

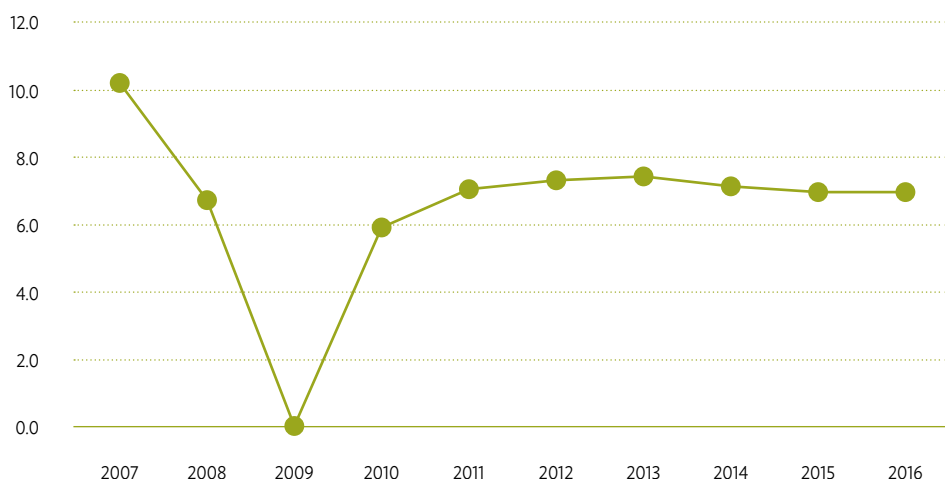
# OIL

## 1.1 Issues and required policies for petroleum products on the demand side

### 1.1.1 The demand trend

Cambodia has attained high economic growth since 1999. Although growth was temporarily stagnant due to the global financial crisis in 2009, it continued to increase by 7% from 2011 onwards. According to the International Monetary Fund and the Asian Development Bank, the Cambodian economy is expected to continue growing steadily, supported by strong domestic demand.

**Figure 1.1** Real GDP Growth Rate of Cambodia



GDP = gross domestic product.

Source: International Monetary Fund.

Economic growth has increased demand for petroleum products, and petroleum product imports have continued to increase. From 2012 to 2016, the demand for petroleum products increased by 7.2% per year. Amongst them, gasoline, diesel oil, and liquefied petroleum gas (LPG), which are the main products, showed high growth rates of 6.1%, 8.4%, and 23.0%, respectively.

Furthermore, according to the demand forecast by the Economic Research Institute for ASEAN and East Asia (ERIA), the total demand for petroleum products in the year 2040 is expected to be 4,650 kilotonnes of oil equivalent (ktoe) (3.8% growth per year) under the assumption of stable economic growth.

**Table 1.1 Annual Imports of Main Petroleum Products**  
(tonnes)

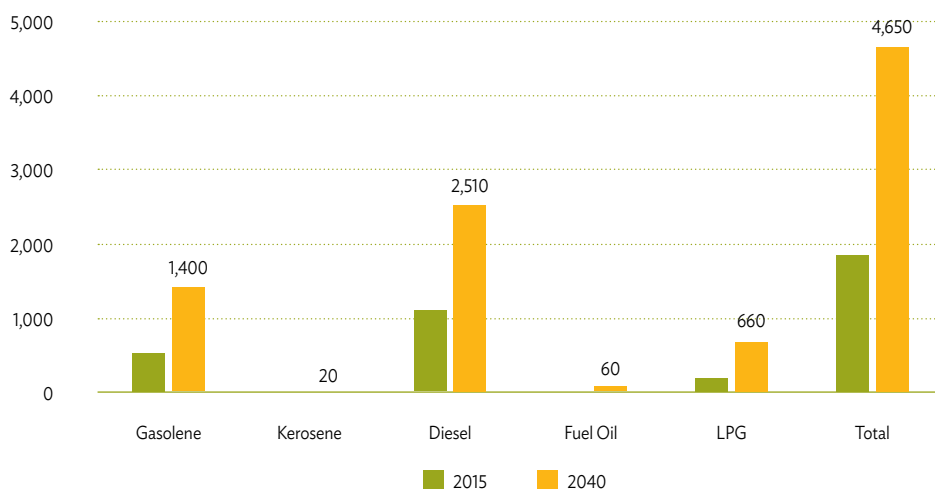
	2012	2013	2014	2015	2016
Gasoline	387,729	392,011	426,830	481,671	490,898
Diesel	897,641	918,437	1,005,484	1,073,248	1,240,184
LPG	84,678	98,692	112,120	162,332	193,595

LPG = liquefied petroleum gas.

Source: Customs Statistics.

Additionally, in the future, gasoline and diesel oil demand for the transportation sector, LPG demand for households, and fuel oil and LPG demand for the industry sector will increase until 2040.

**Figure 1.2 Demand Forecast by ERIA**  
(1,000 ktoe)



ERIA = Economic Research Institute for ASEAN and East Asia, ktoe = kilotonnes of oil equivalent, LPG = liquefied petroleum gas.

Source: ERIA Outlook 2018.

Because Cambodia is in the development stage, it is expected that oil demand may increase more than the economic growth rate at times. Therefore, it is important to consider how to respond to increasing oil demand.

With the expansion of demand, we have to consider the following issues:

- Environmental burden
- Accidents in each field
- Deterioration of the trade balance

There is concern that the environmental burden, such as air pollution, will become worse, and the number of accidents will increase. The trade balance will also worsen due to an increase in imports of oil. Therefore, it is necessary to improve the quality of petroleum products to prevent air pollution and to strengthen the regulations for fire prevention in oil storage, transportation, and sales. In Asia, the environmental burden has increased due to the rapidly rising oil demand in some countries, but measures have been taken when the problem has become serious. It is necessary to implement countermeasures at the appropriate time, taking this as a lesson. It is also important to promote energy saving and alternative energy and take measures to prevent international oil supply disruptions and oil supply shortages due to natural disasters.

### **1.1.2 Action plans and necessary policies on the demand side**

#### **(1) Energy saving in the transport sector**

Energy saving not only improves the international balance of payments by reducing the imports of fossil fuels but also contributes to reducing the environmental burden.

The following are effective examples of action plans in the medium-to-long term:

- Import restrictions on old cars (medium or long-term policy)
- Preferred tax system for fuel-efficient cars (medium-term policy)
- Fuel consumption regulation by type of vehicle (long-term policy)

**Figure 1.3 Example of a Promotion Method for Fuel Efficiency**

Understanding the current situation	Average car age
Improvement target	15 years in 2030
Promotion measures - Import regulation - Inspection regulation - Vehicle tax	Car import ban for 15 years or more Cars over 12 years are inspected every year New-car tax reduction
Annual grasp	Register and discard

Source: Asiam.

Consultation and cooperation with the relevant ministries and agencies, such as the Ministry of Transportation and the Ministry of Economy and Finance, are necessary to implement these action plans.

## **(2) State of demand for petroleum products**

In order to extract the issues and formulate policies, it is important to grasp the actual state of the consumption of petroleum products and recognise the products that are being rapidly expanded. It is necessary to have a system for periodically collecting the required data from oil companies and conducting market research. Also, in future, if we can clarify the data on petroleum consumption intensity for each sector, the targets for fuel efficiency and alternative energy will be clearer.

## **(3) Promotion of alternative energy**

Biogasoline, electric vehicles (EV), electric bikes (EB), and compressed natural gas (CNG) have the effect of decreasing oil demand. The balance between the benefits of reducing oil imports and the costs of introducing alternative energy should be studied, and, in order to assess the benefits, a pilot project should be considered.

#### **(4) Establishment of the quality specifications for petroleum products**

The quality of petroleum products is also an issue on the supply side, but quality assurance is an effective policy for reducing the environmental burden, such as air pollution associated with the expansion of demand. Quality should be gradually improved while looking at the circumstances of neighbouring countries.

#### **(5) Strengthening of regulations aimed at preventing accidents**

There is a risk that accidents will increase due to the expansion of oil demand. Regulations are required to prevent accidents in the fields of oil storage, transportation, sales, and consumption. Especially for LPG, since accidents at the consumption stage have been increasing, consumer awareness is important.

## **1.2 Issues and required policies for petroleum products on the supply side**

### **1.2.1 The supply situation**

Cambodia currently imports 100% of its petroleum products. The import sources are mainly Thailand, Viet Nam, and Singapore. Quality specifications of petroleum products have not been established, so there are variations in the quality of imported goods.

Meanwhile, the construction of a domestic refinery is planned by a private enterprise. Because this refinery is small in size, there is a possibility that it will be subject to severe competition from imported goods. Having refineries in the country is important for energy security, but it is necessary for the refineries to be competitive with refineries in the Association of Southeast Asian Nations (ASEAN) region. There are large refineries in Asia, as shown in Table 1.2.

**Table 1.2 Asia's Large Refineries**

Country	Company	Location	Cap. 1,000b/d
Korea	SK energy	Ulsan	840
Korea	GS caltex	Yeosu	785
Korea	S-OIL	Onsan	669
Korea	Hyundai	Daesan	390
Singapore	Exxon Mobil	Jurong	593
Singapore	Shell	Bucom	462
Singapore	SPC	Merlimau	290
Taiwan	FPCC	Unrin	540
Taiwan	CPC	Darin	300
Taiwan	CPC	Takao	220
Taiwan	CPC	Toen	200
Thailand	Esso	Sriracha	177
Thailand	BCP	Bangchak	120
Thailand	TOC	Sriracha	275
Thailand	PTT	Map ta Phut	280
Thailand	IRPC	Rayong	215

B/d = barrels per day.

Source: Ministry of Economy, Trade and Industry, Japan.

## 1.2.2 Action plans and necessary policies on the supply side

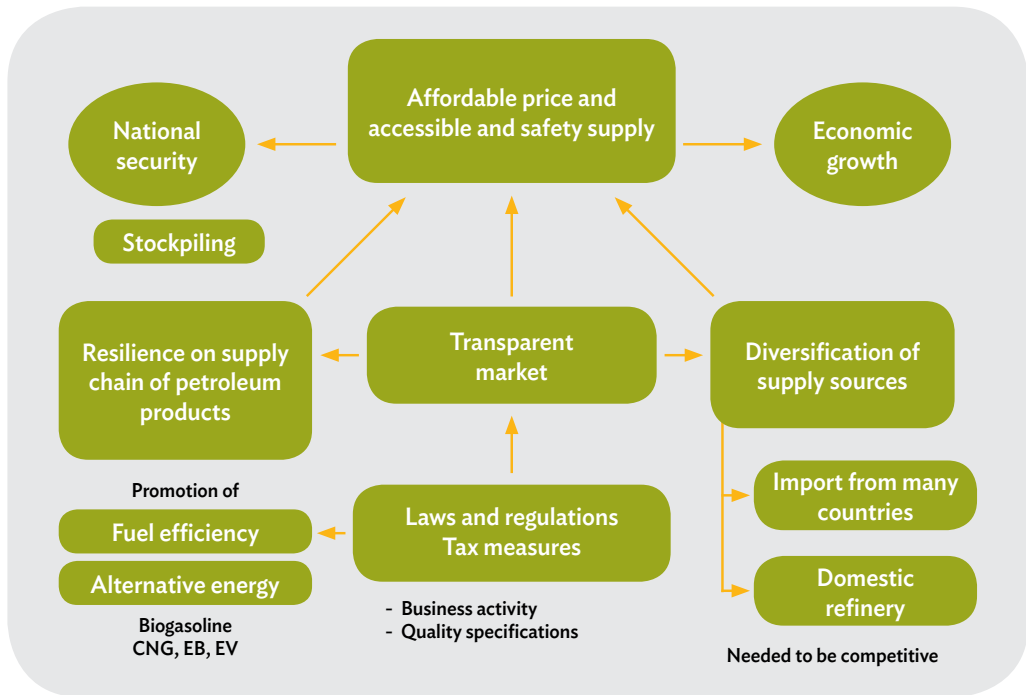
The most important objectives are affordable prices and an accessible and safe supply of oil. This will contribute to national security and economic growth and will be achieved through a transparent market. The relevant agencies and companies can contribute to the petroleum market data on supply and demand and prices.

A transparent market will promote the following:

- The diversification of supply sources
- Resilience in the supply chain of petroleum products

Laws and regulations and a preferential tax system are the platform of a transparent market and also contribute to ensuring safety and the promotion of fuel efficiency and alternative energy. In order to advance these policies, cooperation with the related ministries and agencies is necessary.

**Figure 1.4** Summary of the Issues and Policies on the Supply Side



CNG = compressed natural gas, EB = electric bikes, EV = electric vehicles.

Source: Author.

## (1) Early promulgation and the implementation of laws and regulations

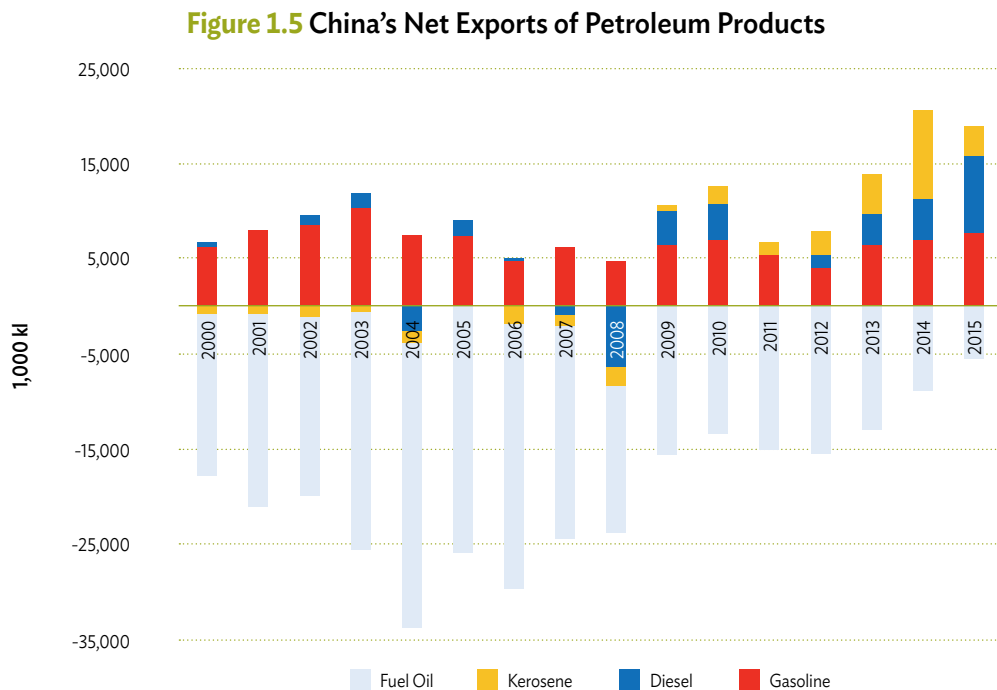
Laws and regulations are the platform of a transparent market and contribute to ensuring safety. The following laws and regulations are ready, and early promulgation and implementation are expected:

- Petroleum Law
- Sub-decree on Licenses and Permit Letters
- Specifications of petroleum products
- Assurance of quality of petroleum products
- Technical Regulation on Storage Tanks
- Technical Regulation on Petroleum Service Stations
- Technical Regulation on Bottling Stations of LPG
- Technical Regulation on Storage of LPG

## (2) Diversification of supply sources

The oversupply of petroleum products in China, the Republic of Korea (hereafter, Korea), Taiwan, India, and the Middle East is expected to continue in the medium term, and Cambodia should seek cheap procurement sources. The diversification of supply sources also contributes to energy security. Understanding the price formulas of importing petroleum products is important. In an oversupply environment, it is encouraged that importing companies look for the appropriate procurement sources.

→ China's export volume of petroleum products is over 15 million kilolitres (kl) per year.



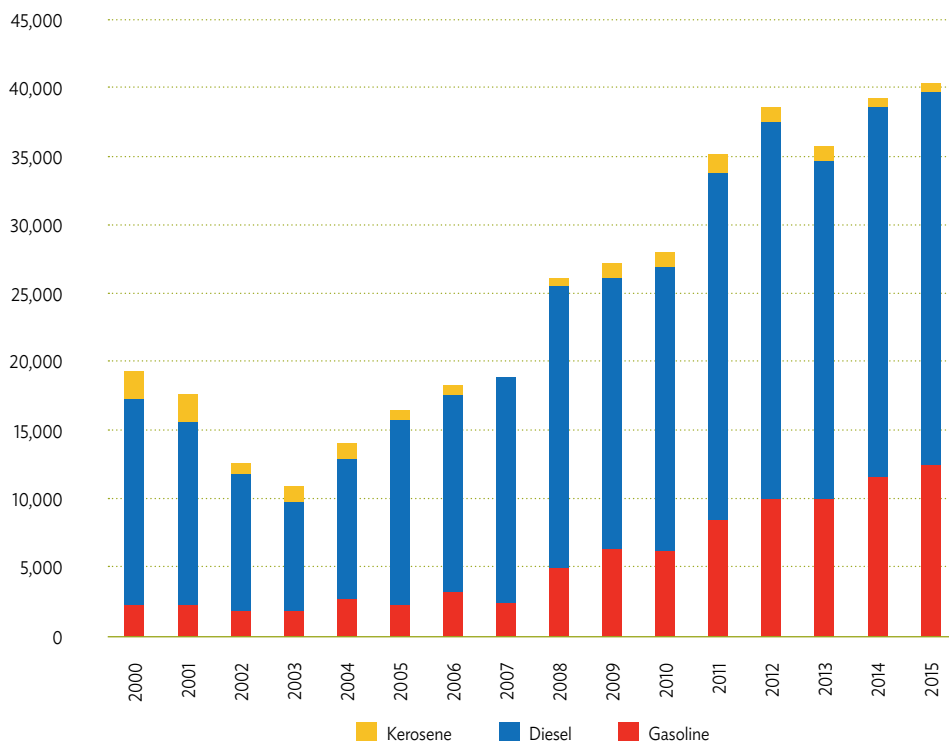
kl = kilolitres.

Source: Asiam.



→ Korea's export volume of petroleum products is over 40 million kl per year.

**Figure 1.6** The Republic of Korea's Net Exports of Petroleum Products  
(1,000 kl)



kl = kilolitres.

Source: Asiam.

### (3) Promotion of a transparent market

Currently, Cambodia lacks statistical data on the oil market. For statistical data on supply and demand, although the energy balance table has been developed, it must be continuously updated and further improved in its level of detail, such as for petroleum demand and supply data on both a yearly and monthly basis. It is also necessary to further improve the data, such as on the number, size, and location of oil terminals, LPG bottling stations, gas stations, and petroleum service stations, etc. Increasing market transparency will lead to the following:

- Resilience of the supply chain of petroleum products
- Investment opportunities for market participants
- The fostering of a strong and active oil industry

Such a market environment will contribute to affordable prices and an accessible and safe supply.

#### **(4) Quality assurance of petroleum products**

##### **→ Establishment of quality specifications**

Currently, since Cambodia imports all its petroleum products, it is necessary to check the specifications of the exporting countries and determine the specifications for Cambodia, taking into consideration the balance between the purchase price and the environmental burden, as high-quality products have high prices.

##### **→ Promulgation of the *prakas* (regulations)**

Based on the Petroleum Law, restrictions on quality assurance at the time of storage, transfer, and sale of petroleum products should be conducted.

In the *prakas*, the following shall be stipulated.

##### **Clarification of who is obligated**

The refinery (petroleum products producer), oil terminal, petroleum service station, gas station, or LPG bottling station should be obligated to ensure quality.

##### **Designation of inspection centres**

The Ministry of Mines and Energy (MME) should designate inspection centres with capacity and experience. Those obligated to ensure quality must periodically undergo inspection by the MME. The inspection centre performs quality inspection practices by receiving consignments from the MME. Refineries, oil terminals, petroleum service stations, gas stations, and LPG bottling stations can also ask for inspections from inspection centres.

##### **Inspection items**

In order to shorten the time required for inspection and to reduce the inspection costs, inspection items should be set and be subject to inspection.

#### **(5) Stockpiling of petroleum products (including crude oil)**

Currently, importing companies are carrying out commercial stockpiling for 30 days according to the *prakas* by the Ministry of Commerce. This should be executed reliably by the Petroleum Law to ensure industry stock (strategic petroleum reserves by private companies). Oil stockpiles are an effective means of countering the risk of disruptions in international markets, such as sudden crude oil supply shortages due to accidents and natural disasters, and it is necessary to gradually strengthen oil stockpiles. Also, the

national stock (strategic petroleum reserves by the government) should be considered in the medium or long term. There are also low-cost methods, such as ticket stockpiling in foreign countries, and various options that should be considered.

## **(6) Introduction of biogasoline (E3)**

Cambodia has crude oil resources, but their development will take time. There are no oil-refining facilities in the country at the present time, and all petroleum products depend on imports, which is a critical issue for the national trade balance.

Because of this situation, biogasoline, as a domestically produced liquid fuel, is important for the improvement of the national trade balance and energy supply security. The development of biogasoline can form an industry chain of cassava cultivation, bioethanol manufacturing, and biogasoline production. The promotion of biogasoline contributes to improving farmers' incomes, reducing gasoline imports, and reducing greenhouse gases.

The key to successfully introducing biogasoline into Cambodia is to reduce the production cost of cassava as a raw material, reduce bioethanol production costs, and promote the consumption of biogasoline. Establishing bioethanol policies and related regulations, such as biogasoline specifications, safety regulations, and roadmaps, is also required. To achieve these policy objectives, cooperation between the related ministries and agencies is indispensable.

Regarding the quality specification of biogasoline, it is preferable to upgrade step by step to ethanol protection engines, such as from E3 to E5 and E10, according to vehicle speed. E3, which is blended ethanol 3%, should be the first step because E3 has no effect on old cars. In order to introduce biogasoline into Cambodia, it is necessary for the government to encourage it by providing some incentives, and the promotion of a pilot project would also be effective. The primary goal of the pilot project would be to catch the issues that may occur during the initial deployment and promptly take effective countermeasures.

- Targets of the pilot project:
  - Catch issues and consider countermeasures
  - Secure the ethanol supply chain
  - Improve public consciousness
  
- Benefits of the introduction of biogasoline:
  - Agricultural industry development
    - Increase in cassava demand → increase in farmer income
  - Improvement of the trade balance
    - Reduction in the outflow of Cambodian monetary assets
  - Improvement of energy security
    - Reduction in reliance on imported fossil fuels
  - Greenhouse gas reduction
    - Bioethanol can replace gasoline consumption and reduce CO<sub>2</sub>

## **(7) Resilience of the supply chain of petroleum products**

Based on the medium-to-long-term forecast for the demand for petroleum products, the government needs to prepare a petroleum supply plan.

The objective of the petroleum supply plan is to consider optimal logistics measures, assuming the scale, location, and timing of the new expansion of the oil supply base. This will lead to resilience of the supply chain of petroleum products.

- A reasonable supply plan should be considered based on the demand assumptions by province.
- The supply plan should include new or expansion plans for refineries, import terminals, and secondary terminals and their locations, sizes, and timing.
- The optimal means of transportation should be studied, such as tank trucks, ships, railroad, and pipelines.

The above are the optimal logistics based on the supply plan.

**Table 1.7 Roadmap**

	2019	2020	2021	2022	23-26	27-30
Petroleum Law	→					
Sub-decree	→					
Prakas	→					
Quality assurance	Prakas →	Prepare →	Operation of inspection center step by step →			
Biogasoline	Draft → Policy of MME →	Prepare → Pilot project →		Nationwide E3 →	E5, E10 →	
Supply Plan	Preparation →		Grasp actual condition every year and to be revised →			
Stockpiling	Certain execution 30 days step by step →				SPR 5 days →	→

Source: Author.

### 1.3 Conclusion

Oil demand in Cambodia has increased rapidly in recent years, and it is expected that it will continue to increase with economic growth in the future. With the expansion of demand, we have to consider the environmental burden, the accidents in each field, and the deterioration of the trade balance. It is necessary to take countermeasures at an appropriate time before problems become serious. It is also important to promote energy saving and alternative energy sources and take measures against international oil supply disruptions and shortages due to natural disasters.

The action plans and necessary policies on the demand side are as follows:

- (1) Energy savings in the transport sector through the promotion of eco cars
- (2) Grasping of the actual state of demand for petroleum products
- (3) Promotion of alternative energy
- (4) Establishment of quality specifications to prevent air pollution
- (5) Strengthening regulations aimed at preventing accidents, including on the supply side

On the other hand, the most important objectives of the supply side are affordable prices and an accessible and safe supply. This will be achieved through a transparent market. This means that the data on supply and demand and prices should be maintained so anyone can access the data on the petroleum market. In addition, laws and regulations and a preferential tax system are the platforms for a transparent market and also contribute to ensuring safety and the promotion of fuel efficiency and alternative energy. Collaboration with the related ministries and agencies is necessary to advance them.

The action plans and necessary policies on the supply side are as follows:

- (1) Early promulgation and implementation of laws and regulations
- (2) Diversification of supply sources
- (3) Promotion of a transparent market
- (4) Quality assurance of petroleum products
- (5) Stockpiling of petroleum products (including crude oil)
- (6) Introduction of biogasoline (E3)
- (7) Resilience of the supply chain for petroleum products