

REPUBLIC OF CHINA

The Petrochemical Industry of Taiwan, ROC

The Global Economic Outlook and its link with the petrochemical industry

After the deepest global downturn in 2009 of recent history, the world economy experienced a booming year in 2010 and gradually spiraled down (still positive growth) in aftermath, as illustrated in table 1. The recovery is proceeding at different speeds in the various regions. Basically, recovery is expected to remain sluggish in most advanced economies, whereas the activity is expanded relatively vigorous, largely driven by buoyant domestic demand in many emerging and developing economies. Thanks to shale gas, USA is the only advanced country that could enjoy good GDP growth in recent years.

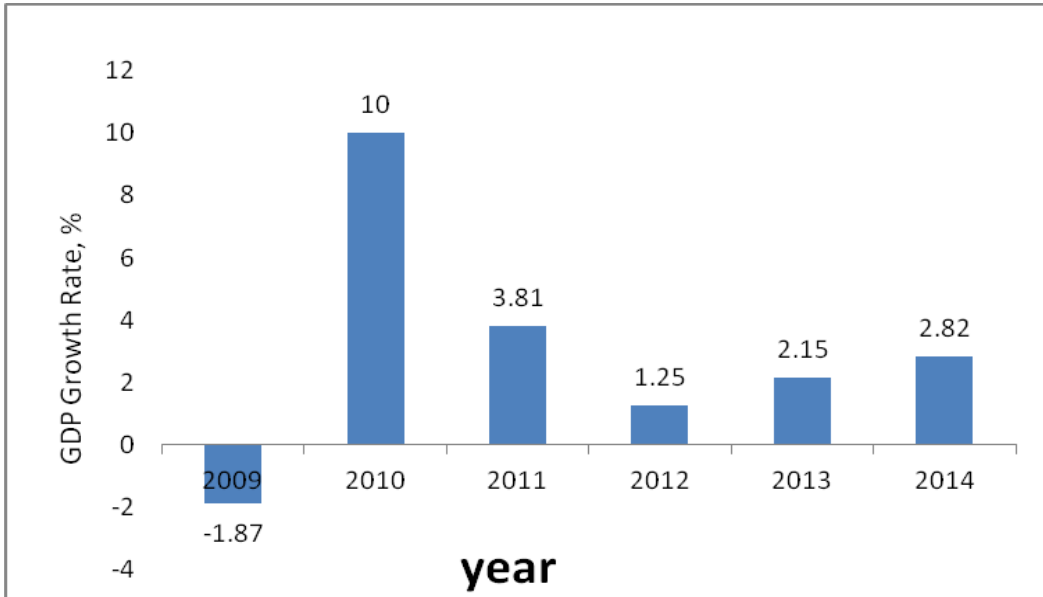
Table 1. Economic Growth Rate (%) in Selected Regions & Countries
Source : IMF

	2011	2012	2013(EST)	2014(EST)	2015(EST)	2016(EST)
World	3.91	3.18	2.87	3.59	3.96	4.07
USA	1.85	2.78	1.56	2.59	3.35	3.48
Euro Area	1.55	-0.64	-0.44	0.96	1.35	1.52
Japan	-0.59	1.96	1.95	1.24	1.14	1.17
China	9.3	7.7	7.6	7.25	7.03	7.02
Taiwan	4.07	1.32	2.19	3.77	3.93	4.16
India	6.33	3.24	3.80	5.15	6.27	6.47
Thailand	0.08	6.49	3.11	5.25	5.01	4.41
Indonesia	6.49	6.23	5.3	5.50	6.00	6.00

Taiwan Economic and petrochemical industry Outlook

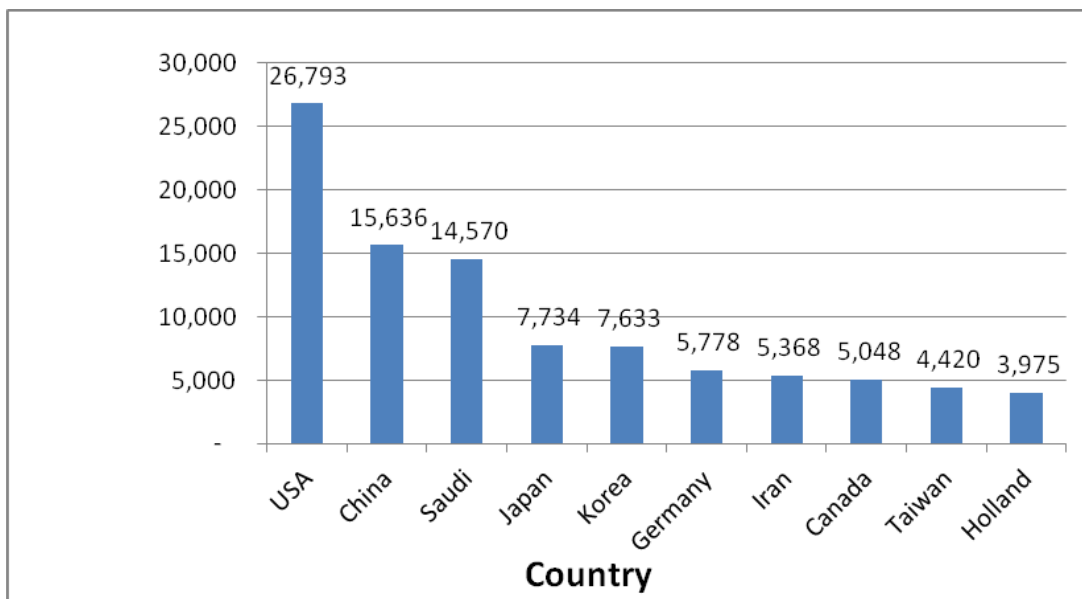
Government economic figures showed Taiwan GDP growth in 2013 was only 2.15%. As the global economy is heading to recovery, Taiwan is forecast to grow 2.82 % in 2014, as shown in Figure 1. Consumer Price Index (CPI) increased 0.79 % and Whole- sale price index (WPI) decreased 2.43%, respectively in 2013. Inflation pressure from the rebound of economic activities is anticipated. Both CPI & WPI are likely to see a moderate increase in 2014.

Fig 1 Taiwan's Economic Growth



Taiwan petrochemical industry did suffer a lot in recent years. Anti-pollution protest and strict environmental regulations have badly restrained the construction of new petrochemical facilities, for example Kuokung Petrochemical & Technology Project in Yulin County. So the petrochemical production capacity has gradually lagged behind that of other countries which started later. Thanks to CPC's new No. 3 naphtha cracker which came on stream in Q4 last year, the olefin capacity again surged. For now, Taiwan's total ethylene capacity ranks at 9th largest in the world, as shown in Fig 2.

Fig 2 Taiwan's Ethylene Capacity Ranks World Top 10
(Unit: 1,000mt/y)



The 2013 Petrochemical Industry Situations in Taiwan

Overview

The production of six basic raw materials and twenty four major petrochemical intermediates totaled 29,065,657 metric tons, an increase of 1.06% over the previous year, according to PIAT statistics, as indicated in Table 2. The increase of production value and volume was a result of the commercial run of CPC's new No.3 naphtha cracker which started up since Q3 of 2013. The total import was down by 0.44 % whereas the total export grew 1.44 % in 2013, compared with 2012.

Table 2. Supply and Demand for Major Petrochemicals in Taiwan

Year	2012	2013	Growth
Basic Materials			
Production	10,962,004	11,798,593	7.63%
Import	3,107,121	3,039,169	-2.19%
Export	1,598,201	2,621,066	64.00%
Demand	12,470,924	12,216,696	-2.04%
Intermediates			
Production	17,799,037	17,267,064	-2.99%
Import	3,301,369	3,341,021	1.20%
Export	9,059,994	8,190,882	-9.59%
Demand	12,040,412	12,417,203	3.13%
Total			
Production	28,761,041	29,065,657	1.06%
Import	6,408,490	6,380,190	-0.44%
Export	10,658,195	10,811,948	1.44%
Demand	24,511,336	24,633,899	0.50%

Demand= Production+ Import- Export Unit: Metric ton

While Taiwan's downstream derivative producers and converters have invested heavily in China for almost two decades, the Taiwanese government has long restricted the investment in upstream in China. This policy was lifted in January this year (2014). Gulei petrochemical project planned in Fujian Province of China, which is fully integrated from refinery through naphtha cracker to petrochemical down streams, is the first one that has been approved by Taiwanese Government, allowing investing in China. The ever-warming relationships of Taiwan-China are certainly a major catalyst to this project.

Basic Raw materials

The supply & demand statistics for petrochemical basic raw materials is illustrated in Table 3. The production of ethylene · propylene · butadiene · benzene · toluene, all increased to certain extents in 2013 except that of xylenes with a minor setback. The imports of ethylene, propylene,

butadiene, and xylenes declined while imports of benzene and toluene grew. Exports of ethylene, propylene, butadiene, toluene, and xylene increased in 2013, compared with 2012, whereas export of benzene receded. The apparent domestic demands for all basic raw materials registered positive growth in 2013, except for xylenes. Judging from the import & export figures in Table 3, Taiwan remains a net importer for all basic raw materials except for propylene and xylenes.

Petrochemical Intermediates

Table 2 also indicates the supply & demand of 24 petrochemical intermediates in 2012 & 2013. The production and export all decreased to certain extent in 2013, mainly attributed to PTA.

Synthetic Resins or Plastics

The supply & demand statistics for plastics are summarized in Table 4. The production of six commodity plastics all showed positive growth in 2013 over the previous year, except for polystyrene.

Raw materials for Synthetic Fibers

Supply & demand balance of materials for synthetic fibers is depicted in Table 5. Monoethylene glycol is the only material showed positive production/import/export/demand in 2013. Caprolactam (CPL) continued to be in far short supply in 2012/2013 and relied heavily on import. Due to PTA substantial expansion projects in China within the past two years and import tax difference between Taiwan & ASEAN made Taiwan PTA producers slashed production/import/export volume in 2012/2013.

Synthetic Rubbers

Table 6 summarized supply & demand for synthetic rubbers in 2012/ 2013. In 2013, the production of SBR amounted to 86,076 MT, down by 7.36% over the previous year while the production of BR increased 14.74% to 59,705 MT. Domestic demand of SBR decreased by 2.17% and that of BR shrank to a larger extent of 14.34%.

Table 3. Supply and Demand for Basic Petrochemicals in Taiwan

Year	2012	2013	Growth
Ethylene			
Production	3,478,448	3,925,325	12.85%
Import	348,415	254,440	-26.97%
Export	123,129	193,643	57.27%
Demand	3,703,734	3,986,122	7.62%
Propylene			
Production	2,696,817	3,047,400	13.00%
Import	388,646	245,872	-36.74%
Export	501,235	522,271	4.20%
Demand	2,584,228	2,771,001	7.23%
Butadiene			
Production	481,880	545,953	13.30%
Import	165,642	128,426	-22.47%
Export	86,383	92,225	6.76%
Demand	561,139	582,154	3.75%
Benzene			
Production	1,683,578	1,725,922	2.52%
Import	603,524	708,956	17.47%
Export	30,000	-	-100.00%
Demand	2,257,102	2,434,878	7.88%
Toluene			
Production	26,731	76,019	184.39%
Import	242,956	372,106	53.16%
Export	18,491	69,227	274.38%
Demand	251,196	378,898	50.84%
Xylene			
Production	2,594,550	2,477,974	-4.49%
Import	1,357,938	1,329,369	-2.10%
Export	838,963	1,743,700	107.84%
Demand	3,113,525	2,063,643	-33.72%
Total			
Production	10,962,004	11,798,593	7.63%
Import	3,107,121	3,039,169	-2.19%
Export	1,598,201	2,621,066	64.00%
Demand	12,470,924	12,216,696	-2.04%

Demand= Production+ Import- Export

Unit: Metric ton

Prospects

As 2014 Q1 petrochemicals demand in Asia slowed down, so did the prices. Buyers stepped aside waiting for cycle turning point. The escalating down in petrochemical prices and business confidence triggered industry-wide de-stocking, as well as cutback in the production of petrochemicals. The outlook of petrochemical industry depends upon many factors, such as global economy development, outlook of crude oil prices, and supply & demand situation of each different derivatives...etc. According to latest International Monetary Fund forecasts, global economic activity is expected to grow by 3.59% in 2014. The USA, Euro Area and Japan are projected to expand 2.59%, 0.96% and 1.24%, respectively this year. Growth is also accelerating in emerging & developing economies in 2014. China, the world second largest economy, successfully reached 7.7% GDP growth last year but is forecasting only 7.5% this year. Bad debts in Banking system, restricted monetary policy and kept reforming of Manufacturing Sector made China PMI (purchasing manager index) consecutive dropped below 50 (contraction) from Jan to Mar this year as HSBC reported. With gloomy growth in Q1 this year, Chinese government is trying all measure to spur domestic consumption through reducing tax and construction of inland high speed railway. With 4 trillion RMB launched to develop economy in 2010 after global financial crisis, massive build-up of ethylene(either naphtha based or coal based), propylene(PDH or coal based) and downstream derivatives such as PE, MEG, SM, PP, Phenol, and n-Butanol/ 2-EH may also experience oversupply situation after successful start-up of these new capacity. On the other side, the new capacity will also come from Middle East (Borage 3/Kavyan 11) this year, with the region's indigenous advantage of low feedstock cost. For Asian petrochemical producers, the only one bright spot is the fierce competition that may render the uneconomic European capacities become obsolete. Global consultant reported that in Europe 14 out of 43 crackers will be economically unattractive by 2015 and should be closed. Asian petrochemical producers must take all available measures to avoid their cost drawbacks while establishing proximal advantages.

Table 4. Supply and Demand for Plastics in Taiwan

Year	2012	2013	Growth
LDPE/LLDPE/EVA			
Production	499,252	588,571	17.89%
Import	313,854	271,777	-13.41%
Export	385,387	464,458	20.52%
Demand	427,719	395,890	-7.44%
HDPE			
Production	469,559	560,121	19.29%
Import	79,637	76,987	-3.33%
Export	258,915	329,079	27.10%
Demand	290,281	308,029	6.11%
PVC			
Production	1,510,378	1,621,111	7.33%
Import	20,199	22,522	11.50%
Export	988,555	1,068,876	8.13%
Demand	542,022	574,757	6.04%
PP			
Production	1,049,126	1,208,987	15.24%
Import	157,327	154,331	-1.90%
Export	646,615	790,067	22.19%
Demand	559,838	573,251	2.40%
PS			
Production	838,330	828,031	-1.23%
Import	10,539	8,508	-19.27%
Export	745,904	760,927	2.01%
Demand	102,965	75,612	-26.57%
ABS			
Production	1,209,109	1,210,159	0.09%
Import	14,561	10,231	-29.74%
Export	1,100,340	1,095,372	-0.45%
Demand	123,330	125,018	1.37%

Demand= Production+ Import- Export

Unit: Metric ton

Conclusion

The sluggish economic situation in recent years has heavily impacted both domestic and overseas petrochemical producers. However, IMF has forecast a better global economy this year. Meanwhile, the Taiwanese government and some research institutes all pointed out that the GDP growth of Taiwan in 2014 would be raised to a higher point (3% VS 2.15 in 2013). Since the market demand of petrochemicals is closely geared up with the economic situation, it is anticipated that the general performance of the petrochemical industry of Taiwan will benefit to some extent in 2014 and upcoming 2 to 3 years.

Table 5. Supply and Demand for Synthetic Fibers in Taiwan

Year	2012	2013	Growth
Caprolactam			
Production	288,256	272,700	-5.40%
Import	390,116	444,515	13.94%
Export	7,452	8,704	16.80%
Demand	670,920	708,511	5.60%
Acrylonitrile			
Production	443,105	458,211	3.41%
Import	107,432	97,820	-8.95%
Export	155,337	175,752	13.14%
Demand	395,200	380,279	-3.78%
Purified Terephthalic Acid			
Production	4,388,262	2,929,805	-33.24%
Import	2,543	21	-99.17%
Export	1,938,284	497,718	-74.32%
Demand	2,452,521	2,432,108	-0.83%
Monoethylene Glycol			
Production	1,944,305	2,112,419	8.65%
Import	273,159	311,130	13.90%
Export	1,237,193	1,323,431	6.97%
Demand	980,271	1,100,118	12.23%

Demand= Production+ Import- Export Unit: Metric ton

The year of 2014 should be a better year for the petrochemical industry worldwide as a whole, as demand grows in line with a recovery in global GDP, although the recovery varies by geographic regions. With no robust engine to support a strong upturn in petrochemical demand, the pace of improvement might be moderate this year, largely driven by domestic demand in many emerging and developing countries. China, with its huge and growing demand for petrochemicals, will remain the single most influential factor in determining the outlook of Asian petrochemical

industry. With more and more new capacities coming on stream, as mentioned above, China is going to change its position from a net importer to a net exporter in different derivatives (PTA · SBR · CPL...etc.)

The re-rise of the USA (shale gas), as the world's new production base for petrochemicals will surely changing this industry landscape. The competition for Asian petrochemical producers in coming years will be fierce under a surplus scenario. Flexible feedstock slates, upgraded production facilities and integrated local utilities/logistics to minimize production cost, will be major factors to survive for Asian petrochemical producers. As the proverb says, "Heaven helps those who help themselves".

Table 6. Supply and Demand for Synthetic Rubbers

Year	2012	2013	Growth
SBR			
Production	92,911	86,076	-7.36%
Import	50,488	48,485	-3.97%
Export	74,998	67,647	-9.80%
Demand	68,401	66,914	-2.17%
BR			
Production	52,036	59,705	14.74%
Import	23,268	29,415	26.42%
Export	57,001	73,442	28.84%
Demand	18,303	15,678	-14.34%
CB			
Production	94,441	90,378	-4.3%
Import	75,564	69,851	-7.56%
Export	40,607	37,006	-8.87%
Demand	129,398	123,223	-4.77%