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Issue **Article**

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THE ROLE OF STRATEGIC OIL RESERVES IN THE GLOBAL ECONOMY

Abstract: *The article provides a detailed discussion of the four main models for establishing oil reserves: state-owned, hybrid, delegated, and specific models:*

- *United States (State-Owned Model): The U.S. Strategic Petroleum Reserve (SPR) is entirely state-owned and stored in salt domes along the Gulf of Mexico, which ensures cost-efficiency and security in storage.*
- *European Union and Japan (Hybrid Model): The European model combines government-held reserves with obligations imposed on private companies. Japan, which is almost 100% dependent on imports, uses a three-tier system (government, private, and joint reserves with producer countries), giving it reserves equivalent to more than 200 days of consumption.*
- *United Kingdom (Delegated Model): In this model, the government does not directly own the oil, but instead places the obligation on the private sector, reducing budgetary expenditures.*
- *Russia and China (Specific Models): Russia's model is mobilization-oriented, focused on military readiness and control of the domestic market. China, on the other hand, uses state capitalism and "market opportunism" — filling its reserves when prices are low.*

Key words: *strategic oil reserve, state reserve, reserves, strategic stockpiles.*
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Introduction

The **strategic petroleum reserve** in contemporary geopolitics is viewed not merely as a stockpile of raw materials, but as a fundamental guarantee of **national energy security**. Its analysis brings together several key dimensions:

- **Historical evolution**: the developments that compelled the Western world and leading global powers (the United States, the European Union, Japan, Russia, etc.) to establish protective mechanisms.
- **International standards**: the **90-day net import rule** established by the **International Energy Agency (IEA)** and its adaptation across different economic systems.
- **Economic modeling**: the three principal models of petroleum reserve creation—**state-owned** (United States), **hybrid** (European Union/Japan), and **delegated** (United Kingdom).
- **Impact on the private sector**: considering both the positive aspects (shock absorption) and the negative aspects (capital lock-up).

The management of strategic petroleum reserves is no longer merely a matter of warehouse control; it is the **highest level of risk management**, where state interests and private-sector efficiency intersect.

The Strategic Petroleum Reserve of the United States

The idea of establishing a **Strategic Petroleum Reserve (SPR)** in the United States emerged in the period following the **Second World War**. As early as **1944**, the administration of President **Franklin D. Roosevelt** was already considering the necessity of government oil stockpiles for military purposes. However, in the early Cold War period, the United States was a **net exporter of oil**, which temporarily reduced the urgency of the issue. The situation

changed dramatically in the early **1970s**, when domestic U.S. oil production reached a critical threshold and dependence on imports increased.

In **October 1973**, following the **Yom Kippur War (Arab–Israeli War)**, the **Organization of Arab Petroleum Exporting Countries (OAPEC)** imposed an embargo against countries that supported Israel. As a result, oil prices in the United States increased fourfold, causing a severe recession, inflation, and an acute fuel shortage. This event demonstrated that energy dependence posed a direct threat to **national sovereignty** and **economic stability**.

In response to the energy shock, on **December 22, 1975**, President **Gerald Ford** signed the **Energy Policy and Conservation Act**. Its main objectives were:

- to reduce the impact of oil supply disruptions,
- to fulfill U.S. obligations under the **International Energy Agency (IEA)** framework,
- and to encourage energy efficiency.

The original target was the creation of a reserve of **1 billion barrels of oil**.

For the location of the reserve, the **Gulf Coast region** (Texas and Louisiana) was selected. This choice was based on the existence of **underground salt domes**, which offer several technical advantages:

- **Cost efficiency**: storage in salt domes is approximately **ten times cheaper** than above-ground tank storage.
- **Security**: underground caverns are virtually impermeable and highly resilient to environmental conditions.
- **Logistics**: proximity to refineries and ports.

Regarding the timeline of accumulation, the **IEA was established in 1974**, under which the United States and other member states committed themselves to maintaining oil reserves equivalent to at least **90 days of net imports**. This became the **international standard** for managing strategic petroleum reserves.

Accordingly, the U.S. strategic petroleum reserve is not merely a physical storage facility; it is a **geopolitical instrument of defense**. Its creation was a rational response to energy vulnerability and laid the foundation for the modern global architecture of energy security.

The Strategic Petroleum Reserve of the Soviet Union and the Russian Federation

The strategic reserve system of the **Soviet Union**, known as **Gosrezerv**, was one of the largest, most secretive, and most complex mechanisms in the world. Unlike Western models, which were created in response to the **1973 oil crisis**, the Soviet system was built from the outset upon a **mobilization economy** and the doctrine of **total war**.

The origins of the system date back to the post-**1917 Revolution** period, but it assumed its modern form on **October 17, 1931**, when the **Reserve Committee under the Council of People's Commissars of the USSR** was established. Its purpose was:

- to ensure military readiness,
- and to insure the leap of industrialization.

Oil was regarded as the **blood of the Red Army**, underlining its critical importance.

Significant changes in reserve placement were revealed during the **Second World War**. Stationary storage sites proved vulnerable to air strikes, and therefore, by the late **1940s**, the era of **underground and protected storage construction** began, becoming part of the Cold War strategy.

The Soviet oil reserve was **not a market buffer**. Its economic logic was based on **centralized allocation**.

The reserves were divided into two main categories:

1. **State reserve**: an untouchable stockpile intended solely for war or global-scale catastrophe.
2. **Mobilization reserve**: stockpiles stored directly at industrial enterprises and railway hubs to facilitate wartime economic conversion.

In the Soviet economy, the reserve also served as a **compensator for planning failures**. When five-year plans were disrupted, the **Politburo** authorized the release of reserves in order to prevent economic collapse.

The Soviet Union developed unique oil storage methods that are still used in Russia today:

- **Underground caverns**: storage in salt formations (for example, in the **Caspian lowlands**).
- **Isolated complexes**: special military facilities (so-called *objects*) carved into mountain massifs.
- **Pipeline technological reserves**: the **Druzhba** and other major trunk pipelines were filled in such a way that they permanently contained millions of tons of oil, which formally counted as reserve stock.

Although parts of the Soviet state material reserve property remained with different republics, the direct successor of the system today is the **Russian Federation**, whose strategic reserve system differs sharply from that of other countries. Russia is one of the world's largest exporters of energy resources; therefore, its reserve system is designed not to reduce import dependence, but to ensure **domestic market control**, **military readiness**, and the **manipulation of export pricing**.

Russia does not store crude oil on the same scale as the United States. Its strategy is divided into two parts:

1. **Petroleum product reserves**: **Gosrezerv** stores finished products (diesel, gasoline, kerosene) in storage facilities (*kombinats*) distributed throughout the country. This is essential for military logistics and domestic price regulation.
2. **Pipeline system reserves**: for Russia, the pipeline system itself functions as a reserve. Tens of

millions of tons of oil are permanently contained in the system as **technological oil**, which can be used as a crisis buffer.

Since Russia is an exporter, its mathematical algorithm does not rely on **90 days of imports**. Its **Z coefficient** is determined by the **mobilization plan**.

Russia's **Energy Strategy to 2035** envisions the expansion of underground oil and gas storage, with particular emphasis on the **eastern corridor (toward China)** in order to create logistical reserves for Asian markets.

Russia's reserve model is therefore of a **mobilization type**. It is not designed to protect against the classic fluctuations of a market economy, but rather serves as the state's **reserve purse** and **military warehouse**. Its defining characteristics are **extreme centralization** and **opacity**.

The Strategic Petroleum Reserve of the European Union

In examining the historical stages of oil stock creation in the **European Community**, special attention should be given to the **first directives of 1968**, coordination with the **International Energy Agency (IEA)**, and the **2009 reform**, which established the modern standard of European energy security.

The idea of oil reserves in Europe emerged significantly earlier than in the United States. On **December 20, 1968**, the **European Economic Community (EEC)** issued **Directive 68/414/EEC**, whose main characteristics were:

- Member states were required to maintain minimum oil stocks equivalent to **65 days of the previous year's domestic consumption**.
- The objective was not to influence global prices, but rather to compensate for **short-term supply disruptions**.

The **1973 oil embargo** showed that a **65-day reserve** was insufficient. In **1974**, the **IEA** was established and required member states—including European countries—to increase their reserves to **90 days**.

In the late **2000s**, increased volatility in energy markets and the **Russia–Ukraine gas disputes (2006 and 2009)** compelled the European Union to fundamentally reassess its oil reserve management mechanism.

On **September 14, 2009**, **Directive 2009/119/EC** was adopted. It remains the backbone of European energy security to this day. Its key innovations include:

1. **Calculation methodology**: member states must maintain oil stocks corresponding to either:
   - **90 days of average daily net imports**, or
   - **61 days of average daily inland consumption**, whichever is greater.
2. **Central Stockholding Entities (CSEs)**: countries were authorized to establish **non-commercial state agencies** to manage oil stocks.
3. **Transparency and reporting**: strict **monthly reporting** to the **European Commission** was introduced.
4. **Specificity of the European model**: **decentralization**. Unlike the U.S. SPR, which is 100% state-owned and centralized, the European model is mixed:
   - **State stocks**: managed by CSEs.
   - **Private obligations**: oil companies (such as Shell, BP, Total, etc.) are required to maintain strategic stocks in their own terminals.

Not all companies are subject to the reserve obligation. Under **British legislation**, the requirement applies only to entities that:

- supply more than **50,000 tonnes of petroleum products annually** to the UK domestic market;
- this includes both domestic refiners and pure importers.
- **Emphasis on refined products**: the EU places particular importance on the storage of **gasoline, diesel, and kerosene**, because Europe has more limited refining capacity compared to the United States.

The evolution of the European Union's strategic reserves reflects a transition from **individual state protection** toward **collective energy solidarity**. **Directive 2009/119/EC** ensures that the European market is protected not only from global shocks but also from local supply interruptions.

The Strategic Petroleum Reserve of the United Kingdom (Great Britain)

The analysis of the **United Kingdom's strategic petroleum reserves** is especially interesting because it differs radically from the U.S. model. The UK uses a **delegated obligation model**, under which the state does not itself own oil; rather, it imposes the obligation on the **private sector**.

Historically, the UK's approach to energy security differed from that of other European countries. During the **1970s and 1980s**, the boom in **North Sea oil production** turned the country into a **net exporter of oil**. It should be noted that countries that are **net exporters of oil** are not required to maintain a **90-day import reserve** (Bamberger, 2004). However, after **2005**, with the decline of North Sea production, the UK again became a **net importer of oil**, forcing the government to tighten reserve obligations.

The main legal instrument governing oil reserves in the UK is the **Energy Act of 1976**, according to which:

The UK applies an **industrial obligation model**. The **Secretary of State** has the authority to direct oil companies that supply more than **50,000 tonnes of oil annually** to the British market to maintain minimum stock levels.

The British model is economically efficient for the state budget because:

- the state does not purchase oil or build storage facilities;
- the cost of maintaining reserves is transferred to companies, which is ultimately reflected in fuel prices;
- companies without their own storage facilities may lease reserve capacity from other companies through special contracts.

As an **IEA member**, the UK is required to maintain reserves equivalent to **90 days of the previous year's net imports**. Despite leaving the **European Union (Brexit)**, the UK retained standards similar to **Directive 2009/119/EC** in domestic legislation in order to ensure energy compatibility with the continent.

In **2022**, following the outbreak of the **Russia–Ukraine war**, the UK coordinated with the **IEA** to release reserves in order to stabilize the market, providing another test of this model's effectiveness.

The British model is a classic example of how a state can ensure **energy security with minimal budgetary expenditure**, through partnership with the private sector. This model is particularly resilient when a country still possesses domestic production (even if declining) and a developed logistics network.

The Strategic Petroleum Reserve of China

The analysis of **China's strategic petroleum reserve** represents one of the most complex issues in modern economic geopolitics. China's model is unique in that it combines **state capitalism**, **military-strategic planning**, and elements of **market manipulation**.

China's interest in strategic reserves began in **1993**, when the country shifted from being a **net exporter of oil** to a **net importer**. However, the process accelerated in **2003**, after President **Hu Jintao** articulated the **"Malacca Dilemma"**: because approximately **80% of China's oil imports pass through the Strait of Malacca**, any blockade in a crisis would mean economic collapse for China. As a result, in **2004**, the creation of a strategic petroleum reserve was officially approved.

China adopted a **systematic, phased approach**:

- **Phase I (2004–2009)**: construction of four giant storage facilities along the coast (**Zhoushan, Zhenhai, Dalian, and Huangdao**). Total capacity: **100 million barrels**.
- **Phase II (2010–2015)**: regional diversification. Construction of inland storage facilities (e.g., **Lanzhou**) and development of underground caverns.
- **Phase III (2016–present)**: integration of commercial and state reserves. The goal is to achieve the equivalent of **90 days of net imports** (approximately **600–800 million barrels**).

Unlike Western models (U.S., UK), China's system is distinguished by two characteristics:

- **Opacity**: China does not publish precise official data on reserve volumes. Analysts rely on **satellite observations** to estimate stock levels.
- **Market opportunism**: China fills its reserves when global prices fall sharply (e.g., during the **2014–2015 oil price collapse** and the **2020 pandemic**). This is effectively a strategy of **financial arbitrage at state scale**.

China views reserves not only as an economic buffer, but also as a **strategic accumulator** in the event of possible military conflict. In **2021–2022**, China conducted its first **public auctions of oil from its reserves** in order to stabilize domestic prices, demonstrating that it is prepared to actively manage the global market.

China's strategic reserve is a **state-corporate hybrid** that serves the long-term objective of the **Communist Party—energy invulnerability**. Although China is not a full member of the **IEA**, the scale of its reserves already equals or exceeds that of the United States, making it an **invisible regulator of the global oil market**.

The Strategic Petroleum Reserve of Japan

The analysis of **Japan's strategic petroleum reserve** represents the **gold standard of energy security**. Japan is a country that possesses virtually no domestic fossil fuel resources and depends on imports for approximately **99%** of its oil needs, which has forced it to develop one of the world's most layered and strictly regulated reserve systems.

For Japan, the **1973 oil crisis** was an **existential shock**. The country's economy, heavily dependent on oil during the period of the "Japanese economic miracle," faced the risk of collapse. As a result, in **1975**, the **Oil Stockpiling Act** was adopted. Initially, emphasis was placed on the private sector, but from **1978**, the state began building its own national reserves.

Japan's reserve system consists of **three major components**, making it one of the most reliable in the world:

1. **Government reserves**: managed by the **Japan Organization for Metals and Energy Security (JOGMEC)**. Volume: **90 days of consumption**.
2. **Private reserves**: the law requires refiners and importers to maintain stocks equal to **70 days of consumption**.
3. **Joint reserves with producer countries**: Japan uses a **shared storage model** (for example, with the **United Arab Emirates** and **Saudi Arabia**), whereby producers store oil in facilities located in Japan, granting Japan priority access in times of crisis.

Because of its geographical constraints (**earthquakes** and **limited land area**), Japan has developed **three types of storage**:

- **Above-ground tanks**: the traditional method.

- **Underground caverns**: storage carved into rock formations (e.g., **Kuji** and **Namikata**).
- **Marine (floating) storage**: giant tanker-like structures located at sea (e.g., **Shirashima**).

From a mathematical standpoint, Japan's **service level (Z coefficient)** is nearly maximal. In total, Japan maintains reserves exceeding **200 days of consumption**, more than double the IEA's minimum requirement of **90 days**. This is Japan's response to the geopolitical risks of global supply chains.

Japan's model demonstrates that the complete absence of domestic resources can be offset by **technological and institutional excellence**. Japan's reserve is not merely a stockpile; it is a guarantee of the country's **economic viability**.

Conclusion

The approach of the **International Energy Agency (IEA)** is **deterministic** (predefined). It is based on a **90-day period**, because 90 days is considered the optimal time frame necessary for the global market to adapt. This is the time required to identify alternative suppliers, redesign tanker routes, and activate diplomatic channels. It is the **minimum survival threshold**.

At the same time, **dynamic cost optimization** is also crucial. Its essence lies in finding a balance between two opposing forces:

1. **Storage cost**: maintaining reserves is expensive (construction of storage facilities, capital tied up in oil, natural losses).
2. **Shortage cost**: the absence of oil is even more expensive (factory shutdowns, transport collapse, GDP decline).

The **optimal reserve** is the point at which the sum of these two costs is minimized. In other words, we store exactly enough so that the price of insurance does not exceed the potential loss from catastrophe. This is the principle of **rational insurance**.

Ultimately, the **strategic petroleum reserve** is a guarantee of a country's **economic viability**. It is a rational response to **energy vulnerability**, ensuring **national sovereignty** and **stability** in force majeure situations.

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