

AN OVERVIEW OF VIETNAM'S OIL AND GAS INDUSTRY

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Summary

The paper presents an in-depth analysis and evaluation of the role of the oil and gas industry, which is represented by the Vietnam National Oil and Gas Group (Petrovietnam), in the national economy, and analyses the changes and development of the oil and gas sector in recent years. The analysis covers most of the activities that contribute to the development of Vietnam's economy and Petrovietnam's activities in the oil and gas value chain.

Key words: Oil and gas, Petrovietnam.

1. Introduction

According to BP's statistics, Vietnam ranked 28th among 52 countries that have oil and gas potential in the world. By the end of 2015, the proven crude oil reserves of Vietnam were approximately 4.4 billion barrels and ranked first place in Southeast Asia, while the proven gas reserves were about 0.6 trillion cubic metres (Tcm) and ranked the third place in the South East Asia (after Indonesia and Malaysia) [1].

Since the first oil at Bach Ho field in 1986, the Vietnam National Oil and Gas Group (Petrovietnam) - after nearly three decades - has made significant progress and strived to be the backbone of the national economy. Petrovietnam also plays an important part in the process of industrialisation and modernisation of the country, contributing averagely about 25 - 30% of the total annual state budget revenues. Petrovietnam has uplifted Vietnam's position in the community of oil producing countries and contributed to raising Vietnam's international reputation. So far, Petrovietnam has built an integrated oil and gas value chain, including exploration and production, processing and oil and gas services.

The paper presents an in-depth analysis and evaluation of the role of the oil and gas industry, which is represented by Petrovietnam, in the national economy, and analyses the changes and development of the oil and gas sector in recent years. The analysis covers most of the activities that contribute to the development of Vietnam's economy and Petrovietnam's activities along the oil and gas value chain.

2. The role of oil and gas industry in Vietnam's economy

The oil and gas industry, including the Vietnam National Oil and Gas Group (Petrovietnam) and the

Vietnam National Petroleum Group (Petrolimex), plays an important role in Vietnam's economy and has major impacts on the development of Vietnam. The oil and gas industry in general and Petrovietnam in particular contribute significantly to the state budget revenues and have a high proportion in Vietnam's export. Moreover, this sector attracts foreign investors to bring capital and modern technology to Vietnam.

2.1. Contribution to GDP and the State budget

Over the years, Petrovietnam has always maintained the leading role in the national economy. While the state-owned enterprises contribute about 42% of GDP, Petrovietnam separately accounts for 16 - 18% of GDP, the highest level in comparison with the whole country in the period from 2008 to 2015 (Table 1).

After the first gasoline by Petrovietnam's first refinery (Dung Quat), crude oil revenues, in the 2009-2013 period, now only contributed an average of 13.6% of total annual state budget. In the previous years, crude oil revenues always brought more than 20% of total state budget revenues while revenues from all state-owned enterprises (excluding the oil and gas industry) accounted for only about 15 - 16%. Moreover, the budget contribution of Petrovietnam is much higher than the contribution made by all foreign-invested and private enterprises. By the end of 2014 and early 2015, when the world was affected by the fall in oil prices, revenues from crude oil still accounted for an important proportion in the national economy. As reported by the General Statistics Office, crude oil revenues reached VND 98.1 trillion, contributing 12.1% of the total state budget in 2014. However, the figure for 2015 reduced significantly to VND 62.4 trillion because of the slump in the crude

oil price and the contribution was only 7.1% of the total state budget in the year.

In terms of consolidated revenues: From the end of 2007 and particularly in 2008, the world has witnessed the unpredictable volatility of crude oil prices, from USD 90/barrel by the end of 2007 to above USD 147/barrel in July 2008, and followed by an unexpectedly rapid decline to nearly USD 50/barrel at the end of 2008 - almost 70% compared to the peak. From the beginning of 2009, oil prices have fluctuated and averaged USD 64/barrel. However, in the wake of financial crisis, the global economic downturn and the sharp fall in oil prices, the consolidated revenue of Petrovietnam in 2009 still reached VND 137 trillion, 8% higher as compared to 2008. In 2010, Petrovietnam made great progress to achieve consolidated sales of VND 235 trillion - an uncommonly high rate in the context of the world economic recession, and equivalent to 24% of GDP. By the end of 2012, the consolidated revenues reached VND 363 trillion, increasing 12% as compared with the revenues in 2011. The state budget contribution was VND 186.3 trillion, which accounted for 24.4% of the total revenue of the country. In 2013, consolidated revenues of Petrovietnam increased by 7% compared to the revenues in 2012, amounting to VND 390 trillion and its state budget contribution increased by VND 9,100 billion. As a result of the plunge in crude oil price, the consolidated revenues in 2014 and 2015 were down 6% and 15% to VND 366 trillion and VND 311 trillion, respectively. However, the contribution of Petrovietnam

to the state budget revenues was still quite high with VND 115.1 trillion in 2015.

2.2. Import-export turnover

Crude oil has a strategic position among the export products of Vietnam. Crude oil exporting is essential for Vietnam's economy because it provides the foreign currency needed for imports, international transactions, and also for paying foreign debts. This source of foreign currency also plays an important role in stabilisation of exchange rates, macro-economics adjustments and improvement of foreign currency liquidity for the national economy.

Since crude oil was first produced, it has always accounted for a large share of export value as compared to other major export products of Vietnam such as footwear, textiles and garments, and fisheries. Table 2 illustrates the shares of export value (expressed in percentage) of some major products of Vietnam in 2005 and in the period from 2008 to 2015.

In 2005, crude exporting accounted for 26.41% of Vietnam's total exports and reached USD 7.37 billion. In 2008, the figure was USD 10.36 billion, which was equivalent to 21.42% of total exports but then fell down to just only USD 3.806 billion in 2015 (or 2.34%). The data showed that crude oil exports dropped sharply from 2008 to 2015, and were particularly less than the previous period. There are two reasons for the decrease in crude oil export value in recent years. Firstly, it is the decline of production in large fields, especially Bach Ho

Table 1. Contribution of Petrovietnam to Vietnamese economy [2 - 9]

Year	2008	2009	2010	2011	2012	2013	2014	2015
Petrovietnam's consolidated revenue (trillion VND)	127.0	137.0	235.0	325.0	363.0	390.0	366.0	311.0
GDP (trillion VND)	1,477.7	1,700.5	1,980.8	2,537.5	2,978.2	3,139.6	3,937	4,192.9
Petrovietnam's contribution in GDP (%)	18.9	16.0	24.0	26.6	25.9	24.3	9.3	7.4
Petrovietnam's contribution to the State budget (trillion VND)	121.8	88.0	110.4	160.8	186.3	195.4	189.4	115.1
Petrovietnam's contribution to the State budget (%)	29.2	22.6	27.9	27.1	24.4	24.1	23.3	13.0
Contribution of crude oil revenue to the State budget (%)	24.0	12.9	14.4	11.5	18.3	12.1	12.1	7.1

Table 2. Export value of major products

Unit: %

Year	2005	2008	2009	2010	2011	2012	2013	2014	2015
Crude oil	26.41	21.42	14.56	9.37	10.36	9.70	7.21	4.79	2.34
Footwear	10.89	9.87	9.57	9.55	9.37	8.58	8.38	6.81	7.39
Textiles	17.10	18.87	21.31	20.90	18.91	17.04	17.90	13.84	13.93
Fisheries	9.79	9.33	10.00	9.36	8.75	7.20	6.68	5.24	4.06
Other	35.81	40.51	44.56	50.82	52.61	57.48	59.83	69.32	72.28
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

(Source: 2011 and 2015 Statistical Yearbook)

field. Secondly, in 2009 Dung Quat Refinery went online and consumed a significant amount of domestic crude oil. Despite this, crude oil was still important in the total export value of the country.

2.3. Attracting foreign investment into Vietnam

The oil industry has a positive impact on attracting foreign investment into Vietnam. In the period from 1988 to 2014, many foreign oil companies from the United States, Japan, Russia, UK, Malaysia, Canada, and Australia have invested in the exploration and production sector in Vietnam, through different kinds of oil and gas contract. A total of 102 petroleum contracts have been signed, including 63 contracts which are currently valid. In the period from 1988 to 2012, the oil and gas sector only accounted for about 4.6% of the total number of foreign investment projects but brought more than 17% of total foreign investment (about USD 30.5 billion). Many big projects in the fields of gas, electricity, refining and petrochemical, and technical services have been brought onstream to fuel the national economy development and the industrialisation and modernisation of the country.

Currently, there are more than 40 international oil companies operating in the upstream, midstream and downstream sectors in Vietnam. Several major oil companies are co-operating with Petrovietnam, mainly in the upstream sector such as Chevron, ExxonMobil (US), KNOC (Korea), Gazprom (Russia), Petronas (Malaysia), PTTEP (Thailand), Talisman (formerly Canadian, now Spanish), Total and Neon Energy (France). Most of these companies have invested in the form of capital contributions with Petrovietnam to implement petroleum contracts. In addition, Petrovietnam and Gazprom established the Vietgazprom company to jointly explore oil and gas in Russia and Vietnam.

Beyond the role as the representative for the host country in managing the exploration and production of oil and gas, Petrovietnam is also an investor (equal to other foreign oil and gas companies) in most of domestic exploration and production projects. However, the participation percentage of Petrovietnam (typically 25 - 50%) and the time of capital investment may vary depending on the characteristics of each contract.

Petrovietnam has accessed and been transferred various types of modern technology as well as advanced management methods to apply to its corporate

governance. Petrovietnam's workforces are now able to manage large, important projects, or work independently in E&P activities, gas transportation and downstream projects (power plants, fertilizer plants, etc.). Petrovietnam is also considered a successful corporation in providing high quality oil and gas services, especially drilling services. This is an important step to help Petrovietnam and the country quickly integrate into the oil and gas community and the international economy.

3. Oil and gas exploration and production

3.1. Oil and gas exploration and production

Petrovietnam started oil and gas exploration and production activities in 1961, mainly with the help of the Soviet Union in the North of Vietnam. Following the renovation policy in 1986 and the Foreign Investment Law enacted in 1987, oil and gas exploration and production activities have been strongly deployed, especially on the continental shelf. Many companies have discovered oil and gas such as Total in the Northern Gulf, Shell in the Central Coast, ONGC and BP at the Nam Con Son basin.

At first, exploration activities were mainly conducted by foreign oil companies and Petrovietnam only made capital investment when there was commercial discovery. At present, Petrovietnam is able to conduct oil and gas exploration itself or in co-operation with foreign partners, not only in blocks near the shore but also in offshore and deep-water blocks. Thus, the annual oil and gas reserves of Petrovietnam always increase. In the period from 2010 to 2015, Petrovietnam's oil and gas reserves increased by 43, 35.6, 48.32, and 40.5 million tons of oil equivalent, successively.

Vietnam started gas production in 1981 (at Tien Hai C gas field in Thai Binh province), and has produced both oil and associated gas since 1986 (at Bach Ho field in the southern continental shelf). Since then, Vietnam has been included in the list of crude oil exporting countries in the world. By 31 December 2015, the entire petroleum industry has produced over 352.68 million tons of oil and 114.03 billion cubic metres (Bcm) of natural gas. Basement reservoirs account for 80% of oil reserves and production of Vietnam. In the period from 1986 to 2013, oil and gas production increased significantly. Oil production averaged over 16 million tons of oil/year or 0.5% of total global oil production. Gas production reached 7Bcm/year or 0.2% of total global gas production. In 2014 alone, 17.39 million tons of crude oil and 10.21Bcm of gas were

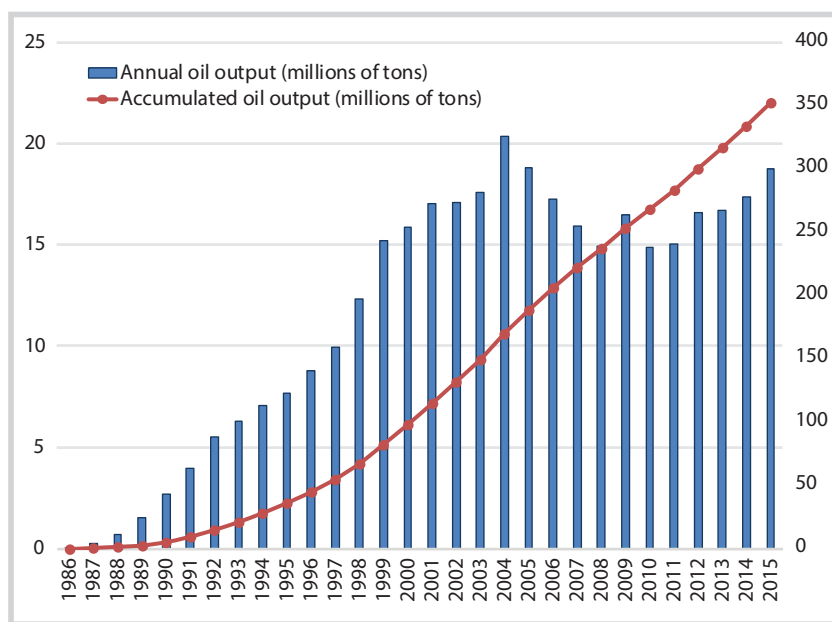


Figure 1. Annual crude oil production from 1986 - 2015

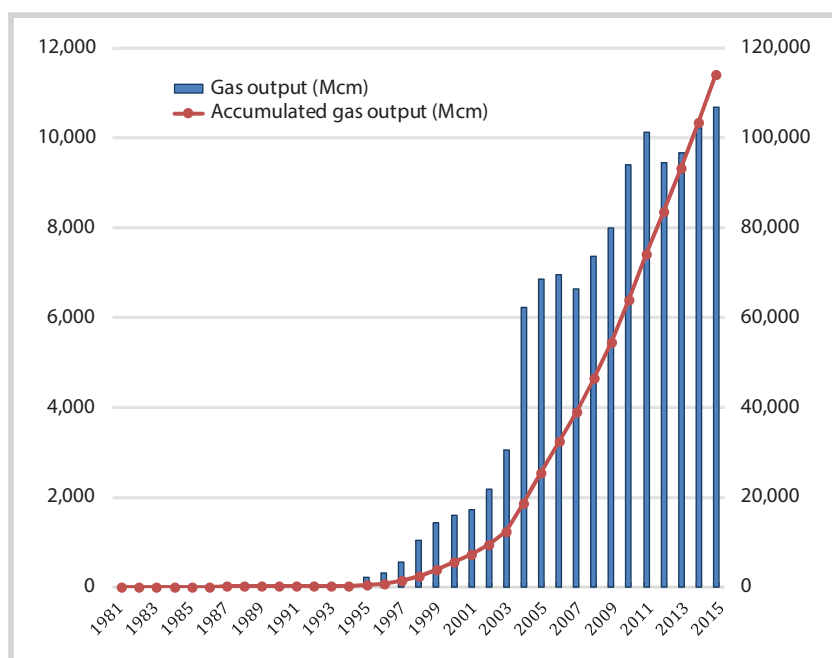


Figure 2. Annual natural gas production from 1981 - 2015

produced by Petrovietnam. The figures rose slightly in 2015 to 18.75 million tons of crude oil and 10.67Bcm of gas.

Figure 1 shows that crude oil production had increased gradually since 1986 and peaked in 2004 at over 20 million tons/year. However, production started to decrease in 2005 because production level from major fields such as Bach Ho or Rong fell sharply while production of small fields could not offset this decline. Between 2006 and 2010, 14 small fields were put into production, but production output only increased slightly in 2009 and then continued to fall. From 2011 to 2015, 36 oil and gas fields and structures were put into production, of which 26 fields/structures are at home and 10 abroad. Prospecting and exploration activities are at present conducted in offshore

and deepwater areas, which is costly and time-consuming, and recent oil and gas discoveries are mainly small fields. In its strategy, Petrovietnam will try to produce 5 - 14 million tons/year of crude oil and condensate for the period 2016 - 2025.

Figure 2 shows Petrovietnam’s gas production from 1981 to 2015. From 1986 to 1997, natural gas production did not increase significantly and then a strong surge has been witnessed in the period from 1997 to present. According to statistics from Petrovietnam, by December 2015, total natural gas production is over 111.88Bcm. Specially, the amount of gas produced in 2015 alone reached a record high of 10.67Bcm - the highest level since 1981. For the period 2016 - 2025, Petrovietnam sets its target to produce 11 - 19 Bcm/year of gas.

3.2. Oil and gas fields in Vietnam

By the end of 2013, there were 9 contracts in development stage and 13 contracts in production stage (from 14 oil fields/cluster of fields and 6 gas fields/cluster of fields) in the country. Production of the whole industry has exceeded 268.31 million tons of crude oil, including 189.9 million tons from Vietsovpetro and 78.3 million tons from PVEP. Particularly, in 2013, crude oil production was 15.25 million tons, and gas production amounted to 9.75Bcm; in 2014, production reached 17.39 million tons of crude oil and 10.21Bcm of gas. Oil and gas production continued to climb in 2015 to 18.75 million tons and 10.67Bcm, respectively.

Through development and production activities, Petrovietnam’s technical capability has been developed and Petrovietnam is nowadays capable of operating development and production activities in the deep water and offshore areas. Especially, Petrovietnam has discovered and successfully produced

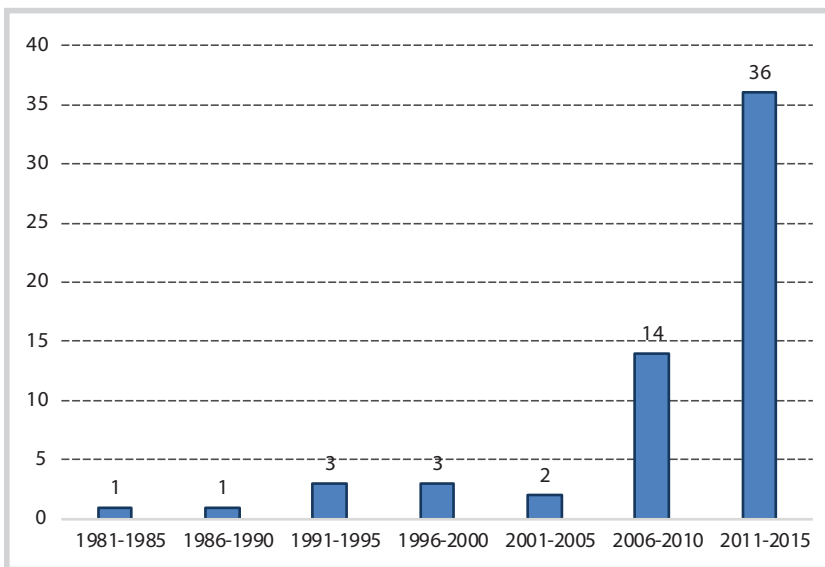


Figure 3. Number of fields put into production in 5-year periods

crude oil from pre-Tertiary basement reservoirs. This opened a new chapter for oil and gas exploration and production activities in the continental shelf of Vietnam. Furthermore, it has made important contributions to petroleum science and technology as well as petroleum production technology for basement reservoirs of the world.

In the past few years, Vietnam has made effort to speed up exploration and field development projects. From 2011 to 2015, 36 new fields and structures were put into operation. Of which in 2011 there were 3 domestic fields (Dai Hung phase 2, Te Giac Trang and Chim Sao) and 2 overseas fields (Visovoye and Dana). In 2012, there were 7 new fields and structures, including H4 platform at Te Giac Trang field, Gau Trang, Su Tu Trang and Lan Do (domestic fields) and West Khosedayuskoye, Junin 2, and Nagumanovskoye (overseas fields). The number of new fields rose to 9 each year in 2013 and 2014. The figure for 2015 plunged to 4 fields, including: Thai Binh gas field, H5 platform at Te Giac Trang field, Tho Trang 2 platform (domestic) and Bir Seba Block 433a - 416b (overseas). Besides exploration activities, Petrovietnam also participated in the field development phase of Su Tu Trang, Dai Hung (Phase 2), Hai Thach - Moc Tinh (Block 05-2 and 05-3), Te Giac Trang (Block 16-1), Hai Su Trang - Hai Su Den (Block 15-2/01), Chim Sao, Dua (Block 12W). However, these oil fields only possess small reserves (the largest among the newly discovered oil fields is Su Tu Den with about 100 million tons, only one-third of Bach Ho).

3.3. Petroleum contract types

Vietnam has signed oil and gas contracts in various forms, namely production sharing contract (PSC), petroleum contract (PC - with the participation of Joint Operating Company - JOC), business co-operation contract (BCC), and joint venture (JV). The majority of oil and gas exploration and production acres of the signed contracts are located in three basins: Nam Con Son (32), Song Hong (23) and Cuu Long (19). Big foreign oil companies such as ExxonMobil, Shell, and Chevron are operating

in Vietnam in the form of PSC contract with Petrovietnam - the representative of the host country. With this type of contract, Petrovietnam may reduce the risk when there is no commercial discovery and have the opportunity to learn the high technologies applied in the petroleum industry, train the workforces and have significant contribution to the state budget. In the PSC contracts, the parties will appoint an operator - mostly a foreign oil company, whereas in the PC contract, Petrovietnam will take part in field management together with foreign oil companies through a joint operating company (JOC). BCC is also a production sharing contract but differs in the operating and managing subject, in this case the party which contributes more shares will be the operator. By the end of 2013, Vietnam had about 100 oil and gas contracts, of which 90% were PSC contracts and the others were JOC and BCC. There was only one contract signed in 2015 which increased the total number of contracts during the 2011 - 2015 period to 34 contracts.

4. Oil and gas processing

Oil and gas processing is one of the core sectors. It plays an important role in the development of Vietnam's oil and gas industry with the purposes of enhancing the value of oil and gas resources, saving foreign currency, contributing to ensuring energy security, promoting national industrialisation and modernisation and improving the competitive position of Vietnam's oil and gas industry in the world.

Construction of fertilizer plants started in 2001 and Phu My - the first fertilizer plant of Petrovietnam went into operation in 2004 (with a capacity of 800,000 tons/year). Next, the Ca Mau Fertilizer Plant with a similar capacity came online in 2012.

Table 3. Production capacity and market supply of Petrovietnam's main petroleum products

Source: EMC

Product	Production capacity (thousand tons)						Domestic demand (thousand tons)						% meet Domestic demand					
	2010	2011	2012	2013	2014	2015	2010	2011	2012	2013	2014	2015	2010	2011	2012	2013	2014	2015 (Expected)
LPG	552	578	569	707	672	750	1,115	1,125	1,367	1,465	1,483	1,701	49.5	50.0	41.6	48.0	45.0	44.0
Gasoline	1,820	1,840	2,029	2,232	1,790	1,896	4,502	4,783	5,034	5,243	5,457	5,632	40.0	38.0	40.0	43.0	33.0	33.7
Diesel oil	2,801	2,949	3,251	3,576	2,869	3,037	7,297	7,606	8,006	8,395	8,811	9,284	38.0	39.0	41.0	43.0	33.0	32.7
Jet A1	106	107	118	130	104	110	910	967	1,018	1,078	1,151	1,248	12.0	11.0	12.0	12.0	9.0	8.9
Fuel oil	178	180	199	219	176	186	2,071	2,200	2,314	2,395	2,341	2,404	9.0	8.0	9.0	9.0	8.0	7.8
Urea	807	920	1,724	1,602	1,525	1,600	1,928	2,175	2,042	2,105	2,200	2,874	41.9	42.3	84.4	76.0	69.0	55.7

Table 4. Petrovietnam's gas consumption in 2011 - 2015 [10 - 13]

	Unit	2011	2012	2013	2014	2015
Dry gas	Million m ³	8,533	9,175	9,469	9,960	10,430
LPG	Thousand tons	1,166	1,027	1,061	1,086	1,320
Condensate	Thousand tons	58	61	62	59.5	59.8

The year of 2009 marked an important step in oil and gas processing activities of Petrovietnam when the first oil refinery of Vietnam - Dung Quat Refinery - went into operation with the capacity of 6.5 million tons/year. Dung Quat Refinery began commissioning in February 2009 and had commercial products from May 2010. Since then, Petrovietnam has had complete activities of the oil and gas value chain, from exploration to processing. Currently, the Nghi Son Refinery and Petrochemical Complex with the capacity of 10 million tons/year is being constructed and is expected to come online in 2017. With the new capacity added, Petrovietnam can meet about 60% of domestic demand. Besides, Petrovietnam has been implementing a series of new projects in oil refining, petrochemical, bio-fuels and plans to expand and upgrade the Dung Quat Refinery in order to meet the demand for petroleum, feedstocks and petrochemical products of the country.

With successful projects in the processing sector, Petrovietnam has the capacity to produce essential products such as gasoline, fertilizer, plastic resins and other chemical products with economic value of tens of trillions VND, thus helping Vietnam move from import dependent to producing for domestic demand and in the future for export. By 2015, the production capacity in oil and gas processing is expected to increase substantially to meet most of the domestic demand with export orientations in the future (Table 3). However, the domestic petroleum products are facing great competition from imported products.

5. Gas industry

With the aim to optimise the gas value chain, Petrovietnam has invested in the gas industry since

the 1990s to develop an integrated gas business from collecting, import, transportation, storage, processing, distribution, and trading. The National Gas Pipeline System Plan approved by the government also foresees possible connection with the gas pipelines of ASEAN countries. Currently, Vietnam has three main gas transportation and distribution systems: Nam Con Son gas transportation and distribution system, PM3-Ca Mau gas transportation system and Cuu Long gas transportation and distribution system [10].

Besides gas pipeline systems, Thi Vai Refrigerated Storage (with a storage capacity of 60,000 tons of cold LPG) invested by Petrovietnam Gas Joint Stock Corporation (PV GAS) has been completed and began operation. Thi Vai storage system includes: wharf technology system for cold LPG import; LPG off-loading system; storage system, cooling system, pressurised tank system, heating system, pump system, LPG vapour compressors, and other auxiliary systems. This is the largest cold LPG depot in Vietnam that allows PV GAS to store a big amount of LPG, increase LPG supply in long term, stabilise domestic supply, and contribute to national energy security.

Gas consumption systems include Dinh Co Gas Processing factory and LPG importing and storage systems. They have been developed and operated safely in order to provide a stable source of gas for industrial development including gas power plants of Petrovietnam and EVN, the BOT investors, the fertilizer plants and the low-pressure gas consumers. Gas fired power plants produce over 39 billion kWh of electricity per year and account for 33% of national electricity production. Gas is also supplied to produce over 1.5 million tons of nitrogen per year, accounting for 70 - 75% of the domestic demand. LPG and

CNG are also imported and distributed to industrial and household consumers in the country in order to contribute to ensuring the national energy and food security. In its strategy, Petrovietnam will maintain to supply to 100% of market share for dry gas and to increase the market share of LPG to at least 70% of total domestic market.

6. Power industry transportation

Besides the gas industry, Petrovietnam has also invested in building power plants to meet the rising demand for power needed for the country’s economic development. Although this is a new field, Petrovietnam has achieved initial success. From 2011 to 2015, 5 power plants came online including Nhon Trach 2 Thermal Power Plant (750MW), Phu Quy Wind Power Plant (6MW), Hua Na Hydro-power Plant (180MW), Dakdrinh Hydro-power Plant (125MW) and especially in 2015, Vung Ang 1 Thermal Power Plant (1,200MW). Vung Ang 1 is the first coal-fired power plant of Petrovietnam and also the largest capacity thermal power plant of the country. By the end of 2015, the total capacity of Petrovietnam’s power plants was 4,214MW. Total electricity supplied by Petrovietnam to the national grid in the 5-year period from 2011 to 2015 reached 83.554 billion kWh (with an average growth rate of 12.1%/year). Particularly in 2015, Petrovietnam’s power production amounted to 21.98 billion kWh, up 31.7% from 16.69 billion kWh in 2014. Petrovietnam is striving to develop a power industry with the target of producing 15% of the national electricity production by 2020. At the same time, Petrovietnam is preparing the infrastructure, technology and human resources to participate in the wholesale competitive electricity market.

7. Oil and gas services

Oil and gas services is one of Petrovietnam’s important business domains. Petrovietnam’s oil and gas services are expanding both in scale and technology to support domestic and overseas oil and gas projects. Petrovietnam provides diverse services, including geophysical surveys, drilling services, oil and gas wells services, export, import

and supply of materials and equipment for the petroleum sector; import, export and trading of crude oil and oil products; transport, storage, supply and distribution of petroleum products; operation and maintenance of oil and gas projects/structures; handling of oil spill; designing, construction and installation of oil, gas, power and civil construction projects; shipping and logistic services; provision of technical manpower, tourism, and hotels, etc. Besides, Petrovietnam’s subsidiaries also provide insurance services, credit arrangement for investment projects, capital raising, corporate credit, financial services and securities. In addition, Petrovietnam can provide scientific research and training services such as consulting, research and technology transfer, geophysical data processing services, etc.

The wide range of oil and gas services has significantly contributed to the total revenue of Petrovietnam. Total revenue from oil and gas services from 2011 to 2015 was VND 1,114 trillion, accounting for 31.7% of Petrovietnam’s total revenue. The growth of oil and gas service sector has been relatively fast and stable and its revenue reached VND 207.8 trillion in 2011, VND 234 trillion in 2012, VND 236.3 trillion in 2013 and VND 240.7 trillion in 2014. In 2015, the decline in oil prices which forced oil and gas operators to cut jobs and service prices, along with the difficulties of competition, barriers to trade, and tariffs, has lowered revenue from oil and gas services to VND 196 trillion (down 19% compared to 2014). However, the average growth rate in the period from 2011 to 2015 was still 4%/year.

8. Conclusion

Vietnam is a country with oil and gas resources and the oil and gas industry has made important contribution to the national economy. The industry brings over 20% of total state budget revenues and contributes 16 - 18% of GDP in recent years. Crude oil is always one of four products of Vietnam that have the highest export value. Before 2005, crude oil contributed up to 23% of export turnover and even today when other industries (such as

Table 5. Business performance of some major service companies [4]

Company	Return on equity (%)					
	2011	2012	2013	2014	2015	5-year average
PTSC	30.6	20.8	23.4	20.7	13.3	22
PV Drilling	18.8	20.0	23.7	23.8	13.3	20
Petrosetco	25.3	17.3	15.9	18.2	13.0	18
DMC	25.0	37.2	18.7	36.3	16.0	27
PVE	36.8	4.3	5.2	8.4	10.3	13

the petrochemical industry) are more developed, crude oil still maintains an average contribution rate of 7 - 8% of annual export turnover. The oil and gas industry attracts major foreign investment in oil and gas exploration and production activities. It not only helps Vietnam resolve difficulties in investment funds but also improves management skills and technology in the industry, helping it strive to be able to compete with international oil companies and make investments abroad.

Vietnam's oil and gas industry which is represented by Petrovietnam has made great progress in science and technologies, especially petrochemical technologies. Dung Quat Refinery's first batch of products in 2009 marked the comprehensive development of the oil and gas industry in Vietnam. Today, the oil and gas industry of Vietnam has developed an integrated oil and gas value chain, including oil and gas exploration and production, gas-power industry, oil and gas processing, and oil and gas technical services, with the core sector being oil and gas exploration and production. In the near future, Vietnam's oil and gas industry continues to play an important role in the national economy and Petrovietnam continues to supply substantial amounts of petrochemical products, fertilizer and electricity to the domestic market.

The oil and gas industry's goal is continuing to make major contribution to the GDP and the national budget. In 2016, Petrovietnam is expected to increase oil and gas reserves to 16 - 20 million tons of oil equivalent and produce 5,690 thousand tons of petroleum products, striving to meet 80% of domestic demand. In the near future, Petrovietnam should speed up exploration activities in order to discover more small fields to offset the decline of major oil fields. For that purpose, Petrovietnam needs more capital investment for exploration, especially in the oil and gas potential areas of the country. On the other hand, the recent discovery of large gas fields, such as Ca Voi Xanh in the offshore of Central Vietnam, is expected to boost the gas industry's development in the near future (expectedly after 2020).

To maintain the momentum, the oil and gas industry should identify and improve weaknesses in production organisation, investment management, administration and development of human resources, especially highly-qualified workforce. Simultaneously, the decrease in

oil prices recently has caused significant impact to the oil and gas industry in general and Petrovietnam in particular. This is the time to review and supplement the development strategy, including point of view, orientation and development goals towards adapting to the rapid change of the oil and gas industry. This is also the period to prioritise the efficiency of the whole oil and gas chain and to enhance the operational capacity of the entire system. These are the decisive factors for the petroleum industry to maintain its dominant position and the sustainable development of Vietnam's oil and gas industry in the process of international integration.

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