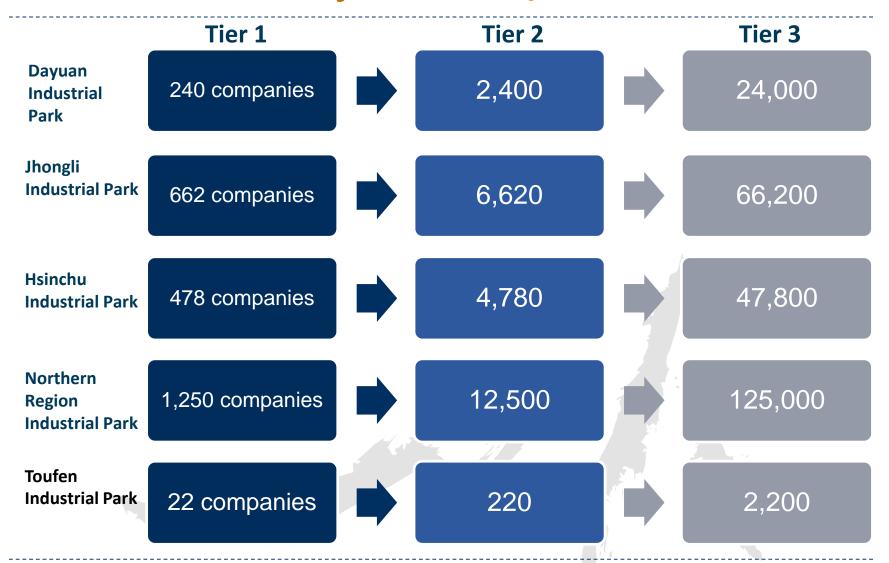
Douliou Industrial Park

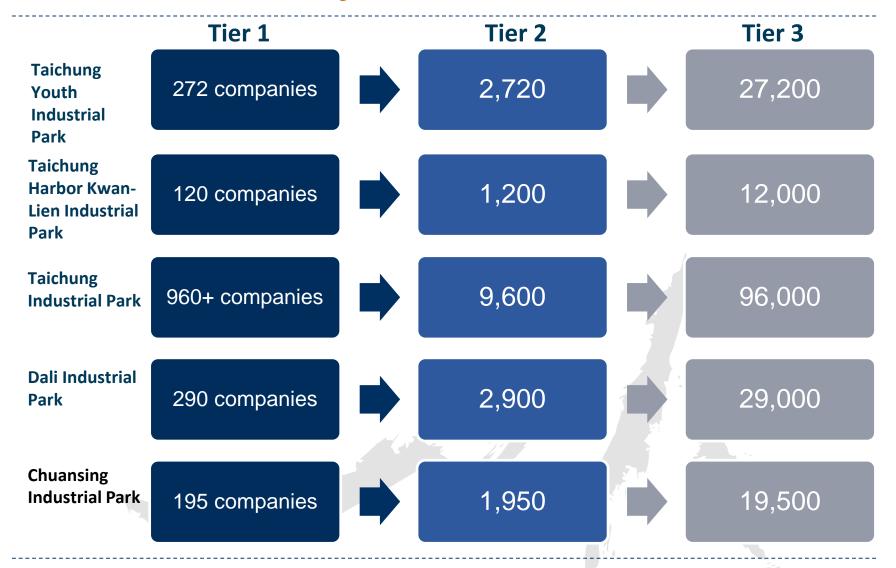


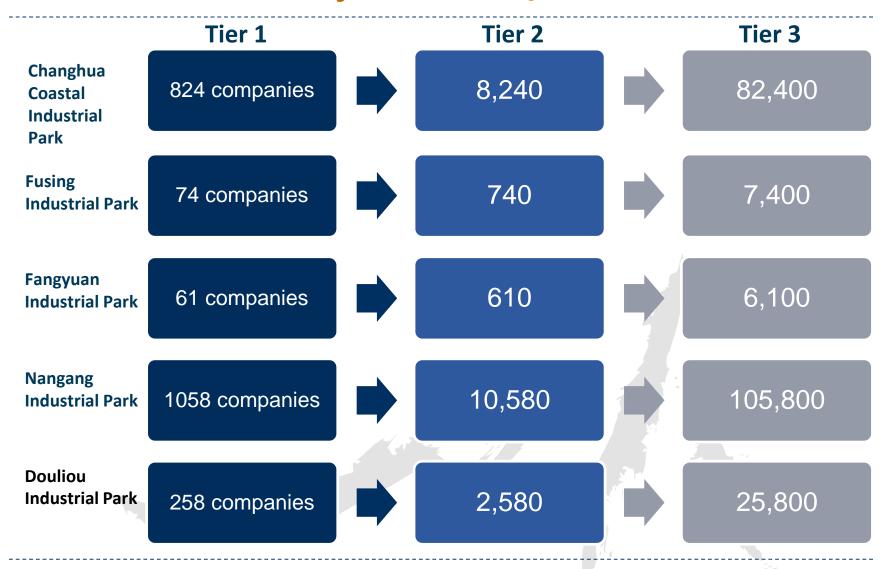
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Foreign Chambers of Commerce in Taiwan



10,872

Total Amount of Tier 1 Companies in Taiwan's 30 Major Science/Industrial Parks

108,720

Total Amount of Tier 2 Companies in Taiwan's 30 Major Science/Industrial Parks

1,087,200

Total Amount of Tier 3 Companies in Taiwan's 30 Major Science/Industrial Parks

Total: 1,206,792 Companies