



# FORMOSA PLASTICS GROUP

2020 Annual Report



FPG Mailiao Eco-Industrial Complex: Green Energy and Environmental Protection for Industrial and Environmental Sustainability

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**FPG Mailiao Eco-Industrial Complex:  
Green Energy and Environmental Protection for  
Industrial and Environmental Sustainability**

True to its principles of balancing industrial development and the environment, FPG utilized advanced industrial pollution control technology when building Mailiao Eco-Industrial Complex, investing up to NTD128.3 billion and setting up 8 layers of environmental protection networks to conduct 24-hour VOC (volatile organic compound) monitoring in order to understand the changes in air quality in the nearby areas. Thanks to these efforts, the park was able to achieve the ultimate goals of both environmental friendliness and economic development.

## Formosa Plastics Group | 2020 Financial Highlights

(In Thousands of USD, persons)

| Company                                | Capital           | Assets             | Equity             | Sales             | Income Before<br>Income Tax | Number of<br>Employees |
|--|-------------------|--------------------|--------------------|-------------------|-----------------------------|------------------------|
| Formosa Plastics Corp.                 | 2,232,966         | 15,986,005         | 11,664,660         | 4,881,333         | 816,552                     | 6,310                  |
| Nan Ya Plastics Corp.                  | 2,781,964         | 18,440,655         | 12,088,427         | 5,030,361         | 969,173                     | 12,904                 |
| Formosa Chemicals & Fibre Corp.        | 2,055,979         | 15,620,045         | 12,079,201         | 5,601,305         | 722,716                     | 4,762                  |
| Formosa Petrochemical Corp.            | 3,341,504         | 12,982,851         | 10,807,540         | 14,488,654        | 303,962                     | 5,289                  |
| Nanya Technology Corp.                 | 1,085,167         | 5,809,754          | 5,395,399          | 2,129,241         | 314,789                     | 3,397                  |
| Nan Ya PCB Corp.                       | 226,661           | 1,429,695          | 1,135,214          | 1,170,451         | 140,408                     | 5,998                  |
| Formosa Sumco Technology Corp.         | 136,049           | 811,502            | 713,695            | 418,644           | 54,174                      | 1,336                  |
| Formosa Taffeta Co., Ltd.              | 590,945           | 2,623,887          | 2,156,714          | 755,047           | 76,828                      | 4,525                  |
| Formosa Advanced Technologies Corp.    | 155,122           | 477,375            | 414,451            | 340,493           | 59,731                      | 2,433                  |
| <b>Subtotal of Public Companies</b>    | <b>12,606,357</b> | <b>74,181,769</b>  | <b>56,455,301</b>  | <b>34,815,529</b> | <b>3,458,333</b>            | <b>46,954</b>          |
| <b>Other Domestic Companies</b>        | <b>2,424,896</b>  | <b>22,214,379</b>  | <b>19,425,798</b>  | <b>6,268,853</b>  | <b>924,774</b>              | <b>31,175</b>          |
| <b>Subtotal of Domestic Companies</b>  | <b>15,031,253</b> | <b>96,396,148</b>  | <b>75,881,099</b>  | <b>41,084,382</b> | <b>4,383,107</b>            | <b>78,129</b>          |
| <b>Companies in U.S.A</b>              | <b>1,440,281</b>  | <b>15,201,783</b>  | <b>11,628,736</b>  | <b>4,713,712</b>  | <b>-198,599</b>             | <b>4,229</b>           |
| <b>Companies in China</b>              | <b>6,485,171</b>  | <b>12,180,027</b>  | <b>8,550,384</b>   | <b>9,011,089</b>  | <b>717,266</b>              | <b>18,644</b>          |
| <b>Other Foreign Companies</b>         | <b>6,433,121</b>  | <b>15,390,043</b>  | <b>5,928,008</b>   | <b>4,302,045</b>  | <b>-293,950</b>             | <b>14,317</b>          |
| <b>Subtotal of Foreign Companies</b>   | <b>14,358,573</b> | <b>42,771,853</b>  | <b>26,107,128</b>  | <b>18,026,846</b> | <b>224,717</b>              | <b>37,190</b>          |
| <b>Total of Formosa Plastics Group</b> | <b>29,389,826</b> | <b>139,168,001</b> | <b>101,988,227</b> | <b>59,111,228</b> | <b>4,607,824</b>            | <b>115,319</b>         |

\*NOTE: The financial data shown above is extracted from the individual financial statements of each company.



## Preface

Formosa Plastics Group will always take the initiative and pay close attention to market dynamics and future trends. This is how the Group can flexibly adjust production and sales plans and investments to ensure a long-term competitive edge while constantly reminding itself to fully embody its management philosophy of “striving for excellence”.



Wang Zhan-Yang Memorial Park in Mailiao Industrial Complex

*2020 was a year of global political and economic instability. The COVID-19 pandemic outbreak, in particular, spread fear and worry across the world. Countries went into lockdown and imposed travel restrictions. This resulted in a sharp decline in demand, cut off supply chains and severely impacted production, consumption, and investor confidence. Due to the sudden drop in demand, crude oil inventory levels surged, causing oil prices to plummet to a historic low point. This, in turn, brought down the international market for crude oil and relevant petrochemical products.*



**Chairman  
WenYuan Wong**

Meanwhile, the US-China trade war, which began in July 2018, continued until January 2020. The world had hoped that the conflict between the two sides would subside after they signed the first phase of trade agreements. Unfortunately, the outbreak of the COVID-19 pandemic once again heightened tensions between the two countries, broadening the conflict from trade to technology and finance. To make matters worse, the pandemic spun out of control, limiting normal activities and causing drastic economic decline in most countries. The IMF estimated that the global economy shrunk by up to 3.3% in 2020.

To save the stagnant economy, many countries implemented quantitative easing and fiscal revitalization packages to boost consumption. By the second half of the year, the pandemic had eased slightly and, as countries gradually lifted lockdown measures, there was a surge of “retaliatory” consumption demand. In addition, remote working/learning measures have increased IT communication and e-commerce demands. Countries have also actively invested in 5G infrastructure and the development of electric cars. Meanwhile, oil-producing countries reached an agreement in June 2020 to reduce production,

thereby stabilizing oil prices. Petrochemical-related products also benefited from increased downstream demand and the industry gradually recovered.

Taiwan's success in containing the COVID-19 pandemic, combined with the US-China trade war prompting companies to transfer orders and China-based Taiwanese businesses to return to Taiwan, have allowed Taiwan to become one of the rare countries to experience growth in both export trade and private investment during this period with the economic growth rate reaching 3.1%.

### Business Operation Overview

The overall revenue of Formosa Plastics Group in 2020 was NTD 1.6851 trillion, which is a decrease of 17.9% or NTD 366.4 billion from 2019. The Group's pre-tax profit was NTD 131.4 billion, and the annual profit dropped drastically by NTD 74.5 billion or 36.2% from 2019.

#### 1. Taiwan

In 2020, Formosa Plastics Group's various companies in Taiwan created a total revenue of NTD 1.1712 trillion, representing a decrease of 20.6% from 2019. The pre-tax profit was



FORMOSA PLASTICS GROUP Profile

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NTD 125 billion, representing a decrease of 35.4% from 2019. Such performance was mainly due to the impact of the COVID-19 pandemic. In the first two quarters of 2020, market demand froze and investor confidence plummeted, causing a drop in sales and inventory costs to skyrocket. Thankfully, countries began to lift lockdown measures in the second half of the year, and demand for petrochemical and plastic products gradually recovered, though not enough to offset the negative impacts that the pandemic caused in the first half of the year.

In response to the COVID-19 pandemic, FPG implemented employee epidemic prevention measures through rigorous management and control to ensure normal operations. In addition to closely tracking global pandemic news, work policies, and raw material/product market conditions, FPG also took the initiative to expand internal/external sales channels and regions to diversify market risks.

Meanwhile, FPG continued to expand the market for high-value and differentiated products. In 2020, special-grade plastic products accounted for a significantly higher proportion of sales. For example, Special-grade PP produced by Formosa Chemicals & Fibre Corporation accounted for 49.5% of sales and was adopted by Toyota as a material for its new models. In addition, FPG also actively introduced AI in smart production, quality testing, process optimization, maintenance and repair, and industrial safety forecasting. As of 2020, we have completed 318 projects with estimated annual benefits of NTD 2.134 billion. There are also 336 projects in progress, which are expected to bring in an additional NTD 1.824 billion of annual benefits once completed, culminating in total annual benefits of NTD 4 billion, which demonstrates the effectiveness of AI application.

It's also worth mentioning that, during the pandemic, many FPG products were needed by Taiwan's "national face mask production team". For example: PP is a raw material for non-woven fabrics used for face masks, HDPE

is used to make adjustable nose bridge strips, and elastic fibers are used to make the ear straps. FPG was behind Taiwan's healthcare protection for the Taiwanese people, cooperating with rushed orders, offering our full support, and even having plants voluntarily hand out bleach to nearby residents and schools for them to disinfect the environment.

## 2. United States

Economic performance of the US in 2020 was severely impacted by the COVID-19 pandemic. Its annual economic growth rate fell by 3.5%, which is the worst performance since the end of World War II in 1946. Formosa Plastics Group owns several vertically integrated petrochemical and plastic processing plants. Due to the COVID-19 pandemic, lockdowns and remote working measures were put in place, affecting the normal operation of various industries. With the sudden drop in demand, the price of petrochemical products fell, reducing our profit margins. The turnover of the US company was equivalent to NTD 134.4 billion, down 14.7% from 2019, with pre-tax profits equivalent to a loss of NTD 5.7 billion, representing a sharp decline of 125.9% from the previous year.

## 3. China

China was impacted by the pandemic in the first half of 2020 and suffered a sharp decline in overall sales. Though demand rose again after lockdowns were lifted in the second half of the year, with the automobile and construction markets recovering and product prices rising, it was still impacted by the global shortage of shipping containers. As a result, the economic growth rate of China in 2020 was only 2.3%, which was the lowest in nearly 4 decades.

Formosa Plastics Group's companies in China had a 2020 turnover equivalent to NTD 256.9 billion, which was a decrease of 6.43% from 2019. However, since China was gradually able to contain the pandemic by the second half of the year while other countries were still struggling with the virus, global orders flooded to China and



Formosa Ha Tinh Steel Corporation

caused demand to skyrocket. As a result, the price difference of upstream plastic products like PVC, PS, PE, and ABS plastic pellets quickly expanded. FPG's Ningbo plant made historically high profits from these products, bringing in pre-tax profits equivalent to NTD 20.4 billion, showing a dramatic increase of 89.3% from the previous year.

## 4. Vietnam

The 2020 turnover of Formosa Plastics Group's companies in Vietnam was equivalent to NTD 109 billion, which was down 9.6% from 2019. This is mainly due to lockdowns caused by the pandemic, which caused demand for textiles and steel to fall drastically. However, after lockdowns were lifted in the second half of the year, with strong market demand and timely adjustments to the production and sales structure, Formosa Industries Corporation was able to restore its operation rate and production and sales volume to pre-pandemic levels and turn losses into profits by the 4th quarter.

Also, after Formosa Ha Tinh Steel's second blast furnace started operations in 2018, it managed to overcome internal and external pressures like the heavy burden of depreciation and interests, competition with local steel plants, and foreign

steel products exported to Vietnam at a low price. This enabled the company to maintain positive cash flow in the first year of operation with steady orders and inventory control. In the second half of 2020, Formosa Ha Tinh Steel also benefited from lockdowns lifting around the world and the global economic recovery. China's automobile industry recovered and began heavily investing in infrastructure, causing the price of raw materials like iron ore to rise which in turn supported product prices. The company entered the European market in September 2020 and turned losses into profits by November. The increased demand for steel products in 2021 is expected to last into the second half of the year.

## Implementation of Circular Economy

For decades, Formosa Plastics Group has remained committed to its corporate tenets of "get to the heart of matters" and "strive for excellence". Since 1993, we have exerted every effort to implement the 5S management principles (Seiri、Seiton、Seiso、Seiketsu、Shitsuke). In 1999, we implemented our no leakage policy (no gas leakage, no water leakage, no oil leakage) to become friendlier to the environment and increase rainwater recycling. In 2006, an enterprise-wide "Energy Conservation, Carbon Reduction,

and Pollution Prevention Task Force” was established to further promote energy conservation and emissions reduction. In 2016, we went even further to promote “circular economy”, taking the four aspects of circulation, namely raw materials, water resources, energy, and waste, into consideration to implement inter-company, inter-factories energy and resource integration. In 2018, we applied AI to our energy conservation, emissions reduction, and circular economy efforts and got ready to initiate digital transformation and further expand benefits. The following is an overview of our “circular economy” measures and their results:

#### Water Conservation

According to the statistics of the Ministry of Economic Affairs, although Jiji weir was initiated to supply water for the sixth naphtha cracker complex, industrial water consumption accounted for only 5% of the weir's water supply, while up to 93% went to supplying agricultural water usage in Yunlin County and Changhua County. In order to use our precious water resources more efficiently, FPG actively reduced water consumption by reducing the amount of water used in production processes, recycling water, and reducing loss due to evaporation. As a result, the water recycling rate throughout the region exceeded 90.9%, and the Mailiao Industrial Complex conserves up to 280,000 tons of water per day.

Additionally, according to the “Directions for Application Review on Proposal of Water Usage” published by the Ministry of Economic Affairs, the water recycling rate (R1) of the Mailiao Industrial Complex is 98.8%, which is equivalent to each drop of water being reused up to 7.3 times.

In addition to using less water, FPG also took active measures to cultivate water resources. By increasing rainwater collection areas and modifying rainwater storage tanks to effectively improve rainwater storage and reuse, FPG managed to increase the rainwater collection rate

to 94.7% in recent years. These improvements allowed an average of 19,486 tons of rainwater to be collected per day, which is enough to satisfy the usage of Yunlin County residents for about 42 days. Furthermore, FPG also invested NTD 5.4 billion to establish a 100,000-ton seawater desalination plant in the Mailiao Industrial Complex. The plant is expected to be completed and ready for use by 2022.

#### Energy Conservation and Emission Reduction

In order to enhance its energy and resource usage efficiency, FPG established a dedicated unit for energy conservation and carbon reduction in 2006 with the Chairman of FPG serving as the convener. The unit hosts monthly meetings and set the annual energy saving target at 3% and the water conservation target at 5% to promote inter-plant, inter-company energy and resource integration.

According to the statistics, the average daily production output of Mailiao Industrial Complex has risen 5% in the past decade, but the average daily electricity consumption and steam consumption per unit of product have decreased by 17% and 19% respectively, while hourly electricity consumption and steam consumption have decreased by 13% and 15% respectively.

As for air pollution control, in order to continue promoting the optimization of environmental protection control technologies, FPG is working to reduce PM 2.5 emissions by



..... Mailiao Harbor -a green ecological port realizing corporate and local prosperity

installing wet electrostatic precipitators in co-generation power plants and promote the reuse of heat emitted from boiler chimneys, thereby eliminating the visible pollution of white smoke from chimneys without using extra energy. The two improvement initiatives are well underway and are expected to be completed before 2023, after which the plants will be able to match natural gas emission standards.

In addition, all vessels traveling in and out of Mailiao Harbor must use low-sulfur fuel or energy-saving power, and vessels in the harbor must use shore-side electricity instead of burning fuel to effectively reduce sulfide emissions. These active environmental protection measures made Mailiao Harbor the first industrial port in Asia to be awarded the “EcoPorts Certification”.

#### Overall Investment and Results

Using the Mailiao Industrial Complex as an example and with the measures listed above, FPG has invested approximately NTD 31.6 billion into energy conservation, emissions reduction, and circular economy as of the end of 2020, completing 2,329 water conservation improvement initiatives to conserve 152.6 million tons of water each year. At the same time, 8,214 energy-saving initiatives that can reduce CO<sub>2</sub> emissions by 11.54 million tons each year were completed. The results are quite impressive, with combined annual water and energy conservation benefits reaching NTD 31.9 billion, making Mailiao Industrial Complex a true eco-industrial park.

Moreover, according to the evaluation results published by the international environmental evaluation index Carbon Disclosure Project (CDP) in 2020 (evaluation scores are divided into 8 grades, from A to D-), Formosa Plastics and Nanya Technology were awarded the top score of “A” in climate change while Nanya, Formosa Chemicals & Fibre, Formosa Petrochemical, Nan Ya Printed Circuit Board, and Formosa Taffeta also achieved an impressive score of “A-”. As for water resources, Nanya, Formosa Chemicals & Fibre, Formosa Petrochemical, and Formosa



..... FPG has always upheld its principles of balancing industrial development with environmental protection

Taffeta all scored “A”, while Formosa Plastics and Nanya Technology scored an “A-”. Such amazing performances demonstrated that FPG's long-term focus on conserving energy and reducing emissions has been recognized by authoritative international organizations. Going forward, FPG will continue to follow government policies and international ESG promotion and work towards the goal of “carbon neutrality”.

#### Social Care and Giving Back

While actively developing its business, FPG remains committed to its management philosophy of “taken from the community, given back to society”. In addition to establishing three universities and the Chang Gung Memorial Hospital, FPG has founded multiple foundations and charitable trusts, giving back over NTD 72.9 billion to society over the years. FPG's main charitable projects include (see attachment for details):

**1. Campus reconstruction:** Since the 921 earthquake, FPG has sponsored the reconstruction projects of 76 school buildings that have deteriorated with age or been stricken by natural disasters throughout Taiwan. Through these projects, FPG has rebuilt more than 900 classrooms.

**2. Welfare for the elderly:** FPG has donated approximately 1.15 million doses of pneumococcal vaccine with a total market value of nearly NTD 990 million for senior citizens over the age of 75. According to research by Chang Gung Memorial Hospital, the vaccine can reduce the infection rate by 76% and the mortality rate by 91%. On the whole, these donations saved the government over NTD 14.3 billion in medical expenses for pneumonia treatments. Meanwhile, FPG also provided subsidies for improving housing for the elderly, established senior health centers, donated funds and equipment to the Yunlin County Evergreen Canteen, and supported other charitable programs.

**3. The Rainbow Program and Sunshine Program:** FPG provided health education, psychological counseling, and skill training for drug-addicted inmates with AIDS (Rainbow Program) and drug offenders (Sunny Program), as well as regular follow-up counseling after they are released to help them find employment, cutting recidivism rates from 60-80% down to around 10%. Because of these programs, FPG's Chairman received the

11th "Charity Award" from the HK & Macau Taiwanese Charity Fund. Besides donating all of the prize money, the Wang Jhan-Yang Social Welfare Foundation also donated a matching amount to expand the project and spread more love to the world.

**4. Welfare for women and children:** FPG promotes multiple welfare programs, including medical and financial assistance for patients with rare diseases, education support for minor welfare institutions, support for minors that have left welfare institutions, professional early intervention and treatment for children with developmental disabilities (benefiting over 23,000 children and 92 institutions), financial assistance for abused families, scholarships for low-income students, work-study programs at social welfare institutions, financial support for students in remote areas, talent training programs in remote areas, grants for school lunches in elementary and junior high schools in Yunlin County, donations towards childcare subsidies provided to grandparents caring for children aged 0 to 2, donations to provide funds for 7th grade girls to

receive the HPV 9-valent vaccine, English courses for students in the remote areas of Hualien and Taitung Counties, and support for the development of preschool children in vulnerable families.

**5. Other social welfare programs:** In addition to providing funding to train young athletes in sports like tennis, table tennis, billiards, and golf, FPG also actively promotes performances by local art and culture groups, such as: The Ming Hwa Yuan Arts & Cultural Group, I Wan Jan Puppet Troupe, and Apple Theater, making arts and culture events more accessible to people in remote areas and helping local art and culture groups to grow.

Many of the charitable programs promoted by Formosa Plastics Group were the first of their kind in Taiwan and were widely praised, allowing the Group to elevate the quality of their services and meet the goal of sustainable operation. Under the Chairman's leadership, Formosa Plastics Group is fully realizing the two founders' wish to give back to society.

### Future Operating Environment

The COVID-19 pandemic spread across the world in 2020, causing drastic global economic decline. Taiwan benefited from its successful containment of the pandemic and the transfer of orders prompted by the US-China trade war, resulting in a rare, exceptional economic performance. However, such a development is not the norm, especially when Taiwan's vaccination progress is significantly behind and mutations of the COVID-19 virus threaten to bring a new wave of challenges. The government must prepare for the worst and evaluate the situation to be ready for all possible global economic developments.

Meanwhile, the new US President, Joe Biden, is generally expected to continue putting pressure on China after taking office, continuing the trend of deglobalization as the global economy and trade move towards regional integration. The CPTPP (Comprehensive and Progressive Agreement for Trans-Pacific Partnership) officially went into effect at the end of 2018, and the RCEP (Regional Comprehensive Economic Partnership) was



..... Since being awarded the "Charity Award" in 2016, the Chairman was invited as an award presenter and officiating guest for the 4th time in 2020



..... FPG Healthcare Team in Mailiao

Summary Table of Formosa Plastics Group's Social Welfare Projects in Taiwan (As of the end of 2020)

Unit: NTD million

| Donors  | Main Social Welfare Projects  | 2020  | As of 2020 |
|---|---|-------|------------|
| Formosa Plastics Group  | 1. Established Ming Chi University of Technology, Chang Gung University, and Chang Gung University of Science and Technology  | 1,805 | 38,770     |
|   | 2. Established Chang Gung Memorial Hospital   |       |            |
|   | 3. Made donations towards earthquake and typhoon relief and sponsored campus reconstructions  |       |            |
|   | 4. Organic vegetables, food waste recycling, afforestation  |       |            |
|   | 5. Local contributions  |       |            |
| Founder and the Wang Family                                     | 1. Established Ming Chi University of Technology, Chang Gung University, and Chang Gung University of Science and Technology  | 0     | 26,842     |
|   | 2. Established Chang Gung Memorial Hospital   |       |            |
|   | 3. Donation of cochlear implants  |       |            |
| Wang Chang-Gung Charitable Trust Fund (Founded in October 2002) | 1. Disability welfare - Improving the quality of early intervention institutions  | 504   | 2,122      |
|   | 2. Welfare for minors and women - Scholarship program for orphaned children, etc.   |       |            |
|   | 3. Welfare for the elderly - Pneumococcal vaccine donations for the elderly, long-term care systems, etc.   |       |            |
|   | 4. Sports promotion - Athletic trainer assistance program   |       |            |
|   | 5. Health research - "Formosa Plastics Group - Fulbright" Scholarship   |       |            |
|   | 6. Educational support and other subsidies for indigenous students  |       |            |
|   | 7. Welfare for the disadvantaged and others - Homeless service program, etc.  |       |            |
| Wang Jhan-Yang Charitable Trust Fund (Founded in March 2006)    | 1. Welfare for minors and women - Scholarships for children and teens, nutritional breakfast subsidy, economic assistance for abused families   | 128   | 1,293      |
|   | 2. Inmate assistance - Sunshine Program drug rehab course, Ministry of Justice Inmate Family Assistance and Care Program, etc.  |       |            |
|   | 3. Welfare for the Elderly - Pneumococcal vaccine donations for the elderly, Meal Delivery Program for Elders Living Alone in Mailiao and Taixi Township, Wisdom Foundation Dementia Family Support Program, etc.                 |       |            |
|   | 4. Health promotion - Research Project on the Discussion of Preventable Factors of Leading Causes of Death  |       |            |
|   | 5. Cultural sponsorship - Development Program for Taiwan's Characteristic Cultures, Mind Theater campus tour, Yunlin local puppet theater campus performances, etc.   |       |            |
|   | 6. Sports promotion - Flaming Stars Athletic Talent Cultivation Program, Future Stars Athletic Talent Overseas Training Program, etc.   |       |            |
|   | 7. Educational support and other subsidies for indigenous students  |       |            |
|   | 8. Welfare for the disadvantaged and others - Lighting improvement plan for social welfare institutions   |       |            |
| Ching Pao Charitable Trust Fund (Founded in June 2010)          | 1. Disability welfare - Employment assistance program for mildly autistic people  | 38    | 826        |
|   | 2. Welfare for minors and women - Scholarships and talent training programs for remote areas, Hualien County English Teaching Assistantship Program, etc.   |       |            |
|   | 3. Welfare for the elderly - Housing improvement and home appliance subsidy program, etc.   |       |            |
|   | 4. Welfare for the disadvantaged and others - Donation of transportation vehicles and daily necessities to social welfare organizations, donation of daily necessities to the Christian Relief Association (1919) food bank, etc. |       |            |

| Donors  | Main Social Welfare Projects  | 2020  | As of 2020 |
|---|---|-------|------------|
| Wang Jhan-Yang Social Welfare Foundation (Founded in August 1995) | 1. Disability welfare - Improving the quality of early intervention institutions  | 167   | 1,586      |
|   | 2. Welfare for minors and women - Funds for school lunches for elementary and junior high school students in Yunlin County, funds for the construction of welfare institutions for minors and women, etc. |       |            |
|   | 3. Inmate assistance - Rainbow Program (inmates with drug addiction and AIDS), donation to the Taipei Prison Environment Improvement Project, etc.  |       |            |
|   | 4. Welfare for the elderly - Pneumococcal vaccine donations for the elderly, donation of funds and equipment to the Yunlin County Evergreen Canteen   |       |            |
|   | 5. Culture - Sponsored the Vienna Philharmonic New Year Concert   |       |            |
|   | 6. Educational support and other subsidies for indigenous students  |       |            |
|   | 7. Welfare for the disadvantaged and others - Donations to the Mailiao Township Library and volunteer firefighting group  |       |            |
| Ching Pao P.D. Charitable Foundation (Founded in November 1995)   | 1. Disability welfare - Improving the quality of early intervention institutions, donation to the Yunlin Physical Therapy Youth Association for building repairs  | 219   | 1,385      |
|   | 2. Welfare for minors and women - Ching Pao Diligence Scholarship, donation to the Taipei Orphan Welfare Foundation, Junior High School Breakfast Program, etc.   |       |            |
|   | 3. Welfare for the elderly - Active Aging Center Program, donation towards establishing healthcare plans for remote areas, etc.   |       |            |
|   | 4. Health promotion - donations to environmental protection research projects at Chang Gung University and Ming Chi University of Technology  |       |            |
|   | 5. Educational support and other subsidies for indigenous students  |       |            |
|   | 6. Welfare for the disadvantaged and others - Donations to the Chang Gung Memorial Hospital Social Welfare Fund, United Way, and the Dharma Drum Mountain Humanities and Social Improvement Foundation    |       |            |
| Ming-De Foundation (Founded in July 1974)                         | 1. Disability welfare - Early Intervention Service Efficacy Enhancement Program   | 0.2   | 76         |
|   | 2. Welfare for minors and women - Donations to CGU Choir and the Nantou County After-School Program for Indigenous Students   |       |            |
|   | 3. Educational support and other subsidies for indigenous students  |       |            |
|   | 4. Welfare for the disadvantaged and others - Educational support and other subsidies for indigenous students   |       |            |
| Jin-che Indigenous Foundation (Founded in April 1997)             | 1. Welfare for minors and women - Work-study programs and emergency relief for indigenous students  | 1     | 12         |
|   | 2. Educational support and other subsidies for indigenous students  |       |            |
|   | 3. Welfare for the disadvantaged and others - Donation to the Yilan Leshui Community Development Association  |       |            |
| Total   | Formosa Plastics Group  | 1,805 | 38,770     |
|   | Founder and the Wang Family   | 0     | 26,842     |
|   | Foundations and Charitable Trusts   | 1,057 | 7,300      |
| Total   |   | 2,862 | 72,912     |



..... Administrative building in Mailiao Industrial Complex

officially signed into agreement by its 15 member countries (excluding India) on November 15, 2020. Due to its unusual international status, Taiwan was left out of both regional economic organizations, which means that industries may face serious problems with export tariffs going forward, which will be detrimental to Taiwan's long-term economic development.

In addition, despite continued cross-strait tensions, China remains the world's second-largest consumer market and Taiwan's primary export market. According to statistics from the Ministry of Finance, in 2020, the China and Hong Kong markets accounted for 43.9% of Taiwan's total exports, which was up by 14% from the previous year. However, because China managed to keep the COVID-19 pandemic under control, its industries recovered, and its 4th quarter economic growth rate in 2020 has returned the strong levels of the past. Meanwhile, the 14th Five-Year Plan published by China in November 2020 will focus on establishing a new “dual circulation” development pattern with a primary domestic “internal circulation” supported by the global market, or “external circulation”, which will support China's steady economic recovery. Therefore, it is foreseeable that Taiwan's trade will become even more inseparable from China in the future.

Therefore, it is hoped that the government can actively improve cross-strait relations and lead Taiwan in overcoming trade barriers so that Taiwan's room for international economic and trade development does not shrink going forward nor does it suffer from more impacts and obstacles. Also, there will be a sharp increase in new petrochemical production capacity in China and the United States in the next few years, making the overall international situation even direr for Taiwan's petrochemical industry.

### Future Outlook

In 2020, global economic growth was disrupted by the sudden outbreak of the COVID-19 pandemic. Expansion plans throughout the global petrochemical industry were also affected by the pandemic, with certain plans being suspended or delayed. In February, a series of blizzards hit Texas, US, causing the price of petrochemical raw materials to skyrocket. Meanwhile, major oil-producing countries continued to cut down on production in the first quarter of 2021, which helped maintain the price of crude oil and petrochemical raw materials.

Unfortunately, global economic and political situations remain unclear due to different vaccination conditions and virus mutations. Formosa Plastics Group will maintain a cautious and practical attitude, while constantly improving its competitiveness and working hard to develop and sell high-quality products with high added value. The Group will also further expand its business in composite materials for electric cars and medical materials, striving to develop highly fluid and lightweight materials to actively improve the added value of products.

In terms of electronics, in response to the new development trends of 5G, AI, self-driving cars, and other smart technologies, Nanya Technology plans to invest NTD 360 billion over the next 7 years, initiating major investment projects and upgrading existing manufacturing processes in three stages. This would make Nanya Technology

the first DRAM production plant in Taiwan to possess self-developed 10nm technology and it is the largest memory investment project in Taiwan's history. The first phase of expansion will start by the end of 2021 at the earliest and is expected to be completed by the end of 2023.

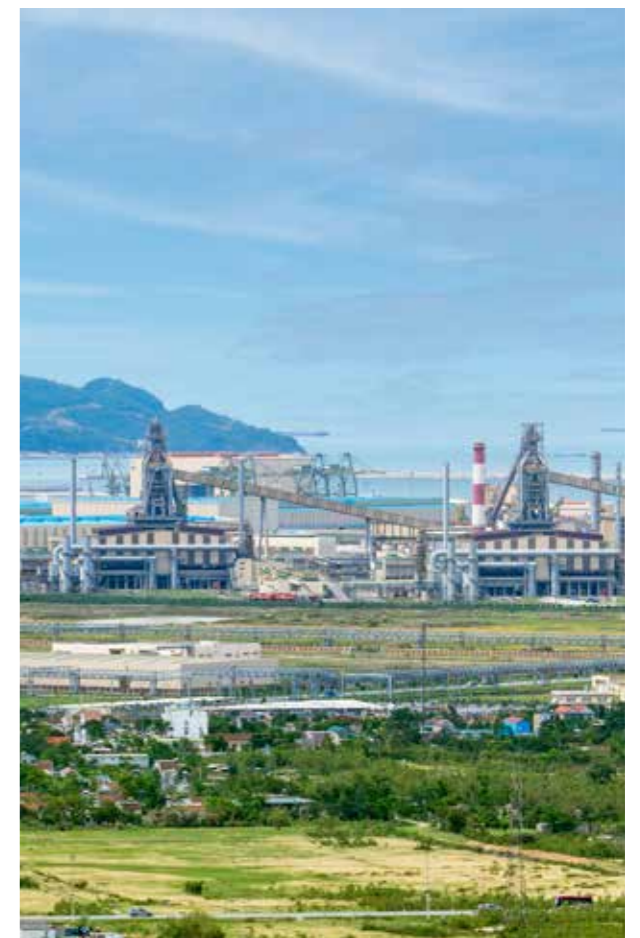
Regarding overseas operations, Formosa Plastics Group continues to promote investment and expansion projects. Not only is the Group actively building a new cold-rolled stainless steel plant in Fujian, China, expanding the petrochemical material production capacity of its Ningbo Plant, and expanding its electronics material production capacity in Huizhou, its large-scale petrochemical investment project in Louisiana officially obtained EIA approval in 2020, and construction is about to begin. At the same time, the Group's third ethane cracking plant and relevant downstream petrochemical plants in Texas are being completed and put into operation.

Furthermore, Formosa Ha Tinh Steel in Vietnam has been actively improving the quality of its products. The company has obtained certification from multiple Southeast Asian countries and the EU since 2016, and in 2021, it will continue to apply for certification from Japan and the UK to expand export sales. At the same time, in response to Vietnam's transportation infrastructure demands, the company has developed high-strength steel products and made plans to expand to the auto parts industry to better expand the high-value market. Meanwhile, Formosa Ha Tinh Steel also plans to establish an “auxiliary processing zone” to the northwest of the steel plant, implementing vertical integration to form the Ha Tinh steel industry chain and expanding the capabilities of the steel industry. This will further secure Vietnam's place as a steel heavyweight in Southeast Asia.

FPG has also continued to promote AI, AI+simulation, and digital transformation to improve production efficiency and the energy utilization rate. The goal is to increase annual

benefits by NTD 20 billion to improve operational efficiency and maintain stable operations.

The economy tends to fluctuate or be affected by unpredictable external factors. Regardless of economic conditions, Formosa Plastics Group will always take the initiative and pay close attention to market dynamics and future trends. This is how the Group can flexibly adjust production and sales plans and investments to ensure a long-term competitive edge while constantly reminding itself to fully embody its management philosophy of “striving for excellence”. We trust that the hard work of every FPG employee will lay a strong foundation for the future of the Group's sustainable development.



..... Improving the strengths of the steel industry - Making Vietnam the Southeast Asian stronghold of steel production





## Formosa Plastics Corporation

.....  
FPC will continue to develop the R&D for forward-looking and high value-added products and production process. In the meantime, FPC moves towards the trend in refinization of products to strengthen long-term competitiveness.  
.....

*The Company (Formosa Plastics Corporation) generated consolidated sales of NTD 185.81bn in 2020, reaching 89% of its target of NTD 208.06bn and was down 11% from NTD 207.84bn generated in 2019. Consolidated pre-tax profit came in at NTD 24.16bn in 2020, reaching 76% of its target of NTD 31.76bn and declined by 43% from NTD 42.21bn generated in 2019.*



**Chairman  
Jason Lin**

Due to the worldwide COVID-19 pandemic, countries locked down since March 2020 resulted in a sharp demand decline and supply disruptions. Production activities, consumptions, and global economy were hit hard and dragged down crude oil, ethylene, propylene, and petrochemical product prices. Especially, WTI crude oil futures prices even fell to a negative value on April 20, 2020. Although the Company's product prices declined in 1H20 to narrow down the margins, the sharply falling feedstock prices still made the Company profit for its core business. However, it still reported a net loss on a consolidated basis as dragged by the decline in investment incomes from Formosa Petrochemical Corp. and Formosa Plastics Corp., USA in 1H20. Nevertheless, in 2H20, given the easing of lockdown, demand for work-from-home related products, anti-epidemic products, home gym equipment, building materials, 3C, and home appliances have been surging. Given the gradual recovery of global economy as well as the roll out of monetary easing measures and fiscal stimulus policies by countries, the prices of petrochemical products have rebounded strongly and returned to the levels of the end of 2020 before COVID-19. Among them, polyvinyl chloride (PVC) and polyethylene vinyl acetate (EVA) prices reached the record high in the latest 9 year, which made the Company turn profitable in 2020.

Even though sales volume of polyethylene (PE) increased by 329K tons in 2020 from 2019 thanks to the contribution from the new HDPE plant built by 100% owned subsidiary, Formosa Industries Corp. with selling its products under full production in 2020, the Company's operating profit of NTD 17.09bn still dropped by 15% in 2020 from 2019 due to the ASP decline with 12-38% and narrowing product margins. In addition, the total cash dividends of NTD 3.35bn in 2020 from investees including Nanya Plastics Corp., Formosa Chemicals & Fibre Corp. and Nanya Technology Corp., etc. decreased by NTD 4.82bn from 2019. Also equity investment incomes of NTD 5.21bn from investees including Formosa Petrochemical Corp., FPC-USA and Formosa Sumco Technology Corp., etc. significantly lower NTD 9.52bn from 2019. The decrease in 2020 led to a 43% decline of the Company's pre-tax profit from 2019.

Looking back at 2020, the confrontation between China and the US had spread from trade war to technology war and financial war. Moreover, the supply disruptions impacted by COVID-19 led to the decline in economy growth for many countries. Except for China, of which the economy could still maintain positive growth due to better control of COVID-19, the economy of other developed countries were declining.



Mailiao HDPE Plant



..... Mailiao PVC Plant

While the world is under the shadow of COVID-19, Taiwan has been the top performer in term of GDP growth among the Four Asian Tigers for 2 consecutive years as benefiting from 1) the homecoming capital, 2) order reallocation, 3) strong demand rebound after the easing of lockdown, and 4) better control of COVID-19. Both export value and domestic investment showed positive growth in 2020. However, the China-US trade war, which has lasted for more than 2 years, caused the change for international division of labor between Taiwan, China and US. The COVID-19 also accelerated the anti-globalization trend, which put Taiwanese companies located in China and ASEAN countries at risks on supply chain issue.

In addition, the Regional Comprehensive Economic Partnership Agreement (RCEP) was signed on November 15, 2020. It will be not only the world's largest free trade zone, but also bring a huge boost to the economic and trade integration for Eastern Asia and reshape the global economy and trade. However, due to political issues, Taiwan is absent from the two major free trade zones, RCEP and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), which becomes a missing corner of the regional economic and trade integration picture. In the short term, RCEP's impact to Taiwan is not too significant with low deduction of tariffs rate, long preferential period and exempt from tariffs about

70% of Taiwan's exports to the ASEAN region. However, in the long term, it may not only result in a rising concentration rate for semiconductor and electronics industries which is not good for Taiwan's export structure, but also the growing tariff pressure for the homecoming Taiwanese companies. If Taiwan is not able to actively seek for solutions on the breakthrough for the obstacle on trade tariff, in the long run, it will not only harm Taiwan's international trade, but also the economic growth momentum. Moreover, it will create hurdles on the development of relationships with regional trade partners.

Furthermore, in order to build green energy and connect with the international trend, in accordance with the newly revised Renewable Energy Development Act, which requires the major users to bear a 10% obligation on renewable energy including the investment on green energy equipment and cash payment, etc. However, Taiwan's power grid is independent, and the power generated by renewable energy is still unstable. Moreover, there are transportation and storage problems for natural gas. It is difficult to undertake the energy transformation policy of "replacing nuclear power with green energy; replacing coal-based power plant with natural gas-based power plant". This triggered producers concern about a stable electricity supply going forward. Furthermore, the society has been long brimming with the ideology of environmental protection and unreasonable EPA review system is along with the stringent environmental regulations, which has hindered many investment projects and is adverse effect on the long-term development of Taiwan's industry and economy.

At the critical moment in developing Taiwan's industry and economy during US-China trade war and COVID-19, the governments should roll out a fiscal tax policy with investment incentives, amend the irrational environmental assessment process, loosen the environmental regulation restrictions and revisit the energy transformation

policy to formulate reasonable energy generation allocation. In the meantime, government should improve regulations to be in-line with international standards, and continue to participate in regional economic and trade integration with key trading partners to make up for Taiwan's lacking of connection among international trade, and allow the industry to enjoy a fair competition environment with regional peers. By improving the investment environment and joining regional economic and trade integration to strengthen economic and industry competitiveness, the government can create a friendly and sustainable investment environment.

In view of the impact from COVID-19 globally and the difficulty in an oversupplied market under the supply addition wave, the Company has been proactively engaging in the development of artificial intelligence (AI) technology, and established an AI research and development center in Renwu Complex, combining AI professionals from various departments to enhance operational efficiency in five aspects "optimization of production and sales, quality assurance, intelligent maintenance, digital inspection, and cost reduction". In 2020, 75 out of 148 AI projects have been completed with an estimated annual benefit of NTD 290m, while the remaining 73 projects are still ongoing.

Aside from this, in an effort to strengthen the AI technology capability, the Company continues providing systematic training courses to employees, interacting with companies and academic institutions outside the Company, inviting domestic and foreign experts for speeches, building platforms to hold competitions, etc. In view of the rapid development of AI technology, in addition to continuing to select outstanding talents to train in Taiwan's AI schools, starting from 2020, the Company entrusted Taiwan's AI schools and Taiwan's top universities to cooperate with experts and various academic institutions to organize advanced AI courses to cultivate more high-end

AI talents in order to build a solid foundation for digital transformation, of which, 44 talents have completed the training.

Besides, during COVID-19 period, the Company fully supported the "National Mask Team" on raw materials for medical protection and hygiene products, in order to contribute to Taiwan's efforts in the prevention from the spread of COVID-19 and to ensure the citizens health. Meanwhile, to secure the supply of raw materials for the non-woven fabric for the mask industry, the Company applied blockchain technology to build a non-woven fabric integrated marketing platform. The application is also expanded into supply chains in medical, automotive, shoe materials and wind power industries to connect upstream, midstream and downstream supply chains for the formation of global industry alliance to provide customers with a full range of services.

Furthermore, in order to achieve the goal of customer-oriented digital transformation and the optimization in selling and production to improve the service quality, the Company set up "FPC E-commerce Platform" which combined the Enterprise Resource Planning (ERP) information and AI technology and has been worked online. In addition, in order to continue to serve customers, the Company conducted multi methods to promote business by remote marketing to create a win-win situation during COVID-19 period.



..... Providing the raw materials for medical and healthcare products

Moreover, to pursue a reasonable profitability, strengthen business and reduce the negative impact from COVID-19, the Company implemented the improvement measures including circular economy development, project improvements promotion, the consumption of water, energy, and the utility usage volume per unit reduction. The Company accomplished 1,121 projects in 2020 with an annual benefit of NTD 850m.

At the same time, 13 office buildings, including the 2 founders' offices in the Kaohsiung plant, the birthplace of Formosa Plastics Group, were registered as monument by the Kaohsiung City Government. The “Y.C. Wang and Y.T. Wang Brothers Park” will be established in the 2.5 hectares original site. The restoration and reuse plans were reviewed and approved by the Kaohsiung City Government in January 2021. The park is expected to be completed by the end of 2023 and will be opened to public.

The Company and its China Ningbo and United States subsidiaries mainly produce plastics and chemical fiber raw materials. In 1H2020, sales volume of PVC decreased sharply due to COVID-19 given worldwide lockdown, but PVC price continued to raise from 2H20 because of demand for COVID-19 prevention in China, Vietnam, India, Europe and the United States, automobiles, and construction markets recovery and force majeure of many Europe and US peers. However, due to global shipping and container shortages, total PVC sales volume in 2020 declined by 3% to 1,640K tons from 2019. Sales volume of caustic soda was 1,351K tons in 2020, decreased by 10% from 2019 given the declining downstream demand in alumina, textiles and pulp. Moreover, the price of caustic soda decreased because caustic soda plants raised their utilization rates to increase supply based on a better profit of PVC. In consideration of the unfavorable prices, the Company has conducted an off-peak production strategy and to export based on contract prices.

HDPE was in oversupply situation given a continued capacity expansion globally, while demand was lower in 2020 than 2019 impacted by COVID-19. However, the Company actively increased the selling of the differentiated products such as COVID-19 prevention related fabric grade and bottle blowing grade products, as well as pipe grade and bottle cap grade HDPE, along with the start of the new HDPE plant by the Company's US subsidiary. The Company's HDPE sales volume in 2020 increased by 2% to 524K tons from 2019. The Company's EVA sales volume in 2020 increased by 2% to 290K tons from 2019 given the growth in solar packaging filming demand in China and no new capacity from peers. In addition, despite a high competition in the LLDPE market given new capacity from global peers and demand impact from COVID-19, the Company's LLDPE sales volume in 2020 increased by 150% to 528K tons from 2019, given the aggressive expansion into Vietnam market, promotion of the injection grade and rotation molding grade differentiated products, and the conversion of LLDPE from the US subsidiary's HDPE plant.

Due to a slump in crude oil price and the outbreak of COVID-19 at the beginning of 2020, the lockdown worldwide resulted in the lack of raw materials and labor shortages in the upstream, as well as the declined demand for tapes, coatings and resins in the downstream. Despite the shutdown of Linyuan plant's first phase AA production, the Company's AE sales volume in 2020 increased by 6% to 527k tons from 2019, given demand recovery in 2H20 and the unexpected shutdown from peers. The Company's sales volume of NBA is mainly for captive use by AE plants. The Company's NBA sales volume in 2020 increased by 9% to 241K tons from 2019 given strengthening the bonded customers in Eastern China and also active expansion to Eastern China, Southern China and South Korea. Despite oversupply and a severe pricing competition in SAP market, the Company's SAP sales volume in 2020 increased by 9% to 185k from 2019 given stable orders from contract customers and actively developing new customers.

The Company's PP sales volume in 2020 increased by 5% to 977K tons from 2019 given full production and selling after the scheduled maintenance of Linyuan PP plant and the renewal of the granulator in 2019. The Company's AN sales volume in 2020 decreased by 9% to 253K tons from 2019 due to a weak market demand impacted by COVID-19. The Company's MMA sales volume of 82K tons in 2020 was similar to 2019 due to the recovery of the PMMA light guide plate and the strong demand for anti-COVID-19 plates. The Company's ECH sales volume in 2020 increased by 3% to 97K tons from 2019, which was benefited from the booming development of the wind energy and 5G industries, and the stronger demand from downstream epoxy products.

In terms of capacity expansion, in order to strengthen the competitiveness, the Company aggressively expanded its capacities and conducted debottleneck projects, including the completed debottleneck project of PVC plant in Linyuan in 2020 with new capacities by 50K tons to 1,315K tons per annum, and the ongoing debottleneck project of PVC plant in Renwu, Linyaun and Mailiao with new capacities by 100K tons to 1,415K tons per annum by 2022. In addition, in response to the construction of the IPA plant for the joint venture “Formosa Tokuyama Advanced Chemicals Co., Ltd.”, the first phase of the acrylic acid (AA) equipment in Linyuan AE plant with an annual capacity of 21K tons was dismantled in August 2020. As a result, the annual capacity of AA reduced to 147K tons and AE lowered from 268K tons to 250K tons.

In Ningbo Complex, the SAP plant debottleneck project of 10K ton completed in 2020 and the annual capacity increased to 100K tons. The new PDH plant with annual capacity of 600K tons propylene is expected to complete and commence production in 3Q21. The EVA debottleneck project of 28K is expected to complete its construction and commence production in 1Q23 and the annual capacity increased to 100K tons.

Furthermore, in Kaohsiung, the Company's storage tank in Qianzhen District will be moved to the Phase II intercontinental petrochemical zone. The Company has rent the land and dock from Port of Kaohsiung Taiwan International Ports Corporation for petrochemical usage and will build 12 storage tanks and 1 salt warehouse, which are expected to be completed in 1Q22.

In terms of equity investments, FPC-USA (22.66% owned by the Company) generated pre-tax loss of USD 200m in 2020, decline from 2019, mainly due to the U.S. economy impacted by COVID-19 and 14 plants under maintenance shutdown and equipment inspections leading to significant losses. However, as benefiting from the US CARES tax reform bill which returns the tax expenses incurred in the past five year if a company reported net loss in 2020, FPC-USA's net profit after tax was USD 100million in 2020. Looking into 2021, it is expected that the successful development and roll-out of vaccines could help the US economy to resume growth, and to boost the demand for petrochemical products and the increase in product prices. Moreover, there will be only the second olefin plant (OL-2) and specialty PVC plant needed to conduct equipment inspections, and the new LDPE plant in Texas, US put into operation since November 2020, which will increase total sales volume and resume stable profit growth.



..... Zero Waste & Recyclable Material Presentation



..... R&D 100 Awards in 2020

In addition, the loss of Fujian Fuxin Special Steel Co., Ltd. (29.16% owned by the Company) in 2020 further expanded from 2019 due to (1) the slowdown in economic growth in China with shrinking demand affected by COVID-19, and (2) market oversupplied due to pricing competition from Indonesia peers that led to poor ASPs in finished goods. In 2021, Fujian Fuxin expects to benefit from order shift effect after the resumption of work in China, a sustained economic growth, new infrastructure projects and RCEP, etc., which will support a substantial growth in downstream exports demand for home appliances and metal products. In addition, Fujian Fuxin expects to decrease the loss as Fujian Fuxin will adjust the sales area, expand the sales in super ferritic stainless steel differentiated products, optimize production process and lower cost, and increase the hot rolling OEM for Formosa Ha Tinh Steel Corporation. In order to enlarge the synergy of vertical integration and enhance the competitiveness, Fujian Fuxin is conducting the new cold rolling mill plant project with 300K tpa capacity, and expects the plant to commence production from 3Q21.

Besides, the Company has invested in Minima Technology Co. Ltd. in 2019 with a 19.07% of shareholding. It mainly produces disposable consumer products such as tableware, paper cups, straws and other decomposable plastic products. However, Minima Technology Co. Ltd. reported the loss in 2020 with severely declined demand in Europe and the US market impacted by COVID-19. Its new capacity in Huwei plant

in Central Taiwan Science Park commenced production in 4Q20, which increased the overall annual capacity of decomposable compound rubber particles to 20K tons from 4K tons annually. In 2021, it is expected to turn profitable supported by the rising trend of plastics restriction globally, demand recovery from COVID-19, and the increase in capacity.

In view of the demand in advanced nodes from Taiwan's semiconductor industry, the Company and Japan's Tokuyama Co., Ltd. established a joint venture "Formosa Tokuyama Advanced Chemicals Co., Ltd." with 50% share respectively in October 2020. The new capacity will produce a 30K tons of electronic-grade IPA annually to meet domestic demand from semiconductor industry. The capacity is scheduled to be completed and put into production in the 3Q21.

In terms of research and development, the Company spent NTD 2bn on R&D in 2020, accounted for 1% of the Company's revenues. These R&D expenses were mainly spent on new formulation development, production process improvement, product quality upgrade, energy consumption saving, and human resources cultivation to increase production capacity and lower cost. In 2020, the Company completed 40 R&D projects with an annual benefit of NTD 90m. Meanwhile, the Company conducted R&D on industrial production technique and to commercialize specialty products including High temperature resistant and high mechanical strength chlorinated PVC, 5G wire and cable foam grade HDPE, HDPE cap & closure grade, LLDPE fiber grade, white color EVA encapsulate film grade, super high retention capacity SAP for sanitary napkins and baby diapers, medium modulus carbon fiber by DJWS process, carbon fiber for vinyl ester (VE) resin, carbon fiber for polyether ether ketone(PEEK), pultrusion process for carbon fiber reinforced polymer (CFRP), reactor-grade meltblown PP and low-energy consumption and high toughness EPP foam material, which has achieved good results.

Besides, the Company was awarded the "R&D 100 Awards" in 2020 for the technology of the "application of dye-sensitized battery for smart home", which cooperated with the Industrial Technology Research Institute. This demonstrates the Company's innovation capabilities in R&D and commercialization.

In order to enhance the competitiveness, the Company actively invested in the key technology development and applied for both domestic and international patent. In 2020, the Company received approval on 22 patents, and had a total of 182 effective patents as of the end of 2020. Meanwhile, the Company will continue to work with both domestic and international industry experts and academic area, to strengthen academic fundamentals and R&D to apply to the design for production capacity expansion and shortening the time of production process shift. The Company also set up a new high-end equipment center in Mailiao, and combined with virtual laboratory and talents in production process simulation, to accelerate the development of scratch resistance, flame resistance, toughness, gas barrier, dielectric products, as well as natural antibacterial and beauty-related green products.

Among them, the "Capture and Reuse of Flue Gas", which was a joint project with academic research institutions, was qualified to receive the subsidy from "the A+ Industrial Innovative R&D Program" by Ministry of Economic Affairs in January 2019. It is scheduled to complete the construction and operation in Renwu plant in 2H21. At the same time, in order to support the development in 5G industry in Taiwan, the Company will cooperate with Industrial Technology Research Institute and downstream companies to form a 5G raw material alliance, and expand its R&D towards products such as 5G and 6G base station housings, radomes and high-frequency network communication wires.

On the operational safety and environmental protection front, the Company always put

emphasis on industry developments and environmental protection equally. As of the end of 2020, the accumulated investments on operational safety, environmental protection, and firefighting reached NTD 25.4bn, which was mainly spent on controlling pollution, energy saving, waste and greenhouse gases reduction, and operational safety and firefighting improvement. The Company's pollution treatment and emissions are better than national regulatory standards.

In 2020, there were 4 business units praised by competent authority. Among them, Mailiao LLDPE, AN and ECH plants were all praised by Yunlin County for strong performance on occupational safety and health. Among them, the LLDPE and AN plants even received the "Occupational Safety 5-Star Award" from Yunlin County given the three consecutive years of praise awarded. Besides, Mailiao Complex was praised by Ministry of Labor for strong performance.

In terms of water and energy conservation and greenhouse emissions reduction, in 2020, the Company accomplished 973 improvement projects. Total water saved amounted to 5,351 tons/day, while greenhouse gas emissions reduction reached 179K tons/year. Other ongoing 930 improvement projects would further conserve water by 5,593 tons/day and reduce greenhouse gas emissions by 228K tons/year. According to the results announced by Carbon Disclosure Project (CDP) in 2020, the Company was ranked "A" in climate change assessment and "A-" in water resources assessment. Both achievements were among the top rankings within many well-known international chemical companies, which shows that the Company's efforts in energy-saving, emission-reduction and circular economy in response to climate change have achieved considerable results.

Besides, in order to enhance operational safety, the Company moved factory manager and section chief's office to the side of production

process control room, in order to respond immediately to any production abnormalities. The Company also installed interlock and foolproof devices to avoid operational errors by operators. In addition, the Company set up a Standard Operating Procedures (SOP) platform for operators to familiarize themselves with the operation procedures to reduce errors, and an augmented reality (AR) interactive technology will be further introduced to help improve the effectiveness of the SOP platform. In the meantime, other than using AI and other technologies to assist construction safety, develop smart wearable devices and assist inspections and maintenance, the Company also introduced AI smart detection system for pipeline leakage at Renwu Complex by using 360-degree high-altitude cameras to monitor key production process areas to effectively detect the location of pipeline leaks and protect the safety of employee and equipment.

In view of the international ESG (Environmental, Social and Corporate Governance) and the domestic severe environmental regulations trend, the Company continues to improve the elimination of white smoke from the chimneys of Renwu Complex and to promote zero discharge of wastewater in each Complex. At the same time, each plant is reducing volatile organic compounds (VOCs) and streamlining equipment components to gradually replace the low-leakage equipment components. This is also supplemented by the application of infrared detector (GasFinder) to strengthen autonomous inspections for a friendly environment.

Looking into 2021, the global economic activities is expected return to normal with the gradual normalization of COVID-19 prevention measures by countries, the optimistic expectation of effectiveness of vaccines and the support of large-scale fiscal and monetary easing policies by major economies. According to the latest forecast by the Monetary Fund (IMF), the global economy will recover quickly with ease of COVID-19.

However, the spread of the new variant COVID-19 virus at the beginning of 2021 led to a more severely global pandemic. The resumption of COVID-19 control measures, the shortage of vaccines and the delayed delivery schedules will affect the popularity of vaccination, which may weaken the rebound of economy growth. Besides, the uncertainties from the follow-up of China-US trade tension, whether countries to continue to adopt fiscal stimulus and monetary easing policies, the timetable for the re-lockdown by countries, and the rising geopolitical situation are still need to be closely monitored in the future.

In terms of supply, IHS forecasts that the global ethylene capacity will increase around 11.19 million tons in 2021, and the new capacity from China, Korea, and US will increase by 8.77 million tons. In terms of demand, based on the global ethylene demand growth of 0.6x of GDP growth, incremental demand should only be 5.1million tons in 2021. While polypropylene net capacity increase will be 8.33 million tons in 2021, mainly in China, by 6.13 million tons. Based on 1x of GDP growth, the incremental polypropylene demand should only be 5.7million tons in 2021. The global ethylene and propylene market will be oversupplied.

Furthermore, after the last upcycle of petrochemical industry during 2015-2019, a large number of incoming new capacities of ethylene, propylene and downstream derivatives in China and the US will result in market oversupply, while decreased demand has been largely impacted by COVID-19 in 2020. Looking into 2021, although demand might not be able to fully return to pre-pandemic level before COVID-19 is fully controlled, the roll-out of vaccines and forecast from international agencies generally indicated a slow recovery of global economy growth. Moreover, many of the capacity expansion plans in global petrochemical peers suspended or delayed due to COVID-19, which will help alleviate the pressure of oversupply. Therefore, it is expected that the petrochemical market in 2021 will be better than 2020.

Based on a better control of pandemic in China and some overseas supply chains impacted by COVID-19, some orders have been shifted to China, and it is expected that downstream product exports will increase. Additionally, the “14th Five-Year Plan” from 2021 to 2025 will focus on “the building of a new development pattern with domestic and international dual cycles as the main body” to support a steady recovery of economic growth, and expand investments in traditional infrastructure, AI, 5G, big data, etc. The 2021 GDP growth in China is expected to be faster than other major economies in the world, which will help to increase the Company's sales.

In the new year, given the uncertainties of COVID-19 and the continued capacity expansion from China and US, the Company still has pressures for its business operation. In response, the Company will deepen its applications and R&D in AI. In addition to actively cultivating AI, big data, and cloud computing talents, accelerating the application of AI in various fields, optimizing production and sales, improving product quality and management performance, lowering energy consumption to reduce costs, conducting pipeline inspections and leak detection, and strengthening the management of operational safety, the Company will continue to develop the R&D for forward-looking and high value-added products and production process in response to the trend of the development of semiconductor, 5G, renewable energy and medical and epidemic prevention industries. In the meantime, the Company moves towards the trend in refinization of products to strengthen long-term competitiveness.

Moreover, there will be fewer days of maintenance shutdown for ethylene capacity in Taiwan in 2021 than 2020. The Company expects that the supply of ethylene and propylene feedstock will increase, and will seek for imports to cover the shortfall in raw material, aiming to reach the target of “full production and sales” . Meanwhile, the Company will conduct deep-dive review on petrochemical plant management, and

to continue to promote a comprehensive inspection on equipment and the implementation of SOP, in order to manufacture under zero accidents. Besides, in response to the regionalization trend of the supply chain caused by COVID-19, the Company will not only continue to expand differentiated product markets, but also will integrate its past experience and fundamentals on automation and digitalization to accelerate digital transformation by using AI technology to optimize production and sales, and through remote marketing to overcome restrictions of traditional marketing method, which will help to actively expand into new customers and new markets in response to the drastic changing business environment.

In addition, as taking the sustainable development of industry and environment into account, the Company will build renewable energy capacity, continue to promote circular economy, energy saving and carbon reduction in order to fulfill corporate social responsibilities for a friendly environment. The Company also will aggressively promote the capacity expansion and debottleneck projects in Taiwan and overseas. Through the efforts above, the Company expects to strengthen its business, reverse the business downturn and to make the breakthrough of the challenges and maintain a steady performance.



..... Solar Power Panels of Renwu Plant in Kaohsiung



## Nan Ya Plastics Corporation

The Company will integrate the circular economy into process optimization, and constantly improve and upgrade the efficiency of existing equipment/production lines by introducing AI.



Administrative building in Mailiao

In 2020, Nan Ya Plastics Corp. (NPC) recorded a consolidated revenue of NTD 273.35 billion, 4.5% lower than NTD 286.30 billion in 2019; and a consolidated pre-tax income of NTD 30.44 billion, a growth of 14.1% compared to NTD 26.69 billion in 2019.



Chairman  
Chia-Chau Wu

Facing the pandemic at the beginning of 2020, the industry made a transition—from a passive response to an active adaptation; and from lowering the impact to seeking a new economy and business opportunities. Therefore, despite a decrease in the cumulative revenue for the whole year and a significant drop in non-operating income generated from investments under the equity method due to unfavorable external factors such as the pandemic and fluctuation in oil prices, the operating profit of the business still increased quarter by quarter and reached the peak in the fourth quarter. With the profit generated from core business, the consolidated pre-tax income still grew amidst unfavorable conditions.

The four major product categories of NPC operations are plastic processing, chemicals, polyesters, and electronic materials.

For plastic processing products, NPC continued to engage in the research and development of new applications, new materials, and products that meet environmental protection trends and have unique specifications. It increased the proportion of production and sales of differentiated and high-value products and deployed automated monitoring equipment to ensure the quality stability of the production process. In addition, the Company expanded into high-end and emerging markets with potential through e-commerce and online marketing to boost sales volume, increase utilization rate, and lower costs. Furthermore, NPC provided customers with satisfying services by leveraging its advantages of domestic and overseas production sites in Taiwan, China, the United States, and Vietnam, and timely adjusting plants' production and sales. Although plastic processing products saw a slight decrease in revenue due to the challenges posed by the pandemic, the profit still increased thanks to the extensive efforts exerted by various parties.



Vertical integration from raw material supply, R&D, production, processing, to sales. The Company has a complete supply chain

In terms of petrochemical products, in line with vertical integration and division of labor in the Sixth Naphtha Cracking Plant in Mailiao, NPC's products, including ethylene glycol (EG), Bisphenol-A (BPA),



Series of Asia Industry 4.0 & Intelligent Manufacturing Exhibition

1,4-butylene glycol (1,4BG), plasticizers, phthalic anhydride (PA), 2-ethylhexanol (2EH), and epoxy resin (Epoxy), have been vertically integrated into upstream and downstream industries to form a complete supply chain that supports the development of downstream industries such as polyester, electronics, and plastic processing, respectively.

Due to the outbreak of COVID-19 in 2020, the overall petrochemical products were affected by the dramatic oil price drop and low raw material prices in the first half of the year, resulting in a decline in revenue of all products. However, from the second half of the year, Bisphenol-A (BPA) prices went up significantly because of the strong downstream demand for epoxy that is used for wind power applications, together with supply shortages in the market caused by the unexpected shutdowns of main competitors. Regarding the series products of plasticizers, the demand for pharmaceutical grade gloves surged because of measures to prevent COVID-19 and further drove up the prices of plasticizers such as 2EH, DOTP, and DEHP. Therefore, the overall petrochemical products saw growth in profit.

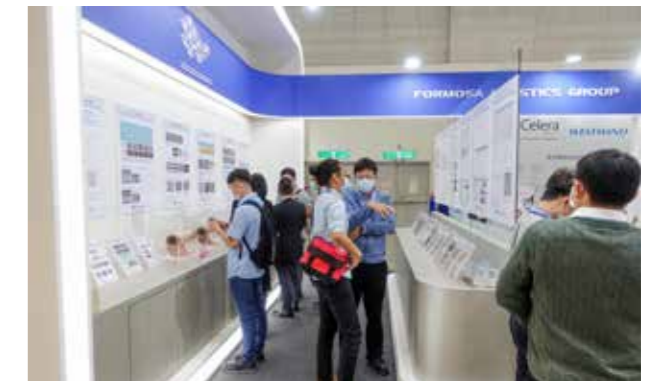
For polyester products, the sale of polyester products saw a drastic drop because the global economy was hit hard by the novel coronavirus pandemic in early 2020. However, as major countries restarted their economic activities and downstream brand companies resumed procurement, textile factories started to receive a large number of orders, especially orders for filament made from recycled PET bottles. With the adjustment of sales portfolio, the overall operation saw a significant improvement starting from the fourth quarter of 2020.

Because of the increasing awareness of environmental protection worldwide, there are unlimited business opportunities in recycling and the circular economy. NPC has been actively investing in the research and development of relevant products—those made with recycled materials from PET bottles, oceans, and textile, as well as biodegradable and green-energy products. It also expanded the application of fiber products to segment the market and to expand business scope; improved equipment; and made production adjustments in the hope of pursuing the optimal product portfolio and achieving profit growth.

In respect of electronic materials, the impact of the COVID-19 pandemic in 2020 gave rise to a new economy and new business opportunities such as the stay-at-home economy, and remote working and learning, which led to strong demand for computers, laptops, and network communication equipment. As a result, the market conditions in the electronic industry recovered month by month. Moreover, the demand for epoxy resins was strong because of China's policy support in wind power. Furthermore, starting from the fourth quarter, the automotive electronics market saw quick rebound while the market snapped up with supplies due to shortages in the overall supply chains. In addition, the volume and price of electronic materials were driven up by price hikes in copper. Therefore, the electronic materials recorded the highest revenue, with a significant increase in profit compared with 2019.

Countries will adopt stronger new energy vehicle policies in the future, which will accelerate the development of lithium batteries. Moreover, the promotion of the stay-at-home economy, 5G communications, vehicle panels, and innovative applications driven by the Internet will boost the demand for electronic materials and upstream raw materials. In light of this, NPC will leverage its comprehensive vertical integration between the upstream and downstream to accelerate the adjustment of production and sales strategies, respond to market development and trends through transformation, actively promote differentiated products, increase sales proportion of niche products with high added value and performance, flexibly adjust the production capacity in Taiwan and China in the hope of driving both revenue and profit growth again.

Nan Ya Printed Circuit Board Corp. (Nan Ya PCB), which is invested by NPC, has long been focusing on the development and production of circuit boards and IC package substrates. Being optimistic with the demand for 5G infrastructure, Nan Ya PCB has taken an advanced move in the development of related products. The



TPCA Show 2020

sales of advanced network communication substrates continued to grow in 2020, and the sales of graphic chip substrates was better than expected because of COVID-19 that led to the demand for remote working, conference calls, and the stay-at-home economy. In addition, the demand for System-in-Package substrates increased significantly as more applications became available, and semiconductor companies scrambled for production capacity due to insufficient supplies of high-end IC panels worldwide, thereby making 2020 a remarkable year for Nan Ya PCB after its transformation.

In response to the future development trend of semiconductors, Nan Ya PCB has actively strengthened its research and development capabilities and continued to expand the production capacity of IC packaging substrates to increase its production proportion of high-density interconnection boards for the purpose of meeting the market demand. In the future, Nan Ya PCB will work closely with customers to obtain more orders for niche products, increase the proportion of high-value products, and continue to optimize the manufacturing processes to improve yield, so that its operational performance will continue to grow. Moreover, the Kuanshan factory that will begin ABF production in the first quarter of 2021 is expected to help increase revenue and profit due to demand brought by AI applications and 5G network deployments.

Nan Ya Technology Corp., another company invested by NPC, is committed to the development,



..... Nanya Kunshan Plant

manufacture, and sales of dynamic random-access memory (DRAM) products. As the global economic development was affected by the outbreak of COVID-19 in 2020, the overall DRAM market condition worsened than expected. In addition, the China-US trade war affected the delivery of DRAM to some customers in China. Meanwhile, the significant appreciation of the New Taiwan Dollar also affected revenue and profit. In the face of unfavorable external factors, the Company still leveraged its technological independence and innovation. Also, the Company successfully introduced its products to data center customers in the United States, China, and Europe by optimizing the 20nm product portfolio and strengthening the application of server products, and gradually launched a number of low power products to expand and diversify product applications. In addition, the Company actively deployed its own technologies, completed the installation of trial production lines for the manufacturing technologies of the first-generation 10nm (1A), and began the trial production of the first 8Gb DDR4.

In 2021, the Company will continue to focus on 1A leading products in terms of the certification and mass production of 8Gb DDR4 and the trial production of the next-generation DDR5 and simultaneously accelerate the manufacturing technologies and product development of the second-generation 10nm (1B). Meanwhile, the Company will optimize the 20nm product portfolio and enhance competitiveness to provide customers with the best memory solutions. In addition, the expansion project for new production capacity is in progress. The Company's operational performance is promising because in the future it will gradually increase the capacity to meet the market demand and satisfy the diversified applications required by the market by launching new products through the advanced manufacturing process.

Looking forward to 2021, although the world is still affected by the pandemic, the economy and demand are expected to gradually recover as many countries have granted market approval of vaccines and started vaccination programs. The global economic outlook in 2021 is optimistic compared to that of 2020 because of the price hike in global crude oil and raw materials, along with 5G application and promotion.

In terms of the trade war, it is expected that it is difficult to change the landscape of the China-US confrontation. However, the United States, a country that is still suffering from the challenges posed by COVID-19, will mainly focus on policies to control the pandemic and revive the economy. Thus, it is still not clear that if the U.S. will continue imposing sanctions on China. However, the global economy will still be impacted if the China-US conflicts in trade and technology continue or move to the next level.

In addition, the Regional Comprehensive Economic Partnership (RCEP), which covers 30% of global GDP and population, was signed in November 2020. However, Taiwan is excluded from RCEP. If China, Japan, and Korea carry out tariff reductions, the petrochemical industry could be impacted the most. Although Taiwan may not be impacted significantly in the short term, it could be hit in the long run due to the regional magnetic effect.

With the complex global situation, maintaining stable growth and profit is still the most important goal. Therefore, NPC will seize the opportunities to develop technological innovation and application, environmental protection, and the circular economy. In addition to continuously strengthening the four business focuses, the Company will also enhance its market expansion, increase capacity utilization, reduce costs, strengthen research and development capabilities, and increase the proportion of differentiated and high-value products to achieve profit growth. Meanwhile, the Company will integrate the circular economy into process optimization, and constantly improve and upgrade the efficiency of existing equipment/production lines by introducing AI in order to create maximum benefit with minimum investment, attain intellectualization in the production process, and achieve the goals of reduction, reuse, and resource recycling.

In addition, the Company will further perfect and expand the electronic material industry

in terms of its integrity of vertical integration, supply stability, quality consistency, and product categories. The Company will strive to enhance the overall operating performance by taking electronic materials as the main driver for its core business.

In response to subsequent market demand, trade tariffs between the United States and China, and the localization of advanced materials, the Company will closely tap into market supply and demand through its diverse production deployments in Taiwan, China, the United States, and Vietnam. In addition to the new plant for ethylene glycol in Texas, USA, that has commenced production at the end of 2020, a number of investments will also be completed to start production this year, including high-value copper foil, polyester film, and high-end PP synthetic paper produced by plants in Taiwan, aluminum plastic film by plants in Nantong, China, and glass fiber by Huizhou plants. For the next several years, apart from the expansion projects of OL-3 plants in Texas and Louisiana of the United States through joint ventures, the Company also participates in the plant expansion projects for copper foil in Huizhou, China, and Bisphenol-A (BPA) in Ningbo. NPC will develop new products and increase production capacity based on the future market conditions to continuously drive the growth of the Company's business performance.



..... Circular Economy Conference and Exhibition- Green and low-carbon strategy application





## Formosa Chemicals & Fibre Corporation

.....  
In pursuit of the worldwide environmental trend, FCFC practice the circular economy by recycling and reusing emissions and wastes.  
.....



Chiayi Xingang plant

*The world was impacted by COVID-19 throughout 2020. With countries imposing lock-downs, demand on the market shrunk drastically. The price of crude oil collapsed, which drove a significant slide in prices of petrochemical products, too. Our consolidated revenue totaled NTD 253.3 billion, a decline of NTD 62.1 billion and 19.7% from the consolidated revenue of NTD 315.4 billion in 2019, mainly because of the reduction in the selling price by NTD 54.9 billion. In sales, thanks to the proper control of the pandemic, production and distribution were as usual in Taiwan. Plus the adequate grasp of business opportunities brought about by the post-pandemic stay-at-home economy, the sales of most products grew compared to those in 2019. Nevertheless, restricted by the epidemic prevention measures adopted in respective overseas facilities and the relatively slow recovery of the market for textiles, the overall sales saw a decrease of NTD 7.2 billion.*



*Chairman  
WenYuan Wong*

In terms of income, the consolidated pre-tax income of 2020 was NTD 24.8 billion, a decline of NTD 12.3 billion or 33.3% from the consolidated pre-tax income NTD 37.1 billion in 2019, which was primarily due to the combined decrease of NTD 10.3 billion in investment income and cash dividends under the equity method. Business income, on the other hand, showed a recovery starting in May despite the sluggishness over the previous four months because of the impacts from the pandemic and rendered only a decline of 7.1% or NTD 1.2 billion from 2019.

COVID-19 kept spreading throughout 2020 and the China-US trade war evolved to be a struggle among emerging powers, which, plus Brexit, completed signing of the RCEP, and the US election, among other issues, significantly impacted the global economy. It was originally hoped that the economy would slowly recover once the Stage 1 trade agreement was signed between China and the US to drive up demand for petrochemical products. The unexpected breakout

of COVID-19 at the end of January and its quick spread throughout the world, in addition to the subsequent lock-downs of borders and cities for the sake of keeping the pandemic at bay and the significantly reduced personnel and cargo flows led to stagnant demand and were a big blow to the global economy. The reduced production in oil producing countries also triggered a collapse in international oil prices. The Brent crude oil once hit the historical bottom of USD 19 per barrel in April, which further deepened the falling stream of prices of petrochemical products. Losses incurred from falling price and reduced demand of petrochemical products and falling price of inventory resulted in operational deficits for the Company in the first quarter. For the second quarter, thanks to the climbing demand for stay-at-home economy and epidemic prevention products, the Company adjusted its sales strategy and reinforced its inventory management. The operation started to show a turn from loss to profit in June.



..... 2020 TITAS Textile exhibition in Taipei

As the pandemic eased, governments gradually lifted lock-down measures and resumed economic activities and proactively introduced respective economic stimulus policies to save the sliding economy. The economy gradually bottomed out in the second quarter. Stay-at-home economy and revenge spending drove a come-back of demand on the market. Prices of the crude oil and petrochemical products slowly turned around. Despite the suppressed selling prices of some products as a result of new throughput from the Mainland, the Company held onto the business opportunities brought about by the stay-at-home economy and revenge spending. The operational performance in the third quarter was no longer impacted by the pandemic. With the market share maintained, the operation in the fourth quarter was even better than that in the third quarter.

As part of the consolidated revenue in 2020, the parent company's net revenue was NTD 123.6 billion, accounting for 48.8% of the consolidated revenue. Subsidiaries that contributed to the revenue included Formosa Industries Corporation in Ningbo, Formosa Industries Corporation in Vietnam, and Formosa Taffeta Co., Ltd., totaling NTD 129.7 billion, accounting for 51.2% of the consolidated revenue. Main contributors to the parent company's revenue are petrochemical and plastic products. Both combined had a net worth of NTD 113.6 billion, accounting for 91.9% of the parent company's revenue. Among them, petrochemical products totaled NTD 66.2 billion or 53.6% and plastic products NTD 47.4 billion or 38.3%.

Operational highlights of respective major products throughout 2020 included not only continued promotion of water and energy conservation and reduced unnecessary consumption and emissions to improve the circular economy but also proactive initiation of Ai-driven production in order to further enhance quality of products and reduce the costs and to hold onto new business opportunities brought about by the pandemic while deploying to meet the demand driven by post-pandemic new normal life and enhancing profits.

For aromatic hydrocarbon, SM, and phenol, the first and third aromatic hydrocarbon plants, and the SM plant in Mailiao completed multiple water and energy conservation improvements taking advantage of the annual inspection to effectively reduce energy consumption and enhance production efficiency. The first aromatic hydrocarbon plant completed the conversion to the new-generation transalkylation catalyst to improve reactivity and boost production efficacy. The third aromatic hydrocarbon plant completed multiple energy-saving improvements such as process optimization to greatly reduce the unnecessary consumption of steam. The SM plant in Mailiao completed water and energy improvements including multiple effect distillation (MED). In addition, the de-bottleneck improvement project began in 2020 for the Ningbo phenol plant in Mainland China. The annual throughput of phenol is increased from 300 thousand tons to 400 thousand tons to effectively enhance the operational performance and increase profits. Faced with the additional throughput from the Stage 2 Petrochemical Project in Zhejiang, competition on the market will become even fiercer in 2021. The petrochemical plant of the Company will continue to improve its process to be more energy-efficient and the AI technology will be combine process big data in order to optimize production management efficiency and to bring down the production cost in the face of challenges on the market.

In terms of PTA and PIA, the increased supply from the commissioned additional throughout in Mainland China drove down prices of products. Despite the constant devotion of new throughputs for downstream polyester in 2020, the stress brought about by supply surplus could not be covered to result in deficits. The PTA plant in Ningbo, with its optimal quality and steady lead time, has been trusted by customers. In addition, the processing cost has been significantly reduced following process transformation in 2018. The operating stress was slightly lower than that of plants in Taiwan. In 2021, the PTA and PIA in Taiwan will first satisfy the needs on the domestic market. For PTA exports, besides Formosa Industries Corporation in Vietnam, more New South-bound markets outside Mainland China will be explored. Full-volume production will be maintained for production lines in Taiwan and optimization of process in respective plants will continue to further drive down the processing cost. In addition, the new production line for PIA in Ningbo with an expected annual throughput of 200 thousand tons is scheduled for commissioning in the second quarter of 2021. Operationally, preemptive action has been taken to develop the potential customer base in areas without tariff barriers such as the Middle East and Russia to be prepared in advance for the sales to be fulfilled following the commissioning.

For plastic products, impacted by the pandemic, demand on the market shrunk for the first half of 2020. The demand for plastic pellets was weak. As the pandemic was gradually under control, however, demand for the new stay-at-home economic life surged. Global purchase orders returned to Mainland China again. The demand for plastic pellets showed an explosion following the suppression. The differences in prices between finished products and raw materials hit the historical height. Profits of plastic pellets set new records in PS and ABS. The unprecedented profits were created by plants in both Taiwan and Ningbo. 2021 is expected to be another harsh year due to the global pandemic and hence the



..... WenYuan Wong, Chairman of FPG, and Vice President, Ching Te Lai, visited the event

rigid demand brought about by the stay-at-home economy is expected to remain steady. Faced with the rapid expansion of plastic productivity in Mainland China, we will expedite the production and distribution transforming cage change program to maximize the sales of high-value differential product and decentralize the market. In 2021, the sales of special PS products will climb from 46.1% to 50%. High-tone, refrigerator sheets, and sink plates will all be prioritized. In terms of ABS products, the sales of special ABS products from Taiwan plants will be enhanced from 35.3% to 45.6% in 2021 and the sales will be focused the increase in high-value special products. With the expanded productivities from the composite plants in Mailiao and Xingang, the production volume of composite PC/ABS products will be increased to 6,400 tons/month and above. The sales of special products from the PABS plant in Ningbo accounted for 27.3% in 2020. As business operation staff and technicians continue to promote application of the products, the sales will be smooth and are likely to continue with the growing streak.

In terms of PP products, the sales of special products in 2020 already reached 49.5%. To further maximize the market share, the goal is to have the overall product sales to grow by 5.5%. Special products need to account for 51.8%. High-quality and high unit-price medical device materials and development towards high liquidity and light weight will continue to be promoted. In 2020, they were successfully introduced and applied to



..... Sharing the same vision with ESG, environmental protection and social responsibilities are highly valued within the Group

new models of Toyota cars and the promotion of composite materials on the automobile market will continue in order to enhance the value added of the products. As far as the PC products are concerned, the sales of special products accounted for 20.5% in 2020 and started to be out of the red after the pandemic eased for the second half of the year. In 2021, the high-value strategy for the PC sector will be continued and efforts will be made to decentralize the market, maintain the good reputation on the market, and proactively work with customers in fulfilling their production and distribution demand. The target in the sales of special products is 30%.

In textiles and fiber products, impacted by undesirable factors, such as the pandemic for the plants in Taiwan and Vietnam and the price cut competition in the exportation of textile products from Mainland China, the sales of yarn and Rayon cotton dropped in 2020 from 2019. Although the revenue and profitability remained undesirable, by proactively holding onto business opportunities, the activation rate and the production and distribution volume returned to the pre-pandemic levels in the fourth quarter of 2020 for Rayon cotton and short-fiber yarn. Deficits dropped each month for the plant in Taiwan and the plant in Vietnam took a turn from loss to profit in October and they were making efforts to increase the sales of differentiated yarn such as environmentally-friendly yarns and anti-bacterial yarns in the

pursuit of the best sales income combination. Rayon cotton, on the other hand, targets high-value products and development of new markets as the operational priorities. In addition, nylon products saw a turn from loss to profit in the fourth quarter after organizational restructuring in 2020 where the production and distribution structure was adjusted in an effort to expand shares of high-value products such as nylon engineering plastic pellets, recycle environmentally-friendly silk and color silk. In the future, to go with the prevailing green, environmental protection, recycling, and re-generation trends, the ratio of green products will be enhanced. Developments will prioritize the production of differential products such as environmentally-friendly silk and color silk with recycled waste fishing nets; brand distribution networks will be combined; the production demand of downstream customers and prevailing trends on the market will be taken into consideration; and the production and distribution plan and the production model will be adjusted to form a marketing system combining the upstream, mid-stream, and downstream.

Our company highly values environmental protection and social responsibilities as always in terms of ESG corporate governance. The best available control technology (BACT) continues to be adopted for pollution preventing equipment. The Company was the first in the country to realize clean emissions and elimination of white smoke generated by its co-generation units in May 2019. The emission quality is comparable to that of a natural gas unit. Meanwhile, there is the real-time bulletin board set up outside each plant to facilitate supervision by residents in the neighborhood. In addition, in honor of the belief in circular economy, energy conservation and emission reduction were promoted to reduce carbon emissions and to make utilization of water resource sustainable, fulfilling the Company's corporate social responsibilities. The AI technology was introduced to enhance energy conservation improvement efficiency. By 2020, the Company had invested accumulatively up to NTD 12.9 billion in the promotion of energy

conservation and emission reduction; 5,297 projects on improvements were completed, saving a total of 98,100 thousand tons per day of water in total and steam of 1,070 tons per hour, electricity of 128,000 kWh; the benefits combined totaled NTD 11.1 billion.

To enhance the emphasis over safety, health, and environment management, the Sustainable Safety Mechanism Group was established in August 2019 to take charge of not only promoting environmental protection-related business but also exploring blind spots in industry safety management and eliminating hidden industrial safety risks at further depths as well as reinforcing awareness of safety among the employees to boost occupational safety. The plant in Mailiao was awarded the "2020 Outstanding Workplace" from the Ministry of Health and Welfare. In 2021, promotion will be focused on human-centered essential safety management from scratch for comprehensive improvements. Outstanding cases will be released on a quarterly basis of PHA, ISA/SOP, MOC, and false alarms to fulfill the experience-sharing purpose and educational training for contractors and employees will continue to be enforced while working towards zero hazards.

For the purpose of sustainable management, the Company continues to make investments. Expansion of the phenol plant in Ningbo was completed in 2020 and the throughput has been enhanced from 300 thousand tons to 400 thousand tons a year. The annual throughput of composite materials of the three plants across the Taiwan Strait under the Plastics Department combined reached 132 thousand tons. In 2021, efforts will be made to add 250 thousand tons to the existing capacity of the ABS plant in Ningbo, to expand the annual production volume of the PTA plant to 1.5 million tons, to build a new PTA plant with an annual capacity of 200 thousand tons. The most advanced production technologies are exclusively adopted for the new plant, which is unparalleled in the industry. For the Petrochemical Plant in

Louisiana, USA, however, the construction pace has slowed down due to impacts from COVID-19 and will be continued as soon as the pandemic dies out or the administered vaccines show extensive effectiveness.

The pandemic is likely to remain throughout 2021. Experienced preventive measures and vaccination in full swing, however, will help the economy pick up in speed towards recovery. The demand for crude oil will gradually stabilize and the steadily climbing oil prices will support prices of petrochemical products. The proactive policies adopted in Mainland China, such as dual circulation based primarily on the domestic cycle and new infrastructure construction meant to comprehensively maximize domestic demand, given its relatively stable condition in the midst of the pandemic compared to that in Europe, the United States, and India, also expedited the comeback of the petrochemical industry; it is conducive to the Company exploring business opportunities.

Nevertheless, there are many other pending challenges, such as the China-US trade conflicts, the mushrooming petrochemical production capacities, and the signing of the RCEP, among others, facing the Company. The stay-at-home economy catalyzed by the pandemic and the growing demand for epidemic prevention products, however, have brought about business opportunities under the new normal lifestyle. The Company will continue to hold onto the opportunities and deploy ahead of time and reinforce differentiation and high-value nature of its products, keep only the best under its production and distribution structure, and apply the AI big data for enhanced production and management efficiencies. Meanwhile, efforts will be continued in the promotion of comprehensive recycling of emissions and scraps for re-use and the practice of circular economy in response to the world trends.



# Formosa Petrochemical Corporation

By introducing digital technology along with current existing flexible logistics, FPCC further improved operational and production efficiency.



FPMC C Intelligence (DWT 301,861), VLCC arriving at Mailliao Harbor

*In 2020, FPCC generated NTD 415 billion in sales revenue, a 35.7% decline compared to NTD 646 billion in 2019; consolidated earnings before tax was NTD 8.7 billion, an 80.7% decrease compared to NTD 44.9 billion in 2019. EPS came in at NTD 0.78.*



**Chairman  
Bao-Lang Chen**

## Foreword

In 2020, COVID-19 pandemic disrupted political and economic strategies around the world. Though border control and city lockdown were implemented in order to slow down the spread of the pandemic, both economic and social activities were inevitably halted. As a result, plummeting demand caused collapsed oil price, weak product spread and the huge amount of inventory loss all contributing to the shrinking profit.

Under this difficult circumstance, FPCC subdivided workforce flow and held emergency response conference twice a week in order to track global outbreaks of COVID-19 and product margin, thereby adjusting production and sales model. Besides, FPCC managed the industrial safety and environmental protection more strictly to ensure the stability of production process. Eventually, business activities took place in the recovery phase in the second half of 2020, then FPCC turned a loss into a profit.

## Business Management

### (1) Petroleum Production Business

To reach the maximum profit, FPCC's refining business manipulates the production rate of each oil product instantly bases on the price differential.

Daily throughput of crude oil reached 374,000 barrels in 2020 (-22.2% YoY). The decline mainly resulted from weak demand amid COVID-19 pandemic and accident at RDS#2.

Seeking to increase sales volume and expand domestic market share remains to be FPCC's priority. Although most of promotion events were canceled due to the pandemic, FPCC is continuously adopting digital-channel to enhance brand awareness and promote 95+ unleaded gasoline to people of all ages. Apart from the existing sales channel, FPCC franchised Mech-Smile to increase customer base and cooperated with the government's relief package to organize event with TAXI unions.

With regards to the foreign sales, due to the COVID-19 pandemic, global oil demand fell sharply in 2020. FPCC exported gasoline at 1.8 million kiloliters (-45% YoY) and exported gasoil at 6.8 million kiloliters (-29% YoY).

In the first half of 2020, the collapsed oil price caused a large inventory loss. In addition, narrow product spread and low refinery margin were all in consequence of the global pandemic. As a result, annual profit decreased compared to 2019.



..... Continuously raising market share and increasing customer awareness

## (2) Basic Petrochemical Materials Business

Basic Petrochemical Materials business is deemed as the upstream plants in the vertical production chain which supplies raw material to downstream units constantly. By utilizing economy of scale, cost advantage along with flexible feedstock usage to achieve optimized production arrangement, FPCC demonstrated the benefits of up and down stream collaboration. In 2020, the production volume for ethylene was 2.961 million MT, a 1.4% decrease compared to 2019.

Owing to the COVID-19 pandemic, feedstock and petrochemical price dropped significantly in the first half of 2020. Although there were several factors such as hurricanes in United States, LG cracker accident in South Korea and decreased infection rate in China help to ease the oversupply market, overall global demand has not yet returned to pre-COVID level. Therefore, the profit in 2020 remained less than 2019.

## (3) Utility business

With a total installed capacity of 2,750MW, the primary mission of our cogeneration units is to offer stable and sufficient power to all units within the Mailiao complex. To reduce air pollution emissions, FPCC is not only devoted to improving the efficiency of turbine generators but introducing the most advanced technology to raise the efficiency of pollution prevention.

Because of the equipment upgrades against pollution, the scheduled maintenance periods were longer than that in 2019. While the decline of steam selling price caused revenue and sales volume to shrink, the overall profit increased compared to 2019 since the feedstock cost dropped with the plunge in coal price.



..... Refinery in Mailiao

## Domestic and Overseas Investment

In recent years, FPCC keeps forming strategic alliances with overseas companies toward high-valued and emerging businesses. With regards to high-valued business, a HSBC project with JV company, Kraton, produces 40,000 MT HSBC annually. Additionally, a joint venture with Japan-based Idemitsu Kosan Co. Ltd, establishing a 43,800 MT annual HHCR production capacity started commercial operation in 2020. For emerging business expansion, a joint venture project with Japan-based Nikkiso Co. Ltd, was established in 2018. This project combines UV LED technology to innovate various sterilization products which made a splash during the COVID-19 outbreaks.

Regarding the overseas investment business, FG LA sunshine Project located in Louisiana has begun construction after receiving an air permit in January 2020. Even though the project was

delayed due to COVID-19, FPCC will manage the project progress in accordance with the pandemic status.

## Corporate sustainability

FPCC goes on widening the applications of AI technology and Big Data system across production, and safety management. In 2020, we completed 10 projects regarding AI and Big Data applications such as tracking and adjusting process parameters, and building process models to achieve quality prediction and automatic execution. Through process optimization, we aim to provide products meeting quality requirements with lower energy consumption.

In 2020, FPCC finished a total of 214 improvement cases regarding water-saving (3,097 tons per day), energy-saving (5,448 KW per hour), and greenhouse gas emission reduction (210.2 KT per year). We received awards from



..... Energy and Water conservation cases sharing

two authorities, Industrial Development Bureau, as well as Water Resource Agency, Ministry of Economic Affairs, R.O.C. for contributions toward gas emission reduction and water conservation. Furthermore, the permit of construction seawater desalination with a capacity of 100 thousand tons per day was received in August 2019, and the trial run is expected to start in the second half of 2022.

Concerning air pollution prevention and control to comply with the IMO 2020 regulation, Mailiao port has required all the vessels either entering or departing shall be LSFO-fueled. The port also completed the construction of shore power system allowing docked vessel to stop burning gasoil, thereby reducing the sulfide emission. Besides, to continue controlling the air pollution, the following two improvement projects have completed in January 2021: the wet electrostatic precipitators were installed for lowering the emissions of PM2.5 and meeting the minimum emission standards while the heat

recycling was meant to eliminate the white smoke from co-gen units.

### Operating Sales Goals

In 2021, our estimated sales volume for gasoline and gasoil are 4.478 million KL and 8.525 million KL respectively. For export, FPCC proactively cooperates with oil majors and trading houses to expand our gasoline market shares in Singapore, Middle East, and Indonesia. New Zealand and Australia are also included but more inclined to raise the gasoil sales.

In respect to petrochemical products, the expected sales volumes of ethylene, propylene, and butadiene are 3.139 million MT, 2.442 million MT, and 433 thousand MT respectively. As for the Utility division, the key role is to provide consistent electricity and steam to meet the demand of all units in the Mailiao complex.

### Outlook

In 2021, the roll-out of the COVID-19 vaccine shed light on easing the spread of the virus. The global economic recovery together with the revival of oil and petrochemical demand will all boost product margin. But the uncertainties still surround the pandemic, global economy, and geopolitical risk. What's more, the rising awareness of environmental issues around the globe has resulted in much stricter environmental regulations and the promotion of renewable energy. These are the conditions that we are encountering, which should also be taken into account when we adjust our business strategy.

FPCC continues to raise the level of global competitiveness. By introducing digital technology along with current existing flexible logistics, we further improved operational and production efficiency. Also, we are all more than aware of the ever-growing environmental policies. To adapt to the changes, currently, we are in the process of unit updates and studying the feasibility of building renewable power plants.

The unprecedented impact caused by COVID-19 offered us an opportunity to refine ourselves. We, staying devoted to our core business, believed that what we had experienced last year will surely lay parts of our foundation towards a sustainable corporation.



..... Expand the application of AI technology and big data so as to optimize product structure, increase equipment reliability and reduce occupational accident



## Formosa Plastics Group-US. Operations

.....  
FPG U.S. is implementing artificial intelligence (AI) and other related technologies to improve product quality and production/sales management performance.  
.....



**New Ethylene Glycol II plant  
in Point Comfort, TX**

*Formosa Plastics Group - U.S. Operations consists of Formosa Plastics Corporation, U.S.A. (FPC USA), Nan Ya Plastics Corporation USA (NPC USA), and Nan Ya Plastics Corporation, America (NPCA). In 2020, the total revenues for this group of companies were USD 4.4 billion, which represents a 13.7% decrease from the USD 5.1 billion in revenues achieved in 2019. The main reason for the decline was the widespread Covid-19 pandemic in the United States. Since March, cities have been locked down due to emergencies, causing economic activities and product demands to drop dramatically. Commodities prices, including crude oil and its downstream products, fell sharply in the first half of the year. In addition, several new olefin and polyolefin plant expansions in the past couple of years caused the U.S. petrochemical industry to face the dilemma of an imbalanced market and drastic price changes in 2020 under those significant impacts by the pandemic. The overall economy of the U.S. has fallen drastically, and the real GDP decreased by a record 3.5% in 2020, which has reflected the deepest recession since the Great Depression in the early 1930s.*

Production continues to follow the company's core vision of sustainable business management and continuous improvement. All plants had executed the annual turnaround and also conducted comprehensive and in-depth critical equipment inspections. Therefore, the overall operating rate was reduced to around 70% in 2020. Furthermore, the company has continuously made every effort to improve product quality, process, production efficiency, benchmarking with industry peers, etc. We believe these efforts will contribute to an advantage in cost positions and competitiveness in the North American marketplace.

In the Olefins and Polyolefins segment, our oil & gas operations were supplied with natural gas, ethane, and propane by the spot market. In 2020, our olefin crackers produced 3 million metric tons of ethylene and 390,000 metric tons of propylene. Polyolefin operations had 1.73 million metric tons of polyethylene (PE), and 920,000 metric tons of polypropylene (PP) produced. Besides, the HDPE3 plant (own by Formosa Plastics Taiwan Co., Ltd.) made 440,000 metric tons of PE products.

For the Chlor-Vinyl segment, the FPC USA Utility Venture's power plant generated electricity

to electrolyze brine to produce 1.06 million metric tons of caustic soda and chlorine. These materials were used by our ethylene dichloride (EDC), vinyl chloride monomer (VCM), and polyvinyl chloride (PVC) operations to produce 1.46 million metric tons of PVC resin. Using a portion of the resin, NPC USA made 78,000 metric tons of rigid PVC film, and NPCA had 48,000 metric tons of flexible PVC film produced.

In the PET/Fiber segment, FPC USA supplied the ethylene for NPCA to produce 390,000 metric tons of ethylene glycol, 860,000 metric tons of polyester derivatives, and NPC USA to produce 11,000 metric tons of PET Rigid Film.



..... Glycol Railcar loading stations  
in Inland Traffic, TX



..... Olefins III Plant in Point Comfort, TX

Our marketing strategy is to balance production and sales, with the key focus on North American customers and export as a corresponding outlet. In building customer relationships, we strategically selected specific product grades to expand our customer base and formed several partnerships through research and new product development. In North America, we focused on high-growth, high-profit margin segments across customers of different sizes. We already set up regional bonded warehouses and storage stations in Europe, Taiwan, and Korea to support our capacity expansions. In 2020, we achieved the sales target of 10,000 metric tons of polyolefin products per month in these areas. Besides, we continue to grow in Mexico, Central America, and South America by taking advantage of low freight costs.

Looking forward to 2021, the demand for bulk commodities should strengthen as more people become vaccinated, and the petrochemical commodity prices are expected to rebound. According to the newest IHS projection, United States GDP will reach more than 4% growth during the second half of this year. However, with the global situation of the Covid-19 epidemic remaining unpredictable, the overall demand growth among the petroleum and petrochemical industries will still be ambiguous, and the possible inflationary pressures may impact the global growth as well. Hence, it is expected that the situation in 2021 is still not optimistic, and the

overall strategy still needs to be cautious and conservative.

Regarding FPC USA's phase 4 expansions, the High-Density Polyethylene III plant, Olefins III plant, and Lolita Packaging plant have been fully commercialized into routine operation in the second half-year 2019. The Low-Density Polyethylene and Ethylene Glycol II plants have successfully started up in the fourth quarter of 2020. These new expansions will further improve the overall polyethylene and polyester product portfolios, which will enhance the competitiveness of the company.

FPG U.S. operation has always had a core management goal of ensuring sustainable operation and growth. Achieving this goal relies heavily on our continuous efforts to emphasize environmental and safety management, long-term human resources training, and staff quality improvement. We are implementing artificial intelligence (AI) and other related technologies to improve the product quality and the performance of the production/sales management. In the meantime, we will continue to enhance the customer-oriented sales service and management functions - by focusing on long-term customers who demand excellent product quality and services. Ultimately, we believe these implementations will improve our global presence, increase profitability and grow the market share.



## Other Investments

*In addition to these four major corporations, the Formosa Plastics Group has many other affiliates.*

### Our domestic affiliates include:

NanYa Technology Corp., Nan Ya Printed Circuit Board Corporation, Formosa Sumco Technology Corp., Formosa Taffeta Co., Formosa Advanced Technologies Co., Formosa Heavy Industries Corp., Mailiao Power Corp., Formosa Daikin Advanced Chemicals Co., Ltd., Formosa Asahi Spandex Co., Hwa Ya Power Corp., PFG Fiber Glass Corp., Formosa Environmental Technology Corp., Formosa Idemitsu Petrochemical Corp., Formosa BP Chemicals Corp., Formosa FCFC Carpet Corp., Formosa Oil (Asia Pacific) Corp., Formosa Plastics Transport Corp., Formosa Plastics Marine Corp., Nan Ya Photonics Inc., Formosa Biomedical Technology Corp., Formosa Technology Corp., Formosa Lithium Iron Oxide Corp.,

### Our overseas affiliates include:

Formosa Plastics Corporation, U.S.A., Nan Ya Plastics Corporation, USA, Nan Ya Plastics Corporation, America, Formosa Ha Tinh Steel Corporation and P. T. Indonesia Nan Ya Indah Plastics Corporation. FPG's investments in Mainland China include Formosa Plastics Corporation, Nan Ya Plastics and Formosa Chemicals & Fibre Corporation.



..... Formosa Plastics Marine Corporation



..... Formosa Ha Tinh Steel Corporation





Non-Profit Organization—Medical Care  
**Chang Gung Memorial Hospital**

By integrating teaching, research, services and sound management, Chang Gung Memorial Hospital (CGMH) have created an institution that serves the public as we strive toward upgrading the level of medical care and enhancing the well-being of the society.



Taoyuan City Mayor Cheng Wen-tsan was welcomed to visit Chang Gung Memorial Hospital-the Smart Hospital.

*In order to achieve the goal of “service quality improvement and appropriate medical cost control” , Chang Gung Memorial Hospital has continuously evaluated Taiwan's environment and needs with the exploration of each core problem for more than 40 years. Patient orientation is our central belief to develop environmental innovation and high-quality medical care. Taking good use of limited resources maximizes the effectiveness and the contribution with unstoppable progress of Taiwan's medical standards.*

Established in 1976, Chang Gung Memorial Hospital (CGMH) is now in its 45rd year of operation. Adhering to the belief of “What is Taken from the society is to be used in advancing the interests of the Society” , we have overcome numerous obstacles during that timeframe. By integrating teaching, research, services and sound management, we have created an institution that serves the public as we strive toward upgrading the level of medical care and enhancing the well-being of the society.

1. Teaching

As a teaching hospital, we have launched cooperative programs with Major medical schools in the country to provide their interns with clinical training. We have also developed a highly respected resident training system designed to nurture highly competent attending physicians in in different specialties. In 2020, 208 residents finished their training program at CGMH for promotion to Attending Physician. Over the years CGMH has graduated over 4,218 students to achieve excellent Performance in their respective careers in the medical profession.

2. Research

To encourage R&D, we provide funding for clinical research, basic Medical research and international studies for our medical, nursing, technical and administrative staffs. In 2020 we conducted more than 3,211 medical research projects under the Ministry of Science

and Technology and Ministry of Health and Welfare. In addition, we provided Funding of NTD 3.7 billion, published nearly 2,896 papers in domestic and International journals and supported international studies for 33 research staff personnel.

3. services

As one of the biggest general hospitals in Taiwan, both our facilities and our level of health care are on par with first-rate hospitals around the world. By the end of 2020, we offered 9,000 beds with health care services provided by over 25,300 employees. In 2020 we served over 8.53 million outpatients and admitted almost 277,000 patients for inpatient services.

4. Management

To achieve the goal of enhancing service quality and controlling Medical costs within reasonable limits, for over 44 years we have Constantly evaluated local conditions and needs, inquiring into the root Of every problem. With patients at the center of our mission, we have embraced innovations allowing us to provide the best possible medical care, to make the most of limited resources and to enhance the quality health service in the country.

In terms of management, we follow the belief of Founder Wang and the spirit of ‘inquire into the root of the matter and aim at the sovereign good’. In terms of service, one out of every three



... President Tsai Ing-wen expresses her gratitude to Linkou Chang Gung Memorial Hospital for its great effort during the Covid-19 epidemic

people in Taiwan has been a patient of CGMH. In terms of teaching, one out of every four doctors in Taiwan has been trained by CGMH. In terms of research, we publish over 2,800 papers a year in world leading medical journals. We search for excellence in every aspect, establishing CGMH in the world arena.

Following the Founder, Mr. Yung-Ching Wang's idea, Chang Gung Medical Foundation has dedicated ourselves in consolidating work flows, human resources and facilities with technology to assist the operation and improve the quality of medical service. We have also made efforts to implement Electronic Medical Record and Smart Hospital policies in order to enhance medical information security, becoming the first private medical system to acquire ISO 27001 Certification. Chang Gung Medical Foundation will continue the use of Informatization as a systematic strategic tool, becoming a tech-savvy and information-based organization.

Linkou Chang Gung Memorial Hospital has become the first hospital to pass the Stage 7 field certification on the Electronic Medical Record Adoption Model (EMRAM) of Healthcare Information and Management Systems Society (HIMSS). The level of Informatization is highly appreciated and approved by the committee

representatives of third party verification entities. There are seven major applications in medical care processes, such as paperless, structured data, closed-loop management, clinical decision making support, business intelligence (BI), information security, and data exchange, helping patients to be treated safely, keeping us aiming for excellence to make sure that the patients and their family will get the best medical service.

Since 2004, Chang Gung Medical Foundation has started implementing Electronic Medical Record to assure the quality of recording, preserving, using and maintaining the medical records in the foundation. We also follow the "Methodology of Preparing and Managing Electronic Medical Record in Medical Institutions" to implement paperless medical records. We have also drawn the "Medical Records Hierarchical Preservation Policy" to regulate the preservation, read, and replication process, ensuring the proper protection of patients' privacy and the rights to access medical service. reaching the 100% paperless target in the end (excluding forms from outside entities and documents that require patients' signatures). The entire foundation has reduced the total cost of NTD 180 million and may preserve the time to care the patients, improving the efficiency and quality of medical work flow.

During this pandemic, Chang Gung Memorial Hospital rapidly established an epidemic prevention integration platform to connected the travel contact history data from cloud system of Taiwan's National Health Insurance (NHI) and collected TOCC (Travel history, Occupation, Contact history, and Cluster history) data from patients and employees. The internal medical information system can integrate the above data and remind medical staff of the patient's TOCC history during medical process.

The application of business intelligence (BI) monitors all patients in nursing stations, and verify

examination reports to track patients with fever and lung infiltration. The suspected patients will be isolated at the first moment to prevent nosocomial infection. Besides, the hospital applies intelligent technology to achieve goals in all aspects, such as inventory control and abnormal monitoring of materials, online video conferences, and telemedicine.

In the area of organ management, we continue to promote the Concept of organ donation and perform organ transplants. In 2020 CGMH received organ donations from 113 people and performed organ transplants that included 110 cornea cases, 8 heart cases, 13 lung case 80 kidney cases (include 30 case of vivo transplant), 184 liver cases (include 148 case of vivo transplant). The hospitals also handled 1 anatomical pathology cases, and 7 body donations.

CGMH has also been active in providing advanced social services. In 2020, CGMH provided relief to over 3.35 million patients, CGMH have taken an active part in Social welfare such as Charity project of sport medicine, Mobile health care project for rural schools in Yilan County, The protection of children and youths program, Health care system of communities in Yunlin County, Telemedicine service, Medical volunteer programs by employees, etc. representing An outlay over NTD 720 million from our social service fund.

Our facilities have expanded our service area and fulfilled the aspiration of Founder Wang to care for both the young and the elderly. For example, recognizing the specialty services for children in Taiwan were inadequate compared with those offered in other advanced nations, CGMH established children's hospitals in Linkou and Kaohsiung in 1993 and 1995, respectively. These hospitals have trained pediatricians of various sub-specialties and treated numerous acutely or critically ill children in these regions. In addition, in 2003 we established a hospital for patients with Chronic illnesses and a nursing home in response to

the aging population in Taiwan, where over 16% of the population is over the age of 65 and face a lack of long-term care facilities. Other efforts to address this issue included the establishment of a health culture village to provide the elderly with proper and comforting care. Given that medical resources in Taiwan were relatively scarce in the Chiayi and Yunlin district, in that community we built Chiayi and Yunlin branch that opened in December 2001 and December 2009.

For the proper care of cancer patients and to protect people health, we invest billions of dollars to set up the Asian first and largest Proton radiation therapy center at Linkou Y.C.WANG Center for Advanced Medicine. Had started service since Nov 2015; We have also set up YUNG-CHING Premier Cancer Therapy Center and provided proton radiation therapy at Kaohsiung branch since Oct 2018. In the view of Founder Wang, after five thousand years of development Chinese medicine is an invaluable asset that reflects the amalgamation of wisdom and experience of our ancestors and warrants being carried forward. thus, in 1996 we became the first among large medical centers to set up a Chinese medicine department at our Linkou medical center and started at our other centers. In practice, we will unite the concepts of Chinese medicine with modern scientific techniques and methods of Western medicine to care for the health of the public.



*Non-Profit Organization—Education*  
**Chang Gung University**

.....  
 Chang Gung University will keep enhancing teaching and research in various fields, continue working on industrial innovation, and facilitate academic exchanges with international institutions in response to social demands and trends.  
 .....



Chang Gung University Campus

*From the very beginning of the establishment, Chang Gung University has been planning long-term curricula and academic research programs under the educational motto of “Diligence, Perseverance, Frugality, and Trustworthiness” . These endeavors have helped the university achieve its goal of “combining theory and practice in education programs” . In addition, efforts have been made in pursuit of excellence in instructions and academic research and long-term promotion for holistic education of its students.*

Chang Gung University was established in April 1987 under the name of Chang Gung Medical College, with the aim of preparing future outstanding medical professionals. In order to support the economic development of the nation, Chang Gung Medical College later introduced the engineering and management programs to prepare young talents in these fields, and was renamed to Chang Gung College of Medicine and Technology. In August 1997, the Ministry of Education formally approved the name change to Chang Gung University. At present, Chang Gung University has three colleges: Colleges of Medicine, Engineering and Management and includes 19 departments (including the Bachelor Degree Program of Artificial Intelligence), 2 bachelor's degree programs (Bachelor Degree Program of Medical Science and International Program of Health Informatics and Management), 23 master's programs, 7 master's degree programs, 12 doctoral programs, and 1 doctoral degree program.

From the very beginning of the establishment, Chang Gung University has been planning long-term curricula and academic research programs under the educational motto of “Diligence, Perseverance, Frugality, and Trustworthiness” . These endeavors have helped the university achieve its goal of “combining theory and practice in education programs” . In addition, efforts have been made in pursuit of excellence in instructions and academic research and long-term promotion for holistic education of its students.

There are 573 full-time and 623 part-time faculties and preceptors currently. CGU has 6,811 students, including 5,099 undergraduate students and 1,712 postgraduate students. In addition to classroom learning, students are required to participate in various internships and cooperation programs with Formosa Plastics Group, Chang Gung Memorial Hospitals and other institutions in order to achieve the goal of “combining theory and practice” . There are plenty of opportunities for various practical training or work-study programs available to students during semester breaks. These programs are designed to allow them to gain working experience and to develop proper working ethics before graduation. The university has also introduced over 29 academic programs, including the Biomedical Engineering Program, the Interdisciplinary Long-term Care Program, the Creative Intelligent



..... AI Innovation Research Center



..... Molecular Medicine Research Center- Orbitrap Fusion Lumos Tribid Mass Spectrometer

Business Platform Program , the Reliability Science and Technologies Program, the Clinical Trials Research Program, the Program of IOT and Bioelectronics Applications, the Smart Manufacturing Program, and the Artificial Intelligence Program, just to name a few. These programs are also available to the students who desire to develop additional expertise or secondary specialty in addition to their major programs. Graduates of Chang Gung University have proved their abilities and competence at work or during their advanced studies; they also are well liked by their employers because of their devotion and ethics displayed in the workplace.

With annual research funding of nearly 1.4 billion dollars, Chang Gung University's core research fields consist in biotechnology, medicine, engineering, and management. Besides continuing to research and develop key technologies in many disciplines, CGU's interdisciplinary research centers also help resolve global and domestic

important issues by responding to the socio-economic development, change, and need. CGU has delivered stellar results. For example, at the onset of the COVID-19 outbreak, the Research Center for Emerging Viral Infections joined the National Pandemic Prevention Team and collaborated with international research teams to fight the pandemic. Another example is The Application of Pressure Sensor developed by the College of Engineering. This project was included in the Semiconductor Shooting Plan of the Ministry of Science and Technology, and its paper was listed among the 100 most downloaded papers from Scientific Reports in 2018. In terms of the overall academic performance, CGU was ranked 25th in the ARWU's Global Ranking of Academic Subjects 2020 – Nursing, which has topped all universities in Asia for 4 years in a row. Furthermore, CGU was ranked by the Global Views Monthly as No.1 in academic research among all private universities in Taiwan. In addition, according to the University Impact



..... Microscope Center -Transmission electron microscope

Rankings of the Times Higher Education (THE), CGU was listed as No.10 in the world (No.2 in Taiwan) in Good Health and Well-being (SDG3), and among top 101-200 in the world (No.4 in Taiwan) in Partnership for the Goals (SDG17).

Chang Gung University places emphasis on the equal development of morality and literacy, professional abilities integration between the individual and groups, and harmony between body and mind. Students are expected to develop into well-balanced individuals by following the “Learning by doing” philosophy. Besides, indicators including caring and giving, teamwork, humanity and art, self-reflection, self-discipline, and innovation and progress, etc. are used to measure the effect of holistic education. These endeavors are made to ensure our students to transform into individuals who have balanced development in all aspects, have moral integrity, and maintain their principles.

Chang Gung University aims to develop into a top-notch university with distinctive global vision. The University will keep enhancing teaching and research in various fields, continue working on industrial innovation, and facilitate academic exchanges with international institutions in response to social demands and trends. In addition, the university will persist on edification of its students by encouraging them to care for humanity and to devote themselves to serve. The university's mission is to educate good young generation to develop sound personality, to acquire specialized knowledge and skills, to possess excellent learning capabilities, and to believe in lifelong learning.



*Non-Profit Organization—Education*  
**Chang Gung University of Science and Technology**

.....  
 Founded to support commitment to humanity and integrity, The University's vision is to be, in every aspect of health care, the highest-quality school and the source of the highest-quality nurses entering the field.  
 .....



**Chang Gung University of Science and Technology Campus**

*The Chang Gung University of Science and Technology began in 1988 as a two-year nursing junior college. It was founded by Mr. Yung-Ching Wang and named after his father. The University, with the aims of elevating the quality of medical and nursing practices and fostering nursing professionals in Taiwan, commits itself to nurturing in its students such qualities as endurance, reliability, diligence and sincerity. Indeed, these four words are the motto of the University.*



..... Gallery of CGUST History

In 1989, an evening nursing degree program was launched, followed by a five-year junior nursing program in 1991. In 1996, the two-year Child Care and Education Program was established. In 2000, the Department of Information Management was created. Two years later, in 2002, the school was upgraded by the Ministry of Education from a Junior College to an Institute of Technology. In order to respond to a growing demand for medical and nursing services in the Chiayi and Yunlin areas, the additional Chiayi Campus was established in January 2003. In 2006, two new departments were established: the Department of Cosmetic Science on the original Linkou campus, and the Department of Respiratory Care on the Chiayi Campus. To cope with a rapidly growing elderly population and to meet the changing needs of senior citizens, the Department of Geriatric Care and Management was founded in September 2008. In the same year, the Graduate School of Nursing (Chiayi Campus) was also launched. The Department of

Nutrition and Health was founded a year later, in 2009. In August 2011, Chang Gung Institute of technology CGIT was transitioned to Chang Gung University of Science and Technology (CGUST). Graduate Institute of Health Care was founded in 2012, Graduate Institute of Health Industry Technology was founded in 2013, and the following year, Graduate Institute of Nursing (Linkou Campus) was inaugurated in 2014. In June 2017, the Ministry of Education approved to merge the Gerontological Care and Management and Graduate Institute of Health Care to form the Department of Gerontology and Health Care Management since August, 2018.

The University educational scope has been broadened gradually, and its growth clearly reflects the soundness of the University central tenet. Currently, the University employs 316 full-time teachers, and 6,333 students are enrolled. With additional expansion of excellent academic programs over the years, the University seek to



..... HTC VR Learning Experience

nurture best professionals in the field of health care industry.

The University is a health sciences university that places an equal emphasis on both research and teaching performance. Founded to support commitment to humanity and integrity, its vision is to be, in every aspect of health care, the highest-quality school and the source of the highest-quality nurses entering the field. In order to develop in its students the spirit of diligence and endurance, and to enable them, in both theory and practice, to apply that spirit for the benefit of society, the University has cooperated with Chang Gung Memorial Hospital, the Formosa Plastics Group, and 303 other organizations to provide students with a wealth of internship opportunities. The students are thus offered chances to accumulate work experience and hone their skills. This strategy is designed to help students achieve the educational goal of combining work

experience with classroom knowledge in a solid way, thus placing them in an advantageous position in today's competitive job market.

Moreover, the University has implemented a mandatory boarding school policy in order to pursue integrate school education with guidance and discipline. Based upon the belief that ethical and moral education is developed in daily life, the policy aims to promote all-rounded development of students, cultivate students to become good-tempered and modest, respect for life, and concern for society. The students are envisioned as professionals endowed with love and patience.

Within the aspect of academic research, the University encourages teachers to participate in research projects in cooperation with the government, Chang Gung Memorial Hospital, and the Formosa Plastics Group. Efforts in cooperative research projects with other industries



..... Nurse Aide National Examination Center

are strongly encouraged as well. In the academic year of 2020 alone, the university received 233 Industry-University Collaboration Projects with total grant of nearly NTD 170.45million. The results are listed as followed. Grant of NTD 47,805,438 from the Ministry of Science and Technology for 53 research projects, and a grant of NTD 49,306,370 from governmental offices for 63 research projects. In addition, grants totaling NTD 73,335,732 were accumulated by 117 cooperative projects between the University and the private sector.

In response to the rapid changes in society, the University is dedicated to improving its administration, with personnel as its central consideration. Moreover, the learning environment is being improved to support the ideal of providing quality health care for the general public. In the future, the aim of “being the best” will continue to guide the development of the University administration, teaching,

research, industry cooperation, and student development. The Chang Gung University of Science and Technology continuously strives to foster top-quality professionals who provide the best professional education.



..... Education Base for Elder Long-Term-Care Industry, EB-ELTCI



Non-Profit Organization—Education

## Ming Chi University of Technology

.....  
In the pursuit of adhering to the spirit of perfection, we strive for excellence in everything, keep making self-improvement, and are tailored to the requirements of the development of the whole industrial economy in order to continue cultivating professional talents with good character.  
.....



Ming Chi University of Technology Campus

*In the 1960's while both the industrial and economic developments were taking off in Taiwan, there was a lack of mid-level professionals in the industries. In response to the developmental needs, Mr. Y. C. Wang and Mr. Y. Z. Wang, the founders of Formosa Plastics Group, donated the funds for the establishment of the University in December 1963 in order to strengthen the cultivation of talents.*

The University is located on the hillside of Kueizi Village in Taishan District, New Taipei City and was originally named “Ming Chi Institute of Technology.” The campus occupies an area of 62 hectares with vast green areas and beautiful yet tranquil sceneries. More than 200 years ago, during the reign of Emperor Chienlong in the Ching Dynasty, the “Ming Chi Academy,” founded by a Tributary Scholar, Mr. Hu Cho-yu in Southern Fukien, was located in the vicinity of the University. At that time the Academy was a center of intellectual and cultural hub and was also the cultural origin of northern Taiwan. This university was named “Ming Chi” with an aim to encourage the faculty and the students to learn from the virtuous elders and to embrace heritage and vision as their own mission.

With the exceptional operational performances and in response to the need for talents due to the economic development and the industrial advancement in Taiwan, the School was approved in 1999 for its transformation into “Ming Chi Institute of Technology.” After being awarded Excellence by the annual evaluation conducted by the Ministry of Education (MOE) for six consecutive years, the Institute was approved again in 2004 for its further transformation into “Ming Chi University of Technology.” The University currently hosts 4,492 students (4,097 students in the day division and 395 students in the continuing education division), 195 faculty members, and 114 staff members. The University consists of the College of Engineering, College of Environment and Resources, and College of Management and Design, offering 11 M.A. programs, two Ph.D. programs and 10 departments. All the departments and graduate institutes have passed the certifications of IEET (Institute of Engineering Education Taiwan) and ACCSB (Accreditation of Chinese Collegiate School of Business), showing that the University's educational system is on the international track.

Due to the fact that all the units of Ming Chi received top rankings and the school was ranked number one nationwide in the 2011 MOE Evaluation of Technological Universities, Ming Chi was approved to self-evaluate since 2016 instead of being evaluated by the MOE. In that year, Ming Chi passed the MOE evaluation on technological university affairs and self-evaluation on colleges. According to the data collected from Web of Science, Ming Chi ranked the third among all the technological universities and colleges in the year of 2020 in producing SCI/ SSCI papers per author, including assistant professors and above, and ranked number one among all private technological universities nationwide. Surface and Coatings Technology in 2019 announced that Ming Chi ranked number seven worldwide in terms of the cumulative number of articles published in that journal from years 2016 to 2018. In 2018, the Institutional Research Center was established to develop a data-based decision-making model to implement efficient and effective school management systems and pursue sustainable school administration. The average amount of subsidies per student at Ming Chi received from the MOE (including MOE grants, Teaching Excellence Program funds, and Higher Education Sprout Project grants) has led other funded technological universities for years. Ming Chi, which has been awarded certificates of information security management system (ISMS) ISO-27001, and environmental management system (EMS) ISO-14001 every year, is an outstanding technological university with excellent traditions and achievements.

The motto of the University is “Diligence, Perseverance, Frugality and Trustworthiness.” In terms of “Diligence and Perseverance,” we expect the students not only to work hard but also to do the right and useful things. Students are encouraged to build their wisdom and enhance self-confidence through the accumulation of such useful experiences.



..... Semiconductor Process Laboratory

When students live simple and honest lives, they can concentrate on the pursuit of their life goals. Based on this foundation and equipped with the professional knowledge and skills, all our students are expected to become useful members of the society. Ming Chi has been a boarding school since its establishment. Through this shared on-campus living, students are encouraged to maintain a regular life, strong body and mind, while fostering grounded characteristics and good moral character. The Mindfulness Center was established in 2016. A selective course of Mindfulness for general education was offered to help students boost their concentration and observation. In 2018, the general education course “Design Thinking” was offered to guide students to develop interdisciplinary skills, to inspire their creative thinking, and to lay the foundation for them to explore practical problems and solve problems in the future. In 2019, Ming Chi was awarded the “Excellent Green Procurement Performance” school by the Environmental Protection Department, New Taipei City. Moreover, since teachers also live on campus, they can better guide students and live up to the standards of propagating the doctrines of the ancient sages, who would not only teach but also clarify any doubts.

In order to take both theory and practice into account, and to help students develop the spirits of self-supporting, hard working, and endurance, Ming Chi has implemented the co-op programs by alternating regular classes and internship in four years. Students are arranged to participate in full time practical internship program for one year in the Formosa Plastics. This allows students to receive salaries from

the work so that they could reduce the financial burden of their families and complete their studies. Through the internship, students are able to learn the techniques relevant to their professions as well as the practical management skills. Students are also able to experience the meaning of diligence, perseverance, frugality and trustworthiness and develop the attitude of being down-to-earth and always getting to the bottom of everything. The overseas internship system is unprecedented. Presently the practical training program has expanded to various industries and companies in the U.S., Switzerland, Mainland China, Indonesia and Vietnam. The amount of students working overseas has accumulated to 593 till now. Moreover, Ming Chi has been selected to establish a project office to facilitate nationwide vocational schools in offering co-op programs. The practical training program has expanded to various types of industries with over 150 companies participating in the program. Students' performances are highly accredited in the industry. Ming Chi has also received lots of recognition of “Excellent Performances in Industry-Education Cooperation” evaluated and selected by the Chinese Institute of Engineers. The gap between school education and the employment among industries is effectively shortened, realizing the educational goals in connecting industries and education. According to the 2020 university ranking released by Global Views Magazine, Ming Chi ranked number one in the technology category of comprehensive universities among all other private technology universities. The Ming Chi alumni of the past years have received positive affirmation from the academic, industries, and business fields. In addition, to continue the founder's spirit of caring the financially/physically challenged, Ming Chi has been offering scholarships of NTD 150 million accumulated until now.

Beginning from the academic year 2004, Ming Chi started to recruit aboriginal students in the four-year college in order to extend our concerns for the aboriginal students. Ming Chi has funded the aboriginal students up to NTD 430 million. This program has gained much appreciation from the aborigines and acclamation from the public in the society. Moreover, in coordination with the needs in lifetime learning and

returning education for technical training, Ming Chi provides employee training for enterprises as well as career guidance for young adults. Meanwhile, in order to satisfy the needs of the alumni and members of the society in continuing education, the Division of Continuing Education was established. This Division has offered in - service master program. In 2016, Dual Award Master's Degree Program was offered between Ming Chi and University of Cincinnati. Further in 2017, Ming Chi together with National Taiwan University of Science and Technology set up dual award Ph.D.'s degree program. In 2019, Dual Award Master's Degree Program was offered between Ming Chi and Northern Illinois University. Ming Chi has signed more than 90 sister school partnership agreements with overseas schools striving toward a goal of globalization.

After the institute was upgraded to the university level, in addition to the usual devotion in the maintenance of the existing educational beliefs and practice, Ming Chi also focuses on “Industry - Academia Cooperation.” Ming Chi has frequently been honored by the Chinese Institute of Engineers for its excellent practices in industry - academia cooperation. The iAuto team from Taiwan, consisting of Ming Chi University of Technology, National Taiwan University, L. L. iAuto Technology LTD, the Formosa Plastics Transport Corporation, and Industrial Technology Research Institute, took the runner-up prize in the 2019 Dubai World Challenge for Self-Driving Transport. According to the statistics released by the Ministry of Science and Technology (MOST), Ming Chi has ranked number three for consecutive years nationwide, and number one among private technology universities in the category of the average amount of funding per project director. Ming Chi ranked number three in 2018 among all technological universities and colleges nationwide, and ranked number one among private technological universities for securing the average amount of intellectual property rights per project director, including assistant professors and above. In 2020, Ming Chi ranked the third nationwide, and number one among private technological universities and colleges nationwide in the average amount of conducting public and private

Industry - Academia Cooperation projects per project holder, including assistant professors and above, ranked number five nationwide in the category of the average amount of funding per MOST project director. These honors demonstrate the fruitful results of developing collaborative relationships with industry partners. In recent years, by means of continuously integrating the resources of various colleges, nine research centers have been established: the Biochemical Engineering R&D Center, the Center for Plasma and Thin Film Technologies, the Chinese Herbal Medicine Center, the Battery Research Center of Green Energy, Organic Electronics Research Center and Center for Reliability Engineering, Research Center for Intelligent Medical Devices, Artificial Intelligence and Data Science Research Center, and Center for Environmental Sustainability and Human Health. The faculty and students are always encouraged to participate in practical researches and to provide industry - academia services for enterprises. With the development of internship opportunities, the industry academia cooperation relations are actively being built. Utilizing the resources of intern students, guidance teachers, specific research centers, the Industry - Academia Cooperation Center, and the Innovation and Incubation Center, we are able to achieve close cooperation with the industries and improve the research quality and quantity, and further contribute the research findings to the industries. While the education purposes as well as the advancement of technological force in the industries are achieved, a win-win situation is also created.

Education is the foundation of a nation and its importance is hardly surmountable. Ming Chi looks for “perfection” in every aspect including school administration, research, industry cooperation, and the development of personal integrity of the students. We seek the best for everything we do, and pursue self-improvement at all the times. We hope to contribute to help the entire economic development of the industry through the cultivation of professionals with sound personality, and set our goal for a new model for the vocational education in Taiwan.



## HEADQUARTERS

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