NATURAL GAS IN THE BALTIC SEA REGION

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Natural gas is the most preferable among the fossil fuels, and the most efficient in use. With the natural gas, it is most easy to flexibly change the productivity of power and heat producing plants. Therefore natural gas is especially suitable in facilities covering the peak load, as well as in combined heat and power plants and in combination with renewable fuels. Investments for building natural gas stations are lower than for building those operating on liquid or solid fuel. Per energy unit the natural gas is cheaper than the oil fuel, at least in the Baltic States. The emission level of greenhouse gas (CO_2) is nearly two times lower. Seen as a drawback with gas, is its large specific volume – per energy unit at atmospheric pressure nearly 1000 times higher than with liquid fuel. This ratio can be reduced, by transporting and storage of the gas under pressure, yet in case of absence of large interim storages the gas system will operate literally on starvation rations, i.e. it is extremely vulnerable to disruption of supplies.

In 2004 in the world gas was consumed in the amount of 2.4 trillion m^3, of which 420 billion m^3 i.e. ca 20% was used in Europe (Table 1). Production of gas has in recent years increased by 3–4% pear year. At the same time, the dependence of main consumers on import has increased – in the EU, it is over 50%, according to the forecast, in 2030 as much as 80%. Germany depends even now 78% on import. To achieve a guaranteed supply, the sources of delivery should be constantly diversified, and more gas pipelines running from those sources should be installed. The Baltic States depend 100% on Russia for their gas deliveries.

Table 1

Energy consumption 2004

	World	EU 25	Germany	Baltic States
Primary energy consumption, Mtoe	10224	1719	330	18,6
Share of natural gas,%	27.2	23.6	23.3	24.3
Consumption of natural gas, Bm^3	2420	420	16.4	5.4
Gas import dependence, %		>50	78	100
Reserves	180000 Bm^3 67 years	incl. Norway 5050 Bm^3; 2.8%	Russian Federation 48000 Bm^3; 26.7%	

Given the present output volumes the researched reserves of gas are expected to hold out for another 67 years (c.f. the oil is supposed to last 41 years), of which 2.8% are being held by the EU countries, with the Norwegian reserves included, and 26.7% by Russian Federation. Prospecting allows for a significant growth of reserves in the Norwegian Sea and Barents Sea, e.g. in the Shtokman deposit with reserves over 3 trillion m^3.

Natural gas is a vital commodity. The European countries imported in 2004 over 300 billion m^3 of gas, of which by pipelines 43.9% from Russia, 34.1% from the North Sea, 11% via the Mediterranean Sea from North Africa (Table 2). The balance of 11% is imported by tankers, liquefied, from West Africa and Middle East. There are plans laid down to build new gas pipelines from Russia and the Caspian Sea area, and to build new tankers and terminals for liquefied gas. An example to the case is gas pipelines in the North Sea presented on Figure 1.

Table 2

Natural gas trade movements in Europe 2004

	Sum	Russia	from North Sea	Africa	LNG
Bcm^3	303.1	132.8	103.4	33.4	33.5
%		43.9	34.1	11.0	11.0

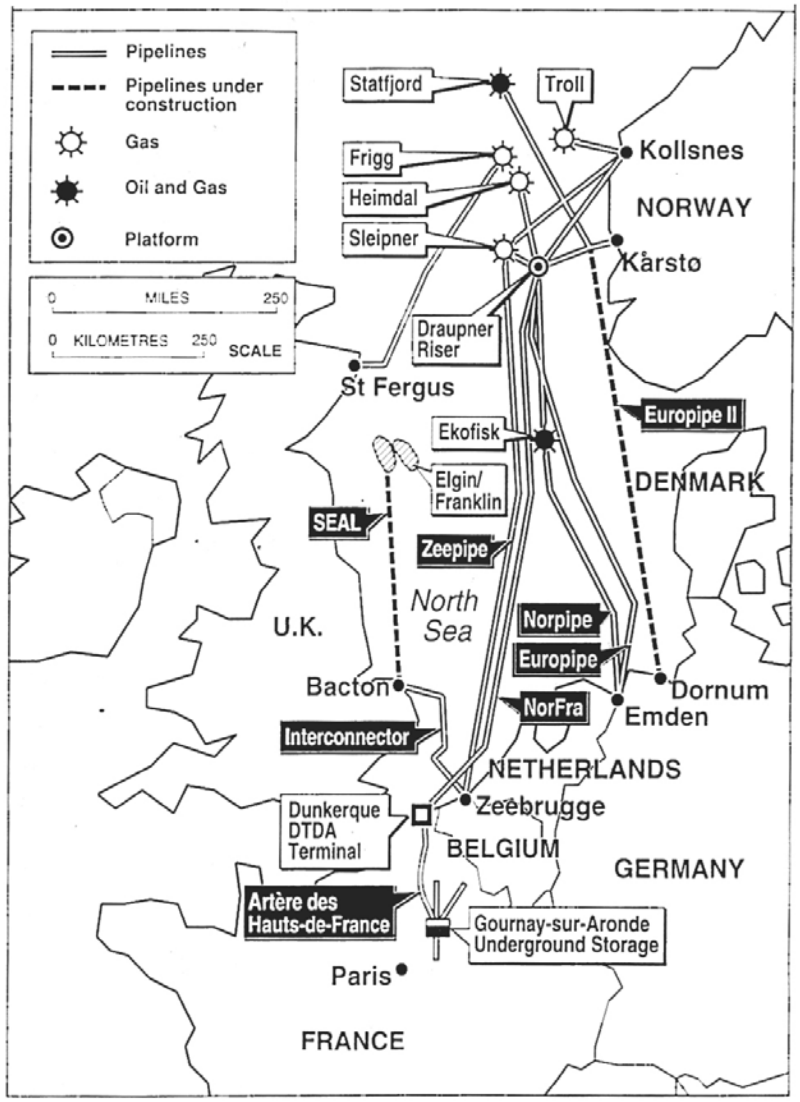

Figure 1.
Gas pipelines in North Sea.

Coming back to the Baltic States we see (Table 3) that together, they cover with domestic energy resources 52.8% of their need for energy, more specifically Latvia by 28%, Lithuania by 57%, Estonia by 67%.

Table 3

Energy consumption of the Baltic States 2003

	Estonia	Latvia	Lithuania	Sum
Primary energy consumption, Mtoe	5.03	4.60	8.98	18.60
Share of domestic energy production, %	67.3	28.0	57.3	52.8
Supply of natural gas, Bm^3	0.85	1.63	2.88	5.36
Share of gas in primary energy consumption, %	13.5	32.4	26.2	24.3
Storage working volume, Bm^3	-	2.3	-	2.3

In 2003, the Baltic States consumed 5.36 billion m^3 of natural gas. This makes 24.3% of summary energy consumption (approximately as much as on average in the EU). The highest was the share of gas in Latvia – 32.4%, the lowest in Estonia – 13.5%, approximately as much as in Finland. In the proximate future the need for gas in the Baltic States will increase, in particular in view of closing down the Ignalina nuclear station and the problems with oil shale and transfer to free electricity market in Estonia.

The Baltic States have an excellent joint network of gas pipelines (Figure 2). Gas arrives from Russia through two pipelines – via Irboska and from the southern part of Lithuania. A major asset in it is underground gas storages in Latvia. The present Inčukalns storage has the capacity of 2.3 billion m^3. That storage holds the gas reserves of Latvia, Lithuania and Estonia, however also those of Russia. The volume of Latvian underground gas storages can be increased up to 20 billion m^3, which would make them unique in the whole of Europe. If they are be connected to gas pipelines running to Europe, they could play a much more important role. Under scrutiny presently is laying the gas pipeline from Finland over Gulf of Finland to Estonia. That would provide access of Finland to the Latvian gas storages, and would provide to Finland a second supply channel. That would be a welcome counterpart to the electricity cable running over the Gulf of Finland, to be finalised in 2006.

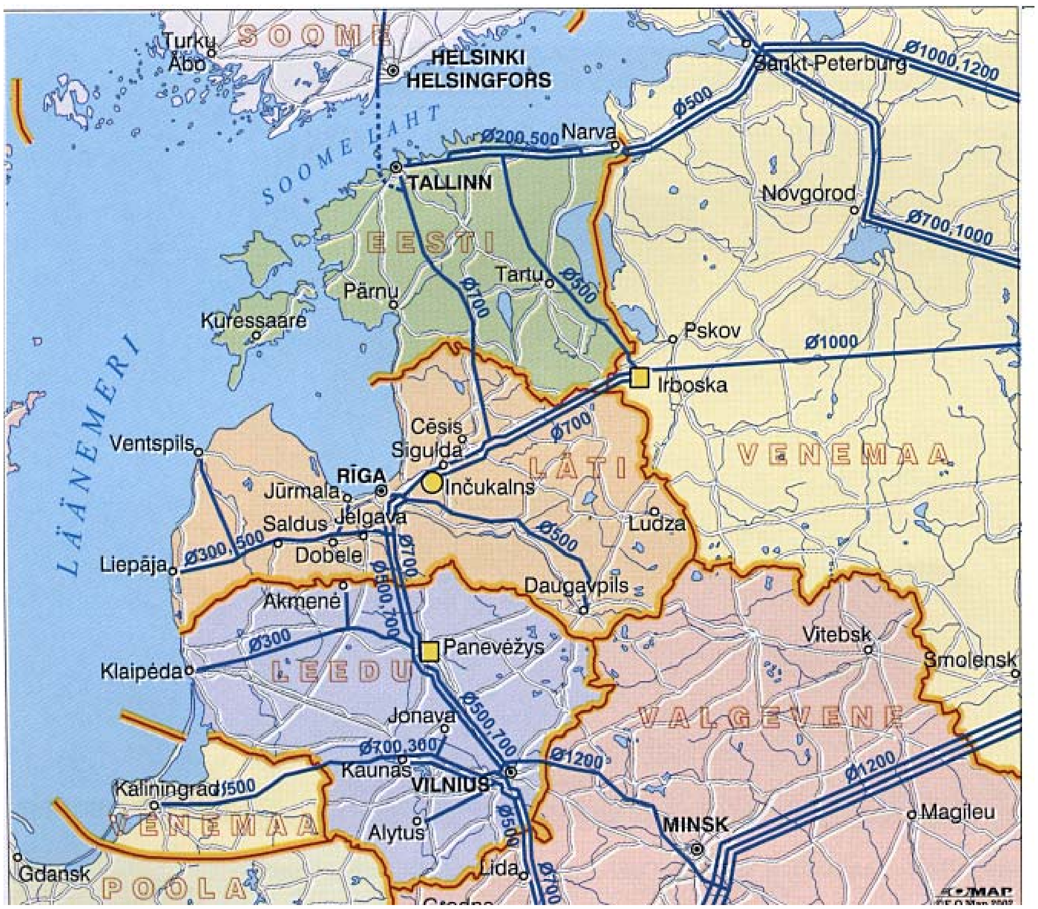

Figure 2.
Gas pipelines in the Baltic States.

The Baltic Sea area has, for quite some time now been considered as the natural gas transit way from Russia to West Europe. The first project to that end was the so-called Nordic Gas Grid, the base version whereof has been presented in Figure 3. The goal of the project was the transport of Russian gas over Finland and Sweden to Germany, creating to the gas pipelines an access, via Estonia to the Latvian gas storage, and contemplating to feed it also with the gas from the North Sea. The second project (MNG) was the gas pipeline from the Norwegian Sea via Norway to Sweden and from there on via Gulf of Bothnia to Finland (Figure 4).

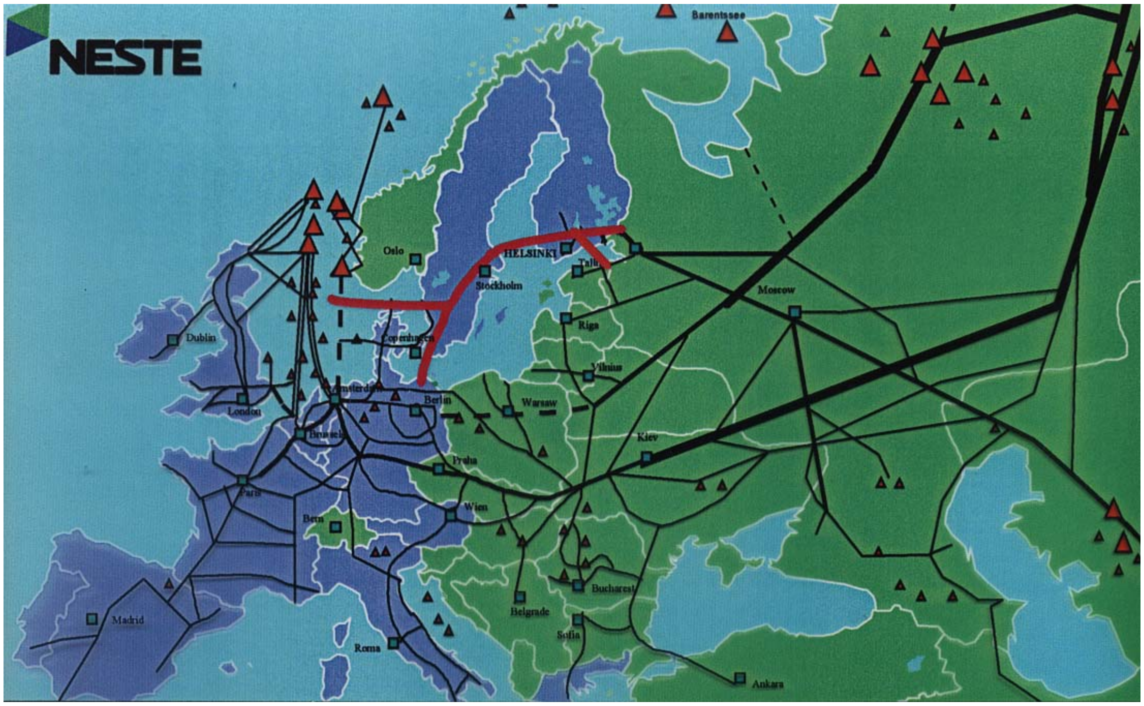

Figure 3.
Nordic gas grid.

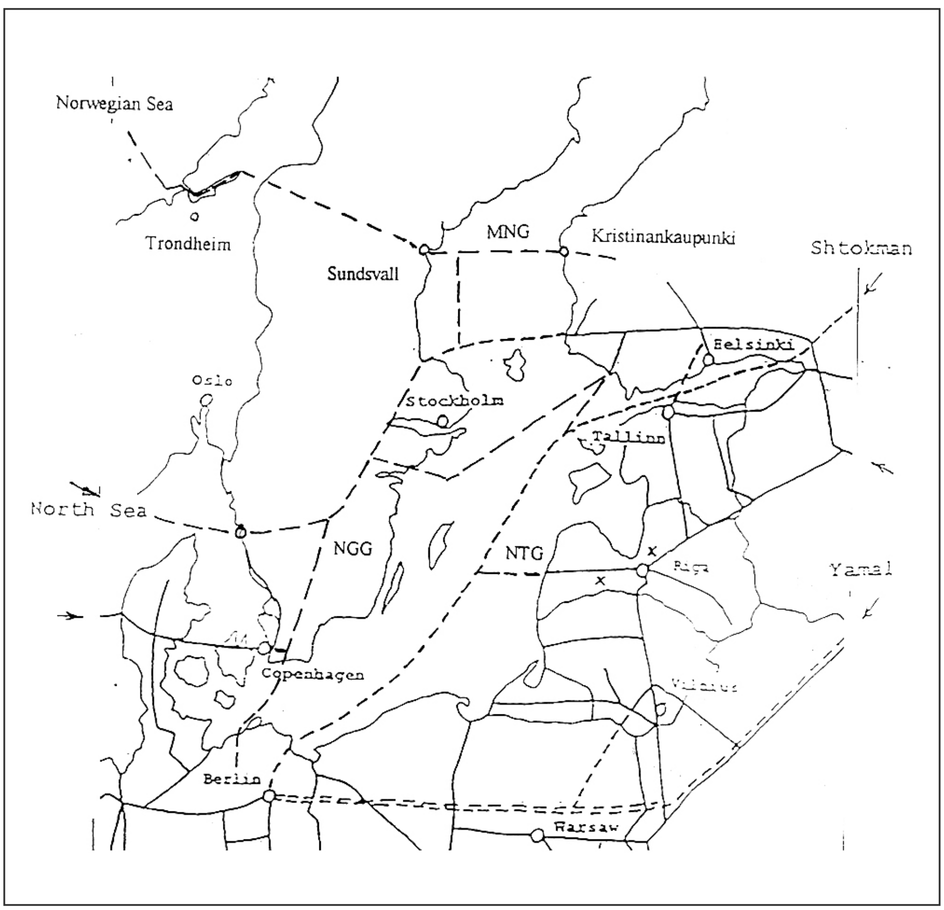

Figure 4.
Gas pipelines in the Baltic Sea region.

This project was discarded, before long because the idea did not catch on in Sweden. Moreover, the gas volumes were too small for such expensive business project. Two versions evolved, to supply Germany with gas via the Baltic Sea: one through Latvia by connection to gas storage, and on from Liepāja along the Baltic Sea to Germany (NTG), the second along the Baltic Sea the whole stretch of 1200 km from Vyborg to Greifswald without branching off pipelines to other Baltic Sea countries. It turns out that the second variant, the most unsuitable to other Baltic Sea countries has prevailed now. From the narrowly German angle of view that variant may have advantages: it makes possible safe large-scale import, it enables independence of other countries, and it does away with paying for gas transit. Furthermore - laying the gas pipeline through sea usually turns out cheaper than running it across main-land. I believe that Russia is also most pleased with such variant – large gas and cash flows will traffic between those two countries, suffering no nuisance from troublesome "neighbouring" foreign countries.

The Russian-German gas project must be analysed from several aspects: from how the Baltic Sea countries visualise it, in particular regarding the energy security of the Baltic States, from its impact on ecological situation of the Baltic Sea, from its compliance with the provisions of international maritime law.

If that project is realised, the supply of the Baltic States with gas will continue to be at the mercy of Russia, through two existing gas pipelines, distanced from the gas transportation highways. Conceivably, in case of inadequate development of production capacities, crises and accidents in production or gas pipelines, the Baltic States as smaller consumers will turn out the main injured parties. Even now, in case of deficit of the winter gas in Russia, the gas is detoured from Inčukalns back to the St. Petersburg region. From the standpoint of the Baltic States and Finland, from the gas pipeline running by sea a branch pipeline should be branched off to Latvian gas storages, developing them in due manner. The existence of such buffer storage in the gas corridor should be of interest also to Germany.

How does the envisioned installation impinge on the ecosystem of the Baltic Sea? Mainly, through the agency of mines planted there during WWII and the subsequent years, the dumped chemical and conventional weapons, the sunken vessels and planes, the gas leakages. 80,000 mines are reckoned to have been left in the Baltic Sea, most of them in the Gulf of Finland and in the northern part of the Baltic Sea, planted there by the USSR, Germany and Finland.

Figure 5 displays only the areas, which were mined in 1941. The following three years witnessed the accretion of at least the same quantity of mines, as evidenced by additional mapping. The naval chart of the Baltic Sea left in Estonia by Russian navy indicates also the locations of other sunken blasting charges.

The locations of military foreign bodies were documented anew by sectors within the framework of topographic pilot project of the Baltic Sea, the executive agency whereof was the German mine flotilla. In the general case, the mines are not dangerous, because their batteries have discharged, although the blasting substances have been preserved. By using appropriate safety measures, they can be trawled out of the sea, except when they are anchored to the bottom.

In the sea zone of the Republic of Estonia, only there have been identified *ca* 26,000 mines and 3000 other underwater objects. In the past ten years, in that zone, there has been cleaned of mines ca. 2115 km^2 i.e. 5.8% of the total area, and 428 blasting charges have been defused (Figure 6). Trawling out the mines is so labour-intensive and time-consuming that it cannot be done in full, nor is it deemed necessary. It is necessary however in the area of shipping lanes, fishing sectors and areas of gas pipeline routes, in the latter case evidently in the zone 1 km wide. The more exact location of the gas pipeline is not known, but in the Gulf of Finland at least, it will cross the economic water zone of Finland and/or Estonia. Behind their back and without consulting them, the project cannot be implemented. This however has not been deemed as necessary, heretofore.

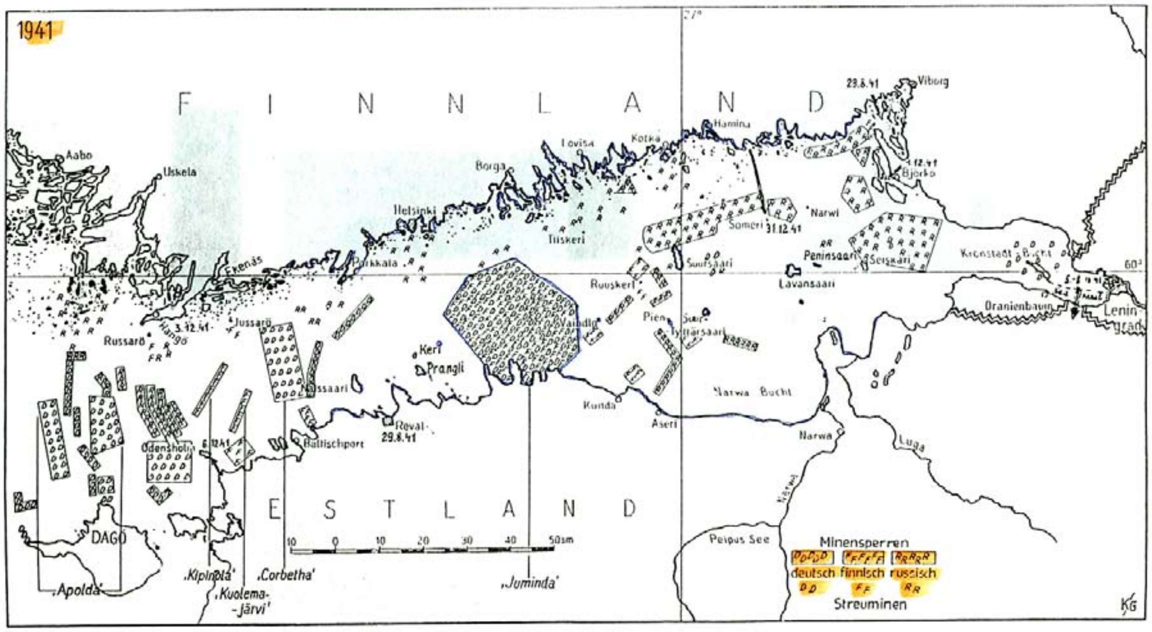

Abb. 1: Der Seekrieg in der Ostsee 1941

Figure 5.
From: J. Meister. Der Seekrieg in der osteuropäischen Gewässen 1941-1945. 1958, München.

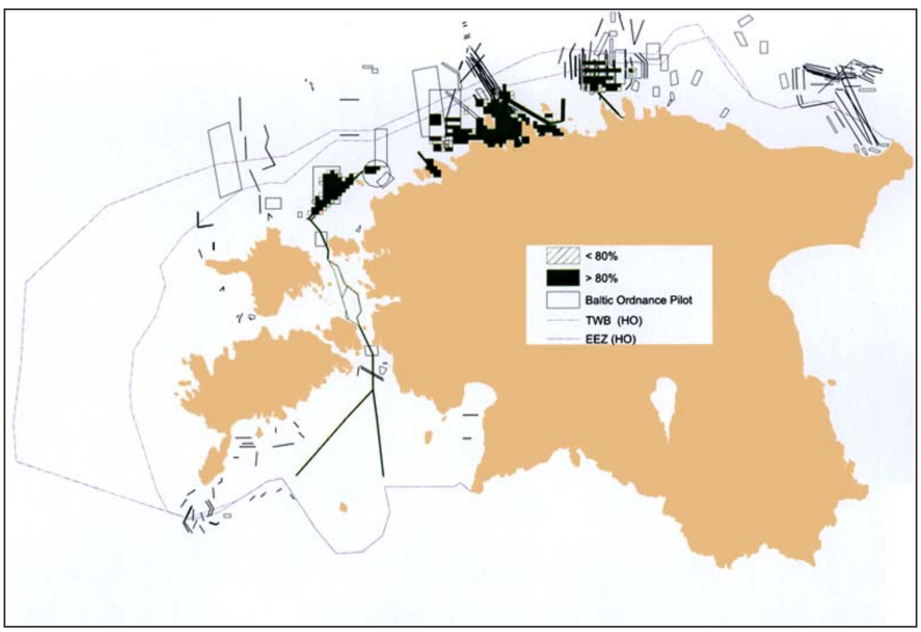

Figure 6.
Cleaned areas
1994-2003.

Major hazard are the chemical weapons dumped into the sea. After the end of the war the allies collected the German chemical weapons and dumped them into the sea – altogether over 300,000 tons, of which the bigger part in Sound of Skagerrak and in the Baltic Sea, less in the North Sea. Dumped in the Baltic Sea were 38,000 tons of chemical weapons (at rated chemical poisons ca. 12,000 tons), mainly in three areas – most of all to the east of the Bornholm island, less to the centre of the Baltic Sea and in the Sound of Small-Belti (Figure 7). Major part of them was aerial bombs; of chemical warfare agents there were mustard gas and arsenic compounds (Figure 8). The mustard gas escapes from the weapon in composition with the thickening agent. This mixture is of higher density than water and it descends into the bottom sediments in thick clots. Conceivably the mustard gas will slowly break down in such conditions and will not present a great hazard to the ecosystem of the sea. Those clots however have got caught in the fishing nets and have been pulled out, causing burns in fishermen. Arsenic compounds, in the contrary are more viable, because they preserve in the bottom sediments and are therefore the source of long-term hazard, as a result of bioaccumulation. Until now, the attitude to dumped chemical weapons has been prevailed by a consensual standpoint – keep your hands away from them. This standpoint was also assumed by the chemical weapons *ad hoc* working group established in 1992 within the framework of the Convention for Protection of the Baltic Sea.

Yet, in 1996, in connection with installation of cable links, gas pipelines and oil terminals HELCOM adopted the recommendations (no. 17/3), envisaging exchange of information between the parties, joint study of the problems and decision making only after a proper investigation is carried out into the impact of the installations on the Baltic Sea ecosystem. It needs be taken into account that the Baltic Sea is a relatively closed basin, with low water exchange rate, and its ecosystem is therefore more sensitive as that in the North Sea.

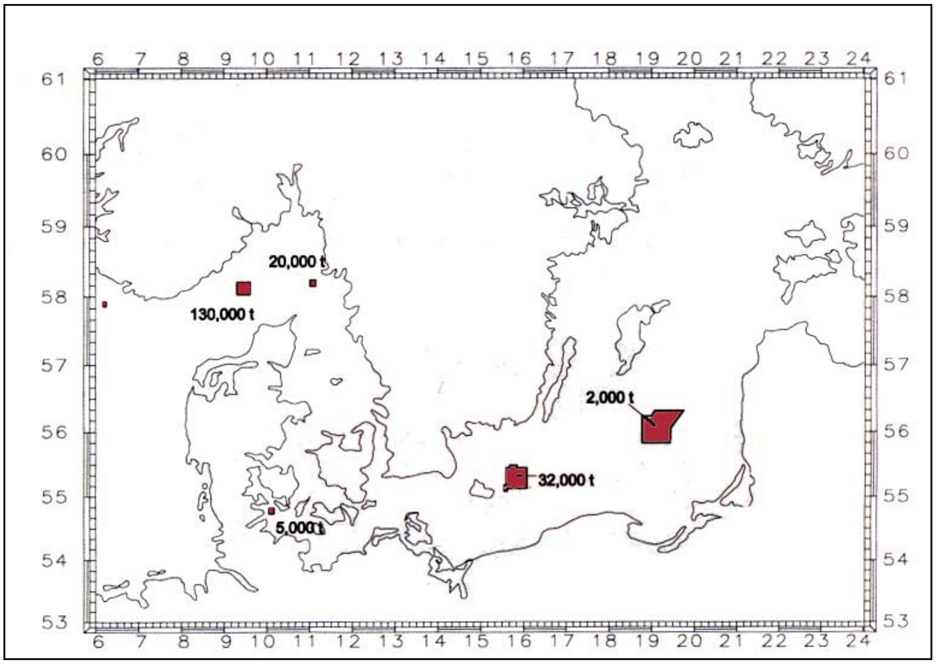

Figure 7. Location and amounts of dumped chemical munitions. From: Chemical munitions dump sites in coastal environments. 2002, the Brussels.

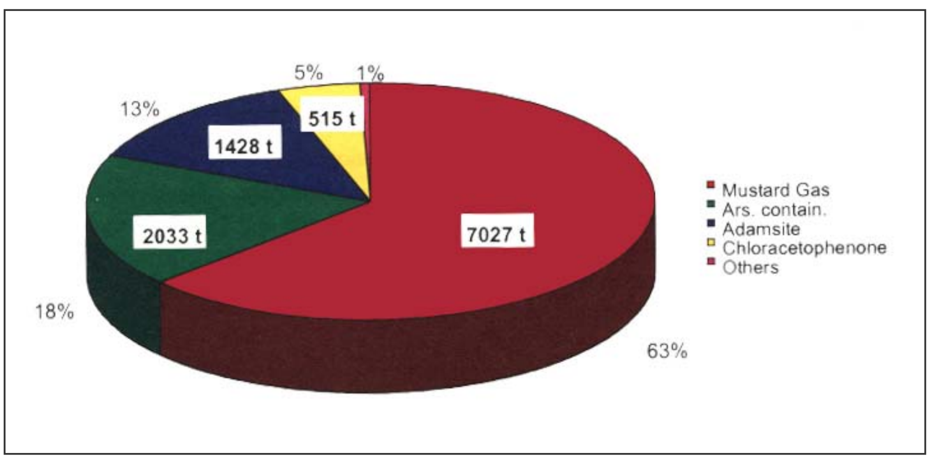

Figure 8. Amounts of chemical warfare agents dumped in the Bornholm basin. From: Chemical munitions dump sites in coastal environments. 2002, the Brussels.

The international seminar on dumped military weapons held in Belgium in 2002 emphasised that the available information was insufficient and partly of dubious value, in the first place regarding the rate of leaking and degradation of toxic substances. Seminar considered it necessary to organise constant and appropriate monitoring. There are no data available about this monitoring having been launched. Trawling out the chemical weapons was considered technically feasible, however involving high risks and costs. Anyway, cleaning of the Russian-German gas pipeline routing from sunken military weapons will essentially lift the cost of the project.

Lately the said issue was handled at a special meeting of leaders of delegations of HELCOM held on 4 November this year, with the German-Russian Baltic Sea gas pipeline project on agenda, among others. The meeting took cognisance of the letter from Federal Republic of Germany Ministry of the Environment, saying that they lacked as yet a respective detailed information on project and the composition of the expert panel on the German side was not known, however intimating that the recommendations of HELCOM would be taken into consideration in the process of expert examination of the project, of which the commission in Helsinki would be duly apprised.

To put it into a nutshell – when making the agreement on establishing the gas pipeline between the FR of Germany and Russian Federation, one tacitly ignored

- Requirements of the International Convention for Protection of the Baltic Sea and HELCOM protocol no. 17/3,
- UN Convention for Maritime Law (which the Republic of Estonia joined in 2005) art. 79 and 87, envisaging co-ordination of projects of marine installations with the countries, whose sea zone they affect,
- Needs for energy related security of the EU Member States located on the Baltic Rim.

The further fate of the project will be conditional of the joint political actions of the Baltic Sea countries.