



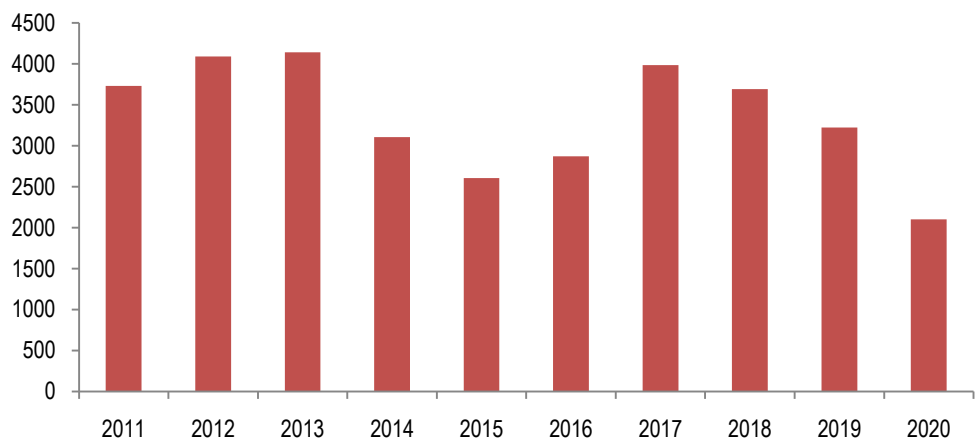
Midlincoln October Commodities Rankings from Best to Worst

Name	Rank*
Natural Gas (Nymex)USD/MMBtu	75.99
Cooking CoalCNY/MT	71.60
Oats (CBOT)USd/bu.	51.69
Brent Crude (ICE)USD/bbl.	39.46
Coffee 'C' (ICE)USd/lb.	38.72
3Mo Tin (LME)USD/MT	35.86
Canola (ICE)CAD/MT	33.39
Cotton #2 (ICE)USd/lb.	29.78
3Mo Aluminum (LME)USD/MT	27.54
Ethanol (CBOT)USD/gal.	19.63
Sugar #11 (ICE)USd/lb.	19.44
SteelUSD/MT	18.56
Wheat (CBOT)USd/bu.	16.21
Copper (Comex)USd/lb.	12.09
Corn (CBOT)USd/bu.	11.53
Orange Juice (ICE)USd/lb.	9.46
3Mo Zinc (LME)USD/MT	9.38
Cocoa (ICE)USD/MT	7.76
Live Cattle (CME)USd/lb.	6.03
NickelUSD/MT	5.85
Rough Rice (CBOT)USD/cwt	3.35
Feeder Cattle (CME)USd/lb.	0.61
Soybean (CBOT)USd/bu.	0.24

Chutzpah of Ukraine Gas Transit System

- Ukraine is adjusting to new reality where it earns much less for gas transit
- Ukraine still has few options when Gazprom launches Nordstream 2
- Ukraine can give up and run to Russia for help, cut its ties with the west and embrace Russia.
- Another option is evident from BP chart which shows that Ukraine in the middle of 80ties used to produce almost 40 bcm of its own gas. It's hard to believe that it did. But whoever believes that chart can argue that Ukraine needs to rely on its own gas production and may even export substantial volumes.
- Ukraine could also become a transit hub for gas produced by LNG regasification terminals on Baltic coast or on its own Black Sea coast.
- Some even suggested that Ukraine can fill up its gas pipeline with hydrogen. It can produce and export its own hydrogen.
- Finally inside Russia there are also forces that do want to sell gas for exports, but they are barred currently by Gazprom export monopoly (Russian independents can only export LNG). So Ukraine will rely on the transition of gas from Russia's independent producers like Lukoil, Rosneft, Novatek including some international majors.
- Gas prices in the US still offer substantial discount to European prices, but the future of US gas price is vague if US starts to export more gas.
- Gas equities – an interesting place to be in when the US gas prices adjust to global levels.

■ Estimate of Ukraine revenue from transit of Russian gas \$ mn



Source: EEGas, Midlincoln Estimates

The super realist Victor Pelevin in his story "Methuselah's Lamp, or The Last Battle of the Chekists and Freemasons", creates a reality full of yiddishisms in which he hints that Gazprom is a creation of Russia's free masons, who after the revolution were exiled by Stalin to the north of Yamal peninsula.

Lean Hogs (CME)USD/lb.	-0.82
Gold SpotUSD/t oz.	-2.79
Platinum SpotUSD/t oz.	-5.70
Silver (Comex)USD/t oz.	-8.25
Lumber (CME)USD/1000 board feet	-8.67
Palladium SpotUSD/t oz.	-21.49

Source Midlincoln

*Rank is obtained through mix of quantitative and fundamental methods

Gas reserves

Proven Gas Reserves Trillion cubic feet	At end of 2020	Share of total
Russian Federation	1320.5	19.9%
Iran	1133.6	17.1%
Qatar	871.1	13.1%
Turkmenistan	480.3	7.2%
US	445.6	6.7%
China	296.6	4.5%
Venezuela	221.1	3.3%
Saudi Arabia	212.6	3.2%
United Arab Emirates	209.7	3.2%
Nigeria	193.3	2.9%
Iraq	124.6	1.9%
Total Europe	111.9	1.7%
Azerbaijan	88.4	1.3%
Australia	84.4	1.3%
Canada	83.1	1.3%
Algeria	80.5	1.2%
Kazakhstan	79.7	1.2%
Egypt	75.5	1.1%
Kuwait	59.9	0.9%
Other Africa	55.4	0.8%
Libya	50.5	0.8%
Norway	50.5	0.8%
India	46.6	0.7%
Indonesia	44.2	0.7%
Ukraine	38.5	0.6%
Malaysia	32.1	0.5%
Uzbekistan	29.9	0.4%
Oman	23.5	0.4%

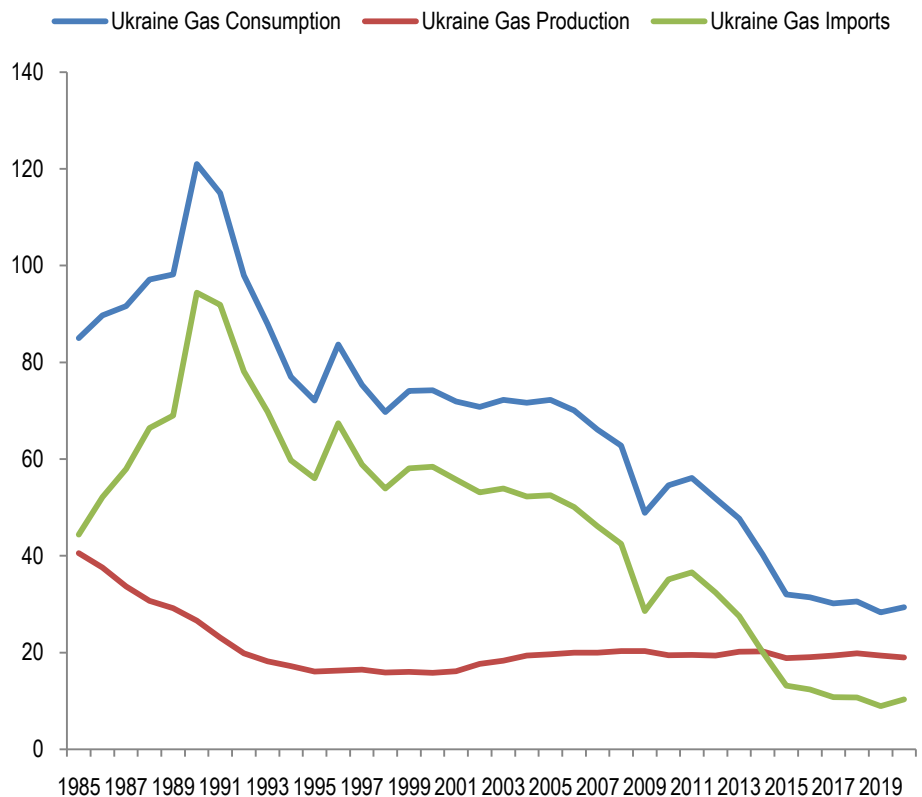
Source: BP

Now Gazprom is about to launch Nord Stream 2, and could start supplying large volumes of gas to Europe bypassing Ukraine.

Ukraine revenues from gas transit been volatile in the past decade. There were years in the past when Ukraine transit revenues amounted to as much as 4bn USD per year. In 2020 Ukraine only earned 2bn\$ as a transit fee for transiting Russian gas (although the drop in revenues coincided with Covid crisis and record low gas prices in Europe).

The volumes of gas that Ukraine has been buying from Russia also shrunk to minimum. NBU statistics shows Ukraine bought from Russia only 256 mln USD worth of Gas in 2020. Approximately the same figure Ukraine has been paying to Russia for gas imports each year from 2016.

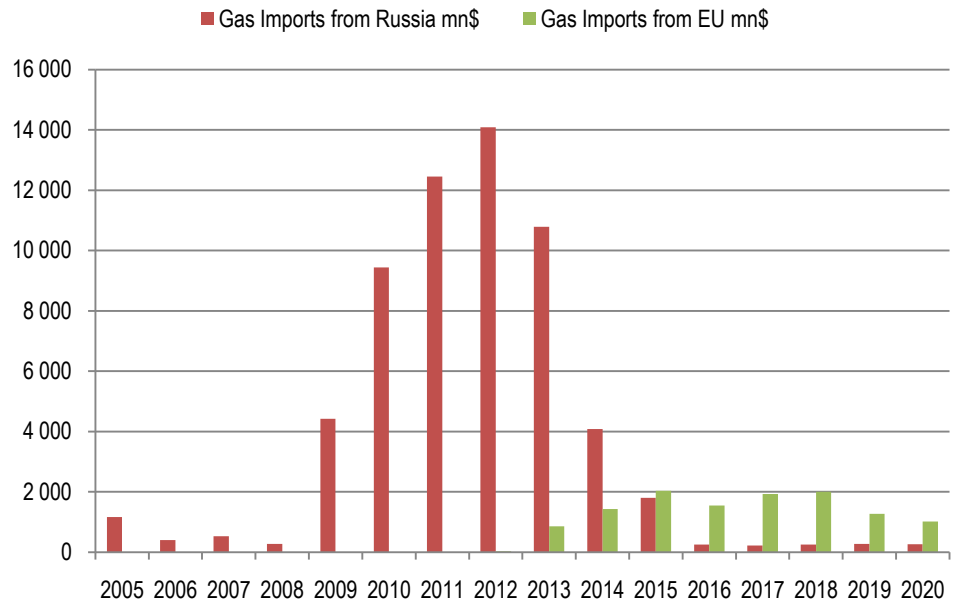
Most of its gas Ukraine produces itself. BP chart shows that Ukraine produces 19bcm of gas per year and that figure was steady for the last 20 years.



Source: BP

Ukraine gas consumption steadily dropped in the last 40 years and the decrease in consumption accelerated in the last 10 years. In 2010 Ukraine consumed 54 bcm of gas while in 2020 Ukraine gas consumption was only 29 bcm. The remaining 10bcm of gas - the difference between its consumption and production – Ukraine imports. Ukraine imports most of its gas from EU since 2016. It pays EU a figure around 1.2bn USD per year since 2016 for gas imports.

Ukraine Gas Imports in mn USD



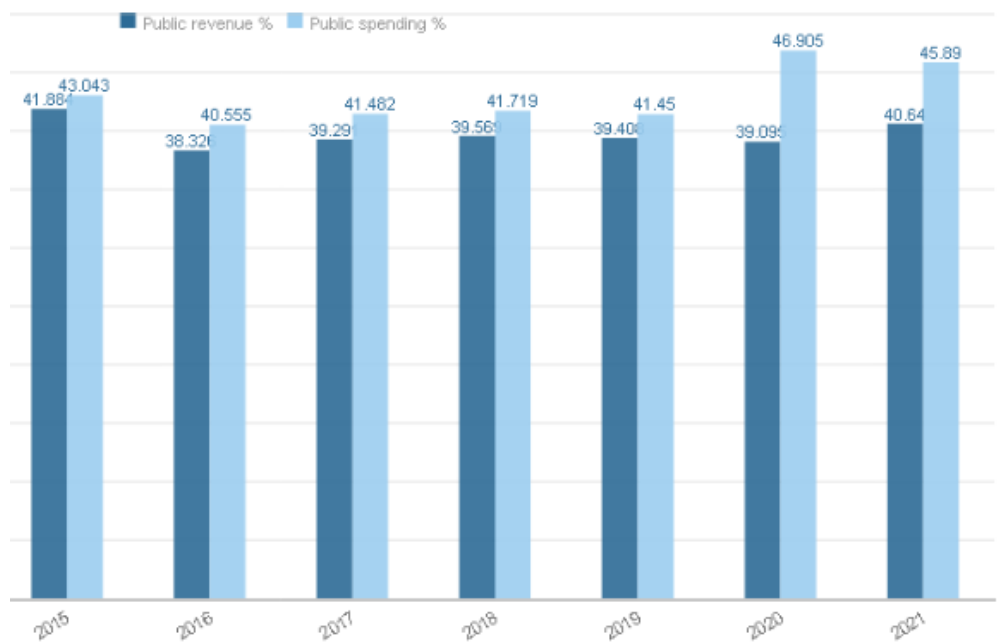
Source: NBU

Ukraine is much less dependent on gas transit fee it earns from Russia. 2bn USD is quite a modest sum and only a 1.3% of Ukraine's 149bn GDP. Ukraine is also much less dependent on Russian gas imports.

Ukraine is also less sensitive to gas price. In the last 5 years - Ukraine steadily pays just around 150\$/tcm when it imports its 10bcm of gas (1,2bn\$ to EU and 0.25bn\$ to Russia). But residential prices increased from 3 hryvna (5 years ago) to around 8 hryvna per cubic meter in 2020 implying 300\$/tcm and that is favorably compares to European gas price (except for the recent spike). In fact Ukraine makes around 1.5bn\$ a year (gross) when it sells (10bcm of imported gas) to its residential and industrial customers.

Ukraine Budget Revenues and Budget Spending

Public revenue % and Public spending %

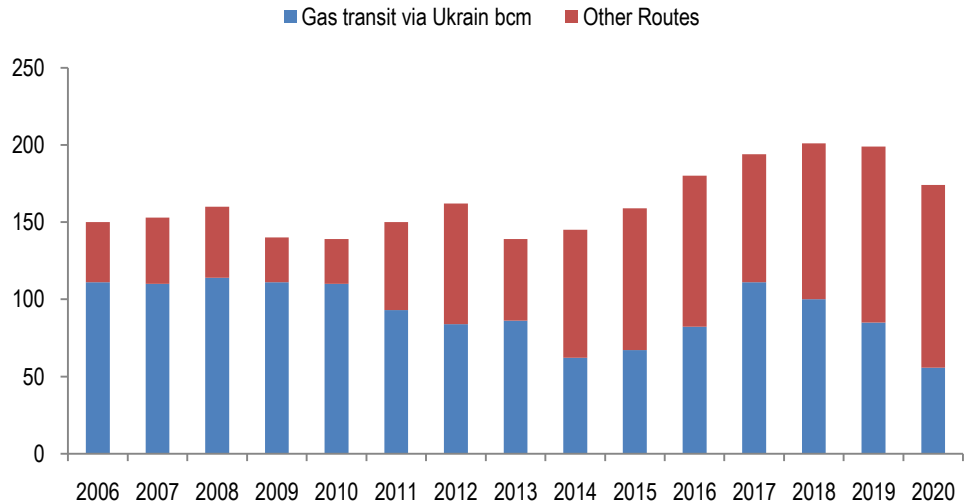


Source: Midlincoln, IMF

The issue of gas transit revenue is still important to Ukraine. Even 2bn\$ of transit revenues correspond to 3% of its budget spending. Especially given that Ukraine runs about 7% budget deficit in 2020.

As Russia grows less dependent on Ukraine gas transit, the 38,000 km Ukraine gas pipeline system with replacement cost of 10-20bn USD will need new uses.

Russian pipeline gas transit



Source: S&P, Reuters, Midlincoln Estimates

How this story will develop?

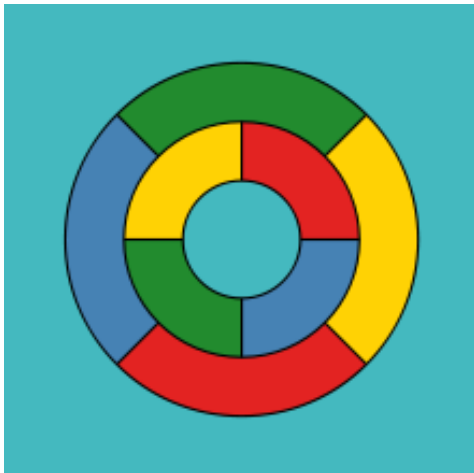
1. Ukraine can give up and run to Russia for help, cut its ties with the west and embrace Russia.
2. Another option is evident from BP chart which shows that Ukraine in the middle 80ties used to produce almost 40 bcm of its own gas. It's hard to believe that it did. But whoever believes that chart can argue that Ukraine needs to rely on its own gas production and may even export a little.
3. Ukraine could also become a transit hub for gas produced by LNG regasification terminals on Baltic coast or on its own Black Sea coast.
4. Some even suggested that Ukraine can fill up its gas pipeline with hydrogen. It can produce and export its own hydrogen.
5. Finally inside Russia there are also independent producers who want to sell gas for exports, but they are barred currently by Gazprom export monopoly (Russian independents can only export LNG). So Ukraine will rely on the transition of gas from Russia's independent producers like Lukoil, Rosneft, Novatek including some international majors.

Scenarios 2-4 require massive investment. Scenario 5 could cause some price cannibalisation of export gas price and could meet some opposition in Russia, although proponents of this scenario are quite powerful to overcome opposition.

Scenario 3 is the one that can cause the worst geo-political implications. On one hand Russia's diminishing reliance on Ukraine in gas transit gives Russia some vague benefits of independence. On the other hand Ukraine loses a partner that

Map Colorings

For a mathematician geopolitical problems are reduced to a graph coloring problems. Just before Great Britain and France started to draw border line between Iran, Iraq and Syria in the Middle East as an outcome of the First World War Sir Alfred Bray Kempe and Percy John Heaword provided a proof of a five color problem in 1890. Example of 5 color map



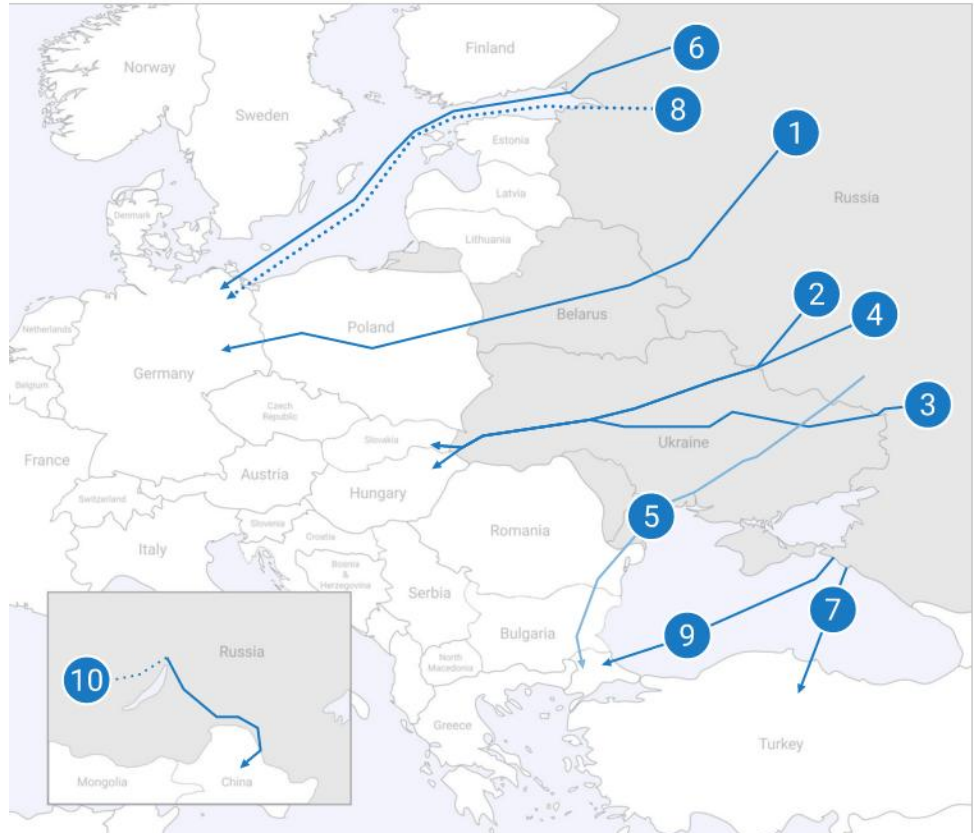
A more difficult the four color theorem was proved in 1976 by Kenneth Appel and Wolfgang Haken. Example of 4 color map



Source: Wikipedia

might be replaced by other gas exporters in e.g. in Central Asia, Middle East or by the US or Norway gas exporters and Russia is unlikely to easily accept it.

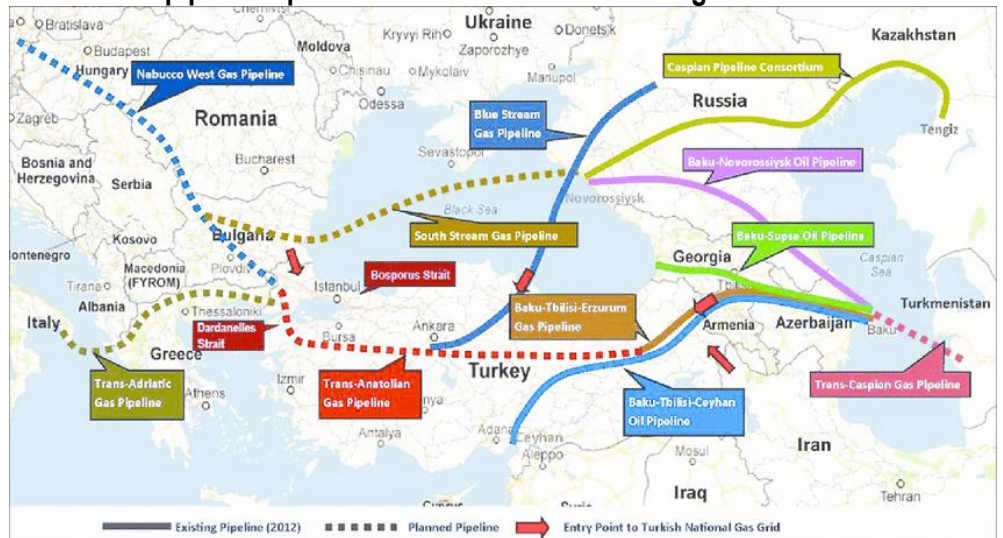
Existing Gazprom export routes



- | | |
|--|--------------------------------------|
| 1 Yamal-Europe | 6 Nord Stream |
| 2 Brotherhood | 7 Blue Stream |
| 3 Soyuz | 8 Nord Stream 2 (under construction) |
| 4 Progress | 9 Turk Stream |
| 5 The Gas Transportation Route through Romania | 10 Power of Siberia |

Source: <http://www.gazpromexport.ru/en/projects/transportation/>

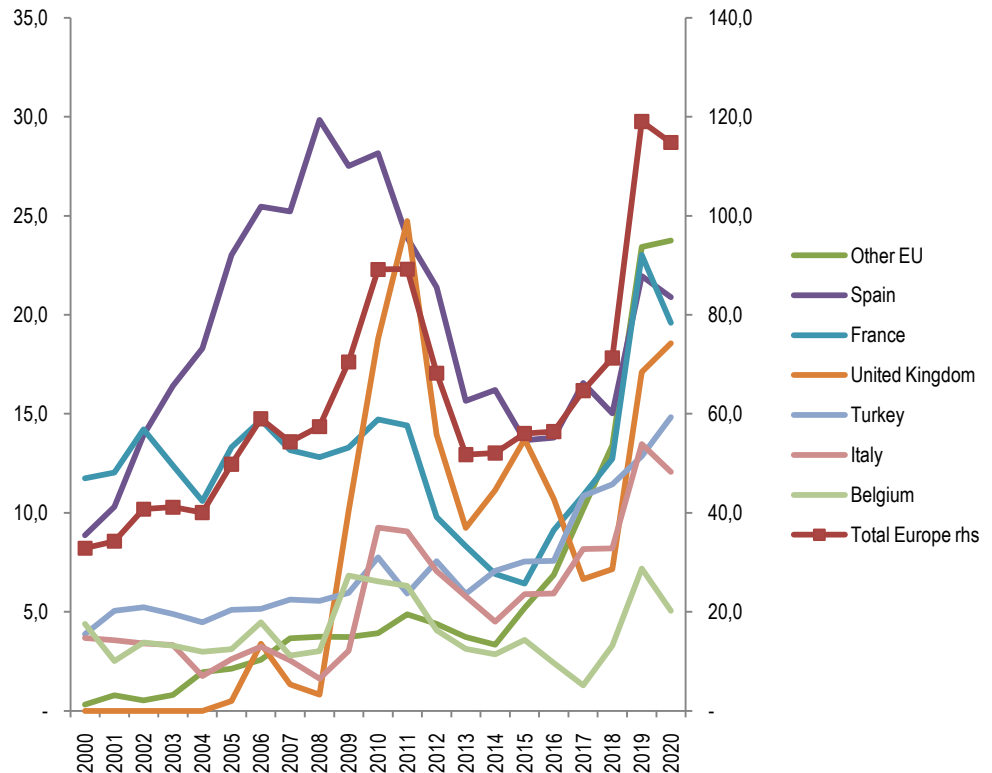
The broader pipeline options for Central Asian and ME gas



Source: Esen Ömer, Security of the Energy Supply in Turkey: Prospects, Challenges and Opportunities, International Journal of Energy Economics and Policy

Geography offers multiple options. E.g. Turkey just like Russia has the biggest transitional potential for pipeline gas from Asia to Europe. Another route is by Black Sea and will involve LNG carriers from countries like Russia, Georgia or Turkey to Romania, Bulgaria or Ukraine. Turkey has borders with Iran, but not with Azerbaijan. Georgia doesn't have a border with Iran only through Armenia or Azerbaijan. When it comes to Europe the countries like Ukraine, Balkan countries, Austria and Hungary are the key countries for transition of pipeline gas to Europe.

European LNG imports bcm



Source: BP

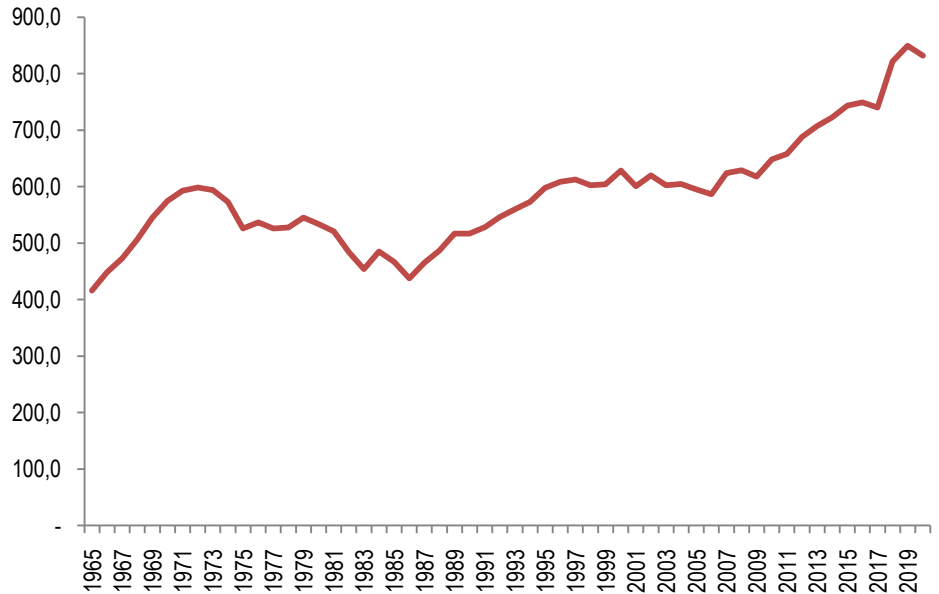
But further west there are options for Adriatic and Mediterranean LNG regasification terminals or in the Bay of Biscay and further north and so on. The options are complex and all require substantial investment and they also require lots of diplomacy.

The shortage of capacity for production of LNG in the US is key barrier for increase in LNG trade. 2021 saw yet again an increase in the US LNG exports from 6.5bcfd in 2020 to 9.38 bcfd in 2021.

US gas consumption stood at 832bcm in 2020 and US consumers paid roughly 85\$bn in 2020 for their gas.

But this year spot prices in the US increased 2 fold so the US gas costs at spot prices could have increased by 85 bn\$.

US Gas consumption bcm



Source: BP

US exported LNG equivalent of 61.4 bcm in 2020 while in 2021 US is to export an equivalent of 81bcm of LNG. The latter figure corresponds to 9.5% of US gas production.

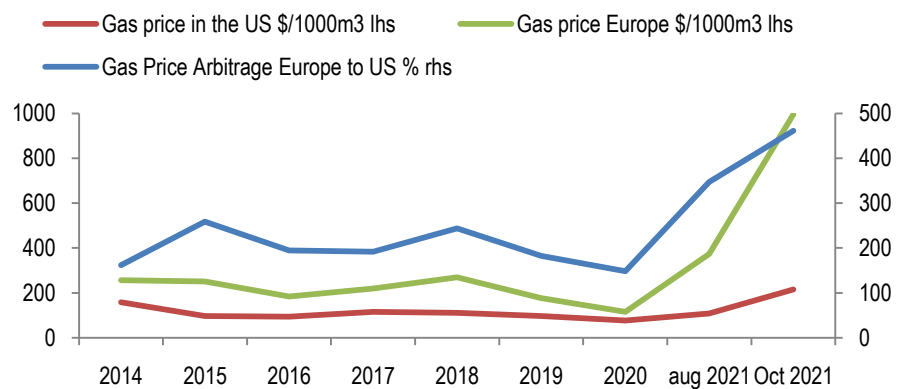
US spot gas price is still 5 times less than European spot gas prices. But US consumer gas costs are likely to rise higher when US domestic gas prices adjust to European gas price levels.

The extent to which US gas price will adjust is not clear so far the US slashed back the export volumes of gas for the 2022 to 9.2bcfd or 79bcm in total of LNG.

Russia's export volumes via Ukraine likely to keep shrinking, inviting other producers including US LNG exporters to fill up the Ukrainian pipeline.

In the medium term that could be an interesting catalyst for various new plans for gas routes and somewhat a catalyst for US gas exports increase.

Meanwhile gas equities – an interesting place to be in when the US gas prices adjust to global levels. But that will put a stress on US gas consumers, and possibly on US trade, as goods produced in the US will become slightly more expensive further exacerbating US deficits.



Source: Bloomberg, ICE, Midlincoln

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