



# IEEJ e-NEWSLETTER

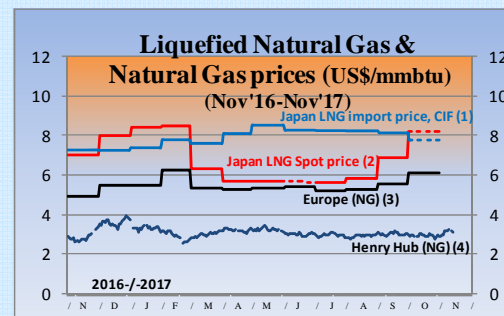
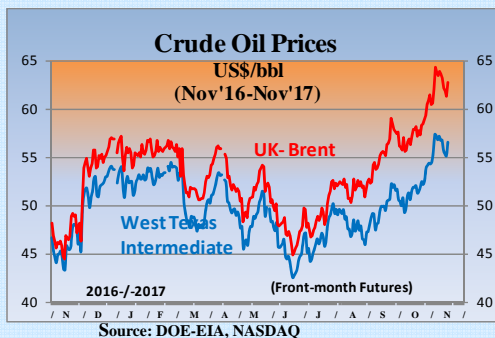
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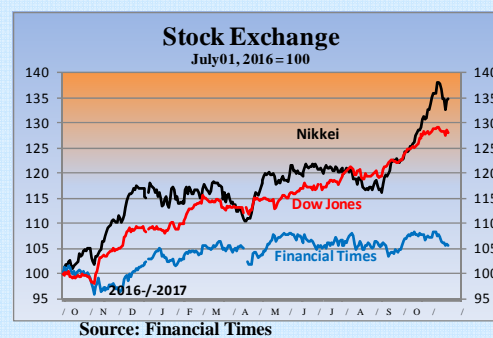
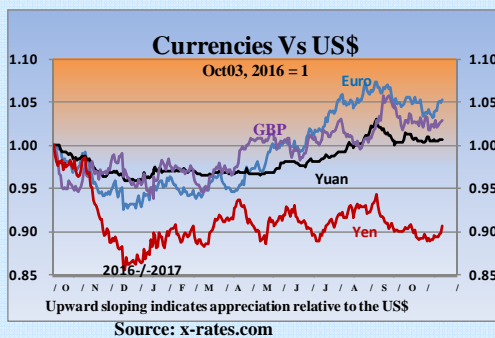
The Institute of Energy Economics, Japan

(As of November 17, 2017)



Sources:

- (1) Ministry of Finance "Japan Trade Statistics"
- (2) Ministry of Economy, Trade and Industry (contract month basis)
- (3) Estimated by World Bank and World Gas Intelligence
- (4) DOE-EIA, NYMEX (Front-month Futures)
- (5) Investing.com



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## Summary

### **1. Key Points of the IEEJ Outlook**

The IEEJ Outlook 2018 forecasts the global supply and demand for energy in 2050 based on two major scenarios. The possibility of peak oil demand and long-term climate change were analyzed as main topics.

### **2. US: Efforts of US Automakers Aimed at the Chinese EV Market**

The federal government is yet to announce a clear policy regarding support for automobile technologies, but the two major automakers Ford and GM are ramping up their sales strategies for EVs and other innovative automobiles in the Chinese market.

### **3. EU: Electric Vehicles in Europe**

A number of European governments have announced plans to ban new gasoline and diesel cars, raising expectations for the accelerated take-up of EVs. Specific actions by governments and companies hold the key going forward.

### **4. China: Becoming an NEV Powerhouse through Institutional Reform**

China made the final decision to introduce the NEV sales ratio regulations and credit trading system. NEV credits can also be used to meet fuel regulations. China aims to efficiently transform into an auto manufacturing powerhouse by introducing this unique system.

### **5. Russia: Moves to Strengthen Ties with Saudi Arabia and Others**

Russia is rapidly strengthening ties with Saudi Arabia and Turkey. Attention must be paid to its development, including the impact on the Russian economy as well as US diplomatic policies toward Saudi Arabia and Turkey.



## 1. Key Points of the IEEJ Outlook

**Shigeru Suehiro**, Senior Economist  
Manager, Econometric and Statistical  
Analysis Group(ESA), The Energy  
Data and Modelling Center

### Overview of the global energy market through 2050

As the global economy expands through 2050 at an annual rate of approx. 3%, global energy demand will continue to increase at a lower rate of about 1%. In the Reference Scenario based on existing policies and technology trends, the supply-demand situation will remain unchanged with non-OECD countries of Asia accounting for roughly two-thirds of the demand growth through 2050. China's energy demand will peak in the mid-2040s and the center of demand growth will shift to India and the ASEAN thereafter.

Three-quarters of the additional energy demand will be concentrated in fuels for power generation and transportation. The soaring demand for electricity in developing countries will be covered mainly by thermal power, which will drive growth in fossil fuel consumption alongside transportation fuels for automobiles and ships. The energy market's dependence on fossil fuel will remain at around 80% even in 2050, and energy-related CO<sub>2</sub> emissions will be 30% higher than current levels.

On the other hand, the Advanced Technology Scenario, which is based on the maximum introduction of cutting-edge energy and environmental technologies, can reduce energy consumption by 13% by 2050 compared to the Reference Scenario mainly by improving energy efficiency in the transportation and electricity sectors. Mainly through electricity-related reductions (non-fossil power sources, thermal power with CCS, decrease in demand, and improved transmission efficiency), CO<sub>2</sub> emissions will start to decrease in the mid-2020s but will still be far from halving by 2050.

### Pursuit of a practical long-term approach to climate action

Climate change is an ultra long-term challenge affecting wide-ranging areas, and thus requires sustainable measures. In terms of sustainability, it will be essential to minimize total cost, which is the sum of the costs for mitigation, adaptation, and damage.

In the "minimum cost 2°C path" which keeps the rise in global temperature within 2 degrees Celsius in 2150 at the lowest cost, the total cost would be about 20% higher than the minimum cost path without temperature constraints (a rise of 2.6 degrees C), but it will still be half that of the path for halving GHG emissions in 2050 (a rise of 1.7 degrees C). However, achieving the "minimum cost 2°C path" will require introducing innovative technologies such as CO<sub>2</sub>-free hydrogen energy, and drastic cost reductions through international cooperation will be the key.

### Examining the possibility of peak oil demand

Some consider that peak oil consumption may be caused by a fundamental reinforcement of environmental measures due to demand side factors, rather than resource constraints. If zero-emission cars increase to 30% of global sales of new automobiles in 2030 and 100% in 2050, oil consumption will peak in around 2030 and decrease to around the present level by 2050. A change in the current market assumptions of supply-demand easing and demand



growth may cause oil prices to fall substantially. A drastic drop in oil revenues caused by plummeting prices and low exports could destabilize the economies of oil-producing countries, and so their diversification is essential. If pessimism about the future of the oil market causes investments in supply to stagnate, a lack of investment and the supply-demand gap could cause prices to soar, which in turn may cause a shift away from petroleum. Ensuring steady and sufficient investment is important in all demand scenarios.



## 2. US: Efforts of US Automakers Aimed at the Chinese EV Market

**Ayako Sugino**, Senior Researcher  
Electric Power Group  
Fossil Fuels & Electric Power Industry Unit

In 2009, the Obama administration set a goal to "get one million EVs and plug-in hybrids on the roads by 2015" and backed large subsidies for improving battery performance, building charger infrastructure, and boosting sales. The resulting improvement in battery performance and price reductions have increased the take-up of EVs, as symbolized by the success of Tesla, but sales remain at around 400,000 units as of end-2015, far from the target of one million. The situation was attributed by some to the fall in competitiveness of EVs due to plummeting gas prices and misprediction of the timing of auto replacement by US consumers, on which the target was based. Since then, the government has announced no goals for spreading EVs, and nine months since inauguration, the Trump administration is yet to clearly indicate which automobile technology the US is going to support for cars sold in the country. The current focus of the US automobile policy is setting safety standards for the pilot program and commercialization of self-driving cars, while discussions on the fuel policy are focusing on revision of the excessive biofuel targets.

Under such circumstances, since the summer of 2017, Ford Motor has been prioritizing EVs as part of its revised global strategy, pursuing a cruise range target for EVs and centering its sales expansion strategy on the development of EV trucks in the Chinese market. Further, in October, General Motors announced a new production plan for EVs and fuel cell vehicles to respond to the demand in the Chinese market, which is on the way to becoming the world's largest EV market as the country looks at the possibility of banning gasoline vehicles in the long term. Apparently, the two major US automakers see China as the main battlefield for EVs, as if the US market is being put aside and losing influence in the auto industry. It remains to be seen whether this image is accurate.

Since the establishment of the Clean Energy Research Center based on the 2009 US-China governmental agreement, the development and expanded use of clean energy vehicles has been selected as one of the focus areas. The US government has spent 150 million dollars from its initial budget from 2011 to 2015 on the development of clean energy vehicles. The University of Michigan and many US auto-related companies are participating in the effort, with the US DOE sitting on the steering committee. In 2014, the University of California launched a consortium for developing and commercializing zero emission vehicles with the China Automotive Technology and Research Center, backed by the California Air Resources Board and the National Development and Reform Commission of China. Under this framework, China researched the auto fuel standards and subsidization policy for innovative vehicles of the US government and the ZEV (zero emission vehicle) regulations of California, and the results of the research helped shape the NEV and CAFC regulations that the Chinese government announced in 2016. EV makers including Tesla have also reportedly approached the State Grid Corporation of China to standardize interfaces with the EV charger infrastructure that the state-run company is constructing.

China's development of its EV policy and system based on those of the US is a typical process of policy transfer or policy learning, and in the process, US companies may have led some regulations to be more beneficial for themselves. Attention must be paid to how US companies improve their EV development and production in the Chinese market, bring them back into the US market and boost the take-up of EVs at home.



### 3. EU: Electric Vehicles in Europe

**Kei Shimogori**, Researcher  
Nuclear Energy Group, Strategy Research Unit

On October 12, the UK Department for Business, Energy & Industrial Strategy announced the Clean Growth Strategy. It is considered an important component of Britain's ongoing modern Industrial Strategy, and contains policies and proposals for spurring Britain's effort to achieve its target of reducing GHG emissions by at least 80% against 1990 levels while concurrently accelerating economic growth. The Strategy includes policies and proposals for speeding up the transition to low carbon transportation, including ending the sale of new conventional gasoline and diesel cars by 2040, spending 1 billion pounds to support the take-up of ultra low emission vehicles including pure EVs, fuel cell vehicles, and plug-in hybrids, and investing an additional 80 million pounds to support the deployment of charging infrastructure with the government taking new powers under the Automated and Electric Vehicles Bill to set requirements for the provision of charging points. The British government also pointed out that one out of every five battery-driven EVs was made in Britain in 2016 and Britain exported around 2.5 billion pounds worth of low emission vehicles in 2015, and emphasized that it will work harder to reduce the cost of batteries and EVs for future economic growth.

In Europe, following France's July announcement to ban the sale of gasoline and diesel vehicles by 2040, in October, the Netherlands announced plans to ban gasoline and diesel cars by 2030 to shift to battery-driven cars while Slovenia approved an alternative fuel strategy to ban the sale and registration of new gasoline and diesel vehicles beyond 2030. German Chancellor Merkel also suggested in August the intention to ban the sale of gasoline and diesel vehicles in the future, but without specifying when. However, while policies have been announced, it must be noted that specific actions remain uncertain. The front-runner of EV sales in Europe is Norway, where EVs accounted for 22.5% of new car sales in 2015. The Norwegian government aims to make all new cars zero or low emission by 2025, and is implementing initiatives such as offering purchase subsidies (through related tax breaks) and financial support for introducing chargers, and allowing the use of toll roads without charge. European governments are accelerating moves to promote EV and other zero/low emission vehicles in Europe. Going forward, attention must be paid to specific efforts aimed at achieving targets, as well as studying and developing systems.

The European Commission has long been prioritizing transportation electrification in its research program, and clearly indicated this direction in the European Economic Recovery Plan in 2008. Automakers Volvo Cars and Jaguar Land Rover have announced that they will electrify all of their new cars from 2019 and 2020, respectively. Further, Shell has announced the purchase of Europe's largest EV charger company, New Motion, to prepare to enter the promising EV market. As the series of government announcements fuel expectations for the spread of EVs, governments and companies are expected to present specific measures for addressing the major challenges of EVs, such as high prices and improvement of the charger network.



## 4. China: Becoming an NEV Powerhouse through Institutional Reform

**Li Zhidong**, Visiting Researcher  
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In July, Britain and France announced that they would end the production and sale of gasoline and diesel vehicles by 2040. This may mark the turning point toward an accelerated global shift to electrified next-generation vehicles (New Energy Vehicles, or NEVs, which include EVs, PHEVs, and FCVs). In October 2016, China established a target to increase the ratio of NEVs in total auto sales to 40-50% in 2030 from 1.3% in 2015, though without specifying when it will ban internal combustion engine vehicles. Further, on September 27 this year, the government released the Management Regulation for Corporate Average Fuel Consumption (CAFC) and New-Energy Vehicle (NEV) Credits, taking the decision to simultaneously introduce NEV and CAFC regulations and their respective trading systems. Though details need to be studied, this is the first time in the world for this or any other similar system to be introduced at a national level.

Under the NEV regulation and credit trading system, NEV credit trading will be introduced by assigning the target companies a required NEV sales ratio (and the requirement to obtain the matching credits) against the annual sales of engine vehicles, namely 10% in 2019 and 12% in 2020. In calculating NEV credits, cars with higher performance (longer cruising distance of battery) and lower power consumption are allocated more credits. Companies achieving more than the requirement will earn salable (but not transferrable to the next year) credits (for EVs only; not applicable to PHEVs and FCVs). Any company failing to meet the requirement must pay for the shortfall with NEV credits purchased on the market. Meanwhile, under the CAFC regulation and credit trading system, CAFC credits trading will be introduced for companies that are subject to the CAFC regulation. As an incentive for NEVs in the CAFC calculation, an NEV's fuel consumption is counted as zero, and one NEV is counted as five engine cars in 2017 and two such cars in 2020 (as NEVs increase, fuel consumption is divided by a greater number of cars, lowering the CAFC). Any company surpassing the requirement will be awarded credits with a three-year expiry limit and which are allowed to transfer (relative trading) to automobile-related companies with capital tie-up. If the requirement is not met, a company must offset the shortfall with its own CAFC credits and those transferred from affiliated companies, and NEV credits including those purchased from the market. The Regulation stipulates that NEV credits can be used to achieve CAFC targets, but not the other way round. As a penalty for nonattainment common to both regulations, restriction of sales of new products and punishment of the company based on relevant regulations are stipulated. The NEV credit trading system will be launched in 2019, and that for CAFC in 2018.

Since the release of the draft Management Regulation on September 22, 2016, it has been pointed out in China that allowing the use of NEV credits for achieving the CAFC regulation would blur the intended goals of the respective regulations, which are to improve fuel economy and promote NEVs, making it difficult to verify their true effectiveness. Many also think that the grounds for offsetting excess NEV credits (counted in units of vehicles) with CAFC credit shortages (measured in L/100km/unit) are unclear (see the November 2016 edition of this Newsletter). The system has also been criticized by the auto industries of Japan, the US, and Europe, which are ahead in internal combustion engine vehicles, that the NEV



ratio is too high. Nevertheless, the Chinese government did not change the NEV ratio, and introduced the system with only a minor modification of postponing the start by one year to 2019. Through this globally unique institutional reform, China aims to accelerate market competition for promoting NEVs following the ban on engine vehicles announced by Britain and France, while simultaneously shifting the center of development from foreign companies to domestic ones, for China to transform efficiently from a major car manufacturing country to a car manufacturing powerhouse. The developments in this area and their impact will continue to be monitored.





## 5. Russia: Moves to Strengthen Ties with Saudi Arabia and Others

**Sanae Kurita**, Senior Researcher  
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As the stand-off with the West over Ukraine remains stalled, Russia's Middle East policy and strengthened relationships with the region are receiving attention. From October 4-7, King Salman visited Russia, the first Saudi King to do so, for talks with President Putin. The countries signed in total 14 economic and military agreements. Regarding economics, the countries agreed to establish a joint fund (\$2 billion) for investment in energy and high-tech areas, whereas in the petrochemical and gas area, Russia's largest petrochemical and gas company, Sibur, and Saudi Basic Industries Corporation (SABIC) agreed to build a petrochemical plant in Saudi Arabia (\$1.1 billion). Regarding gas, Gazprom and Saudi Aramco signed a memorandum of international cooperation in all areas, namely gas development, production, transport, storage, and LNG. The two countries also discussed extending the current oil production cut, which is scheduled to end in March 2018.

Several agreements were also signed in the military sector (\$3 billion in total). In the weapons purchase deal this time, the countries agreed on the sale of the advanced anti-aircraft missile S-400 to Saudi Arabia, and a memorandum was signed between Russia's state weapons export company Rosoboronexport and the Saudi military-industrial complex on the purchase of AK-103 Kalashnikov assault rifles and their production in Saudi Arabia. The countries also agreed on the Russian supply of multiple-launch rocket launchers, anti-tank missiles, and grenade launchers to Saudi Arabia. Behind the bilateral military cooperation is believed to be Saudi Arabia's major goal to foster a domestic military industry and create jobs under Vision 2030, the economic reform led by Crown Prince Muhammad of Saudi Arabia, for which Russia's proposals were the most suitable. Attention must be paid to how the series of agreements with Russia will affect US-Saudi relations.

Turkey is also strengthening its ties with Russia. In August 2016, Russia and Turkey agreed to normalize relations, and in May 2017, started construction of the section of the Turk Stream gas pipeline passing through the part of the Black Sea in Russian territory. Further, on September 12, 2017, the countries signed an agreement for the purchase of S-400 anti-aircraft missiles. Meanwhile, the US Department of Defense had been warning Turkey, a member of the North Atlantic Treaty Organization (NATO), against purchasing weapons from non-NATO countries. US-Turkey relations have been deteriorating quickly over Fethullah Gülen, whom Turkey believed to be the mastermind behind the 2016 coup. Turkey's decision to buy weapons from Russia has further widened the crack between Turkey and the US, and on October 8, 2017, both countries stopped supplying visas for the other country.

Russia has been suffering negative growth due to low oil prices and political confusion, but according to the IMF economic outlook released in October, the country's GDP growth rate for 2017 is expected to turn positive to 1.8%. However, the growth rate is likely to remain at 1.5% until around 2021 due to structural economic problems including the continuation of low oil prices, depopulation, and overdependence on the oil and gas sector. As the West's sanctions continue and prospects remain bleak, attention must be paid to whether business with Saudi Arabia and Turkey in energy and military areas will help the Russian economy to recover. Further, the abovementioned moves of these countries to strengthen ties with Russia, and their impact on US policy toward Saudi Arabia, Turkey, and Russia, must be closely monitored.



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