PANORAMA 2014

a look at ...

The importance of underground storage in the security of European gas supplies

While European capacity for underground gas storage has increased by 16% over the last three years, levels of stock at the beginning of the 2013/2014 winter, in relation to capacity, are the lowest that have been seen since 2010; they represent only 84% of storage capacity(1). The suppliers of gas have no incentive to reserve storage capacity, for which the cost is considered too high in relation to the spread, currently very low, between the price of gas in winter and in summer. They also rely on sufficient gas supply thanks to other sources of flexibility available on the market: flexibility of production or imports, spot LNG purchases, purchases in the spot market... or even use of the storage capacities of neighbouring countries via European network interconnections. Yet, the 2013/2014 winter is beginning in a gas supply context in Europe that is more difficult: imports of LNG, which had already dropped sharply in 2012, have continued to contract, faced with increased competition from Asian buyers on the international LNG market. Gas imports from Norway are also declining following production limits in that country. Only Russia has strongly increased its exports to Europe in 2013. However, the dispute between Ukraine and Russia about the price of Russian gas delivered to Ukraine still raises the spectre of a threat to the European supply of Russian gas, nearly 60% of which transits via Ukraine. Under these circumstances, as demonstrated by the gas crises of 2006 and 2009 and the cold conditions of February 2012 and March/April 2013, storage is the most efficient means of securing the supply of gas providing, of course, that the storage sites are filled at the beginning of winter.

European storage capacity strongly up

Although gas consumption in Europe is declining, faced with increased competition from coal in the power sector, storage capacities have increased by nearly 14 billion cubic meters (Gm^3) over the last three years, and had reached nearly 100 Gm^3 on 1 January 2013(2). Most of the storage facilities that came into service during the period 2010-2013 were decided before the economic and financial crisis of 2009, which explains this increase in the face of depressed demand (Fig. 1).

(1) Cedigaz, Underground Gas Storage in the World, 2013 Survey (http://www.cedigaz.org/surveys/underground-gas-storage.html)

(2) Europe includes 35 countries: UE28, Albania, Bosnia-Herzegovina, Macedonia, Norway, Serbia, Switzerland and Turkey

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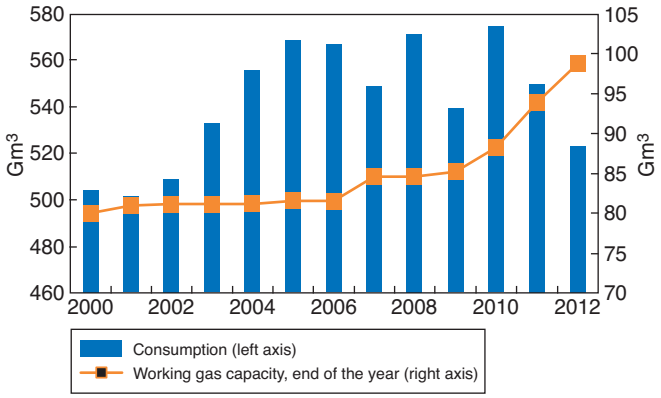
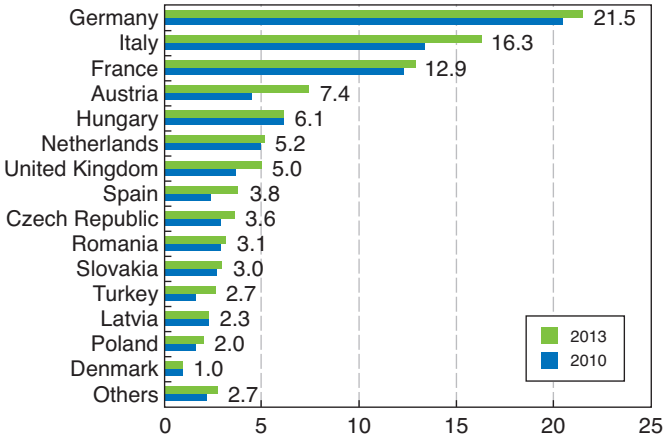
Fig. 1 – Development of storage capacity[3] and consumption of natural gas in Europe



Source: Cedigaz, Underground Gas Storage in the World, 2013 Survey

Four countries have significantly increased their capacity: Austria (+2.9 Gm^3), Italy (+2.9 Gm^3), Spain (+1.4 Gm^3) and the United Kingdom (+1.3 Gm^3). Europe nevertheless presents very mixed situations in terms of numbers of storage facilities and working gas capacity (Fig. 2).

Fig. 2 – Development of working gas storage capacity – 2013 vs. 2010



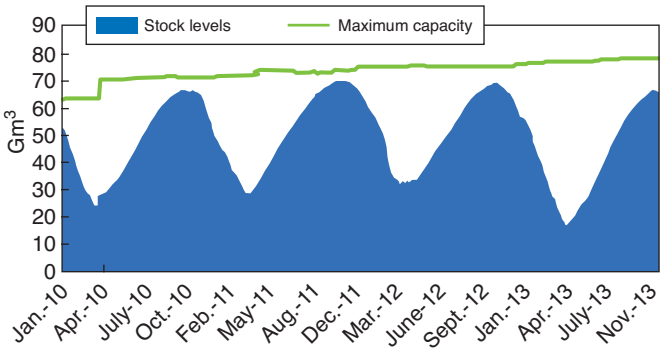
Source: Cedigaz, Underground Gas Storage in the World, 2013 Survey

However, usage is down over the last three years, and this is particularly pronounced this winter

The drop in gas demand in Europe, combined with this capacity increase, has led to overcapacity in the storage market, which partly explains the drop in the use of capacity that has been seen over the last three years.

(3) Working gas capacity

Fig. 3 – Developments of stock levels and storage capacities in Europe[4]



Source: GSE/Aggregated Gas Storage Inventory (AGSI)

On 1 November 2013, stock levels represented only 84% of storage capacity, while they were at 94% at the beginning of the 2011/2012 winter and 90% at the beginning of the 2012/2013 winter. At the beginning of the 2013/2014 winter, stock levels were 3 Gm^3 below their level at the beginning of the previous winter (Fig. 3).

The drop in storage filling rates has been seen in nearly all European countries, but it is particularly pronounced in certain countries. In France, in the North PEG[5] zone, storage facilities are only filled at 72% of their capacity (against nearly 83% at the beginning of the 2012/2013 winter), in spite of capacity purchases by the operator Storengy (1.4 Gm^3 for this winter). In Hungary, where the government is in the process of buying back all the storage capacity in the country, stocks reach only 46% of capacity.

In the other European countries, the drop in filling rates of storage facilities is less pronounced: in Germany, for example, storage facilities are filled at 90% of their capacity, against 95% last winter.

In the United Kingdom, where gas supply security is particularly worrying, stocks are at the highest level: 98% at the beginning of the 2013/2014 winter… but storage capacity in the country is still very limited: it represents only 6% of British gas consumption, while the European average is 19%.

The market is not sending the right signals

Although the drop in European gas demand partly explains this drop in the use of storage facilities, most of

(4) The data comes from the Gas Storage Europe (GSE) database. GSE groups the European storage operators and represents about 85% of the European capacity of the Europe of 35

(5) PEG: point d'échange de gaz or Gas Exchange Point

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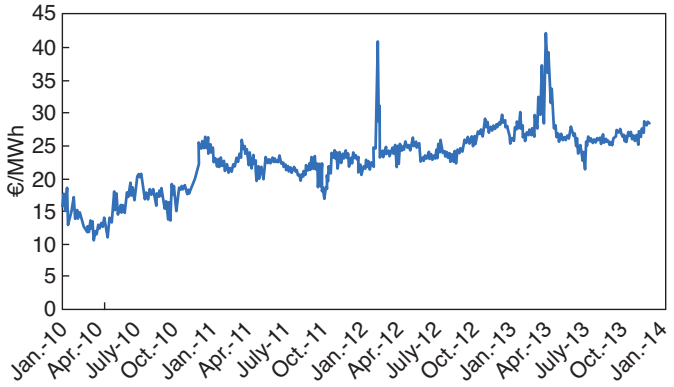
Fig. 4 – Spot price in the British market



Source: Platts

this under use is the consequence of market signals. Gas suppliers have no incentive to purchase storage services, for which the price is higher than the winter/summer spread in the price of gas in the forward markets. This differential has collapsed over the last few years, reaching only €2.5 to €5/MWh in 2012, a particularly low level. This low level gives the illusion that gas is always available on the spot market at prices that vary little between winter and summer. However, as the cold spells in 2012 and 2013 showed, although the gas has always been available, its price in the spot market can rise very quickly: at the beginning of April 2013, the spot price in the United Kingdom rose to more than €40/MWh, an increase of more than 40% in one week (Fig. 4).

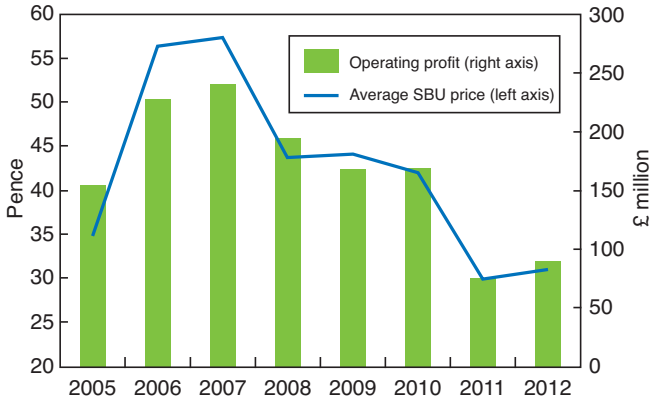
The storage operators are seeing their margins collapse

Faced with this situation, European storage operators are seeing their margins collapse. They are seeking to reduce their costs by all means. Some storage sites have been mothballed (Saint-Clair-sur-Epte in France, for example). Investment in new seasonal storage sites is not profitable and new projects are cancelled: Centrica Storage Limited has just announced the cancellation of the construction of two new sites in the United Kingdom, Baird and Caythorpe, due to the unfavourable economic environment and the British government's decision not to grant financial aid to storage (Fig. 5).

A gas supply that is closely monitored

European gas supplies are undergoing profound changes. The three main sources of supply (Russia, Norway and LNG) had very mixed developments in 2013.

Fig. 5 – Changes to the average price of storage services in the United Kingdom and profits associated with the business (example of Centrica Storage Limited)



SBU: Standard Bundle Unit (unit representing the storage services offered by European operators). One SBU includes 1 kWh/day of withdrawal capacity, 66.593407 kWh of working capacity and 0.351648 kWh/day of injection capacity.

Source: Centrica Storage Ltd, Annual reports; Cedigaz

Sharp drop in LNG imports

The market for LNG is increasingly tight. Although LNG was widely available before the Fukushima disaster, the increasing Japanese imports (Japan now represents 35% of worldwide LNG imports) have resulted in increased competition between buyers of LNG and a reduction in the capacity available in the international market. The price of LNG imported in Asia is $16/MBtu (€40/MWh), while the European price is about $11-12/MBtu (€28-30/MWh). The Asian premium is leading to a drop in volumes exported to Europe: in 2012, imports of LNG into Europe dropped by 27%. Over the first eight months of 2013, they dropped again by 22% (Fig. 6). There is therefore no longer any certainty that spot cargoes of LNG can be used in case of pressure on European supplies.

Drop in Norwegian exports

In 2012, Norway became the first exporter to the European Union, ahead of Russia. In the Europe of 35, its exports increased by 14%, reaching 109 Gm^3. But the ceiling on Norwegian production led to a drop in exports in 2013. Over the first eight months of 2013, these dropped by 5.5% and should stand at 103 Gm^3 in 2013.

Increase in Russian exports, but crisis between Ukraine and Russia

In contrast, Russian exports of gas to the Europe of 35, which dropped to 135 Gm^3 in 2012, were strongly up in

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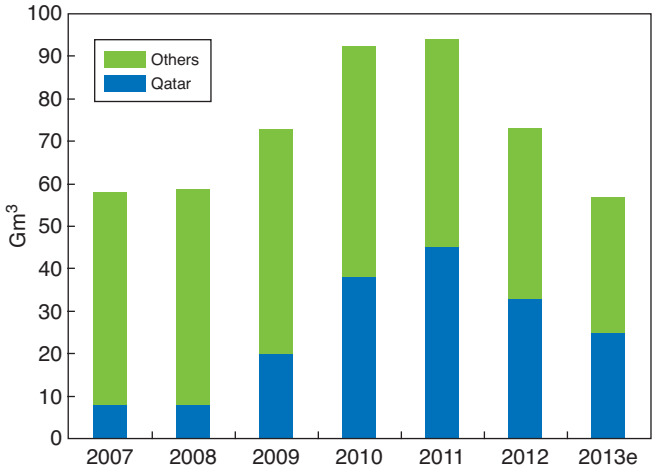
Fig. 6 – Developments of LNG imports in Europe



2013: estimate based on the first eight months of the year.

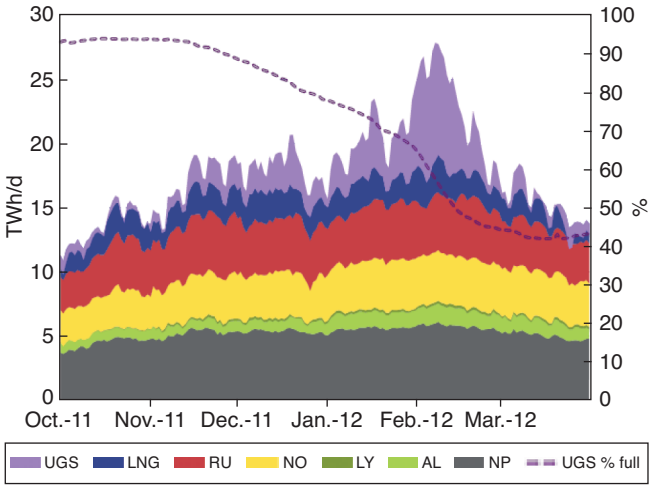
Source: Cedigaz

2013. During the first eight months, they increased by 15% compared to the same period in 2012. Russia would therefore be able to provide balance to the European gas supply. However, the recurring tensions between Ukraine and Russia raise a threat concerning Russian exports, as a major share of European imports of Russian gas transits via Ukraine. At the beginning of November 2013, Ukraine announced that its imports of Russian gas were halting following a dispute with Gazprom about the price of gas; its imports resumed a few days before the country renounced the signature of a partnership agreement with the European Union. The crises between the two countries in 2006 and 2009 each ended with drops or breaks in deliveries of Russian gas to Europe. Since then, Russia has built a new gas pipeline that directly connects Germany, North Stream, and can also count on the Yamal gas pipeline that transits via Belarus and Poland. But these capacities do not compensate for the volumes transiting via Ukraine: in 2012, in spite of the drop in volumes transiting via Ukraine, the country transported 60% of Russian gas deliveries to Europe.

The role of storage facilities in ensuring security of supply is vital

The gas crises that Europe has experienced, whether they have been related to breaks in supply (January 2006 and January 2009) or to exceptionally cold spells (February 2012 and March/April 2013) have demonstrated the crucial role of storage facilities in guaranteeing the security of the European gas supply. In its analysis of the 2011/2012 winter, ENTSOG[5] showed that storage, amongst all sources of flexibility, is the most reliable source. During the 14 peak days of consumption observed from 31 January 2012 to 13 February 2012, the contribution of storage facilities to European supplies reached 30%, against 11% on average for the entire 2011/2012 winter. That of LNG, for commercial reasons and logistical constraints, was only 10% during the 14 days of cold, against 11% on average during the 2011/2012 winter (Fig. 7).

Fig. 7 – European gas supply profile during the 2011/2012 winter



The violet area shows the crucial role that underground gas storage facilities played during the cold spell in February 2012.

Source: ENTSOG

Greater risks for the 2013/2014 winter

The insufficiently-filled European storage facilities, combined with supply uncertainties, mean that the European gas supply is at risk. At the start of the 2013/2014 winter this situation cannot be changed, as the storage facilities are filled in summer when demand for gas for heating requirements is down. In France, the transport operator, GRTgaz, estimates that a deficit of 25 million cubic meters/d (Mm^3/d) will remain to cover the peak cold point of the winter (peak "P2")[6]. To cope with this situation, GRTgaz has set up an alert signal intended for gas shippers, specifying the measures to be implemented in case of a tight gas supply on the

(5) ENTSOG, Winter Supply Outlook 2012/2013 and Winter 2011/2012 Review, Brussels, November 2012

(6) Peak "P2" corresponds to extremely low temperatures on three consecutive days, as occurs statistically once every fifty years. Source: GRTgaz, Winter 2013/2014, functioning forecasts in situations of tightness on the GRTgaz network, 7 November 2013

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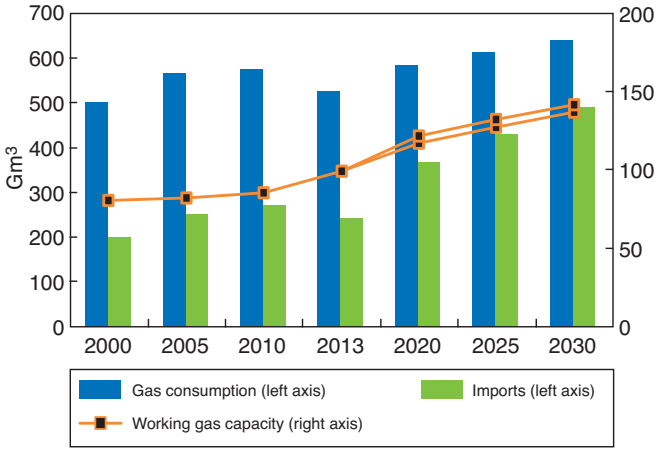
network. The operator recommends retaining a maximum level of stock at the beginning of the winter, to maintain sufficient withdrawal capacity to cover the cold periods that are likely to occur even at the end of winter. In cold periods, GRTgaz recommends minimum withdrawal from storage facilities and maximum supply from LNG terminals. The Ministry for Ecology, Sustainable Development and Energy has prepared a gas emergency plan in case of tightness in the gas supply in France.

Similar to the situation in France, European operators will be obliged to be especially vigilant in the use of stocks during winter, to maintain sufficient withdrawal capacity in case it is required (even at the end of winter, as we saw during the cold spell in March/April 2013). Although this strategy is possible, it requires suppliers and traders to be very disciplined and to use their capacity for functional rather than commercial purposes. The use of LNG gas supplies is an option. But as we saw during previous winters, it is difficult to attract spot cargoes of LNG to Europe when they are required. Even in periods of price tightness, LNG will not be available immediately, for commercial and logistical reasons. The storage capacities of regasifying terminals can play a complementary role, but they are very limited compared to underground storage capacities: at the European level, storage capacities at regasifying terminals stand at 8.6 Mm^3 liquid (5.1 Gm^3 gaseous) and withdrawal capacities stand at 624 Mm^3/d, against 1,949 Mm^3 for underground storage facilities[7].

(7) GLE, LNG Map, July 2013

Fig. 8 – Requirements in working gas storage capacity by 2030



Source: Cedigaz, Underground Gas Storage in the World, 2013 Survey

With the prospect of a Europe that is ever more dependent on external sources of supply and gas demand that is increasingly volatile, related to the development of intermittent renewable energy sources, storage requirements (seasonal and flexible) will increase. In a scenario where European gas demand recovers — after 2020 for the European Union, Cedigaz estimates the requirement for new capacity at 34-42 Gm^3 by 2030 for the Europe of 35. The price signals sent by the market are insufficient to consider such a level of investment (Fig. 8).

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