

Strategic Oil Stocks and Security of Supply

Giacomo Luciani and François-Loïc Henry*

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Abstract

Holding strategic oil stocks is at first sight an obvious tool to address potential disturbances in supplies. Rationally defining the desirable size of stocks and designing rules for their predictable use is an elusive task, however. A key conceptual difficulty arises in the distinction between commercial and strategic stocks, because a physical shortfall in the oil supply will inevitably lead to an increase in prices. But if strategic stocks are utilised when prices increase they become indistinguishable from commercial stocks. This paper reviews the legislation in force in the US and the EU on the use of strategic oil stocks as well as the emergency response systems of the International Energy Agency. It finds that such measures have been activated rarely and in dubious circumstances. Alternative approaches are proposed consisting of encouraging companies and major consumers to hold larger stocks and seeking a cooperative agreement with oil-producing countries for mutually beneficial stock management.

* Giacomo Luciani participated in the SECURE project in his capacity as Director of the Gulf Research Centre Foundation in Geneva. He is currently the Scientific Director of the International Energy Master's programme at the Paris School of International Affairs (PSAI) at Sciences-Po in Paris and a Princeton University Global Scholar. François-Loïc Henry is a researcher at the Gulf Research Center Foundation. CEPS Working Documents are intended to give an indication of work being conducted within CEPS' research programmes and to stimulate reactions from other experts in the field. The views expressed in this paper are those of the authors and do not necessarily represent any institutions with which they are affiliated.



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Introduction

Holding strategic oil stocks is at first sight an obvious tool to address potential disturbances in supplies. Rationally defining the desirable size of stocks and designing rules for their predictable use is an elusive task, however.

In the first section of this paper some conceptual problems related to oil stocks are discussed, including a brief review of the economic literature on optimal stock holding. In the second section a review of the legislation in force is presented, examining the experience of the Strategic Petroleum Reserve of the US, the emergency response systems of the International Energy Agency (IEA) and finally EU legislation. On the basis of this background, the third section discusses opportunities for novel approaches to the management of stocks in the event of supply disruptions.

1. Conceptual problems concerning strategic stocks

Strategic stocks are a well-recognised policy tool to alleviate supply disruptions – at least since Joseph advised the Pharaoh that Egypt would need to withstand seven lean years after seven fat ones. Nevertheless, the literature on the subject does not appear to be well developed, and indeed the state of the debate, especially with reference to the strategic storage of oil and gas, is surprisingly rudimentary. In this first section we focus on a list of conceptual problems that are encountered in the definition of a sensible policy for strategic stocks. As with most issues, it will appear evident that the question is not one of yes or no, but of the modalities and details of defining a policy.

Actually, defining a rational storage policy is a deceptively simple task. The rationale for storage is initially compelling, but is found to be extremely problematic when looked at in greater detail, as noted by Wright and Williams (1982):

Without divine assistance in forecasting stochastic production, the storage decision is considerably more complex than the one Joseph faced, and the role of storage quite different. In fact, several commonly held impressions about the role of storage of commodities such as grains are incorrect. Rather than stabilising production, storage actually accentuates its variability. Rather than causing a mean-price-preserving decrease or a mean-output-preserving decrease in the dispersion of price, storage generally causes a more complex modification of the distribution of price. Rather than being most effective at eliminating short-falls in consumption, storage actually is more effective at eliminating the incidence of exceedingly high consumption.

In theory, strategic stocks are clearly differentiated from commercial stocks. The latter are held by private companies or final consumers to guarantee the smooth functioning of their plants or vehicles between the discrete re-fills of tanks, or in the expectation of financial gain in case the future price might be higher than the current one. Commercial stocks are therefore determined by the requirements of the stockholder, the size of available storage facilities and expectations about future prices.

Private operators make decisions concerning the size of their storage facilities and the extent to which these are kept full on the basis of their assessment of the ease of procuring fresh supplies, the forecasted requirements and price expectations. The outcome of these complex and highly diffuse stockholding decisions by ‘the market’ is a system that may be very stable – if large stocks are normally held – or quite brittle. This is plainly not something that public authorities are responsible for, yet neither can they be indifferent. If, to put it very plainly, an individual car-owner remains stuck on the motorway because s/he failed to keep the car tank sufficiently full to reach the next station, that is the individual’s problem. If, however, all car-owners normally fill up their tanks to the full and well before the tanks are empty, a considerable amount of aggregate stock will be established – which may help in the event of supply disruptions.

Private operators are expected to deal on their own with all ‘normal’ discontinuities in supply, those that are an intrinsic part of the system and are easily predictable. Strategic stocks, on the other hand, are meant to deal with extraordinary situations, which constitute a security threat to the nation. Obviously, this may apply to a situation of open warfare; but as we move from extreme conditions to more nuanced situations the question of whether the matter should be considered strategic or commercial becomes increasingly blurred.

1.1 Defining the threat

The first prerequisite for elaborating a sensible, strategic stock policy is an accurate definition of the ‘threat’ (or ‘accident’ or ‘event’) against which the stocks are intended to provide a buffer. This is indispensable not only to allow for a discussion of the adequacy of the tool (are strategic stocks an appropriate tool, and if so, what is the required size of them?), but also of the costs and benefits of resorting to this tool.

In relation to oil supply, the threat may be defined as either a physical shortfall or a major change in prices. The two aspects are patently related, because a physical shortfall will inevitably lead to an increase in prices.

Physical shortfalls may be the result of a cut in production or exports of a major exporting country or group of exporting countries; shortfalls may also stem from the voluntary or accidental closure of a particular transportation or transit facility. The latter may affect a specific group of importers without necessarily impacting on global supplies, leading to restricted availability of crude or products in specific markets. With respect to European supplies, the logistics and sources of supplies are sufficiently diversified, so it is difficult to envisage localised disruption.¹

Hence, when we speak of the European situation, the threat that we should consider is primarily the shortfall in global supplies that may result from a cutback in production or exports on the part of one or a group of major producers.

Demand for oil is constantly increasing, but the pace of change may vary quite significantly; global supply is the algebraic sum of declines in certain fields and increases in other fields. Accidents or disturbances of greater or lesser impact happen in the industry all the time, and some producing countries have lived in a state of more or less constant turmoil for decades: we may be hard put to define the ‘normal’ state of affairs against which the deviation, or ‘accident’ that we wish to protect against, is measured. This point is extensively made in the SECURE project papers on *Global Oil Supplies: The Impact of Resource Nationalism and Political*

¹ This point is also discussed in G. Luciani, *Restrictions of passage, accidents and oil transportation norms: Scenarios of impacts on costs, global crude oil supplies and supply security*, CEPS Working Document No. 354, CEPS, Brussels, 2011(d).

Instability (Luciani, 2011b) and on *Armed Conflict and Oil/Gas Security of Supply* (Luciani, 2011a).

This situation is evidenced by experience over the past decade, during which supply tensions and price increases have been linked to an array of events, *including* war in Iraq, but also strikes or disturbances in Nigeria or Venezuela, hurricanes and other acts of God – while demand has increased much faster than anyone expected. Prices increased in 2008 to a level never seen before: Was this due to the Iraq war, the unexpected increase in demand or the economic crisis? Or was it simply the market at work, reflecting the circumstances of the day – exceptional in the sense that each day is different, but no more?

The IEA considers that the most important supply disruption in historical experience was consequent to the Iranian revolution, when 5.6 million barrels per day (b/d) were lost for a period of six months. This loss was nonetheless compensated by increased production in other countries, and total world oil production actually increased from 63.3 to 66 million b/d between 1978 and 1979; it declined in subsequent years in response to a decline in demand.² So, was there a crisis?

The oil market is quite ‘nervous’ and tends to anticipate a supply shortfall with considerable price hikes, rather than waiting for it to happen. Consequently, it is frequently the case that we pay the price already while the discussion is still going on, whether the physical shortfall is fact or fiction – which is not a condition conducive to the orderly and predictable use of strategic stocks.

In other words, situations in which there is a single and clearly identifiable cause of a significant supply shortfall will be extremely rare. The precedent of the 1973 embargo by OAPEC (Organization of Arab Petroleum Exporting Countries) is unlikely to be repeated, and remains quite isolated. Other episodes of open war involving oil-producing countries, notably Iraq, Iran and Kuwait, have had a variable impact on supply and expectations have been as important, if not more so, than facts.

A definition of the threat based on price variations would be, in this respect, much clearer than a definition based on physical supply changes. Yet if the trigger event for the use of strategic stocks is defined as a change in prices, the distinction between strategic and intervention stocks – the latter being instruments for managing prices on the market rather than tools for addressing a security concern – becomes blurred.

1.2 Predictability and adequacy

For the adequacy of stocks to be rationally discussed, it is necessary that we have some understanding of the probability of the event against which we are trying to protect ourselves. All insurance policies are based on the statistical evaluation of the probability of an event occurring and the cost of it. Even in such seemingly absolute state objectives as guaranteeing the integrity of the state we follow a probabilistic approach, in the sense that no state actually incurs the expense that would be required to be able to protect itself against any imaginable external threat.

All discussions of strategic stocks in economic literature tend to relate to their use in agriculture or other sectors in which production is not known a priori, but the probability distribution of outcomes can be estimated. In the case of global oil supplies, we have a plethora of smaller accidents, industrial or socio-political, which cause actual production to

² See G. Luciani, *Armed Conflict and Oil/Gas Security of Supply*, CEPS Working Document No. 352, CEPS, Brussels, 2011(a).

deviate from the desired level; these may possibly be predicted statistically, but are not the main source of concern. It is implicitly assumed that these smaller disturbances are part and parcel of the normal functioning of the industry, and protecting against them is the task of private actors.

The adequacy of military preparedness is measured against some scenario on the use of a country's armed forces, which defines their intended capabilities. This could well be done also with respect to strategic oil storage: we might discuss what kind of accident we intend to protect against, and attempt to attribute a probability factor to it in order to guide a rational decision. This, however, is not frequently done. Notably, reference is commonly made to 'political instability' and 'volatility' in the Gulf, somehow hinting at the possibility that all of the Gulf countries' oil might suddenly disappear from the scene. Any considerate discussion shows this to be almost impossible (Luciani, 2011a and 2011b).

Alternative scenarios might be more plausible, but the compelling need for large strategic stocks would quickly evaporate. After all, the Gulf has been politically unstable and volatile for decades, and existing oil stocks have been used for genuine political circumstances only in 1991 when hostilities began against Iraq to roll back the invasion of Kuwait – and then too late, when the market had already turned around. Our analysis in previous SECURE project papers³ has shown that scenarios such as the sudden disappearance from the market of the entire production of Saudi Arabia are not credible. The Iraq–Iran war offered an experience of protracted conflict between two main Gulf producers, yet both continued to export throughout the war and a serious shortfall occurred only in the initial months of the conflict, and was easily compensated by production increases elsewhere in the world.

At the time of writing, the most credible imminent threat to global oil supplies is a boycott of Iranian oil imposed by the United Nations in connection with the Iranian nuclear programme. This threat has a very low probability anyhow, because the necessary consensus within the Security Council would be very difficult to achieve; in any case, there is presently sufficient unused capacity in neighbouring countries to compensate for the disappearance of Iran from the market. Strategic stocks might be needed, if at all, simply as a temporary source to fill the gap while other producers ramp up their output. For this, they are very abundantly sufficient.

1.3 Cost-benefit analysis

In deciding on the rationality of holding strategic oil stocks and their optimal size, we should be able to engage in a proper cost-benefit analysis. It is commonly assumed that a shortfall in oil supplies may constitute a security threat or inflict serious economic damage to industrial countries. Nevertheless, when considering the impact of oil price increases – which would be the immediate manifestation of oil supply shortages – the literature overwhelmingly suggests that this is limited and certainly far from being considered catastrophic or a security concern.

The estimation of the impact of a disruption in oil supplies is problematic. The results critically depend on an array of assumptions about possible production increases from non-impacted sources, about market reactions and consequent price increases, and about the policy reactions of the affected importing countries.

Indeed, it is clearly unrealistic to pretend to model the market response to a supply disruption: we can hardly predict market response in normal circumstances, even less so in

³ See Luciani (2011a and 2011b), op. cit., and also G. Luciani, *Global Oil Supplies: The Impact of Resource Nationalism and Political Instability*, CEPS Working Document No. 350, CEPS, Brussels, May 2011(b).

exceptional ones. In practice, we see at present a tendency to conceptualise a supply disruption as a sudden jump in price – thus eliminating the need for specifying a function linking a physical disruption to the consequent movement in prices. This means that a physical supply disruption will be considered serious if it leads to a serious jump in prices; if prices do not move very much, the disruption is not there. Yet while a jump in prices is a necessary condition it is still not a sufficient one to speak of a supply disruption, because prices frequently register wide swings even at times when no physical disruption is visible.

But can we consider a significant jump in prices a security threat, which must be countered by resorting to the use of the strategic stocks? If so, under what conditions?

First of all, in many industrial countries – with the notable exception of the US – energy products are heavily taxed. This is done for general budgetary purposes, but is also frequently justified for reasons of curbing consumption, to reduce import dependency or mitigate the impact of emissions on the environment (or both). Whatever the reasons for imposing high excise taxes on energy products, the fact is that the consumer is accustomed to paying prices that are well above market realities. At the very least, this means that the consumer is shielded against market price increases, in the sense that the price increase as felt by the consumer is percentage-wise much less than the increase in international market prices. In addition, the consumer might further be shielded because in the event of a very severe increase in international prices, such as would justify the liquidation of strategic stocks, excise taxes might be reduced. Of course this measure would not eliminate the impact on the trade balance, and it would have a negative effect on the government budget, thus requiring macroeconomic adjustment; however, if the supply shortfall is temporary, then financing might be preferable to adjustment. If on the other hand the supply shortfall is permanent or sustained, then strategic stocks would be of no avail, and adjustment would be required anyhow. In other words, strategic stocks represent a tool to cushion and not eliminate supply shortfalls, and changes in excise taxes are a valid alternative in that function.

Even ignoring the possibility of modulating excise taxes, the experience of the period 2004–08 leads us to the conclusion that the impact of changes in oil prices on GDP is limited. While oil prices kept climbing in the years 2004–07, economic policy-makers of the industrial countries frequently voiced the concern that growth would be affected and pleaded for moderation by OPEC. Yet economic growth only suffered when the real estate bubble burst in the US, and more decisively so when the fragility of the financial system was exposed by the collapse of Lehman Brothers. High oil prices may well have played a role in the final outcome, but they certainly were neither the sole nor the main culprit.

2. Legislation on strategic stocks: Frameworks of the US, IEA and EU

2.1 The US Strategic Petroleum Reserve⁴

According to the US Department of Energy, the US Strategic Petroleum Reserve (SPR) is the largest stockpile of government-owned emergency crude oil in the world. Established in the aftermath of the 1973–74 oil embargo, the SPR is intended to provide the president with a response option should a disruption in commercial oil supplies threaten the US economy. It also allows the US to meet part of its IEA obligation to maintain emergency oil stocks, and it

⁴ This section is based on the US Department of Energy (DOE) website article, “Strategic Petroleum Reserve – Profile”, DOE, Washington, D.C., updated 16 March 2011(b) (<http://www.fe.doe.gov/programs/reserves/spr/index.html>).

provides a national defence fuel reserve. The federally owned oil stocks are stored in underground salt caverns along the coastline of the Gulf of Mexico.

Decisions to withdraw crude oil from the SPR are made by the president under the authority of the Energy Policy and Conservation Act of 1975, which declared it to be US policy to establish a reserve of up to 1 billion barrels of petroleum. Although the SPR has been used for emergency purposes only twice (during Operation Desert Storm in 1991 and after Hurricane Katrina in 2005), the Department of Energy claims that its size makes it a significant deterrent to oil import cut-offs and a key tool of foreign policy. Still, no proof is offered for this statement, which appears *prima facie* to be highly objectionable: one can hardly think of any case in which oil-producing countries may have considered cutting off oil exports – either to the US specifically or in general – and have been deterred by the existence and size of the SPR.

On 16 January 1991 President George H.W. Bush ordered the first-ever emergency drawdown of the SPR (see Box 1). The Department of Energy then implemented a plan to sell 33.75 million barrels of crude oil, the US contribution agreed to by the International Energy Agency. But between the initial authorisation and the final sale, world oil supplies and prices stabilised; the US subsequently reduced the sales to 17.3 million barrels, which were sold to 13 companies.

On 13 November 2001, President George W. Bush ordered the SPR to be filled to approximately 700 million barrels.

In December 2009 the full capacity of 727 million barrels was reached and further accumulation has stopped.

Notwithstanding the increasing size of the SPR, the coverage measured as the number of days of net petroleum imports has remained below 60 due to the parallel increase in imports. It went above that level in 2008 owing to the decline in imports. It nonetheless remains well below the IEA's mandated level of 90 days of imports.

Conditions for the utilisation of the SPR are defined by the Energy Policy and Conservation Act (1975).⁵ In essence, the reserve is specified for use in the event of a “severe energy supply interruption”, which is primarily defined as a physical shortfall. The definition abounds with less than precise parameters: the interruption must be of “significant scope and duration” and must have “an emergency nature”; it must also have a “major adverse impact on national safety or the national economy”.

In establishing whether a severe energy supply interruption has occurred, however, one of the criteria is also whether “a severe increase in the price of petroleum products has resulted from such [an] emergency situation”; what exactly constitutes a severe increase in the price of petroleum products is not said. In addition, the Act also envisages the possibility that the reserve might be used pre-emptively, to prevent the manifestation of a severe energy supply interruption.

In short, the Act attributes considerable latitude to the president in deciding if and when to draw down from the reserve.

⁵ Energy Policy and Conservation Act of 1975, Public Law 94-163, 89 Stat. 871, 42 U.S.C. 6201 *et seq.*

Box 1. SPR drawdowns according to the Department of Energy**Desert Storm drawdown*

Stockpiling crude oil in the SPR reduces the nation's vulnerability to economic, national security and foreign policy consequences of petroleum supply interruptions. The SPR proved its value in 1991 when a partial drawdown, coupled with a coordinated international supply response, helped restore stability to world oil markets during the Persian Gulf War.

On 16 January 1991, coinciding with the international effort to counter the Iraqi invasion of Kuwait, President George H.W. Bush ordered the first-ever emergency drawdown of the SPR. The Department of Energy immediately implemented a drawdown plan to sell 33.75 million barrels of crude oil, the US portion agreed to by the International Energy Agency.

The drawdown proceeded on schedule and without major complications. Between the initial authorisation and the final sale, however, world oil supplies and prices stabilised, and the US cut the sales amount to 17.3 million barrels, which were sold to 13 companies.

Hurricane Katrina drawdown

The SPR's second emergency drawdown occurred after Hurricane Katrina caused massive damage to the oil production facilities, terminals, pipelines and refineries along the Gulf regions of Mississippi and Louisiana in late August 2005. All Gulf of Mexico production was shut initially, which equated to about 25% of domestic production. Gasoline prices spiked nationwide in reaction to the disruptions, and the supply levels of gasoline and other refined products were impacted.

On 2 September 2005, in coordinated action with the International Energy Agency, President George W. Bush issued a Finding of a Severe Energy Supply Interruption and directed Secretary of Energy Samuel W. Bodman to draw down and sell crude oil from the SPR. The Secretary immediately authorised a Notice of Sale for 30 million barrels of crude oil to US markets. The online sale was held from 6 to 9 September 2005. The Department of Energy evaluated each bid and determined that five companies had submitted acceptable offers for 11 million barrels.

* See US Department of Energy (DOE) website article, "Strategic Petroleum Reserve – Profile", DOE, Washington, D.C., updated 16 March 2011(b) (<http://www.fe.doe.gov/programs/reserves/spr/index.html>).

2.2 The IEA's emergency response systems

The International Energy Agency was established in the wake of the 1973 export restrictions to the US and other selected industrial countries imposed by OAPEC. Ensuring security of supply and solidarity among the major industrial countries is a core objective of the IEA. The Agency's emergency response system is therefore a key feature of the organisation. The International Energy Program (IEP), which is contained in the IEA's governing treaty, commits participating countries⁶ to the following measures:

- maintain emergency oil reserves equivalent to at least 90 days of net oil imports;
- undertake programmes of demand-restraint measures to reduce national oil consumption; and
- participate in oil allocation among IEA countries in the event of a severe supply disruption.

⁶ See the IEA "Agreement on an International Energy Programme" (as amended 25 September 2008).

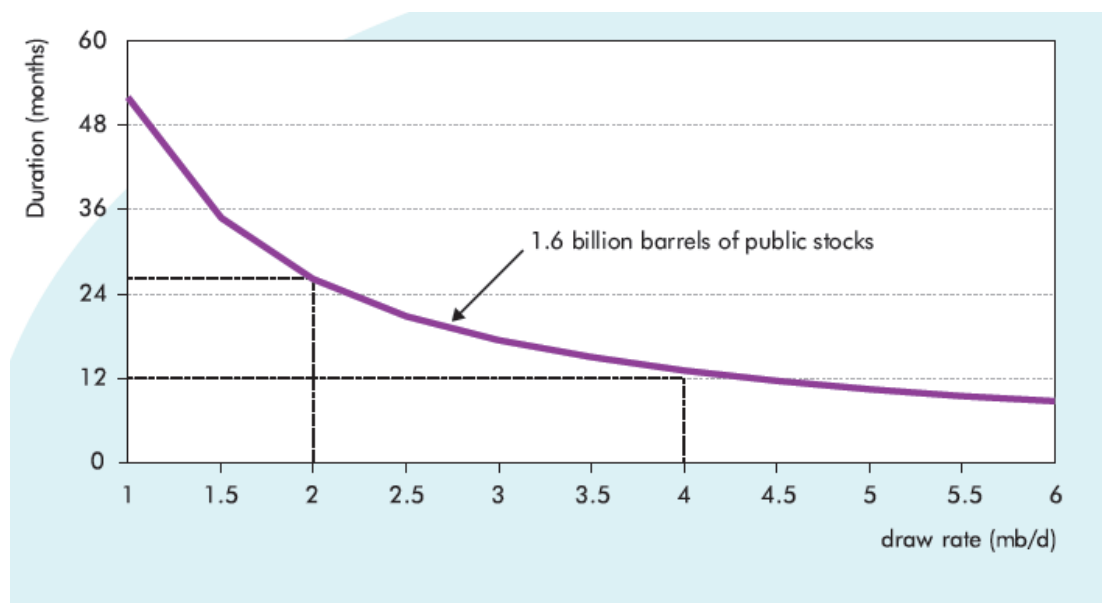
The IEA also has an additional set of coordinated stockdraw and other response measures, known as the Coordinated Emergency Response Measures (CERMs). These were established by an IEA Governing Board Decision of July 1984 and updated more recently. In taking this decision, the Governing Board recognised the importance of responding rapidly to a supply disruption in order to minimise the potential economic damage. CERMs may apply even if the oil supply disruption is not acute enough to activate the IEP emergency measures.

The decision to activate emergency response measures would also be taken by the IEA's Governing Board. The Governing Board receives advice from industry experts, through the Industry Advisory Board.

IEA net oil-importing countries have a legal obligation to hold emergency oil reserves equivalent to at least 90 days of the net oil imports of the previous year. According to the latest information available from the Agency, IEA member countries are currently holding nearly 4.2 billion barrels of public and industry oil stocks,⁷ which represent at least 180 days of net imports. The bulk of this total (60%) is in industry stocks, which include commercial stocks as well as strategic stock obligations imposed by the respective governments. It is not possible to clearly demarcate what is commercial and what is strategic in the industry stock pool.

The duration of available stocks is a function of the drawdown rate (see Figure 1). In the case of a drawdown rate of 4-4.5 million b/d, the duration would be approximately one year.

Figure 1. Strategic stocks' availability and drawdown rate



Source: IEA (2010).

In addition to using the strategic storage, the IEA countries may adopt various policies to reduce consumption. It is indeed clear that not all uses of petroleum products are essential or of strategic importance. The IEA has published a major study on the potential for reducing consumption in times of crisis.⁸

⁷ See International Energy Agency, *IEA Response System for Oil Supply Emergencies*, IEA, Paris, 2010.

⁸ See International Energy Agency, *Saving Oil in a Hurry*, IEA, Paris, 2005.

Strictly speaking, the IEA's emergency response system has been activated only twice, during the outbreak of hostilities in the Gulf (Desert Storm) and after the damages caused by Hurricane Katrina in the Gulf of Mexico in 2005. The IEA activated its contingency plan on 17 January 1991 to make available to the market 2.5 million barrels of oil per day. But the market turned around almost immediately after the outbreak of hostilities, and the IEA's intervention proved unnecessary. In relation to the hurricane, the IEA member countries decided to make available to the market the equivalent of 60 million barrels through the use of emergency stocks, increased indigenous production and demand restraint.

There were also preparations to use the emergency response in connection with the Y2K scare, which proved entirely unfounded.

Preparations were made again in 2003, when global oil markets were tight, affected by low inventories and a high degree of uncertainty with strikes in Venezuela, disturbances in Nigeria and the war in Iraq.

Nevertheless, the fact is that the shortfall in Iraqi production was met by increased production in Saudi Arabia, and there was no need to use emergency stocks.

2.3 EU legislation in force regarding oil stocks

The legislation currently in force in the EU concerning oil stocks is Council Directive 2009/11/EC of 14 September 2009.⁹

Council Directive 68/414/EEC of 20 December 1968 was the first piece of legislation on this matter.¹⁰ The Directive notes the growing dependence of the EU on oil imports and the gravity of the consequences of "any difficulty, even temporary, having the effect of reducing supplies of such products imported from third States", but does not specify what exactly is meant by "difficulty".

Council Directive 98/93/EC of 14 December 1998 introduced several modifications to the 1968 Directive. The 1998 Directive refers to "any difficulty, even temporary, having the effect of reducing supplies of such products, or significantly increasing the price thereof on international markets", thus not clarifying the exact definition of "difficulty", and indeed opening the door to the possibility that not just a physical shortfall, but also a significant increase in prices might be considered one.¹¹

On 11 September 2002, the Commission proposed a new set of measures for improving the security of energy supplies, as it believed that the tools existing at the time were not sufficient. The proposition did not receive the approval of the Parliament and was withdrawn in 2004. In particular, there were objections to the proposal to adopt stocks for 120 days while the international norm had settled at 90.

In 2006, Directive 2006/67/EC was promulgated, which was meant as a summary document of the previous Directives (68/414/EC, 72/425/EC and 98/93/EC) in the interest of clarity, and therefore did not introduce any new provisions.

⁹ Council Directive 2009/119/EC of 14 September 2009 imposing an obligation on Member States to maintain minimum stocks of crude oil and/or petroleum products, OJ L 265/9, 9.10.2009.

¹⁰ Council Directive 68/414/EEC of 20 December 1968 imposing an obligation on Member States of the EEC to maintain minimum stocks of crude oil and/or petroleum products, OJ L 308, 23.12.1968.

¹¹ Council Directive 98/93/EC of 14 December 1998 amending Directive 68/414/EEC imposing an obligation on Member States of the EEC to maintain minimum stocks of crude oil and/or petroleum products, OJ L 358/100, 31.12.1998.

2.4 Council Directive 2009/11/EC of 14 September 2009

In September 2009 the European Council enacted a new directive on stocks to replace and cover the scope of the previous directives, achieve a higher level of coherence with IEA standards and thus reduce bureaucratic procedures. It also aimed at harmonising emergency mechanisms among member states.

2.4.1 *Stockholding obligations*

The stockholding obligations remain at 90 days, but the emergency reserves are henceforth to be based on net imports and not on consumption, as stated in a summary given by the Commission:

Under Council Directive 2006/67/EC of 24 July 2006 imposing an obligation on Member States to maintain minimum stocks of crude oil and/or petroleum products, stocks are calculated on the basis of average daily inland consumption during the previous calendar year. However, stockholding obligations under the Agreement on an International Energy Programme of 18 November 1974 (hereinafter “the IEA Agreement”) are calculated on the basis of net imports of oil and petroleum products. For that reason, and owing to other differences in methodology, the way in which stockholding obligations and Community emergency stocks are calculated should be brought more into line with the calculation methods used under the IEA Agreement.

The text also allows for the reserves to equate to 61 days of daily consumption instead of the 90 days of imports if the former amount is higher:

Indigenous production of oil can in itself contribute to security of supply and might therefore provide justification for oil-producing Member States to hold lower stocks than other Member States. A derogation of that kind should not, however, result in stockholding obligations that differ substantially from those that apply under Directive 2006/67/EC. It therefore follows that the stockholding obligation for certain Member States should be set on the basis of inland oil consumption and not on the basis of imports.

The Directive adds the obligation for each member state to have at least one-third of the reserves composed of oil products in proportions corresponding to the consumption patterns of the member state (IHS, 2009).

Member states have an obligation to ensure that stocks are available and physically accessible. In this regard, they are responsible for putting in place arrangements for the identification, accounting and control of these stocks. A register containing information on emergency stocks (the location of the depot, refinery or storage facility, the quantities involved, the owner of the stocks and their nature) should be established and continually updated. A summary copy of the register shall be sent to the European Commission once a year.

The Directive leaves the door open to the possibility of setting up specific stocks for a list of refined products.

2.4.2 *EU powers*

Additional powers are granted to the EU, such as reviewing and auditing stocks maintained by member states (IHS, 2009). The purpose of this measure is to enable the European Commission to coordinate an EU contribution in the event of IEA action.

2.4.3 Stockholding entities

The Directive wishes to encourage the setting up of central stockholding entities (CSEs) in the form of non-profit making bodies or services.¹² Under the conditions and limitations laid down by the Directive, CSEs and member states may delegate some aspects of the management of stocks to another member state with stocks on its territory, to the CSE set up by the said member state or to economic operators. The CSE shall maintain oil stocks (including the acquisition and management of these stocks).¹³

2.4.4 Coordination Group

The Directive sets up a Coordination Group with the task of reviewing the security situation of the Union in Art. 17:

A Coordination Group for oil and petroleum products is hereby set up (hereinafter the “Coordination Group”). The Coordination Group is a consultative Group that shall contribute to analysing the situation within the Community with regard to security of supply for oil and petroleum products and facilitate the coordination and implementation of measures in that field. The Coordination Group shall be made up of representatives of the Member States. It shall be chaired by the Commission. Representative bodies from the sector concerned may take part in the work of the Coordination Group at the invitation of the Commission.

2.4.5 Emergency procedures

No specific rule is set up by the Directive concerning the usage of the stocks. In particular, it does not propose a definition of an emergency. In Art. 20 it asserts that

Member States shall ensure that they have procedures in place and take such measures as may be necessary, in order to enable their competent authorities to release quickly, effectively and transparently some or all of their emergency stocks and specific stocks in the event of a major supply disruption, and to impose general or specific restrictions on consumption in line with the estimated shortages, inter alia by allocating petroleum products to certain groups of users on a priority basis.

Two kinds of situations are envisaged:

- If an international decision to release stocks affecting one or more member states has been taken (probably by the IEA), the member states can use their stocks and must notify the Commission so that the Coordination Group can be alerted. Or the Commission can directly recommend to member states to release some of their stocks.
- If one member state experiences difficulties and no international decision has been taken, the Commission shall arrange for consultation with the Coordination Group and inform and coordinate with the IEA. If a major supply disruption is deemed to have occurred, the Commission shall authorise the release of some or all of the quantities of emergency stocks and specific stocks.

¹² Art. 7(1): “Where a Member State sets up a CSE, it shall take the form of a body or service without [a] profit objective and acting in the general interest and shall not be considered to be an economic operator within the meaning of this Directive.”

¹³ Art. 7(2): “The main purpose of the CSE shall be to acquire, maintain and sell oil stocks for the purposes of this Directive or for the purpose of complying with international agreements concerning the maintenance of oil stocks. It is the only body or service upon which powers may be conferred to acquire or sell specific stocks.”

3. Alternative approaches to oil stocks for enhanced security

The analysis in the previous sections points to some significant shortcomings in the current design of strategic stock policies. Below we summarise the key problems:

- The rules for the activation of strategic stocks are nebulous – the main objective is expected to be compensation for physical shortfalls of supply, but price movements anticipate any such shortfall and crises manifest themselves as price rather than quantity shocks. Undoubtedly, prices are far more volatile than the quantities supplied. At the same time, price shocks may also be independent of actual/expected changes in the quantities supplied.
- Strategic stocks necessarily have a limited duration; experience has consistently shown that the availability of unused capacity in major producing countries is much more important and effective in compensating for physical supply shortfalls.
- The accumulation of strategic stocks should not be viewed in isolation from commercial stocks and possible demand-management policies in case of supply emergencies.
- The desirable size of strategic stocks is difficult, if not impossible, to determine. The effect of accumulating stocks on markets and prices is not clear and could result in increased volatility, rather than the opposite.

In the light of the above considerations, we present and analyse two main, innovative approaches to oil stocks:

- playing down the distinction between strategic and commercial stocks, and adopting policies to encourage accumulating and holding stocks on the part of all operators; and
- facilitating cooperation between major oil importers and exporters with a view to encouraging and consolidating the existence of a sufficient cushion of unused capacity to compensate for supply shortfalls.

3.1 Encouraging companies and major consumers to hold more stocks

We should clearly distinguish between the wisdom of maintaining large public stocks and that of encouraging large(r) private stocks. The problems we have been highlighting concerning public stocks are very much related to their public nature – that is to the need to have clear activation criteria, cost-benefit analysis and differentiation between emergency contingencies and market intervention. None of these arguments applies to privately held stocks, and the wisdom of encouraging private actors in the industry to hold larger stocks would appear to be beyond discussion.

The drive towards cost-cutting and the maximisation of return on invested capital has meant that all companies have strived to minimise their working capital, and one way to do so is to reduce stocks and progressively eliminate all redundancies in one's logistics system. The consequence is much greater vulnerability to supply disruptions; however, this is clearly not considered much of a problem by the financial community, whose analysis influences the market evaluation of the stock. This is not a problem just for oil; it is a problem for network energy and for other industries as well.

The debate about insufficient investment under conditions of market liberalisation is ongoing, and may be expected to eventually converge on solutions that will re-establish some stability and resilience in the system. This debate nonetheless mainly concentrates on network energy, and appears to have overlooked the problems of the oil industry.

The alternative should be considered of adopting regulations at various stages in the industry mandating a certain level of stocks and redundancies in several crucial facilities, which may contribute to the overall reliability of the system. In a sense, this is what is done when oil companies are mandated to maintain stocks equal to at least 'x' days of consumption – except that these stocks are then called 'strategic' and are not freely controlled by the companies themselves. Companies should be mandated to maintain stocks of crude and products as well as maintain a certain redundancy in capacity in crucial logistics or refining capacity, which the companies might more flexibly resort to when they feel a need to do so. For example, companies might be required to maintain a minimum average level of crude oil stocks over a 12-month period, but drawdowns might be allowed in the event of specific tensions or shortages.

Encouraging private operators to hold larger stocks requires that institutions and facilities should be established to manage stocks in a flexible way, which is more in line with market signals.

Managing stocks in response to price signals can be a profitable operation and contribute to dampening price fluctuations. Investors may choose to buy and sell purely paper barrels or they may decide to hold physical barrels; the latter option is likely to have a beneficial effect on price stability. The objective of government regulations should therefore be to encourage private investors to hold physical stocks. Today, individual investors (the doctors and dentists of Chicago fame) and large financial investors shy away from physical barrels and only want to deal in paper.

Encouraging the holding of physical stocks requires passing legislation that will make it easier to build and maintain storage. This is partly an issue of environmental and fiscal rules, and partly an issue of market organisation. Physical storage operators (who shall be separate legal entities from the owners of the stored oil) should be empowered to issue certificates convertible into physical barrels: oil deposited in this storage would be exchanged for such certificates, and certificates could be used to withdraw oil from storage. There is nothing exotic about this, but such a facility and a market for the certificates that it might issue does not exist.

Governments may well decide to facilitate this development by establishing an agency to build and manage such a storage facility – which can be established at the national or regional level or both – and issue certificates to oil depositors. The possibility of depositing oil would be open to all, including the national oil companies of oil-exporting countries.

Major trading companies, such as Vitol, already maintain storage facilities, but the phenomenon is limited and not sufficient to influence crude oil prices. Much larger storage facilities are needed, and the private sector may not be attracted to establishing them. Nevertheless, the business of operating storage facilities per se may very well be profitable if investment in physical stocks develops as envisaged here.

The EU might decide to invest in the creation of storage facilities and offer their free use to producers wishing to 'deposit' their crude in them. Producers would retain ownership and control of the crude under normal circumstances, but the EU would be allowed access under emergency conditions. Producers might receive a certificate for the crude they deposit in this storage, which they might use as collateral to borrow from the financial system. The European Investment Bank might specifically be mandated to issue loans against these certificates, e.g. to finance investment in creating unused capacity in the same producing countries. The availability of such an 'oil deposit window' would encourage producing countries to abandon the attempt to modify their production levels *in anticipation* of changes in market balance: experience has told us that such expectations can prove unfounded,

leading to even worse market imbalances. The ability to divert oil to a deposit window in the event of weak demand or to withdraw from it if there is unexpectedly strong demand would enhance the ability of major producers to maintain prices at levels close to their targets.

Storage facilities could be set up in all appropriate locations, not necessarily in the territory of the country or group of countries establishing them. Indeed, it might be very interesting to establish large storage facilities at critical logistical junctures, such as the Suez Canal or the Malacca Strait, or in conjunction with pipeline projects to bypass these places.

3.2 Prospects for a cooperative approach to the management of strategic stocks

The hypothesis of some kind of cooperative management of supply emergencies was originally contained in the informal agreement between the Executive Director of the International Energy Agency, Claude Mandil and the Minister of Petroleum of Saudi Arabia, Ali Naimi, in the run-up to the 2003 war in Iraq. The agreement envisaged that Saudi Arabia would use its unused capacity to make up for any shortfall in global supplies of crude oil, and the IEA would abstain from using its strategic stocks.

The agreement set a powerful and extremely significant precedent, because it implicitly asserts that existing unused capacity in Saudi Arabia – and to some extent in other Gulf Cooperation Countries as well, although the role of Saudi Arabia is quite unique because of the extraordinary elasticity of the Kingdom's oil production – is the first line of defence against unexpected and undesirable interruptions or disturbances in the regular pattern of crude oil supplies. In contrast, non-OPEC countries normally produce at full capacity and do not have a policy of systematically maintaining unused capacity that might be resorted to if there is a shortfall in other countries' exports. It is only within OPEC, and indeed within the Gulf, that significant unused capacity is systematically maintained.

Ever since this early informal agreement the main industrial countries, led by the US, have consistently pressed major Gulf producers to maintain significant unused capacity and persist in investing even at times of slack demand.

Nevertheless, the importing countries do nothing to share the investment burden required to maintain such unused capacity. Indeed, the importing countries constantly claim that the producing countries should allow more involvement by the international oil companies in investing upstream – despite the international oil companies certainly not being interested in investing in unused capacity. It is probably impossible to envisage that the governments of the importing countries would contribute to the financing of investment in unused capacity; however, in the context of a cooperative approach to dealing with supply emergencies, the investment by producing countries in unused capacity should be credited to them as their contribution to the overall stability of the system.

The pace of investment in new capacity and the possibility of maintaining a sufficient cushion of unused capacity are closely connected to the discussion on 'demand security' that has featured prominently in the preoccupations of the main oil-exporting countries. This point has been discussed already in another SECURE project paper.¹⁴ It was proposed there that major producers may stabilise the utilisation of their capacity through long-term take-or-pay contracts modelled on the experience of major gas exporters. Such contracts might include the joint establishment and management of sufficient storage capacity to compensate

¹⁴ See G. Luciani, *The Functioning of International Oil Markets and its Security Implications*, CEPS Working Document No. 351, CEPS, Brussels, May 2011(c).

for any unexpected variation in demand or supply in the short term, with automatic adjustments to prices and contractual volumes in case of persisting deviations.

The underlying theme of these proposals is that the purpose of maintaining stocks should be changed from being a tool for confrontation to becoming a terrain for cooperation. Originally, strategic stocks were conceived of as a tool to resist the possible political use of oil supplies, a memory of the 1973 OAPEC attempt to use oil as a weapon. Little mattered that the attempt was ultimately a total failure.

But sufficient water has passed under the bridge to allow us to conclude that what is needed is a policy to manage stocks in a cooperative manner with major producers, in order to stabilise oil markets and prices. Major producers have today clearly embraced a policy aimed at guaranteeing consumers that supplies will be sufficient – and increasingly are also preoccupied with the concern that unstable prices might eventually undermine acceptance of their primary export. The interests of exporters and importers therefore tend to converge at least to some extent – i.e. on the desirability of a more orderly and predictable evolution of oil markets, to which cooperative management of stocks might substantially contribute.

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