

South Korea: a Paradigm Shift in Energy Policy

In this latest installment of *Living Energy's* essay series, Seung Il Cheong, South Korea's Director General for Energy Industry Policy, provides an insightful overview of the critical changes currently being planned to the country's energy policy to ensure stable supplies and sustainable economic growth.

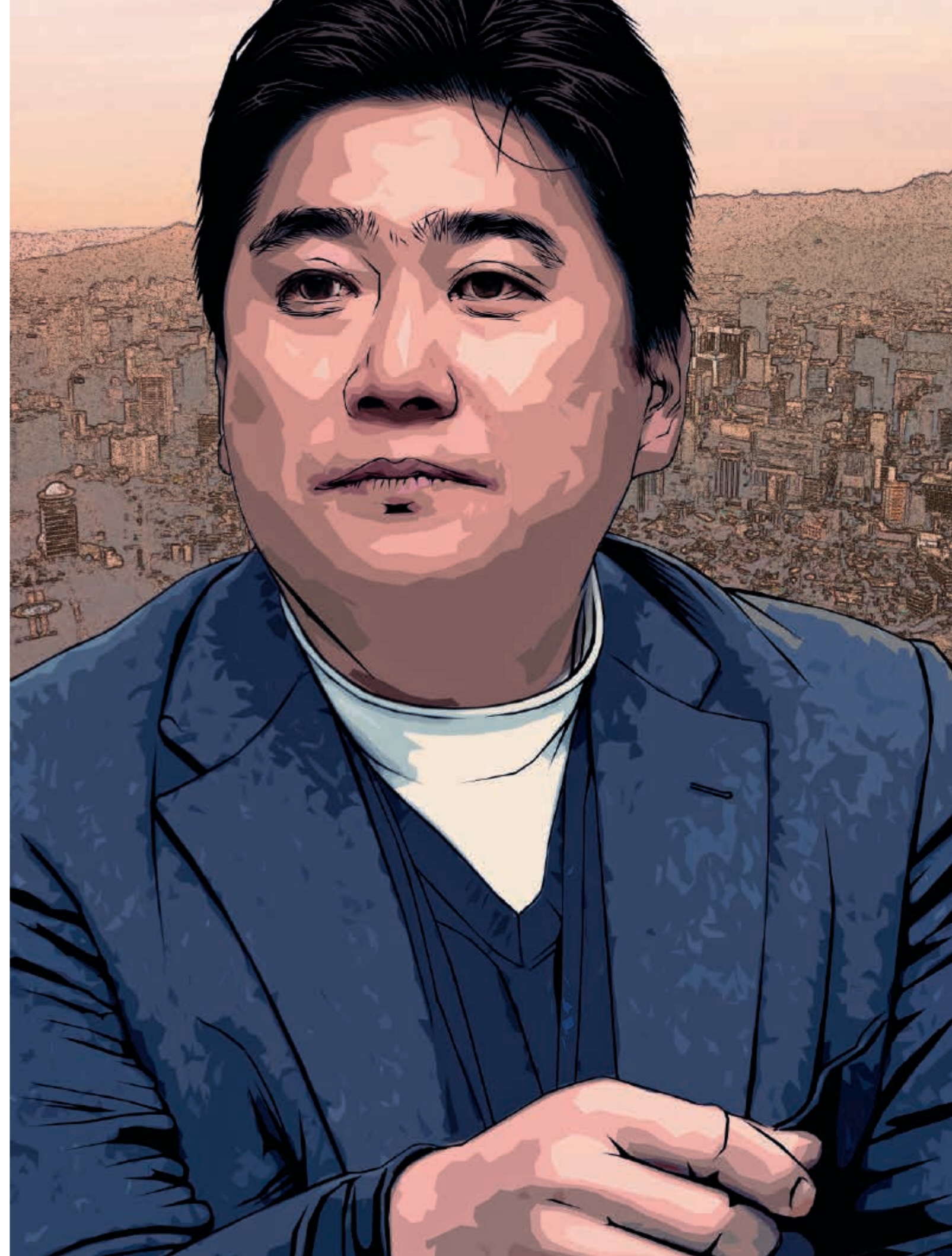
Text: Seung Il Cheong Illustration: Burkhard Neie

South Korea is the eighth-largest trading nation in the world, with its recent trade volume reaching US\$1 trillion for two consecutive years. South Korea's rapid economic growth over a short period of time has been backed up by a stable energy supply. However, the country has practically no natural resources and for this reason, the government has faced consistent challenges in setting its energy policy objectives in order to meet diversified demands. In the past, South Korea's energy policy focused on developing energy and securing a reliable energy supply in order to support economic growth. However, the oil crisis of the 1970s and the environmental problems which emerged on the world's radar in the late 1980s have led to renewed calls for policies that can tackle the issues surrounding energy security. Simultaneously, with the onset of neoliberalism in the 1990s, discussions on adopting market mechanism and competition in the energy market have become brisk. The early 2000s saw a focus on new and renewable forms of energy as a way to respond to the challenge of climate change while driving green growth. Recently, however, existing policy frameworks in South Korea which focused on expanding supply

whenever consumption increased have proved to be unsustainable in matching energy supply and demand. What is called for is a paradigm shift in its energy policies, shifting its attention from the supply side to the consumption side. Against this backdrop, I would like to introduce South Korea's energy policy for sustainable economic growth and stable energy supply and demand.

Imports Needed to Meet High Energy Consumption Rate

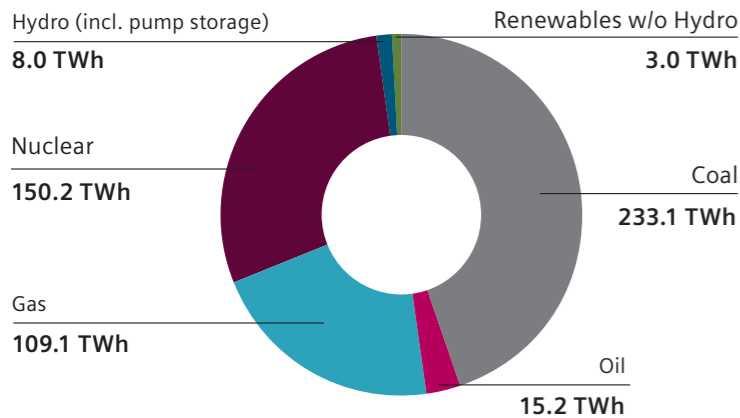
South Korea ranks tenth in the world in terms of energy consumption, but lacking natural resources, a staggering 96 percent of the country's energy consumption relies on imports, amounting to US\$184.8 billion in 2012, the monetary equivalent to nearly one-third of its total imports. Imports of oil, LNG and coal add up to nearly 99 percent of energy imports. Nonetheless, energy consumption has continued to increase in line with economic growth. With traditionally energy-intensive industries such as petrochemicals and steel, energy intensity is relatively high in South Korea compared with that of other countries. In fact, South Korea's gross energy consumption has been



South Korean Electricity Statistics

Gross electricity generation (2011)

Total:
518.6 TWh



Electricity consumption (2012)

9.337

kWh per capita

Population (2012)

50.0

million

Total CO₂ emissions (2010)

563.08

Mt, CO₂ in total

(incl. 279.2 Mt CO₂ in power and heat supply)

Emissions per capita (2010)

11.52

t, CO₂ per capita in total

(5.71 t CO₂ per capita from power and heat supply)

Electricity price for household (2011)

98.2

SK wons/MWh

Source: IEA Statistics; Global Insight

increasing more rapidly over the past decade than in key nations such as Japan, the USA, and the UK. Electricity consumption has increased five times faster than the OECD average in the past decade.

Thus, the main focus of its energy policy will be to neatly balance increased demand with diversified supplies. To elaborate, on the demand side, Korea has achieved rapid economic growth through compressed development in energy-intensive industries such as the manufacturing industry, which brought about a rapid surge in energy consumption. And energy consumption is expected to remain high for the time being. On the supply side, in order to achieve higher self-reliance in energy, the government will seek to make new and renewable energy sources more economically feasible.

Strengthening Demand Management with Smart Grids

Given South Korea's paucity of natural resources, it is vital to bring in effective measures to improve energy efficiency so as to successfully manage the competing demands of economic growth. For this, the consensus at a governmental level is firmly behind smart grid technology. Smart grids enable smarter and more efficient use of energy by converging IT technologies with existing electrical grids and by offloading higher loads found at peak times to off-peak times. Additionally, energy storage systems can also be included in smart grids, optimizing power quality and efficiency and reserving electricity as a power plant similar to pumped-storage hydroelectricity. Meanwhile, an energy management service provider can participate as a negative power plant in an electricity trade market. Needless to say, smart grids are a highly promising technology. The South Korean government's enactment of the Smart Grid Act in 2011 and establishment of a consequent master plan in 2012 have together paved the way for institutional support for smart grids. Technological development and a smart grid test field on Jeju Island are just two of the

Graphic: independent

initiatives already being brought in for support. The problem is that smart grid technologies remain in their infancy and are not yet ready for commercialization.

The government is thus committed for the foreseeable future to a strategy of development, with plans to establish smart grid technologies as a fledgling industry in South Korea. Concretely, the government is currently mapping out a plan to supply advanced metering infrastructure to 80 percent of the country by 2017. As an effort to advance commercialization of smart grid technologies, the government plans to create base districts customized around each metropolitan area. This program aims to resolve any obstacles to the commercialization of these technologies by providing tailored technologies to small and medium-sized cities nationwide. Furthermore, the government will strive to ensure intelligent demand management and, at the same time, encourage and invite smart grid service providers to the electricity trade market.

Finally, the government will exert great efforts to significantly reduce energy consumption, such as by increasing its support for development of technologies aimed at enhancing energy efficiency, by strengthening fuel economy management and by installing highly efficient equipment in both new and existing buildings.

A Need to Secure Adequate Energy Reserves

In recent years, South Korea has suffered from sporadic shortages in electricity due to the increasing strain the grid has been under with the country's continuing economic growth. A faster-than-expected rise in energy demand has not been matched by a concomitant investment in power plants. With economic growth, electricity consumption by industries has skyrocketed, and with the rise in income levels and introduction of convenient electric appliances, electricity consumption by households has rapidly increased as well. Moreover, the comparatively cheap price of electricity relative to the use of other power generation methods has led to a massive uptake in applications relying on the national grid. Changes in the climate have also meant an increase in electricity demand for air-conditioning and heating. Despite increasing demands, supply has been limited. Construction of new power plants has been delayed due to environmental concerns and civil complaints. To add to the problem, some nuclear power plants and other power plants have stopped operating.

To effectively cope with these problems and address the imbalances they create, in February 2013, the South Korean government announced the "6th Basic Plan for Long-Term Electricity Supply and Demand." First, the plan aims to curb electricity consumption by 15 percent and thereby cut 12 percent of the overall target demand by 2027 through positive electric power demand management. This will minimize the need to construct new power generation facilities. Another part of the plan is to bring the price of electricity and fuel into line with the level of prime cost and to introduce a seasonal,

"The main focus of [South Korea's] energy policy will be to neatly balance increased demand with diversified supplies."

hourly rate system, in which electricity rates will differ according to the supply situation. As mentioned earlier, using the smart grid to heighten overall energy efficiency will be one of the first measures to go into effect. Second, on the supply side, the government plans to bring reserves from standby facilities up to the level of the OECD countries, which will provide South Korea's population with energy security against power outages. To alleviate instability in supply and demand, and to secure sufficient reserves corresponding to South Korea's economic scale, the government has set its goal to keep the rate of reserves at 22 percent of total electricity demand. This figure takes into consideration the uncertainty of load forecasts, as well as reductions in operation for nuclear power plants during renovations to ensure their safety.

Third, the government has established a power supply mix plan that takes into consideration each power supply's characteristics and limits. The Fukushima nuclear accident has thrown open all questions of the future of nuclear power in the country's energy supply mix – questions which are for the nation as a whole to decide together. Renewable energy is targeted for an increase so that it constitutes 20 percent of generating units and 12 percent of all energy consumed by 2027. This ambitious target is a reflection of the government's strong determination to increase new and renewable energy supplies despite the fact that challenges still

remain in the dissemination of new and renewable energy. The remaining shortage in generating units will be provided by coal-powered plants and gas-powered plants, and throughout this course, the government will make sure to minimize social and economic costs by developing and investing in technologies such as integrated gasification combined cycle with carbon capture and storage that will minimize greenhouse gases and environmental pollutant emissions.

According to the “6th Basic Plan for Long-Term Electricity Supply and Demand,” the government will pursue construction of power plants as well as facilities for transmission and transformation of electric power. The government will also concentrate on heightening the receptivity of the South Korean people by extending compensation to people living in areas near these facilities.

Shale Gas: a Possible New Energy Supply Source

Until the early 2000s, increase in natural gas demand stemmed from the introduction and expanded distribution of City Gas across the country. Even after that period, demand for natural gas continued to be high, but this time, due to increased electricity consumption. South Korea’s natural gas demand was about 38 million tonnes in 2012, making it the world’s second-largest LNG-importing nation after Japan. South Korea depends on imports for nearly all of its LNG needs, except for a small quantity it gets from its own offshore Donghae gas fields, so it is very important for the country to maintain a stable supply of natural gas.

In order to ensure energy security and competitive prices, it is necessary to diversify LNG import channels. This is because about 80 percent of South Korea’s current LNG imports are from the Middle East and Southeast Asia, and their price is interlinked with the price of oil, so the country pays a higher premium compared to prices in North America and Europe. In light of this situation, the recent development and import of shale gas has attracted South Korea’s at-

tention – and in fact the world’s attention, with this now being heralded as the “Golden Age of Gas.” In fact, South Korea announced a “Shale Gas Development and Use Strategy” in September 2012. The Korea Gas Corporation, which is in charge of the importation of natural gas for South Korea, has had a stake in developing shale gas fields in Canada since 2010 and recently became part of the “LNG Canada” joint venture with Shell, CNPC, Mitsubishi, and other companies. In 2012, the Korea Gas Corporation signed a purchase contract with Cheniere Energy’s Sabine Pass port for 3.5 million tonnes of LNG annually, making it the United States’ first project for the export of LNG. Apart from its North American shale gas activities, South Korea also plans to pursue its goal of securing an economically critical and flexible supply of LNG in a successful offshore Mozambique gas field. It is also important to supplement these activities with supply facilities like pipeline networks and storage facilities to ensure a stable balance between supply and demand. Thanks to the construction of a nationwide pipeline network in the 1990s, the City Gas distribution rate reached 76 percent in 2012. It is also planned for some regions outside the distribution network to be supplied with gas from small LPG storage tanks. Also, the government will soon increase the storage rate from about 10 percent to 20 percent by completing the Samcheok LNG Terminal, adding to the capacity from three other terminals that are already in operation at Incheon, Pyeongtaek and Tongyeong. Moreover, the government will efficiently manage natural gas demand by improving the current consumption pattern, in which demand for natural gas is high in winter and relatively low in summer, and by relaxing seasonal electric power peaks in summer and winter through distributing gas-powered cooling systems and expanding gas-based distributed power systems.

The Green Challenge: Making New and Renewable Energy a Priority

New and renewable energy are important energy sources that can help the country increase its energy self-sufficiency. They can be domestically produced and will never be depleted. Moreover, they are carbon-free and clean, which will contribute to the mitigation of climate change. With new and renewable industry itself growing at an annual average rate of 20 percent or more, this sector provides great opportunities and is expected to serve as the country’s new growth engine.

The South Korean government will continue to exert great efforts on fostering new and renewable energy so that they can serve as the country’s main energy sources in the future. The government will especially concentrate its efforts on revitalizing the new and renewable energy industries that were hit hard by the European financial crisis in 2012.

First of all, the government will increase the supply of new and renewable energy in production of electricity and contribute to creating a larger market by seamlessly implementing the renewable portfolio standard (RPS). It has only been a year since RPS was adopted, but new facility capacity has already been increased by 620 megawatts, and this figure is nearly half of the accumulated quantity under FIT (feed-in tariffs) over the last ten years.

Moreover, in order to create a new market in the heat and transportation sector, the government is reviewing policy measures such as the renewable policy standard (RPS) and renewable heat obligation (RHO) that will support that end. The government will expand implementation of the “new and renewable energy compulsory installation system,” which is expected to promote private investment by creating demand for new and renewable energy in the public sector. The government aims to help South Korean companies strengthen their competitiveness by fostering R&D, operating large-scale test sites, and assisting localization of parts and components so that the companies will be able to export their technologies and products in the future.

A Master Plan and a Vision for National Energy Policy

Within this year, the South Korean government will integrate all of its energy policies introduced above and establish its second “Energy Master Plan” that will include its mid- to long-term vision for a new energy mix. This plan will allow the country to ensure energy security and efficiency, and, at the same time, help the country outline a smart strategy to address environmental and safety concerns. Moreover, the government will continue to foster the energy industry so that it can play a central role in promoting a “creative economy.” Last but not least, the government will strive to effectively communicate with the South Korean people in the making of these policies to win their support and trust. ■

Seung Il Cheong

“To minimize social and economic costs, the government will be developing and investing in such technologies as integrated gasification combined cycle with carbon capture and storage.”

Background

Seung Il Cheong is South Korea’s Director General for Energy Industry Policy in the Ministry of Trade, Industry and Energy (MOTIE). Over the years, he has also held several other important posts in MOTIE, including Director of the Radioactive Waste Division, Director of the Semiconductor Electricity Division, Director of the Gas Industry Division and Chief of Staff to the Minister. He also served as a Commercial Counselor for the Korean Embassies in the United Kingdom from 2000 to 2004 and in the USA from 1997 to 1998.

Education

Seung Il Cheong is a graduate of Seoul National University, where he earned his Bachelor’s and Master’s degrees in business administration.

Award of Merit

In 2006, Seung Il Cheong received South Korea’s Service Merit Medal for his outstanding contributions to the country and its people. The Service Merit Medal is one of the most recognized and honorable medals, comparable to the US Congressional Gold Medal.