Chapter 4

Future Actions

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CHAPTER 4

Future Actions

As a conclusion of the study, this chapter presents future actions to be taken by ASEAN countries to proceed with stockpiling development.[11] Such actions can be categorised into domestic actions and international actions. This chapter explores the two kinds of actions followed by a model road map for the future actions.

4-1 Domestic Response for Improvement of Oil Stockpiling

The following five steps should be taken for the future improvement of oil stockpiling.

[1] Providing principles and legislation

[2] Developing an accurate and timely data collection system

[3] Founding a specialised organisation

[4] Financing

[5] Selecting an oil stockpiling option

[6] Securing sites and carrying out construction and operations

4-1-1 Providing principles and legislation

The top priority is the determination of a government policy for the improvement of oil stockpiling and the development of the legal system required for the improvement. The investment of large funds and human resources is necessary for the development oil stockpiling. For this reason, basic policies for developing national oil stockpiling must be determined. These include whether oil stockpiling should be improved on a governmental basis or private sector basis at first, whether oil should be stored in the form of crude oil or products, and the degree to which funds and aid should be accepted from foreign corporations and countries. Next, it is necessary to develop the legal system required for mobilising various domestic resources. A legal framework and its rationale must be prepared based on the requirements of oil stockpiling development, such as the formulation of a detailed plan and securement of a budget, and the responsibilities to be taken by the government organs and oil companies.

[11] As mentioned in the Foreword and Chapter 1, the particular geographical focus of this report is on ASEAN. Descriptions in this chapter therefore assume future actions by ASEAN countries.

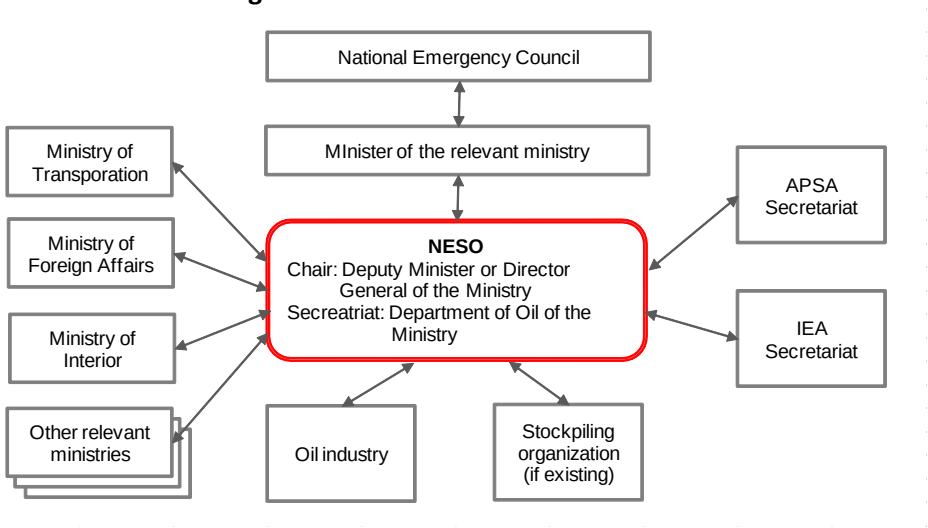
4-1-2 Developing an accurate and timely data collection system

Accurate and timely data on demand, supply, and inventory is important for appropriate policy decisions in every aspect of energy policy. This is also the case for oil stockpiling development. In setting targets for stockpiling volumes, forecasts of the future oil demand and supply balance are required. Needless to say, accurate statistical data are needed to prepare such forecasts. Without an understanding of the kind of oil and the quantity of oil that is domestically consumed, a government cannot effectively determine its oil stockpiling targets. Also, recent trends and projections for oil imports are an important benchmark of the extent to which a country is vulnerable to external oil supply disruptions, and can be used in determining the grade of oil that needs to be stockpiled most urgently. In cases of emergency, accurate and timely statistical data are critical in releasing and allocating a limited amount of oil to the most needy users. Developing such a statistical data collection system is always a challenging task, but it is a highly important condition for developing an effective oil stockpiling system.

4-1-3 Founding a specialised organisation

The next step is establishing an organisation for promoting oil stockpiling based on the provisions in the legal system. In light of its importance in energy security, the organisation in charge of oil stockpiling should preferably be independent. Among the IEA member countries, the National Emergency Strategy Organisation (NESO) exists to control overall emergency response actions and coordinate domestic oil industries and the IEA (see Figure 4-1). Countries planning to newly promote oil stockpiling should establish an organisation similar to NESO to allow smooth coordination between the government parties concerned and industrial circles. Also, it is necessary to clarify who is responsible for the development of domestic oil stockpiling and establish a professional organisation in charge of oil stockpiling to accumulate expertise. When this is done, it is imperative to arrange a sufficient number of full-time personnel.

Figure 4-1. Model Case of NESO



Source: Elliott (2012), modified by the IEEJ.

4-1-4 Financing

Next, funds for the development of oil stockpiling must be secured. A supportive financial base is imperative to allow the practical functioning of the legal system and organisation. To secure such funds, it is necessary to identify a procurement source, and decide whether they should be allocated out of the government budgets or loaned from commercial financial institutions or private corporations. Since two types of funds have to be secured for the construction of stockpiling facilities and operations after completion, the respective fund sources have to be determined. Table 4-1 lists the fund procurement sources in IEA member countries. Looking at the examples, the majority of the countries procure the expenses required for initial improvement of oil stockpiling from government budgets or government-guaranteed financial support. On the other hand, once the oil stockpiling facilities have been constructed, operating expenses are procured from government budgets in half of the countries and by imposing taxes on the industry, such as import taxes, in the remaining half. The method of procuring the funds depends on the particular circumstances in each country, but it is important to create a mechanism that allows for constant and stable securement of the funds.

Table 4-1. Financing Sources for Stockpiling

	Initial set-up costs			Running costs		
	Government budget	Government-backed loan	Bank loans/ bonds	Government budget	Levy on industry	Tax
Austria		X			X	
Belgium			X		X	
Czech Republic	X			X		
Denmark*			X			
Estonia	X				X	
Finland	X					X
France			X		X	
Germany		X			X	
Hungary		X			X	
Ireland			X		X	
Japan	X			X		
Korea	X			X		
Netherlands**		X				X
New Zealand***				X		
Poland	X			X		
Portugal			X		X	
Slovak Republic	X			X		
Spain			X		X	
United States	X			X		

* In Denmark running costs are covered by the financial surplus the Danish stockholding agency built up in the early 1990s in the wake of falling demand and rising indigenous output, together with the amortisation of storage facilities.
** In the Netherlands running costs are covered by a levy on final consumers.
*** New Zealand has not built up a physical reserve for emergencies. The difference between operating industry stocks and the IEA obligation is entirely covered by stockholding tickets. Therefore, there have been no set-up costs.

Source: IEA, Energy Supply Security.

4-1-5 Selecting an oil stockpiling option

The fourth process is the selection of an oil stockpiling option. As described in Chapter 2, although there are four traditional types of oil storage base, it may be preferable for ASEAN countries to begin with a lower-cost option. There are many restrictive factors to promoting oil stockpiling, which differ greatly among countries. These may be geographic conditions, economic efficiency problems, differences in technological capabilities, lack of acceptance from local residents regarding planned construction sites, or depending on the case, required compensation for agriculture- or fishery-related losses. Under such restrictive factors, the best possible oil stockpiling option for each country should take into account the highest-priority factors.

It is also important to conduct a risk assessment at this stage. Identifying the most likely risks, or determining the risks that will have the biggest impact, is necessary for designing the oil stockpiling system in an optimal manner. In particular, assuming a shutdown of a country's largest oil supply infrastructures, such its refineries, receiving terminals, or pipelines, is a useful method to examining the potential impact to a country's oil supply chain.

Among those options, ticket stockpiling is the easiest option to start the development of stockpiling efforts. Ticket stockpiling is an established practice in Europe, and in the Asia-Pacific region, Australia and New Zealand have in fact adopted this option after through examinations of the various stockpiling options. Tickets may be issued by Japan or Korea, which have large storage capacities and surplus stockpiling volumes, or Singapore or Thailand, both of which have large refining capacities and large oil product storage capacities. Because oil demand in ASEAN is highly likely to continue to grow, construction of a permanent stockpiling facility should be pursued in the long run and thus ticket stockpiling should be treated as a temporary measure.

Besides ticket stockpiling, upgrading commercial inventory to oil stockpiling is also a relatively easy option. This option, described in Section 2-2, obligates the currently operating domestic oil companies to hold part of their commercial stockpiles as emergency oil stockpiles. It prompts companies to engage in oil stockpiling by specifying the number of days of oil and the concrete volume of oil according to sales volume that they must stockpile. In doing so, it is important to set the goal at a level that as far as possible does not place excessive burden on their business. In this sense, close communication with oil companies is necessary, even before the introduction of the oil stockpiling system.

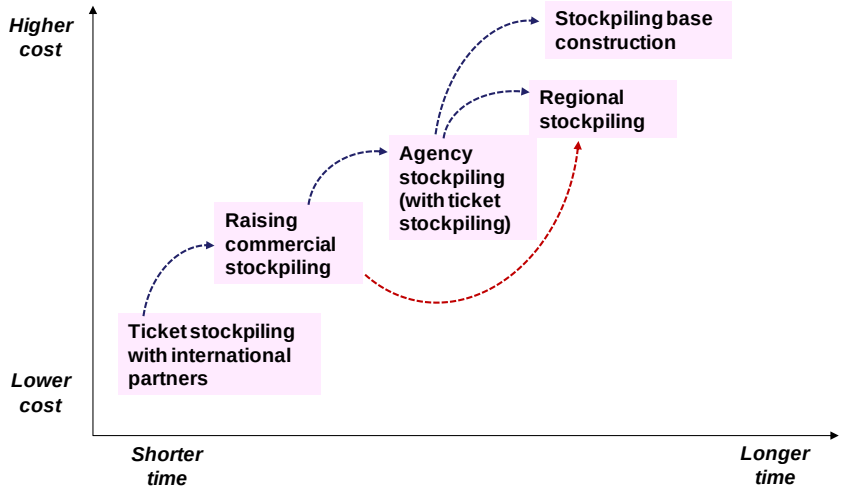
When using commercial stockpiles as emergency oil stockpiling, the target volumes and stockpiling days will increase as the storage capacity goes up on the part of the oil companies. Oil stockpiling development can proceed more smoothly if there is financial support by the government for the improvement and operation of oil stockpiling, as has been observed in Japan or Switzerland. Depending on the case, the implementation of ticket stockpiling with overseas oil companies may be worth considering.

The next possible short-term option is the introduction of agency stockpiling. As explained previously, the greatest benefit of agency stockpiling is that it makes use of economies of scale by establishing one leading body to hold and operate the oil stockpiling. In some ASEAN countries, medium and small-sized import business operators are incapable of single-handedly constructing the necessary facilities for oil stockpiling. The agency stockpiling system would be a significant, viable option for promoting oil stockpiling in such cases. Agency stockpiling is an effective option for facilitating investments in stockpiling facilities. It separates the stockpiling elements from a competitive environment and provides a medium to long-term solution by creating a central organisation specialised in stockpiling. What is important is the securement of funds. For this, the simplest method is to collect a membership fee from domestic oil companies, as is the case in Germany and France.

In ASEAN, regional stockpiling may be the next step. As discussed in previous sections, ASEAN has many good reasons to explore the possibility of regional stockpiling. Combination with international ticket stockpiling, where smaller countries purchase tickets from countries with large storage capacities, may be a relatively easy arrangement.

While developing such short-term options, the construction of an oil storage base or bases should be carried out in the medium and long term. There are four types of oil storage base, as described in Section 2-1, and the best possible type should be selected in line with the peculiar circumstances in each country. However, this is just a medium- to long-term approach. As observed in the cases in Europe and Oceania, emphasis should be initially placed on an approach centring on the improvement of oil stockpiling through private stockpiling, ticket stockpiling, or agency stockpiling.

Figure 4-2. Stockpiling Options for ASEAN



Source: Institute of Energy Economics, Japan.

In considering the oil stockpiling improvement options, an important point is also whether the oil should be stored in the form of crude oil or petroleum products. A merit of oil stockpiling in the form of crude oil is the low cost. This is simply because crude oil is less expensive than petroleum products, resulting in lower initial oil stockpiling expenses. Other factors are that different types of crude oil may be stored mixed together, and the quality does not deteriorate like it does for petroleum products, even after long-term stockpiling, so there is no need to replace the inventory regularly. Furthermore, if stored in the form of crude oil, it is also possible to refine products to a certain extent by adjusting the refining process in cases of emergency.

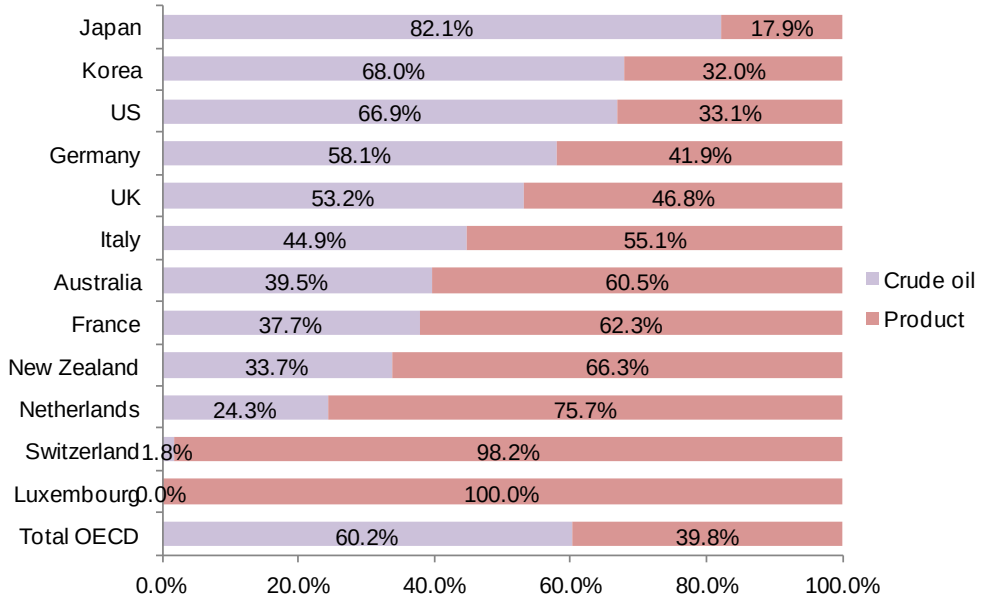
The merits of oil stockpiling in the form of petroleum products include that the necessary products can be supplied in a timely manner to sites that require the products in times of emergency. Except for some uses for power generation, crude oil cannot be consumed directly.

As such, in cases where there are no oil refineries near to locations that need petroleum products, or in cases where an oil refinery is located far away, oil stockpiling in the form of petroleum products is more practical. Furthermore, the oil supply is not always disrupted at the crude oil phase. If it is disrupted due to trouble at oil refineries, the effect of the oil supply disruption can be minimised by storing the petroleum products in advance. However, a problem for storing the petroleum products is the cost. In the case of kerosene or diesel oil, in particular, it is necessary to replace inventory every few years in order to avoid quality deterioration.

The stockpiling ratio of crude oil to petroleum products varies among IEA member countries (Figure 4-3). For domestically stored inventory, Japan has the highest stockpiling ratio of crude oil, at 82.1 percent as of 2014. This is because national oil stockpiling in Japan is mostly in the form of crude oil. The US and Korea also have a high stockpiling ratio of crude oil. This is because, as with Japan, oil stockpiling is mainly implemented on a national basis and crude oil is collectively stored in large-scale national stockpiling facilities, so the crude oil can be refined quickly, even in an emergency, as there is sufficient domestic refining capacity to satisfy domestic demand. For this reason, under such conditions, it would be economically preferable for ASEAN countries to have stockpiles in the form of crude oil.

In Europe, on the other hand, more oil is stored in the form of petroleum products. This is partly due to European Union regulations, which require at least one-third of oil stockpiling to be in the form of petroleum products. Luxemburg stores all its oil in the form of petroleum products. This is because there are no oil refineries in the country. The Netherlands has many domestic oil refineries, but Rotterdam is an oil trading hub in the European market with many domestic product stockpiling facilities, hence the country’s high stockpiling ratio of petroleum products.

Figure 4-3. Share of Crude Oil and Oil Products (as of 2014)



Source: IEA, Oil Market Report, June 2015.

Upgrading the commercial inventory, by obligating a part of the commercial stockpile to be used for oil stockpiling, can be a viable option for ASEAN countries to build an inventory of petroleum products, particularly diesel oil. As domestic refining capacities are developed, oil stockpiling can shift from products to crude, which can be stored at low costs.

In selecting the oil stockpiling option, countries should undergo a comprehensive cost-benefit analysis. As described in Chapter 2, many countries have already made cost-benefit analyses of the individual oil stockpiling improvement options. Oil stockpiling improvement expenses vary greatly depending on the individual factors in each country, but such analysis can be implemented in a relatively easy manner based on already established international methods. This analysis is important as a reference for making a rational final decision.

4-1-6 Construction and operation of an oil storage base

The final process is securing a site and the construction and operation of the oil stockpiling base. Finding and acquiring an appropriate site for stockpiling is always a challenging task. Preferably, the location should be geographically close to the demand centre and linked to existing oil supply infrastructure by pipelines or other readily available transpiration means. Environmental and ecological issues must be thoroughly considered, and most importantly, public acceptance must be gained from the neighbouring local communities. The government may need to play an important role in finding the location and coordinating with the relevant ministries and communities to carry out the construction.

Considering the security implications of the oil stockpiling base, it is preferable to make maximum use of domestic corporations in constructing the oil storage base. Depending on the type of oil stockpiling base, assistance by foreign corporations may be needed to some extent, requiring preparation of an engineering contract to that end. In such cases, an important requirement is to select business operators depending on the extent that the technologies will be transferred from the participating foreign corporations to the host country. Preferably, the base should be mainly operated by the aforementioned specialised organisation (corresponding to NESO). As a transitional measure, however, an option is to entrust the operation of the base to the domestic oil industry.

4-2 International Response Required for the Improvement of Oil Stockpiling

4-2-1 Regional cooperation

While domestic approaches should be encouraged, it is also important to make use of international resources as much as possible. One way is through the regional approach. ASEAN countries have already agreed to a regional framework, APSA, and operationalisation the framework is imperative. APSA is a framework for transferring stockpiled oil during oil supply disruptions. An emergency interchange framework has been also created, modelled after the Coordinated Emergency Response Mechanism of the IEA. However, there have been no cases of actual emergency interchange so far and its operationalisation is an urgent issue. A task force team formed by ERIA in cooperation with ASEAN countries is currently studying this issue. Some of the problems of the present APSA have been identified: there is only a low volume of interchangeable stockpiled oil in the entire region; the requirements for invoking emergency interchange are strict (30-day continuation of a 10 percent supply reduction); an interchange is implemented only in a voluntary and commercial manner; and there is no permanent secretariat. These issues should be assessed for achieving a more effective framework.

Regional stockpiling is one of the regional cooperation items to be considered. While agency stockpiling allows benefits from economies of scale, some ASEAN countries cannot make full use of economies of scale single-handedly due to low domestic demand. Accordingly, international regional stockpiling is worthy of consideration. The specific procedures are as follows:

(1) Agree to an international framework for promoting regional stockpiling

(2) Agree to fund the arrangements for establishing regional stockpiling

(3) Establish a permanent stockpiling supervisory organisation

(4) Construct a base or specify particular existing facilities as a regional stockpiling base

For Step (1), it is appropriate to include such an article in APSA. If the procedure takes time, however, it might be conceivable to conclude an international agreement separately. Step (2) should also be discussed together with the conclusion of such an international framework. An objective sharing ratio should be determined, such as setting a share of expenses according to the oil consumption and oil import volume in each country. For Step (3), the APSA permanent secretariat currently being discussed should be the relevant organisation. Specifically, it will be rational to expand the functions of the ASEAN Centre for Energy, which regulates energy cooperation in the ASEAN region, or those of the ASEAN Council of Petroleum, a body of national oil companies in ASEAN countries. Concerning Step (4), it is of course ideal to install a permanent storage base in the ASEAN region, but it will be difficult to implement in the short run due to the problem of expense. From the viewpoint of regional balance, the most practical idea may be to set up regional stockpiling facilities in the existing facilities in Singapore, as the country is a hub for the oil market in Asia. Alternatively, the facilities may be based in Thailand, where there are concentrations of oil refineries and stockpiling facilities are relatively large. In the long run, it may be an option to construct oil stockpiling facilities in a future development area, such as Dawei in Myanmar, to ensure regional stockpiling.

One issue in promoting regional stockpiling is that some countries are averse to stockpiling their oil in another country's territory from the viewpoint of security. As there is a high demand for stockpiling facilities in Singapore, borrowing stockpiling facilities there for regional stockpiling may require a large budget. When implementing regional stockpiling, it more effective to stockpile in the form of petroleum products. In cases where the product standards differ among countries, however, it is also necessary to consider product or stockpiling styles that minimise such issues.

Unlike European countries, ASEAN countries are separated geographically by sea, they are at different phases of national development, have different political systems, and have differing degrees of development of their domestic law systems. As such, they differ greatly from each other and energy issues are often treated in a politicised manner. Accordingly, it is true that their regional cooperation has distinct difficulties in comparison to Europe[12]. However, the countries have common oil security problems, such as the increasing demand for oil imports and the volatile international oil market. ASEAN countries should work together to overcome these problems and engage in energy cooperation for deeper regional economic integration and cooperation.

[12] Tom Cutler, "The Architecture of Asian Energy Security," in Mikkal E. Herberg, Roy Kamphausen, Tsutomu Toichi and Tom Cutler, *Adapting to a New Energy Era: Maximizing Potential Benefits for the Asia-Pacific* (Washington DC: National Bureau of Asian Research, 2014)

4-2-2 Bilateral cooperation

For the improvement of oil stockpiling, multilateral approaches are the most desirable when taking in to account factors such as the commonality of oil security problems among countries, the the internationally integrated oil market, advantages of economies of scale, and on-going market integration in the ASEAN region. For problems peculiar to each country, however, bilateral cooperation may provide more flexible, tailor-made solutions.

Bilateral cooperation is more likely to be realised between ASEAN and non-ASEAN member countries than between ASEAN countries. Detailed cooperation items are not mentioned here because they were summarised in last year's report (ERIA, 2015), but the following items are conceivable with respect to the particular problems in each country, from the viewpoint of order-made cooperation items.

- Support for the development of laws related to oil stockpiling
- Form and functions of the organisation for regulating oil stockpiling and securement of operating expenses
- Technological support for construction and operation of the oil storage base
- Ticket stockpiling with ASEAN countries by making use of surplus inventory
- A preferential product interchange agreement in case of an emergency by making use of surplus refining capacity
- Provision of an opportunity for third-party stockpiling by providing domestic surplus tanks and provision of dynamic stockpiling thereof

Some ASEAN countries do not have a clear reference point of how to initiate their stockpiling development. Capacity building and training for stockpiling policy, or in some cases technology transfer provided by IEA member countries in East Asia, will facilitate the efforts for stockpiling development by ASEAN countries. One such example is the agreement between Japan and Cambodia made in November 2015. The Japan Oil, Gas, and Metals National Corporation (JOGMEC), a Japanese state-owned organisation, supported the Cambodian government to draft a road map for stockpiling development based on the agreement.[13]

4-2-3 Road map

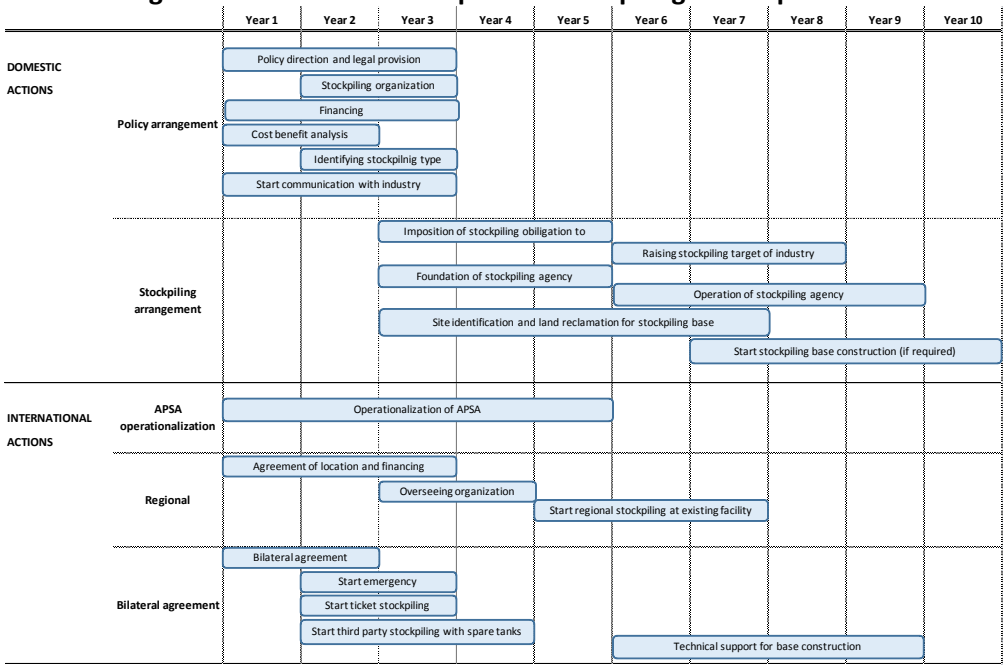
Figure 4-4 is a simple road map showing the previously described responses. The specific number of years is only a guide because the time required for realisation differs from one country to another. Since the details and order of options to be taken also differ depending on

[13] JOGMEC website (http://www.jogmec.go.jp/news/release/news_06_000124.html)

the country, this road map is treated only as a model.

It is never easy to improve oil stockpiling. With increased uncertainty of current international oil demand and supply, and greater dependence on oil imports in the ASEAN region, however, its importance has been increasing day by day. To protect domestic economies and people's lives from unexpected supply disruptions, oil stockpiling has to be improved step by step, making progress where we can.

Figure 4-4. Model Road Map of Oil Stockpiling Developments in ASEAN



Source: Institute of Energy Economics, Japan.

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