The Texas Power Crisis Seen from the EU: a testbed for its resilience and risk-preparedness rules

BY ANNE HOUTMAN AND MARIANA LIAKOPOULOU

Anne Houtman is the Former Ambassador of the European Union and Member of the Belgian Royal Academy. **Mariana Liakopoulou** is an Energy Security Research Fellow, NATO Association of Canada. Mariana Liakopoulou can be reached at liakopouloumariana@gmail.com

Abstract

The chain of events in the Texas crisis is a testbed for the relevance and more importantly, the effective implementation of the rules the European Union (EU) introduced in recent years on the security of its electricity and gas systems, aiming at improving their resilience and risk-preparedness.

As European energy markets became more integrated, energy security also became a European issue as a disruption of supply in the system of one Member State (MS) can affect other MSs. At the same time, the smooth functioning of the European markets and an adequate level of interconnections between MSs are the first EU priority to guarantee the security of supply. But this is not sufficient and rather stringent EU regulation was put in place - in 2017 for gas[1] and in 2019 for electricity[2] - to safeguard supply in the case of extreme climate events, fuel shortages as well as accidental hazards or malicious attacks. Risk assessments, the elaboration of preventive and emergency plans and their implementation are closely coordinated and monitored at EU level, for both electricity and gas systems. Most importantly, the recent EU regulations introduced solidarity mechanisms whereby MS cooperate and give each other assistance to prevent or manage electricity and gas supply crises. Finally, when developing its crisis scenario of a gas fuel shortage, the European Network of Transmission System Operators for electricity (ENTSO-E) must use the scenario developed by its equivalent for gas (ENTSO-G) and the two entities are cooperating more and more in the context of energy system integration. Information channels, including early warnings, are also well defined, with the European Commission (EC) playing a central role in coordinating emergency response.

The electricity perspective

With electricity as a source of heating for 61% of Texas households[3] and poorly insulated houses, the cold wave that hit the State in February 2021 saw electricity demand peak to 74 GW. While electricity represents only 5.2% of the EU energy consumption for residential heating, this share is bound to increase with the deep decarbonization policy launched by the European Green Deal and the roll-out of heat pumps. As almost 75% of the EU building stock is also considered energy-inefficient, building renovation is among the priorities of the EU decarbonization strategy.

When the cold wave hit the State, available power generating capacities totalled about 77 GW, enough in theory to cover a higher demand that did not surpass Winter peak load forecast. Many commentators were quick to point to Texas' reliance on an « energy-only » market to ensure electricity resource adequacy and even to the growing share of variable renewables as the causes of the blackouts. Yet electricity market design and the absence of capacity markets do not appear to be the prime cause of the electricity shortage, and as neighbouring states were facing similar conditions, a higher interconnection level would probably not have offered much help. What seems more at stake are the lack of preparedness of the gas and electricity systems to climate-related risks and of regulatory oversight, as well as poor coordination and cooperation between the operators and regulators of the interdependent electricity and gas systems.

Market design however did play a role in the consequences suffered by consumers. Wholesale market prices surged from a normal average of $50/MWh to more than $9,000/MWh, and with dynamic pricing contracts, Texas consumers were exposed to this spot price volatility and faced unaffordable bills. Dynamic pricing is a cost-effective way to activate demand response during peak demand periods if consumers are able to easily manage their consumption. Where shortages occur for such a long period during an extreme cold wave it is only practicable with local generation and storage resources. As EU rules now foresee the entitlement to dynamic price contracts for its consumers, the Texas crisis questions whether even mandatory information on the risk of such contracts and the need to have an adequate electricity meter installed are sufficient to protect those customers not equipped with alternative resources, either as prosumers or within energy communities.

In addition, while it is reasonable to have consumers pay a higher price during demand peaks, it is questionable whether they should suffer the consequences of unpreparedness of the system or even negligence of utilities and regulators. Security measures such as the weatherization of installations have a price which would reflect in higher consumer bills but is probably worth paying for. It is likely that the vast majority of customers, in particular households, are not aware of the trade-off: the benefit of marginally higher bills to cover security investments largely outweighs the much higher cost of risk such as the system failure seen in February estimated at more than $195 billion[4]. Resilience has a value whose cost Europeans are paying for. Common EU rules and methodologies apply to all EU critical infrastructures, including energy grids, and to the reliability standards MS must set for example when applying capacity mechanisms. As many parts of the EU are particularly exposed to extreme weather events, the methodology set by ACER for assessing seasonal and short-term adequacy relies, among others, on a state-of-the-art climate data basis.

Governance and transparency matter too. With Texas only marginally interconnected with surrounding systems, ERCOT operates a largely isolated and in-sourced power grid and can escape from the federal oversight of FERC, while the Public Utilities Commission of Texas (PUCT) appears to have done little to obtain adequate information from ERCOT and to push for weatherization. ERCOT could thus simply ignore FERC's recommendations and warnings following similar crises in the past. In contrast adequate flows of information, while ensuring the confidentiality of sensitive one, are an essential part of EU security rules. MSs must each designate a competent authority tasked with the control of the implementation of EU rules on security, including to issue an early warning to the EC as soon as they have reliable evidence of a likely disruption. A common entity for electricity and gas, the Agency for the Cooperation of Energy Regulators (ACER) monitors on an ongoing basis the security of electricity supply measures and must report to the Electricity Coordination Group (ECG), a forum of exchange of information and cooperation between MSs, in particular in the area of security of electricity supply.

The gas perspective

Gas-fired power plants accounted for about half of the capacity that went offline in February. According to ERCOT's ex post analysis, more than 20% of the outages were due to gas supply shortage, themselves largely attributable to electricity shortage. Output from Texas's largely un-winterized and liquids-rich shale plays declined due to freeze-offs at wellheads and frozen pipelines. Electrically-powered compressors facilitating pipeline gas flows – in their turn required for power generation- went offline, as a result of ERCOT's requests towards utilities to urge industrial customers to curtail consumption. This chicken and egg situation between the difficulties of the electricity and gas systems to cope with the extreme temperatures pleads for even closer coordination and cooperation between responsible entities of both systems, which is why EU rules foresee cooperation between them already at the stage of scenarios definition. But gas-fired electricity generation represents only slightly more than 20% of the EU power mix[5], a relatively small but stable share compared to more than half in Texas.

Unlike the in-sourced Texas, the EU-27 has recorded a 2019 dependency rate of nearly 90 percent, as indigenous production has been gradually mitigated, especially following the Groningen gas caps imposed by the Dutch government[6]. Consequently, most gas supply disruptions in Europe have been related to outages or decisions originating in third countries. Notable examples include the priority given by Gazprom to its domestic customers during the February 2012 cold spell, in tandem with accusations towards Ukraine for "excess gas withdrawal"[7] to the outage at Norway's Nyhamma gas plant in 2013, which, in combination with unseasonably low temperatures and a water pump failure in the UK-Belgium Interconnector, led to a surge in the NBP price, and the geopolitically-led Russia-Ukraine gas disputes of the 2000s and mid-2010s[8]. Only in a few instances were disruptions due to domestic events such as the late 2017 blast at Austria's Baumgarten hub coupled with the shutdown of the UK's Forties pipeline system, that sent day-ahead PSV price soaring[9].

EU gas demand is expected to remain relatively stable or only slightly decrease to +/-400 bcm until 2030 depending on economic progress, natural gas price competitiveness versus renewables in the power sector and the market share of renewables and electricity storage by that year[10]. Meanwhile decarbonization will decrease the EU's primary energy import dependency to circa 20%-36%, but imports of competitive natural gas resources outside the EU territory are projected to bear an impact on the future energy supply until 2030[11]. Therefore, EU is poised to remain prone to all four above-mentioned types of disturbances, be they highly predictable (e.g., weather-related), relatively predictable (e.g., due to unplanned outages), impossible to predict (e.g., due to accidents and technical error factors) or partially/purely geopolitical.

To the extent that EU gas system flexibility is mainly driven by an active policy of diversification of pipeline gas and LNG sources, by increasing interconnectivity of national markets complemented by reverse flows, which foster inter-MS price convergence, and by large market-driven storage capacity, it is rather similar in that respect to the well-connected Texas system, also equipped with ample underground storage space. These flexibility factors have each in turn or in combination played a role to ease EU market tightness in the various occurrences of supply disruptions. Price signals have directed market players to alternative sources or increased storage withdrawals, which can be interpreted a sign of a well-functioning single EU gas market[12], while the slight rise in electricity and coal prices during the Baumgarten/Forties disturbance has also demonstrated the ability of the electricity market to arbitrate between different sources[13]. However, it should also be noted that it has proved overall easier for market-based responses to be triggered in times of gas shortfalls particularly in Northwestern Europe, which, compared to Eastern and Southern Europe, has achieved timely market integration via gas-on-gas competition and the lifting of cross-border barriers.

A last issue merits attention in view of the Texas chain of events, that of the priority given to certain customers in case of gas supply disruption. This prioritization in the regulation has been driven by the Treaty-based, risk-sharing perception of energy security as an inter-MS "solidarity" issue[14] due to negative spillovers from distinct national policies[15]. One of the aims of EU rules is to safeguard uninterrupted supply of gas throughout the Union to household gas users and other vulnerable customers who are considered as « protected customers » in the event of difficult climate conditions and this holds true also in case the solidarity mechanism must be activated. However, those rules take an integrated approach of gas and electricity systems whereby priority may be given to gas-fired power plants over protected customers if the lack of gas supply would affect the functioning of the electricity system or hamper the production and/or transportation of gas.

Conclusion

As part of the EU Governance of the Energy Union and Climate Action adopted in 2018[16], the EC already has the tools to monitor progress in MS on adaptation to climate change, in particular in relation to energy security. In line with the Green Deal's vision of a climate-resilient society, the EU has recently decided to further raise its ambition, to widen the scope of its strategy on adaptation to climate change[17] and to develop suitable indicators and a resilience assessment framework. This article has demonstrated that the Texas crisis cannot be solely attributed to the "energy-only" market design, but that it has primarily been the result of the lack of preparedness of the gas and electricity systems to climate-related risks, the lack of an integrated approach of the two systems and of regulatory oversight. And it is for this reason that this crisis reminds us how important it is for the EU to fully implement its policy on climate resilience and existing rules on security of supply.

Footnotes

1 Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010, OJEU L 280.

2 Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010, OJEU L 158.

3 IEA, 2021. Texas State Energy Profile.

4 Ivanova, Irina, February 25, 2021. « Texas winter storm costs could top $200 billion - more than hurricanes Harvey and Ike», CBS news, https://www.cbsnews.com/news/texas-winter-storm-uri-costs/.

5 European Commission Directorate-General for Energy, Unit A.4, Market Observatory for Energy, 2021. Quarterly Report on European Gas Markets with Focus on the European Barriers in Retail Gas Markets. Volume 13 (issue 4, fourth quarter of 2020).

6 Eurostat, 2020. « Natural gas supply statistics. Data from September 2020. » https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Natural_gas_supply_statistics

7 Henderson, James and Heather, Patrick, 2012. Lessons from the February 2012 European Gas "Crisis". Oxford Energy Comment April 2012. Oxford: Oxford Institute for Energy Studies.

8 Liakopoulou, Mariana, 2018. The Caspian Legal Status and Riparian Producers' Outlook on the European Commission's Strategy Towards the Fourth/Southern Gas Corridor. Paris: European Gas Hub.

9 European Commission Directorate-General for Energy, Market Observatory for Energy, 2018. Quarterly Report on European Gas Markets. Volume 10 (issue 4, fourth quarter of 2017).

10 Liakopoulou, Mariana, 2021. The Decarbonization of Natural Gas and Europe's Energy Security. IAEE/USAEE Working Paper Series.

11 ENTSO-E and ENTSOG, 2020. TYNDP 2020 Scenario Report.

12 Bartelet, Henry, 2017. Gas Markets in the EU: Testing Resilience. November 9, 2017. ENERGETIKA XXI: Economy, Policy, Ecology. Saint Petersburg: Russia.

13 Hassel, Arndt and Egenhofer, Christian, 2017. Does Russian Gas Weaken Energy Security in Europe? Lessons from the Baumgarten Incident. CEPS Commentary, 19 December 2017. Brussels: Centre for European Policy Studies.

14 Treaty on the Functioning of the European Union, Article 194.

15 For a detailed analysis on the impact of European integration at the domestic level in situations of crisis (*top-down Europeanization concept*), see: Saurugger, Sabine, 2014. Europeanization in Times of Crisis. Political Studies Review. Volume 12, pages 181-192. For a focused analysis on the impact on EU energy market integration of negative spillovers from national approaches with regard to private investment stimulation and cost-effectiveness of national portfolios flexibility options for Europe's gas infrastructure, see: Tagliapietra, Simone and Zachmann, Georg, 2016. Rethinking the Security of the European Union's Gas Supply. Bruegel Policy Contribution, No. 2016/01. Brussels: Bruegel.

16 Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council. OJUE L 328.

17 COM (2021)82 of 24.02.2021 « Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change ».