

## **Energy Poverty and Natural Gas**

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On May 9 and 10, an international symposium titled “Reducing Energy Poverty with Natural Gas: Changing Political, Business and Technological Paradigms” took place at Stanford University, sponsored by the Natural Gas Initiative created in the university in 2015 to study natural gas from a wide range of angles as natural gas increases its significance on progress in the shale revolution. As indicated by the title, discussions at the symposium covered the global energy poverty problem and the potential of natural gas use as an approach to resolving the problem. In addition to experts and energy policy and industry stakeholders mainly for natural gas, liquefied natural gas and liquefied petroleum gas, developing economy and energy poverty experts participated in the conference, indicating an interesting mix of participants.

Energy poverty in the title is basically defined as “the lack of access to or lack of affordability of modern energy services,” indicating a situation where citizens in developing countries (in some cases, developed countries as well) cannot use modern energy such as electricity and gas and have no choice but to depend on traditional biomass fuels such as fuel woods and animal wastes in daily life. At present, more than 1.3 billion people have no access to modern electricity supply, concentrating in Asian and African developing countries. The abovementioned biomass fuel use causes environmental destruction in a wider sense and forces many women and children to work hard to secure biomass fuels, leading to great constraints on their social participation and education opportunities. More seriously, burning biomass fuels causes heavy health damage, leading to more than one million deaths annually. Energy poverty is positioned as a key problem to be globally resolved by 2030 in the Sustainable Development Goals compiled at the United Nations Sustainable Development Summit in September 2015.

In order to mitigate or resolve the serious effects of energy poverty, traditional biomass fuels must be replaced with cleaner energy for sustainable supply. The symposium dealt with the possibility of natural gas as a key option playing a great role and relevant challenges. As a matter of fact, natural gas is the cleanest among fossil fuels. It has the environmental advantage of emitting far less carbon dioxide than coal and oil and little of sulfur and nitrogen oxide causing air pollution. As many developing countries agreed to and submitted greenhouse gas emission reduction targets under the Paris Agreement, many countries are tackling the promotion of natural gas as a clean fuel. At the same time, clean energy such as natural gas is expected to help mitigate air pollution and the abovementioned health damage.

Natural gas resources are globally abundant, indicating great supply potential. Some participant at the symposium argued that actual natural gas supply expansion and falling natural gas prices would provide a boost to natural gas use. It was pointed out that LNG prices under long-term supply contracts have fallen substantially due to plunges in oil prices to which these LNG prices are indexed, with spot LNG prices weakening on oversupply in the market, resulting in a remarkable gas price fall in the Asian market. The key question in the symposium was how the price decline would lead to the promotion of natural gas use. In Asian and other developing countries, great hopes are placed on gas as an effective means to meet growing energy demand at a time when demand for energy, particularly electricity, is expected to sharply increase due to population and economic growth. Natural gas's penetration into and expansion in the energy market is naturally viewed as an effective response to the energy poverty problem.

However, natural gas has some problems. The key point in the discussions at the symposium was that as gas does not necessarily have price competitiveness advantages in some cases even on the premise of remarkable gas price declines in Asia and other regions, more price competitive energy sources are chosen in developing countries where priority is given to economy and actual life. An argument seen in the symposium was that natural gas particularly in the power generation sector in Asia is exposed to competition from abundant coal with greater price competitiveness and from renewable energy with falling power generation costs under policy support while expanding nuclear power generation affects natural gas/LNG demand. Symposium participants also pointed out that as mainly transportation-related infrastructure must be developed for natural gas to affect its price competitiveness, initial supply chain development investment for natural gas tends to be higher than for other fossil fuels, that securing finance for such initial investment is important and that such challenge affects the flexibility of natural gas supply. This may mean that while various initiatives are implemented to increase gas supply flexibility in the market, attention must be paid to the market characteristics of gas/LNG.

A general argument in the symposium was that how to enhance the price competitiveness of natural gas and improve natural gas supply flexibility to strengthen natural gas's overall competitiveness and attractiveness would become the key to promoting natural gas's penetration into the market. It was pointed out that policy-side initiatives to design and regulate the market, including the market's assessment of natural gas's environmental advantage (internalization of environmental costs), is important in addition to the industry side's creative business development responding to natural gas/LNG market changes. Natural gas is required to play expected roles in resolving energy poverty and other areas by overcoming its unique problems through these initiatives.

In response to the question of how to resolve energy poverty with natural gas, one may argue that top priority must be given to overcoming poverty itself first through economic development to allow the use of natural gas and other clean energy sources to be promoted naturally in line with economic development and income growth. Energy demand is a kind of derivative demand and energy use is advanced gradually depending on economic development and income growth. Given such conventional idea, it may be difficult to introduce clean energy with higher prices to resolve energy poverty at a time when income levels are extremely low. If economic growth is given priority

in responding to the actually existing energy poverty, however, the present serious social problem may be ignored. Participants in the symposium pointed out that serious considerations should be given to responses to energy poverty, including realistic initiatives such as LPG introduction to mitigate infrastructure development costs and reduce initial investment. As various energy challenges exist in the world, rational and practical solutions to them are required to be explored.

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