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European Systemic Risk Board
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ESRB Secretariat's response to the European Commission's Targeted Consultation document

Review of the functioning of commodity derivatives markets and certain aspects relating to spot energy markets

The Secretariat of the European Systemic Risk Board (ESRB) welcomes the consultation launched by the European Commission on the Review of the functioning of commodity derivatives markets and certain aspects relating to spot energy markets.[1] The integrity and efficiency of commodity and energy derivatives markets constitute a foundational pillar for the stability and sustainable growth of the economy of the European Union. In the context of energy derivatives, such functionality is particularly critical for ensuring energy affordability across the Union and for supporting the efficient operation of the broader energy market.

The ESRB Secretariat is tasked by legislation to provide high-quality analytical support to the ESRB, which is responsible for the macroprudential oversight of the EU financial system and for the prevention and mitigation of systemic risk. The ESRB's remit covers a wide range of financial entities and markets, including banks, insurers, asset managers, financial market infrastructures and other financial institutions. By covering the entire financial system, the ESRB has also the duty to consider systemic risk generated by non-regulated entities. Pursuant to Article 3 of the ESRB Regulation[2], the ESRB is mandated with the macroprudential oversight of the financial system within the Union. Its objective is to contribute to the prevention or mitigation of systemic risks to financial stability in the Union, arising from developments within the financial system and taking due account of macroeconomic developments, with a view to avoiding periods of widespread financial distress.

In addition, the ESRB supports the smooth functioning of the internal market and thereby promotes a sustainable contribution of the financial sector to economic growth. For the purposes of the ESRB Regulation, systemic risk is defined as "*a risk of disruption in the financial system with the potential to have serious negative consequences for the real economy of the Union or of one or more of its Member States and for the functioning of the internal market*" (Article 2(c) of the ESRB Regulation).

[1] See **https://finance.ec.europa.eu/document/download/1f0a18f3-b3dd-4a0f-9ddd-4838645d3a86_en?filename=2025-commodity-derivatives-markets-consultation-document_en.pdf**.

[2] Regulation (EU) No 1092/2010 of the European Parliament and of the Council of 24 November 2010 on European Union macro-prudential oversight of the financial system and establishing a European Systemic Risk Board

Given this role, the Secretariat of the ESRB would like to provide its views related to the functioning of commodity and energy derivatives markets, drawing on the lessons learned during the 2021-2022 energy crisis. This response is structured in three sections:

- The first section delineates key preliminary considerations pertinent to the policy issues raised in the consultation paper, framed in relation to the mandate and tasks of the ESRB.
- The second section presents an overview of the principal findings derived from the analysis conducted prior to, during, and following the energy crisis.
- The third section outlines some policy considerations, encompassing those previously articulated by the ESRB, as well as prospective enhancements warranting further examination.

Preliminary considerations

The energy crisis revealed a complex interplay between the financial and real economy dimensions of energy markets, with derivatives playing a pivotal role in the dynamics that unfolded. This interplay manifested on three main levels: first, through the dual role of derivatives as both hedging instruments and price benchmarks; second, through the interaction between funding liquidity needs (particularly those triggered by margin calls) and overall market liquidity; and third, in relation to market microstructure, specifically the concentration of market activity in the price formation process.

This dynamic has been also recognised and analysed in the "Draghi report".[3] Notably, Chapter 3 of the report examines energy markets, underscoring two critical features of commodity and energy derivatives —particularly those linked to natural gas — and their consequential role in shaping price formation within the real economy. It notes that "*financial and behavioural aspects of gas derivative markets can exacerbate this volatility and amplify the impact of shocks*", and that "*Europe's market rules pass on this volatility to end users*". The report further identifies high levels of trading concentration, noting that this concentration increased as the energy crisis unfolded.

Over the years, the ESRB has analysed in depth the events connected with the energy crisis. The results of this work concur with the findings expressed in the Draghi report. The ESRB has leveraged the detailed information on derivatives transactions reported under Article 9 of the European Market Infrastructure Regulation (EMIR), the information of credit instruments provided under the AnaCredit regulation and securities issuance (CSDB) and detailed information on prices and liquidity from market providers. Importantly, data collected under EMIR provide detailed information on derivatives transactions undertaken by counterparties in the EU, covering both exchange-traded and over-the-counter (OTC) derivatives. These data include, for example, information on the identity of the counterparties, the trading venue, the price of the executed transaction, and the timestamp.

[3] See **The future of European competitiveness: Report by Mario Draghi**.

Given the strategic importance of energy to the European Union's economy, the ESRB Secretariat would like to hint to the critical role that energy and commodity derivatives hubs may play in determining and signalling prices relevant to the real economy. Energy and commodity derivatives — analogous to those based on other asset classes such as credit and interest rates — serve as both implicit and explicit benchmarks. In the case of natural gas prices specifically, these derivatives function as direct or indirect reference points for determining the unit cost of imports from gas-exporting countries, as well as the prices ultimately charged to end consumers. The unit price of many long-term energy import contracts is determined by hub prices linked to derivatives markets. Variable end-user energy contracts are often indexed to formulas that reflect derivatives-based hub prices. Furthermore, as derivatives serve as instruments for risk transfer, their functioning affects both the cost and availability of hedging across the system. Through their interaction with the spot market,[4] they may also exert influence on spot price formation. Finally, as natural gas plays a pivotal role in setting the marginal price of electricity, the dynamics of natural gas derivatives also influence the overall cost of energy, even when lower-cost alternative sources are available.

It is therefore essential to identify and address potential inefficiencies and vulnerabilities in the price formation mechanisms of energy and commodity derivatives, particularly in relation to the market functioning and role of market infrastructures. Some derivatives markets exhibit high concentration in both exposures and trading activity, with a small number of market participants providing not only market liquidity but, in some instances, funding liquidity for margin calls. Such concentration can pose risks not only when a key participant withdraws from the market but also when prices disproportionately reflect the trading behaviour of a few actors, thereby deviating from the ideal of a competitive market. Moreover, derivatives markets are susceptible to episodes of short-term or prolonged illiquidity, during which price formation may be impaired by liquidity spirals —for instance, under margin pressure — leading to temporary dislocations of prices from fundamental values.

In its own official statements, the ESRB has noted that several recent episodes of financial instability have exposed critical vulnerabilities within derivatives markets.[5] Notable among these (in addition to the energy crisis of 2022), the March 2020 market turmoil[6] — characterised by a “dash for cash” to meet margin calls — and the UK gilt market dislocation in 2022. These events share two key characteristics: i) large, directional derivatives positions among some non-bank financial intermediaries, and ii) endogenous, often procyclical,[7] feedback mechanisms that magnified the effects of initial exogenous shocks. A central manifestation of these dynamics has

[4] Energy and commodity derivatives may influence spot markets through price discovery, arbitrage, and expectations. Futures often lead price formation and serve as benchmarks for physical contracts, while arbitrage pushes convergence with spot prices. The forward curve guides storage decisions, affecting spot supply. Derivatives also shape hedging behaviour and risk allocation, with liquidity and speculation potentially transmitting volatility to spot prices. Futures prices, reflecting market expectations, further guide spot market dynamics.

[5] See the **ESRB response to the consultative report by the BCBS, CPMI and IOSCO on transparency and responsiveness of initial margin in centrally cleared markets** and **A system-wide approach to macroprudential policy**.

[6] See **Liquidity risks arising from margin calls**, ESRB 2020.

[7] See **Mitigating the procyclicality of margins and haircuts in derivatives markets and securities financing transactions**. ESRB 2020.

been the procyclical nature of margin calls, which has become a concern for policymakers at both EU and global levels. Addressing the funding and liquidity stress triggered by margin requirements and containing the risk of contagion to the broader financial system, required the implementation of a wide range of policy measures. Unprecedented interventions by public authorities helped to stabilise the liquidity conditions on financial markets and reduced risks in the clearing ecosystem.[8]

Key findings

The ESRB Secretariat has identified four key empirical findings related to natural gas derivatives market. First, the sharp spikes observed in the key natural gas benchmark prices predate the Russian invasion of Ukraine by at least six months and are linked to episodes of illiquidity, during which a limited number of contracts traded were associated with significant price shifts over very short time frames—sometimes within minutes. Second, the spikes were also associated with significant trading concentration,[9] with a small number of participants accounting for the majority of contracts traded on a given trading day. Third, market liquidity progressively deteriorated as both variation margin calls and initial margin requirements increased, with several market participants citing the increasing initial margin requirements as a key reason for withdrawing from the market. Fourth, the spikes were further associated with concentrated energy traders and energy producers closing short positions at varying speeds due to hedging activity—sometimes progressively over several days, and at other times within just a few minutes.

All sharp spikes in natural gas prices occurred within very short time frames and were sometimes rapidly reversed, suggesting underlying issues with market liquidity. Intraday volatility during these episodes was exceptionally high—occasionally amounting to several tens of euros per MWh—indicating the substantial price impact of traders initiating long positions. Market participants, trading venues and CCPs are likely aware of these dynamics, given their access to order book data.

The pronounced increase in both levels and volatility in the prices of natural gas derivatives — and energy derivatives more broadly during 2022 — triggered substantial margin calls.[10] Unlike banks and other financial intermediaries, participants in energy markets typically lack substantial holdings of liquid assets that can be readily sold to satisfy margin calls. Consequently, many were compelled to draw on bank credit lines to meet these

[8] For instance, during the COVID-19-induced market dislocation in March 2020, central bank liquidity support helped ensure that clearing members could meet margin requirements. Similarly, in response to the 2022 energy crisis, several public authorities intervened to support market participants in meeting elevated margin calls. By easing liquidity pressures on CMs and their clients, these interventions contributed to preserving the resilience of central counterparties (CCPs) under strained market conditions.

[9] See **TRV Risk Analysis. EU natural gas derivatives markets: risks and trends**. ESMA, 2023 and Bouveret *et al*. **EU energy derivatives markets: structure and risks**.

[10] See **ESRB response to ESMA's Final Report on Emergency measures on collateral requirements, including draft RTS amending Commission Delegated Regulation (RTS) 153/2013**, ESRB 2022.

obligations. ESRB analysis[11] shows that, in the first seven months of 2022, EU non-financial corporations (NFCs) with energy derivatives exposures, increased their credit from euro area banks by approximately 20% primarily driven by uncollateralised credit lines and overdrafts. Some euro area banks reported nearing their risk-appetite limits for exposures to NFCs active in derivatives markets, indicating a potential deceleration in uncollateralised lending. While governments expanded public guarantees on NFC loans, escalating market volatility continued to pressure banks' risk limits, thereby constraining their capacity to provide additional financing. As a result, several market participants chose to unwind their derivatives positions as a means of managing liquidity pressures arising from margin calls. Specifically, firms with short positions still faced sizable margin payments and liquidity strains, despite these positions being used for hedging against price declines.[12]

As previously highlighted by the ESRB,[13] the energy crisis demonstrated the significant influence that margin requirements can exert on market liquidity and price dynamics. This placed pressure on counterparties hedging their energy output by taking short positions in natural gas futures markets. Faced with rising margin calls and limited access to funding at short notice, these counterparties responded by reducing or unwinding their short positions through the purchase of long positions. This covering of short positions shifted demand towards the long side of the market and, in an environment characterised by high participant concentration, contributed to a liquidity squeeze that further amplified price increases and volatility.

This self-reinforcing feedback loop between rising margin calls, elevated price levels and heightened volatility exemplifies the interaction between funding and market liquidity.[14] As price movements triggered increased margin requirements, market participants faced growing funding constraints. These constraints, in turn, led to the unwinding of short positions, further amplifying price movements and contributing to a deterioration in overall market liquidity. This dynamic created a cycle, in which volatility fed into liquidity stress, and vice versa. Moreover, high levels of concentration in the trading of key energy benchmarks—such as natural gas futures —played a pivotal role in exacerbating these effects. As highlighted in a report by the ESMA,[15] such concentration can significantly reduce the depth and resilience of markets, leaving them more vulnerable to abrupt shifts in positioning and less able to absorb shocks without significant price dislocations. Analysis by the ESRB Secretariat, using EMIR transaction-level data for each intraday trade on the TTF front-month contract, found that during periods of the most pronounced price spikes, a very limited number of market participants rapidly closed their short positions.

[11] Ibid.

[12] See **Stability risks in EU energy markets, the role of central clearing, and policy responses**, Speech by Froukelien Wendt, ESMA.

[13] See the **ESRB response to the consultative report by the BCBS, CPMI and IOSCO on transparency and responsiveness of initial margin in centrally cleared markets**.

[14] See Avalos *et al.* **Margins and liquidity in European energy markets in 2022**, BIS Bulletin No 77.

[15] See **The August 2022 surge in the price of natural gas futures**, ESMA TRV Risk Analysis October 2023.

This feedback dynamic, as stylised in the diagram presented in Figure 1, served as an amplifying mechanism during episodes of extreme price spikes in natural gas derivatives markets. Some derivative markets have shown that they are vulnerable to destabilising feedback loops during periods of financial stress. Exogenous shocks to market fundamentals often initiate sharp price movements, which subsequently trigger significant increases in both initial and variation margin requirements. These heightened margin calls intensify liquidity pressures on market participants, potentially leading to further financial distress. Such dynamics are often amplified by endogenous feedback mechanisms: rising liquidity demands can force disorderly liquidation of positions, exacerbating volatility and further impairing market functioning. This procyclical dynamic, as illustrated in the feedback loop presented in Figure 1, underscores the need to enhance the resilience of energy derivatives markets and increase the preparedness for margin calls. It also highlights the pivotal role of market infrastructures — including trading venues, CCPs, and clearing members — in mitigating shock amplification and preserving orderly price formation in critical segments of the energy market.

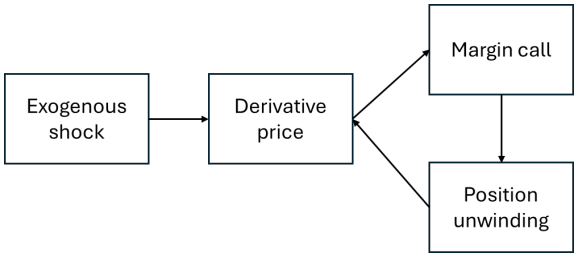

Figure 1 Price/margin feedback dynamics

These dynamics can unfold across varying time scales, ranging from rapid intraday developments occurring within minutes to more prolonged episodes spanning several days. The temporal dimension significantly influences both the depth and resilience of market liquidity, as well as the price impact associated with the unwinding of positions. Short-term dislocations may trigger abrupt liquidity withdrawals and sharp price adjustments, while more extended episodes can lead to cumulative stress through persistent margin calls, increasing the likelihood of disorderly deleveraging and broader market contagion.

Based on contractual agreements, derivatives-based benchmarks may play an important role in determining both natural gas import prices and end-user energy prices across the real economy. Energy firms increasingly rely on benchmark-linked pricing in a wide range of contracts. However, the extent and significance of such benchmark usage vary depending on the type of client—such as industrial, commercial or retail consumers—and the regulatory and contractual frameworks in place in each EU Member State. This heterogeneity influences how price shocks in benchmark markets are transmitted to final consumers and the broader economy. The transmission of price shocks to the real economy and their impact on inflation will depend on several factors, including the prevalence of fixed-price contracts and the frequency of price adjustments in variable-price contracts.

The transmission of energy derivatives hub prices to the real economy consumer inflation is influenced by several factors and requires detailed information. Wholesale natural gas prices impact retail energy prices. However, as already mentioned, the extent and timing of this pass-through depend on the structure of consumer

contracts and the frequency of price adjustments. For instance, fixed-price contracts delay the reflection of wholesale price changes in consumer bills, while variable-price contracts allow for more immediate adjustments. This variability can lead to situations where decreases in wholesale prices are not promptly mirrored in consumer prices, as observed in late 2022 when falling natural gas prices did not immediately reduce inflation figures.[16] Data on the composition and specific terms of import and retail contracts are not systematically compiled or readily accessible and require further work from statistical institutes and authorities.[17]

Policy considerations and proposals

The below summarises some policy proposals that could be further analysed and considered in order to improve the functioning of the energy derivatives markets. They do not represent formal views by the ESRB as an institution, nor by their technical committees. Nevertheless, the ESRB Secretariat wants to provide an input in the hope to be beneficial to an informed EU-wide interaction among informed counterparts.

First, enhancing transparency across the functioning and use of derivative energy markets would strengthen market discipline and confidence, and facilitate more effective policy responses in case of a need. Because of insufficient transparency, policymakers and regulatory authorities may encounter significant delays and limitations in assessing market dynamics and the transmission of energy price shocks to the real economy. These constraints would hinder the timely design and implementation of effective policy responses. To mitigate such shortcomings, greater transparency is essential —particularly through the disclosure of market concentration metrics, indicating the share of trading volumes traded by the largest participants. Where feasible, this should be complemented by the identification of key market actors and market shares of the principal entities active in benchmark energy markets. Enhanced transparency would not only facilitate more informed policymaking and regulatory oversight, but also strengthen market discipline and bolster confidence, especially during periods of market stress.

Second, to strengthen market resilience, particularly in the face of episodes of extreme volatility, the establishment of real-time monitoring frameworks and advanced circuit breakers is essential. These frameworks would support the timely detection of early warning signals indicating the emergence of liquidity spirals, enabling pre-emptive interventions. In parallel, the introduction of advanced circuit breakers—triggered by indicators such as price dislocation, rapid margin escalation and breaches of position concentration thresholds—could serve as a critical stabilising tool.

[16] See J. Jonckheere (2022) **Energy prices and inflation: it's complicated**. National Bank of Belgium.

[17] See for instance **Towards a new method of calculating energy prices**, 2022. Statistics Netherlands.

While initiatives to enhance margin preparedness, as promoted by the Financial Stability Board (FSB), are vital for mitigating the effects of instability, they may not be sufficient on their own. As highlighted by the ESRB (2024), such measures can be particularly costly for non-financial counterparties and may fall short of preventing destabilising feedback loops in highly concentrated markets. A combination of pre-emptive monitoring and well-calibrated intervention tools is therefore needed to contain systemic risk and safeguard market functioning.

Moreover, enhanced oversight and governance of central counterparties' risk practices are necessary components of a more resilient financial infrastructure, also for the commodity derivatives markets. Central counterparties play a critical role in safeguarding financial stability, yet their risk management frameworks may create systemic externalities. In line with approaches such as those promoted by the Bank of England,[18] CCPs should be encouraged to internalise the broader market implications of their margining practices, particularly during periods of stress. Furthermore, supervisory authorities should assess the feedback effects of margin calls on market liquidity and stability. As noted by institutions such as the Financial Conduct Authority (FCA),[19] sudden and procyclical margin increases can contribute to destabilising liquidity spirals, especially in markets characterised by participant concentration and volatility. Enhanced oversight and governance of CCP risk practices are therefore essential components of a more resilient financial infrastructure.

Finally, turning to the pricing formulas used in energy contracts, it would be useful to assess their role in the transmission of price shocks to the real economy and their impact on inflation dynamics. A clearer view of how benchmark prices are standard wise embedded into supply and end customer contracts would enable more accurate assessments of inflationary pressures and facilitate more effective policy responses. In parallel, there is merit in exploring the adoption of pricing formulas that are specifically designed to mitigate or more evenly distribute the impact of market volatility, thereby enhancing resilience for both suppliers and end-users.

[18] See Fundamental Rule 10: "An FMI must identify, assess, and manage the risks that its operations could pose to the stability of the financial system.", **https://www.bankofengland.co.uk/paper/2024/cp/fundamental-rules-for-financial-market-infrastructures**.

[19] See **https://www.fca.org.uk/publication/policy/ps25-1.pdf**.