

Appendix 1. Sectoral Analyses

1. Manufacturing

The overall performance and contribution to economy of the manufacturing industry has been weak and declining for the past two decades of the Philippines. With its GDP declining from 26.3 percent to 23.7 percent and share to value added and employment performing the same from 28.2 percent to 23.7 percent and 11.3 percent to 9.1 percent, respectively, the manufacturing sector has failed to influence growth, employment and productivity of the country.

Nevertheless, the industry remains to be the most important sector for long-term productive employment, revenue and value-added generation and innovation. The manufacturing sector remains to be the largest sector of the country accounting 21 percent of the total GDP in 2010 and generating Php3.4 trillion in 2009.

Now, the manufacturing sector continues to exhibit growth rates above 9.5 percent since the first quarter of 2013 and accelerated growth in the fourth quarter with 12.3 percent compared to 5.5 percent a year ago. Manufacturing even grew faster than services reaching a full year growth of 10.5 percent, nearly double the 2012 growth of 5.4 percent.

The following subsectors contributed positively to the growth of the sector: Chemical and chemical products, which grew by 124.5 percent from 3.5 percent in the previous year; Furniture and fixtures, which rebounded to 72.8 percent from a decline of 3.8 percent; Radio, television and communication equipment and apparatus, 3.6 percent from 19.9 percent; Beverage industries, 4.5 percent from 2.7 percent; and Footwear and leather and leather products, 17.5 percent from 24.5 percent. On the other hand, the following subsectors pulled down the growth of the sector: Wearing apparel, which plummeted 25.3 percent from 10.2 percent; Petroleum and other fuel products, which declined by 18.8 percent from a growth of 3.1 percent; Miscellaneous manufactures, dropped by 15.8 percent from 1.9 percent; Textile manufactures, further dropped by 20.4 percent from negative 6.9 percent; and Electrical machinery and apparatus, declined further to 15.0 percent from negative 13.5 percent.

Based on the studies of The Manufacturing Institute (TMI), the manufacturing sector has a multiplier effect of 1.4. For every liter of paint produced, it required a range of raw chemical raw materials, packaging like metal or plastic containers, printed paper labels, delivery trucks, it required capital equipment that grinds, blends filters and stores the product. It employed chemist in laboratories, engineers and operators to run and maintain the plant. It requires utilities like electricity and water. It requires “services” such as financial, marketing, sales and logistics services. Manufacturing is called the engine of the economy. Many services exist because of manufacturing; and many service jobs will disappear if manufacturing disappears¹.

¹Based from an article of Mr. Bobby Batungbacal, Director, Federation of Philippine Industries, Inc., entitled, “The Strategic Importance of the Philippine Manufacturing Sector” dated October 6, 2011.

Appendix 1. Sectoral Analyses

Thus, the revival of the manufacturing industry could highly contribute in the attainment of the commitment of the President to the Filipino people to pursue economic growth and generate more employment. It is for this reason that the government has for 2014-2016, the government has declared the Manufacturing Resurgence Program as a flagship program. The manufacturing industry roadmap crafted by the Philippine Institute for Development Studies (PIDS) would be its main blueprint.

a. Automotive (Motor Vehicle Assembly and Parts Manufacturing)

The motor vehicle industry represents a significant portion of the global economic activity with extensive upstream and downstream linkages to many diverse industries and sectors. The employment, skills, and export potentials associated with car production are enormous. The fact is, the top 20 industrial economies in the world are also the top 20 auto producers; lending credence to the fact that no country has ever become a developed industrial economy without an auto industry; from Japan, to the United Kingdom, to China not even the United States.

In 2013, it posted a 16 percent increase in the total number of four-wheel vehicles sold, that is, from 182,779 units in 2012 to 212,414 units sold in 2013. The Philippine automotive manufacturing sector, particularly car manufacturing, has an annual capacity of 200,000 units. Unfortunately, these facilities are highly underutilized at 36 percent. The growing preference for CBUs, importation of used cars, and smuggling of vehicles have all factored in the decline of local production.

There are a total of four (4) car manufacturers currently operating in the Philippines – Toyota Motor Philippines Corp. (TMPC), Mitsubishi Motor Philippines Corp. (MMPC), Honda Cars Philippines Inc. (HCPI), and Nissan Motor Philippines Inc. (NMPI). Ford Motor Company Philippines (FMCP) used to manufacture vehicles in Santa Rosa, Laguna until December 2012. FMCP closed its Philippine assembly citing low production volume and lack of supply base as the main reason of its closure.

Aside from car manufacturers, there are 14 firms producing commercial vehicles such as light trucks, trucks, and buses. MAN Automotive Concessionaires Corp., Pilipinas Hino, and Universal Motors Corp. (Nissan Diesel) dominate the truck and bus categories while others focus more on the production of light trucks.

The presence of these automotive manufacturers in the Philippines gave birth to some 272 original equipment manufacturers (OEM) supplying the more than 300 parts and component requirements of local automotive manufacturers. Some of these parts and components, e.g., transmissions, wiring harness, among others, are also exported.

In the case of electric vehicles (e-vehicles), the market is just starting to develop in the country. There are already a few that have registered with the BOI to assemble e-trikes in anticipation of the implementation of the Asian Development Bank (ADB) program for the supply of e-trikes to several local governments.

Appendix 1. Sectoral Analyses

Employment and Export Performance

The automotive and auto parts manufacturing provides stable wages and working conditions even across a range of other industry sectors. In the Philippines, the industry employs 8,000 in the auto manufacturing and 60,000 in the auto parts manufacturing. Careers are also often long-lived; workers are employed for an average of 20 or 30 years. In addition, the industry employs around 340,000 in the auto-supporting industries.

The auto parts industry has also generated exports for the country, thus making it a foreign currency earner. In 2013, the industry's export reached \$3.3B which alone is already 0.5 percent of the country's gross domestic product.

There is still no local production of e-vehicles in the country.

Latent Comparative Advantage and Potential to Move up the Value Chain

The supply network of the automotive industry is characterized by a tiered structure. The OEM is supported by a small number of first tier suppliers which are also supported by other suppliers. Tier 1, which are mostly large firms, are surrounded by lower tier suppliers. Tier 2 firms may be large or small and medium enterprises (SMEs) supplying parts, components and other inputs to the next higher-tier suppliers. Tier 3 firms are at the lower-end of the value chain and are predominantly SMEs performing low-skill, low value added activities and manufacturing relatively simple products. Higher level tiers 1 and 2 are characterized by greater skill, technology, knowledge, innovative and value adding and creation activity as well as pricing power and brand presence. Lower tiers 2 and 3 are characterized by lower skill, technology, innovative and value adding activity and the need to compete on cost. The activities of tiers 3 and 4 are considered as relatively simple and require unskilled labor and standardized low level of technology (Abonyi 2005).

The auto parts potential to move up the value chain is also HIGH, considering the capability of existing players and high trainability of Filipino workers and that there are 30,000 parts in every vehicle, and currently there are 256 parts manufacturers producing only over 300 parts and components made of metals, plastic, rubber and composite materials for both the original equipment manufacturer (OEM) and replacement market.

Considering the current sentiment on sustainable development and fearful of the climate change effects, the government has made e-vehicles part of the priorities. Further, the Electric Vehicle Association of the Philippines (EVAP) has formulated its roadmap that would see the Philippines a significant player in the global production of e-vehicles.

Appendix 1. Sectoral Analyses

Spillover Effects

Of the 256 parts manufacturers, 124 are considered first-tier manufacturers while the remaining 132 are mostly small and medium enterprises that act as sub-contractors and serve as second- and third tier suppliers. Tier 1 suppliers are multinational affiliations while Tiers 2 and 3 suppliers are mostly 100 percent Filipino owned companies.

Tier 1 suppliers are large firms with capitalization of more than Php100 million and account for about 7 percent of the industry. They are mostly suppliers from Japan brought in by assemblers forming part of their vertically integrated operations. For example, Toyota Motor Philippines is supported by large first tier enterprises such as Aichi Forging metal/casting/forging), Fujitsu Ten (audio/electronics), Philippine Auto Components (electrical/meters), Technol Eight (metal parts), Tokai Rica Philippines (electrical/mechanical parts), Toyota Autoparts Philippines (transmission), and Toyota Boshoku Philippines (interiors/seat assembly).

Tiers 2 and 3 suppliers, on the other hand, form the bulk of the industry mostly composed of small firms with capitalization of Php5 million and below. Most of them operate as mom and pop style suppliers with varying capabilities and some real quality problems. These firms failed to develop as they have insufficient capital and technology that are necessary to improve their products. They comprise the major players of the industry and are the same companies manufacturing parts for OEM car assemblers and engaged in exporting activities. The major players in the automotive components manufacturing sector are Yazaki-Torres Manufacturing Corp. and United Technologies Automotive Phils. (wiring harness); Temic Automotive (Phils.), Inc. (anti-brake lock system); Honda Parts, Asian Transmission Corp. and Toyota Autoparts Phils. (automotive transmission), Fujitsu Ten Corp. of the Phils. (car stereos) and Aichi Forging Co., Inc. (forged parts). These companies are manufacturers of wiring harness; transmission; alloy wheels; radiator, leaf spring, and stamp parts; tires; and auto rubber parts. Almost 60 percent of all parts manufacturers produce OEM parts while the remaining 40 percent caters to the replacement market.

The automotive industry generate skills base, comprising of mechanical, process and materials engineering, foundry engineering, fluid mechanics, CAD/CAM designers, welders and fitters & turners, alongside specializations in chassis systems and lubrication products. There are also significant spillover effects of this skills base into critical elements of the mining, aerospace and possibly the defense sectors.

Supply Chain Gaps/Binding Constraints

As mentioned earlier, there is lack of locally manufactured parts and components and other support activities. Of the 30,000 parts to make a car, only 300 are currently produced in the country.

Appendix 1. Sectoral Analyses

Further, there is lack of scale in the production by the car assemblers that lead to a cost handicap relative to the ASEAN competitors like Thailand and Indonesia. This could be attributed to high logistics cost in the importation of the large parts, particularly, the body shell and other large plastic moulded parts.

The establishment of stamping facilities to make these large parts require high capital investments, and thus, production volumes would have to be increased to make it a sound investment.

At present, there is a relatively small domestic market for the local producers. The concern on market size is further aggravated by the cases of smuggling and cheaper imports from ASEAN and China.

In the case of e-vehicles, the binding constraint is in the absence of batteries for such vehicles, i.e., batteries other than lead acid batteries, as well as control assembly. It is noted that e-vehicle batteries (e.g., lithium-ion batteries) accounts for 40-50 percent of the cost of the vehicle.

Policy Response

To address the above supply chain gaps and binding constraints, the following interventions have been identified:

- Provision of incentives to investments in assembly operations with stamping facilities and production of critical parts and components;
- Provision of R&D support to the parts and components manufacturers;
- Demand stimulation measures such as refueling of government vehicles, facilitation of franchising procedures, and strict implementation of the ban on used cars importation.

It may be noted that the Metals Industry Research and Development Council (MIRDC) of the Department of Science and Technology (DOST) has approved funding for a testing facility for automotive parts and components in its compound.

b. Motorcycle

The motorcycle industry covers the manufacture and assembles of motorcycles and its parts and accessories. For the year 2010, the motorcycle industry contributed Php8.2 billion worth of value-added. In the same year, the industry produced around 1.052 million motorcycles, making the Philippines no. 8 in the world's motorcycle production, overtaking Japan, and 4th in ASEAN, surpassing Malaysia.

There are five motorcycle companies that are members of the Motorcycle Development Program Participants Association (MDPPA) and thirteen members of the

Appendix 1. Sectoral Analyses

Chamber of Assemblers & Manufacturers of Motorcycles in the Philippines (CHAMMP) registered participants of the Motor Vehicle Development Program (MVDP).

The Philippines' motorcycle density for 2011, i.e., the ratio of number of people for every motorcycle, is 24:1. Untapped domestic market presents a healthy picture for the industry. Even after saturation, Filipinos will continue to use motorcycles in various travel needs and livelihood.

Employment

The motorcycle manufacturing industry employs around 5,000 personnel, and generates 3,000 additional jobs for its support/allied sectors.

Supply Chain Gap/Binding Constraints

The motorcycle industry's upstream sectors include iron and steel, the metalworking industries, such as metalcasting and tool and die, rubber, petrochemical and electrical industries. Its downstream industries include the dealerships networks and distributors around the country.

The most binding constraints preventing entry and/or moving up value chain of the industry are as follows:

- Underdeveloped local parts manufacturing sector;
- Short model life cycle;
- Lack of testing facilities;
- Smuggling and proliferation of counterfeit motorcycles and parts.

The steady rise in production of motorcycles has led to increased demand for parts and components. However, the industry has a very low localization rate. The local parts and component industry has not been able to capitalize on this demand increase and has been highly dependent on imports for a variety of critical parts and components. The local parts manufacturing on the other hand has been hesitant to invest because of the short model life cycle, in short, any investment must be recovered within 3 years before the model is phased out of the market thereby making their components uncompetitive in terms of price.

Spillover Effects

The motorcycle industry, like the automotive industry also generate skills base in areas of mechanical, process & materials engineering, foundry engineering, fluid mechanics, CAD/CAM designers, welders, fitters & turners and lubrication products. Upstream from the motorcycle manufacturing there also lays a network of direct and indirect suppliers. There are the motorcycle supporting industries that include machinery and equipment, dies and moulds, metal stamping and die casting and machining. Parts and

Appendix 1. Sectoral Analyses

components manufacturing also has a place in the supply chain feeding motorcycle manufacturing, as first, second or third tier suppliers. Thus, the spillover effects of the motorcycle industry, like the automotive industry is also HIGH.

The domestic market presents a healthy picture for the industry, such that the current Philippine possession ratio of 24:1 is an appealing factor to the industry compared to other ASEAN countries where the density of motorcycles per person is near the saturation point. The situation offers tremendous growth potential in the near future.

Policy Response

The domestic market presents a huge potential for growth with motorcycle density still far from our ASEAN neighboring countries. It is therefore important to equip the industry to capitalize on the opportunities, as well as face the changes and challenges in a liberalized and open market environment. This is where the government can step in and provide the boost to the industry to increase their competitive edge, especially in the motorcycle parts manufacturing.

The following have been identified as possible interventions for the industry:

- Provision of fiscal incentives to develop critical parts manufacturing and allied industries such tool and die, injection molding facilities;
- Establishment of testing facilities;
- Strict enforcement of customs and IP laws.

c. Electronics

The Philippine electronics industry began in the mid-seventies when industrialized nations relocated their production facilities to third world countries in order to control the escalating cost of production. The Philippines was an ideal relocation site due to its cost competitive, highly-educated and English-speaking labor. Other factors included the country's geographical location (being at the crossroads of international trade), and attractive government incentives. The conditions that encouraged foreign electronics companies to turn to the Philippines have remained and have been further enhanced by the country's political transition to popular democracy in 1986. Since then, the industry has grown rapidly and overtook agriculture as the leading export earning industry in 1996.

Employment and Export Performance

The Philippine electronics industry remains to be the major contributor to the economy, accounting still for 40 percent of total exports in 2013.

As of December 2013, in terms of employment, the sector directly employs around 273,000 and contributes around 1.91 million indirect employment.

Appendix 1. Sectoral Analyses

Latent Comparative Advantage and Potential to Move up the Value Chain

Semiconductor Manufacturing Services (SMS) account for **77 percent of all electronics exports**, but include only back-end testing and assembly as the country does not have manufacturing capability for semiconductor wafer fabrication. The remaining **22 percent is comprised of Electronics Manufacturing Services (EMS)**. According to SEIPI, industry trends identify several EMS subsectors with high growth potential: Medical/Industrial Instrumentation, Automotives, Consumer Electronics and Office Equipment. Similarly, PHL is the traditional top choice worldwide for Test and Assembly operations, but value-adding does not come from these operations, and instead derives from semiconductor research and chip design processes.

Sales from semiconductors will continue to be on a downward slide, as these are mainly legacy products with declining profit margins that are dependent on the industry's fast turnover trend of cheaper and increasingly more efficient products (similar to how the price of USB flash drives has gone down while memory capacities have doubled). This means that the Philippines will definitely have to focus more on the electronics side to remain competitive for the long term.

To this end, SEIPI, with the support of BOI, is currently in the process of securing funding for its proposed industry think tank project, entitled "Product and Technology Holistic Strategy (PATHS)", which aims to identify product niches and an overarching long-term industry strategy for the Philippine electronics sector over the next 5 to 10 years.

Spillover Effects

The Electronics industry has the highest global value chain (GVC) participation rate, with a share in foreign value added in trade of all exports at 45 percent. This is because the products of this industry can be broken down into discrete components that can be separately produced, easily transported and assembled in low-cost locations.

Supply Chain Gaps/Binding Constraints

Based on the current structure of the industry, the identified supply chain gaps include IC design, wafer fabrication and R&D in the upstream section and no manufacturing diversification in the downstream. Constraining the development of the upstream and downstream activities are the lack of highly-skilled workforce, high power costs, lack of technology and product innovation, financing, and SME product development initiatives.

Appendix 1. Sectoral Analyses

Policy Response

To address the above constraints, the Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD) of the DOST approved funding for the establishment of the following facilities:

- Advanced Device and Materials Testing Laboratory (ADMATEL);
- Electronics Product Development Center (EPDC); and
- Philippine Institute for Integrated Circuits (PIIC).

In addition, the government will develop SME localization programs (“Big Brother- Little Brother”) to further enhance the participation of SMEs in the value chain.

Other interventions include human resource development, reducing the cost of doing business in the country (taxes, energy cost, logistics cost, etc.), and investment promotion.

d. Chemicals, Petrochemicals, and Oleo-chemicals

The chemicals industry is considered as one of the pillar industries in any economy as it supports all sectors of the economy, namely: agriculture, services, and manufacturing. The various chemical sub-sectors include petrochemicals, oleo-chemicals, coatings and inks, adhesives, plastics, fertilizers, cosmetics and personal care, soap and detergent.

Employment and Export Performance

Based on the Labor Force Survey (LFS) conducted by the Bureau of Labor and Employment Statistics (BLES), the chemical industry employs a total of 176,000 employees as of July 2013. The Samahan sa Pilipinas ng mga Industriyang Kimika (SPIK) provided industry estimates on the number of direct workers for the following sub-sectors: petrochemicals–3,000 direct workers; oleo-chemicals–3,000 direct employees; and the chlor-alkali sector–600 direct employees. However, industries which use their products employ huge numbers of employees (food processing, healthcare, electronics, transport and energy, construction and automotive).

The Philippine Chemical export performance has been increasing. Based on the industry’s export performance from 2009 to 2013, exports grew by 167.80 percent from US\$969 Million in 2009 to US\$2.595 billion in 2013. However, the industry is still a net importer of chemical products with a value of US\$5.1 billion imports compared to the export value of US\$2.3 billion, both as of October 2013.

Appendix 1. Sectoral Analyses

Latent Comparative Advantage and Potential to Move up the Value Chain

There is a high potential for the industry to move up the value chain given that it shall make use of the latest available technology in their operations. As an example, the expansion in chlor-alkali production capacity would be making use of the latest available technology called the Ion Exchange Membrane (IEM) which will give more efficient and cleaner processing. The first naphtha cracker plant in the Philippines has been constructed and will commence commercial operations in August 2014. The said naphtha cracker will be the base producer of the raw materials to be used as feedstock by the midstream petrochemical polymerization plants. Further, one of the country's vital assets, the coconut, serves as the major input for oleo-chemicals, i.e., cocochemicals, which are recognized as natural and sustainable.

Spillover Effects

A wide window of opportunities exists for the domestic chemical industry market as it exhibits strong linkages to industries such as agriculture, agribusiness and fishery, housing, cement, pharmaceuticals, and creative industries. Petrochemical products may be used in construction, electronics, transportation, telecommunications, agriculture, packaging, and furniture. Chlor-alkali, which is an input for petrochemicals, may also be used in water treatment, batteries, agrochemicals, electroplating and galvanizing, and pharmaceuticals. Lastly, oleo-chemicals, which are derived from coconut oil, can be used in everyday products such as soap, cosmetics, pharmaceuticals, detergents, and food products. The development of the Philippine chemical industry would give support to the roadmaps of the plastics, automotives, electronics, and copper industry roadmaps, among others.

Supply Chain Gaps/Binding Constraints

The nature of the industry that covers the upstream, midstream, and downstream sectors makes the network of the different sectors an interactive partnership and competition in itself.

The petrochemical industry is a strategic industry in an economy. In most countries, the development of the petrochemical industry is primarily hinged first on supplying the domestic market resin requirements and subsequently, expanding capacity to cover export market to further achieve economies of scale.

Based on the Philippine Chemical Master Plan, the industry emphasized the importance of the full integration of the petrochemical industry which includes the expansion of naphtha production and diversification of petrochemical products, so as to help in achieving inclusive growth and sustainable socio-economic development. The need for the petrochemical industry integration is seen vital as there are gaps in the supply value chain that needs to be filled in.

Appendix 1. Sectoral Analyses

The midstream petrochemical industry has 7 major players which provide the needs of its downstream plastics industry consisting of more than 100 players. Due to the insufficient supply of raw materials, the downstream industry is forced to import its requirement. Therefore, a supply chain gap in the midstream petrochemical exists; and this will be partly addressed by the Naphtha Cracker as it will produce the raw materials ethylene and propylene, to produce PE and PP. Other than PE and PP, an expanded PVC production is needed to meet domestic demand. The size of a PVC expansion necessitates an economical supply of chlorine from a chlor-alkali plant.

In addition, the Philippines is currently confined to only one component of the oleochemical value chain, which is an ingredient manufacturing. But the entire value chain is quite long, comprising of feedstock production, ingredient manufacturing, compounding and formulation, branding and packaging, logistics and distribution, retail or direct marketing.

Policy Response

Having stable operations of the domestic petrochemical facilities, leading to a steady supply of ethylene, propylene, PE and PP materials, will help develop local olefins and polyolefins demand and as such may lead to an increased market size for the said products. This creates the environment for having the current facilities undergo further capacity expansions, for which the granting of investment benefits will play an important role in ensuring the sustainability of the industry's operations.

It is a known fact that chemical plant facilities are highly capital intensive and usually require foreign technologies. Thus, it is not uncommon that foreign investors are highly encouraged by governments to participate/invest on these projects considering the huge capital investments required.

Other than incentives, there should be research & development (R&D) support given to the industry in order to be innovative, both in its products and processes. Further, product innovation and technological advancements should be supported by strong knowledge-based workers in the sciences. R&D support should then be supplemented with skill training programs for chemists, scientists and engineers who shall mobilize the industry.

Technical smuggling shall be addressed through the strict and proper implementation of customs laws. Lastly, investing in the construction of power plants and logistics infrastructure should also be considered to address the concerns of high power costs and availability, as well as logistics costs.

e. Shipbuilding and Ship repair

For the year ending 2013, the Philippines regained its position as the 4th largest shipbuilding nation of the world in terms of gross tonnage, with just a 0.3 percent edge

Appendix 1. Sectoral Analyses

over Brazil. It is thus noteworthy that more shipyards in the country are building more ships of higher tons such as bulk carriers, container ships and passenger ferries. Investments in shipbuilding facilities are seen to benefit the food manufacturing, tourism, transportation, oil and steel industries.

Employment and Export Performance

One of the major contributions of the sector is its employment generation. At present, the sector employs 45,038 Filipino workers, 70 percent of whom belong to the skilled and semi-skilled category. Hanjin Philippines alone employs 25,000 workers. Enhancing investments in the ship building and ship repair sector (SBSR) will surely generate additional jobs for Filipinos. Based on the Input-Output (I-O) Analysis², the sector has a simple global employment multiplier of 395. This means that a one-billion peso investment in the sector can potentially generate 395 jobs across the various industries.

The sector has also generated exports for the country, thus making it a foreign currency earner. In 2012, the sector's export receipts reach US\$1.07 billion, which is already 0.7 percent of the country's gross domestic product.

Latent Comparative Advantage and Potential to Move up the Value Chain

A latent strength of the sector which still needs to be fully taken advantage of is the country's strategic location to the shipping routes of oceangoing ships serving the Asia-Pacific region. Such strategic location could be translated into the country becoming a hub for ship repair and dry-docking of oceangoing ships, including fishing vessels operating in international waters. For this latent strength to be realized, the country's shipyards would need to be capable and competitive with neighbouring foreign shipyards, in servicing the dry-docking/repair requirements of oceangoing ships.

Ship building being a heavy industry with high degree of technology immersion, this offers an opportunity for foreign collaboration. According to the Nomura study entitled "accelerating foreign direct investments (FDIs) in the Philippines' Shipbuilding Industry," Japan seems to be the most promising to the Philippines in attracting FDIs in the SBSR sector, followed by Korea. The study further indicates that Japan, China and Korea are potential markets for investments in shipbuilding. At present, the Philippines hosts some of the world's biggest players in shipbuilding such as Japan's Tsuneishi with its Cebu facility now its second largest shipyard.

A more concrete strength of the sector is the readily available cheap and easily trainable technical and skilled manpower for shipbuilding and ship repair works in the country. Many Filipino workers have inherent skills for shipyard-related jobs like welding, pipe fitting, moulding, etc., including technical/engineering competence. With comprehensive training programs, a pool of skilled shipyard manpower would easily

² Input-Output Analysis was prepared COMPETE Project and Center for Research and Communication (CRC) with funding from the United States Agency for International Cooperation (USAID)

Appendix 1. Sectoral Analyses

become a basic asset of the sector, not only for local shipyard requirements but also for foreign-based shipyards.

Spillover Effects

The local industry has the potential to develop 18 backward linkage industries which may include ship out-fittings, safety accessories, marine lighting, maritime signs, symbol and posters, switch gear, furniture, marine cables, anchor and chain, electrical and electronic items and shipbuilding steel plates.

In addition, the shipyards could also provide ship repair services to the local shipping industry and serve as an alternative ship repair hub to Singapore in ASEAN.

Supply Chain Gaps/Binding Constraints

At present, virtually all raw materials, ranging from engines to steel, electronics, furnishings, cabling, piping and washbasins are imported. Thus, investments in parts and components as mentioned above would be most beneficial to the economy.

Further, it is very seldom that a Filipino shipping firm orders a brand-new vessel. Ship operators choose to import second-hand ships from Japan, South Korea, and Europe. Thus, there is low domestic demand that likewise result in small and outdated shipyards.

Policy Response

To ensure that the Philippines remains as a major player in the SBSR sector, it is necessary that investments are encouraged in the local parts manufacturing and other support industries as well as ensure that the country's regulatory environment remains competitive with other ship building countries.

Noting the country's current small market due to the preference of ship operators to import second-hand ships from Japan, South Korea, and more recently from Europe, it is advised that the provision on vessel retirement under the Domestic Shipping Act be implemented by the Maritime Industry Authority (MARINA).

Other possible support to the industry include investment promotion activities to forge joint-ventures, partnerships or tie-ups with foreign shipyards to address concerns on capitalization and access to more advanced technology and modern facilities.

f. Aerospace

The Philippines has the potential to be a center for manufacturing for the global aerospace and aviation industry. According to the industry, the next two decades could see the country becoming a manufacturing hub of aerospace and aviation parts and components in the ASEAN region, generating jobs that will surely upgrade the capabilities of local

Appendix 1. Sectoral Analyses

labor to advanced stages of competence in varying degrees. In 2013, the aerospace industry accounted for 0.15 percent of the estimated US\$257 billion GDP.

The aerospace industry projects a double-phased growth over the next five years.

Employment and Export Performance

The aerospace industry directly employs 2,200 personnel in 2013. With government help, the industry projects to employ about 14,932 personnel by 2022.

In 2013, aerospace parts exports amounted to US\$385 million. The industry projects to export about US\$2.57 billion worth of parts by 2022 if the roadmap recommendations would be followed. It should be noted that the local aerospace industry is a net export industry, with 99 percent of industrial output manufactured for export.

Latent Comparative Advantage and Potential to Move up the Value Chain

Currently, there are three principal Tier 1 International Suppliers/Original Equipment Manufacturers (OEMs) in the Philippines: Moog Controls Corp., which manufactures flight control actuation systems, B/E Aerospace, which specializes in aircraft galley and equipment manufacture, and JAMCO, which manufactures airframes and sub-assemblies. These major OEMs subcontract some of the processes to Tier 2 and Tier 3 suppliers in the Philippines. Thus, there is the potential to move up the value chain and secure the chance to supply more of the critical aircraft parts and components. A complete supply chain will potentially attract more principal Tier 1 manufacturers to locate in the country, which can have spillover effects as their demands can create more subcontracts to local Tier 2 and 3 suppliers.

Young, relatively cost-competitive, English-proficient, highly-trainable and fairly knowledgeable manpower has been the comparative advantage of the Philippines, which is supported by a chain of aerospace and aviation schools.

Spillover Effects

An aircraft requires thousands of spare parts which provide large opportunities for OEMs, their Tier 1, 2 and 3 suppliers, plus the MRO companies. The manufacturing industry for aerospace is fast gaining momentum, bringing with it related industries in the supply chain as well as other backward and forward linkages of industries. These include: tool and die, metalworking, chemicals, plastic, rubber, electronics, logistics and tourism. Promoting the aerospace parts and components manufacturing industry will generate more economic activities by increased outsourcing of manufacturing to more of our local SME subcontractors and suppliers of our principal OEM locators.

Further, the aerospace sector, being an export-oriented industry, is densely located in industrial areas and export zones such as Laguna/Batangas, Baguio, Bulacan and Metro

Appendix 1. Sectoral Analyses

Manila. Thus, employment generation and skills development would likewise have geographical spillovers in nearby areas.

Supply Chain Gaps/Binding Constraints

Industry challenges limit its full capabilities into machining, assembly, production and delivery. The country's major players in Tier 1, i.e., Moog Inc., B/E Aerospace and JAMCO, are mainly involved in said processes with some companies in Tier 2.

Also, raw materials are imported because aerospace parts manufacturing is a highly standards-dependent industry. United States, Canada, United Kingdom, Singapore and some European countries are the main sources of raw materials for aerospace manufacturing. Raw material gap in the value chain goes with inadequacy in terms of special processing, chemical / metallurgical testing and fine machining. Though some of the Tier 1 players have the capabilities on some of those processes, firms still come up with the resort to outsource these processes from Singaporean companies.

In terms of production and process capability, the following are the identified gaps:

- High-end machine tools and metrology equipment;
- Fine Machining (hone, fit , lap, extrude, hone, deburr equipment);
- Heat treat, surface treatment process;
- Gear manufacturing;
- Non-destructive inspection (NDI) and plating/metallurgical;
- General functional testing for compliance to aerospace requirements;
- Chemical test / solution test compliance to aerospace requirements.

Likewise, accreditation for potential entrants to the aerospace industry is said to be expensive, tedious and time-consuming. Standards for aerospace parts manufacturing is high because of the demands for safety. Tier 1 companies and their suppliers and subcontractors must comply with certain aerospace standards (such as AS9100 or NADCAP) to be able to supply to Boeing or Airbus for instance.

Policy Response

There should be a focus on the build-up of the aerospace supply chain through the promotion of productive partnerships between buyers and suppliers, the enhancement of the business environment and the improvement of the technical base capability through manpower education and training, and technology systems upgrading.

Recognizing that integrating the aerospace supply chain locally can reduce costs by 19 percent, trade facilitation/integration of the supply chain should be encouraged for these components:

- Raw material supply/distribution (MIL/AMS Specifications);

Appendix 1. Sectoral Analyses

- Transport and import / export turn-around;
- Completion of process capability in the supply chain;
- Tooling and chemical supply distribution.

Likewise, investments would be encouraged in aerospace parts and components manufacturing to attract the other major Tier 1/OEMs to locate in the Philippines that would ultimately increase manufacturing opportunities for our local metals and engineering industries.

Partnership between industry and the government, particularly the MIRDC-DOST would be enhanced through support programs on process capability building, supply chain integration, and training & education. The MIRDC can provide training programs and certifications on industry accreditation for Aerospace Standards (AS 9100, NADCAP) to Tier 1, 2 and 3 supplier companies.

Further, policies that support trade facilitation for imported raw materials and processes, and improvement of logistics efficiency to reduce cost and import and export lead times would also be considered.

g. Copper Industry

The copper industry is a disjointed industry, local productions of copper concentrates and cathodes are being exported while domestic requirements for concentrates, cathodes and rods are being imported. There is minimal or no linkage between industry players.

The output of the Philippine copper mines today is less than 25 percent of what it was in the 1970's, coming from just four mining projects with deposits that are about to be exhausted. At 250,000 metric tons per year, this is not enough to supply the annual concentrate requirement for smelting, which is about 720,000 MT under the existing full capacity cathode production. All the concentrate output is exported by mining companies. The sole smelting plant, PASAR, buys all its copper concentrate requirement abroad and also exports almost all of its copper cathode produce abroad. Only a minimal quantity goes to the domestic rod production for own use of less than a handful of wire and cable manufacturers on an intermittent basis. The rest of the establishments in the wire and cable industry source their copper wire rod requirements abroad and essentially sell to the domestic market, with only one exception.

Appendix 1. Sectoral Analyses

Employment and Export Performance

The mining industry supplies roughly 250,000 metric tons (MT) of concentrates annually, but all of these go to foreign markets as there is no local demand for copper concentrates at this time. There is potential demand from PASAR, but only when concentrate output increases substantially giving some comfort on the supply reliability to the cathode producer. Locally-produced copper cathodes are also nearly 100 percent exported.

Moreover, at least 90 percent of the output of the local wire and cable producers goes to the domestic market, while 10 percent are exported, mostly to Taiwan and Korea (sold mainly to the companies' subsidiaries in these countries). The domestic market, in turn, is about 60 percent supplied by local producers and 40 percent by imports including possibly smuggled substandard products, according to industry sources. Capacity utilization among local producers averaged about 50-60 percent, indicating that existing capacity is sufficient to meet local demand over the medium-term. In 2011, export of copper products reached US\$1.64 billion.

The 2009 Annual Survey of the Philippine Business and Industry (ASPBI) reported 3,700 employed in insulated wires and cables, with total compensation accounting for 4 percent of production cost. PASAR employs about 1,000 with annual salaries and wages representing 20 percent of total operating expenses.

Latent Comparative Advantage and Potential to Move up the Value Chain

The Philippines has significant deposits of copper, reputed to be among the biggest in the world. It also has a world class copper smelting plant. It has a thriving local wire and cable manufacturing, and exports automotive wiring harnesses and copper foil in significant quantity out of its special economic zones. It used to operate copper wire rod casting plants commercially.

If the industry gaps would be connected, it is envisioned that the Philippines could produce and export more of the higher value added copper products that are used in the other industries such as electronics, construction, automotive, and chemicals, among others. A start in this endeavour is the establishment of a copper wire rod facility that would connect the copper concentrate production to the copper wire production.

Spillover Effects

The actual production of copper, its transformation and further processing of semi-finished products into components for end-user goods comprise the product segment of the industry. Copper's final products are essentially inputs to the manufacture of end-user goods like cars, mobile phones, computers, valves, and electrical materials, among others. Currently, there are four (4) operating copper mines that are producing concentrates of about 250,000 MPTY.

Appendix 1. Sectoral Analyses

As the full integration will not be about having a single entity performing most or all stages of processing, but more of an industry where one entity performs the crucial stage of processing and provides for the needs of others in the various stages of processing, there is a great opportunity to create spillover benefits across the industry. As integration happens from the upstream with the development of major copper mines to the midstream with the establishment of a copper rod casting facility and the downstream with the development of new copper products, cost competitiveness across all user industries would be enhanced, thereby, spurring further access to the local and regional/global supply chains.

Supply Chain Gaps/Binding Constraints

The product segments of the copper industry can best be described by considering the industry's supply chain which is divided into three main areas: (1) the actual production of copper, (2) its transformation and (3) further processing of semi-finished products into components for end-user goods. Copper's final products are essentially intermediate products, entering as inputs in the manufacture of end-user goods like cars, mobile phones, computers, valves, electrical materials, etc.

As mentioned earlier, the copper industry is disjointed. The local production of copper concentrates and cathodes are being exported while domestic requirements for concentrates, cathodes and rods are being imported. Thus, there are several gaps to close in this industry. For starters, the government is looking at encouraging investments into the copper wire rod facility to link the copper concentrates to the copper wire production. The pre-feasibility study for the establishment for such a facility has already been completed.

For the upstream integration, this becomes physically viable if local supply of concentrates is sufficient and stable enough to meet the volume requirement of PASAR, which is 720,000 metric tons per year (MTPY) under existing smelting capacity (the company plans to expand its capacity shortly), more than twice the available domestic concentrates supply. The development of major copper mines like Tampakan, Far Southeast and Silangan will increase the potential for upstream integration. In order to support the development of a few large scale, efficient and sustainable copper mines, a rational mining policy and program is needed.

For the downstream integration, the objective is to have local production of 12,000 MTPY of copper rods by 2016. A pre-feasibility study on the establishment of a copper wire rod facility has already been completed and indicated that such activity is profitable. Support is needed to promote investment in the copper wire rod-making facilities.

Appendix 1. Sectoral Analyses

Policy Response

Based on the copper industry roadmap, to achieve integration of the industry, the priority focus is to: (1) support the development of a few large scale, efficient and sustainable copper mines; (2) immediate actions covering the downstream industry, as this is where value can be optimized and can achieve results relatively more quickly; and, specifically, (3) the re-building of the copper wire rod segment of the downstream industry, which is currently the missing link in the value chain and where the country used to have a brief success.

To this end, the following interventions have been identified:

- Develop a rational mining policy to develop world-class copper mines;
- Work on the integration of the copper industry by encouraging investments in the current industry gaps, e.g. conduct investment promotion activities for a copper wire rod facility;
- Encourage agglomeration of allied and related industries to reduce logistics cost and promote industry linkages. The development of a domestic manufacturing industrial zone in Leyte for copper industry cluster is recommended;
- Review tariffs on copper products to remove distortions. Raw materials are imposed MFN tariffs of 1-3% (cathodes: 1%), while copper wires, cables and all other finished products have zero tariffs under AFTA-CEPT. Note that the imported raw materials for the local downstream copper industry mostly come from non-ASEAN countries, while most of the Philippine imports of semi-finished copper products like rods and wires come from within the ASEAN sub-region.

h. Iron and Steel

The iron and steel industry plays a pivotal role in long term economic development because it provides key material inputs for the construction of roads, buildings, houses and factories as well as the manufacturing of automobiles, ships and electronics.

Sustained long-run economic growth will require growth in public spending for infrastructure and private construction spending, which will also undoubtedly boost demand for iron and steel products. In the Philippines, the surge of public-private partnerships in infrastructure development, expansion of the real estate industry, growth of the housing industry, and the emergence of the shipbuilding industry will intensify demand for iron and steel products.

Appendix 1. Sectoral Analyses

Employment and Export Performance

The local iron and steel sector contributes less than 2 percent of total employment in the manufacturing industry. The lack of upstream steel manufacturing facilities after the closure of Global Steel has led to the downscaling or closure of many steel plants. This development has even reduced the industry's manpower by 16 percent from 19,700 in 2003 to 17,000 in 2012. Its employment multiplier effect is that for every Php100 million investments will lead to a permanent employment of 155 new jobs.

Latent Comparative Advantage and Potential to Move up the Value Chain

The Philippine Iron & Steel industry is currently operating far below its economic potential because it lacks the integration of the industry. There is no iron and steel making to supply the midstream and downstream steel requirements of the flat steel producers. The industry produces billets for the long product sector.

The upstream section of the industry is said to have one of the most value addition in the industry. However, it was also informed that it may not be feasible to develop the upstream section at this time in view of the scattered iron ore deposits. In this regard, the approach of small-scale mining with on-site processing is currently being discussed.

Another potential exists in the midstream section to produce the flat sheets for the automotive, shipbuilding and home appliance industries, among others. These require specific technical specifications that could command higher prices than the low-end iron and steel products.

Spillover Effects

The iron and steel industry is widely considered one of the catalysts of industrialization and a major backbone of all industries in the economy. It remains a major driver in raising national output. In fact, industrialization in many countries is strategically linked with the growth and development of the iron and steel industry. The domestic output multiplier of the industry is higher than construction, private health services, transportation, financial intermediation, wholesale and retail trade, other personal services, real estate, nickel mining, private education and mining/quarrying. It is overtaken by only five other sectors: manufacturing, fishing, agriculture and forestry, electricity/gas/water, and hotel/restaurants.

Supply Chain Gaps/Binding Constraints

The iron and steel industry is highly energy-intensive industry due to the huge requirements of the electric arc furnaces. According to industry estimates, the share of fuel and electricity cost to total operating cost is within the range of 5-30 percent depending on the technology and age of steel plant and the type of steel product produced. The country's lack of available sustainable power in Mindanao and high cost of electricity have been cited

Appendix 1. Sectoral Analyses

as impediment to the development of the local iron and steel industry and one of the major factors why it cannot compete in the international markets.

Further, the level of production technology of Philippine steel producers vary from state-of-the-art to over two decades old. Most new investments in process technologies are driven by short-term profit-seeking brought about by a lack of long-term vision. The last mini-mills in the country were established in the 1996-1998, and no new mills for to produce steel products like bars, wire rods, hot rolled coils/sheets/plates have been opened since then. Most of the “new” steel mills (actually, using second hand equipment from China) are rolling mills for the long products sections and rebars. Scrap-based integrated mills using Electric Arc Furnace are normally called Mini-mills to distinguish it from ore-based integrated mills using the Blast furnace route.

There is also rampant smuggling of iron and steel products. Smuggling creates an uneven playing field among competing firms since the effective price of the smuggled raw materials and/or intermediate goods are much lower than the prevailing market price. The bulk of the smuggled steel products come from China. It has resulted in the closure of several steel plants in the country. Moreover, capacity utilization of the surviving firms continues to drop with unabated smuggling. Smuggling of steel products occurs through: (1) technical smuggling; (2) diversion through customs-bonded warehouses; and (3) outright smuggling. Technical smuggling is prevalent through undervaluation of prices, misdeclaration of nature of goods, misclassification of tariff heading, and undervaluation of volume or weight. On the other hand, in outright smuggling, imported goods are not registered at all with customs and other institutions.

The industry has likewise raised distortion in tariff rates wherein some raw materials are subjected to duty, whereas the finished product is not. The distortion stems out of the differences in the schedule of tariff reduction in the MFN rate and the Free Trade Agreement rates. In the case of steel billets (the raw material for steel angle bars), the MFN rate is at 3 percent while the ASEAN, China and Korea are zero-rated. The finished product produced from billets (including steel angle) from China, ASEAN and Korea are also zero-rated. The finished product from the rest of the world has an MFN rate of 7 percent.

Policy Response

Below are the proposed policy responses to the mentioned binding constraints of the industry:

- Entitlement to generate its own electricity, either directly or through co-generation, build-operate-and-transfer and other contracts;
- Financing of projects through official development assistance;
- Tax and duty exemptions on imported equipment;
- Tax credit on domestic capital equipment;
- Authority to contract loans, credits and indebtedness in any convertible foreign currency or capital goods from foreign financial institutions or fund sources;

Appendix 1. Sectoral Analyses

- Rationalization of the country's tariff incentive and protection scheme to enhance the viability of the local iron and steel industry.

i. Tool and Die

The tool and die industry is one that uses general and specialized metal cutting technology to fabricate dies, molds and toolings employed to convert raw materials into a desired shape. The common products of this sector include dies (simple, compound and progressive), molds (for forging, plastics injection or blow molding, die casting, glass blow molding) and tools, such as jigs and fixtures used for cutting and shaping different materials.

Employment and Export Performance

An industry survey conducted in 2005 showed that the tool and die industry employed a total of 5,862 personnel.

The tool and die industry has exported a total of US\$7.2 million in 2012, a much accelerated performance from 2011's export figures of US\$1.3 million and US\$1.25 million in 2010. The estimated local sales of the industry is US\$12 million in 2011.

Latent Comparative Advantage and Potential to Move up the Value Chain

Based on the Japan Overseas Development Corporation (JODC) study in 2002 on technical assistance for capacity building for the Philippine Die and Mould Association (PDMA), it has been found that with respect to the cost of tool and die making, the Philippines is on the least expensive side and can still compete with better quality and delivery time of Taiwan, Thailand and China.

The tool and die industry's main strength and comparative advantage are the skills and competence of Filipino tool and die engineers, technicians and specialists. The Philippines' wages are relatively cost-competitive compared to ASEAN neighbors, plus we have a growing pool of engineers that can be employed in the metalworking industries.

Spillover Effects

The tool and die industry exhibits linkages with the major manufacturing industries in the country, such as the motor vehicles, electronics/semiconductor, furniture, homewares, food beverage, health, cosmetics and pharmaceutical products. A goal of the roadmap is increased localization of dies and moulds, which mean expanding the local market and providing measures which would encourage large manufacturing companies to procure their die and mould requirements locally.

Supply Chain Gaps/Binding Constraints

Appendix 1. Sectoral Analyses

The major raw materials used in the industry are mainly special steels which are not locally produced. There is no steelmaking facility in the Philippines to process these special metals. High cost of shipping adds to the price of the already expensive raw metal. If high quality metals, such as high grade steel and aluminum are required, then the price is driven up more. Indeed, the cost of direct raw materials account for 34 percent of production cost. Consumables for this industry are likewise imported, e.g., cutting tools, and coolants.

The industry employs general and specialized metal machining equipment, such as lathes, milling machines, surface grinders, EDM, CNC, and software, such as CAD CAM. These expensive technologies, such as CNC's, coating techniques, such as CVD and PVD, robotics and automation and rapid prototyping, while necessary for future viability, is discouraging acquisition by a lot of companies. This directly leads to the industry lagging behind in technological competency compared to other countries. Recent studies show that the Philippines tool and die industry is about 3-5 years behind developing countries and 10 years behind compared to highly developed ones.

Tool and die firms also mention the absence of some metallurgical facilities which are needed by the industry. These facilities are not regularly needed, thus capital investment on one is not really justifiable. However, its use may be occasionally warranted when some special projects are undertaken. A commonly cited facility is a vacuum heat treatment facility used for treating specialty alloys like high grade steel and aluminum. Another engineering facility that would be useful to the industry is the surface hard coating facility. This facility may employ current techniques such as physical vapor deposition (PVD), chemical vapor deposition (CVD) and plasma-enhanced deposition.

One upgrade that the industry needs, especially the small companies, is in software applications. The field of tool design is one of the most diverse and time-consuming aspects of tool and die making and consists of several steps which include analysis, planning, design and construction. Design software cuts the processing time and allows for the prediction of mould or tool performance without the need for actual prototyping and qualification tries. In the absence of this software, tool manufacturing turns to trial and error which proves costly in the end. Unfortunately, advanced design software is continually becoming more expensive and unaffordable for small enterprises.

Policy Response

In view of the above, investments will be encouraged for pioneering and expanding tool and die firms to invest and build up their capabilities through upgrading and acquiring new technologies to enhance their firm-level competitiveness. Incentivizing the tool and die industry can help in building up their capability, with the ultimate goal of meeting the local die and mold requirements of the large manufacturing companies in the Philippines, thereby strengthening domestic linkages in manufacturing, increasing sound economic activities and promoting employment generation among the metals and engineering industries.

Appendix 1. Sectoral Analyses

The industry is open to partnership and joint ventures with foreign companies to improve the reliability of the Philippines as a tool and die making country. This includes investment promotions and crafting of value propositions for the tool and die industry to be handed out to foreign investors. In addition, the BOI may look for potential investors who are willing to set up a steelmaking facility in the country so as to localize the sourcing of raw materials such as special steel.

The DOST-MIRDC has approved funding for the establishment of the Die and Mould Solution Center (DMSC) in its compound. The DMSC aims to enhance the competitiveness of the local tool and die sector in support of the automotive industry through the acquisition of the needed technology and facilities to support the competitiveness in the localization of currently imported dies and moulds. It serves as a common service facility for the local tool and die makers under a facility-sharing scheme at reasonable rates. The agency is also gearing up to provide consultancy and training on specialized techniques and procedures relevant to tool, die and mould-making.

To address the shortage of tool and die engineers and specialists, work on the integration of tool and die in the education system, as well as creation of an updated Tool and Die vocational course by the Technical Education and Skills Development Authority (TESDA), and a dedicated engineering course will be pursued.

j. Rubber Products

At present, there are 46 companies that comprise the rubber products industry. Of these, 26 are direct industry players while the rest are suppliers (e.g. natural latex, and crumb rubber, synthetic rubber, additives, and polymers, carbon black, release agent, tube valve, organic pigments, bead wire, and tire cord) as well as sources of business development services (e.g. agents, brokers and cargo container lines).

The manufacturing output of the group looks robust but capacity utilization is relatively low at an aggregate of 66 percent. Information gleaned from interaction with stakeholders shows that the sector is not competitive, if competitiveness is expressed as the ability to export rubber products. The 4 firms that are currently exporting have tie-up arrangements with foreign companies (in the form of ownership as well as technology transfer). The sector's process technology is a mix of low, medium, and very high.

Appendix 1. Sectoral Analyses

Employment and Export Performance

Respondent firms employed a total of 2,994 direct workers and 921 indirect employees. Product price is cited as the most important driver that influences the sector's market, followed by quality, marketing channels, and industry standards (in that descending order).

Latent Comparative Advantage and Potential to Move up the Value Chain

Rubber products are used in a myriad of industrial, household and medical goods. At present, the local rubber product manufacturers produce only a limited number of products. There is thus the potential to move up the value chain in terms of doing more products that could be supplied to the automotive, industrial machinery, footwear, medical supplies, coatings, and other industries.

Spillover Effects

The Philippines is one of the few countries where rubber trees can viably grow. The rubber tree grows best in the tropics at temperatures ranging from 20°C to 28°C. It grows in all types of soil with year-round rainfall. In the Philippines, rubber grows mostly in Mindanao.

It is noted that 70 percent of total natural rubber production goes to the tire industry and construction works (roads, bridges, buildings, sports race tracks, etc.) while the rest goes to non-tire products such as gloves, medical wares, sports wares, shoes, balls, rubberwood for floor tiles, furniture, plywood, cabinets, and toys. Thus, there is potential for the Philippines to be a major supplier of rubber products both in the domestic and international market.

Supply Chain Gaps/Binding Constraints

The gap in the industry is the supply of natural rubber to the local producers. As informed by the industry, most of the natural rubber produced in the country is exported mainly to China. Thus, rubber product manufacturers resort to importation and are subject to fluctuations in the global supply. Hence, the clamor for an export ban on natural rubber.

Further, the following are the identified binding constraints in the industry:

- Low quality of cup lumps;
- High cost of logistics for imported goods as well as for the transport of natural rubber to the processors/manufacturers (Note: Most of the rubber product manufacturers are in Luzon while the plantations are in Mindanao);
- High cost of power;
- Lack of business development services to support the industry;
- Lack of R&D support and testing facilities;

Appendix 1. Sectoral Analyses

- Outdated manufacturing facilities /processes;
- Smuggling;
- Peace and order situation in Mindanao;
- Investment in higher value-added products.

Policy Response

The following are the recommendations to address the key constraints in the industry:

- Provision of incentives to new and modernizing manufacturing facilities;
- Establishment of an accreditation system for raw rubber suppliers;
- Provision of marketing support;
- Provision of R&D support for product development and establishment of testing facilities;
- Provision of financing support for the upgrade of machinery and equipment.

k. Cement

The Philippine cement industry is one of the few integrated industries in the country. It has strong backward (mining and quarrying) and forward linkages (construction-related sectors). With intensified efforts on improving the country's infrastructure, the more cement the country needs to sustain the increasing construction activities. According to the industry roadmap, total demand for cement is expected to still increase beyond 2016. The increase will be lower at 3 percent in 2017 but will improve at an average of 4 percent up to 2022. In 2023, there will be a higher increase of 5 percent and an average of 4 percent increase for the next years up to 2030.

Cement production is highly capital-intensive. It requires huge investments and commission of cement plants usually take 3-5 years. The cost of building a cement plant is approximately US\$150 million per 1 Million MT of annual production capacity.

Employment and Export Performance

The industry employs around 120,000 direct and indirect employees. The cement companies operate in 17 municipalities. These cement plants are often the major source of livelihood and employment opportunities for the community.

Historical data on domestic cement production show that the industry has the general capacity to export. The highest export sales for industry happened in 2001 with around 1.86 million metric tons and the next highest was in 2008 at US\$1.57 million. Since then, exports were declining to 1.57 million metric tons in 2010 and then none in 2011.

Appendix 1. Sectoral Analyses

Supply Chain Gap/Binding Constraints

Cement production is highly capital intensive. As informed, power cost is around 40 percent of production cost. According to the industry, local cement prices are still lower than in Indonesia, India, Japan and Brunei even without government subsidies.

Based on the industry roadmap, domestic clinker and grinding capacities can meet any upsurge in cement demand. With construction spending expected to increase by an average of 10 percent for the public sector and an average of 8 percent for the private sector up to 2016, cement demand is expected to increase 4 percent annually.

Other constraints to the further growth of the industry are: input costs, pricing, logistics difficulties and the threat of dumping from China and Vietnam.

Clinker and cement grinding operations are highly efficient and produces minimal scrapped output relative to production process and product quality.

Spillover Effects

The industry's strong backward and forward linkages with the infrastructure and housing sectors and backward linkages with the mining and quarrying sectors show the extent of spillover the industry has in the economy.

With the industry's current work with the Department of Environment and Natural Resources (DENR) and DOST to absorb wastes in the operation of its kilns, the industry can also process agricultural and industrial wastes like used tires, oils, mold runners, rice husks and coco husks as alternative fuel and raw material. Such initiative not only benefits the cement manufacturers but also helps in the community's solid waste management and environmental protection. At full capacity, the industry can co-process more than a million tons of rice husks annually. The industry is, at present, looking for a mechanism whereby the rice farmers (not millers) will benefit directly from the on-going procurement of rice husks by the industry.

Policy Response

To address the above constraints, the following measures have been identified:

- Strict enforcement of customs laws and technical regulations;
- Continuing investments in the energy sector and infrastructure development to help reduce cement input costs and increase capacity utilization;
- Rationalize transport policy and planning to significantly enhance road network expansion, the development of an extensive railroad system and the modernization of our ports and sub-ports systems. The resulting increased market reach of cement producers can greatly improve the utilization of plant capacities and allow for greater efficiencies in energy consumption.

Appendix 1. Sectoral Analyses

I. Paper

Paper is a commodity so vital for mankind to fully realize the benefits of modern life, without necessarily bringing undue damage to the environment or depletion of non-renewable natural resources. All aspects of human activities, at one time or another, involved the use of paper and paper-based products. The amount of paper consumed by a country is a measure of its economic progress. Communication between individuals and among nations became possible with the use of paper and business transactions were recorded on paper. Man's vast knowledge of the world around him is based on messages written on paper in books, magazines, journals, reports, etc. Indeed, a "paperless society" predicted by scientists in the early 80's has not actually materialized even with the advent of modern technology such as computers, internet, TV, mobile phones, and electronic mail.

The pulp and paper industry in the Philippines has not developed as fast as its Asian counterparts, such as Indonesia, Thailand, Malaysia and China. The development in terms of production and technology levels in this sector is about 15-20 years behind that in Japan, Korea, Taiwan and Australia. For the last 10 years, most of the paper mills have been unable to allocate large enough investments in technology upgrading projects needed to attain quality or cost-competitiveness in open market.

By 2012, only 23 paper mills and 5 abaca pulpmills remain in operation. With the shutdown in 2010 of the country's only integrated pulp and paper mill, PICOP Resources Inc. (forestry-to-papermaking operations), the local industry now has only two (2) types of mills operating: (a) non-integrated recycling paper mills; and (b) non-integrated pulp (abaca) mills. The paper mills, all recycle-based (non-integrated), consist of 10 firms located in Metro Manila (48 percent) and in the regional provinces (52 percent).

Employment and Export Performance

As of 2012, the local paper industry directly employs about 6,000 personnel, mostly skilled workers and technical professionals, and contributes value to the economy by sustaining the livelihood opportunities of about 1.2 Million workers in the wastepaper collection, sorting, and hauling sub- sectors. This figure already excludes the more than 12,000 direct and indirect workers who lost their jobs when the country's only integrated mill, PICOP Resources Inc. ceased operations in Mindanao, which included tree plantation workers and agro-forestry farmers who grow trees and supply harvested wood to PICOP's pulp mill.

In 2011, the industry's exports of paper and board was valued at US\$144 million. Exports of abaca pulp, on the other hand, amounts to about US\$40 million/year in the past decade. The paper industry contributes about P30 billion/annum in domestic sales value to the economy, or saves the country US\$700 Million/year in foreign exchange from imported paper and board.

Appendix 1. Sectoral Analyses

In 2010, the country exported 165,000 MT paper and paperboard valued at US\$132 million, mostly to Singapore, Hong Kong, South Korea, Taiwan, India and Thailand. Most of these exports are newsprint from TIPCO, averaging 140,000 tons/year. The country also exports abaca pulp to Japan, Netherlands, United Kingdom, USA and France. Around 80 percent of the world's abaca fiber requirements are sourced from the Philippines.

Latent Comparative Advantage and Moving Up the Value Chain

Domestic paper demand relates directly to per capita economic growth. Since the local paper industry was confined to the local market for so long a time, its development almost merely followed whatever growth there was due to population increase. When literacy, print media, and production and export of goods slumped, demand for paper stagnated. As an indicator of standard of living, the paper products we use today is a fraction of that consumed by Americans, Europeans and our advanced neighbors in Asia. This indicates that, apart from having a lower per capita income, the average Filipino has been reading less, manufacturing goods less, and engaging less actively on educational, cultural, sports, scientific and many economically-productive activities. Despite that use of paper is part of modern society's life, be it in communication, packaging of products, entertainment or health care, local demand alone could not drive the paper industry into fully developing itself and becoming globally competitive.

The domestic demand for paper continues to rise in real terms because of population growth, rise of electronics and agriculture-based exports, office services, education, media, and growing demand for consumer items, food, and entertainment. While markets for newspaper and printed communication was hit by the shift to electronic media, paper remains a cost-effective and environmentally-acceptable material for packaging consumer and industrial goods, as well as a practical medium for education, print media and advertising, and office and commercial documents.

The Philippines is the world's primary source of abaca fiber for cordage production and pulp for specialty paper manufacture (DBP, 1992). Abaca's strong fibers can be used to reinforce the quality of recycled paper if measures are undertaken to reduce the cost of abaca fiber. Due to its superior strength, abaca pulp is used by the importing countries in the production of tea bags, currency notes, high-strength disposables, and valuable documents requiring long storage and durability in use

Supply Chain Gap/Binding Constraints

Most of the paper mills are small by international standards, with capacities lower than 60,000 tons per year (TPY). There are only 4 manufacturers capable of producing 70,000 tons or more per year. These are Trust International Paper Corporation, United Pulp and Paper Corporation, Bataan 2020 Inc., and Container Corporation of the Philippines.

Appendix 1. Sectoral Analyses

The following have likewise been identified as constraints to the growth of the industry:

- **Raw Material Problem (Wastepaper)** - The quality and volume of locally-available wastepaper is not sufficient to meet the requirements of our recycled paper mills. Paper mills resort to importation to help meet their fiber requirements in terms quantity and quality. Many mills are 90-100 percent dependent on wastepaper but are not equipped to handle this kind of material, especially, the low grades of wastepaper and local wastepaper which has poor strength and contains too high levels of dirt. There is not enough process equipment to clean and treat the low-quality recycled fiber. Recycled paper mills can use some special equipment and chemicals to help solve process problems caused by low-quality wastepaper, but many mills lack funds to invest in these modern methods. Most mills do not even have enough laboratory facilities to evaluate the effects chemicals and new equipment. These bring production losses and, therefore, increased operating costs.
- **Raw Material Problems (Virgin Pulp)** - There is no local market pulp mill to support the virgin fiber requirements for strong packaging and high-grade graphic papers or for enhancing the quality of recycled fibers in tissue, newsprint and paperboard. Pulp is totally imported and its supply subject to the uncertainties of foreign exchange rate. More than these, there is no local producer of long-fiber pulp after the country's only wood pulp mill supplying the industry (Cellophil Resources in Abra), shutdown 20 years ago. There are four abaca pulpmills exporting about 12,000 TPY of the specialty, but this source of non-wood pulp is just too small or too expensive for common paper grades. In fact, the industry imports about 80,000 TPY virgin pulp, half of which is long-fiber (softwood). In contrast Indonesia, Malaysia, Thailand, and Vietnam have established at least 10 modern pulp mills ranging in sizes from 500-3000 tons per day (TPD) and based on sustainably-managed tree plantations.
- **Small-sized Mills, Old Equipment** - There are too many small and slow machines running commodity grades like containerboard and packaging paper, surviving on low profit margin and making inconsistent quality products. Majority of paper machines in the Philippines is still in the 50-60 TPD (and lower) capacity. The international standard for paper machines running commodity grades of paper and board is 500-1,000 TPD. It is widely known that the minimum economic size for a new paper machine on commodity grades is 150 TPD and should operate at speeds exceeding 400 meters/minute. In developed countries (e.g. Canada, Scandinavia, Australia) paper machine sizes of 800-1,200 TPD running at speeds of 600-1,200 m/min. are typical. The new mills in Indonesia, Thailand, Malaysia and China have paper machine capacities of 500-1,200 TPD and run at speeds of 600-1,000 m/min.

Appendix 1. Sectoral Analyses

Although obsolescence is not a problem per se in many mills, spare parts for very old machines are difficult to find. Drawings and plans are not updated or missing and equipment specifications are not known to younger workers, delaying parts replenishment, downtime troubleshooting or execution of improvement projects. And with metal fatigue or too advanced wear and tear, equipment reliability is greatly reduced. This has led to frequent breakdowns and more shutdown time for scheduled repairs, lowering machine efficiencies.

- High Energy Costs - The paper manufacturing industry suffers from high electricity and fuel costs.
- Dumping - Imports are rising not only because of customer demand for grades having qualities that local manufacturers could not satisfy but also because of cuts and reduced duties on imports. There have been dumping from giant producers in North America and Indonesia and other developed countries when their own markets weaken (naturally, they would constrict supply or drastically raise prices when their home demands pick up). This concern is now overtaken by the influx of low-cost exports from large exporters of paper from Indonesia, Thailand and China who have globalized their paper industries ahead of us.
- The industry is plagued with heavy financial burden, especially, interest on working or short-term capital while long term investment funds with international borrowing rates are lacking.
- By early 2000's, labor problems, environmental sanctions and changes in ownership or corporate priorities hit the operations of several paper mills, taking out of commission about 200,000 TPD or 20 percent of productive capacity.
- Loss of productivity and plant efficiency caused by the continued departure of skilled craftsmen and technical professionals from the industry. Experienced and highly-trained personnel have left the local paper industry to work overseas or move to other local industries. This large turnover contributed significantly to a decline in maintenance effectiveness at many mills and our capabilities to manage operating problems methodically. Many young engineers who received pulp and paper training's from the late 70's to early 90's have left the industry. Ironically, one can locate these talents serving competitor mills overseas or other industries. Many mills lack technically-trained and well-motivated personnel to handle pulp and paper mill operations.

Spillover Effects

Most if not all industry sub-sectors, particularly exports of electronics, fruits, handicrafts, garments and furniture, as well as local production of processed food and

Appendix 1. Sectoral Analyses

consumer goods rely significantly on locally-manufactured and imported paper and board as packaging materials.

The packaging industry, a downstream sector of the paper industry, is critical to the export sector since high-quality and sophisticated packaging is a requirement for success in the global market. (Paper Industry Structure and Competitiveness, FT Asia Consult, Ref. 2). In manufacturing corrugated boxes, paper sack, paper bags and carton boxes, the packaging sector uses linerboard and fluting medium, multi-ply paperboard, sack kraft, and bag paper as component materials. Improving the paper industry as a source of packaging inputs for exporters translate to better competitiveness of Philippine exports.

Upstream, the paper industry is linked to the recycling sector, from where most of the fiber raw materials are sourced by the country's non-integrated paper mills. As of 2011, the paper industry provides the market for 1.2 Million tons recycled wastepaper per year of which 25 percent is imported.

The paper industry is also vertically linked (albeit indirectly) to the forestry and commercial tree plantation sectors, as well as to agricultural sub-sectors producing by-product fibers and annual crops, for its requirement of virgin pulp. Currently without a local market pulp mill in operation supplying fiber to non-integrated mills, the country imports 80,000 TPY of virgin pulp. In addition, the industry's requirements for pulp is substituted by importation of high-grade wastepaper and actually diminished significantly by the local paper mills' non-production of higher grades of paper (which are instead imported from other countries).

This means that the raw material sourcing of the paper industry in Philippines is currently linked to virgin pulp production and forestry operations of pulp producing countries like Indonesia, New Zealand, Europe, and North and South Americas. But a resumption of the tree plantation and pulp production operations in the Philippines similar to that done in Northeastern Mindanao by PICOP from the 70's-90's, driven by the paper market's demand for fiber, offers tremendous potential to revitalize the local paper industry and restore its huge contributions to the country's economic development.

Policy Response

Several strategies are recommended to assist the industry. These include improving the recovery of local waste paper and encouraging its use locally; modernization, retooling and rehabilitation of old paper mills; improving and expanding the fiber raw material base of the industry to include agricultural wastes, such as rice straw, sugarcane bagasse, banana, and other plantation wastes, as well as developing mass-plantations of abaca and other annual crops like kenaf, which have promising potentials for utilization in pulp and paper making; possible consolidation of small mills; and, most important of all, developing massive tree plantations and commercial agro-forestry integrated with virgin wood pulp production to help meet the fiber requirements of existing non-integrated paper mills with locally-grown wood pulp.

Appendix 1. Sectoral Analyses

Specific recommendations are found below:

- Discourage the exportation of local wastepaper,
- Remove remaining tariff duty on imported wastepaper;
- Provide incentives for programs/projects that support improved recovery and recycling of local wastepaper;
- Maintain current tariff duties on finished paper and paper products;
- Fast track the implementation of electronic monitoring of importations and systems, to minimize misdeclaration and technical smuggling and bring greater transparency in Customs operations;
- Grant incentives for programs and projects that address raw material and equipment problems, including capital costs to improve environmental performance in pulp and paper mills;
- Promote the Philippine pulp and paper industry as an attractive business area for investors;
- Support strongly the campaigns of environmental, health and local government authorities and NGO's to replace plastic with paper in packaging;
- Intensify the campaign against corruption and reward businesses that faithfully comply with government and international laws and regulations.

m. Metalcasting

Metalcasting is the process of forming a shaped metal component by pouring the desired molten alloy into a mould containing a cavity of the desired shape. It is one of the most economical method of making a shaped metal component.

Almost all metalcasters in the Philippines belong to the small and medium business (SME) category. This is true with metalcasters in Japan, the USA and most other countries. As an SME, metalcasters have different institutional support requirements than micro and large businesses. Because of the size differences, are affected more by the changes in the environment. For example, SMEs are more affected by inflation and changes in the exchange rates than large enterprises (OECD, 2004).

Since 1996, the annual domestic casting production has been on a steady decline as shown in the table below. The most recent survey this year showed very significant drop in the production. The 2012 production is less than 10 percent of 2002 production data.

Appendix 1. Sectoral Analyses

Employment and Export Performance

As of 2003, there are 195 foundries in the Philippines with a total employment of estimated 12,285 personnel, for an average of 63 personnel per foundry. Almost all metalcasting companies, except for some 2 or 3, have less than 200 employees.

Based on National Statistics Office statistics³ on the export data for cast iron, aluminum and bronze from 2006-2011. The following observations can be derived:

- A cast iron export is decreasing over the 6-year period down to approximately US\$150,000.00 in 2011;
- Cast steel export is decreasing over the 5 – year period from 2006-2010 from jumped significantly from almost zero export to US\$13.5 Million worth of export in 2011;
- The cast aluminum exports is gradually increasing over the 3-year period from 2009-2011 with an approximate US\$17 Million worth of exports in 2011;
- Cast bronze export is almost nil in 2011 following a declining trend over the 6-year record.

Supply Chain Gap/Binding Constraints

The metalcasting is an example of low level integration industry. Except for scrap metal, energy and manpower, almost all physical production inputs such as raw materials, supplies, production and quality control equipment are all imported.

Casting processes and products are constantly evolving with advancing technology. Processes are increasing in productivity but becoming more complicated and knowledge intensive. Likewise, castings are also evolving – higher performance is being required, alloys are changing or even replaced with non– metal materials. New markets and applications are emerging while old markets and applications are slowly being phased out. In this highly dynamic environment, the only way to compete, or even survive is to through innovation – continuous improvement of products, processes and organization. Thus, there is a need to continuously upgrade the local industry’s technology and skills development in new foundry technology.

Spillover Effects

Cast metal products are used in virtually all sectors of the economy from transportation, aerospace, defense, energy exploration and conversion, mining, construction, maritime, fluid power, instrumentation, computers and household appliances and products. Examples of cast metal components are engine blocks, suspension parts for all land transport vehicles, valves, pumps, faucets, pipes, fittings, replacement parts for mining, cement, oil field, energy production, surgical equipment, prosthetic and

³Metalcasting Industry Roadmap

Appendix 1. Sectoral Analyses

biomedical implants, and components for majority of household and electronic devices we use today. In fact, 90 percent of all manufactured durable goods and 100 percent of all manufacturing equipment contain castings. All industrialized and newly industrialized countries have strong metalcasting industry as one of the major drivers of industrialization.

Majority of the durable goods and manufacturing machines do not exist as purely castings. Most of them contain parts manufactured through other processes such as metalworking, machining and integration. In itself, the contribution of metalcasting industry to the country's GDP is small. But with the development of other metals engineering industries such as metalworking, equipment, and machinery manufacturing, the metalcasting industry contribution can be significant. In this age of globalization, the presence of a competitive metalcasting industry can attract and maintain MNCs which uses castings as one of the major inputs. The Philippines need a strong and capable metalcasting industry to support the development of machine, equipment manufacturing and other metals engineering sector.

Policy Response

The Philippine metalcasters need to be competitive if they are to survive. Competitiveness is created within the organization but its implementation is dictated and influenced by the availability of the support of government institutions and suppliers (Aldaba, 2008). Support programs such as easy access and competitive financing rates, availability of skilled workers, technical support programs for training, technology development and transfer and market linkages create the confidence needed by entrepreneurs to invest and increase exposure. To assist the industry, the following measures have been identified:

- Promotion of clustering of industries;
- Provision of incentives to the production of identified critical metal industries in the core industries such as automotive, shipbuilding, electronics, etc.;
- Strengthening of MIRDC's focus on the foundry innovation center;
- Inclusion of metalcasting in relevant engineering courses;
- Updating of TESDA's foundry training courses to current level of technology.

n. Furniture

As envisioned by the industry, the Philippine furniture industry will be the global design innovate/center/hub for products using sustainable materials by the year 2030. To achieve this, the industry will focus its programs on four (4) key development factors: (1) product development, (2) marketing, (3) capacity building and (4) advocacy.

The three major furniture production areas in the country are in Metro Manila, Pampanga and Cebu. Metro Manila and nearby peripheral cities in CALABARZON (Cavite, Laguna, Batangas, Rizal and Quezon consist of small, medium and large furniture enterprises which specializes on wood furniture and other mixed materials. Pampanga is

Appendix 1. Sectoral Analyses

associated with hand-carved wood, wicker and iron products whereas Cebu, which is used to be the heart of rattan furniture making in the country is now known for its fine wood furniture works.

Employment and Export Performance

The Philippine furniture industry, which is 98 percent categorized under SMEs, provides 2.1 million indirect workers nationwide and provides business to 5.4 million in supply chain. In 2013, employment by the industry was recorded at 123,000.

The industry's overall revenue was estimated to reach US\$750 million in 2013 of which exports accounted for US\$177 million in 2013 from US\$150 million 2012. For this year, the industry is expected to grow 8 percent wherein domestic sales could grow faster at 8 percent while exports at 5 percent. The domestic market had even a bigger potential because of the robust housing sector although there is no official data. The contract markets are also growing here and abroad for hotels, resorts, and entertainment facilities.

Latent Comparative Advantage and Moving Up the Value Chain

Being regarded as the "Milan of Asia" because of recognized creativity, design and quality, the Philippines has potential to earn more from exports and local sales particularly, in the sophisticated and high end market is high. At present, the industry represents 0.08 percent of the total export of the Philippines, with 99 percent of exported furniture coming from Cebu, Metro Manila and Pampanga.

It is noteworthy that the industry intends to be technologically advanced to meet the global market by having sustainable materials, improving existing process, available skilled labor, and advanced machinery.

Supply Chain Gap/Binding Constraints

One major constraint of the industry is the lack of raw materials, specifically wood, because of the total log ban in the country, which deprive manufacturers of access to quality wood at affordable prices. Local furniture companies are therefore forced to import their wood requirements from Indonesia and Malaysia. Adding on to the difficulties are the stringent requirements in importing specialty wood species from Europe.

Further, the surge of imports of cheap furniture from among the competitor countries has hugely affected the Philippine industry. This aggravated the impact of the recession in its major markets as well as the fluctuation in the Peso-US dollar exchange rate that led to the massive downsizing in the industry. This led to the closure of some firms and the industry is said to be in a surviving mode.

In addition, ASEAN countries do not have strong intra-regional furniture trade as the bulk of ASEAN furniture imports come from China. The Philippines, for example,

Appendix 1. Sectoral Analyses

exports most of its products to the US and Europe. Filipino furniture manufacturers are not actively opening outlets in other ASEAN countries.

There is also a shortage of mid-level and skilled workers to sustain the growth of industry. In addition, there is the lack of a globally-accredited testing laboratory.

Spillover Effects

The industry's has strong backward linkages with the forestry and agriculture sectors. It utilizes wood, rattan, bamboo and other materials such as buri, metal, stone/marble and plastic, which are creatively and finely handcrafted into various products including: leg items for chairs, tables, beds, setters case goods such as cabinets, desks, chests of drawers, kitchen storage units, combinations for building/home fittings, shelves and ornaments. Any increase in sales of the industry would definitely redound to the benefit of community-based forest organizations as well as farmers.

There would likewise be spillovers in the other sectors such as the creative/design, logistics, business services, and packaging sectors. Furniture manufacturers/exporters use the following packaging materials: double corrugated carton box with polyethylene tubes on critical points, kraft paper, abaca fiber straps, plastic bubble sheets, and styropor.

In terms of forward linkages, we also have the hotels, restaurants, offices and other public institutions, contractors and interior design offices.

Policy Response

To assist the industry, the following have been identified as possible interventions:

- Provision of incentives to investments in common service facilities, plantations not covered by the Industrial Tree Plantation law and supply/trading hubs for raw materials;
- Intensified support to marketing and promotion, and market intelligence;
- Provision of R&D support in terms of raw materials and supplies and establishment of testing facilities;
- Assistance in skills training through TESDA.

o. Ceramic Tiles

The ceramic tile industry is a subsector of the construction industry. There are currently four (4) active local players namely: Mariwasa, Lepanto, Ten Zen, and Euro Tiles. The industry's total installed capacity is estimated at around 30M square meters per annum. All four (4) domestic tile manufacturers have their plant in Luzon and is under the umbrella of the Ceramic Tile Manufacturers' Association (CTMA).

Appendix 1. Sectoral Analyses

The ceramic tile market has been expanding, but the growth is hardly felt by the local tile manufacturers due to the surge of imported tiles. The cost of local players are high thus, they are hard up in competing with imported tiles that are sold cheaply in the market. The market share of local players is being eroded by imported tiles. It is estimated that imported tiles now accounts for more than 50 percent of the total tile market.

The industry's performance has been negatively affected by the surge of low priced imported tiles. As a result, some of the local players have already streamlined their operations reducing the capacity utilization of the industry to only about 65 percent. The high cost of production has placed local players in a disadvantage position which imported tiles seized as an opportunity to expand their market. Imported tiles are slowly eating up market share of local players.

Employment and Export Performance

The industry is directly employing more than 2,000 and several thousand more by industries that are directly and indirectly linked to the Ceramic Tile Industry.

Supply Chain Gap/Binding Constraints

The industry has identified the following as challenges to their growth:

- Industry Cost and Production.
 - Relatively high production of cost of local players as compared to its foreign counterparts due to :
 - High fuel and power cost;
 - High raw material cost;
 - High repair and maintenance cost of machinery due to age.
 - Limited source of local raw materials and high domestic inland freight costs
- Technical
 - Entry of imported tiles that are not within product standard quality;
 - Continuous threat of de-listing ceramic tiles from the mandatory list of items subject to testing.
- Institutional
 - Lack of policy/ guidelines with regards to the trade remedies fund that should be appropriated to the local industry in accordance with RA 8800, Safeguards Duty Act;
 - Enforcement of customs regulations to minimize/ prevent entry of smuggled and misdeclared goods;
 - Policy of DTI-BPS with regards to imported tiles who failed from testing;
 - Lack of government assistance in developing small-scale raw material suppliers.

Appendix 1. Sectoral Analyses

Spillover Effects

As a major construction material, enhancing the competitiveness of the ceramic tiles industry would create significant spillovers to various industries such as hotels, resorts, housing, hospitals, industrial and commercial buildings and other facilities.

It also has strong linkages with mining and quarrying sectors in terms of its raw material sourcing.

Policy Response

The following are the recommendations of the CTMA to address the challenges facing their industry:

- To facilitate/fast track the availability of natural gas and other alternative sources of energy;
- To pass the Anti-Smuggling Bill and undertake strict enforcement of customs regulations;
- Institution of non-trade barriers to help local manufacturers be more competitive with their foreign counterparts (e.g. retention of the mandatory testing of ceramic tiles);
- Review policy of DTI-Bureau of Product Standards (BPS) regarding imported tiles that failed the test; if possible, consult the local industry concerned during the review;
- More defined guidelines on the implementation of DTI's monitoring of the mandatory standard for ceramic tiles under PNS ISO 13006:2007;
- Help develop small-scale raw material suppliers to become more efficient and professional in their method of mining and to extend assistance in their capitalization.

2. Agribusiness and Fishery

The agriculture and fisheries sectors are important components of the Philippine economy. From 2009 to 2013, these sectors contributed 10 to 30 percent of the country's Gross Value-added (GVA), 6 to 8 percent of the country's total merchandise exports and 31 to 34 percent of the country's total employment. Further, the agriculture employs 32 percent of the Filipino workforce as of 2013, according to World Bank statistics. Agriculture accounts for 12 percent of Filipino GDP as of 2013, according to the World Bank.

While the DTI-BOI had been including these sectors in the IPP since 1968, the performance of the agriculture and fisheries sector remained unimpressive. Overall, poverty incidence in the sector is still prevalent. In 2009, the highest incidences of poverty among the basic sectors were recorded for fishers (43.6 percent) and farmers (42.4 percent).

Appendix 1. Sectoral Analyses

Foregoing considered, there is a need to specify agriculture/fishery-related activities for inclusion in the IPP and optimize such inclusion to contribute in the development of the sector and support the government in its pursuit for inclusive growth. The sub-sectoral utilization of the supply-chain based framework of the 2014 IPP enabled the BOI to identify these strategic agriculture/fishery-related activities.

a. Crops

The Department of Agriculture (DA) opines that investments in the commercial production of the following agricultural crops should be continuously promoted:

- Coconut, cassava, coffee and cocoa.
- High value crops such as rubber, spices, vegetables and fruits.
- Emerging commodities such as sampaloc, jackfruit, peking duck, native pigs, siling labuyo, peanuts, monggo and achuete.

The crops production sub-sector is faced with high cost of inputs such as fertilizers and pesticides – two important components to improve land productivity and increase yield. These inputs typically account for 20-30 percent of total production cost. For some players, high fertilizer and pesticide costs translate to usage rate below recommended thresholds. In line with sustainable development principle, promotion of investments in fertilizer and pesticides comes with an aggressive information/education campaign on the appropriate fertilizer and pesticide usage to avoid agro-climatic imbalance and pollution.

In the case of sugar, particular focus is on the full implementation of the ASEAN Economic Community (AEC) in 2015 wherein the sugar tariff rate will be reduced to 5 percent from this year's rate of 10 percent. To enable the local players to be competitive, there is a need to increase productivity not only on the farm side but also on the milling side. There is a need to promote modernization of existing sugar mills to increase sugar recovery rates.

Other non-incentive government interventions required by the sector include:

- Establishment of additional nurseries producing improved seedling/plating material varieties;
- Strengthening research and development for the sector (currently less than 1 percent of the sectors' GVA contribution) and full integration with agricultural extension services;
- Increased irrigation service area; and,
- Bloc farming for scale-sensitive crops such as sugarcane.

Appendix 1. Sectoral Analyses

b. Livestock and Poultry

Producers of livestock and poultry products, specifically for hogs and chicken, are concentrated in Central Luzon and CALABARZON regions. Promotion of investments in the livestock and poultry sub-sectors may be concentrated in the non-traditional production areas such as ARMM, Mindoro and Palawan.

The poultry/livestock producers are faced with high cost of feeds, which accounts for as much as 70 percent of total production cost. On top of promoting investments in feed milling (to exclude those feeds to be used for game animals, fowls, and other species for pet/leisure purposes), there is also a need to promote investments in mechanized drying (to reduce post-harvest losses for yellow corn) and production of yellow corn (major feed component). Incentivizing production of corn, in general, was already discussed in the previous section on “crops.”

For the downstream livestock/poultry industry such as the meat processing industry, investments in AAA slaughterhouses and dressing plants shall also be encouraged. Currently, the 24 National Meat Inspection Service (NMIS)-accredited slaughterhouses and dressing plants are not sufficient to cater to the needs of the industry.

The much-needed government interventions include the following:

- Strengthening of the DA-Bureau of Animal Industry’s (BAI) regional testing laboratories (for efficient detection of aflatoxins in yellow corn); and,
- Strengthening of the DA-NMIS considering the expanding demands of the industry beyond meat inspection (e.g., traceability, market surveillance, meat trade competitiveness, etc.).

c. Fisheries

The Philippines, with a total territorial water area of 2.2 million km² and inland resources of almost 750,000 hectares, is one of the world’s top fish producing country in the world. While we have been exporting on large volumes and values of fish products such as tuna, seaweeds/carrageenan, shrimps/prawns, crabs/crab fat and meat, and octopus (export values of these products comprise 76 percent of total fishery exports), the country is also a net importer of fish products. Inasmuch as there is need to boost local fishery production capacity, investments in fishery production should be promoted.

As with the livestock and poultry sub-sectors, investments in the production of aqua feeds shall likewise be promoted.

Considering the high-perishability of fish products vis-à-vis far distance of production sites to local and international market destinations, the fisheries sub-sector is also in need of investments in support infrastructures such as ice plants, blast freezing and cold chain storage facilities.

Appendix 1. Sectoral Analyses

Interventions needed by the fisheries sub-sector include the following:

- Establishment of fish ports/fish landing facilities in government-identified strategic locations;
- Comprehensive stock assessment program by the DA-Bureau of Fisheries and Aquatic Resources (BFAR);
- Additional government-accredited nurseries, hatcheries and testing laboratories; and,
- Institutionalization of a strong partnership with local government units and the national government (through BFAR) in strengthening fisheries regulation.

d. Natural Rubber

The world production of natural rubber is projected to increase at three to five percent per year up to 2020 that is from 6.6 million tons in 2006 to 17.4 million tons in 2010 to 28.1 million in 2020. According to the DA, however, the country's rubber industry accounted for only 1.05 percent of the world consumption of rubber in 2004.

Production of rubber reached 106,000 tons dry from an area of 162,000 hectares in 2011 according to the Bureau of Agricultural Statistics (BAS). The new planting of rubber was 22,900 hectares while replanting was only 800 hectares during the same year (Association of Natural Rubber Producing Countries). Industry sources, however, estimate that rubber output in the Philippines is at best 60,000 tons dry, with about 70 percent of the total supply (70,000 tons) going to exports (48,000 tons) and the rest to the domestic market. Assuming an average yield of 0.6 tons dry per hectare, the maximum area harvested would be about 100,000 hectares. The rest of undetermined areas are immature and senile.

Rubber development plays a key role in the reduction of rural poverty and agriculture development in many ASEAN countries specifically Thailand, Indonesia, Malaysia and Vietnam. The Philippines can also embark upon the same path as it has the potential to become a major rubber producing nation. In fact, it is regarded as one of the most profitable agro-industrial businesses in the country that supply the domestic and export markets.

The identified supply chain gaps in the rubber upstream sector:

- Areas for planting;
- Lack of quality planting materials;
- Low quality of raw rubber;
- Lack of skilled tappers;
- Location of plantations and rubber processing facility (Market);
- Pre-processing and testing facilities.

Appendix 1. Sectoral Analyses

The industry has also identified the following constraints to the growth of the sector:

- Tenurial problems (Land Access);
- Long gestation period;
- Insufficient accredited nurseries, plantations and pre-processing & testing facilities;
- Limited area for rubber planting;
- Access to credit;
- R&D for the upstream sector;
- Slow adaption of productivity-enhancing technology;
- Quality issues for primary rubber processing;
- Transport cost (within the Philippines);
- Peace and order in the plantation areas.

The following are the recommendations to address the key constraints:

- Incentives for accredited nurseries, certified plantations and pre-processing facilities;
- Support testing facilities;
- Support R&D for development of high-yield varieties;
- Capacity Building for tappers;
- Marketing support;
- Support infrastructure & logistics to lower transport cost;
- Review existing laws.

Special note is taken that the DA has implemented the Rubber Development Program (RDP) in early 2000 as a component of the High Value Commercial Crops Program. The RDP's goal was to develop a globally competitive rubber industry and empower small farmers, plantation owners, cooperatives, as well as new investors. The program not only sought to increase investment in the industry through policy reforms and advocacy but also aimed to give investors access to financing. It tried to expand income opportunities for farmers by identifying derivative products for rubber and looked into improving the sector's state of technology to make it globally competitive. So far, the program has instituted planting in expanded areas and replanting activities in existing crop lands. The DA also facilitated investment in R&D, training, infrastructure, and human resources development.

e. Natural Health Products

The Philippine Natural Health Products industry is an emerging industry rising out of the country's mainstream agriculture-based industries. It represents a wide spectrum of experts and scientists, as well as companies engaged in R&D, farming, production, processing, trade and marketing of health-related ingredients or raw materials, including the transformation of raw materials or ingredients into finished products and health-related

Appendix 1. Sectoral Analyses

services. These are in the form of botanicals, semi-finished products, either in their natural state or transformed states, such as using isolated actives and bioactive ingredients and other similar forms.

In 2011, local sales of Philippine herbal/traditional products increased by 7 percent compared to its total value in 2010 (*Source: Euromonitor International website*). Increasing consumer preference for safe treatments and growing health and wellness trend in the Philippines is the major factor contributing to the growth of the industry. In addition, companies emphasize the safety of these products and claim that it provides the same health benefits as the standard medicines without risk and other side effects.

Growing interest in natural and organic food has transformed a small market niche into a double-digit growth sector with global sales estimated at US\$91 billion in 2011, which is 10 percent over in 2012. Retailers, suppliers and producers both natural and mainstream are meeting this demand with new foods and organic alternatives to conventional products.

Based on the interview with DA Secretary Proceso Alcala, the current demand for natural ingredients in the global market is US\$400 billion. From the current forecast of the Global Industry Analyst, Inc., the global herbal supplement and remedies is estimated to be at US\$107 billion industry by 2017.

Employment and Export Performance

There is estimate as to the total employment of the industry but based on an industry survey, a large manufacturing firm employs an average of 200 individuals, 50 percent of which would be involved in marketing and distribution. A small-scale firm engaged in the production of natural ingredients gives livelihood to around 450 people, 35 percent of which would be directly under the firm while the rest would be the farmers and raw material producers.

In 2011, based on the export data from DTI-Bureau of Export Trade Promotions (BETP), the Philippine natural and organic products have an estimated total export value (FOB) of about US\$153 million. The major contributor of the growth in the sector is the medicinal plants/foods and the personal care category.

Latent Comparative Advantage and Potential to Move up the Value Chain

One of the biggest global trends in the past 20 years has been the growing interest in health and well-being. It has become increasingly important to consumers to improve both their health and the environment that they live in. Hence, natural and organic household and home care products that include cleaners, surface, laundry and dish cleaners, pet food, flower and linens and fibers are becoming more in demand.

Appendix 1. Sectoral Analyses

Considering the more than 850 species of medicinal plants that have the potential as new natural ingredients, a growing domestic and global market and a rapidly increasing number of companies engaged in the business, there is a bright prospect for the industry especially in terms of quality and supply of natural health products.

Spillover Effects

The development of the natural health products industry would greatly benefit the agriculture sector, particularly, the farmers who could supply raw materials such as ampalaya, sambong, lagundi, malunggay, banaba, and luya, among others. The supply of fresh raw materials is through contract growing schemes with farmers.

Supply Chain Gaps/Binding Constraints

Like in the rubber products industry, the main supply chain gap in this industry is the supply of organic/natural raw materials. Other raw materials are imported already processed by the industry such as in the case of melatonin, valerian roots, chamomile, steria, insulin fiber, different plant extracts, amino acids collagens and other functional raw materials since foreign suppliers are already internationally certified and comply with international standards for ingredients.

Further, the following have been identified by the industry as key constraints to their growth and development:

- Insufficient nurseries, plantations and pre-processing facilities;
- Slow adaption of productivity-enhancing technology;
- Lack of pre-processing and clinical trial facilities;
- Weak industry integration and weak capacity of players (mostly MSMEs);
- Lack of certification system;
- Weak linkage among scientists, research institutions and private sector;
- Lack of standards.

Policy Response

To mitigate the impacts of the above, the following have been recommended:

- Provision of incentives to commercial production of crops used for natural health products as well as to those that will establish nurseries and processing plants;
- Provision of R&D support, clinical trial facilities and state-of-the-art testing facilities;
- Establishment of a certification system consistent with international standards;
- Provision of support to marketing, promotion and market studies;
- Provision of financing support and capacity-building for MSMEs.

Appendix 1. Sectoral Analyses

f. Agriculture-related infrastructures, facilities and support-services

In line with the objectives of the government embodied through R.A. No. 8435 (Agriculture and Fisheries Modernization Act of 1997) and the recent R.A. No. 10601 (Agriculture and Fisheries Mechanization Law of 2012), investments in mechanized agricultural support services such as harvesting, plowing, spraying and dusting should be encouraged. Investments in support infrastructures (on top of mechanized drying, cold chain storage, blast freezing, ice plants, slaughter houses and dressing plants as these were already discussed) such as bulk handling, packing house and trading centers should likewise be encouraged.

3. Services

The Services sector plays an increasingly important role in the growth and development of developing countries. Services present alternative opportunities for the Philippines to fast track economic growth by building on niches to specialize on and scale up in order to achieve explosive growth.⁴

The role of the sector to poverty reduction is currently higher than the contribution of growth in the agriculture or manufacturing sectors. It has been reported that strengthening the Services sector has the capacity to increase backward and forward integration in the domestic economy and boosts international trade linkages.⁵ This is in line with the Comprehensive National Industrial Strategy (CNIS).

Services grew 7.1 percent in 2013, accounting for 57 percent of the economy and contributing more than half of the increase in GDP. The strong growth was buoyed by business services which include higher value business process outsourcing (BPO) and real estate activities, among others.⁶ Further increase is expected with the growth of emerging Services revenue streams such as IC Design, Hospital/Medical Services, Maintenance, Repair and Overhaul (MRO) of Aircraft, and Ship Repair Services.

Given the multifaceted contribution to national economy and trade, it is important that the government ensures that it is nurtured and supported through fiscal and non-fiscal measures achieved through a proactive public and private sector consultation process. The right blend of policies can be implemented towards this end in order to synergize policy and mobilize resources to further boost the sector's contribution to growth and development.

⁴ The Service Revolution, EjazGhanii, Paper presented at ILO Conference, Geneva, 2011

⁵ World Bank presentation, "Role of Services in Economic Development"; Geneva, July 2012 (Data source: World Bank, 2010)

⁶ Asian Development Outlook 2014

Appendix 1. Sectoral Analyses

a. Knowledge-Based Services

The Philippines is a mature location for IT-BPM services. In 2010, the country emerged as the number one voice BPM provider in the world. Non-voice services and global in-house centers (GICs) also gained traction, rising to prominence as the number two location worldwide.

The anticipated growth in the domestic market due to the improving economy and resulting consumption spending will lead to increase demand. Services play a key role in improving competitiveness of all industries because it will strengthen backward and forward linkages among the primary and the secondary sectors. This is an effective component of a comprehensive development strategy.⁷

IT-BPM services are generally categorized into horizontal or vertical services, as follows:

- Sales and Customer Relations Management;
- Back Office / KPO (Marketing Research, Legal Case Research and Preparation, Medical Research, Insurance, Mortgage, F&A, HR, Payroll, Procurement);
- Software Development(Product Development, Embedded SW, Project Management, Quality Assurance) and IT Services (Business Continuity/Disaster Recovery, Web Hosting, Network Management);
- Health Information Management (HIM), i.e., Claims Processing, Coding and Billing, Electronic Medical Records/Electronic Health Records;
- Transcription (Medical, Legal, Publishing, Data Transformation, Film Subtitling);
- Creative Content (Games Development and Animation);
- Engineering and Architecture Design.

The World Bank reports that higher labor productivity (sales/employees) is associated with greater usage of professional services in all East African countries, especially for small firms.⁸ The growth in the services sector is also more correlated to poverty reduction than the contribution of growth in the agriculture for a sample of 50 developing countries.⁹ Directly, they provide the largest source of new job growth. Indirectly, they provide the income that, when spent, drives further demand for goods and services and jobs to produce these.¹⁰

⁷ World Bank, July 2012, Nora Dihel, Africa Region - Poverty Reduction and Economic Management Unit

⁸ World Bank, July 2012, Nora Dihel, Africa Region - Poverty Reduction and Economic Management Unit

⁹The Service Revolution, EjazGhanii, Paper presented at ILO Conference, Geneva, 2011

¹⁰ Ibid.

Appendix 1. Sectoral Analyses

Employment and Export Performance

IT-BPM reached about \$15.5 billion export revenues in 2013. This represents a 17 percent growth from 2012. The industry created more than 140,000 new jobs reaching about 900,000. It is expected to create 100,000 more in 2014. The industry is still on track to revenue and employment projections by 2016.¹¹

Latent Comparative Advantage and Moving Up the Value Chain

The industry targets to employ more than 1.3 million direct employees and contribute around 8 percent of GDP. To do this, the IT-BPM has to diversify significantly in breadth, scale, and maturity of services. It has to evolve dramatically, with non-voice, complex services as the fastest developing segments. Prominent industry verticals include healthcare, software development, and creative services (animation and game development). These sectors need a strong domestic base to be able to build competitiveness. Knowledge-Based Services providers can help find appropriate solutions/systems like healthcare, transportation systems, disaster risk prevention, e-government systems, among others.

One potential growth segment of the industry is the HIM services sector as it is information-intensive. It leverages ICT to ensure better delivery of services and widespread access to health care services.¹² Many hospitals/medical facilities lack capacity to implement HIM systems due to high cost of investing, installation, and maintenance.

Policy interventions are necessary to build a knowledge economy in order to foster development and growth of globally competitive Filipino companies. The main drive is to move up the value chain and become more specialized in high value-added activities and Knowledge-Based Services represent the link between innovation and commercialization.

Supply Chain Gaps/Binding Constraints

The main constraint of the industry is insufficient supply of talent to the different segments. While there is a large pool of labor available for the industry, additional skills training and English proficiency are needed to have them employed. Likewise, there is a pervading concern that parents do not prefer their children to be employed in the industry because of the workshifts.

Another constraint would be the lack of network redundancy in the areas other than central business districts. This offers limited location options for IT-BPM companies that contribute to geographical shortages in available manpower.

¹¹Information Technology and Business Process Association of the Philippines (IBPAP)

¹²Ibid

Appendix 1. Sectoral Analyses

Other identified constraints include the following:

- Presence of MNCs in the Philippines put a further strain in the talent supply and cost of doing business for local companies;
- Volume of funds for MSMEs lending has been inadequate as traditional government / private sector financing is more likely to be allocated toward livelihood and microenterprise projects, many of which fail to grow;¹³
- Prohibitive cost of software and hardware for animation and game development operations hamper growth. The same can be observed for hospital/medical facilities in integrating HIM systems;
- Limited resources for marketing and promotion to build a country brand.

Policy Response

To address the above, the following interventions have been identified for the industry:

- Provision of incentives to the selected segments of the industry to stimulate innovation and commercialization of locally produced products/services (e.g. animation & game development) that create/produce Intellectual Property for commercial sale and to the emerging high value services such as HIM activities to address the lack of capacity of hospitals/medical facilities to ensure the achievement of the government goals of better health outcomes and responsive health system;¹⁴
- Promotion of more PPPs to address concerns on talent supply, financing, ease of doing business, market access, promotion and marketing.

4. Housing

Generally, the housing sector is divided into five segments namely: socialized (Php450,000.00 and below), economic (above Php450,000.00 to Php1.25 million), low cost (Php1.25 million to Php3 million), medium cost (above Php3 million to Php4 million) and open market (above Php4 million).

To date, the Philippines faces an estimated unserved housing need of 3.9-million, including 832,000 households that cannot afford decent shelter. The magnitude of housing need is estimated to soar to 5.8 million housing units by 2016.

The Housing Industry Roadmap of the Philippines 2012-2030 envisions eliminating the housing backlog by 2030 by increasing housing production, enhancing shelter affordability through a comprehensive housing subsidy program for targeted beneficiaries,

¹³Aldaba, PIDS, 2012

¹⁴ Philippines eHealth Strategic Framework and Plan 2013-2017

Appendix 1. Sectoral Analyses

mobilizing and generating housing finance for end-user financing support, and improving the regulatory environment for housing.¹⁵

In 2012, the construction sector was able to contribute a total of Php345 billion to the economy (from Php302 billion in 2011), increasing its share to GDP from 5.1 percent in 2011 to 5.5 percent in 2012. For the year 2013, this sector contributed a significant 5.6 percent share to the country's GDP.

Employment

The housing sector has high contribution to employment as well as the potential to contribute such in the coming years. This sector's employment multiplier shows that it can create an additional 2,032 jobs for every 1 billion of investments.

Supply Chain Gap/Binding Constraints

A recent study¹⁶ shows that from the years 2001-2011, bulk of this housing backlog is composed of the economic type of housing at almost 1.96 million units, followed by the deficit from socialized and low cost housing at 663,282 units and 462,160 units, respectively. Taking into account the country's future needs until 2028 for these segments (socialized, economic, low cost), the country is facing a total deficit of 3.2 million of housing units for both economic and low cost housing segments while socialized is expected to be at a deficit of 1.6 million units. The limited space on which housing can be provided in highly-populated areas, exacerbate the backlog situation. As such, vertical housing needs to complement supply where horizontal housing would not be feasible anymore.

It is also seen that there is a need for competitively priced inputs especially needed in building socialized, economic and low cost housing units to ensure its affordability to the lower segment of the country's population. There are inputs for housing construction that are cheaper if imported however, there is also a need to increase the inputs that can be locally produced.

Production inputs of the housing industry can be divided into intermediate inputs and primary inputs. Intermediate input accounts for the 46 percent of the production structure and these include metal, wood and land transportation. On the other hand, primary output which composes of labor and capital accounts for the remaining 54 percent.

In case of the most binding constraints, regulatory concerns topped the list. Among these regulatory-related issues include difficulties in securing permits and licenses needed such as the Development Permit (DP), License-to-Sell (LTS), and Certificate of Registrations (COR). Most of the developers also experienced difficulty in securing BIR

¹⁵ The Housing Industry Roadmap of the Philippine 2012-2030 by SHDA and UA&P, page 3

¹⁶The Housing Industry Roadmap of the Philippine 2012-2030 by SHDA and UA&P, page 58

Appendix 1. Sectoral Analyses

rulings. Non-harmonized national and local rules and regulations in securing permits and licenses, which eventually increases construction costs, are also among these constraints.

Spillover Effects

The spillover effects of the housing sector are also notably high. Creating or developing a community tends to increase economic activities (opening up of sari-sari stores and other trade inducing practices, among others) in addition to the social development (building of hospitals, schools, and public transport) that it brings. In addition to for housing construction involves different sectors such as but not limited to cement, iron and steel, copper electrical wires, paints, ceramics, etc. that are of significant contribution to the country's economy.

Competitive market is also high for mass housing. Given the existing and continuous demand for housing, housing developers have been in dynamic competition with each other by giving the most economical housing units for end-users.

Policy Response

The continued listing of economic and low cost housing in the preferred areas of investments will encourage more developers to construct low cost housing for the low income group, in addition to the fact that housing is classified as a “merit good”, a social aspect of giving incentives. In addition to direct investments through housing development, BOI-registered housing projects also contribute in the production of socialized housing through its compliance projects, which is equivalent to either 20 percent of the main project's total project cost or 20 percent of its total saleable area. BOI requires its registered mass housing projects to comply to the said 20 percent socialized housing requirement under Section 18 (Balanced Housing) of R.A. No. 7279 or Urban and Housing Development Act of 1992 (UDHA). Even not stipulated under the law, vertical housing projects are also required to comply with the socialized housing requirements under BOI guidelines and closely monitor the same.

There is also a need to look at common facilities such as the drainage, sewerage, and other infrastructure needs for housing and there is also a need to address financing for low income housing beneficiaries.

To augment identified supply chain gaps in the housing sector, the “Reverse Trade Arrangement”¹⁷ initiative of the DTI-BOI is now in its conceptualization stage, and is getting positive response from the industry players that produces key inputs for the production of housing such as paints of the chemical industry, cement, and iron and steel. The success of this initiative will not just address the supply chain gap of the housing sector but is also expected to contribute in the revival of the local manufacturing industry.

¹⁷An interaction between buyers/end-users and sellers/manufacturers wherein the buyers/end-users (in this case is the housing developer) present their needs and arrange for preferential pricing for inputs from interested sellers/manufacturers (input producers) that will supply the inputs for production needed by the former.

Appendix 1. Sectoral Analyses

Other policy responses aside from fiscal incentives, would be the harmonization of existing national and local regulations so as not to confuse the developers and to avoid additional cost to them. The development of public rental housing opportunities through in-city socialized mid-rise buildings (MRBs) should also be looked into.

5. Hospitals

Health service delivery in the Philippines developed into primary dual administration systems run by public and private provisioning. In a decentralized system as that of the Philippines, public health services are mainly delivered by LGUs with the technical aid of the national government through the DOH. The nearest service available to households is the Barangay Health Services (BHS). On the other hand, the private sector delivers services through hospitals, freestanding clinics, and group practice or polyclinics. The country has 13 private hospitals with international accreditation.

Comparative 2010 figures on hospital bed-to-population ratio among selected Asian countries show that the Philippines (at 1:855) lags behind Indonesia (at 1:1,667), Vietnam (at 1:610), Thailand (at 1:467), China at (1:400), Singapore (at 1:381), and Japan (at 1:71).

Employment

The health care sector has a medical manpower pool of 1.06 million in 2010 (doctors, nurses, dentists, physical and occupational therapists, pharmacists, medical technologists, and laboratory technicians), with estimated multiplier of 2,505 additional workers for every PhP1 billion additional demand in healthcare services.

The percentage share of health budget to the total national budget as of 2014 is 3.07. This is 22.31 percent higher from 2.51 percent in 2013.

Health sector is information intensive.¹⁸ It can benefit from appropriate use of ICT (i.e., medical coding/ billing, claims processing, electronic medical records) directed towards ensuring the achievement of the health system goals of better health outcomes, sustained health financing and responsive health system.¹⁹

Supply Gap/Binding Constraints

As of 31 December 2012, there are a total of 1,824 public and private hospitals (Levels 1, 2, 3 & 4) spread throughout the country, with a total of 101,437 beds. Based on this number and the 2012 estimated population, the national hospital bed-to-population ratio is currently at 1:945. The ratio is compliant to DOH standard of 1:1000 ratio.

¹⁸ Alvin B. Marcelo, MD, Chief Information Officer, PhilHealth, *The Philippine eHealth Development Plan, Leveraging ICT for a More Efficient Health Sector*, 2013

¹⁹ Philippines eHealth Strategic Framework and Plan 2013-2017

Appendix 1. Sectoral Analyses

However, regional ratios using 2012 number of beds and 2010 regional population show that 13 out of 17 regions (76 percent) do not yet meet the standard. Further, 4 out of 17 cities in NCR (23 percent) and 52 provinces out of 82 provinces throughout the country (63 percent) do not yet meet the standard. The hospital bed-population ratio in some regions/provinces do not meet the DOH standard of 1:1000, much more the WHO standard of 1:500 and lags behind our ASEAN neighbors. In addition, there is lack of investments and adoption of fast-changing technology to keep pace with international counterparts.

There are also gaps in the distribution of medical and allied professionals across the country, more doctors and nurses are available in cities and urban areas compared to rural areas. Preference of medical and allied health professionals to practice in urban areas

Health Information Management (HIM) is likewise inadequate or lacking in many hospital/medical facilities due to high cost of investing, installation, and maintenance.

Policy Response

To improve the hospital bed to population ratio, the inclusion of hospitals in the BOI's annual IPP has been considered. This would not only improve the bed to population ratio but also encourage new hospital to acquire new equipment and technologies to enhance healthcare services in the country.

Healthcare ICT systems implementation is crucial to achieve the eHealth 2020 vision of the DOH which ensures widespread access to health care services, health information, and securely share and exchange patients' information. This transforms the way information is used to plan, manage, deliver and monitor health services.²⁰HIM systems integrators, which are covered by Knowledge-Based Services, will likewise be considered to help improve on hospital services and thus, enhance patient care.

Further, more PPP projects for hospitals particularly in regions/provinces where most needed would be encouraged and government programs to bring doctors/medical professionals to rural areas would be improved.

6. Energy

Energy is considered the life-blood of the economy. It is indispensable in achieving economic growth and critical in sustaining a nation's progress and prosperity. It is an instrument for poverty reduction and social equity as it serves as an enabling factor to channel grassroots development with the delivery of the much needed public services to marginalized and disadvantaged sectors of our society.

The country's current installed capacity for power generation is 17,025 MW, which is largely located in the Luzon grid. Based on DOE's 2014-2019 demand-supply

²⁰Ibid

Appendix 1. Sectoral Analyses

projections, an additional 5,100 MW is needed from 2014-2019 in all major grids of the country. The Luzon grid would be needing some 3,800 MW, Visayas grid would need 900 MW, and the Mindanao grid would need 400 MW. As such, the 2014 IPP would encourage investors to put up the necessary additional capacity that would be needed until 2019.

Even as the government promotes the use of renewable and alternative energy, we recognize that fossil fuel remains a dominant source of energy to fuel the economy. Natural gas-fired plants remain the top producers of electricity followed by coal-fired power plants.

It is recognized that the development of a power plant takes a long gestation period, requires big investments and entails risks. Thus, investors in energy projects are looking for a sound and stable policy and regulatory environment within which they will operate with an attractive business environment. Due to the heavy capital requirements to erect a power plant, generating companies usually rely on lending institutions to supply the needed cash. The lending institutions, on the other hand, look at all the financial support from the government to mitigate the risk of exposure to the project.

The existing plant generating capacity and additional capacity needed on top of the committed capacity to meet the demand and the required reserve margin per major grid is shown below:

	Existing Capacity (MW)		Additional Capacity Required*						
	Installed	Dependable	2014	2015	2016	2017	2018	2019	Total
Luzon	12,528	11,349	600	1,300	400	500	500	500	3,800
Visayas	2,448	2,103	0	150	150	250	200	150	900
Mindanao	2,049	1,614	300	0	0	0	0	100	400
Total	17,025	15,066	900	1,450	550	750	700	750	5,100

Source: DOE Electric Power Industry Management Bureau

Per the DOE, from 2014 to 2019, an additional 5,100 MW of power generating capacity is needed in all major grids of the Philippines. Out of the 5,100 MW required additional capacity, only 45 power generating plants equivalent to 3,382.75 MW (combined RE and conventional fueled) are committed to go online in 2016.

Appendix 1. Sectoral Analyses

Major Island Grid	Existing Capacity (MW)		Additional Capacity Required(MW)	Committed Additional Capacity (2014 to 2016)			
	Installed	Dependable	2014 to 2019	Capacity (MW)	No of Plants	No. of BOI Registered	Total BOI Registered Capacity
Luzon	12,528	11,349	3,800	1,724.65	19	12	973.6
Visayas	2,448	2,103	900	579.60	10	7	293
Mindanao	2,049	1,614	400	1,078.50	16	6	318.8
Total	17,025	15,066	5,100	3,382.75	45	25	1,585.4

Source: DOE

Still, the committed power plant that will go online in 2016 is not sufficient to address the projected power requirement of the three (3) major the grids in 2019. Investors have, however, provided an indicative additional capacity from (2016 to 2019) of around 13,101.8 MW depending on the market requirements.

Supply Gap/Binding Constraints

Energy security will not be substantially realized if only a small portion of the fuel requirements to run our generating plants is sourced locally. The slow pace of exploration and development of indigenous and other alternative energy sources therefore needs to be addressed. Analyzing the supply chain for geothermal energy, we consider test-drilling during the exploration stage as one ancillary activity to be encouraged. Much of the cost for the development of geothermal energy and also the risks occur during the exploration stage. Common industry practice is that developers outsource the exploration and the test-drilling activities to professional drillers who are better equipped and are more technically capable to do the job to lower their costs and the risks involved.

Based on the DOE data, the geothermal installation targets are as follows:

Location	Commissioning Year			
	2013-2015	2016-2020	2021-2025	2026-2030
Luzon	20	760	20	-
Visayas	20	150	65	60
Mindanao	-	250	70	20
Total	40	1160	155	80

For the oil and gas, based on the DOE data as of 2011, the potential petroleum resources of the Philippines totalled to 27,905 million of oil initially in place and 53,870 billion cubic feet of gas in place. The estimated recoverable discovered and undiscovered resources include 1,892 million barrels of oil, 10,349 billion cubic feet of gas and 164 million barrels of condensate. These petroleum reserves calculations are based on the sixteen sedimentary basins situated all over the country from the Cagayan Valley Basin in the north down to the Agusan-Davao Basin in the south as well as the prolific Northwest

Appendix 1. Sectoral Analyses

Palawan Basin and the Sulu Sea Basin along the western flank of the archipelago. These basins extend on both offshore and onshore areas. The offshore regions comprise both shallow to deepwater areas for exploration.

Another ancillary activity considered is commercial energy storage that would require the setting up of a battery storage facility. The battery energy storage facility helps ensure the reliability of the power system by stabilizing the supply of electricity in the grid and in meeting peak power demand. Further, with many of our existing power plants getting older and prone to sudden breakdowns or emergency shutdowns, the storage battery serves as a back-up load to avoid power outages. The electricity stored would be the excess electricity produced by power generating plants (RE and non-RE) when demand for electricity in the grid is low.

As mentioned earlier, the energy sector is still heavy reliant on imported fossil fuels like coal and fuel oil. In this connection, intensive efforts to develop the supply of energy crops for biofuels should be exerted. Energy crops could be bunker substitute for many power plants, manufacturing plants and marine vessels and to ensure the future fuel security of the country. However, the potential diversion of food supply to fuel use has been raised in several international discussions as the cause for increasing food prices. In this connection, it is recommended that cultivation of non-food biomass sources be encouraged and in areas that would not rival food sources. While it may not be discounted that food sources like coconut, sugar and palm could still be used for biofuels, these should already be declared at the outset and should be planted in areas designated by the Department of Agriculture for biofuel crops.

There is a need for a long-term reliable power supply. Private sector investments are relatively low in power generation, exploration and development of other energy resources due to high capital requirement and the 3-5 year gestation period to build a new plant.

Further, there is heavy reliance on imported fossil fuels (coal, fuel oil). Most of the local coal-fired power plant use imported coal with higher British thermal unit (BTU) as fuel to produce electricity. Coal will remain the major fuel for power generation. It is noted though that there is growing opposition to coal-fired power plants due to environmental concerns.

Other constraints identified to power generation include:

- Limited supply of local coal;
- Non-suitability of local coal for most coal-fired power plants (low heating value);
- Periodic supply of energy resource (hydro - limited during summer);
- Limited infrastructure to deliver energy services (grid connection);
- Slow phase in the exploration and development of other potential energy resources (Oil, gas, coal and geothermal);

Appendix 1. Sectoral Analyses

- Peace and order situation.

Policy Response

The following have been identified as required policy interventions for the energy sector:

- Provision of incentives to power generating plants, drilling services for geothermal projects, commercial energy storage facilities, and plantations of biofuel crops;
- Support the salt fertilization program for existing coconut plantations;
- Review of the EPIRA law.

7. Public Infrastructure and Logistics

a. Transport

Land, water and air transport or the tri-modal transport system plays a very important role in moving goods and people to various parts of the country as well as to international destinations.

At present, local transport facilities need substantial improvements to support the country's logistics network. With the Philippines' archipelagic nature, it is really a challenge to interconnect the more than 7,100 islands in an effective and efficient transportation network.

Employment

The aviation sector supports 123,000 jobs in the Philippines which include jobs that are directly and indirectly supported through the aviation sector's supply chain and those jobs supported through the spending by the employees of the aviation sector and its supply chain.²¹

For the shipping industry, the 2010 Annual Survey of Philippine Business and Industry (ASPBI) records about 17,630 employment for sea and coastal water transport,²² while transportation via buses records about 25,535 employees.²³

Supply Chain Gap/Binding Constraints

The key constraints that hinder the growth of the transport sector are the huge capital requirements considering the cost of brand new aircrafts, ships and land/mass rail transport, the high fuel cost determined by global oil markets, the high barriers to exit and

²¹<http://www.benefitsofaviation.aero/Documents/Benefits-of-Aviation-Philippines-2011.pdf>

²²Release date: January 21, 2013 (<http://www.census.gov.ph/content/2010-annual-survey-philippine-business-and-industry-aspbi-transport-and-storage-final>)

²³ Ibid.

Appendix 1. Sectoral Analyses

foreign equity restrictions. The potential migration of the country's world-recognized workforce is also high considering that the salaries of pilots, engineers and cabin crews are not competitive as compared with the salaries being offered by other countries.

Further, the presence of maintenance, repair and overhaul services (MRO) for the air transport sector is also necessary while ship repair is also needed by the shipping industry. For the shipping industry, there is a need to retire old ships and modernize vessels, thus the need to have ship repair facilities. In addition, the Philippines has the potential to be an alternative ship repair hub to Singapore.

There are also government policies/ regulations that need to be looked into:

- R.A. No. 9295 (Domestic Shipping Act);
- R.A. No. 9301 (Overseas Shipping Act);
- Cabotage Law/ Foreign equity investment restriction;
- Bareboat Charter Law Restrictions;
- Common Carrier's Tax;
- Franchising/ Issuance of CPC;
- Bill of Rights for Passengers.

Other factors that may be considered under binding constraints that prevents the shipping industry to move up the value chain:

- Fuel efficient technology;
- Limited port ship calls;
- Ocean freight/ fare rates vs. air freight/ fares;
- Low cargo volume in some ports;
- Ports congestion.

Spillover Effects

The air, land and water transport sector will create opportunities for growth and development for industries such as tourism, logistics and manufacturing industries as well as global supply chains management of goods and services sectors. Data shows that the aviation sector contributes about Php35.5 billion (0.4 percent) to Philippine GDP. This total comprises: (a) Php17.6 billion directly contributed through the output of the aviation sector (airlines, airports and ground services); (b) Php9.7 billion indirectly contributed through the aviation sector's supply chain; and Php8.2 billion contributed through the spending by the employees of the aviation sector and its supply chain.²⁴

In addition, there are about Php156.7 billion in 'catalytic' benefits through tourism, which raises the overall contribution to Php192.2 billion or 2.4 percent of GDP.

²⁴<http://www.benefitsofaviation.aero/Documents/Benefits-of-Aviation-Philippines-2011.pdf>

Appendix 1. Sectoral Analyses

The shipping industry also has a high spillover effects. Data shows, the Philippines, being the world's leading supplier of seafarers, deployed 365,924 seafarers all over the globe in 2012, serving 25 percent of the total world fleet and likewise remitted a total of US\$4.8 billion.²⁵ Most of the agricultural commodities and other products are also being transported through shipping. This creates job opportunities for those small to large businessmen who are engaged into trading of goods, middlemen traders, drivers, and vendors to name a few. In addition to transporting of goods and services, passengers also get to their destination at the least possible cost. The tourism industry likewise benefit from the shipping industry since this is also one of the modes of transportation being used to ferry tourists from one island to another, thus creating job opportunities and new markets.

The land transportation sector likewise creates high spillover effects. Most of the goods transported either through air and water are being distributed to several destinations through land via trucks, buses or rail. Aside from goods, employees, students, businessmen, buyers and sellers also use land transportation in their everyday activities.

Create Competitive Market

The transportation sector is a very dynamic and competitive sector. Competition occurs not only within the mode itself but also across the modes. This is particularly true for inter-island travels in the country. The introduction of comfortable high-speed ferries as a result of the deregulation of the inter-island shipping industry opened up an alternative mode of travel to a market that would previously only consider travel by air. At the same time, the lower airfare offered by recent entrants in the airline industry allowed passengers to have comparative options for travel between air and sea. Prior to the entry of the new carriers, these passengers used to take the boats to travel.²⁶

Likewise, the improvement of roads in Mindanao has significantly reduced travel time by land. Since land travel is a lot cheaper than by air, this development became a source of competition for the air transport industry. An example of this is the Davao-General Santos route of Mindanao Express which load factor was significantly reduced from 90 percent to 20-30 percent when travel time by land in this route was reduced from 6 hours to 2 hours as a result of the road improvement in the area.²⁷

The air transport industry is also creating competition, not only with the other mode of transportation such as water and land, but also within themselves. An example of this is the increasing number of low cost carriers who would like to increase their market share in the growing tourism industry.

²⁵FR-PH Maritime Prospects –Challenges, <http://gpcci.org/home/wp-content/uploads/2013/05/FR-PH-Maritime-Prospects-ChallengesGPCCI-5.23.pdf>

²⁶<http://pascn.pids.gov.ph/DiscList/d00/s00-12.pdf>

²⁷[Ibid.](#)

Appendix 1. Sectoral Analyses

Policy Response

As a support to the said industries, the government may provide the necessary assistance through duty free importation of capital equipment for air, water and land transportation and income tax holiday incentives for airlines and shipping lines. However, only brand new air, water and land transportation should be eligible in order to ensure air and sea worthiness. The requirement for newly acquired vessels is also in support of the vessel retirement program of MARINA in pursuant to the Domestic Shipping Act (R.A. No. 9295).

In addition, the following laws and policies should be looked into:

- Foreign ownership restrictions to help the country attract bigger foreign direct investments most especially on infrastructure projects and development.
- De minimis rule considering that the Philippines has one of the lowest de minimis threshold which is US\$0.35.²⁸ Increasing the de minimis threshold will help reduce the compliance costs imposed on importers and accelerate delivery of the merchandise. It will also allow our government to refocus their revenue collection efforts on those parts of the indirect tax base that yield higher net revenue.
- Bill on Customs and Tariff Modernization Act in view of the need to modernize and upgrade customs administration in the country by aligning it with international standards and thereby achieve unanimity in customs procedures with all member states of the World Customs Organization (WCO) which includes the Philippines.²⁹
- Cabotage law³⁰ considering that high local shipping costs may be attributed largely to the absence of competition in the local shipping industry, thus the need for a comprehensive review and amendment of the Philippine Cabotage law.³¹
- Common Carrier's Tax for cargo. President Aquino signed last March 2013 RA 10374 exempting foreign carriers tax imposed on foreign airlines and vessels. However, this exemption applies to passengers only and not to cargo.
- Strict implementation of the Domestic Shipping Act, in particular, the Mandatory Vessel Retirement Program and the progressive restriction on ship importation.
- Level playing field on taxes for both domestic and foreign vessels.
- Review MARINA Memorandum Circular on maritime incidents/accidents.

²⁸<https://www.google.com.ph/#q=de+minimis+air+cargo+philippines&safe=active&start=0>

²⁹ <http://www.noodls.com/view/4159DB5820A900F85A53079C63A55E53473786B2?904xxx1401267289>

³⁰ Cabotage law – RA 1937, also known as the Tariff and Customs Code of the Philippines contains provisions that states that maritime transportation of goods and passengers within the country is reserved for Philippine registered marine vessels.

³¹ <http://www.pids.gov.ph/index2.php?pr=162>

Appendix 1. Sectoral Analyses

b. Water Supply and Distribution

Water is a basic need and everyone has the right to be provided with access to it. In addition, economic growth must be supported, specifically by meeting the needs of priority growth and production centers for water supply.³² Unfortunately, only 80.2% of the Philippine households have access to water. Of the 80.2 percent with access to water from formal providers, only 44 percent are connected to Level 3 (waterworks systems) that are considered the safest and the most convenient sources of water supply. The rest get their water from Level 1 or 2 systems that include protected wells, springs, public faucets, etc.³³

There are approximately 5,400 water service providers in the country based on latest available information.³⁴ In Metro Manila, Maynilad Water Services, Inc. (Maynilad) and Manila Water Corporation (Manila Water), are the contracted water providers. Outside Metro Manila, the 831 local water districts registered with the Local Water Utilities Administration (LWUA) are the major water service providers. The local government units (LGUs) and community-based organizations (CBOs) remain to be the biggest provider serving 55 percent of those with access to water, followed by the water districts at 20 percent and private operators at 5 percent. The informal sources provide water to the remaining 20 percent of the population. While the formal providers are required to meet national water quality standards, no such oversight exists for the informal providers.³⁵

Employment

The water sector industry generate high employment rate. In 2009, the employment generated for purification and distribution of water is 25,510, with additional 1,067 workers for steam and hot water supply.³⁶ Forward linkages include the construction and real estate industry, agriculture and manufacturing industries. Backward linkages include suppliers of water, pipes, distribution systems, water treatment, among others.

Supply Chain Gap/Binding Constraints

One of the major constraints to the development of the sector is the lack of new sources of water. Unless new water sources are developed, the Philippines may face a water crisis over the next 10 years due to its growing demand. Among the urban centers where severe water shortage could be experienced by 2024 were Metro Manila, Cebu,

³² <http://www.neda.gov.ph/wp-content/uploads/2013/09/CHAPTER-5.pdf>

³³ <http://dirp4.pids.gov.ph/webportal/CDN/PUBLICATIONS/pidspn1316.pdf>

³⁴ Sector overview of the Philippine water supply sector roadmap
(<http://dirp4.pids.gov.ph/webportal/CDN/PUBLICATIONS/pidspn1316.pdf>)

³⁵ <http://dirp4.pids.gov.ph/webportal/CDN/PUBLICATIONS/pidspn1316.pdf>

³⁶ <http://www.census.gov.ph/content/2009-annual-survey-philippine-business-and-industry-aspbi-electricity-gas-and-water-supply>

Appendix 1. Sectoral Analyses

Davao, Baguio, and Angeles.³⁷ In addition, there are still 432 identified waterless barangays and municipalities that need water service providers.³⁸

Likewise, there is low government budget allocation for water infrastructure. Of the total water infrastructure budget of Php97.3 million (22 percent), only Php3.7 billion (3.8 percent) was allocated for water supply and the rest going to irrigation and flood control.³⁹

In addition, huge capital requirements, foreign nationality restrictions, high barriers to exit and the non-revenue water concerns have been identified as barriers to new entrants. The following policy related constraints are also notable:

- Prospective investors in the water supply sector have noted the lack of an economic regulator and the inadequate capacity and resources of the current resource regulator. This discourages foreign investors from entering the field. The absence of an independent regulator forced the Metropolitan Waterworks and Sewerage System (MWSS), Manila Water, and Maynilad to establish one by contract. While the arrangement is novel and apparently works, establishing an independent regulator via legislation will afford greater comfort and long-term stability.⁴⁰
- Weak enforcement of water-related laws such as Clean Water Act, etc.
- Different tariff structures/ methodologies. Tariff levels are not sufficient for the majority of the Water Service Providers to recover recurrent costs and accumulate sufficient reserves to fund new capital developments.⁴¹
- Franchise/CPC
- Other constraints pertain to the following issues:
 - Water pollution
 - Climate change
 - Low performance of water utilities
 - Limited access to financing
 - Rapid population growth.

Spillover Effects

Since water is a basic need, it is expected to have high spillover effects as the availability of water supply in an area contributes to its fast growth and development. It is actually one of the major services being considered by any investor or locator in their business decisions. With the availability of the necessary services/ utilities in the vicinity such as electricity, telecommunication, and water supply connections, the construction of

³⁷<http://www.interaksyon.com/business/57541/water-crisis-to-hit-philippines-in-10-years-if-no-new-sources-are-tapped-expert-says>

³⁸ Philippine Water Supply Sector Roadmap 2nd Edition, 2010 National Economic Development Authority

³⁹ Executive Summary, xvi, Philippine Water Supply Sector Roadmap 2nd Edition

⁴⁰<http://www.investphilippines.info/arangkada/wp-content/uploads/2011/06/14.-Part-3-Seven-Big-Winner-Sectors-Infrastructure-Water.pdf>

⁴¹ Philippine Water Supply Sector Roadmap 2nd Edition, 2010 National Economic Development Authority

Appendix 1. Sectoral Analyses

residential houses, commercial and industrial businesses follow, if not preceded by water supply thus increasing the economic activity and employment generation in that given area.

Policy Response

To address the above constraints and gaps, the following have been considered as the required interventions:

- Provision of incentives to new projects utilizing new water sources and those that will cater to any of the identified waterless barangays and municipalities
- Creation of a separate and independent Water Regulatory Commission
- Promotion of Private Sector Participation/Joint Ventures
- Tapping Official Development Assistance (ODA) as complementary funding sources
- Harmonization of tariff setting/methodologies

c. Industrial Waste Treatment

With the current efforts on reviving the manufacturing sector, it is expected that there will be an increase in the generation of industrial wastes, which could include residuals after a manufacturing process in factories, mills and mines. Industrial wastes could be hazardous or non-hazardous depending on the product being manufactured or processed used. These wastes could include chemical solvents, radioactive wastes, colorants, metallic substances, paper products, and other industrial by-products.

While sewage plants can treat some industrial wastes, i.e. those consisting of conventional pollutants such as biochemical oxygen demand (BOD), industrial wastes containing toxic pollutants would require specialized treatment systems and thus, special treatment facilities will have be established to handle the treatment and disposal of such wastes. At present, there are no known commercial treaters of industrial wastes. Some companies would have in-plant storage facilities for wastes, especially, hazardous wastes but none really for treatment and proper disposal. In this connection, investments in industrial wastes treatment facilities would be encouraged. These activities would also add to the employment opportunities to our engineering and environmental professionals and contribute to the environmental protection initiatives of the government for sustainable development.

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