GAS PRICE REFORM: ARE WE ON THE RIGHT TRACK?

*Deunden Nikomborirak**

1. INTRODUCTION

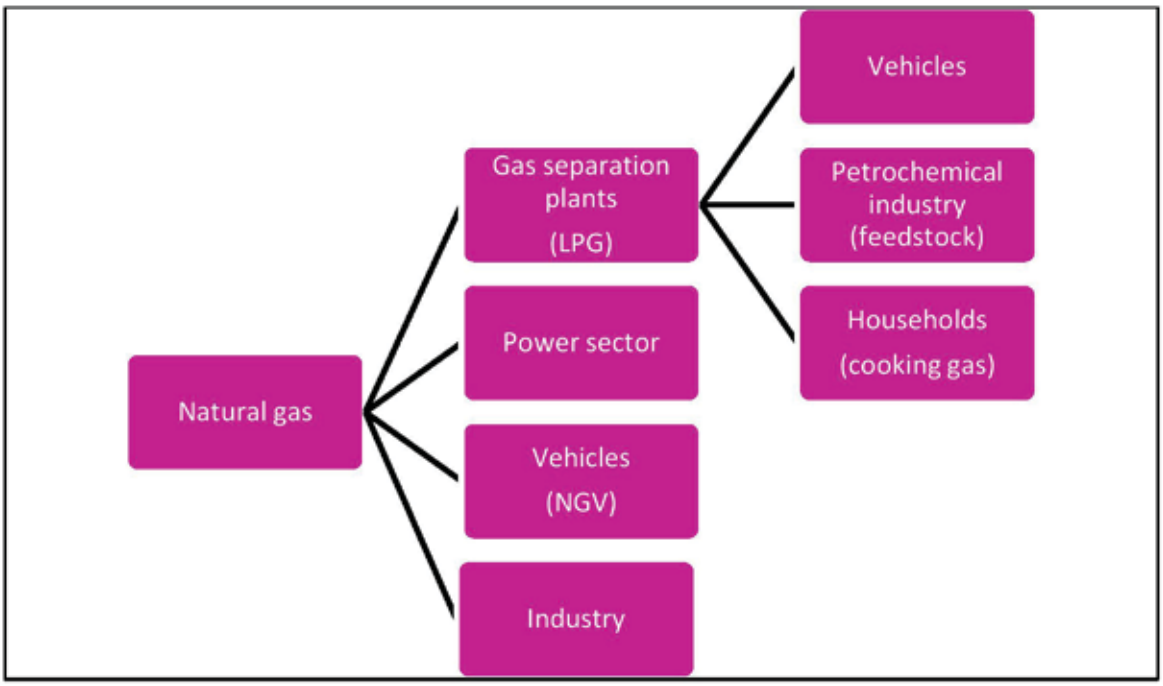
Before mid-1970s, Thailand was highly dependent on imported petroleum for its energy needs. The discovery of off-shore gas fields in the Gulf of Thailand altered markedly the landscape of the country's energy industry. Thailand now ranks 26th in terms of natural gas production (36.99 billion m^3 estimated in 2011) and 40th in terms of proven natural gas reserves (284.9 billion m^3 estimated in 2013).[1]

The bulk of the demand for natural gas in Thailand comes from the power generation sector, which relies heavily on natural gas. In 2013, electricity generating plants accounted for more than 70 percent of gas consumption, with the country's six gas separation plants accounting for the remaining 17 percent; those plants produce liquefied petroleum gas (LPG), which is used as a "feedstock" for petrochemical plants, and as fuel for industries and for vehicles (mainly taxis and buses) as well as for household cooking. A small portion of the natural gas is compressed to be used as a fuel for vehicles (NGV), mainly taxis and buses, as can be seen in Diagram 1.

* *Dr. Deunden Nikomborirak is Research Director, Economic Governance, TDRI.*

[1] *Central Intelligence Agency (2014), "World Fact Book," downloadable from https://www.cia.gov/library/publications/theworld-factbook/rankorder/2249rank.html.*

Diagram 1: Demand for natural gas



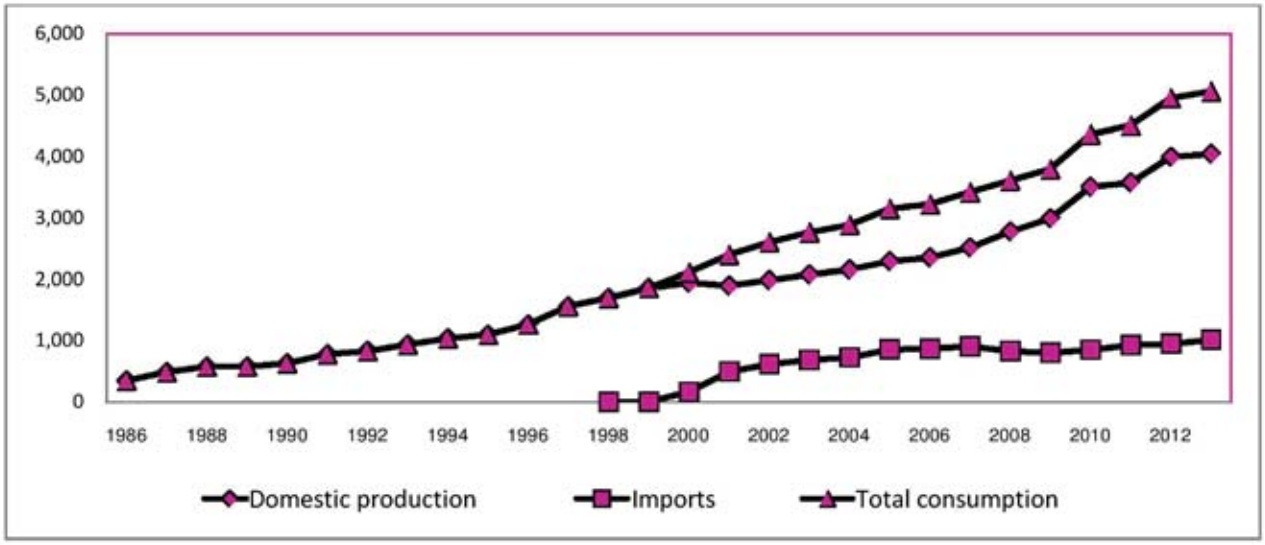
Despite the continual increase in the production of natural gas in the Gulf of Thailand and the Andaman Sea, domestic supply was not able to keep up with the surge in demand prompted by escalating global petroleum prices and state subsidies for the use of LPG as vehicle fuel and as a cooking gas in households. Thailand's policy to promote the use of natural gas as a vehicle fuel and as cooking gas for households through a price subsidy began in 2004 as a result of the abundance of domestic gas supplies at the time. However, as supply eventually was not able to keep up with demand, Thailand became an importer of natural gas starting in 1998, as can be seen in Figure 1.

The country's dependence on imported gas is likely to increase as current gas fields in the Gulf of Thailand are gradually depleted. According to the Ministry of Energy, Thailand's production is expected to peak in 2017 and cease in 2030 in the absence of new proven reserves. With the current regulated retail price being below cost however, there is little incentive for new exploration and production and little incentive to curb demand.

Thailand has had to seek new energy sources to meet its insatiable domestic appetite. This includes the import of natural gas transmitted through pipelines from offshore fields in Myanmar as well as liquefied natural gas (LNG) shipped in vessels from the Middle East. Currently, 79 percent of Thailand's natural gas supply is sourced domestically (including from joint development fields with Malaysia), 18 percent is from offshore fields in Myanmar and 3 percent is imported as LNG.[2]

[2] *PTT (2012), "Natural Gas Everyday," downloadable from http://www.pttplc.com/th/Media-Center/Energy-Knowledge/KnowledgeLibrary/Natural%20Gas%20Knowledge/Natural-Gas-Everyday.pdf.*

Figure 1: Thailand's natural gas supply, 1986-2013



Source: Energy Policy and Planning Office.

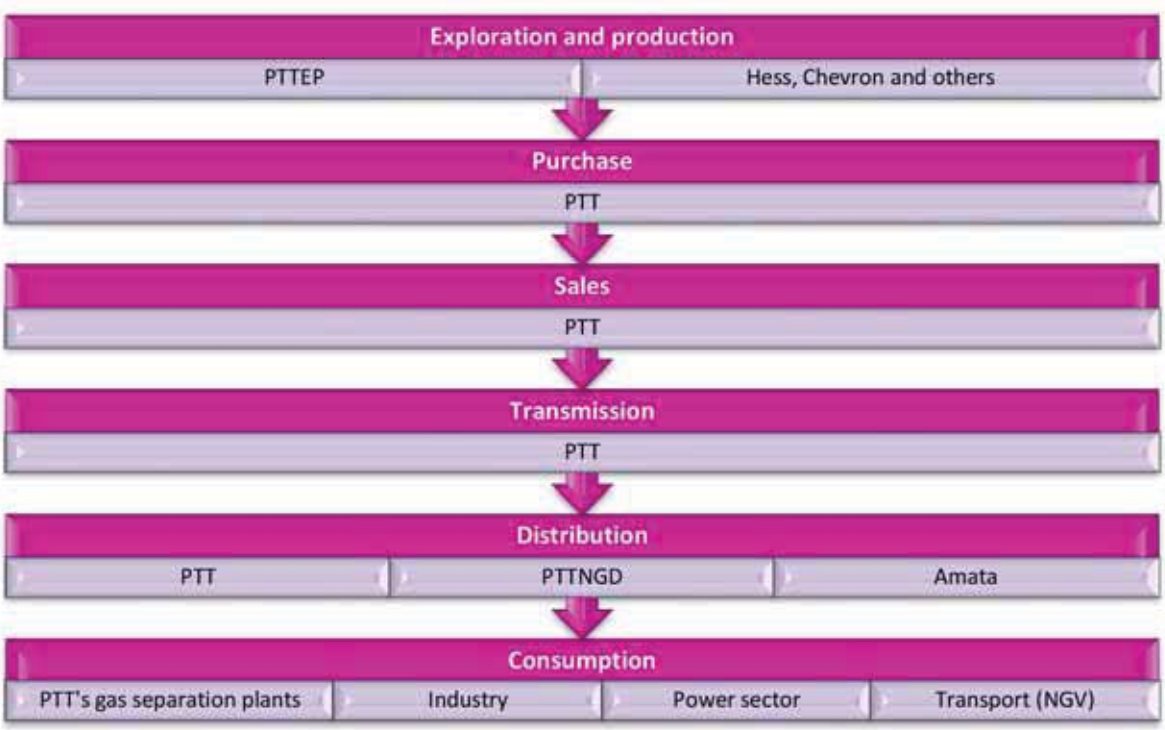
Sourcing gas from overseas has proven to be expensive. The cost of gas from Myanmar is roughly US$ 11-12 per mmbtu[3], approximately 40 percent higher than that of domestic gas from the Gulf of Thailand, which is US$ 8-9 per mmbtu.The price of imported LNG is US$ 16-17 per mmbtu, almost double the cost of domestic gas. Several government administrations in the past recognized that subsidies are both economically inefficient and financially unsustainable, but lacked the courage to abolish subsidies for fear of losing political popularity.

In 2013, the ruling Phua Thai Party, which enjoyed a relatively stable administration at the time, passed a Cabinet decision that prescribed a gradual increase in the price of LPG for households (cooking gas) and NGV (compressed natural gas for vehicles) in order to close the price-cost gap. The move drew heavy criticism from non-governmental organizations (NGOs) and consumer groups and sparked a major debate on a broader issue about the country's energy sector reform agenda.

Views on the issue have been extremely divisive. The NGO groups disapprove of any further increase in household LPG that is advocated by the Ministry of Energy. The main argument is that it is the petrochemical industry, not households, that should shoulder the burden of higher costs for imported natural gas, as the industry accounts for more than a third of the LPG consumed in Thailand. To them, it is unfair to pass on the higher gas acquisition cost to households. As the pricing issue is by nature highly sensitive, the debate about gas price reform has galvanized diverse actors concerning the entire energy reform agenda. The key issues at hand are the following: How should access to relatively inexpensive domestic gas be prioritized across different groups of users, and who should shoulder the cost of the more expensive imported gas?

[3] *A BTU is British standard unit of measurement used to denote both the amount of heat and energy in fuels. Mmbtu or mbtu denotes a million BTU. One BTU is the amount of energy needed to heat or cool one pound of water by one degree Fahrenheit.*

Diagram 2: The current structure of the Thai natural gas industry



This paper contains an examination of the on-going debate about gas price reform in order to delineate the different viewpoints and improve understanding of them, and to propose possible policy directions in order to move forward the country's natural gas reform agenda. Sections 2 and 3 are devoted to explaining the market structure and the current pricing regime of the gas industry.

2. THE CURRENT MARKET STRUCTURE OF THE GAS INDUSTRY

In a nutshell, Thailand's natural gas industry can be described mainly as a vertically integrated monopolistic market dominated by a single conglomerate headed by the PTT Public Company Limited, the partially privatized state-owned energy giant. In the upstream exploration and production market, its subsidiary, PTT Exploration and Production (PTTEP), maintains roughly a 25 percent market share in terms of sales. Although the figure is not high, the company also holds non-trivial equity shares (5-40%) in many of the exploration projects undertaken by its main competitor, Chevron.

As a national energy company, PTT is designated as the sole purchaser of natural gas produced domestically and imported from overseas sources. It is also the sole trader of the natural gas procured, as it has exclusive access to its pipeline system to wholesale and retail consumers. It is also the sole importer of LNG, as it owns and controls both the pipeline and the LNG-receiving terminals, as can be seen in Diagram 2.

PTT's network of pipelines in Thailand currently stretches 3,100 km, linking all commercial offshore gas fields to major power plants and its own six gas separation plants, as well as some 200 industrial users, many of which are petrochemical companies and gas distribution companies in which PTT owns a controlling share.

Currently, there is no mandatory third party access to both PTT's gas transmission pipeline network and LNG-receiving terminals. Thus, there is no competition in the gas trading, import and dis-

tribution markets. Certain power plants or industrial users construct their own distribution pipelines to connect to PTT's main transmission pipeline and transfer the ownership to PTT for maintenance.

Limited private participation in pipeline construction and operation at the distribution level has been introduced. There are currently three distribution companies, in all of which PTT has a significant shareholding, namely PTT itself, PTT Natural Gas Distribution Company (PTTNGD), its subsidiary, and Amata NGD, a joint venture between the Amata Industrial Estate Group and PTTNGD.

PTT is also extensively involved in the downstream petrochemical industry. PTT Global Chemical (PTTGC) enjoys an abundant supply of relatively inexpensive LPG for its feedstock supplied by PTT's gas separation plants. PTT also holds shares in several power generation companies that rely on natural gas as a fuel.

To conclude, there is little market competition in the vertical structure of the natural gas industry in Thailand. PTT dominates much of the market landscape, from upstream exploration and production to the downstream petrochemical industry. Undoubtedly, the company derives its market power throughout the entire supply chain from its monopolistic hold of the gas transmission facility.

In the absence of effective competition from upstream to downstream gas markets, gas prices at all stages in the supply chain are regulated either by the Ministry of Energy or the Energy Regulatory Commission (ERC), a semi-autonomous regulatory body. The Ministry regulates upstream gas prices–i.e., well-head gas prices and ex-factory LPG, while ERC regulates middle to downstream gas prices–i.e., gas transmission tariffs and electricity prices. The following section contains a discussion of price regulation in detail.

3. THE GAS PRICING SCHEME

Gas price regulation in Thailand is broadly based on a cost-plus regime, which allows producers to pass on all costs to consumers. However, there are many exemptions, as will be elaborated below.

The current gas pricing scheme is relatively complex and opaque with multiple prices designated for different groups of users. First of all, the supply of natural gas is divided into two pools. The first pool, known as "Gulf gas" or "pool 1 gas," consists exclusively of legacy gas from the Gulf of Thailand and the Malaysia-Thailand Joint Development Area, which is relatively inexpensive. Pool 1 gas is dedicated to the gas separation plants which produce the LPG consumed by petrochemical industries, households and the transport sector. Pool 2 gas comes from three main sources, namely the remainder of pool 1 gas, imported gas from Yetagun and Yadana offshore gas fields in Myanmar, and imported LNG. Pool 2 gas is channeled mainly to the power sector.

As the price of gas is determined by the underlying cost, pool 1 gas is priced markedly lower than that of pool 2, which is a weighted average of the price for domestic gas, imported gas from Myanmar and imported LNG. The pool 1 price is currently US$ 8-10 per mmbtu, and that of pool 2 is US$ 10-12 per mmbtu. As the share of imported LNG is rising, the pool 2 gas price will gradually gravitate toward the global price of LNG at US$ 16-17 per mmbtu. The widening price differential will certainly spark discontent among the public, as higher fuel prices translate into higher electricity tariffs.

It is interesting to note however that the lower price for pool 1 gas that is dedicated to gas separation plants for producing LPG does not benefit all users of LPG equally. The retail price of LPG varies across different user groups. This is where the current controversy about gas price reform begins.

First, LPG sold to the petrochemical industry is supposed to be based on a "net-back pricing" basis calculated from the natural gas price at market destinations less the cost of pipeline transportation, regasification, waterborne shipping and liquefaction. Ironically, gas supply contracts between PTT and its commercial customers are considered commercial secrets, so the actual price of LPG sold to

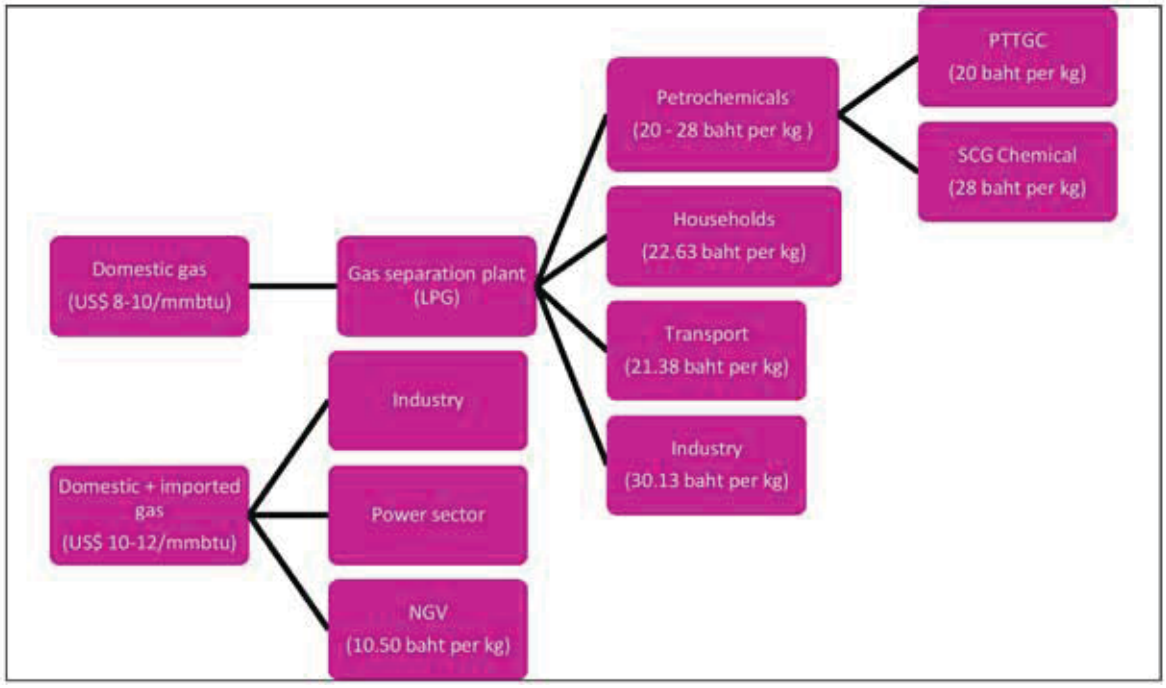
petrochemical clients cannot be verified. However, based on information provided by security houses, PTT sells LPG to its subsidiary, PTTGC, at 19 baht (about US$ 0.59) per kg. As for its only other petrochemical client, Siam Cement Group Chemical (SCG Chemical), LPG is sold at global prices, roughly 28 baht per kg. This glaring price discrimination would certainly constitute a violation of the competition law. Unfortunately, state enterprises such as PTT are exempted from the Trade Competition Act 1999.

Second, the ex-factory price of LPG sold to the household, transport and industrial sectors is fixed at 10.73 baht,[4] a price which is well below actual cost, which is claimed to be 24.82 baht per kg.[5] PTT shoulders the burden of the subsidy on the sale of legacy gas, which was estimated at roughly 36 billion baht per annum in 2013. On the other hand, PTT is fully compensated for imported LNG. It is thus not surprising why the company is loath to sell LPG to other users and tries to channel as much as possible of the product to its own petrochemical company which can transform the gas into petrochemical products sold at market prices.

The retail price that the household, transport and industrial sectors have to pay for LPG however is significantly higher than the ex-factory price of 10.73 baht. This is because it includes a contribution to the "Oil Fund" in order to compensate PTT for the difference between the imported LPG price, roughly 28 baht per kg, and the domestic regulated price at 10.73 baht per kg. The government adjusts the contribution in order to manipulate the retail price of LPG sold to different groups of users, as can be seen from Diagram 3.

As can be seen from the diagram, industrial clients (bar petrochemical producers) pay the highest regulated price of 30.13 baht per kg, which

Diagram 3: Current gas pricing regime



Note: Prices presented are inclusive of contributions to the Oil Fund.

[4] *The original ex-factory LPG price is based mainly on the cost of production in gas separation plants, whereas in practice, approximately 40 percent of LPG supply comes from oil refineries, the production cost of which is higher.*

[5] *The mentioned cost is not yet officially endorsed by the regulator.*

households and the transport sector can purchase at approximately 22 baht per kg. The petrochemical industry, specifically PTTGC, pays the lowest "net-back price" at 19 baht per kg plus 1 baht as a contribution to the Oil Fund, which means that the price is 20 baht per kg. The only other petrochemical client, SCG Chemical, pays the internal price for the same product however, at roughly 28 baht per kg. With such a complicated and seemingly discriminatory pricing regime, it is not surprising that the issue of gas price reform has attracted considerable public attention.

4. ON-GOING DEBATE ABOUT REFORM OF THE ENERGY SECTOR

As mentioned previously, the current debate about gas sector reform seems to be narrowly preoccupied with the issue of LPG price reform. The first group of reform advocates, consisting of bureaucrats and certain academics, perceives the current subsidy for diesel, NGV and LPG used by households and the transport sector to be highly distortionary, leading to excessive domestic demand and widespread smuggling of the cheap subsidized LPG into neighboring countries. Thus, the energy reform agenda of this group is focused on the termination of current gas price subsidies, which implies a significant jump in the prices of household cooking gas and LPG used for transport, from 22 baht to about 25 baht per kg, which is claimed to be the cost price of LPG. Interestingly, this group seems to believe that the petrochemical industry should retain its entitlement to buy LPG at net-back prices (19 baht per kg) because, unlike other industries, it uses LPG as a feedstock rather than as a fuel, which creates a "significant value added" for the product that is beneficial to the Thai economy as a whole. LPG is a relatively expensive fuel alternative compared with petroleum or coal. Thus, that group feels that pricing should discourage the use of LPG as a fuel.

On the other hand, the second group, mainly NGOs, has resisted any LPG price increase for household use for several reasons.

First, PTT's huge profit (roughly US$ 3.5 billion in 2013) indicates that the company is making a healthy profit and so should be financially capable of shouldering the loss of the subsidy. After all, the company belongs to the state and should be obliged to pursue not only commercial objectives but also social ones.

Second, natural gas resources belong to the Thai people; thus, the benefits obtained from the exploitation of those resources should be distributed equally to all. The fact that the petrochemical industry pays a much lower price for indigenous gas and takes a third of the total supply means that it is reaping benefits disproportionately. Hence, this group feels that any increase in the price of the same product for other users is discriminatory and unfair.

It should be noted that there is deep public distrust of policy makers, as some of them enjoy special benefits from PTT. For example, it is a tradition that the Permanent Secretary of the Ministry of Energy or his or her deputy sits on the PTT Board of Directors, sometimes along with the Director of the Energy Policy and Planning Office, the Secretary General of the Thai National Economic and Social Development Board, which is the main

economic policy body of the government, and even the Attorney General. Appointment of "cronies" of politicians to the Board of Directors of the national energy giant also indicates that not only bureaucrats, but also politicians share special benefits derived from PTT's affluence.

According to the Lantau Group, an energy consulting firm based in Hong Kong that is familiar with the Thai energy industry, the divergent views between the two groups of energy reform advocates may arise from the fact that each group gives different importance to issues of "efficiency" versus "equity." Efficiency is related to the allocation of resources–i.e., the production and consumption of natural gas–at the macroeconomic level, whereas equity is concerned with the distribution of benefits from the exploitation of gas resources among different groups of people. These aspects will be elaborated in greater detail in the section below.

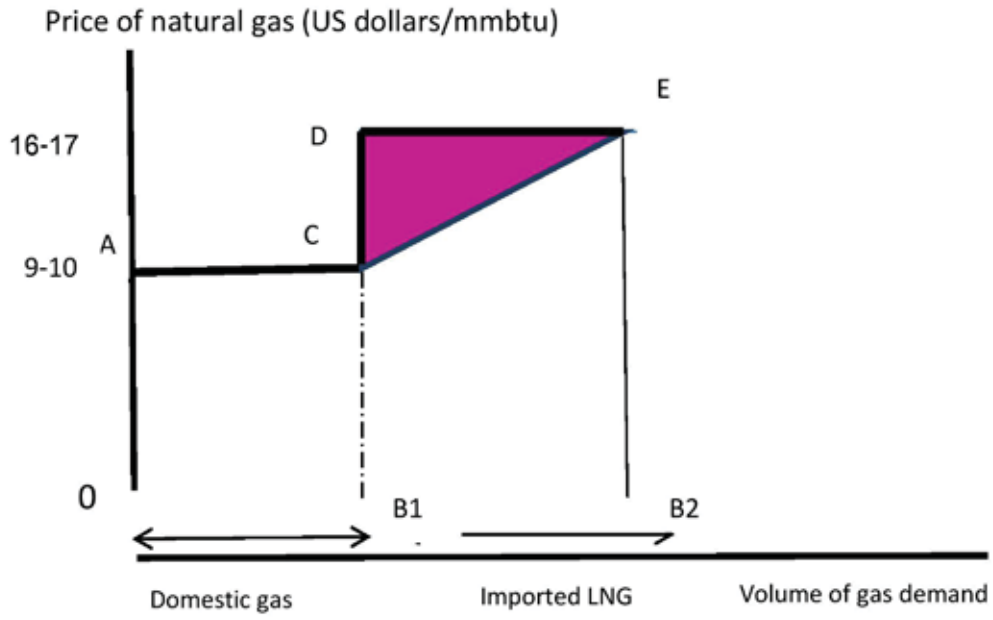
4.1 On "efficiency"

The on-going debate between the two groups of energy reform advocates about who should get access to LPG and at what cost may have diverted the attention of the public from the more fundamental problem facing Thailand's energy policy–the increasing reliance on imported gas that will inevitably lead to a rise in the country's electricity price in the next few years as "cheap gas" from the Gulf of Thailand is quickly running out, and there is no new exploration and production to replace it. The question is: Why can Thailand not produce more lower-cost domestic gas?

As mentioned previously, the current price controls on LPG and NGV provide little incentive to explore for new energy sources in the Gulf of Thailand. As the sole purchaser of gas, PTT is also loath to buy domestic gas if it is forced to sell the product at prices lower than cost. The company no doubt prefers to sell imported gas, for which it is fully compensated, rather than domestically produced gas.

The current natural gas market is illustrated in Diagram 4. As a result of price control, the current natural gas supply curve in Thailand is a "kinked" one, with the price of domestically produced gas (reflected in the straight line A-C) being regulated and that for imported gas (shown in the line from D to E) being made available at the higher global price. If the domestic gas price were to move to parity with the global price, the supply of domestic gas could be boosted, say, from point B1 to B2. Alter-

Diagram 4: The current market supply of natural gas in Thailand



natively, if the price were to be set somewhat lower than the import price, somewhere between US$ 9 and US$ 17 per mmbtu, then domestic supply would be somewhere between B1 and B2. Whatever the case may be, the move would be a win-win proposition for all, as Thailand would be able to reduce the importation of expensive gas and at the same time, produce more domestic gas at a lower price because of the savings realized on transportation costs, as well as on employment, taxes and royalties to boot. This gain is represented by the shaded triangle CDE in the diagram.

However, for Thailand to fully benefit from gas tariff reform in terms of new investment in exploration and production, the concession regime needs to facilitate broad competition to boost exploration and production of natural gas in the Gulf of Thailand. Perhaps the government might consider conducting open bidding for gas exploration and production, with publicly advertised terms of reference in lieu of negotiations behind closed doors where all the negotiated parameters are concealed from the public.

Besides gas exploration and production, downstream gas trade and distribution also have to be liberalized by allowing third parties to buy and sell gas through PTT's gas pipeline and to use PTT's LNG terminals for receiving imports at fair prices. In the longer run, the ownership of the pipeline business, a natural monopoly, should be separated from other competitive markets in order to ensure non-discriminatory access to the pipeline network. Only when there is effective competition in the energy market and prices are determined by the market can all the murky "price regulations" that are at the heart of the current controversy be done away with.

4.2 On "equity"

Advocates of the "efficiency" goal believe that the LPG and NGV price subsidies has led to a shortage in the domestic supply of and an excessive demand for natural gas, a situation that requires the importation of expensive LPG from overseas to bridge the demand gap. An increase in the domestic gas price would stimulate domestic exploration and production of natural gas and other alternative fuels, which would help generate additional employment and extra revenue for the government from taxes and royalties. At the same time, higher prices would help curb demand and thus, imports, which would save valuable foreign exchange.

The proposed price increase does not sit well with those who are more concerned about the "equity" or "fairness" of the gas pricing regime, however. To them, the suggested price rise does not seem "fair" to consumers as they believe that the importation of LPG is due mainly to the surge in LPG demand for the petrochemical industry over the last few years. Hence, the industry, rather than households, should bear the cost of imported gas.

So, the questions boil down to these: Who should get to use the relatively "cheap" domestic gas, and who should bear the cost of its expensive imported counterpart?

It is interesting to observe that all the "hype" about prices is concentrated mainly on the pricing of LPG when the majority of the legacy gas goes to the production of electricity. This is because the benefits associated with cheap domestic gas are widely dispersed when the gas is devoted to producing electricity, but this is not so when it goes to the gas separation plants owned by PTT. Proponents are suspicious that PPT may channel legacy gas at favorable prices to its own petrochemical plants before other groups of users, thereby reaping most of the benefits from the exploitation of national natural energy resources. This view has been vindicated. SCG Chemical, the only other petrochemical producer, has revealed that it has had to resort to the use of naptha (a close substitute for LPG) as a feedstock procured from overseas at the global price of roughly 27 baht per kg. This indicates that the company does not have access to adequate supplies of low-priced LPG.

Thus, PTT appears to be "hogging" cheap domestic gas in compensation for its obligation to subsidize domestic sales of LPG and NGV at regu-

lated prices that are well below cost. Where does this leave Thailand with regard to gas sector reform?

First, the author believes that Thailand needs to do away with all current cross subsidies that distort the choice of energy source. There should be a single price for LPG for all users. This should be the import-parity price if Thailand still needs to import LNG to meet domestic demand. The difference between import price and domestic cost should be collected as a tax that goes directly into state coffers. Without price discrimination, the debate on who should get preferential access to legacy gas would no longer be relevant.

As for the petrochemical industry, while it is true that LPG is a relatively expensive fuel and thus should be dedicated to the petrochemical industry, there is no reason why the industry should not pay the same price for LPG as do other business sectors and households. After all, SCG Chemical was not able to tap LPG produced from domestic gas but it survived by using naptha purchased from overseas at global prices; thus, PTTGC should do the same.

Second, not only should the price of LPG be harmonized, but that of natural gas should be too. The government should abolish pool 1 and pool 2 gas prices and charge a single import parity price for natural gas. Hence, no sector in the economy would have special access to legacy gas.

Third, the government may continue to subsidize low-income households. The "targeted" rather than "blanket" subsidy should be less distortionary but more financially manageable. In fact, the government has already introduced the means-tested subsidy since the introduction of the household LPG price increase last year but many eligible individuals have not been registered; registration procedures have proved cumbersome. With an effective targeted subsidy scheme, the government could diffuse much of the public resistance to LPG price reform.

Fourth, as gas prices are to align with costs and as price differentiation is abolished, the government should do away with the highly controversial "Oil Fund" that has been used to cross subsidize

prices of different types of fuel across different types of user. Earmarked funds are often mismanaged and abused given the lax scrutiny in spending. Financing for subsidies or price stabilization could be allocated directly from the national budget.

Fifth, to ensure that higher domestic gas prices will lead to new exploration and production of indigenous gas, the government needs to develop a more transparent concession-granting regime that is based on open rounds of bidding for designated "blocks" with clear qualifications and conditions, as is the case in Brazil.

Finally, this author believes that successful reform of the Thai energy sector requires a delicate balancing of both efficiency and equity goals. Policies that promote greater efficiency in the use of Thailand's scarce energy resources can result in great benefits for the country; however, those policies will not receive public support if a particular group must take a "hit" while another still enjoys special privileges. On this note, the proposed energy reform, including the revision of the LPG price, will have to ensure that all parties share the same burden or enjoy the same benefits associated with the policy changes.

When it comes to human appreciation, fairness or equity trumps efficiency hands down.