



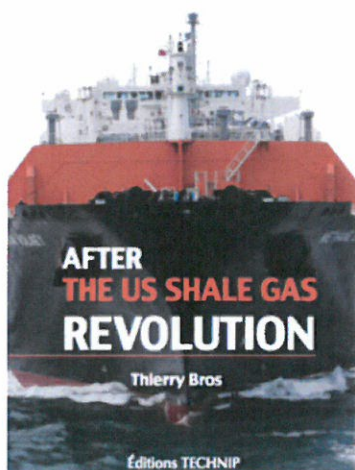
South Stream: Evolution of a Pipeline

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Interview: Thierry Bros, Senior Analyst European Gas and LNG Markets at Société Générale



Natural Gas Europe was pleased to interview Dr Thierry Bros about his book "After the US Shale Gas Revolution."

The title is surprising given the fact that you only discuss the shale gas revolution at the end of your book.

Nowadays we cannot avoid talking about shale gas. To understand shale gas development, it is necessary to explain the history of gas and the gas markets worldwide.

The first part of this book (75%) is a textbook; the second part (25%) is a forecast for 2020. I wrote this book mainly for students. This kind of didactic book was missing in the gas world.

This was also a way for me to gather all the information I have accumulated for 20 years working in the gas industry. The only limitation that I had was to exclude the period from 2012 to 2018, which is the period I am researching daily at the bank 'Société Générale'. When I published the book in August 2012, not many people thought that LNG export from the US would happen.

The gas industry is changing daily; this is a fast paced industry. What has changed since you published your book in August 2012?

The big difficulty when you write a book like this, compared with some short notes on the subject, is that the book has to be long lasting. The first technical and historical part (the 75%) remains true regardless of the current events. The forecast is more difficult to make perennial.

The only part where I almost made a mistake was in not mentioning in depth Mozambique. The temptation was to say nothing would happen over there. That is why initially I did not give enough

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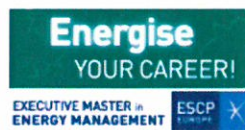
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importance to the possible rapid LNG development in this region. Fortunately, the person who wrote my preface warned me about this, so I researched Mozambique further. In fact, I think some significant changes are occurring in Mozambique with the Italian multinational oil and gas company Eni investing in exploration for LNG. This is a unique opportunity for Eni to recover from its delay in dealing with LNG within 2020, compared with the other big operators.

So nothing major has had to be changed in my book after a year. We published a second edition, which is similar to the first one. What I did add in my research for the book was that coal from the US has not only replaced gas in Europe (which I discussed in my book) but it has replaced Russian gas in Europe.

In your book, you mention that Poland holds a leading position in shale gas development in Europe. What is your opinion on shale gas development in the different European countries?

I wrote that Poland is supposed to be the main point of reference on the environmental issue of shale gas for Europe. If Poland fails on the environmental side, it will have a serious impact on shale gas development in Europe. I have not been keen about Poland from the beginning and in fact, big companies like Exxon Mobil, Talisman and Marathon Oil realised it would be more complicated interacting with Poland than they initially thought. Today, I think we have to look at the UK as an economic leader for shale gas in Europe. The UK already has 30-40 years of experience on conventional exploration and production (E&P), and has well-established rules on the environmental issues.

What about France?

I had to present an updated version of my book to the former Environment and Energy Minister for France, Delphine Batho, at the end of June (see video in French: <http://www.transition-energetique.gouv.fr/le-mag-du-debat/les-prix-des-energies-fossiles>). I told her that we cannot exclude shale gas from our discussion anymore. France might even follow the UK if they decide to produce shale gas. The former Environment and Energy Minister said shale gas will never be produced in France. She added, "In Democracy, citizens chose, not the market". Since then we have a new Environment and Energy Minister. Is there a better chance now that shale gas exploration will occur in France?

In the book, I discuss the \$130bn (€100bn) of global price differential that Europe paid compared with the US in 2012 because of shale gas use in the US. This represents 0.8% of the GDP. At the industrial level, which is 1/3 of the total consumption - the others 2/3 being residential and power generation - the cost of competitiveness between the US and Europe represents €30bn. To compete with the US, Europe needs to either cut labour cost or energy cost by €30bn.

British MPs have already understood that shale gas could bring revenue in through competitiveness and taxes to Her Majesty's Treasury.

In contrast, French deputies have not yet understood the advantages of potential shale gas revenue from taxes. They have begun a debate but discussions are mainly focused on environmental issues of shale.

It is clear that there will not be a shale gas revolution in Europe; even in the UK, where shale production could materialise before 2020, it won't be enough to allow the UK to achieve self-sufficiency. It is not the same thing to extract conventional oil in Nigeria compared with extracting shale gas in the UK. Risks are not at the same level, therefore there is a lower social acceptance in the UK. Geology is also different in these two countries. That is why the margin for the UK's industry will be closer to 20% rather than 50%.

Why the industry would take such high risks for a 20% margin when it could create higher margins elsewhere?

For a utility, 20% is a good margin. A margin of 80% can exist in case of a monopoly or in a business based on raw material income. Centrica was the first company to buy a shale gas license in the UK. They are used to a lower margin, compared with oil and gas companies.

Interestingly, the UK government unveiled some new reforms to encourage safe UK shale production. As a proposal, local communities situated close to shale E&P would benefit from a package including £100m (£115m) as compensation, as well as 1% on revenue, once exploration is commercially active. This is called 'fracking sweetener': the action to compensate communities with cheaper energy bills for instance, in exchange for dropping opposition to local fracking projects. Recently, the UK Department of Energy and Climate Change published a report indicating larger estimates of shale gas resources in the North of England. This, alongside a

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package of community benefits, could boost shale gas development in the UK.

On shale E&P research side today, market participants tend to focus on onshore only, when they could in fact focus on offshore, as it would be more readily accepted by local community. But offshore needs more R&D, as we do not yet know how to extract shale gas from offshore. Additionally, existing offshore platforms need to be resized in order to adapt to shale gas E&P; it will cost more. The UK industry is a pragmatic price taker, which means that it will go on with shale gas E&P if it perceives potential revenue, otherwise it will not be pursued.

Isn't the negative or flat gas demand in Europe an obstacle to shale gas development?

It is true that the peak gas demand occurred in Europe in 2005. It will be null or weak in the next few years. But domestic supply is decreasing in Europe. Due to this decrease, European countries are obliged to import more. The question for the European community is to ask, 'Shall we continue to rely more and more on imports or do we want to diversify our energy sources?' Maybe shale gas development could help in covering some of our demand.

Gas is very often seen in the same light as oil because of the associated extraction method. However, gas is not as pollutant as oil. How is this associated image impacting on European gas development? Do you think that gas tends to be forgotten in the discussion about energy mix?

The gas industry has not had its industrial revolution yet. The gas industry is the little brother of the oil industry. Gas presents less harm to the environment than oil, and electricity generation from gas is said to be more flexible than from coal. All these attributes indicate that gas is the fuel of the future.

But this is not completely accurate. Gas may be more environmentally friendly than oil but I am not sure that gas-fired power plants are always more flexible than coal ones. If one day carbon capture and storage (CCS) happens, the coal industry would win over gas and oil. The problem is that the gas industry is too aware of its advantages (environmentally friendly and flexible), so this industry is not fighting to carve out its own space in the market. Because of this, other sources of energy are overtaking it in Europe.

The other emerging energies are the ones which receive subsidies, such as renewables, or other industries which are investing in R&D. CCS is too expensive now but it could happen in the future. Renewable energies are also expensive but are supported by European politics through incentives.

Typical European layperson does not think about where their energy comes from when he or she switches on the light. If consumers are ready to pay high prices to pay the bills of renewable sources, because they wish to use green energy, that is fine. But I think consumers really care about costs. That is why gas should have its space in the energy mix.

We talk about lack of growth in the gas industry but there is one niche where gas could lead: transport! Gazprom understood this and it is already investing in individual and collective transport using gas. In the US, gas-powered vehicles could become the new model, because gas is so cheap. If gas transport networks and refuelling stations are well developed throughout US territory, then people will start to buy cars that use gas, because it is less expensive than traditional cars that use oil. I do not think people care as much as before about speed. People live more and more in cities, where nobody drives over 50km/h.

I went to China last month. Everyone drives an electric motorbike there. They do not go fast but it is not a problem for them. This is the fruit of the Chinese government's intervention: it wants to lessen pollution that is caused by using oil and coal.

In Europe, if we want to develop gas transport, then we have to work hard on it. This means we have to go to the European Commission to create an industry community that engages with local population, and offers a platform for discussion. Again, for the European Commission, gas is seen as the little brother of oil. It is not easy to change this image and explain for instance that CO2 emissions have decreased in the US thanks to shale gas use.

Do you think US shale gas import could create a threat to the European gas industry?

For instance, to the gas storage business, which has been encountering some difficulties recently? Could more LNG imports lead to less reliance on storage?

Storage creates a certain security of supply and cannot be substituted entirely. With the very tight winter-summer spread, storage business is at a low profitability. This is the first year that storage

levels have reached their lowest. Simultaneously, we can see that Ukraine has just refused to fill its storage. But we have to be careful as we can still see some demand spikes in December if the winter is cold. We can see storage activity from two points of view. The first one indicates that it is too expensive compared with the profit it generates and therefore there is less incentive to store. The second view is that we always need to cover the risks that the winter will be cold and so we need a flexible system such as storage.

With shale gas import, we have to envisage various scenarios for the future. Some markets will connect together. The US shale gas will come to Europe at a price of HH+6 (Henry Hub price+\$6, including all costs). But there is a big player in the market which is adapting to the new geopolitics map: Gazprom. Gazprom does not wish to see the arrival of US LNG and shale gas in Europe, who is its main client. If Gazprom proposes a lower price at HH+5, continuing with their long-term contracts for delivery in 2018-2028, it would prevent the US cargoes from taking over Europe. I'm sure that European gas and utilities incumbents would accept this deal.

We have seen that shale gas development has contributed to the decrease of CO2 emissions in the US. Now the Obama administration would like to stop their coal production. How would shale gas development in Europe impact on climate change and the EU ETS system?

Obama has followed a green political scheme that has succeeded thanks to shale gas production and its commercialisation. In Europe, we have the Emission Trading System with carbon credits. The initial proposal to backload the carbon credits, which was rejected few months ago, was recently accepted by the European Parliament's Environment Committee.

Independently from shale gas, the problem with the Emission Trading System is that it is too complex. It is hard to convince market participants to trade something that they do not fully understand. Furthermore, this system was built years ago in an economy which was still developing. Now that there is a recession, industrial production has decreased, which also means less emissions. We are in a different context and the CO2 trading system needs to be adapted. Perhaps the solution in Europe is to implement a linear tax, starting with €0/t to €70/t. When this tax reaches €170/t, then CCS will be profitable.

What do you think of the Trans Adriatic Pipeline (TAP) success?

I did not want to speak about specific routes in my book because I am not a geographical map expert/drawer. However, it is interesting to understand why the Azeris are doing it. TAP is not the most rational, nor economical choice. It is easier to bring gas from the Middle East but this is not what we are doing.

Azeri gas is extracted from offshore platforms. It is expensive to produce and to transport from the Caspian Sea to Europe. Azeris understood that Europe does not want oil-indexation prices anymore so they have decided to offer spot-indexation contracts. Since the main gas producers succeeded in maintaining high prices, Shah Deniz 2 can use this fact to achieve profitability, even if the Azeri gas price will be spot-indexed in Europe. Additionally, the Azeri state energy company SOCAR is now investing in TAP transportation, so that transport costs are also covered by SOCAR. This is a profitable business. In my book, I said that oil-indexation would be less than 50% before 2014. We are now reaching this critical point.

What would be the ideal energy mix for Europe?

Each country has its own solution for energy mix according to its resources, skills, politics, and culture. Today we are at an impasse. In France, we used to think that nuclear energy was the solution. But it is just one of the solutions. CCS is not going to happen tomorrow. We need more R&D, and more time. The ideal would be to achieve grid parity for renewables. For that, R&D is really needed to make this work.

Shale gas could also be a bridge until we establish a greener and cheaper energy mix. Shale gas could give us the 10-15 years in-between time until we find a cleaner solution. Shale gas will be extracted with considered care to the environment. We do not want to repeat what the cowboys did at the beginning of shale gas development in the US. European industries must align themselves with local communities and with environmental compliances.

If it is true that we missed out on the shale gas revolution in Europe, and that shale gas will not transform our energy mix, we can still take part in the shale oil revolution. This could be our next opportunity to decrease our energy dependency on energy imports.

Thierry Bros was appointed Senior European Gas and LNG Analyst for Société Générale's Commodities team in 2010, having joined the group in 2007 as a Senior Financial Analyst to provide recommendations on listed pan-European gas stocks and in-depth research on gas issues. Thierry covered the gas chain from upstream to downstream with BG Group, Centrica, Enagas, Gas Natural, Gazprom, GDF SUEZ and Snam. From 2002 to 2007, Thierry was a Senior Oil & Gas expert at the French Ministère de l'Economie des Finances et de l'Industrie. His responsibilities included providing global oil and gas industry reviews to senior French officials and negotiating European directives. Since 2011, Thierry has also regularly chaired sessions at the United Nations Gas Centre. Dr. Bros is also a visiting faculty professor at several universities. He is the author of the book *After the US shale gas revolution* published, in 2012, by Editions Technip. In 2012, Thierry was appointed as a member of the EU-Russia Gas Advisory Council which provides recommendations on long-term gas cooperation to the Russian Federation Minister of Energy and the European Commissioner for Energy.

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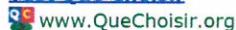
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