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LPG Market under Shale Revolution (1)

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Since the start of its full-fledged progress, topics involving the U.S. shale revolution have appeared in media almost every day. The revolution has thus continued to attract much attention in the United States, Japan and the world. The rapid shale gas output expansion has prompted shale gas to become a mainstay in U.S. natural production and allowed the United States to become the world's largest natural gas producer surpassing Russia. Following the shale gas output expansion, the substantial increase in tight oil output has enabled the United States to drive up global oil supply. The two great developments have shaken global oil and natural gas markets. The shale revolution has led U.S. coal to lose its competitiveness against cheapening natural gas, flow out into the European market and take some energy market share from natural gas in Europe. The revolution has thus affected competition among energy sources.

In fact, however, another major development has emerged under the shale revolution, while failing to attract attention from people other than energy industry stakeholders or become a high-profile topic. That is a sharp expansion in liquefied petroleum gas (LPG) output, exerting various impacts. This report, hereafter divided into two parts, deals with LPG market changes under the shale revolution. The first part outlines global LPG supply and demand, and the sharp expansion in U.S. LPG output. The second part focuses on increases in U.S. LPG production and exports, and their impacts on the global market.

Of hydrocarbons, LPG primarily includes propane with carbon number 3 and butane with carbon number 4 that can be liquefied through compaction relatively easily. This is a familiar energy source used widely in residential, industrial and transportation sectors. Of total LPG supply in the world, 45% comes from crude oil refining, 35% accompanies natural gas production and the remaining 20% accompanies crude oil production.

As LPG demand has expanded, the above three operations (oil refining, natural gas production and crude oil production) have increased year by year, boosting LPG output. For 2011, global LPG output is estimated at 270 million tons. Major LPG producers include North America, the Asia-Pacific region and the Middle East. Each of the three regions accounts for more than 20% of global LPG output. The Asia-Pacific region is the largest LPG consumer, accounting for one-third of global LPG demand, followed by North America and Europe.

Under such supply and demand conditions, international maritime trade in LPG to fill interregional supply and demand gaps has been active. For 2011, maritime LPG trade is estimated at 63 million tons. The largest exporter in the year was the Middle East, accounting for 35 million tons of the global maritime LPG trade, followed by Africa, Europe and North America. The largest importer was the Asia-Pacific region, accounting for 35 million tons of the total, followed by Europe.

Under such market structure, the shale revolution has prompted LPG production to sharply increase in the United States. This is because the three LPG production sources of oil refining, natural gas production and crude oil production have all expanded under the shale revolution. More directly, a substantial increase in output of natural gas liquid including propane and butane in the United States is linked to the LPG output expansion. Under the current energy market where natural gas prices have weakened due to the shale gas revolution with oil prices remaining above $100 per barrel, market players have naturally chosen to expand production of “liquid fuels” that can be sold for higher prices. As a result, LPG output has expanded substantially.

Meanwhile, residential and industrial LPG demand in the United States has leveled off. Demand for LPG for ethylene production has declined gradually as demand has expanded for cheapening natural gas (ethane). Therefore, the LPG output expansion is working to boost LPG exports from the United States. In fact, U.S. companies including Enterprise are implementing or planning projects in Texas and other regions to start LPG exports in 2013 or 2014.

Under such conditions, some experts started to argue that annual U.S. LPG exports may expand from an estimated 4 million tons in 2011 to about 8 million tons in 2013 and to about 20 million tons in three years. In 2012, the United States was the world's fifth largest LPG exporter following Qatar (with exports at about 10 million tons), Saudi Arabia, the United Arab Emirates and Algeria. If U.S. LPG export capacity is expanded as described above, the United States may become the largest LPG exporter in the world in the near future. Given that global maritime LPG trade totals some 63 million tons at present, the rapid expansion in U.S. LPG exports can be expected to have significant implications for the global LPG market, as detailed in the second report on LPG.

Unlike crude oil and natural gas (or LNG), LPG is a petroleum product left out of export control in the United States and which can be exported freely according to supply/demand and market conditions. While LNG exports to Japan are expected to start in 2017 at the earliest, LPG exports to Asia have already been implemented. In this sense, the U.S. LPG production and export expansion is significant.

The geopolitical significance of the United States' expected energy independence, the possible enhancement of U.S. economic and industrial competitiveness and its implications, and internal and external discussions on U.S. LNG exports have become remarkable topics attracting

global attention under the shale revolution. In contrast, the revolution's impact on the LPG market has attracted less attention in public. But we may have to pay attention to the impact as a steadily progressing issue.

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