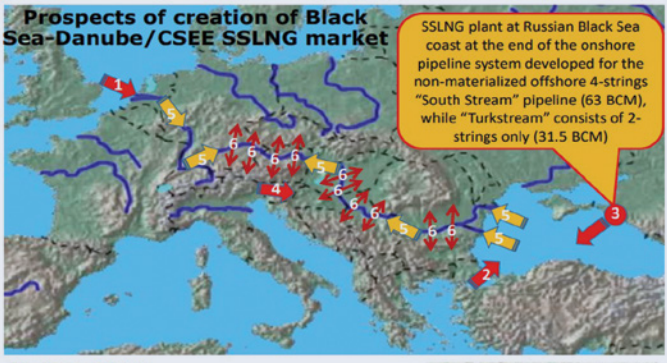
The prospects of a Black Sea/Danube small-scale LNG market *

Gas supplies to South-East Europe (SEE) originate either from long-distance sources transmitted via pipeline or through re-gasified LNG injected into the gas transmission grid in various locations in SE Europe (Turkey, Greece, Croatia) but also beyond this area. This grid is rather scarce in SEE, as its density today in the countries of the region has stayed at the level of the gas grid density available in North-West Europe (NWE) as it was in late 1970s or early 1980s. So, the countries of SEE require additional gas supplies much more than the rest of the EU. However, today there is an additional option for gas supplies available to the countries in the area and they are best suited for this for a number of objective reasons. Such an option concerns off-grid small-scale LNG (SSLNG) supplies to the housing and transportation sectors, and to the small and medium business entities of the region.

Here is the vision of a prospective Black Sea/Danube SSLNG market, which will also cover bunkering of sea and river vessels in the area.

A principal distinction between SSLNG and large-scale LNG (LSLNG) is that SSLNG, if transported and consumed at the end-use in liquid form and is not re-gasified, is delivered directly to the retail market and to the end-users, and not through the wholesale gas market. The latter is the case with pipeline gas and/or LSLNG. This is because SSLNG in such cases directly acts as the end-use energy for final consumers and no further transformation is needed prior to its end-use. In such capacity, SSLNG possesses absolute competitive advantages since it covers those market niches which cannot be covered by pipeline gas or by LSLNG.



Legend:
1-4 = SSLNG supplies to SEE (**1-3** – available; **4** - prospective):
1 = from North Sea area (re-loading) by barges via Rhine-Danube waterway from the North;
2 = through Turkish Straits (limited, up to prohibitive);
3 = by trucks via N.Italy (currently from Spain) & prospectively from coastal regaz/FSRU in North Med;
4 = from proposed Russian Black Sea SSLNG plant: (i) in changeable cryogenic tank-containers, by container vessels of sea-river class upstream Danube & along Black Sea coastal area, (ii) bunkering ships, within (& beyond?) Black sea area;
5 = supplies within Rhine-Danube waterway by barges/see-river vessels;
6 = SSLNG fueling gas stations in Danube cities (i.e. floating, on anchored barges, modular packaging, with changeable cryogenic tanks) => 53 cities on Danube

Source: A.Konoplyanik; *for ssLNG plant (*)*: K.Neuymin (Gazprom). Development of Small and Medium-Scale LNG Infrastructure in Russia. Presentation at 9th SPB International Gas Forum. 1-4.10.2019

A first competitive niche for SSLNG covers the autonomous, decentralized, off-grid gas supplies and/or electricity and heat supplies to small-medium-size users (such as local provincial towns, villages with small population in the scarcely inhabited provinces of SEE where the density of population is much smaller than in, say, NWE) based on autonomous small-scale gas-fueled power stations. Such gas-to-power stations can be developed based on a modular principle so that the broad range of electricity generation capacities can be compiled to cover the energy needs of communities of different size and population. SSLNG shall be supplied to these end-users in changeable cryogenic tank-containers which can fuel small local gas fired power stations and/or local internal municipal isolated gas grids to be developed within each individual municipality (for heating and cooking purposes). A second competitive SSLNG niche is the transportation sector (mobile energy facilities), both on-surface and water-born. Land transportation covers cargo traffic, and public transport, starting with large cities as to obtain "economy of scale" effect: buses, public works trucks, delivery of goods to retail network, etc. Water-born transportation covers bunkering of both river and sea vessels.

SSLNG fueling stations with changeable tank-containers shall be located in cities on the Danube and on the Black Sea coast (see chart). Such fueling stations can be floating, on anchored barges, and of modular packaging. Changeable cryogenic tank-containers will be delivered using one of four delivery options presented below. If placed in the cities along the Danube (a total of 53 cities) where the river is usually crossed by auto and rail routes, SSLNG can be used not only for fueling transportation needs of these cities, but for traffic passing through them.

In those consumption areas, SSLNG competes not with coal, nuclear and/or renewables (as is the case with centralized electricity production based on pipeline gas deliveries), but with petroleum products (gasoline, diesel – in transportation) and electricity (generated from renewables and/or fossil fuels) in the case of households, i.e. in cooking and heating.

There are four prospective ways/routes of SSLNG supplies to SEE (see chart). Three of those are already technically available and the fourth one can be developed based on international cooperation in the Black Sea-Danube area.

The first delivery route is from regas-LNG terminals in the North Sea area of NWE where LSLNG deliveries can be re-loaded on the barges and from there by barges (in the form of SSLNG) can be delivered via the Rhine-Danube waterway to Central Europe and SEE states. SSLNG volumes, which can in principle reach SEE from the North Sea area, cannot be large and will stay mostly in the Rhine area.

A second delivery route is from the Mediterranean area through the Turkish Straits. We have two options here: (i) LSLNG vessels enter the Black Sea and then reload to SSLNG ships to deliver to the final destination, and (ii) immediate delivery into the Black Sea area by SSLNG vessels (which can be reloaded from LSLNG, say, at Marmara regas facility).

The first option is limited (or even almost totally banned) today based on safety reasons which Turkey presented as a key obstacle to LSLNG vessels passing through Bosporus. The country is concerned that an accident or terrorist attack on an LSLNG vessel in a de facto town area presents a high risk for heavily populated Istanbul. When Turkey occasionally allows an LSLNG vessel to pass through the Bosporus, this is conditioned by many limitations which makes such supplies unstable due to the long waiting periods necessary to enter the Strait.

Two questions arise regarding this delivery route. First, whether the current prohibition for LSLNG vessels will be expanded to SSLNG vessels and LNG bunkering ships. Second, what will be Turkey's pass-through policy for the new Istanbul channel (alternative to Bosporus which is by-passing the city from the West; planned to become operational in 2023) since the Montreux Convention cannot be applied to this new route.

The third route is by trucks via Northern Italy (currently they originate in regas terminals in Spain) and prospectively from coastal regas/FSRU in North Mediterranean. This cannot be considered as a major SSLNG supply chain to SEE.

The fourth route can originate from a proposed SSLNG plant to be developed in the Russian Black Sea coast near-by a compressor station (CS) in Russkaya where the "TurkStream" offshore pipeline starts. In 2014, the earlier planned offshore pipeline "South Stream" (four pipes of total capacity 63 BCM) was changed to "TurkStream", with half the capacity of "South Stream" (two pipes, 31.5 BCM). But the onshore capacities of incoming pipelines to the Russkaya CS area are adequate as they had been built to supply the former South Stream.

This is why the incoming onshore infrastructure is available to consider building an SSLNG plant there if the export market in the Black Sea-Danube area (level of prospective SSLNG demand in SEE) can support construction of such a plant. Its architecture and logistics can be described as follows. SSLNG is to be produced and marketed in changeable cryogenic tank-containers. They would be delivered by container vessels of sea-river class upstream Danube and along the Black Sea coastal area for onshore end-users in the area. This plant can also bunker ships within the Black Sea area (for the ships beyond the Black Sea area Marmara regas terminal would be more appropriate if bunkering facilities are made there). This means that there will be no supply monopoly of SSLNG in the area. Gazprom has made a pre-feasibility study of the LNG plant to be located at the Black Sea coast of Russia of the size 0.5-1.5 BCM, but it was looking mostly to deliver LNG beyond the Black Sea area (see chart), which is a different concept.

At the 2016 Saint-Petersburg Economic Forum (SPEF), Gazprom and OMV signed a framework agreement for the development of an SSLNG industry in the Black Sea area. The parties are currently at the pre-investment phase of the project. At the 2019 SPEF, they signed a Memorandum of Understanding regarding cooperation in the LNG field. Creation of the Black Sea-Danube SSLNG market can be a good project for broader international cooperation of the countries in the area. The central and cementing element for this can be the Black Sea Economic Cooperation (BSEC) organization and its financial vehicle, the Black Sea Trade and Development Bank (BSTDB). IENE can provide the necessary research for the project (to assess prospective demand for SSLNG, etc.) and also act as an advisor and promoter.

* Contributed by Prof. **Andrey A. Konoplyanik,** who is an adviser to the Director General, Gazprom export LLC, and Co-chair from the Russian side of the Work Stream 2 "Internal Markets" of the Russia-EU Gas Advisory Council, Member of the Scientific Council for System Research in Energy, Russian Academy of Sciences, and a Distinguished Research Fellow of IENE.