First Philippine Industrial Park
INTERCONNECTED ADVANTAGE

2022

THE PHILIPPINE AEROSPACE MANUFACTURING INDUSTRY

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Abbreviations

A&D	aerospace and defense
AIAP	Aerospace Industries Association of the Philippines
ASEAN	Association of Southeast Asian Nations
BOI	Board of Investments
CAAP	Civil Aviation Authority of the Philippines
CCT	Common Carriers Tax
CNC	computer numerical control
EC	European Commission
EDC	Energy Development Corporation
EU	European Union
FPH	First Philippine Holdings
FPIP	First Philippine Industrial Park
GDP	gross domestic product
MRO	maintenance, repair, and overhaul
NADCAP	National Aerospace and Defense Contractors Accreditation Program
OEM	original equipment manufacturers
PEZA	Philippine Economic Zone Authority
RBF	ready-built factory
SC	Sumitomo Corporation

First Philippine Industrial Park

INTERCONNECTED ADVANTAGE

First Philippine Industrial Park, Inc. (FPIP) is one of the Philippines' largest and fastest-growing premier industrial parks today. With over 600 hectares of prime industrial land, it is now the preferred location of over a hundred world-class locators.

FPIP was established in 1996 in response to the government's call for private-sector assistance in catalyzing industrial growth. Today, FPIP continues to work with its locator partners in contributing to national development and economic growth by helping generate tens of thousands of local jobs and billions of pesos in annual export earnings.

FPIP brings over two decades of operational excellence and an even longer history of multifaceted industry experience through its partners and parent companies.

FPIP is a joint venture between First Philippine Holdings (FPH) and Sumitomo Corporation of Japan. FPH brings leading and pioneering experience in energy, power generation and distribution, transformer manufacturing, commercial and residential estate development and management, construction and engineering, as well as education and healthcare.

Sumitomo Corporation's experience in industrial park development and management aids FPIP in offering integrated services and world-class experience to locators all over the world. Sumitomo Corporation is a leading industrial park developer and operator in Vietnam, Indonesia, Myanmar, India, Bangladesh, and the Philippines.

Executive Summary

Aerospace manufacturing is a high-technology industry that produces aircraft, guided missiles, space vehicles, aircraft engines, propulsion units, and related parts. The industry comprises government and private industries that perform the institutional roles of end-users, suppliers, and manufacturers. The value chain consists of government and airline companies as primary customers; original equipment manufacturing (OEM) companies, a tiered chain of suppliers and manufacturers; companies that perform maintenance, repair, and overhaul (MRO) of equipment and parts; the consuming public as aircraft passengers.

The global aerospace industry is vast and depends on technological innovations. The standards are high because of safety concerns. It is highly influenced by government policies that govern defense budget allocations and support for civil aviation. Trade agreements and trade regulations such as defense treaties and sky travel reciprocities significantly affect the industry.

According to Delloite, with the global economy gradually recovering from the COVID-19 pandemic, the aerospace and defense (A&D) industry has shown signs of a strong rebound in 2022, but supply chain and talent issues continue to limit the industry's growth. According to Deloitte's outlook survey, supply chain disruptions and talent shortages may be the biggest risks or challenges for A&D organizations in 2023. Furthermore, the Russian invasion of Ukraine (the invasion) disrupted global supply chains, especially for critical metals and rare earth elements, and exacerbated fuel price volatility. Inflation remains a challenge for the entire industry—54% of respondents in Deloitte's outlook survey report that price increases are one of the key risks in 2023.

The Philippines' Department of Trade and Industry states that "the Philippine aerospace industry aims to make the country a major hub for manufacturing OEM parts and allied services, such as MRO, for the global commercial aircraft industry."

Based on its report, "the domestic aerospace industry has an estimated .15% share of 2013 gross domestic product (GDP), and a projected 0.57% share of 2022 GDP, given a positive program intervention spearheaded by the government. There are currently three tier 1 suppliers in the country located in economic zones. The industry is under the supervision of the Aerospace Industries Association of the Philippines (AIAP)."

The local aerospace value chain is maturing as evidenced by the presence of key manufacturers in the segments of parts and components manufacturing, subsystems or subassemblies, and MRO. The products and/or services covered by the local industry in the parts manufacturing segment include the production of flight control actuation systems, servo actuators, servo valves, galley inserts, structures and equipment, seat parts, lavatories, interior fit-out, panel assembly, airframes and subassemblies, and assembly of light-sports aircraft. For the MRO segment, the industry can provide base and line maintenance for commercial aviation, engineering training, and MRO for general aviation. The local industry can also provide trainings on aircraft maintenance technology, aircraft maintenance for technicians, aeronautical engineering, aviation management, commercial flying, and composites repair training.

Among the industry's strengths are:

- **Labor Force and Strategic Location.** A pool of young, relatively cost-competitive, English-proficient, highly trainable and knowledgeable manpower makes up the aerospace-specific labor force, which is in turn supported by a chain of aerospace and aviation schools. At the same time, the Philippines is in a strategic location and could make the country serve as a potential vital link in the aerospace industry value chain.
- Competence of the Philippine Economic Zone Authority (PEZA). The Philippines' special economic zones, which are managed by PEZA, are chosen by most foreign investors that have located their manufacturing plants in the country due to their lower overall costs of manufacturing and greater ease of doing business. According to a survey by

Duke University, PEZA has been rated by foreign investors as being organizationally stable and responsive to their needs.

- **Local Supply Chain.** Tier 2-3 supply base of manufacturers that provide OEM requirements have proven capabilities on precision machining, design, and developing capabilities on surface processing and testing.
- Additional strengths include growing commercial airlines, presence of suppliers and linkages, and growth in business aircraft.

Global Perspective

Aerospace manufacturing is a high-technology industry that produces aircraft, guided missiles, space vehicles, aircraft engines, propulsion units, and related parts. The industry comprises government and private industries that perform the institutional roles of end-users, suppliers, and manufacturers. The value chain consists of: government and airline companies as primary customers;

- OEM companies, a tiered chain of suppliers and manufacturers;
- companies that perform maintenance, repair, and overhaul (MRO) of equipment and parts; the consuming public as aircraft Passengers.[1]

[1] Government of the Philippines. Aerospace.

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Based on the same analysis by Delloite, focus on supply chain visibility and resilience mitigates broader set of risks. The COVID-19 pandemic, workforce shortages, and, most recently, the invasion have exacerbated supply chain complexity for the A&D industry. Deloitte's analysis suggests that 90% of surveyed manufacturing executives have experienced an increased frequency of disruptions. In response, industry players across the value chain are building resilient supply chains to mitigate risk and drive long-term growth.[4]

Acceleration of digital thread and smart factory can drive improved efficiencies. Digital technologies and capabilities are expected to increasingly be a source of competitive advantage and, in some cases, a requirement to compete for specific government programs. With new entrants disrupting the market, even on legacy platform programs, A&D companies will likely increasingly leverage digital thread and smart factory to streamline the design and development of products and achieve improved efficiencies.

Attracting, retaining, and developing top talent remain a challenge. Though most jobs lost in 2020 were added back, the workforce turnover rate is still high, and an aging workforce contributes to the workforce shortage. The ongoing shortage is increasing competition for talent within and beyond the industry. It has also led to lower production and created delays in new contracts in the past two years. Meanwhile automation and the use of advanced digital technologies are bringing a change in the industry's workforce composition, driving the need for a workforce with more advanced aerospace engineering, math, data science, and digital skills than before. Many prime contractors have also cut back their sales forecasts. For instance, leading A&D companies reported that the labor shortage has further exacerbated supply chain issues and lowered the revenue outlook for 2022 as factories producing equipment are running slow.[5]

Lowering emissions and implementing sustainable manufacturing remain business priorities. With climate change garnering increased policy and regulatory attention and generating consumer activism, A&D companies continued to work toward reducing direct emissions in 2022. As one of the most challenging industries to decarbonize, the A&D industry has been at the forefront of adopting new and advanced manufacturing technologies, which can help address the sustainability challenge. However, much remains to be done by the industry to address emissions across the

[2] Government of the Philippines. Aerospace.

[3] Delloite. (2023). 2023 Aerospace and Defense Industry Outlook. United Kingdom: Delloite Development LLC.

[4] Ibid.

[5] Ibid.

value chain. According to Deloitte's outlook survey, a lack of feasible alternatives, high costs, and unclear benefits are the biggest challenges for respondents to reducing the commercial aerospace industry's Scope 3 emissions.

Innovation accelerates growth in emerging areas. Emerging markets such as space, supersonics/hypersonics, and advanced air mobility (AAM) are poised to change the industry landscape and capabilities in the coming years. The year 2023 will likely be an important period for these emerging markets in terms of investments, technology evolution, and regulation. According to Deloitte's outlook survey, organizations will most likely invest in space-related technologies and AAM in 2023.[6]

Aerospace Manufacturing Global Value Chain

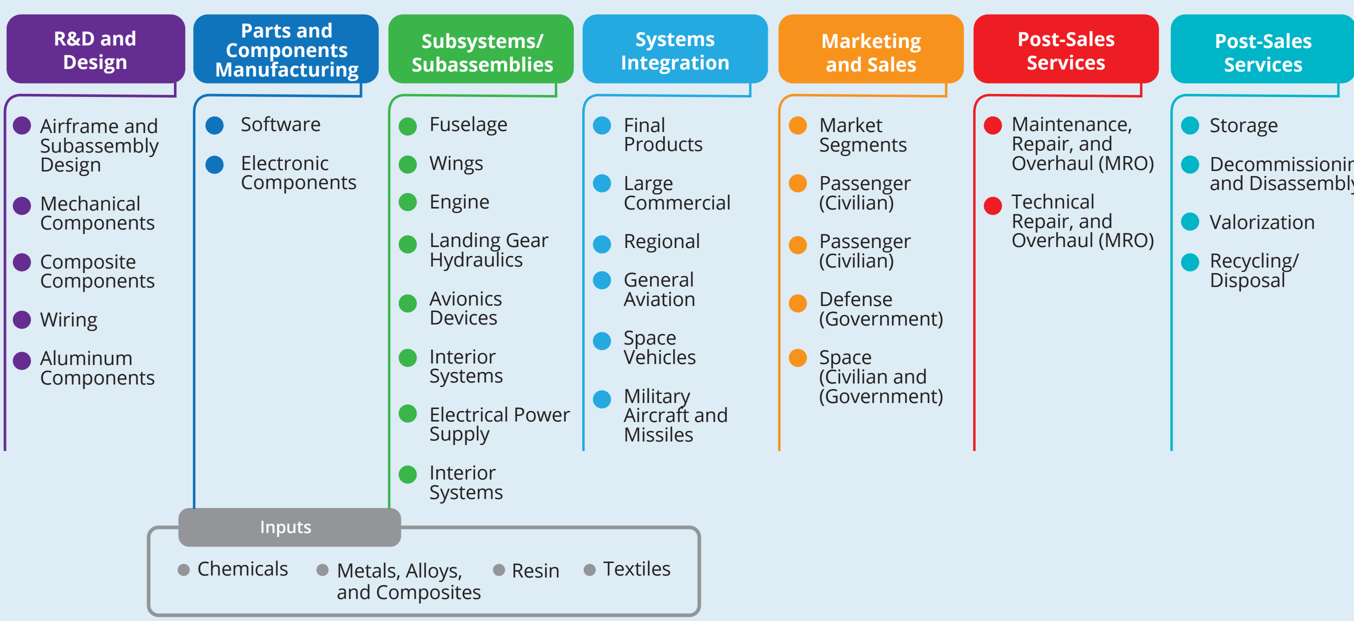
The global value chain of the aerospace manufacturing industry includes seven principal stages: research and development (R&D) and design, parts and components manufacturing, subsystems/subassemblies, systems integration, marketing and sales, post-sales services, and end-of-life.

The arrival of Industry 4.0 has brought about significant modernization across the entire manufacturing sector. Achieving the projected growth of the aerospace manufacturing industry would require focus on innovations that will allow for greater customization, improved longevity, and cost reduction, without comprising comfort and safety.

Research and Development (R&D) and Design

The R&D and design stage of the value chain includes the design of airframes and subassemblies. The aerospace manufacturing market is moving toward the use of lightweight materials to improve the cost-efficiency and performance of aircraft. Composites technology, one of

Figure 1. Aerospace Global Value Chain



Source: Penny Bamber, Stacey Frederick, and Gary Gereffi. 2016. ***The Philippines in the Aerospace Global Value Chain.*** Center on Globalization, Governance & Competitiveness, Duke University. https://www.researchgate.net/publication/305000155_The_Philippines_in_the_Aerospace_Global_Value_Chain

[6] Ibid.

the most important changes in R&D technology in recent years, is being incorporated in the industry through the use of aluminum alloys, such as titanium aluminide and aluminum lithium for manufacturing aircraft engines. Aside from changes with the structure of commercial aircraft, the use of lightweight parts is also expected to reduce carbon emissions.

Parts and Components Manufacturing

This segment includes the specific and generic inputs required to form the subassemblies of the aircraft. These inputs comprise software, electronic components, mechanical components, composite components, wiring, and aluminum components. Aerospace applications require components with integrated functions. Aerospace components use lightweight materials with high strength-to-weight ratio to improve fuel efficiency and reduce emissions. Some are required to work in extreme conditions (i.e., ultra-high or low temperatures or extreme chemical environments) and therefore require innovative solutions to modify tailored parts in aerospace applications.

The trend of using additive manufacturing technology for designing parts with advanced materials and unique geometries has been adopted by a number of companies for its superior designing abilities. Airbus uses the technology to manufacture over 1,000 different parts for its A350 aircraft.

Subsystems or Subassemblies

Modules that are assembled into the final product are referred to as subassemblies . These include airframes, propulsion engines, landing gears, avionics and flight control systems (flight, navigation, and communication systems), electrical power supply, fuel systems, and interior fittings.

Before their integration into final assemblies, the performance of subassemblies as units is verified. Extensive tests are performed in simulated flight environments incorporating vacuum, temperature, and vibration excursions for subassemblies with electrical and electronic, hydraulic, and mechanically actuated components.

Systems Integration

The process of connecting the various systems and subsystems that constitute an aircraft into a complete system is referred to as systems integration. The final assembly of an aircraft usually starts with the joining of fuselage assemblies that have been attached to a supporting jig. Through the process, the aircraft is moved through a series of workstations, acquiring additional subassemblies and accumulating its onboard systems, ducts, control cables, and other interior plumbing. Major assembly steps comprise the addition of nose and tail sections, wings, engines, and landing gear. Once complete, the aircraft is rolled out to the flight line for its production flight test.

Final products in the aerospace manufacturing market include large commercial aircraft, regional jets, and general aviation aircraft (e.g., business jets, turboprops, helicopters, etc.). Boeing and Airbus are two dominant global aircraft manufacturers. In 2018, Boeing delivered 806 commercial aircraft while Airbus followed with 800 deliveries.

Marketing and Sales

Final aircraft manufacturers usually handle marketing and sales. Principal end market segments in the industry are grouped into four:

1. Commercial passenger segment (buyers ranging from airlines and lessors [e.g., Philippine Airlines, Cathay Pacific, Singapore Airlines, and International Lease Finance Corporation, and General Electrical Capital Aviation Services] to businesses and medical rescue operations to individuals);
2. Cargo operations segment (e.g., DHL, Federal Express, United Parcel Service);
3. Defense (e.g., national governments); and
4. Space (e.g., civilians or national governments).

In 2018, airlines carried a total of 4.4 billion passengers, 6.9% over the 2017 record, representing an additional 284 million trips by air. The largest number of passengers systemwide was carried out by airlines in the Asia-Pacific region with 37.1% market share, a total of 1.6 billion passengers. Europe ranks second with 26.2% market share (1.1 billion passengers), followed by North America with 22.6% market share (989.4 million passengers).

Air freight volumes also grew in 2018 in line with global trade volumes with an increase of 5.2% increase in capacity. Federal Express (FedEx) is the top airline by scheduled freight ton kilometers (FTKs) of 17.5 billion.

Post-Sales Services

This segment includes the supply of after-market parts, MRO services, technical training, customer support, and the supply of flight simulators.

Based on analysis by Intelligent Aerospace.com, the Southeast Asia region will be significantly needing widebody airplanes due to the evolving business environment and new long-haul expansion opportunities. The article states that "widebody airplanes will make up 19% of new airplane deliveries, enabling carriers in the region to serve new international long-range city pairs." [7]

The analysis further states that "Boeing predicts that Southeast Asia aviation market will grow to $1.5 trillion over next 20 years. Boeing forecasts airlines in Southeast Asia will need 4,500 new airplanes over the next 20 years, valued at $710 billion at list prices." Based on the review, single-aisle airplanes are the main driver of capacity growth in Southeast Asia, which helps to stimulate the demand for commercial aviation services, which are forecasted to be worth "$785 billion between 2019 and 2038." [8]

This will redound to the need for about 182,000 commercial pilots, cabin crew, and aviation technicians, based on "new airplane deliveries, annual aircraft utilization rates, crewing requirements by region, and regulatory requirements." [9]

Additional sources and research also reveal the following (sources cited in footnotes):

- Cargo revenues are expected to reach a record $175 billion in 2021, an upward revision of $23 billion from April, and stay near that level at $169 billion in 2022 as cargo yields soften from 15% to 7% growth. Airlines generated $128 billion in cargo revenue last year, also a historic high.[10]
- Positive news on the airfreight side of the business was tempered by the trade association's estimate that airlines will lose $51.8 billion this year because of reduced passenger travel associated with COVID-19 and border restrictions. But the financial picture is much improved from last year's $137.7 billion loss.[11]
- Global airfreight demand in 2020 decreased 10.6% year-over-year, the largest decline since IATA began monitoring cargo performance in 1990. The negative growth was primarily from the first half of the year when COVID-19 shut down much of the global economy and crippled passenger travel. During the second half of the year, cargo volume came roaring back as companies tried to quickly restart production and sales. [12]
- By January, the air cargo market was in positive territory versus 2019 and has kept growing, driven by economic expansion, low inventories, e-commerce, and diversion from overcrowded ocean shipping. The World Trade Organization on Monday revised its forecast for global merchandise trade to 10.8% growth in 2021, with trade slowing to 4.7%—near the long-term trend—in 2022.

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7 https://www.intelligent-aerospace.com/commercial/article/14167624/southeast-asia
8 Ibid.
9 Ibid.
10 https://www.freightwaves.com/news/iata-forecasts-2021-air-cargo-revenues-to-hit-record-175b
11 Ibid.
12 Ibid.

The Global Aircraft MRO Industry[13]

According to research from FNF Research Company, the commercial aircraft MRO market "exceeded $70 billion in 2020 and is anticipated to grow at a compounded annual growth rate of over 4.9% from 2021 to 2027." The research states that "increasing economic growth and rapid urbanization in emerging countries along with business & tourism travels are likely to augment the market growth."[14]

Growth Factor

Based on the research company, the MRO market is "dominated by external factors including aircraft utilization, global fleet size, and air traffic volumes, i.e., both cargo and passengers," and that the "growth in air travel requires more aircraft production, which will support the MRO industry."

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13 https://www.fnfresearch.com/aircraft-mro-market
14 https://www.gminsights.com/industry-analysis/commercial-aircraft-mro-market

The research states that "increasing investments in aircraft MRO software are also predicted to offer new growth opportunities. Aircraft MRO software includes software components for maintenance tracking, maintenance scheduling, logbook tracking, budget forecasting, manuals, flight time tracking, electronic task card management, service bulletins management, and work order management. It also includes features aiding compliance with regulatory organizations such as FAA and ICAO."

After the pandemic, "the rising number of passengers choosing air travel is expected to boost the demand for MRO facilities" and the "relaxation in foreign direct investments (FDI) for the airline industry will encourage airlines companies to outsource maintenance activities to ensure the smooth functioning of aircraft." The research states that "the aircraft market will showcase a high growth rate, attributed to the rising number of air passengers flying per year due to flight frequencies, affordable prices of tickets, and route availability. These factors are slated to drive the demand and need for MRO services, in turn, fostering the industry growth."[15]

Regional Analysis

GMInsights analysis states that the Asia-Pacific commercial aircraft MRO market will exhibit over 5.5% growth rate through 2027. "The commercial aviation sector will grow rapidly over the next decade in the wake of strong demand for new narrow-body aircraft in APAC. Countries including India, Japan, China, South Korea, Australia, and Singapore are notable contributors to the development of the regional market. In these regions, the commercial aircraft fleet size is expected to rise during the forecast period, which depicts growth in the demand for MRO services in the APAC region. In the maturing aviation sector of India and China, aging fleets require the disposal and replacement of outdated aircraft components."[16]

[15] Ibid.
[16] Ibid.

Decarbonization[17]

Analysis from Deloitte states that the aerospace industry is expected to grow substantially. However, there are challenges in decarbonizing as the world moves to net-zero emissions. "Without action, the industry would contribute to significantly higher global CO_2 emissions by 2050 and could face restrictions that could be detrimental to its revenues and jobs, such as the banning of flights less than 500 miles."

Deloitte research indicates that decarbonization is a "key business priority, as is developing alternatives and implementing environmentally sustainable practices."

[17] https://www2.deloitte.com/us/en/insights/industry/aerospace-defense/decarbonizing-aerospace.html

The Philippine Context

The Philippine Aerospace Manufacturing Industry[18]

The Philippines' Department of Trade and Industry states that "the Philippine aerospace industry aims to make the country a major hub for manufacturing OEM parts and allied services, such as maintenance, repair and overhauling (MRO), for the global commercial aircraft industry."

Based on its report, "the domestic aerospace industry has an estimated 0.15% share of 2013 GDP, and a projected 0.57% share of 2022 GDP given a positive program intervention spearheaded by the government. There are

[18] https://industry.gov.ph/industry/aerospace/

currently three tier 1[19] suppliers in the country located in economic zones. The industry is under the supervision of the Aerospace Industries Association of the Philippines (AIAP)."

The Philippine Aerospace Value Chain

The local aerospace value chain is maturing as evidenced by the presence of key manufacturers in the segments of parts and components manufacturing, subsystems or subassemblies, and MRO. The products and/or services covered by the local industry in the parts manufacturing segment include the production of flight control actuation systems, servo actuators, servo valves, galley inserts, structures and equipment, seat parts, lavatories, interior fit-out, panel assembly, airframes and subassemblies, and assembly of light-sports aircraft. For the MRO segment, the industry can provide base and line maintenance for commercial aviation, engineering training, and MRO for general aviation. The local industry can also provide trainings on aircraft maintenance technology, aircraft maintenance for technicians, aeronautical engineering, aviation management, commercial flying, and composites repair training.

Four Tier 1 companies in the Philippine aerospace industry are involved in the subsystems or subassemblies segment of the value chain: Collins Aerospace and JAMCO Philippines manufacture interiors, galleys, ovens, and lavatories for the commercial aircraft market;

FACTS AND FIGURES

Currently, the domestic aerospace manufacturing industry has an estimated 0.15% share of 2013 GDP, and a projected 0.57% share of 2022 GDP.

The industry contributes 2,200 in direct employment, generating an estimated $10 million as salaries of direct and allied workers.

In 2013, the industry contributed $2 million as income tax from compensation.

The industry has export projections of $1.5 billion in the next 10 years.

MOOG Controls Corporation manufactures primary and secondary flight controls, actuation systems for the commercial aircraft market; and Surface Technology International is involved in the production of avionics and contract electronics manufacturing. The Board of Investments (BOI) also identified the major players for specific subsectors of the industry, as shown in Table 1.

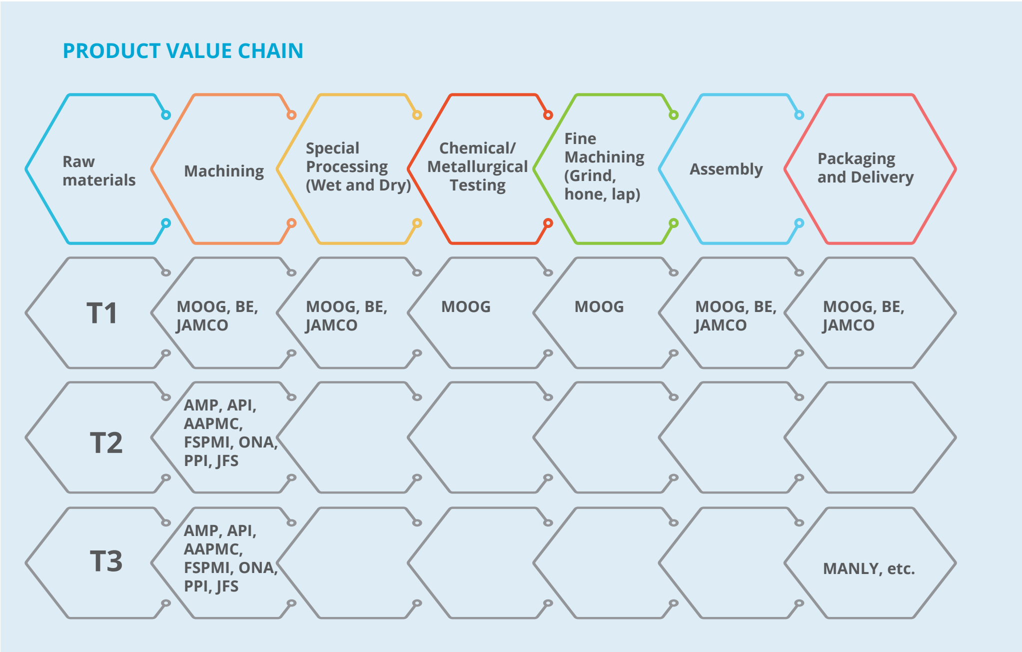
[19] Tier 1: These companies are typically manufacturers of major components or systems who receive parts or subassemblies from the Tier 2 supply chain. The equipment Tier 1 manufactures are final systems that are supplied to the OEM. They manufacture a wide array of critical finished products such as engines, control systems, landing gear, braking systems, flight deck, avionics, aerostructures, electronic warfare systems, and interior cabin products.

Tier 2: These are companies responsible for the manufacture of parts or subsystem assemblies used by Tier 1 companies. Tier 2 companies provide critical components ranging from airfoils and tires, to missile nose cones and airframe structures to transmissions and flight controls. Tier 3: These companies are mostly component manufacturers that ship their products directly to Tier 2 companies for the manufacturing of critical parts and subsystems. Tier 3 component manufactures supply include hydraulic fittings and hose, instrumentation fittings and tubing, high strength fasteners and pins. Some Tier 3 can be smaller machine shops that produce thousands of parts, which ultimately serve a critical purpose. There are also many Tier 3 suppliers that produce mission-critical components and software that are more than just nuts and bolts. https://blog.brennaninc.com/what-are-the-three-tiers-in-the-aerospace-supply-chain

Table 1. Major Players in the Philippine Aerospace Industry Subsectors

Subsector	Major Players
Flight control actuation systems, servo actuators, servo valves	MOOG Controls Corp. (Tier 1 OEM) Tier 2 Suppliers: • Famous Secret Precision Machining, Inc. • Applied Machining Corp.
Galley inserts, structures, and equipment; seat parts; lavatories interior fit out	Collins Aerospace (Tier 1 OEM) JAMCO Philippines (Tier 1 OEM)
Assembly of Light-Sports Aircraft, others	Famous Secret Precision Machining, Inc. Philippine Aerospace Development Corporation (PADC)
Base maintenance and line maintenance for commercial aviation	SIA Engineering Philippines (SIAEP) Lufthansa Technik Philippines (LTP)
MRO for general/government/defense aviation	PADC Asia Aerospace Metrojet Engineering
Aircraft maintenance technology Aeronautical engineering Composites repair training	PATTS College of Aeronautics SIAEP
Aviation Management Commercial Flying	WCC Aviation Company Philippine Academy for Aviation Training (PAAT)

MRO = maintenance, repair, and overhaul; OEM = original equipment manufacturers.
Source: Philippine Board of Investments.



Source: Philippine Board of Investments.

Advantages and Capabilities

Among the industry's strengths are:[20]

Labor Force and Strategic Location. A pool of young, relatively cost-competitive, English-proficient, highly trainable and fairly knowledgeable manpower makes up the aerospace-specific labor force, which is in turn supported by a chain of aerospace and aviation schools. At the same time, the Philippines is located in a strategic location and could make the country serve as a potential vital link in the aerospace industry value chain.

Additional strengths include growing commercial airlines, presence of suppliers and linkages, and growth in business aircraft.

Based on an article from the ***Philippine Star*,** the Philippine flag carrier Philippine Airlines (PAL) "is expanding significantly its overseas and local network as domestic travel restrictions ease and international borders reopen." PAL is adding over 1,500 flights, representing a 52 percent expansion in regular scheduled flights.[21]

Competence of the Philippine Economic Zone

Authority (PEZA). Most foreign investors that have relocated their manufacturing plants in the country have chosen the Philippines' special economic zones, maaged by PEZA, due to their lower overall costs of manufacturing and greater ease of doing business. According to a survey by Duke University, PEZA has been rated by foreign investors as being organizationally stable and responsive to their needs.

Local Supply Chain. Tier 2-3 supply base of manufacturers that provide OEM requirements have proven capabilities on precision machining, design, and developing capabilities on surface processing and testing.

[20] https://industry.gov.ph/industry/aerospace/
[21] https://www.philstar.com/business/2022/03/11/2166382/pal-makes-major-flight-expansion

Industry Associations and Potential Linkages

- The creation of the AIAP is a positive factor in solidifying the initiatives for the growth and development of the aerospace industry because it presents a collective voice in helping shape government policies and incentives affecting this sector. As of 2018, the AIAP has a total of 77 members comprising manufacturers, subcontractors, traders, service providers, and government institutions. Potential linkages with other organizations could further be explored to strengthen collaboration among local industries. These include:
  - Aerospace Cadets of the Philippines
  - Aerospace Medical Association of the Philippines
  - Federation of Aviation Organizations
  - Air Safety Foundation of the Philippines
  - Aircrafts Owners and Pilots Association of the Philippines
  - Philippine Air Force (PAF) Aviation Cadets Association of the Philippines Society of Aerospace Engineers of the Philippines
  - Aviation Society of the Philippines
- The Philippine Aerospace Development Corporation (PADC),[22] a fundamental government mechanism to spearhead the development of the industry, is tasked to undertake business and development activities for the establishment of a reliable aviation and aerospace industry within the Philippines.

ASEAN Market Liberalization. The country benefits from existing trade agreements with other member countries of the Association of Southeast Asian Nations (ASEAN) for cheaper flow of aerospace parts from other ASEAN countries. The ASEAN Single Aviation Market (ASAM) aims to loosen air service (passenger and cargo) as well as facilitate trade and investments in the region. The Philippines, along with Indonesia, is expected to benefit the most from this integration due to the size of its domestic market. By 2030, ASAM is expected to support around 2.5 million jobs across ASEAN.

[22] http://padc.com.ph/

Initiatives

Among the preferred activities listed in the country's Strategic Investment Priorities Plan for 2022 the manufacture of aerospace parts and components, MRO, and support activities, which include R&D activities, research/testing laboratories, and technical vocational education and training institutions.

The Philippine aerospace industry cluster continues to grow with various efforts from different sectors.

- AIAP partnered with the Metals Industry and Development Research Center to further increase the country's technological capabilities to support the aerospace industry.
- AIAP provides assistance to companies in the local supply chain to become AS9100 compliant and receive an aerospace manufacturing accreditation. AS9100 is a widely adopted aerospace standard based on the ISO 9001 quality system requirements.
- Efficient and competitive export processing zone (EPZ) incentives are provided by PEZA.
- BOI facilitates the implementation of the Aerospace Industries Roadmap: Industry Growth Agenda Over a Ten-Year Period (2013– 2022). Its major strategies include:
    - Geographical Clustering
        - Supply chain cluster of aerospace parts manufacturing in the CALABARZON region composed of the provinces of Cavite, Laguna, Batangas, Rizal, and Quezon, to be strengthened and developed
        - The Civil Aviation Authority of the Philippines (CAAP) identification of potential airfields outside Manila (i.e., Region III and Central Visayas) as training hubs
    - Technology, Capability, Education, and Trainings
        - Support current aerospace product exports, upgrading, and 10-year business plans
        - Support investments on process capability building and training in the supply chain
        - Equip companies and the supply chain with AS9100, and the National Aerospace and Defense Contractors Accreditation Program (NADCAP) with accreditations
        - Strengthen the integration of supply chain capabilities on computer numerical control (CNC) machining and metrology, surface processing of metals, nondestructive inspection, chemical test, met lab, gear manufacturing and metrology, and composites manufacturing
        - Continually improve education and training in the areas of aircraft maintenance, CNC machining and manufacturing technology, surface treatment and chemical technology, heat treatment technology, gear manufacturing, AS9100 and NADCAP through the establishment of linkages with the government and private academic institutions
        - Support Countertrade and Offset Policy with the Philippine Air Force and the Department of National Defense (DND) for the acquisition of technology transfer
    - Ease of Doing Business
        - Support port expansion outside Metro Manila
- As part of the country's commitment to environmental sustainability, it submitted its State Action Plan on CO2 Emissions Reduction for International Aviation: A State Action Plan as a tool to communicate information on international civil aviation's CO2 emissions, including the activities taken by the country, as well as its planned mitigation strategies to further reduce CO_2 emissions in the sky.

Common Carriers Tax Law

Republic Act No. 10374, otherwise known as the Common Carriers Tax (CCT) Act, rationalizes the taxes paid by international carriers in the country. The new law is the consolidated versions of House Bill No. 6022 and Senate Bill No. 3343, now known as "An Act Recognizing the Principle of Reciprocity as Basis for the Grant of Income Tax Exemptions to International Carriers and Rationalizing Other Taxes Imposed Thereon by Amending Sections 2B(A) (3) (a), 109, 11 and 236 of the National Internal Revenue Code, as Amended, and For Other Purposes".

Under the new legislation, foreign carriers—both air and shipping—are exempted from paying the 3% CCT imposed on receipts and income derived from transporting passengers. Carriers will also be exempt from value-added tax for the transport of passengers. However, these exemptions will apply only to those carriers whose countries will give the same exemption to Philippine carriers.

The removal of CCT takes away the primary constraint on foreign carriers' capacity growth and places the Philippines on an almost-level playing field with that of other countries. It is expected to reduce the prices of airline tickets, bring in more tourists to the Philippines, and generate significant job-creating activities for the tourism industry. The passage of this law is expected to bring in more traffic, facilitate connectivity among countries, and benefit the aviation and tourism industries and millions of Filipinos in general.

This law comes on the heels of the International Civil Aviation Organization's lifting of the Significant Safety Concerns imposed on the country in 2008, in recognition of Philippine efforts to comply with international aviation safety standards. The European Commission (EC) has cleared the CAAP, which means that the EC may now rely on CAAP's judgment regarding the safety standards being implemented by airlines used by European Union (EU) citizens within the country.

Potential Upgrading Trajectories

In 2019, the Philippines ranked 39th out of 209 countries in the Aerospace Manufacturing Attractiveness Rankings by the PwC. The results of the rankings could be a way to gauge opportunities for the aerospace industry to develop or improve and eventually increase the country's attractiveness for the industry. The following are the country's rankings per category and the measures used to identify them:

Other potential areas of investment or market opportunities identified by BOI for the aerospace manufacturing industry are the following:

- Asia-Pacific markets estimate the production of more than 14,000 new planes between 2015 and 2034
- MRO growth is driven by 1) migration of MRO services to Asia due to lower costs and better capacity/competency; 2) increasing usage of composites leading to composite MRO; 3) MRO competition between airlines, OEMs, and third-party service providers; 4) partnerships with OEMs that are inclined to explore opportunities for vertical integration into MRO services in Asia and going into full-service business model; 5) tourism and increasing intra-ASEAN movement of people and goods; and 6) choice of MRO capacity for A320neo & B737 MAX.

The Philippines in the 2019 Aerospace Manufacturing Attractiveness Ranking by the PwC

Rank	Category	Measures
1	Labor	Measured by total country labor force, basic education (pupil-to-teacher ratio in primary education), skilled education (skill set of graduates), advanced education (ease of finding skilled employees), union flexibility (cooperation of labor-employer relations)
20	Economy	Measured by gross domestic product (GDP), GDP growth, new foreign direct investment (FDI), net capital inflow, interest rate, debt, annual average unemployment rate
31	Geopolitical Risk	Average annual population, annual population growth, overall strategic risk rating, overall political risk rating, sovereign risk (credit risk rating), climate risk index
54	Cost	Operating expenses (aerospace operating expenditure as a percentage of sales, trend in capital expenditures (Capex), unit labor costs index, electricity price for industrial user, labor productivity (GDP-to-employed labor force)
71	Infrastructure	Quality of roads and railroads, efficiency of seaport services, quality of air infrastructure, internet usage, quality of electricity supply (electricity infrastructure)
94	Tax Policy	Tax ranking (based on the overall ranking in PwC's "Paying Taxes" publication)

Source: PWC. 2019 Aerospace manufacturing attractiveness rankings.

- The Philippines aims to maintain category 1 status (i.e., local airlines flying to the US and EU skies).
- The Philippine aerospace industry is in a rare opportunity to take advantage of the growth of the Asian aerospace industry. This development is a most opportune time for the Philippines to regain its image as a major technology contributor. What is needed is the government's economic and technological support to a program that will help the Philippine aerospace industry grow and develop.

First Philippine Industrial Park

First Philippine Industrial Park (FPIP) is one of the largest and fastest-growing premium industrial parks in the Philippines. With over 500 hectares of prime industrial land, it is the preferred location of the world's largest companies with more than 140 world-class locators, all contributing to national development, jobs creation, and economic growth. These locators include industry giants such as Brother, Canon, Murata, Collins Aerospace, Honda, Philip Morris, and Nestle, among others.

Established in 1996, FPIP is a 500+ hectare special economic zone (SEZ) located in the thriving industrial CALABARZON area south of Metro Manila. Considered the most prime investment location in the country today, it is host to a growing number of global leaders in diverse sectors such as aerospace, automotive, consumer goods, electronics, medical devices, and office equipment, among others.

FPIP offers locators best-in-class infrastructure and utilities, while providing industry-leading park management and support to its locator partners. Alongside special incentives in form of tax holidays and lower tax rates,* the unique FPIP experience assures locators ease of doing business, safety and security, and the consistency of a

* For eligible enterprises.

first-world manufacturing environment. These enable locators to focus on increasing their competitiveness in the global marketplace.

FPIP brings over two decades of operational excellence, and an even longer history of multifaceted industry experience through its partners and parent companies.

FPIP is a joint venture between the local conglomerate First Philippine Holdings (FPH) and the Japanese conglomerate Sumitomo Corporation (SC). FPH brings leading and pioneering experience in energy, power generation and distribution, transformer manufacturing, commercial and residential estate development and management, construction and engineering, as well as education and healthcare.

On the other hand, Sumitomo Corporation's experience in industrial park development and management aids FPIP in offering integrated services and world-class experience to locators all over the world. Its network and sales arm are instrumental in helping FPIP attract a significant number of Japanese locators, which are more than half of the locators inside the park. Sumitomo Corporation is also a leading industrial park (IP) developer and operator in Vietnam, Indonesia, Myanmar, and India as well as an IP sales agent in Indonesia, Thailand, and Cambodia.

FPIP and its locator-partners have created about 70,000 jobs to date, transforming the host communities of Sto. Tomas and Tanauan in Batangas into a thriving industrial hub. FPIP also supports the local educational and health systems, and contributes significantly to local infrastructure development to help improve overall living conditions and uplift the lives of residents in the area.

Upholding World-Class Standards

FPIP is a multi-awarded, ISO-certified, and a PEZA Hall of Fame Awardee.

Among over 400 ecozones in the country, FPIP is one of the only two recipients of PEZA's first Green, Health, Smart and Sustainable Award due to its notable commitment to promoting healthy industrialization and sustainably designed, smart, and green economic zones.

FPIP achieved the Investors in People Silver recognition from 2016 to 2019, the international benchmark for companies that aim for business improvement through people management.

For 3 years (2018, 2019, 2021), FPIP was recognized and awarded by the DENR- Environmental Management Bureau of the CALABARZON region for being an active partner in the protection of fragile natural resources through the implementation of Republic Act No. 9003, or the Ecological Solid Waste Management Act of 2000, and for its sustainable practice of using Best Environmental Technology (BET) and Best Available Practice (BAP) governance.

FPIP has also been the recipient of other awards over the past 25 years in recognition of its support for the community and the environment. Other awards given by various sources include the "Outstanding Community Project Award" granted by PEZA; the "Game Changer Communities Award" conferred by DENR-EMB; the "Gawad Kalasag Plaque of Recognition" awarded by NDRRMC; and the "Outstanding Environmental Performer Award" given by PEZA, among others.

Options to Optimize Your Business

Industrial Offerings

FPIP envisions to be the manufacturing location of choice of high-quality export-oriented locators seeking to grow their businesses, and in the process, help build industries and create jobs. FPIP provides best-in-class infrastructure, highly reliable utilities, and industry-leading park management. FPIP has dedicated teams of engineers and technical staff to ensure that the park is safe, clean, and operating efficiently to serve the needs of its locators, employees, and visitors.

Industrial Land

FPIP's prime-grade and site-developed lots are ideal for manufacturing operations of light and medium industries. Strategic location, various lot sizes and options, and access to supporting facilities and services enable seamless construction and expansion of small, medium, and large-scale facilities.

Ready-Built Factories (RBFs)

FPIP's locator-ready, shell-type factory buildings cater to the needs of smaller-scale light to medium industries, as well as serve the back-end business of various industries such as assembly and contract manufacturing, and support/allied industries. This enables RBF locators to quickly establish efficient operations near their partners and prospective customers.This will allow the suppliers or partners of multinational and local companies to be located near their customers, an important requirement to enhance the coordination between buyers and suppliers.

FPIP continues to increase the leasable area of its ready-built factories, with over 180,000 square meters in leasable RBF space to date. FPIP's newest RBF clusters are now configured to accommodate solar panel installations. To complement the RBF specification customization that FPIP offers to meet the unique requirements of locators, FPIP also practices regular predictive and preventive maintenance to ensure that the facilities and equipment are in top condition.

Built-to-suit RBFs

Apart from FPIP's standard RBF offerings, FPIP offers built-to-suit RBFs to cater to a prospective locator's specific needs and requirements. FPIP's in-house teams of engineers and technical staff can provide expertise on refurbishment and renovations based on the locator's preferred handover conditions. Value-added services such as mechanical, sanitary/plumbing, and electrical engineering assistance are also offered, ensuring that locators receive the best customizable menu package available.

Benchmark for Park Development and Management

Best-in-class Infrastructure and Utilities with the Highest Reliability

FPIP provides high-quality infrastructure and utilities to assure locators of stable power and water supplies, reliable communication services, and accessibility. The park also boasts a centralized wastewater treatment facility and a solar-powered bridge as part of the park's sustainability efforts.

Power Supply

FPIP provides the most stable and reliable power supply to its locators via its exclusive on-site 115 kV substation with redundancy via three separate circuits and exposure to minimal inclement weather risk due to the presence of an underground power distribution grid.

FPIP also offers its locators the choice to get energy supply from clean and renewable sources through affiliates First Gen Corporation (FGen) and Energy Development Corporation (EDC). Both FGen and EDC have Retail Electricity Supply and Renewable Energy Supply licenses that allow partners to switch to 100% green and good power.

FPIP strives to deliver resilient and compelling energy solutions that promote energy productivity, empowering its customers to make the right choices and to do more with less energy, while simultaneously reducing their carbon footprints. By offering this option to locators, FPIP contributes to its group's mission of forging collaborative pathways for a decarbonized and regenerative future.

Industrial Water

FPIP has abundant industrial water through its fifteen deep wells and above-ground reservoirs, a 24/7 water supply to locators via a centralized distribution system backed by full-scale generators, and modern wastewater and centralized sewerage collection and treatment facilities.

Centralized Wastewater Treatment

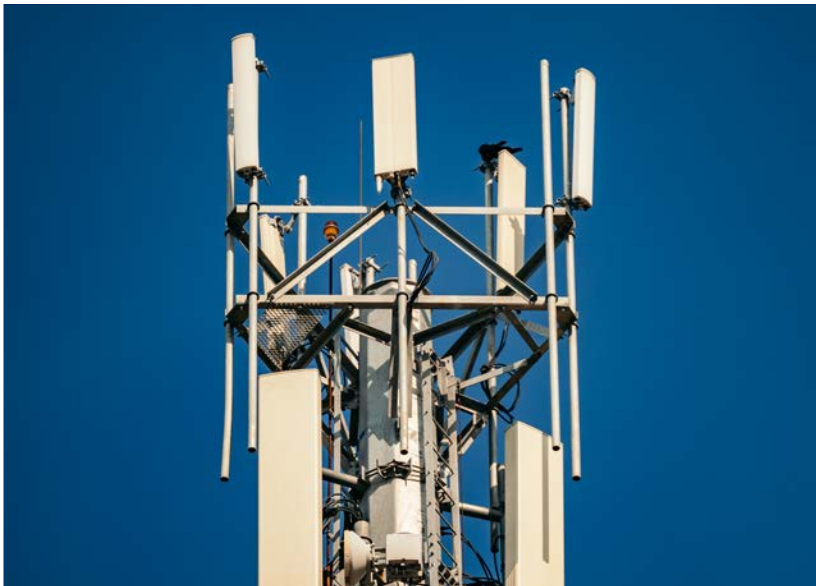
As part of the park's sustainability efforts and waste management, FPIP treats domestic effluents in its Centralized Wastewater Treatment Facility (CWTF). Wastewater from park locators is treated in the CWTF and becomes available for recycling or reuse. With this, groundwater extraction is reduced, and groundwater resources are preserved.

Telecommunications

FPIP ensures fast, consistent, and reliable internet services, capable of supporting video, voice, and data transmissions, through its wireless underground fiber optic and copper cables. It also offers a wide choice of telecommunication services through partnerships with multiple leading providers.

Road Network

FPIP provides a network of wide, well-paved, and properly spaced roads, with broad, concrete, 6-lane/ 40-meter right-of-way (ROW) main roads, 23m secondary roads, as well as newly installed dedicated bike lanes to ensure ease of mobility around the park. It offers a flood-free environment through an extensive underground drainage system and also remains environment and pedestrian-friendly with its well-lit pedestrian and bicycle lanes.



Solar-Powered Bridge

FPIP's newly constructed bridge is powered by solar energy and symbolizes the company's commitment to energy efficiency, sustainability, and low carbon emissions as it connects the industrial park with its expansion areas.

Laboratory Services

FPIP offers environmental laboratory services to locators, including monitoring services for wastewater to ensure compliance with environmental regulations. These efforts are also expected to result in increased convenience, lower costs, and faster response time for FPIP locators. FPIP is also increasing capacity by purchasing additional laboratory equipment, while adding qualified chemists, and ensuring strict compliance with external regulatory bodies.

Commercial Offering

FPIP offers not just space for industrial businesses, but office and commercial spaces as well.

Oasis Commercial Center

The Oasis Commercial Center is primed for office and commercial lease requirements. The three-story building offers office and retail spaces, and includes a school, retail establishments, banks, and a multi-purpose sports facility, among other amenities.

A Growing Variety of Commercial Facilities and Amenities FPIP offers a wide range of facilities and amenities for its locators and visitors to enjoy.

SanTomas Suites and Microtel Hotels

Business, leisure travels, and lodging are also made more convenient and comfortable at FPIP through the presence of SanTomas Suites and Microtel located within the industrial park.

- **SanTomas Suites** is a 40-room business hotel that serves as the perfect place for overnight or extended stays. It comes with all the essential amenities that ensure comfort and functionality, including a king-sized bed, high-speed internet access, work desk with lounge chair, and an energy-efficient airconditioning system.

- **Microtel Suites** is a 78-room hotel centrally located at FPIP which offers warm hospitality and smartly designed rooms. Each room offers the best value and amenities such as an individually controlled airconditioning unit, and a fully automated fire safety system.

Restaurants

Restaurants within FPIP that offer a wide range of cuisines include Minori-Tei (authentic Japanese food), Jongro Korean restaurant (authentic Korean cuisine) and Millie's (all-day continental and local dining), and are open for breakfast, lunch, and dinner. These restaurants also offer delivery services.

Consuelo Park

The new Consuelo Park, named after the matriarch of the Lopez family, aims to provide a space for relaxation, reinvigoration, well-being, and enjoyment to all those who visit. With its eco-trails, 600-person capacity amphitheater, bamboo grove, play fields, and pond feature, this community park is also envisioned to heighten social inclusivity and environmental responsibility.

Consuelo Park Residences

FPIP offers locator-employees the experience of relaxed community living with the Consuelo Park Residences, FPIP's first residential dormitory complex. Consuelo Park Residences features six (6) dormitory buildings and common facilities. Situated at the heart of the industrial hub and alongside Consuelo Park, residents enjoy easy access to work and recreational facilities as well as experience convenient and comfortable living through common facility provisions such as a dining hall, laundry shop, pocket gardens, walkways, bike racks, and the availability of internet and air conditioning units upon request. Safety and security of the place is also ensured with its gated premises and 24/7 security and CCTV surveillance.

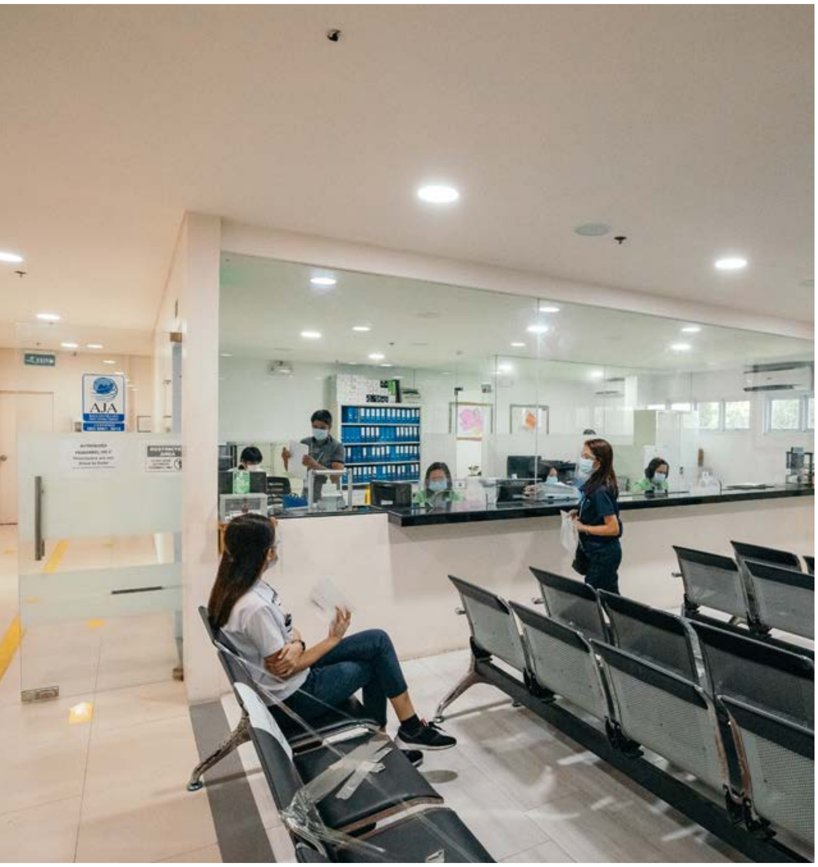
Oasis Multi-purpose Covered Court

The facility also includes the Oasis Multi-Purpose Covered Court, a covered twin court for different sports and recreational activities such as basketball, volleyball, tennis, badminton, darts, and table tennis. The venue may be leased for different company activities and events.

School: FIRST College

FPH established FIRST College in 2018 with a vision to create a school that will deliver real-world, relevant, up-to-date, and practical technical training. The goal was to develop students whose technical training and education is truly useful to modern industries—in a way that companies would want to hire students immediately after graduation.

It is the first college located inside an industrial park, and the first to offer a Bachelor of Science in Industrial Operations and Management program in the Philippines. FIRST College is committed to cultivating graduates that have both the technical and leadership skills needed to succeed in the 21st Century workplace.



Our Locators

FPIP is the preferred location of more than 140 world-class manufacturing facilities and support services. Today, FPIP is home to global and industry-leading businesses from various industries such as leading consumer electronic manufacturers Brother, Canon and Murata, leading aircraft interior manufacturer Collins Aerospace, bicycle parts manufacturer Shimano, motorcycle manufacturer Honda, tobacco giant Philip Morris, and leading food and beverage producers Nestlé and D&L, among others.

Through their partnership with FPIP, FPIP locators also gain access to the expertise and resources of the subsidiary companies of First Philippine Holdings (FPH), one of FPIP's parent companies. FPH's subsidiary companies offer end-to-end solutions, expertise, and experience in energy, power generation and distribution, transformer manufacturing, construction and engineering, commercial and residential estate development and management, as well as education and healthcare.

First Industrial Township

First Industrial Township (FIT), formerly known as Philtown Industrial Estate, is FPIP's sister company. It was acquired by First Philippine Holdings (FPH) and Sumitomo Corporation in January 2015 with the goal of expanding the industrial estate portfolio and increasing the reserve of land area for incoming locators.

FIT offers industrial land for lease, and investment solutions tailored to various locators' needs. FIT's offerings also include utilities and infrastructure with site developed lots in a variety of sizes and reliable facilities to ensure that locators will have everything they need to efficiently run their businesses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