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Federal Office for National Economic Supply FONES

Report on Strategic Stockpiling 2023

This report is available on the www.bwl.admin.ch website.

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1 Summary

This Report on Strategic Stockpiling 2023 sets out how holdings of compulsory stocks have changed over the previous four-year period (i.e. since 2019), their current status, and how they are likely to develop. The objectives and measures it contains reflect their current status at the time the report was drawn up. They may be adjusted in the course of the subsequent reporting period in response to changing economic and market circumstances.

In Switzerland, supplying the country with goods and services is primarily a matter for the private sector. Only if the private sector is unable to fulfil this role does the state intervene. The National Economic Supply (NES) organisation ensures that any supply shortages and disruptions have as little negative impact as possible for Switzerland. One instrument it uses to do this is compulsory stockpiling. It is one of the key measures that can be taken to ensure the country's supply of essential goods in the event of severe shortages.

The NES organisation aims to support the economy with measures until the private sector is once again in a position to guarantee the country's supply. The NES is guided by the principle of subsidiarity in all its actions.

Until now, lengthier food shortages lasting around four months have been bridged by releasing compulsory stocks and promoting imports. Therefore, the volume of goods currently held as compulsory stocks covers the average demand of the Swiss population for a period of three to four months, depending on the basic foodstuff in question. Compulsory stocks of foodstuffs include sugar, cooking oils and coffee, as well as grain and rice. Additional compulsory stocks of feedstuff and fertilisers are also held.

A new approach to calculating the compulsory stockpile quantities has been developed on the basis of the 2018 strategy for ensuring the supply of food. Goods from compulsory stocks should now be able to cover national supply at a reduced level until the start of the new growing season, i.e. for a maximum of twelve months. The Federal Council held a consultation on the matter in 2023, and is expected to announce the next steps in 2024.

Where compulsory stocks of energy are concerned, the focus is on supplies of mineral oil and natural gas. Although mineral oil consumption is decreasing steadily in Switzerland, oil products remain very important. They account for more than 90% of the energy required for transport, while approximately half of that needed for heating comes from fossil fuels. The federal government determines the extent of the compulsory stocks to be held: in the case of petrol, diesel and heating oil, compulsory stockpiles must be sufficient to cover demand for four and a half months, and in the case of aviation fuel for three months. Compulsory stocks of heating oil are also held, and these must be capable of replacing the gas normally consumed in dual-fuel installations for four and a half months.

Compulsory stocks of natural gas are not held directly. This is because, for geological, technical and economic reasons, Switzerland does not have any large underground natural gas storage facilities of its own, such as salt caverns or porous reservoirs. Neither does it have any large storage facilities for liquefied natural gas at present. For this reason, it prefers to indirectly store heating oil for the operation of dual-fuel installations. A gas monitoring system was set up by the NES organisation in 2022 and 2023 as a means of increasing the security of supply of natural gas. It is based on the Ordinance on the Organisation Responsible for Ensuring National Economic Supply in the Gas Sector¹ (VOGW). The monitoring system is designed to keep track of the gas supply situation throughout Switzerland. In an emergency, the Federal Council may order additional standby measures to be taken – including appeals

¹ SR 531.81

to reduce consumption, the switching of dual-fuel installations to heating oil, and the introduction of cutbacks and bans or quotas.

With regard to electricity, Switzerland's Energy Strategy 2050 is likely to lead to some sweeping changes. Nevertheless, the remaining compulsory stocks of uranium fuel elements are to be maintained until further notice.

The supply of therapeutic products and medical devices experienced more frequent and more severe disruptions in the period under review. The largest number of cases was reported in 2022, when there were 201 disruptions to supply. However, it should be noted that the duty to report supply disruptions was also extended in the period under review. The global deterioration in the supply situation was partly caused by the COVID-19 pandemic, which had a drastic impact on the manufacture of therapeutic products and on logistics. The problem with Switzerland's heavy dependence on production sites in Asia became evident. At present, medicines to treat infectious diseases, opiates and vaccines for primary immunisation are subject to compulsory stockpiling. The surge in demand created by a pandemic makes securing the supply of protective equipment, for example, challenging. Therefore, certain medical devices are also stockpiled. Due to the growing challenges in the supply of therapeutic products, other stockpiling options are being examined in addition to the compulsory stockpiling system to cope with future shortages.

Compulsory stocks of plastics are held in granulate form along with the relative additives. These can be used to manufacture packaging for therapeutic products and foodstuffs in particular. The reserve stocks of ethanol have also been built up. This was prompted by experiences gained during the COVID-19 pandemic in 2020.

2 Introduction

2.1 Background

The National Economic Supply (NES) organisation reviews the composition of compulsory stocks on a regular basis. It discloses the findings of its review in this report.

This report sets out how holdings of compulsory stocks have changed since the previous reporting period, their current status, and how they are likely to develop. Its principal target readership is the Federal Department of Economic Affairs, Education and Research (EAER), the NES specialist divisions, and the holders of compulsory stocks and their compulsory stock organisations.

The objectives and measures contained in this report reflect their current status at the time it was drawn up. They may be adjusted in the course of the subsequent reporting period in response to changing economic and market circumstances.

In parallel with the Report on Strategic Stockpiling 2023, the NES has been specifically tasked by the Federal Council with examining, together with other federal, cantonal and economic agencies, whether compulsory stocks need to be expanded to include further essential goods for the purpose of securing supply in a national or international crisis. In this context, planning, procurement, storage and financing are being looked at along with decision-making powers on procurement in a crisis. In addition, the mandate envisages the establishment of a controlling mechanism for the stockpiled goods, and regular reporting. The outcomes of the implementation of this Federal Council mandate are not dealt with in this report.

2.2 Approach and methodology

This report describes and assesses compulsory stockpiling. Information on the various holdings of compulsory stocks is structured in the same way for each product or group of products. The Federal Office for National Economic Supply (FONES) has based its assessment of the current inventories of compulsory stocks on data supplied by the specialist divisions and the compulsory stock organisations.

This assessment is produced for the attention of the Delegate for National Economic Supply and other decision-making bodies responsible for compulsory stocks. It provides both a snapshot of the current situation and a look ahead to future developments. The range of goods for which stocks must be held may be amended at any time as part of normal procedures in response to changes in consumer behaviour or market requirements.

3 The stockpiling system

3.1 Legal basis

The basic principles of compulsory stockpiling are laid down in the National Economic Supply Act, which was revised in 2016, and in the associated ordinances. A list of the relevant legal instruments can be found in the Appendix. These legal foundations empower the FONES to issue directives and guidelines which assign tasks to the various organisations involved, such as conducting stockpile checks and issuing general import licences. A number of these legal bases were amended during the reporting period in line with developments in stockpiling practices.

3.2 Instruments

a. Compulsory stockpiling

The Federal Council requires compulsory stocks to be held of goods that it designates as essential. This duty to maintain compulsory stocks applies to certain foodstuffs, feedstuffs, sources of energy, therapeutic products and fertilisers. The EAER determines the duration for which the respective compulsory stocks should satisfy the average demand of the Swiss population. For some goods, such as nitrogen fertilisers, where the period of time does not serve as a suitable basis, the quantities to be stockpiled are defined.

Companies that import a minimum volume of such goods or place them on the Swiss market for the first time must hold compulsory stocks. More than 95% of the holders of compulsory stocks are subject to this form of stockpiling.

Companies can draw on bank loans guaranteed by the federal government to fund the goods held as compulsory stocks, thus giving them access to low-interest credit. At the same time, they are able to claim higher tax write-offs on their compulsory stocks.

b. Supplementary compulsory stockpiling

Arrangements may be made for the supplementary compulsory stockpiling of essential goods, even though the Federal Council does not require stocks of them to be held. In such cases, the FONES concludes compulsory stock agreements by mutual consent with the private-sector companies concerned. Supplementary compulsory stockpiling is used as an instrument when reserves of essential goods are to be held for which there is normally only little demand, or which are offered by only a small number of suppliers. These include certain medicinal products, medical devices, plastic granules for the packaging industry and uranium fuel elements. Just under 5% of holders of compulsory stocks do so under a supplementary compulsory stockpiling arrangement.

As is the case with compulsory stocks, the companies may take out bank loans guaranteed by the federal government to fund the goods held as compulsory stocks, and make additional tax write-offs.

c. Secure supply agreements with individual companies

The FONES can conclude 'secure supply' agreements with producers, warehousing companies and service providers. These agreements are intended to ensure that sufficient stocks are held.² As is normally the case with compulsory stocks, goods held under secure supply agreements remain the property of the contracting party, i.e. the company. This instrument is currently being used for the stockpiling of

² Article 10 paragraph 2 NESO

ethanol. These reserves were built up during the COVID-19 pandemic and are meant to ensure the production of disinfectants and the supply of ethanol to other sectors, in particular the pharmaceutical industry, especially when faced with a sudden surge in demand. In contrast to compulsory stocks, the federal government compensates the contracting parties directly for stockpiling the goods. A secure supply agreement was chosen as the instrument in the case of ethanol because one large company dominates the Swiss market. Generally requiring all market participants to maintain compulsory stocks would not be effective in this market situation and would have imposed a comparatively heavy administrative burden.

d. Other forms of stockpiling

If there are signs of an imminent shortage, the federal government may also require companies to increase their stocks of essential goods. Thus, for example, in 2022, as a consequence of the war in Ukraine and the resulting limited availability of natural gas, the federal government adopted a temporary ordinance ensuring that gas could be procured from neighbouring countries' stores in the event of a serious shortage. It amended the ordinance in 2023 and extended its scope of validity until 2024.

3.3 Compulsory stock organisations

For the purposes of maintaining compulsory stocks, the affected sectors of the economy have the option of setting up what are known as 'compulsory stock organisations'. These organisations take the legal form of an association or cooperative, and the National Economic Supply Act empowers them to set up guarantee funds. These guarantee funds are intended to cover storage costs and offset fluctuations in the price of the stored goods. They are financed by contributions from the importers or initial distributors of the goods being held as compulsory stocks. The FONES ensures that these contributions are appropriate and used for their intended purpose. The compulsory stock organisations also carry out certain tasks which are delegated to them by the FONES, such as conducting checks of compulsory stockpiles and handling general import licences.

Organisation	Sector	Founding year
Carbura	Liquid fuel	1932
réserveuisse	Grain, food, and feedstuffs	2003 (1948 ³)
Agricura	Fertilisers	1950
Helvecura	Therapeutic products	1951
Provisiogas	Natural gas	2015

3.4 International Energy Agency IEA

Switzerland is a member of the International Energy Agency (IEA). Founded in 1974, it is an independent organisation within the Organisation for Economic Co-operation and Development (OECD). One of

³ Predecessor organisations

the IEA's aims is to respond to disruptions in the global supply of oil by coordinating a collective response from its members. This involves members making additional volumes of oil available to calm the global markets. IEA members, who are net importers of oil, are therefore obliged to hold reserves of crude oil. These reserves must be equivalent to 90 days of that country's net imports in the previous year. Furthermore, the member countries must be able to take appropriate measures to curb their fuel consumption if necessary. If the IEA decides to take collective action in response to a disruption in supply, then Switzerland must also take part. The release of compulsory stocks is the first measure envisaged. The FONES works closely with the Swiss Federal Office of Energy and the Swiss oil industry to ensure it is prepared to cope with such a situation.

3.5 Withdrawal of goods from compulsory stocks

Compulsory stocks may be released in the event of serious supply bottlenecks or a general severe shortage that the private sector itself is unable to respond to. This is intended to prevent, or at least mitigate, a collapse in the supply of storable essential goods. Compulsory stocks can be released quickly.

The NES constantly monitors the supply situation. If there are signs of any potential disruption to supplies of essential products or product groups, the situation is analysed in greater depth. To this end, the NES works with industry associations, compulsory stock organisations, trade organisations, importers and domestic producers. A request to release compulsory stocks is made on the basis of its findings.

To bridge supply chain bottlenecks in the short-term, the FONES may temporarily allow a maximum of 20% of the total volume of a good to be withdrawn from compulsory stocks. If demand for goods held as compulsory stocks increases, the Delegate for National Economic Supply will ask the head of the EAER to release the required goods from the compulsory stockpiles.

The head of the EAER approves the release of compulsory stocks by means of an ordinance. The ordinance constitutes a mandate for both the NES specialist division concerned and the FONES to implement the measures it contains. Working on the basis of this ordinance, the competent specialist division defines the limits on withdrawal and the period for which the compulsory stocks will be available. Once the normal supply situation has been restored, the NES submits a request for the ordinance to be repealed.

The situation was particularly tight in relation to therapeutic products: in the period from 2019 to 2022, medication had to be called up from compulsory stocks to plug supply gaps in 416 cases. The supply of antibiotics was badly affected. As it is common for only a small number of companies to manufacture a particular active substance or offer a particular medicine, the sudden loss of a producer cannot (immediately) be offset by other market participants. Time and again, shortages of a given medication also result in shortages of other preparations with a similar range of indications. The use of goods from compulsory stocks nevertheless meant that Swiss hospitals always had access to the medication they needed.

Following a decision of the IEA, 57,000m² of emergency reserves of heating oil were released in March 2022 as part of a collective action taken along with the other IEA members to influence the price of oil products.

In summer and autumn 2022, restricted transport capacities on the Rhine, ongoing logistical problems experienced by foreign railways, and strikes in France hampered the import of oil products and other bulk goods. The federal government therefore approved temporary withdrawals from compulsory stocks. A total of 175,000m³ of diesel, 80,500m³ of petrol, 11,000m³ of jet fuel (kerosene) and 188,000m³ of heating oil was released in this context. Relatively small quantities of nitrogen fertilisers were also released for use due to import disruptions.

4 Foodstuffs

4.1 Overview

The following table lists the food items for which compulsory stocks must be held, alongside the minimum demand the federal government requires to be covered, and the actual level of compulsory stocks held (as of 31 May 2023).

'Demand coverage' (or 'minimum demand') refers to the quantity that the federal government has decreed should be stockpiled. It is usually expressed as a period of time or, in a few cases, as an absolute quantity. The volume of compulsory stocks held must be sufficient to cover the average demand of the Swiss population during that period.

Stockpiled product	Demand coverage (DC)	Holdings ⁴	Trend
Cooking oils and fats	4 months	35,600t	Increase quantity
Rice	4 months	16,400t	Increase total quantities
Common wheat for human consumption	4 months	160,000t	
Durum wheat for human consumption	4 months	23,000t	
Common wheat for dual use ⁵	3–4 months	212,000t	
Energy sources for feedstuffs	2 months	98,000t	
Protein sources for feedstuffs	2 months	94,600t	Reduce quantity
Nitrogen fertilisers (pure N)	1/3 of quantity needed for one growing period	17,000t	No change
Sugar	3 months	55,000t	No change
Coffee	3 months	18,800t	No change
Raw materials for yeast production	1 month	516t	No change

⁴ Rounded values

⁵ For human consumption, but can also be used as feed

Stockpiled product	Demand coverage (DC)	Holdings ⁴	Trend
Rapeseed	60% of quantity needed for one growing period	60t	Under development

4.2 The trend in foodstuffs

The review of compulsory stocks for foodstuffs was planned as follows during the NES reporting period:

Period	Category	Goods reviewed	Finding	Last updated
2013 – 2016	Essential foodstuffs	Infant formula	No action required; high self-sufficiency level	Not reviewed in the current reporting period
	Consumer goods	Coffee	According to 2019 consultation, no action required	Not reviewed in the current reporting period
2017 – 2020	Basic foodstuffs	Grain types	Changes as per section 4.2. of this report and 4.3. of the Report on Strategic Stockpiling 2019	Consultation in summer 2023; decisions on next steps in 2024 at the earliest
		Cooking oils/fats		
		Sugar		
	Feedstuffs	Energy sources		
	Feedstuffs	Protein sources		
Fertilisers	Phosphorus Nitrogen Potassium	Only one compulsory stockpile is required for mineral fertilisers; quantity increased by lost domestic share	Increase by lost domestic share implemented	
2021 – 2024	Seeds	Target crops for human consumption (grain, oilseeds, sugar beet, potatoes)	Compulsory stocks covering one year's demand for rapeseed proposed. No requirement for grain and potatoes due to security of domestic supply. Sugar beet cannot be stockpiled for technical reasons.	Entry into force of Ordinance on the Compulsory Stockpiling of Seeds of 26 January 2022
	Seeds	Vegetables	A feasibility analysis covering financial and logistical aspects has been requested for three varieties	Next steps to be determined as of 2024
	Plant protection products	For target crops for human consumption and only those diseases / pathogens causing highest yield losses	Confirmed as being essential yet highly vulnerable; however, a traditional compulsory stockpile is not suitable	Next steps to be determined as of 2024
	Feedstuffs	Alternatives to soybean meal	Propose 25% soybean meal equivalents	Consultation in summer 2023; decisions on next steps in 2024 at the earliest
	Seeds	Forage	No action required	No follow-up

The trend in basic foodstuffs and feedstuffs

In May 2019, the Foodstuffs Division asked the Delegate for National Economic Supply to make extensive changes to compulsory stocks. The 2018 strategy for ensuring the food supply played a key role in

this; it takes into account the ongoing fragmentation and globalisation of value chains along with numerous risks, including those in relation to logistics, IT and climate. This resulted in a new approach to calculating the volume of goods to be stockpiled. In addition, various parliamentary procedural requests calling for a review and potential expansion of the compulsory stockpiling system were submitted in 2019 and 2020.

Under the new calculation method, if the situation calls for the release of compulsory stocks, it must in future be possible to satisfy the average energy intake of the population (about 2,300 calories per person, per day) until the start of the new growing period (i.e. for a maximum of twelve months). The major contribution that can be made by domestic production in ensuring supply when severe shortages occur is taken into account. When calculating the quantity of compulsory stocks to be held, it is assumed that imports of foodstuffs will no longer be available and will have to be fully compensated. In addition to raw products, these calculations also factor in the loss of imports of processed products, which contribute significantly to supply during normal times. At the same time, it is assumed that domestic production yields can be kept stable and that the necessary means of production will be available – in part thanks to the compulsory stockpiles.

On this basis, the National Economic Supply organisation proposes making significant adjustments to the compulsory stockpiling of foodstuffs. These are to be included in the EAER Ordinance on the Compulsory Stockpiling of Foodstuffs and Feedstuffs⁶. The proposals were put out to public consultation⁷ to gather feedback in 2023. The decision on the proposed set-up is expected in 2024.

The trend in other means of production

A start was made during the 2017–2020 reporting period on evaluating other means of production (including seeds for grain, sugar beet and rape, and seed potatoes). From 2021 onwards, further investigations were carried out regarding seeds (vegetables, forage crops) and plant protection products. In addition, the question of whether soybean meal equivalents can be used as a source of protein was clarified.

⁶ SR 531.215.111

⁷ [Consultation 2023/16: Amendment of the EAER Ordinance on the Compulsory Stockpiling of Foodstuffs and Feedstuffs](#)

4.3 Basic foodstuffs and feedstuffs

Stockpiled product	Demand coverage (DC)	Holdings ⁸	Trend
Cooking oils and fats	4 months	35,600t	Increase quantity
Sugar	3 months	55,000t	No change
Coffee	3 months	18,750t	No change
Rice	4 months	16,400t	Increase total quantities
Common wheat for human consumption	4 months	160,000t	
Durum wheat for human consumption	4 months	23,000t	
Common wheat for dual use ⁹	3–4 months	212,000t	
Energy sources for feedstuffs	2 months	98,000t	
Protein sources for feedstuffs	2 months	94,600t	Reduce quantity

a. Description

The National Economic Supply organisation intends to make significant changes to the compulsory stockpiling of foodstuffs. The planned changes concern goods the Federal Council already requires to be stockpiled. Article 6 of the Ordinance on the Compulsory Stockpiling of Foodstuffs and Feedstuffs gives the EAER the power to make its own decisions regarding the changes. However, in view of the political, financial and economic implications of the proposals, a consultation procedure was carried out in 2023 (see section 4.2 above).

Grain:

In addition to compensating for the loss of raw product imports, grain – in the new calculation method – also serves to compensate for other imported calories. Accordingly, a significant increase in the quantity of grain held as compulsory stocks of around 250,000 tonnes is being requested (from today's 507,900 tonnes to 755,000 tonnes).

Cooking oils/fats:

As Switzerland is heavily dependent on imports of vegetable oils and fats, an increase of around 10,000 tonnes is being requested (from today's 35,583 tonnes to 44,000 tonnes).

⁸ Rounded values.

⁹ For human consumption, but can also be used as feed

Feedstuffs:

Stocks of protein sources for feedstuffs should in future cover the average requirements for pigs and poultry for about two months. In particular, this will allow orders to be given to slaughter the relevant livestock in good time should a severe shortage arise. Grassland yields and protein sources available domestically will be used to secure the supply of feedstuffs to livestock that feeds on roughage. As a result, the quantity required to be stockpiled will be reduced from its current 93,300 tonnes to 58,000 tonnes.

With regard to energy sources, the calculation shows that the reduced demand for feedstuffs in the event of early slaughter can generally be met by domestic production.

Sugar:

In view of its high energy density and suitability for storage, sugar should continue to contribute to bridging 12 months' requirement. Therefore, compulsory stocks of approximately 55,000 tonnes (the current level) should be held as a strategic reserve.

Coffee:

In line with a Federal Council decision, the minimum demand to be covered by coffee remains unchanged at three months.

b. Assessment

The competent political bodies will decide on the next steps based on the outcome of the consultation procedure.

c. Trend

No decisions on what should happen going forward, as outlined above, are expected before 2024.

The proposed changes are summarised in the table below. The quantities are now indicated as tonnage rather than in terms of demand coverage:

Product	As of end-2021	Proposed quantity
Cooking oils/fats	35,583 tonnes	44,000 tonnes
Common wheat for human consumption, durum wheat for human consumption, rice	199,400 tonnes	755,000 tonnes (in severe shortage situations, must be available exclusively for human consumption; the energy sources required for feedstuffs can be supplied by domestic production)
Common wheat for dual use/ as energy compensation	140,000 tonnes	
Energy sources for feedstuffs	168,500 tonnes	
Protein sources for feedstuffs (now also for pigs/poultry)	93,300 tonnes	58,000 tonnes

4.4 Fertilisers

Stockpiled product	Demand coverage (DC) / Holdings	Trend
Nitrogen fertilisers	17,000 tonnes pure N	No change

a. Description

Fertilisers are substances that support the growth of plants and improve their yield and quality. Nitrogen, phosphorus and potassium are particularly important here.

Phosphorus is required to supply plants with energy. Most of today's Swiss soils are very high in phosphorus. As long as it is bound into the soil, it can be regarded as a reserve for times of reduced supply.

Potassium promotes resistant cell tissue and is essential in regulating the plant's water balance. In the event of a disruption to supply, demand can be covered by farm manure.

Nitrogen is particularly important for plant yields. The availability of natural nitrogen, which is present in the soil and can be absorbed by plants, is too low to meet minimum demand. For this reason, nitrogen must be input during the growing season in the form of organic or mineral fertilisers in order to achieve stable yields. Compulsory stocks are held to deal with any supply disruptions.

b. Assessment

Nitrogen deficiency results in significant crop yield losses. Nitrogen-based mineral fertilisers can be substituted with animal manure to a certain extent. The volume of manure produced is determined by the size of the animal population, and its distribution cannot be adjusted in the short term.

Wheat, rape and sugar beet in particular need to be fertilised for the first time at the beginning of the growing season to prevent yield losses. As a rule, nitrogen fertilisers are therefore delivered to farmers by the end of February. The supply of mineral nitrogen is entirely dependent on imports. Switzerland's only processing plant stopped operating in 2018. Imports of mineral nitrogen fertilisers are spread out over the year, with an emphasis on the second half of the year and a peak in November.

The inventory level was reviewed following events such as the low water levels of the Rhine in 2021, the rise in natural gas prices in 2021/2022 and the war in Ukraine. The experts were unanimous in their conclusion that the quantity required to be stockpiled should stay the same.

c. Trend

No adjustment to the current stockpiling volume is required. The quantity can be left at 17,000 tonnes of pure N.

4.5 Seeds

Stockpiled product	Demand coverage (DC)	Holdings	Trend
Rapeseed	60 tonnes	---	No change
Vegetable seed	---	---	Feasibility study for four varieties
Forage seeds	---	---	Compulsory stocks not required

4.5.1 Rape / grain / sugar beet / seed potatoes

a. Description

There are no indications that the deliberations made in the 2016–2019 reporting period need to be revised.

b. Assessment

The ordinance on the strategic stockpiling of seeds is in force (SR 531.215.61). Rapeseed has been made subject to compulsory stockpiling.

c. Trend

The physical implementation of the compulsory stockpiling of rapeseed is now under way. No requirement has been identified for grain and potatoes due to the security of domestic supply. It is not possible to set up compulsory stocks of sugar beet seed for technical reasons.

4.5.2 Vegetables

a. Description

The analysis of a scenario in which the domestic production of foodstuffs is increased in response to a severe shortage ('Potential Analysis 2017'¹⁰) makes it clear that further investigations are necessary when it comes to vegetable seed. Among other things, the analysis shows what contribution domestic vegetable production could make in the event of zero imports of agricultural products necessitating a medium-term expansion of agricultural production. According to the report, vegetable production would have to increase by more than 20%, and an additional 24,000 hectares of land (roughly equal to the area of the canton of Appenzell Ausserrhoden) would have to be used to grow vegetables in order to meet Switzerland's minimum demand in a severe shortage. Possible methods for increasing vegetable production include staggered cultivation¹¹ and growing under cover, which can shorten the time to harvest and allow the same area to be cultivated even more intensively. According to the Potential Analysis, stepping up vegetable production could be effective in the event of a severe shortage, as various limitations (including crop rotation restrictions and processing capacities) prevent the expansion of other arable crops, e.g. wheat or oilseeds.

¹⁰ Agroscope, Federal Office for National Economic Supply. [Ernährungspotenzial der landwirtschaftlichen Kulturfleichen](#) [Food potential of arable land]; available in German and French only. 2005

¹¹ Regularly planting small areas with the same crop over a longer period of time

b. Assessment

Hybrid varieties¹² are often used to grow vegetables in Switzerland. The seed is mainly produced abroad by a few large companies. Research, breeding and propagation skills are limited in Switzerland, as are resources. This makes it difficult to produce high-yield, disease- and pest-resistant hybrid varieties in Switzerland on a large scale within a short period of time.

Although seeds are also produced in Switzerland, these are mainly intended for use in line breeding¹³, household gardens and partly in organic farming. In certain cases, the existing infrastructures and available expertise would be advantageous in facilitating medium-term emergency solutions in a situation where severe shortages increasingly required Switzerland to find its own means of securing supply. However, this would call for a major shift in production. Moreover, it could create additional dependencies on means of production (e.g. production substrate, nutrient solutions or energy).

That is why the Food Division looked into nine crops. Five of these (onions, carrots, peas, spinach, white cabbage) were discussed in greater depth.

c. Trend

From a strategic perspective, compulsory stocks of each of the following cover one year's demand: carrots, onions, white cabbage and spinach seeds. However, there are no plans to stockpile white cabbage due to the fact that seedlings are often used in Switzerland at present instead of seeds. The Food Division would like to see the financial and technical feasibility of the project clarified in the next reporting period.

4.5.3 Forage

a. Description

Around 130,000 hectares of ley pastures are cultivated in Switzerland, almost equivalent to the area of the canton of Aargau. Among other factors, ley pastures provide the basis for roughage in cattle farming and improve soil fertility. Mixtures of different grass and clover varieties are used, almost without exception. There are sixteen varieties of grass and six varieties of clover on the list of recommended varieties. Ley pastures are often sown for use over a number of years, with the choice of varieties geared to the length of that use. The self-sufficiency level of seed for forage crops is about 10%.

As there is no border protection, only a relatively small amount of forage seed is produced in Switzerland for economic reasons. However, the skills required for the production and processing of seed can generally be found in Switzerland: it is reasonably active in breeding forage crops, and a large part of its domestic seed production is devoted to basic and pre-basic seed of the varieties being bred. Forage seed generally stores well and can be carried over without problems.

b. Assessment

The market for forage seed is global. Various countries have come to specialise in the production of specific seed varieties due to their climate and soils. Major suppliers can be found in Europe, as well as overseas. This concentration entails risks as a crop failure in any one region can create a global shortage. And when shortages occur, forage seed production finds itself in competition with direct food pro-

¹² Hybrids have genetically different parents. The use of hybrid varieties in plant cultivation can have a beneficial effect on the yield per plant and make the plant more resistant.

¹³ Pure plant lines are developed from the progeny. The advantages of line-bred varieties are their high homogeneity and genetic stability.

duction. For that reason, the Food Division rates the risk of forage seed becoming unavailable as significant.

On the other hand, the Division assumes that if domestic food production has to be increased in response to a severe shortage, the cultivation of ley pastures will be reduced by approximately one third. In addition to the ley pastures, around 600,000 hectares of extensive meadows and permanent grassland are available for use in a shortage. Swiss seed merchants normally hold enough stocks to cover roughly one year's demand.

The useful life of the ley pastures could be at least partially extended in a shortage. Compulsory stocks of forage seed were held until the 1990s. They were discontinued due to a lack of flexibility in relation to the varieties that could be held and because insufficient turnover of the seed was giving rise to considerable losses.

c. Trend

After weighing up all the arguments, the Food Division concluded that it was not necessary for the time being to reintroduce compulsory stockpiling to provide security of supply.

4.6 Plant protection products

Stockpiled product	Demand coverage (DC)	Holdings	Trend
Plant protection products	---	---	To be reviewed again from 2024

a. Description

Efforts to control pests and diseases include taking preventive measures, publishing decision guidance and using non-chemical methods. That these options are effective in protecting yields is undisputed. Should there be a need to increase the level of self-sufficiency due to a shortage, disease and pest pressure is also likely to increase. Accordingly, the Food Division of the NES organisation assumes that non-chemical options for controlling pests and diseases will not in themselves be sufficient to reduce significant crop failures. In the event of a severe shortage, synthetic active substances are to be used specifically on those crops for which potential yield losses can be effectively minimised.

The specialist division has carried out an initial assessment of the need for the compulsory stockpiling of plant protection products for sugar beet, grain, potatoes and rape. The extent of the damage caused by pests and diseases was included in the assessment along with the contribution made by the respective plant protection product in protecting yields. The following assumptions were made.

Sugar beet:

Insecticides are mainly needed to control flea beetles, earthworms, beet moths, beet leafminers and aphids. In addition, synthetic active substances are required to control snails (molluscicides), weeds and grass weeds (herbicides), and fungicides are needed to manage leaf-spotting disease, mildew and rust. When choosing insecticides and fungicides, care must be taken to ensure that they can also be used on other crops wherever possible. Seed treatment agents can be excluded from the review, as they are not used in Switzerland. Threadworm (nematode) control is not an issue; however, the trend here must be observed. Active substances against millet and soil pests (leatherjackets, etc.) should be taken into account.

Rape:

There is a need for insecticides which act against the common pollen beetle, cabbage stem flea beetle and weevil, amongst others, and for herbicides and molluscicides. In addition, a seed treatment agent is necessary to reduce seedling disease.

Grain:

Fungicides from the strategy for protecting sugar beet and potatoes are to be used. In the case of herbicides, the focus is to be placed on spring treatments. Grain seed is to be treated only with fungicides.

Potatoes:

Wherever possible, broad-spectrum agents capable of combating both potato blight and mould (alternaria) should be used as fungicides. Rotating families will also strengthen resilience. The active ingredients should also be suitable for use in fruit and vegetable cultivation. There is no need for wireworm control, as 'aesthetic' defects can be accepted.

b. Assessment

The vast majority of plant protection products used in Switzerland are imported from abroad. Even though some products are imported from neighbouring countries, the majority of active substances originate from production sites in China and India. Moreover, the market for plant protection products has changed considerably in recent years. For example, the global market has become concentrated: Swiss companies began reporting back in 2020 that they were having to place orders earlier and earlier so as to obtain the necessary quantities of plant protection products from around the world.

Goods were no longer freely available, leading to a tense situation on the global market. At the time, this was substantiated by the following factors:

- Market concentration: there had been a fall in the number of manufacturers and suppliers of active substances, formulations and products.
- Production security: there had been a rise in production shutdowns and closures of production sites. Reasons included the increase in maintenance work and inspections carried out by the manufacturers of active substances.
- Licensing difficulties: more and more tried-and-tested active substances were being banned (short-term) due to toxicity or their use permitted only under strict conditions.
- Time taken to issue new licences: taking longer.
- Position of Swiss market: very small compared with the rest of the world.

The situation deteriorated further in 2022. This was down to COVID-19, the associated infection control measures overseas and the repercussions for global logistics, as well as the energy shortage caused by the war in Ukraine. The procurement of plant protection products is therefore currently subject to high order lead times and a great deal of uncertainty.

c. Trend

When it comes to stabilising yields in severe shortages, synthetic plant protection products are indispensable for controlling the most serious diseases and pests in key crops. The vulnerability of plant protection product value chains is also considered to be high. Current political developments mean that any application for the compulsory stockpiling of plant protection products in 2023 would not be considered enforceable. The specialist division has stated that the review of compulsory stocks calls for a rethink. Accordingly, new approaches such as dynamic compulsory stockpiling or federal stockpiling are set to be examined in the next reporting period.

4.7 Raw materials for yeast production

Stockpiled product	Demand coverage (DC)	Holdings ¹⁴	Trend
Raw materials for yeast production	1 month		No change
– Molasses and thick beet juice		500t	
– Monoammonium phosphate and phosphoric acid		6t	
– Ammonium sulphate and liquid ammonia		10t	

a. Description

Yeast is an essential ingredient in the production of bread, a staple food. Two companies hold compulsory stocks of molasses and thick beet juice. One company also holds stocks of the four raw materials that are required to produce yeast (monoammonium phosphate, phosphoric acid, ammonium sulphate and liquid ammonia).

An aqueous solution of 40% molasses and 60% thick beet juice is used as the basis for yeast production. This has acids added to adjust its pH value to around 4.5, and is sterilised and filtered. Nutrient salts (mainly ammonium salts and phosphates) are then added along with B-group vitamins, as these are needed for the yeast to grow.

b. Assessment

Fresh yeast can be kept for only a short time as it remains fully effective as a raising agent for no more than 10 to 12 days at an ambient temperature of 2–8°C. To be able to produce bread, bakeries are therefore reliant on continuous, flexible deliveries of yeast. Yeast is produced by just two companies in Switzerland.

By holding compulsory stocks of molasses and thick beet juice, as well as other important agents in yeast production, Switzerland will continue to be able to ensure that fresh yeast can be supplied as a basis for bread-baking.

c. Trend

Since yeast is used to make bread, the quantity required is linked to the grain volume. In the case of grain, an increase in compulsory stocks is being sought in order, among other things, to offset any loss of other carbohydrate imports with bread. Consequently, the processing of larger quantities of grain to make bread will also call for a larger quantity of yeast. The demand coverage of raw materials for the production of yeast is to be reviewed with this aspect in mind.

¹⁴ Compulsory stocks held as of 30 June 2019, rounded values.

5 Energy

5.1 Overview

Where energy is concerned, the focus is on supplies of mineral oil and natural gas. The following table lists the goods held as compulsory stocks for the supply of petroleum products, natural gas and electricity, showing the current minimum demand and the inventories held as of 31 May 2023. The stocks of mineral oil released in winter 2022/2023 had been brought back up to the required level by autumn 2023.

The compulsory stockpiling of petroleum products also satisfies the requirements of the IEA. These call for IEA member countries to ensure oil stock levels equivalent to no less than 90 days of net imports.

No changes are planned to Switzerland's current minimum demand levels for energy. 'Demand coverage' (or 'minimum demand') refers to the quantity that the federal government has decreed should be stockpiled. It is generally expressed as a period of time. The volume of compulsory stocks held must be sufficient to cover average domestic demand during that period.

The sharp rise in the number of new wood energy systems (decarbonisation in conventional heating systems, climate-friendly heating) in recent years, various events in 2021 (disrupted supply of raw and other materials due to lockdowns during the COVID-19 pandemic) and the necessity of making only part deliveries of pellet orders to customers in the winter of 2021/22, as well as the effects of the war in Ukraine, resulted in the NES having to continuously reassess the situation with regard to wood fuels (wood pellets, wood chips and logs) .

Stockpiled product	Demand coverage DC	Holdings ¹⁵	Trend
Motor fuel	4.5 months	1,113,000m ³	No change
Aviation fuel	3 months	362,000m ³	No change
Diesel	4.5 months	1,187,000m ³	No change
Extra-light heating oil	4.5 months	1,033,000m ³	No change
Natural gas for dual-fuel installations (in the form of extra-light heating oil)	4.5 months	384,000m ³	No change
Uranium fuel elements		Sufficient to refuel two reactors	No change

¹⁵ Rounded values.

5.2 The trend in energy

When it comes to securing energy supplies, the focus to date has been on petroleum products, natural gas and electricity. Wood energy (which accounts for just under 6% of total energy consumption) must now also be considered in greater detail. Real and threatened disruptions to energy supplies over the last few years, especially in connection with the COVID-19 pandemic and the war in Ukraine, revealed the challenges that lie in procuring and producing domestic energy sources, and in importing and distributing energy in Switzerland.

The war in Ukraine led to a major turnaround in supply policy. All energy sources were affected. To prevent a shortage, the NES recommended in autumn 2022 that dual-fuel installations be converted from gas to heating oil. In addition, a winter electricity reserve was created. This included hydropower, reserve power plants and generators. Part deliveries of wood pellet orders also had to be introduced in 2021.

Despite there being no global or regional shortage of mineral oil, sizeable quantities of oil had to be released from compulsory stocks from the end of July 2022 onwards to ensure full supply. With the persistent drought in the summer and autumn of 2022 leading to very low water levels in the Rhine, ship cargo volumes had to be drastically reduced. At the same time, staff shortages, engineering work and increased traffic within Germany due to refinery shutdowns, coal transport and freight transport to Ukraine all resulted in huge failures and delays in international rail transport. These logistical bottlenecks greatly affected the supply of petroleum products, making it necessary to release compulsory stocks in order to maintain supply at full level. Once the situation on the Rhine and Germany's railways had normalised, strikes in France beginning in October 2022 and technical problems with the SAPPRO product pipeline from the south of France left the Geneva area undersupplied and dependent on compulsory stocks.

The export ban on pellets from Russia as a result of the war in Ukraine had an indirect impact on the supply of wood fuel. Industrial pellets that were normally purchased from Russia and used for electricity generation, e.g. in Denmark, Great Britain, Ireland, the Netherlands and Northern Germany, now had to be procured elsewhere, which led to a further supply deficit that also made itself felt in Switzerland.

The NES's risk analysis and the experience of the past few crisis-ridden years suggest that the greatest risks to the supply of petroleum products and natural gas lie in access to these energy sources in the producing countries, in the availability of the necessary import and distribution infrastructures, especially within Europe, and in operating the logistics, energy and ICT resources necessary for their secure supply. Switzerland's supply of natural gas is under particular pressure. This is due to the long transport routes, Switzerland's land-locked situation and its lack of domestic storage facilities. Its supply of electricity also relies heavily on imports, especially in winter.

Although the share of final energy consumption accounted for by petroleum products has been falling for years, and despite the COVID dent in (aviation) fuels, mineral oil is still clearly the most important energy source in Switzerland today, standing at 43.4%. The energy turnaround may be in full swing but there will be no fundamental change in the importance of liquid fossil fuels, which will remain key to the population and the economy in the coming years, especially in the mobility sector. On the contrary, the events of 2022 have shown that petroleum products will be assigned a new role in the transitional period – until sufficient new renewable electricity sources are available – as a backup for natural gas (in dual-fuel installations) and for electricity (reserve electricity production in reserve power plants and emergency generators as well as individual emergency power systems).

Switzerland is completely reliant on imports for mineral oil, with about three quarters of those imports taking the form of refined products and one quarter crude oil. The experience of the last eight years confirms that Switzerland's supply is most vulnerable when transport capacity is constrained, especially abroad. Examples of constraints include low or high water levels in the Rhine, rail problems, strikes at

ports or pipelines, or an unplanned outage at the Cressier refinery. It generally takes a combination of events to trigger a shortage. Significant disruption to a single mode of transport or supply can usually be compensated.

Compulsory stockpiling is the ideal means of coping with situations of this kind. The war in Ukraine and a resulting gas and electricity shortage also brought domestic delivery logistics into focus. Dual-fuel installations, reserve power plants, emergency generators and emergency power units could trigger a winter peak in demand for diesel and heating oil, which might exceed delivery capacity given the limited availability of trucks and drivers. In this context, as well as when preparing for possible blackout events, companies are confronted with the issue of business continuity management. They need to give thought, for example, to increasing their storage capacity and ensuring they have diesel and heating oil available to them even in crisis situations.

The share of final energy consumption accounted for by natural gas increased slightly in the reporting period. In Switzerland, natural gas is mainly used for heating homes and supporting industrial processes. Natural gas is also used to a lesser extent in the service sector and for mobility. Importers have their own small-scale storage facilities for intermediate storage, especially for diurnal and winter peak shaving purposes. In addition, use of commercial storage capacity in Etrez (just over the border in France) has been contractually agreed. There are no large gas storage facilities that could be used for compulsory stockpiling. The share of natural gas used in dual-fuel installations, systems which can also be powered by another fuel (mostly heating oil), has been declining in Switzerland in recent years, but still accounted for just under 20% of annual gas consumption in the reporting period.

At present, the Swiss gas market is clouded by legal uncertainty. This is to be addressed by a new gas supply act. The lead role lies with the Federal Office of Energy, which is part of DETEC. The act is not expected to enter into force before 2027.

The share of energy consumed as electricity remained largely unchanged during the reporting period. Thanks to domestic production, electricity is much less dependent on imports than petroleum products and natural gas. Demand and production in Switzerland roughly balances out over the year. However, there is a trend towards more imports. In winter, domestic production is not usually able to meet demand.

Another area in which Switzerland is dependent on other countries is nuclear energy, as uranium fuel elements have to be imported. In view of the decision to phase out nuclear power as part of the Energy Strategy 2050, decisions on when to start reducing the compulsory stocks of uranium fuel elements will have to be made on a case-by-case basis.

The planned exit from nuclear power means that significant production capacities will be eliminated in the coming decades. These are partly to be compensated by enhanced efficiency measures and, in particular, by a major expansion of electricity produced from renewable sources.

The increased demand for electricity (especially from the electrification of transport, and heating systems) in the move towards decarbonisation also poses challenges to long-term security of supply. Another challenge is the availability of energy when demand increases (e.g. in winter).

In order to strengthen security of supply, especially for the 2022/23 winter season, and reduce the dependence on imports, the Federal Council has gradually built up an electricity reserve in recent months with this winter in mind – a procedure accelerated by the backdrop of the war in Ukraine. In addition to hydropower reserves, it particularly includes thermal reserve power plants, pooled generators and co-generation plants. The country's reservoirs continue to play a key role in security of supply.

A new situation has arisen with regard to wood energy following its steady rise over the last 15 years and the events in 2021 and 2022. The transition to climate-friendly heating systems has created a new baseline for wood energy across Europe: the steadily increasing number of wood-fired heating systems, the failure of production, storage and logistics capacities to keep pace, and non-deliveries due to sanc-

tions have had a major impact on the production of wood fuels (wood pellets, wood chips, logs). These inter-related effects appeared almost simultaneously in 2021 and 2022, which meant that orders for pellets could only be satisfied in part during the winter of 2021/2022.

5.3 Motor fuels

Stockpiled product	Demand coverage (DC)	Holdings ¹⁶	Trend
Motor fuels	4.5 months	1,113,000m ³	No change

a. Description

Petrol (gasoline) is used in combustion engines to power cars, smaller commercial vehicles and motorcycles. From the motor fuels, unleaded 95 is subject to compulsory stockpiling. Unleaded 98 and other higher-quality fuels are permitted under the same conditions. The quality requirements are laid down in the SN EN 228 standard. Petrol may also contain biofuels such as ethanol (up to a maximum of 5% v/v).

b. Assessment

Petrol consumption declined again in the current reporting period despite the increase in the number of registered cars. The trend towards more fuel-efficient vehicles continues. 2020 and 2021 saw a decline in road traffic due to corona; there are no figures available as yet for 2022. Petrol consumption was impacted by a significant increase in fuel tourism in 2022 after Germany, France and Italy began subsidising fuel to combat rising energy prices due to the war in Ukraine. As a result of the German diesel scandal, there has been a reverse in the shift away from petrol- to diesel-powered cars, with new diesel vehicle registrations falling sharply. Compulsory stocks of petrol were reduced by around 120,000m³ from January 2019 to December 2022 (without taking releases of compulsory stocks into consideration).

Biogenic fuels have been exempt from mineral oil tax since July 2008, and an obligation to compensate for emissions attributable to the use of motor fuel has been in place since 2013. As a result, E5 – lead-free petrol with a maximum of 5% ethanol (known in Switzerland as BF95) – has established itself as the standard grade. E5 accounts for more than two thirds of current petrol consumption. As of June 2018, it has been possible to include biogenic fuel components in the compulsory stocks required to be held, provided certain conditions are met. However, there is no obligation to store ethanol for use in motor vehicles. This is to remain unchanged. The availability of renewable fuels is scarcer than that of fossil products. In times of shortage, biogenic components become particularly difficult to procure and transport. In addition, storing them is also more demanding.

c. Trend

Demand for petrol is expected to fall further in the next few years. The inventories of petrol held as compulsory stocks are to be adjusted accordingly. Therefore, compulsory petrol stocks will be reduced by an additional 80,000m³ by 2025, and a further 40,000m³ by 2027.

The minimum demand for motor fuels remains unchanged at four and a half months. Despite the current geopolitical situation, and in view of the discussions within the IEA, it would not be appropriate to increase the quantity required to be held, especially considering that compulsory stocks should keep pace with the decline in consumption.

¹⁶ Rounded values.

5.4 Aviation fuel

Stockpiled product	Demand coverage (DC)	Holdings ¹⁷	Trend
Aviation fuel	3 months	362,000m ³	No change

a. Description

Aviation fuel (Jet A-1) that meets international specifications is required to be stockpiled. The fuel is subject to particularly strict quality standards owing to safety requirements in the aviation sector.

b. Assessment

Zurich Airport is supplied with kerosene-grade fuel by rail. Geneva Airport depends heavily on the SAPPRO pipeline to reliably deliver its supply, as the transport capacity of the railway line that runs along Lake Geneva is limited. Basel-Mulhouse Airport sources its supplies from France.

Following the Swissair grounding in 2001, demand for aviation fuel in Switzerland grew steadily for almost two decades until 2019. The COVID-19 pandemic put an end to this, with aviation fuel experiencing a huge slump in demand. Consumption rose again significantly in 2022, reaching the same level as in 2010. Both air traffic and aviation fuel consumption can be expected to increase in the years ahead. Given the discussions on energy transition and climate change, it remains to be seen whether demand will return to its 2019 level.

Stocks of aviation fuel are basically adjusted in line with the change in demand. The creation of additional tank space in the period from 2017 to 2019 enabled the demand coverage targets to be achieved. Due to the corona-related decline, they are currently being significantly exceeded.

c. Trend

Consumption was low during the COVID years, and until they can be factored out of the calculation, the stocks held will either temporarily exceed minimum demand or have to be reduced (by about 50,000m³ by 2025). As sales increase, the same quantity will have to be accumulated again by 2027.

The draft CO₂ Act intended to come into force from 2024 states that a proportion of energy derived from renewable resources must be added to conventional jet fuel. The share of sustainable aviation fuel (SAF) is expected to increase continuously between now and 2050, presumably in line with EU requirements. Although jet fuel with and without SAF are currently stored together, and distinguishing the two by their properties requires a great deal of laboratory work, it is intended to make an exception (management waiver) in the same way as for motor fuels, which means there will be no obligation to stockpile SAF. Even more so than ethanol or FAME¹⁸, SAF availability is poor, and a requirement to blend jet fuel with SAF would create even more difficulties in a shortage.

Demand coverage for aviation fuel remains unchanged at three months.

¹⁷ Rounded values.

¹⁸ Fatty acid methyl esters (FAME) are compounds of fatty acid and methanol. A mixture of FAME derived from vegetable (e.g. rapeseed oil) or animal fats (e.g. lard) and methanol used in diesel engines is called biodiesel.

5.5 Diesel

Stockpiled product	Demand coverage (DC)	Holdings ¹⁹	Trend
Diesel	4.5 months	1,187,000m ³	No change

a. Description

Diesel is used in particular to fuel cars, buses, heavy goods vehicles and other commercial vehicles, motor boats, ships, shunting locomotives and construction machinery. Compulsory stocks are held of diesel fuel meeting the Class 0 winter standard²⁰ defined in SN EN 590. Higher-quality winter diesel is permitted under the same conditions.

Due to the war in Ukraine and the risk of possible electricity shortages, the sale of emergency power units increased significantly in 2022. The use of diesel to operate individual emergency power systems or for reserve electricity production in generators could lead to significantly higher sales in the future, which have not been taken into account when calculating compulsory stockpile volumes.

b. Assessment

The growth trend for diesel has also slowed down. The reasons can be found in the COVID-related decline in individual mobility and of trade and industry production, the fall in the number of diesel cars after a peak in 2019, and also in fuel tourism in 2022.

Compulsory stocks of diesel increased by around 38,000m³ (excluding releases of compulsory stocks) from January 2019 to December 2022. As in the case of petrol, the blending-in of biogenic components has risen sharply, even though FAME were used almost exclusively over the last two years due to the high price and poor availability of HVO/HEFA²¹. Around 60% of the diesel sold in Switzerland contains up to 7% FAME and is sold as B7.

As of June 2018, it has been possible to include separately stored biogenic fuel components in the compulsory stocks required to be held, provided certain conditions are met. There is no obligation to stockpile biodiesel or HVO/HEFA. As with motor fuels, there are no plans to change this or to require renewable diesel to be stockpiled, despite the obligation to place it on the market laid down in the CO₂ Act from 2024 onwards. An exception (management waiver) should be made here.

c. Trend

Compulsory stocks of diesel will be adjusted in line with demand. Compulsory stocks of diesel are expected to have reached a stable level by 2025 and to have been reduced by approximately 15,000m³ by 2027. The minimum demand for diesel remains unchanged at four and a half months. Despite the current geopolitical situation, and in view of the discussions within the IEA, it would not be appropriate to increase the quantity required to be held, especially considering that compulsory stocks should keep pace with the decline in consumption.

At present, it remains to be seen whether special compulsory stocks should be maintained separately to cover any additional demand from reserve power plants during a power shortage. One way of achieving this could be to set up compulsory stocks of electricity substitutes to be financed by the electricity

¹⁹ Rounded values

²⁰ Diesel oil enhanced by additives to reduce the development of solid paraffin wax particles at low temperatures

²¹ Hydrotreated vegetable oils or hydrogenated vegetable oils. They are now more commonly referred to as HEFA (hydroprocessed esters and fatty acids)

industry, similar to the compulsory stocks of gas substitutes. Another would be to tap into the consumer stockpiles held by the operators of reserve power plants, emergency generators and high-performance emergency power systems (that are operated with diesel).

5.6 Heating oils

Stockpiled product	Demand coverage (DC)	Holdings ²²	Trend
Heating oils	4.5 months	1,033,000m ³	No change

a. Description

Among heating oils, the extra-light type is subject to compulsory stockpiling. As of the beginning of 2023, only eco grade (max. 50 ppm sulphur) is permitted to be stockpiled. Higher-grade heating oils can be held as compulsory stocks under the same conditions.

b. Assessment

Demand for heating oil has been falling sharply for many years. The reasons are: the replacement of oil-fired heating systems by heat pumps and other heating systems, the renovation of building envelopes and the lower energy consumption of new buildings. Therefore, from the start of 2019 until the end of 2022 compulsory heating oil stocks were reduced by around 186,000m³ (excluding compulsory stock releases and gas substitute stocks).

From May 2023 onwards, only organic heating oil is permitted to be used in burners with a capacity of less than 5 MW (e.g. small heating systems). EU-compliant heating oil (up to 1000 ppm sulphur) is still permitted for large systems, but will remain a niche product.

c. Trend

Demand for heating oil is expected to fall further over the next few years. This process will be accelerated by the current energy and supply policy discussions. Compulsory stock levels for heating oil will be adapted in line with demand. Therefore, it is anticipated that by 2025 an additional 150,000m³ or so of heating oil stocks will have to be liquidated, and a further 12,000m³ by 2027.

The consumption of bioheating oil is set to increase in the years ahead. As with fuels, there are no plans to stockpile renewable heating oil components.

The minimum demand for extra-light heating oil remains unchanged at four and a half months. Despite the current geopolitical situation, and in view of the discussions within the IEA, it would not be appropriate to increase the quantity required to be held, especially considering that compulsory stocks should keep pace with the decline in consumption.

Consideration must be given to the question of maintaining special compulsory stocks separately to cover any additional demand from reserve power plants and emergency power units during a power shortage. One way of achieving this could be to set up compulsory stocks of electricity substitutes to be financed by the electricity industry, similar to the compulsory stocks of gas substitutes. Another would be to tap into the consumer stockpiles held by the operators of reserve power plants, emergency generators and high-performance emergency power systems (that are operated with heating oil).

²² Rounded values.

5.7 Natural gas

Stockpiled product	Demand coverage (DC)	Holdings ²³	Trend
Natural gas substitutes in the form of extra-light heating oil	4.5 months	384,000m ³	No change

a. Description

For geological, technical and economic reasons, Switzerland – unlike its neighbouring countries – has no large underground natural gas storage facilities of its own, such as salt caverns or porous reservoirs. And the Swiss gas industry does not have any large storage facilities for liquefied natural gas at present. Instead, extra-light heating oil is stockpiled for use in dual-fuel installations. These are systems that can be run on both gas and heating oil.

b. Assessment

Natural gas substitute stock levels correspond to around four and a half months of the natural gas consumed by dual-fuel installations. In Switzerland, just under 20% of natural gas is still being burned in such systems. In the event of a supply disruption, consumers with dual-fuel installations could be obliged to start running them on heating oil, thereby freeing up supplies for non-convertible single-fuel systems. This step would be taken in addition to contractually agreed switchovers. However, the share of total consumption accounted for by dual-fuel installations has been declining for years.

Switzerland's natural gas supply is based on long-term contracts with Western European suppliers and also increasingly on procurement on the spot market. This flexibility has been made possible in recent years by the increased quantities being offered on the global gas market and by the possibility of transporting natural gas from overseas to Europe in liquefied form by ship.

The Swiss gas industry does not source natural gas directly from Russia, but buys gas from German, Italian, French, Dutch and Norwegian gas traders. In 2017, around 60% of natural gas imports came from Eastern Europe, 29% in 2021 and 5% in January 2023. Supplies of liquefied natural gas (LNG) have increased sharply during this time.

The most important route is the Transitgas pipeline, which is part of the pipeline running from the Netherlands to Italy. 'Reverse flow', enabling gas to flow in both directions, has been possible since 2018; as a result, natural gas can also be imported into Switzerland from Italy if necessary, thus boosting the security of supply for natural gas.

c. Trend

The minimum demand for compulsory stocks of extra-light heating oil as a substitute for natural gas is unchanged at four and a half months of consumption by dual-fuel installations.

The fall in the number of dual-fuel installations will lead to mounting pressure in the next few years to create storage facilities for natural gas in Switzerland.

²³ Rounded values.

Under the Supply Security Ordinance, the five regional companies are obliged to store at least 15% of Switzerland's annual gas requirement in gas storage facilities abroad. The Ordinance has been extended and will remain in force until 30 September 2024.

5.8 Uranium fuel elements

Stockpiled product	Demand coverage (DC)	Holdings	Trend
Uranium fuel elements		Sufficient to re-charge two reactors	Declining

a. Description

The uranium fuel elements (fuel rods) used by Swiss nuclear power plants to generate electricity are reactor-specific and cannot simply be exchanged between different nuclear power plants.

b. Assessment

The minimum demand for uranium fuel elements is basically the amount required for one refuelling of each reactor. Two of Switzerland's four nuclear reactors hold the required fuel as supplementary compulsory stocks.

Uranium fuel elements remain in the reactor for three to four years. The oldest third or oldest quarter of the fuel elements are swapped out each year, partly because their nuclear fuel content has fallen too low and partly because of the build-up of fission products that absorb neutrons. The rods for the annual refuelling must be ordered and manufactured specifically for the type of plant in question, with only a small number of foreign producers to choose from.

Operators usually store as much fresh nuclear fuel as they need for the next year of operation. Additional stocks are held at the respective suppliers abroad.

At current levels of global demand, the world's known uranium reserves are estimated to be sufficient for 130 to 245 years. Switzerland's supply of uranium fuel elements will continue to be shaped by its complete dependence on imports and by a market that is dominated by relatively few providers.

c. Trend

The existing nuclear power plants may remain in operation for as long as they are safe. In view of the decision to phase out nuclear power as part of the Energy Strategy 2050 and the related ban on the construction of new nuclear power plants, decisions on when to start reducing the compulsory stocks of uranium fuel elements will have to be made on a case-by-case basis.

5.9 Wood energy

a. Description

Wood fuel takes the form of wood pellets, wood chips and logs. These are made from forest wood, wood from trees outside forests, wood residues from wood processing, and waste wood (e.g. from building demolition, furniture). The volume of wood and wood residue is directly linked to the economy – especially the construction industry. In the event of a downturn in the economy, the demand for raw wood from forests would fall and the wood industry would produce fewer residues. As a result, less material would be available for the production of wood fuel. In general, the market for wood energy is currently undergoing a rapid transition from low demand to strong growth in demand. This situation indicates that the current practice of sourcing wood fuel as a by-product of forest management (wood chips) or wood processing (pellets) will no longer be enough going forward. Instead, more wood from forests will have to be used directly for wood fuel purposes in the future.

As with heating oil and natural gas, the quantity of wood fuel consumed depends heavily on the number of heating days.

b. Assessment

The need to hold compulsory stocks – especially of pellets and logs – is currently being looked into in detail. Similar situations in Germany, France and Austria indicate that imports would be unable to satisfy any increase in demand in times of crisis. The new support programmes in Germany are accelerating the transition from fossil fuel to renewable energy heating systems, with the result that domestic demand is reducing export capacity. In Switzerland, too, the sales and installation of wood-fired heating systems – especially pellet heaters – has caused a sharp rise in demand, partly because replacing heating systems that run on fossil fuels with those that burn wood still qualifies for subsidies. Although new processing capacities for pellets are being created in Switzerland, these are dependent on the general economic trend.

c. Trend

On the basis of the current assessment, quota and rationing measures will be prepared by the National Economic Supply organisation, and the need for compulsory stockpiling will be examined.

6 Therapeutic products

6.1 Overview

Below is a list of the therapeutic products for which compulsory stocks must be held, along with the minimum demand the federal government requires to be covered. 'Demand coverage' (or 'minimum demand') refers to the quantity that the federal government has decreed should be stockpiled. It is generally expressed as a period of time. The volume of compulsory stocks held must be sufficient to cover average domestic demand during that period.

Stockpiled product	Demand coverage (DC)	Trend
Anti-infectives used in human medicine Commercially available packaged doses	3 months	No change
Anti-infectives used in human medicine Active substances	2-3 months	To be reviewed as part of the revision of the national pandemic plan
Neuraminidase inhibitors (Tamiflu®) Active substances and capsules	Treatment for 25% of the population; prevention for health staff for 40 days	To be reviewed as part of the revision of the national pandemic plan
Strong analgesics and opiates	3 months	No change
Vaccines	4 months	No change
Immunoglobulins	2-3 months	No change
Other medicinal products for human medicine: - Adrenaline auto injectors - Oxytocin parenteral forms - Barium X-ray contrast agents - Ultrasound contrast agents	3 months	No change
Anti-infectives used in veterinary medicine	2 months	Review range and DC
Blood bag systems	3 months	No change

6.2 The trend in therapeutic products

d. Supply analysis and economic trends

Disruptions to the supply of medicinal products and medical devices are increasing both in Switzerland and around the world. Despite the fact that Switzerland has a strong pharmaceutical industry and a good, secure distribution system, supply disruptions are becoming more and more frequent and more and more severe. The Essential Human Medicines Reporting Office²⁴ has also noted this trend: 201 cases of supply disruptions were reported in 2022, the highest number to date²⁵. The global deterioration in the supply situation was partly caused by the COVID-19 pandemic in the sense that the lockdowns in China and blocked ports had a negative effect on the manufacture of therapeutic products and on logistics.

Events can generally be attributed to the globally connected and complex nature of production and distribution processes, and to the underlying economic laws. They include: the concentration of production sites for certain product groups at a small number of locations, ongoing inventory optimisation resulting in lower levels of stock being held, regulatory requirements and corporate decisions regarding portfolio adjustments. A few companies are focusing their activities on the development and manufacture of new medicinal products and withdrawing some older medicines from the market. Other causes are: production downtimes due to quality deficiencies, natural disasters and strong fluctuations in demand.

Products with expired patent protection, low prices and complex manufacturing processes (e.g. sterile products) are often subject to supply disruptions or market withdrawals. In Switzerland, the problem is exacerbated by higher costs, a comparatively small market volume and decentralised purchasing. If the number of suppliers on the market offering a particular product is small or if market shares are unevenly distributed, the loss of one company cannot be (fully) offset by other providers. Economic pressure and consistent implementation of just-in-time delivery are also causing hospitals and pharmacies to reduce their stocks and storage facilities.

During the COVID-19 pandemic, demand for certain goods such as disinfectants, respiratory and hygiene masks, examination gloves and respirators skyrocketed worldwide within a short space of time. Medicinal products such as anaesthetics, muscle relaxants and anti-infective agents were also difficult to procure. The findings and lessons learned from various investigations into the COVID-19 pandemic and the evaluations of the Federal Administration's crisis management are being taken into account by the federal government in its revision of the Epidemics Act and the National Economic Supply Act, and its reworking and realignment of the national pandemic plan. Over the next few years, the responsibilities of the administrative units concerned are to be set out more clearly and the medical goods required in an epidemic determined.

On 16 February 2022, the Federal Council took note of the 2022 report on security in the supply of medicines drawn up by the Federal Department of Home Affairs (FDHA). The Federal Council subsequently asked the FDHA (FOPH) and the EAER (FONES) to examine in greater detail the measures set out in the report, working in close partnership with other offices to do so. This involves discussing various aspects of improving security of supply with an interdepartmental working group consisting of representatives from industry, professional and other associations, and the Federal Administration. Topics include possibly enhancing the measures in relation to compulsory stockpiling.

With regard to medical devices, the EU and Switzerland have comprehensively revised their legislation on medical devices and in-vitro diagnostic medical devices in recent years, with the aim of making these

²⁴ Ordinance on the Essential Human Medicines Reporting Office (SR 531.215.32)

²⁵ 2021-2022 report of the Reporting Office for Essential Human Medicines

devices safer. The stricter requirements made it reasonable to expect that a certain streamlining of portfolios would follow. In addition, the bodies responsible for conformity assessment have only limited capacity to evaluate the dossiers and issue certificates in accordance with the requirements of the new Medical Device Regulation (MDR) and In Vitro Diagnostic Medical Devices Regulation (IVDR).

With these new rules entering into force, Chapter 4 (Medical devices) of the Mutual Recognition Agreement (MRA) should also have been updated. However, this did not happen: the EU placed it within the scope of the unresolved institutional issues, and has classified Switzerland as a third country since May 2021.

To mitigate potential supply shortages, the Federal Council subsequently decided to take steps that include unilateral recognition of EU certificates. Nevertheless, manufacturers and importers now face additional barriers to trade and additional costs. For example, foreign manufacturers wishing to market their products in Switzerland must have a Swiss authorised representative. According to a 2022 study of the industry produced by Swiss Medtech, the Swiss Medical Technology Association, one consequence of this is that a number of foreign suppliers no longer wish to supply the Swiss market due to the additional requirements arising from the failure to update the above-mentioned agreement between the EU and Switzerland.²⁶

To safeguard supply, long transitional validity periods apply, permitting products with certificates issued under the old rules to remain available on the market. In order to prevent supply disruptions, these transitional validity periods were extended in March 2023: until 2027 in the EU and 2028 in Switzerland (depending on the risk class of the respective medical device). This is likely to have a positive effect on the supply situation, as manufacturers and conformity assessment bodies now have more time to certify the devices in accordance with the MDR.

e. The trend in compulsory stockpiling

Active substances are assessed and made subject to compulsory stockpiling on the basis of medical necessity (how essential they are) and supply risk (supply chain, market shares, past disruptions to supply).

The revised list of goods annexed to the Ordinance on the Compulsory Stockpiling of Medicinal Products²⁷ came into force on 15 January 2020. This made certain immunoglobulins and contrast agents as well as adrenaline auto injectors and parenteral oxytocin subject to compulsory stockpiling.

Oxytocin is used in obstetric emergencies. Immunoglobulins are proteins that circulate in the body as antibodies and which are used to treat various diseases of the immune system as well as in oncology.

In the case of non-specific human immunoglobulins, compulsory stocks are expected to cover two months' normal usage. Compulsory stocks of specific immunoglobulins, contrast agents, adrenaline auto injectors and preparations containing the active substance oxytocin (in parenteral forms only) must each cover three months' requirements.

The list of goods annexed to the Ordinance on the Compulsory Stockpiling of Medicinal Products is expected to be added to again as of 15 January 2024. The National Economic Supply organisation's Therapeutic Products Division recommends that further active substances be made subject to the stockpiling obligation: selected active substances for the treatment of thrombosis (anti-thrombotics), oncology disorders (cancer drugs) and severe pain (opioids and non-opioid analgesics), as well as various relev-

²⁶ See Swiss Medtech's 2022 Swiss Medtech Industry Sector Study, available online at https://www.swiss-medtech.ch/sites/default/files/2022-09/22_2769_SMTI_2022_Englisch.pdf (14.04.2023).

²⁷ SR 531.215.31

ant active substances used in intensive care medicines. The latter recommendation is based on the events of the COVID-19 pandemic.

Prompted by the COVID-19 pandemic and with a view to stockpiling supplies for a future pandemic, the Federal Commission for Pandemic Preparedness and Response (FCP) and the Federal Office of Public Health (FOPH) are planning a fundamental revision of the existing Influenza Pandemic Plan. The new pandemic plan is no longer intended to focus exclusively on influenza, but should take various pathogens and transmission modes into account (generic pandemic plan). As far as stockpiling is concerned, the FCP and the FOPH will come up with appropriate recommendations within the scope of this review as to which medical goods should be held in reserve for a future pandemic. There is also a need to define for whom (healthcare system, population) and in what quantities the respective goods are to be stockpiled. This work will prepare the ground for the National Economic Supply organisation's Therapeutic Products Division to decide what options exist for stockpiling the goods in question and what costs are to be expected. As previously mentioned, the surge in demand during a pandemic makes securing the supply of protective equipment such as hygiene or FFP masks, for example, challenging. In addition to the compulsory stockpiling system, other ways of building up reserves are therefore also being examined. The existing supplementary compulsory stocks of respiratory masks were used to tackle the COVID-19 pandemic. In the case of neuraminidase inhibitors, intended for use in the event of an influenza pandemic in particular, stocks of active substances, capsules and pre-packaged medication (Tamiflu®) remain available. Here too, the FCP and the FOPH will consult with experts to decide whether these stocks should be maintained in the future and in what composition.

6.3 Anti-infectives used in human medicine

Stockpiled product	Demand coverage (DC)	Trend
Anti-infectives used in human medicine Commercially available packaged doses	3 months	No change
Anti-infectives used in human medicine Active substances	2-3 months	To be reviewed as part of the revision of the national pandemic plan

a. Description

Compulsory stocks are held of anti-infectives in commercially available packaged doses and of selected active substances that can be used to treat all common infectious diseases, but especially bacterial secondary infections in the event of a pandemic. Compulsory stocks held in packaged dose form include antibiotics, antifungals and tuberculostatics. Antibiotics are used for the local or systemic treatment of bacterial infectious diseases. Antifungals, also known as antimycotics, are used in infections caused by fungi (mycoses) that can affect the human body. Tuberculostatics is the name given to the group of medicinal products used to treat tuberculosis. Anti-infectives are stockpiled in various forms: as capsules, film-coated or modified-release tablets, water-soluble dispersible tablets and as syrups or oral suspensions. Stores of parenteral forms such as infusion and injection solutions, auto injectors and other forms for inhalation are also held. Compulsory stocks of anti-infectives are expected to cover three months' demand in the case of commercial packaged doses and two to three months in the case of active substances.

b. Assessment

Switzerland is almost entirely dependent on other countries for its supplies of anti-infectives – in both their pre-packaged and active substance form. Securing the supply of anti-infectives and ensuring successful therapies for infectious diseases has become increasingly difficult in the last few years. The reasons for this deterioration in the supply situation are many and varied, and most have developed over a lengthy period of time. Many of the active substances in this therapeutic group are relatively old and no longer protected by patent. The resulting low prices are prompting manufacturers to streamline their product ranges and withdraw medicines from the market. The concentration of production sites, just-in-time deliveries and the associated reduction in stocks held by suppliers and hospitals is also increasing the risk of supply disruption. The growing global demand for certain anti-infectives and the limited production capacities are exacerbating the problem. Moreover, the small number of suppliers for individual products means that the loss of one of these companies cannot be (fully) offset by their competitors. This trend is clearly demonstrated by the rising number of drawdowns from compulsory stocks: in 2022, withdrawals were made from compulsory anti-infective stocks on 51 occasions. Due to the global supply disruptions, it will take some time to build some of these compulsory stocks up again.

c. Trend

No change is to be made to the minimum level of compulsory stocks of commercial packaged doses. Compulsory stocks of the active substances required to treat secondary infections in the event of a pandemic are to be reassessed as part of the revision of the national pandemic plan.

6.4 Virostatics

Stockpiled product	Demand coverage (DC)	Trend
Neuraminidase inhibitors (Tamiflu®) Active substance, capsules, packaged doses	Treatment for 25% of the population; prevention for health staff for 40 days	To be reviewed as part of the revision of the national pandemic plan

a. Description

Following the recommendations of the Influenza Pandemic Plan, which was last updated in 2018, Switzerland holds compulsory stocks of neuraminidase inhibitors (Tamiflu®). Whether these are to be maintained and in what composition is to be decided as part of the revision of the national pandemic plan. Neuraminidase inhibitors are prescription-only, anti-viral medicines used to combat the influenza virus. They can be used both to treat people who are already ill and as a preventive measure (prophylaxis) for people at risk of contracting the disease through contact with an infected person. They are most effective if taken as soon as possible after the onset of the first symptoms or after coming into contact with an infected person. Stocks of active substances, capsules and pre-packaged doses are being held at present.

b. Assessment

Influenza pandemics tend to occur at irregular intervals (e.g. Spanish flu in 1918-1919, new H1N1 virus from Mexico in 2009). In the event of an outbreak of influenza, neuraminidase inhibitors would be used primarily in the first stage of the pandemic until effective flu vaccines became available. As it can be assumed that the demand for neuraminidase inhibitors and anti-viral drugs will skyrocket at the start of an influenza pandemic, it is crucial to maintain a sufficiently large stockpile that can be made available to the market quickly. It was not possible to use neuraminidase inhibitors effectively in controlling the COVID-19 pandemic because influenza viruses have a different surface structure to the coronavirus (SARS-CoV-2).

c. Trend

As part of the fundamental revision of the national pandemic plan, the Federal Commission for Pandemic Preparedness and Response (FCP) and the Federal Office of Public Health (FOPH) will look into whether the existing compulsory stocks of neuraminidase inhibitors need to be maintained and whether anti-viral medicines should be stockpiled in the future.

6.5 Strong analgesics and opiates

Stockpiled product	Demand coverage (DC)	Trend
Strong analgesics and opiates	3 months	No change

a. Description

Opioids are the strongest available painkillers (analgesics). They contain substances whose pharmacological effect is similar to morphine and which occur naturally in opium, for example. However, these substances are also produced in semi-synthetic and fully-synthetic form. Methadone, for example, is a fully synthetic active substance, whereas hydromorphone is a semi-synthetic opioid. These substances are used to treat intense, acute or chronic pain as well as in anaesthesia, which is why they are of fundamental importance. The active substances subject to compulsory stockpiling include morphine, oxycodone, hydromorphone and methadone. The compulsory stocks of strong analgesics and opioids are held in various pharmaceutical forms that can be swallowed, injected, infused or administered transdermally as skin patches.

b. Assessment

The supply situation for oral opioids has deteriorated markedly in recent years, with severe supply disruptions becoming common. The quantities delivered to Switzerland are not sufficient, especially in the case of morphine preparations, to ensure a stable supply to the market. Switching to other opioids also creates supply disruptions for related active substances such as hydromorphone and oxycodone. In Switzerland, the market shares in this area are distributed very unevenly and certain galenic forms are sold only by a single supplier. This situation means that the loss of the largest supplier could not be (fully) offset by other companies and products. This trend is also clearly demonstrated by the high number of drawdowns from compulsory stocks. In 2022, withdrawals were made from compulsory opioid stocks on 59 occasions (compared with 2019 when there were 10 withdrawals and 2020 when there were only four).

c. Trend

Demand coverage for stocks of strong analgesics and opiates is to remain unchanged at three months. Given the fragile supply situation, the NES will examine whether further active substances should be made subject to compulsory stockpiling to cover demand.

6.6 Vaccines

Stockpiled product	Demand coverage (DC)	Trend
Vaccines	4 months	No change

a. Description

Vaccines are used to acquire active immunity and thus protect against infections with viral and bacterial pathogens. Vaccination is one of the most important means of protecting against infectious diseases. Information about the vaccinations recommended in Switzerland is set down in the Swiss vaccination schedule. Together with the FOPH, the Federal Vaccination Commission (FCV) publishes an updated version of the vaccination schedule at the beginning of each year. The aim is to provide optimum protection by vaccination for each individual and the population as a whole.²⁸

Compulsory stocks have been built up of the vaccines recommended for the primary immunisation of children, young people and adults. Compulsory stocks of vaccines are required to cover four months' demand. COVID-19 and monkeypox vaccines are not part of the vaccination schedule at present, and so are not subject to compulsory stockpiling. New versions of seasonal flu vaccines have to be developed and produced each year, making it impossible to ensure security of supply via stockpiling. Vaccines used in travel medicine are also not subject to compulsory stockpiling.

b. Assessment

The vaccine market has a number of specific features: vaccine production is demanding and the investment outlays are considerable; consequently, only a few specialised manufacturers are able to produce and supply vaccines. Moreover, not all manufacturers produce all vaccines; in Switzerland, there are usually only two suppliers selling any one vaccine. Vaccine production is extremely complex, meaning it cannot be adjusted in the short term. For example, it takes between 18 and 24 months to manufacture a vaccine required for primary immunisation and deliver it to the Swiss market. Therefore, the complete loss of any one manufacturer cannot be fully compensated by the market. Demand in the vaccine market is strongly influenced by the vaccination schedule and vaccination campaigns.

c. Trend

The range and volume of vaccines held as compulsory stocks will be adjusted regularly in line with the new recommendations of the vaccination schedule and the corresponding change in demand. Demand coverage for compulsory stocks of vaccines remains unchanged at four months.

²⁸ <https://www.FOPH.admin.ch/FOPH/de/home/gesund-leben/gesundheitsfoerderung-und-praevention/impfungen-prophylaxe/schweizerischer-impfplan.html>

6.7 Immunoglobulins

Stockpiled product	Demand coverage (DC)	Trend
Immunoglobulins	2-3 months	No change

a. Description

Immunoglobulins (antibodies) are a vital part of our immune system. They are proteins formed by B-cells (B lymphocytes) as a reaction to foreign proteins (antigens). A lack of immunoglobulins can be congenital or it may develop later in life (e.g. due to another disease or therapy that suppresses the immune system). Immunoglobulins can be either non-specific or specific: non-specific immunoglobulins contain the complete spectrum of immunoglobulins and are used to treat immune diseases associated with a general immunoglobulin deficiency. Specific immunoglobulins are used in passive immunisation to fight a specific antigen. This provides immediate, but short-lived, protection against infection. Passive immunisation is used as a short-term preventive measure and to treat patients who are already infected (e.g. tetanus, rabies). In the case of non-specific human immunoglobulins, the total volume of stockpiled goods is expected to cover two months' average demand by the Swiss population. Compulsory stocks of specific immunoglobulins are required to cover three months' demand.

b. Assessment

Immunoglobulins are recovered from human blood donations. Manufacturers therefore buy up pooled plasma donations on the global market. There are numerous reasons why the products are becoming increasingly scarce. On the one hand, the number of blood donations is stagnating, whereas the worldwide demand for immunoglobulins is rising. This is because humans now have an increasing life expectancy, and the products are being used more frequently and in a variety of diseases. Thus, immunoglobulins are increasingly being used as an alternative to and/or in combination with antibiotic therapies.

c. Trend

Due to the global shortage of blood products, the compulsory stocks of immunoglobulins have not yet been fully built up. This should happen in the next few years. Demand coverage remains unchanged at two to three months.

6.8 Other medicinal products used in human medicine

Stockpiled product	Demand coverage (DC)	Trend
Other medicinal products used in human medicine: <ul style="list-style-type: none"> - Adrenalin auto injectors - Oxytocin parenteral forms - Barium X-ray contrast agents Ultrasound contrast agents 	3 months	No change

a. Description

Adrenalin auto injectors are used for the emergency self-treatment of an anaphylactic shock (state of shock) after being bitten by an insect, for example. Adrenaline is a natural hormone produced by the adrenal gland. It increases the heart rate and blood pressure, relaxes the bronchial muscles and inhibits intestinal peristalsis. Treatment with adrenaline has a life-saving function.

Oxytocin is another natural hormone and is produced in the brain (hypothalamus). As a medicine, the active substance oxytocin is used to counteract weak contractions of the womb (uterine atony) in childbirth. Weak contractions can lead to heavy, or even life-threatening, blood loss requiring immediate intervention. In addition, oxytocin is the only substance approved for use in stimulating uterine contractions during labour, and thus also has the potential to save the infant's life.

Contrast agents are products that are indispensable for diagnosis. Barium X-ray and ultrasound contrast agents are held as compulsory stocks.

b. Assessment

In the past, adrenaline auto injectors have repeatedly experienced supply disruptions due to the strong seasonal increase in use, especially in spring. As the syringes only last for 18 to 24 months, allergy sufferers have to replace them regularly.

There have been several short gaps in the supply of parenteral oxytocin in recent years; these were bridged with goods from the compulsory stockpile. Given that only one product is authorised in Switzerland, the supply risk remains high.

Contrast agents are subject to considerable price pressure, leading to market withdrawals and an increase in supply disruptions.

c. Trend

Demand coverage for compulsory stocks of all product groups remains unchanged at three months.

6.9 Anti-infectives used in veterinary medicine

Stockpiled product	Demand coverage (DC)	Trend
Anti-infectives used in veterinary medicine	2 months	Review range and DC

a. Description

Compulsory stocks are held of pre-packaged doses, active substances and medicated pre-mixes for the treatment of animals.

b. Assessment

Switzerland is almost entirely dependent on other countries for its supplies of anti-infectives for veterinary use. In addition, supply chains are highly susceptible to disruption given that active substances are frequently only available as preparations from a single supplier. In many cases, the same active substances are used in both human and veterinary medicine. As a result, disruptions in the supply of anti-infectives usually affect both areas. The problems of germ resistance and food safety mean that considerable care and restraint must be exercised in substituting antibiotics in the treatment of farm animals.

c. Trend

There are plans to introduce a reporting duty for essential active substances in order to gain a better overview of supply disruptions affecting veterinary medicinal products. Consideration is to be given to extending the reporting duty to other product groups in addition to anti-infectives. Discussions will be held with all the stakeholders to develop a concept for implementing the duty to report. In parallel, the requirement to stockpile anti-infectives will also be reviewed and demand coverage adapted in line with the current market situation.

6.10 Blood bag systems

Stockpiled product	Demand coverage (DC)	Trend
Blood bag systems	3 months	No change

a. Description

Blood bag systems are essential in the collection, storage and transfusion of blood. Switzerland has 11 regional blood transfusion services in total, which, together with the national umbrella organisation Swiss Transfusion SRC (Blutspende SRK Schweiz AG), are tasked with supplying blood products to hospitals and ensuring the supply of blood within Switzerland. In the interest of sharing the burden between the blood bag system suppliers and the manufacturers of the respective blood products sold to hospitals, it was agreed that stocks should be held to cover one and a half months. Bag systems used to produce concentrates from red blood cells (erythrocytes) and concentrates from platelets (thrombocytes) are stockpiled.

b. Assessment

In the context of the patient blood management treatment system (an important international principle for improving transfusion safety), hospitals have increasingly adopted a more restrictive and targeted use of allogeneic blood transfusions in recent years. This has also been reflected in blood use, which experienced a moderate decline from 2018 to 2020 and then again from 2021 to 2022. Slightly more blood products were needed in 2021 than in the previous year, however. This can be explained, among other things, by the fact that many operations had to be postponed in 2020 as a result of the COVID-19 pandemic, resulting in lower demand for blood products. According to Swiss Transfusion SRC, demographic change and Switzerland's increasingly ageing population mean that we should expect to see demand for blood products rise again in the long term after initially stagnating in the next few years.

Supply is ensured by just two companies in Switzerland. If one of these were to fail, the blood donation services could not simply switch to the alternative provider as each has their own specific system. Although blood donation services are basically free to change from one system to another, they would have to allow roughly 4-8 weeks for the equipment used to separate the blood to be adjusted before they could start using the new system. This makes it essential to have adequate stocks available to bridge this period.

c. Trend

Given their medical importance and the supply risks that exist if a supplier were to fail, stocks covering a total of three months should continue to be held. Furthermore, there are plans to extend stockpiling to other products essential for the production of unstable blood products.

7 Industrial goods

7.1 Overview

The industrial goods currently held as compulsory stocks are described below, along with the likely future trend in stockpiling. At present, inventories are held of plastic granules used in the production of packaging for foodstuffs and therapeutic products, and of raw materials used in the production of yeast (described in the 'Foodstuffs' section). Reserves of ethanol have been held under secure supply agreements since 2021. Urea solutions for the denitrification of diesel exhaust gases (products like AdBlue or Clearnox) are now being looked into.

Stockpiled product	Demand coverage	Holdings	Trend
Polyethylene and additives	81 tonnes	81 tonnes	No change
Ethanol	6,000 tonnes	6,000 tonnes	No change

7.2 The trend in industrial goods

a. Supply

Plastic

Ninety per cent of plastic granules are made from mineral oil. Some 13% of all crude oil extracted serves the chemical industry as raw material. About half of this is used to manufacture plastics. The Swiss plastics industry imports all the granules it requires to produce packaging. Fifty-two per cent of granule imports come from Asia, 15% come from the European Union (EU), mostly from Germany, Belgium and the Netherlands, and the rest is mainly sourced from the Middle East and the USA. Imports of semi-finished goods and finished packaging are increasing, leading to changes in the packaging industry in Switzerland.

Various events can lead to gaps in the supply of granules: transport disruptions, lower imports into the EU, restrictions in production at petrochemical plants due to technical problems or weather events in Europe and overseas, and low water levels on the Rhine resulting in lower output from refineries along the river.

The COVID-19 pandemic in 2020/2021 saw a global rise in demand for disinfectants, and therefore for plastic granules, which are used to make disinfectant bottles. This could also have resulted in gaps in the supply of granules to Swiss plants. However, as other parts of the economy needed fewer plastics, no shortage arose. Shortfalls in the supply of containers were caused by production bottlenecks and the scarcity of production capacities at the manufacturing plants in Switzerland.

Ethanol

Ethanol is essential in the manufacture of disinfectants and as a solution and extraction agent in the chemical and pharmaceutical industry. Ethanol is produced to a large extent from sugar cane, and is currently almost fully imported: from Brazil, Pakistan, Guatemala and partly from Eastern Europe. Transport disruptions or crop failures can mean that imports fail to match demand. The COVID-19 pandemic demonstrated that Switzerland is unable to import sufficient ethanol when there is a surge in global demand. A small amount of ethanol is now being manufactured domestically, and at the moment is mainly being used to produce high-quality spirits.

Urea solutions for the denitrification of diesel exhaust gases (e.g. AdBlue, Clearnox)

Modern diesel engines (in vehicles or stationary) that meet at the least the Euro 6 emission standard may only be operated if an ultra-pure 32.5% urea solution is added to reduce nitrogen oxide emissions.

Natural gas serves both as a raw material and as energy in the production of urea solutions. Any increase in the price of natural gas will therefore have a direct impact on production costs; any failure of the gas supply will lead to reduced or lost production output.

Urea solutions for the denitrification of exhaust gases are fully imported at present. There are a number of manufacturers in Europe, mainly in Germany, France and Italy. Their plants' natural gas supply and logistics must be guaranteed so that the goods can be manufactured and imported into Switzerland. Urea solutions are also produced outside Europe. However, the manufacturers in question hardly export any of their low-quality products to Europe as the transport costs are too high.

b. Economic trend

Plastic

The European Union banned certain single-use products in Directive (EU) 2019/904 and new rules put forward in November 2022 require all packaging to be recyclable as of 2030. They also set recycling and re-use rates, and specify the rates of recycled content that must be included in packaging. Regulation (EU) 2022/1616 severely restricts the use of recycled materials intended to come into contact with food, which in effect means that only recycled PET drinks bottles will remain viable.

The retail trade is becoming concentrated in the hands of a few large retailers who determine what packaging is used. This concentration and the outsourcing of canning and bottling operations abroad is reducing the domestic demand potential of Swiss manufacturers. Moreover, the unfavourable cost trend (labour costs, euro exchange rate, energy costs, etc.) is making domestic companies less competitive. A number of packaging manufacturers have disappeared from the Swiss market in recent years: films and refuse sacks, for example, are no longer made here.

The dependence on primary raw materials can be reduced by making greater efforts to close loops and thus increase the importance of recycling packaging materials. At present, used PET drinks bottles are being collected, processed and turned into new drinks bottles in a closed loop system. Eighty per cent of the drinks bottles currently required in Switzerland can be produced from collected and recycled PET material.

It is therefore necessary to examine whether compulsory stocks of recyclable materials, such as compressed PET bottles or waste paper, should be held in the future to ensure supply. The legal feasibility of doing so must be clarified. According to the KurVE lifecycle assessment study²⁹, the realistic collection potential of plastic packaging (without PET drinks bottles) is 112,000 tonnes a year. The existing systems only collect between 8,000 and 10,000 tonnes a year at present. One challenge is the waste disposal monopoly given to the state under Article 31b paragraph 1 of the Environmental Protection Act³⁰. The current revision of the Environmental Protection Act could bring about a liberalisation as proposed by the majority of the National Council Environment, Spatial Planning and Energy Committee (ESPEC-N).

²⁹ Ökobilanz Kunststoffrecycling und Verwertung, KurVe Studie UMTEC/Carbotech, Basel, 2017 [Life Cycle Assessment and Eco-Efficiency Analysis of Plastics Collection Systems in Switzerland; available in German only]

³⁰ Federal Act on the Protection of the Environment, EPA (SR 814.01)

Consideration should also be given as to whether PET granules for the production of non-food containers are to be stockpiled going forward. Stocks of preforms³¹, which are central to securing the supply of PET bottles for mineral water, would also need to be held.

It is also necessary to check whether other granule varieties should be held in stock for the production of PET bottle lids.

Ethanol

The entry into force of the new Alcohol Act liberalised the market as of early 2019. As demonstrated at the start of the COVID-19 pandemic in March 2020, the market was unable to meet the increased demand for ethanol. As a consequence, the Federal Council decided in autumn 2020 to set up reserves of more than 6,000 tonnes of ethanol under secure supply agreements. This inventory is primarily intended to serve the healthcare sector and the chemical and pharmaceutical industries in the event of a shortage.

Urea solutions for the denitrification of diesel exhaust gases

The Euro VI emission standards apply to heavy goods vehicles in Switzerland. Heavy-duty and other diesel-driven engines (e.g. emergency power units, construction machines) can only meet these standards by injecting urea solutions into their exhaust gases. Urea solutions are also used, among other things, in larger (more than 2 MW) automatic wood burners and waste incineration plants.

Emergency power systems above a certain size that fall under the currently valid EU emission standards require urea solutions. Transitional periods are still in place in Switzerland with regard to the EU 3A standard, which does not require the use of urea solutions. Large stationary systems can also be operated without urea solutions. Various waste incineration, district heating and special waste incineration plants also use ammonia water (25%) for denoxing purposes.

It can be assumed that the consumption of urea solutions for the operation of diesel engines will rise due to HGV fleet modernisations, more mobile emergency power units, special emergency and breakdown railway vehicles, rescue and fire trucks, and modern agricultural vehicles. Therefore, a range of approaches to securing the supply of urea solutions must be examined.

³¹ Preforms, which are made of PET resin, are created through the injection moulding process and resemble miniature bottles, complete with threaded necks.

7.3 Polyethylene and additives

Stockpiled product	Demand coverage DC	Holdings ³²	Trend
Polyethylene and additives	81 tonnes	81 tonnes	No change

a. Description

Compulsory stocks are held of polyethylene granules used to manufacture disinfectant bottles and of additives such as polypropylene used to manufacture bottle caps, both of which would be required above all in a pandemic.

b. Assessment

Polyethylene is the world's most commonly produced plastic, accounting for some 38% of the total. Typical polyethylene products include clingfilm, carrier bags, agricultural films, milk carton coatings, refuse sacks, and all kinds of bottles (including disinfectant bottles) and containers. Around 2.5 million disinfectant bottles with a volume of 500ml can be produced from the existing inventory of compulsory stocks.

c. Trend

Compulsory stocks of polyethylene granules and additives for the manufacture of disinfectant bottles will continue to be held at their current level.

³² Rounded values.

7.4 Ethanol

Stockpiled product	Demand coverage DC	Holdings ³³	Trend
Ethanol	6,000 tonnes	6,000 tonnes	No change

a. Description

The reserves of ethanol held under secure supply agreements comprise two qualities: ethanol absolute (Ph Eur) and ethanol 96% (V/V) (Ph Eur/USP/BP). At least one quarter of the total inventory should consist of the higher concentration ethanol absolute (Ph Eur). The specifications are based on pharmacopoeias and define the purity content for the manufacture of medicinal products. The two high concentrations mentioned above are suitable for all purposes.

b. Assessment

The goods held in reserve are to be used to produce disinfectants, meet the healthcare system's overall needs, manufacture medicines, and partly to produce food.

c. Trend

There will no change in the level of ethanol stocks held.

³³ Values rounded.

8 Logistics

Stockpiling is a supply chain logistics process. Supply chains are becoming increasingly complex, international and interdependent. To ensure that goods held as compulsory stocks can be supplied to consumers when needed, in addition to the actual stockpiles, both upstream and particularly downstream logistics processes are required, and these must be resilient.

In times of shortage, the stockpiled goods must be available at the point of consumption within the necessary period of time and in the necessary quantities. Having suitable storage sites that operate independently of each other along the supply chains can lessen the impact of any single location being unable to operate.

It is essential that the goods can be accessed at the storage location and that the necessary handling capacities are available. The infrastructure, equipment and processes must be protected in such a way that supply can be ensured despite simultaneous events, such as a power failure.

The ability to distribute the goods domestically from the location where stocks are being held depends on properly functioning freight transport by both road and rail. The NES organisation's Logistics Division has set up measures to safeguard transport.

In the case of road transport, this means temporarily lifting the ban on Sunday and night-time driving, temporarily making drivers' working hours more flexible, and temporarily using the original gross vehicle weight for trucks.³⁴

Measures in relation to rail transport are: temporarily relaxing the requirements of the Working Hours Act for Railway Undertakings and prioritising rail transport.

These measures are also suited to making additional transport capacities available when required temporarily and locally by drawdowns of compulsory stocks. In this case, use is made of existing logistics infrastructures and resources. Holding these in reserve for a crisis situation would not be proportionate and is therefore not to be adopted as a measure by the National Economic Supply organisation.

In addition to the downstream logistics processes described above, which are important for the withdrawal of goods from compulsory stocks, the procurement, replenishment and handling of the goods are also important warehouse operations. They ensure that the warehouses can be run economically, that the goods stored are of the required quality and that the stocks can be replenished efficiently after a drawdown.

³⁴ Two additional measures are available with regard to cross-border transport, namely extending customs opening times and using the manual customs declaration procedure. These are mentioned here for the sake of completeness.

9 Information and communication technology (ICT)

Information and communication technologies and the ICT services based on them form part of the National Economic Supply organisation's supply processes. The ICT Division's strategic priorities lie in supplying Switzerland with these essential ICT resources and service processes. This means ensuring the availability not only of ICT infrastructure (data cables, mobile networks, data centres, etc.), but also of ICT as a critical resource for the other supply processes. ICT services are equally important in running and managing stockpiles.

To this end, the ICT Division develops both preventive and reactive responses. Preventive measures are intended to reduce the likelihood of an incident occurring. Reactive measures are designed to limit the extent of the damage after an incident, and particularly to ensure the continuing supply of critical ICT services.

The most important of the NES preventive measures is the ICT minimum standard. It is aimed primarily at operators of critical infrastructures that rely on the smooth functioning of ICT infrastructures to safeguard their supply processes. It can also be used by any company seeking to improve its protection against cyber risks, including compulsory stockpile operators and their upstream and downstream logistics processes. Particular attention is paid to threats that jeopardise Switzerland's supply of essential goods and its supply of ICT and logistics services. Examples include a power shortage that would require the NES to step in and manage the situation (through electricity quotas and periodic grid shut-downs).

The ICT minimum standard provides users with a set of specific actions they can take. There are 108 of these in total, structured under five headings: 'Identify', 'Protect', 'Detect', 'Respond' and 'Recover'. Implementing these measures will help organisations and businesses to assess and improve their level of ICT resilience. In relation to compulsory stockpiling, this is particularly relevant to coping with incidents that have a major impact on the supply of essential goods.

Further measures are being prepared to ensure supply-related services, such as temporarily providing more bandwidth to voice transmissions. They include appealing to users to voluntarily restrict use (calls and appeals), prioritising ICT services and limiting the bandwidth available to telecommunications end customers. These measures can be adopted when disruptions and overloads of ICT networks affect compulsory stockpiling.

10 Financial aspects

10.1 Value of goods held as compulsory stocks as of 30 December 2022

Product	Value in CHF million
Foodstuffs	671
Energy	2,898
Therapeutic products	51
Industrial goods	0.1
Total	3,619

10.2 Guarantee funds

The economic sectors which are subject to compulsory stockpiling may set up compulsory stock organisations under private law to administer guarantee funds for individual groups of goods. The monies in these guarantee funds are collected by levying two different kinds of contributions on goods for which compulsory stocks must be held: under the initial distribution system, contributions to the guarantee fund are charged both on goods produced in Switzerland and goods imported from abroad. Under the border charge system, contributions are charged on imports only. The guarantee funds are used to compensate individual companies for the costs of holding compulsory stocks. Standard criteria apply to these payments. These costs are ultimately passed on to the consumer via the product price.

This system functions if all holders of compulsory stocks within a given sector are members of the compulsory stock organisation. The FONES requires companies subject to compulsory stockholding to join a compulsory stock organisation.

All the economic sectors covered by the compulsory stockpiling system currently have guarantee funds. They are administered by the compulsory stock organisations, i.e. CARBURA (petroleum products), Provisiogas (natural gas), Helvecura (therapeutic products), réservesuisse (grain, foodstuffs and feedstuffs) and Agricura (fertiliser). CARBURA and réservesuisse levy guarantee fund contributions on imports, while Agricura, Helvecura and Provisiogas apply the initial distribution approach.

The monies in these guarantee funds do not belong to the individual members or the federal government. As earmarked private funds, they are held in segregated accounts, their use is subject to restrictions under public law and they are subject to federal government supervision. The FONES ensures that the level of contributions to the guarantee funds is appropriate, and that the funds are used for their intended purpose.

10.3 The trend in costs

The costs involved in compulsory stockpiling include the payments made to companies from the guarantee funds, and the compulsory stock organisations' administration costs. Stock volumes in the foodstuffs and energy sectors have been reduced considerably over the past 30 years, and the range of goods for which stocks must be held has been streamlined, enabling significant cost savings. Compulsory stocks of therapeutic products have been built up. However, the resulting additional costs are low in

comparison with the savings that had been achieved, especially by reducing the volume of mineral oil stocks. Overall, expenditures in connection with compulsory stockpiling have declined sharply over the past few years, and the low interest rate level has also helped to keep costs down. The costs incurred in compulsory stockpiling do not include the outgoings for supplementary stockpiling or the expense entailed by entering into a secure supply agreement. These are borne directly by the companies in question or compensated directly by the federal government. They are estimated to amount to a low seven-figure sum. The annual cost of compulsory stockpiling came to around CHF 13 per head of population in 2022.

Cost of compulsory stockpiling		
Year	Total in CHF million	Per capita in CHF
1995	307	43
2000	164	23
2005	126	17
2010	116	15
2014	108	13
2018	105	12
2022	116	13

11 List of legal instruments

- Federal Act on National Economic Supply of 17 June 2016 (SR 531)
- Ordinance on National Economic Supply of 10 May 2017 (SR 531.11)
- Ordinance on the Compulsory Stockpiling of Foodstuffs and Feedstuffs of 10 May 2017 (SR 531.215.11)
- Ordinance on the Compulsory Stockpiling of Fertilisers of 10 May 2017 (SR 531.215.25)
- Ordinance on the Compulsory Stockpiling of Therapeutic Products of 10 May 2017 (SR 531.215.31)
- Ordinance on the Compulsory Stockpiling of Fossil Fuels of 10 May 2017 (SR 531.215.41)
- Ordinance on the Compulsory Stockpiling of Natural Gas of 10 May 2017 (SR 531.215.42)
- Ordinance on the Compulsory Stockpiling of Seeds of 26 January 2022 (SR 531.215.61)
- Ordinance on the Organisation Responsible for Ensuring National Economic Supply in the Gas Sector of 4 May 2022 (SR 531.81)
- EAER Ordinance on the Compulsory Stockpiling of Foodstuffs and Feedstuffs of 20 May 2019 (531.215.111)
- EAER Ordinance on the Compulsory Stockpiling of Fertilisers of 20 May 2019 (531.215.251)
- EAER Ordinance on the Compulsory Stockpiling of Therapeutic Products of 20 May 2019 (531.215.311)
- EAER Ordinance on the Compulsory Stockpiling of Fossil Fuels of 20 May 2019 (531.215.411)
- EAER Ordinance on the Compulsory Stockpiling of Seeds of 20 March 2019 (SR 531.215.611)