

Final Report

on the implementation and functioning of the Intra-day Volatility Management Mechanism

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Acronyms and Legal References

| | |
|----------------|--|
| ACER | Agency for the Cooperation of Energy Regulators |
| CB | Circuit Breaker |
| EEA | European Economic Area |
| ESMA | European Securities and Markets Authority |
| ETD | Exchange Traded Derivative |
| EU | European Union |
| (EU) 2022/2576 | Council Regulation (EU) 2022/2576 of 19 December 2022 enhancing solidarity through better coordination of gas purchases, reliable price benchmarks and exchanges of gas across borders |
| FITRS | Financial Instruments Transparency System |
| IVM | Intra-day Volatility Mechanism |
| LNG | Liquefied Natural Gas |
| MCM | Market Correction Mechanism |
| MCM Regulation | Council Regulation (EU) 2022/2578 of 22 December 2022 establishing a market correction mechanism to protect Union citizens and the economy against excessively high prices |
| MIC | Market Identifier Code |
| MiFID II | Markets in Financial Instruments Directive – Directive 2014/65 of the European Parliament and of the Council |
| MTF | Multilateral Trading Facility |
| NCA | National Competent Authority |
| OI | Open Interest |
| OTF | Organised Trading Facility |
| RM | Regulated Market |
| TFEU | Treaty on the Functioning of the European Union |
| TV | Trading Venue |

Executive Summary

Reasons for publication

In December 2022 the Council adopted Regulation (EU) 2022/2576 enhancing solidarity through better coordination of gas purchases, reliable price benchmarks and exchanges of gas across borders ('the Regulation'), which started applying on 30 December 2022 for a one-year period. The Regulation establishes that trading venues (TVs) on which energy-related commodity derivatives are traded should set up temporary intra-day volatility management mechanisms (IVMs).

This Report fulfils the mandate in Article 17 of the Regulation which requires ESMA to develop and submit a report to the European Commission by 30 June 2023 to evaluate the efficiency of the IVMs.

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In this Report, ESMA provides an assessment of the efficiency and the functionality of the introduced IVMs by identifying differences in the approaches taken by the TVs in the implementation and the calibration of IVMs. ESMA additionally analyses how IVMs function in comparison with existing circuit breakers to understand the effectiveness and value added of these mechanisms in managing volatility.

In line with the mandate of Article 17 of the Regulation (EU) 2022/2576, ESMA has structured this Report as follows: Section 1 and Section 2 discuss the context in which the IVM was introduced, including the legal background. Section 3 presents ESMA's mandate and the approach chosen as well as the data sources used to develop this Report. Section 4 provides an overview of the state of play with regard to the different approaches in the implementation of the IVMs, highlighting their customisation features. Section 5 proceeds with an evaluation of the efficiency of IVMs. The implemented IVMs generally seem adequately calibrated with the caveat of the assessment being done in a period with no evidence of protracted volatility episodes affecting energy commodity derivatives trading. The section further highlights the significant practical challenges for implementing the IVMs for illiquid TVs. Section 6 presents the conclusions of the Report. Overall ESMA notes that, due to the practical challenges in implementing IVMs for illiquid TVs, it can be questioned whether the IVMs are appropriate mechanisms for those TVs. ESMA considers that the already existing circuit breakers under MiFID II could deliver on the objective to limit excessive intra-day price volatility without introducing a second layer of circuit breakers via IVMs.

Next Steps

ESMA envisages to issue further guidance to ensure the appropriate implementation and application of circuit breakers under MiFID II in the second half of 2023. ESMA will continue to request updates on the implemented IVMs from EU TVs on a quarterly basis as per the Regulation.

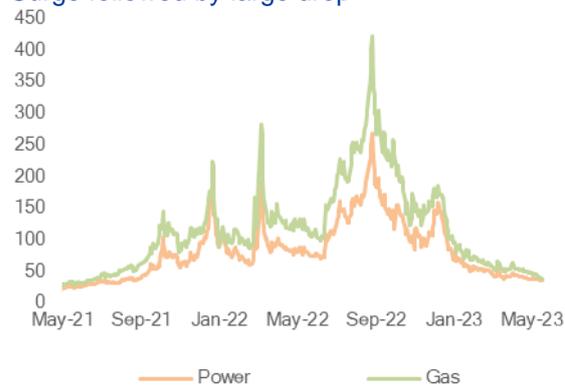
ESMA will continue monitoring developments in the trading of EU energy commodity derivatives and stands ready to provide further technical advice upon request.

1. Introduction

1. In the aftermath of the invasion of Ukraine by Russia, EU energy commodity markets, i.e. natural gas and power, have been subject to record high and volatile prices that reached a peak in August 2022. Since the August 2022 peak, energy prices and volatility have started to decline, and more notably so since the beginning of 2023. The mild weather conditions, high level of gas storage, increased availability of Liquefied Natural Gas (LNG) and increased regasification capacity were factors that contributed to the observed downward trend. The developments affected both spot markets as well as commodity derivative markets (see Charts 1 and 2 below on the developments in energy commodity derivative markets).

CHART 1

Energy commodity derivatives prices
 Surge followed by large drop



Note: ICE Dutch TTF futures for natural gas and EEX Phelix futures for power.
 Sources: Refinitiv EIKON, Datastream, ESMA

CHART 2

Energy commodity derivatives realised volatility
 Large price swings in natural gas and power



Note: Commodity price realised volatility (annualised 20D volatility) in %.
 German Phelix futures for power, Dutch TTF for gas.
 Sources: Refinitiv EIKON, Datastream, ESMA

2. The extreme high and volatile energy prices which materialised at the time had a severe impact on the Union energy markets. Such episodes not only affected the trading activity on trading venues where energy-related commodity derivatives are traded, but also the post-trade environment, in particular margin requirements for clearing, as well as the activity of energy companies, the overall EU economic activity and, ultimately, end-consumers.
3. In a follow up to the market events in August 2022, the European Commission requested ESMA in a letter dated 13 September 2022 to (i) investigate further the

functioning of circuit breakers¹ in the course of the energy crisis, exploring any need for alignment across the EU and to (ii) consider a more harmonised approach to price limits².

4. It is worth noting that in order to manage price volatility, Article 48 of MiFID II requires all trading venues (TVs) to have mechanisms in place (circuit breakers) to temporarily halt or constrain trading in case of significant price movements as further detailed in Section 3. Additionally, Article 48(4) of MiFID II prescribes that TVs should have in place systems, procedures and arrangements (pre-trade controls) to reject orders that exceed pre-determined volume and price thresholds or are clearly erroneous.
5. In its response³ to the European Commission dated 22 September 2022, ESMA explained that a review of the existing rules on circuit breakers was ongoing and would be followed by further clarifications and amendments to the existing framework, where appropriate. At that time, ESMA noted that it appeared useful to consider implementing, on a temporary basis and for energy derivative markets only, a new type of trading halt mechanism, whose parameters were to be set at EU level.
6. The severe disruption in the Russian gas supply which materialised and the unprecedented volatility and price hikes in energy prices in 2022 led the Commission and the Council to consider adopting, under Article 122(1) of the Treaty on the Functioning of the European Union⁴ (TFEU), specific measures in the autumn of 2022. Those measures aimed at ensuring, among other things, that energy derivative markets keep fulfilling their critical role in providing for the hedging needs of the real economy and contributing to ensuring crucial supplies of gas and electricity across the Union.
7. On 22 December 2022, the Council of the EU adopted Regulation (EU) 2022/2578 establishing a Market Correction Mechanism (MCM) to protect Union citizens and the economy against excessively high prices⁵ which entered into force and started applying on 1 February 2023 for a one-year period. The MCM sets a price ceiling at which TTF gas derivatives with maturities between month-ahead and year-ahead can be traded, also considering the spread between the TTF front month contract and the reference

¹ Article 48(5) of MiFID II: "Member States shall require a regulated market to be able to temporarily halt or constrain trading if there is a significant price movement in a financial instrument on that market or a related market during a short period and, in exceptional cases, to be able to cancel, vary or correct any transaction [...]."

² Article 48(4) of MiFID II: "Member States shall require a regulated market to have in place effective systems, procedures and arrangements to reject orders that exceed pre-determined volume and price thresholds or are clearly erroneous."

³ https://www.esma.europa.eu/sites/default/files/library/esma24-436-1414_-_response_to_ec_commodity_markets.pdf

⁴ Article 122(1) of the TFEU provides that "[...] the Council, on a proposal from the Commission, may decide, in a spirit of solidarity between Member States, upon the measures appropriate to the economic situation, in particular if severe difficulties arise in the supply of certain products, notably in the area of energy." <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A12016ME%2FTXT>

⁵ OJ L 335, 29.12.2022, p. 45–60

price, mainly referencing LNG prices, calculated by ACER. The MCM was extended to derivatives based on other Virtual Trading Points by the Commission on 31 March 2023.

8. In parallel, the Council adopted Regulation (EU) 2022/2576 of 19 December 2022 enhancing solidarity through better coordination of gas purchases, reliable price benchmarks and exchanges of gas across borders⁶ (the Regulation) which started applying on 30 December 2022 for a one-year period. To ensure that operators essential for the security of the energy supply in all Member States benefit from safeguards against large price movements that are detrimental to the continued operation of their business, which would also be detrimental to the end-consumers, the Regulation notably requires trading venues on which energy-related commodity derivatives are traded to set up temporary intra-day volatility management mechanisms (IVMs).
9. It is worth noting that despite the measures already set out in MiFID II and described above to manage price volatility, the Council considered it necessary to introduce specific volatility management mechanisms on trading venues trading energy derivatives given the high and lasting volatility episodes in energy derivative markets in 2022.
10. This report has been developed to fulfil the mandate in Article 17 of the Regulation, which requires ESMA to submit a report to the Commission by 30 June 2023, “evaluating the efficiency of the intra-day volatility management mechanisms”.
11. The report is organised as follows. Section 2 further presents the legal background for this report. Section 3 presents ESMA’s mandate and the approach and data sources used to develop this report. Section 4 provides an overview of the state of play with respect to the implementation of IVMs. More in detail, Section 4.1 provides some background on the EU TVs which have implemented IVMs. Section 4.2 discusses how trading venues have technically implemented the requirements in Article 15 of the Regulation. Section 5 proceeds with an evaluation of IVMs and, more specifically, Section 5.1 focusses on the efficiency evaluation and Section 5.2 provides a comparison between IVMs and circuit breakers. Section 6 concludes the report.

2. Legal Background

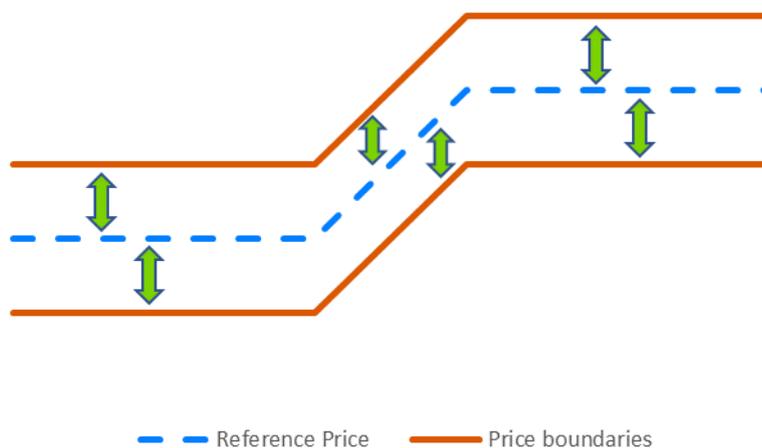
12. The Regulation requires TVs on which energy-related commodity derivatives are traded to set up temporary IVMs by 31 January 2023. As provided in Recital 43 of the

⁶ OJ L 335, 29.12.2022, p. 1–35

Regulation such mechanisms are aimed at safeguarding market participants against large price movements by preventing excessive movements of prices within a trading day.

13. Article 2 of the Regulation specifies that energy-related commodity derivatives in scope of the IVM implementation include commodity derivatives traded on a trading venue and having as underlying electricity or gas, with a maturity which does not exceed 12 months.
14. Article 15 of the Regulation details the technical characteristics of the IVMs, which are qualified as a “price corridor” preventing the execution of those trades which would lie beyond the upper and lower limit of the price corridor. To define the “price corridor” the Regulation mandates TVs to establish two key elements: (i) a reference price and (ii) price boundaries applied to the reference price which act as a corridor for allowed price variations. The concept of a price corridor is visualised in Chart 3 below.

CHART 3
IVM PRICE CORRIDOR



15. With respect to the reference price, Article 15(2) of the Regulation sets out that TVs should use as reference price: (i) at the start of the trading day, the price determined upon the opening of the relevant trading session, (ii) subsequently the last market price observed at regular intervals, and (iii) in the event of an interruption in trading during the trading day, the opening price of the resumed trading.

16. As regards price boundaries the Regulation establishes that TVs should set an upper and a lower price boundary which define the prices above and below which orders should not be executed. The price boundaries can be expressed either in terms of an absolute value or in the form of a percentage variation relative to the reference price.
17. To establish the “price corridor”, TVs are expected to use a calculation method which consists in applying the price boundaries to the reference price. Additionally, as per Article 15(4) of the Regulation, TVs should renew the “price corridor” intraday, by regularly recalculating the corridor using the appropriate price boundaries and the intraday updated reference price.
18. The Regulation acknowledges the diverse liquidity and volatility profile of energy derivatives by providing that TVs should adjust the calculation method used to establish the price corridor to the specificities of each energy-related commodity derivative, including its liquidity and volatility profile. Additionally, TVs are given the choice to implement IVMs either by integrating them into their existing circuit breakers or as an additional mechanism.
19. Regarding circuit breakers, Article 48(5) of MiFID II requires regulated markets⁷ “to be able to temporarily halt or constrain trading if there is a significant price movement in a financial instrument on that market or a related market during a short period (...).” Circuit breakers apply to any financial instrument traded on a TV, including energy-related commodity derivatives. Additionally, the same article requires appropriate calibration of the parameters to halt trading. The specific calibration is left to the discretion of TVs, taking into account, amongst others, the liquidity of different asset classes and the nature of the market model.
20. In this respect, Article 48 of MiFID II additionally mandates ESMA to draft Guidelines for the calibration of trading halts⁸. In the Guidelines, ESMA highlighted elements which should be considered for the purpose of calibration. Amongst other, the Guidelines prescribe that circuit breakers should be calibrated at asset class level, and when necessary, at a more granular level and that the liquidity and volatility of the financial instrument should be considered. Additionally, the Guidelines clearly state that TVs should generally have in place both static and dynamic circuit breakers and can deploy only one of the two in exceptional cases where trading venues can demonstrate to the relevant NCA that volatility is adequately managed using only static or dynamic mechanisms.

⁷ Article 18(5) of MiFID II extends such requirements to MTFs and OTFs.

⁸ [esma70-872942901-63_mifid_ii_guidelines_on_trading_halts.pdf\(europa.eu\)](#)

21. Article 16 of the Regulation requires NCAs to supervise the implementation of IVMs and report to ESMA accordingly at least on a quarterly basis. In this respect NCAs are required to ensure that any possible divergence in the implementation of the mechanisms by the supervised TVs is justified by the specificities of each TV.

3. ESMA mandate, approach and data sources

3.1 ESMA mandate

22. Article 17 of the Regulation sets out ESMA's role in the coordination and monitoring of IVMs. Article 17(1) and 17(2) of the Regulation mandates ESMA to *“coordinate and monitor the implementation of the intra-day volatility management mechanisms on the basis of reports submitted to it by the competent authorities in accordance with Article 16(3)”*. Additionally, ESMA is mandated to *“document any divergences in the implementation of the intra-day volatility management mechanisms across jurisdictions in the Union based on the reports from competent authorities”*

23. Article 17(2) of the Regulation further requires ESMA to submit a report to the Commission by 30 June 2023, “evaluating the efficiency of the intra-day volatility management mechanisms”.

3.2 Approach and data sources

24. To fulfil the mandate received under Article 17 of the Regulation, ESMA organised targeted discussions with NCAs ahead and following the implementation of IVMs. ESMA also developed a reporting template, in cooperation with the NCAs supervising trading venues which are in the scope of the Regulation, to facilitate NCAs' reporting to ESMA in accordance with Article 16(3) of the Regulation. NCAs and ESMA agreed to use the template for submission of reports three weeks after the implementation of IVMs and at least on a quarterly basis.

25. The data used for the purpose of this report has been gathered through those submissions. The template included information on: (i) the technical features of the mechanism as implemented by venues including the choice of parameters, their calibration and the frequency of parameters updating, (ii) the design and effects of the mechanism and (iii) the possible triggering of the mechanism and its effects since implementation.

26. The template additionally included a question as to whether the IVM had been integrated in the existing circuit breakers as well as, some qualitative questions regarding specific issues encountered during the implementation. In the second round

of reporting, TVs were requested to also provide views on the efficiency of the IVMs as an effective tool to manage intra-day price volatility. The information was collected in two iterations between February and May 2023. The data gathered thereby has been complemented by other sources available to ESMA, notably to identify the most liquid TVs and energy derivative contracts.

4. IVM – state of play

4.1 Market overview

27. As part of its analysis, ESMA identified 17 EU TVs in the scope of Article 15 of the Regulation as they trade energy-related commodity derivatives with electricity⁹ or gas as underlying and contract maturities not exceeding 12 months. This included 8 regulated markets (RMs), 8 organised trading facilities (OTFs) and 1 multilateral trading facility (MTF). It is important to highlight here that a TV may offer certain contracts on different market segments. Furthermore, 8 of the analysed TVs offer only contracts with electricity as underlying whereas the rest offer both electricity and gas contracts. Table 1 presents the respective list of EU TVs.
28. Note that the current assessment also includes one EEA TV – Nasdaq Oslo – which implemented an IVM mechanism following the introduction of a similar regulatory requirement into national law.

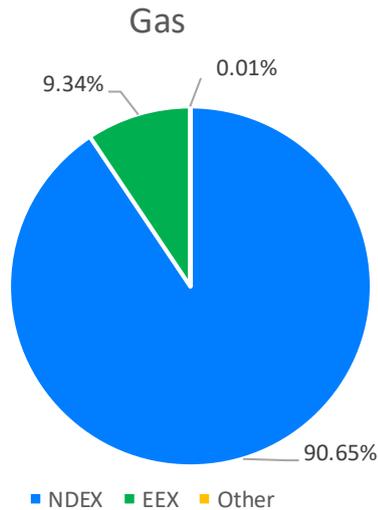
⁹ Note that for the purpose of this Report we refer to electricity and power derivatives interchangeably.

TABLE 1
Trading venues within the scope of the IVM

| No. | Country of the NCA | Trading Venue (TV) | TV type | Sub-product |
|-----|--------------------|--|---------|-------------|
| 1 | BG | Capman AD | MTF | ELEC |
| 2 | CZ | 42 Financial Services | OTF | ELEC; GAS |
| 3 | DE | European Energy Exchange (EEX) | RM | ELEC; GAS |
| 4 | DE | European Energy Exchange (EEX) | OTF | ELEC; GAS |
| 5 | ES | MEFF Power | RM | ELEC |
| 6 | ES | CIMD SV SA | OTF | ELEC |
| 7 | ES | Tradition Espana | OTF | ELEC; GAS |
| 8 | FR | Griffin Markets Europe | OTF | ELEC |
| 9 | FR | TPICAP EU | OTF | ELEC |
| 10 | FR | Tradition Paris | OTF | ELEC; GAS |
| 11 | GR | Hellenic Energy Exchange | RM | ELEC |
| 12 | HU | Hungarian Derivative Energy Exchange (Hudex) | RM | ELEC; GAS |
| 13 | IE | Marex Spectron Europe | OTF | ELEC |
| 14 | IT | Borsa Italiana S.P.A. - IDEM | RM | ELEC |
| 15 | NL | ICE Endex Markets B.V. | RM | ELEC; GAS |
| 16 | *NO | Nasdaq Oslo ASA | RM | ELEC |
| 17 | PT | OMIP - Pólo Português, S.G.M.R., SA | RM | ELEC; GAS |

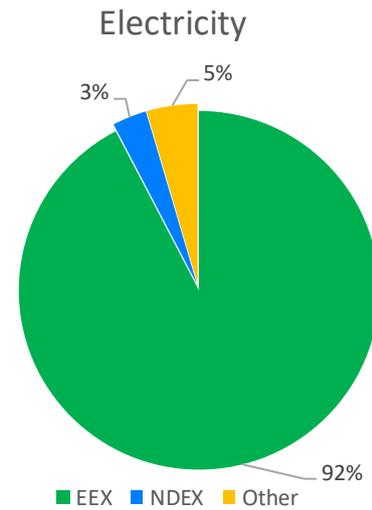
29. When analysing the effectiveness of the IVMs, it is important to also consider the liquidity of the respective venues and contracts since those elements influence the implementation of IVMs at TV level and in turn its impact on the market.
30. Firstly, it should be noted that price formation takes place on the most liquid TVs, whereas the less liquid TVs – as “price takers” – will generally be using the price from the main markets to establish a reference price. This is a key aspect as the calibration of the IVM on the core markets, i.e. the most liquid ones where price formation takes place, is the most relevant and may ultimately impact the implementation model of the IVM by other TVs as well as its effectiveness. The charts below provide some high-level information on the liquidity of the TVs and of the respective contracts traded thereon.
31. Additionally, it is important to remark that the pool of liquidity, both for gas and electricity derivative contracts, is characterised by a high degree of concentration on a few TVs and in a few reference contracts. As regards natural gas traded derivatives, ICE Endex is the main TV, accounting for 91% of the volumes (EUR) traded during the 1-year period examined for the purpose of this report (January 2022 – January 2023). In the case of power derivatives, EEX RM is the main TV with 92% of the volumes (EUR) traded during the same period (see Chart 4 and 5).

CHART 4
Main venues for natural gas derivatives



Note: by traded volume during Jan 22 – Jan 23
Sources: FITRS, ESMA

CHART 5
Main venues for power derivatives



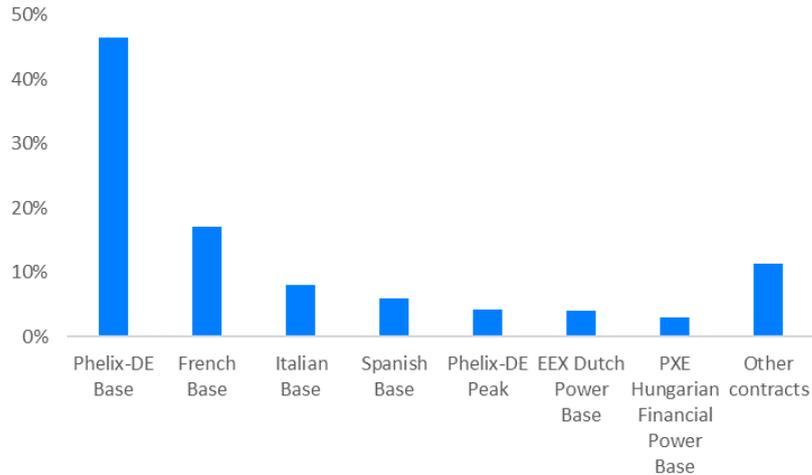
Note: by traded volume during Jan 22 – Jan 23
Sources: FITRS, ESMA

32. Furthermore, the liquidity also differs significantly from contract to contract. With respect to gas derivative contracts, in its recent effects assessment on the MCM¹⁰, ESMA carried out an analysis of the liquidity of various contracts highlighting that there is a significant liquidity gap between the main contract, TTF (the Dutch gas hub) and the remaining ones. For electricity contracts, Phelix-DE Base contract traded on EEX is the most liquid contract (see Chart 6 below).

¹⁰ [See MCM Effects Assessment Report for more details.](#)

CHART 6

Open Interest (in MWh) on EEX for power contracts
 Phelix-DE holds almost half of the OI



Note: Data collection period 1 April 2022 – 31 March 2023
 Sources: NCAs, ESMA

33. It is also important to note that although some of the TVs included in Table 1 make available for trading contracts within the scope of IVM, the actual trading in those contracts was either marginal or even non-existent from January 2022 to January 2023. As an example, during the indicated period EEX reported around 950,000 transactions with electricity as underlying whereas, on the other end of the spectrum, Griffin Markets reported just one transaction followed by Marex Spectron with eleven transactions in electricity derivatives. Thus, for the purpose of the IVM efficiency, we categorise the identified market segments into various liquidity brackets.
34. Table 2 below shows the entities which had at least 1 trade per day during the analysed period either with electricity or gas commodity derivatives (i.e. no further distinction by contract characteristics). The number of trades per day is a key aspect to consider as a potential indication of whether the IVM can possibly be implemented at the venue level using a reference price determined by the same TV. Precisely, a venue with a liquidity index equal to zero may have to rely on the reference price determined on another venue, subject to access and costs considerations. Hence, ESMA notes that only on very few markets the IVMs could play a potential role in curbing intra-day volatility.

TABLE 2

Venue liquidity index, by average number of trades during Jan 22 – Jan 23

| TV | Liquidity bracket | |
|------------------------------|-------------------|---------------|
| | ELEC | GAS |
| EEX | 3000 - 4000 | 700 - 800 |
| ICE Endex | 100 - 200 | 24000 - 25000 |
| MEFF Power | 1 - 10 | na |
| Nasdaq | 200 - 300 | 1 - 10 |
| OMIP | 1 - 10 | na |
| 42 Financial Services | 10 - 50 | 0 |

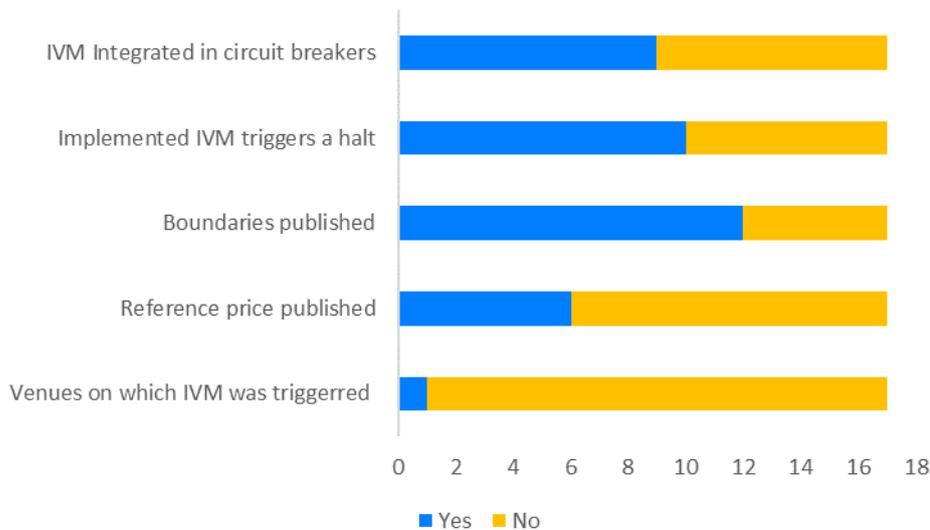
Note: the index is computed to identify the number of transactions per day for the analysed period. The total number of transactions per TV refers to all transactions in commodity derivatives with electricity or gas as underlying (i.e. includes contracts with different settlement periods, sizes and distinct settlement location). A value of the index lower than 1 suggests that the contracts were not traded daily (i.e. 0 indicates that few transactions were performed but no daily trading). "na" indicates that no trades were reported by the venue during the analysed period for either contracts with electricity or gas as underlying.

Sources: FITRS, ESMA

4.2 Implementation by EU trading venues

35. As discussed in Section 1, Article 15 of the Regulation mandates TVs offering energy-based commodity derivatives for trading to set up IVMs, with the aim of preventing excessive movements of prices within a trading day. Article 15 of the Regulation prescribes some common features that IVM should display, leaving TVs the possibility to customise the mechanism depending on the specificities of each market / contract, including liquidity and volatility.
36. This section provides an overview of the implementation of IVMs as reported to ESMA, focussing on the requirements in Article 15 of the Regulation and highlighting how TVs customised the mechanism depending on the liquidity and volatility of the contracts offered for trading. Chart 7 below provides an overview of various implementation practices.

CHART 7
 IVM implementation at venue level



Design of the IVMs implemented

37. With respect to the design of the mechanism, Article 15(6) of the Regulation prescribes that TVs can implement the IVM either by integrating it within existing circuit breakers or as a standalone mechanism. In the information submitted to ESMA it shows that nine TVs implemented IVMs integrating them into existing CB and eight as a new standalone mechanism.
38. The TVs which implemented IVMs by integrating them in their existing circuit breakers, adjusted the latter reflecting the liquidity of contracts traded. Most TVs with frequent trading activity established longer data collection windows to calculate intra-day reference prices for IVM purposes in comparison to the ones used for the triggering of circuit breakers implemented under MiFID II. TVs with less frequent trading activities modified circuit breakers in place to allow for more frequent intraday updates of the reference price sourced from another TV.
39. Some TVs indicated that they took a more conservative approach when adapting their existing circuit breakers to the IVM requirements by reducing the boundaries for the allowed price deviation and/or by extending the halt period. Two TVs indicated that an

adaption was not required as they already had mechanism to deal with price volatility which they considered compliant with IVM requirements.

40. Additionally, TVs envisaged different consequences in case of IVMs being triggered with (i) ten TVs implementing IVMs as trading halts, hence triggering a halt in trading if the boundaries are breached and (ii) seven venues as price collars, hence rejecting orders outside the allowed percentage variation. Trading halts have been calibrated differently depending on the TVs, with a length of trading interruptions ranging from 15 seconds up to 5 minutes¹¹.

Calibration of reference price

41. Article 15(2) of the Regulation sets some requirements with respect to the choice of the reference price underpinning the functioning of the mechanism. The Regulation is prescriptive with respect to the first reference price to be used during the day, being the opening price, and the reference price to be used after the triggering of a halt being the price at which trading resumed. With respect to the choice of the intraday reference price, the Regulation refers to the “*last market price observed at regular intervals*”.
42. ESMA notes that there are divergent approaches among TVs in establishing intra-day reference prices, which appear motivated by the on-venue liquidity. Several TVs have designed IVMs using reference prices which correspond to traded prices observed on the respective venue or, lacking recent trades, orders in the trading venue order book. This approach has been adopted by most liquid RMs (EEX and ICE Endex), but also by other venues which report less frequent trading (see Table 2 for examples of trading activity on selected venues).
43. Considering TVs which use reference prices sourced on their venue, some differences can be noted in the frequency of reference price updates. In this respect, most liquid TVs tend to update the reference price more frequently to ensure the price is representative of the market conditions displayed in the order book. Less liquid TVs tend to undertake less frequent intraday updates of the price. Generally, such TVs would update the reference price two or three times a day, using regular intervals, as limited liquidity on the venue and the lack of trades do not allow more frequent updates.
44. Several TVs among the less liquid ones source the reference price externally, referring to the prices of trades occurring on most liquid markets which offer suitable proxy contracts for trading. ESMA understands that due to trades being very infrequent and

¹¹ Note that one very illiquid venue envisaged a halt up to 10 minutes.

sporadic on such TVs (as evidenced in section 3.1), the prices observed on venues might often be outdated and hence not representative of current market conditions.

45. With respect to the first reference price of the day it should also be noted that it appears that some TVs determine this price based on the previous day closing price or the price resulting from an opening auction, while others refer to prices from other markets. The latter is especially common for TVs with very limited liquidity.

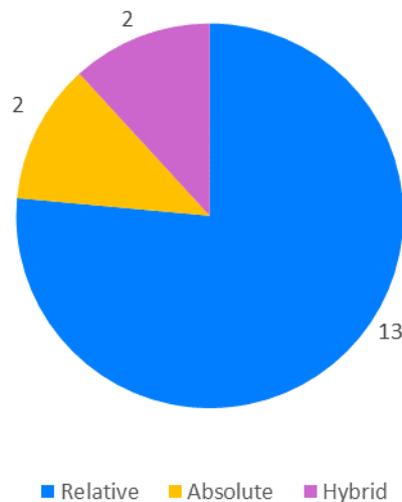
Calibration of boundaries

46. Article 15(3) of the Regulation prescribes that TVs should establish boundaries either in absolute form or as a percentage variation and that the calculation methodology for boundaries should be adjusted to the characteristics of each instrument. It appears that TVs rely on criteria as observed volatility and the liquidity profile of the instrument to set the boundaries range, analysing historical data for each contract encompassing both “normal” and “volatile” market conditions.
47. With respect to the re-calibration of boundaries, TVs explained that they plan to undertake periodic reviews of the set boundaries, and such reviews are planned at different intervals ranging from quarterly to semi-annually to annually. In this respect, TVs clarified that boundaries are monitored daily, and that it is possible to intervene and modify them in case of specific conditions materialising in the market, e.g. in cases of sudden surges of market volatility.
48. The large majority of the TVs (thirteen) set IVM’s boundaries as a percentage variation of the reference price (relative boundary, see Chart 8). Furthermore, the vast majority (eleven) have tailored the boundaries for each contract – often by maturity. The range of percentage variations established generally depends on the liquidity of each contract and its volatility, with tighter boundaries established for more liquid contracts with both gas and electricity as underlying (e.g. ranging from 5% to 15% depending on the specifics of the contract) and larger variation for less liquid ones.

CHART 8

Boundaries type by venue

Mostly expressed in relative values



49. Two TVs set boundaries in absolute values, while two others have implemented a hybrid model by setting either absolute or relative boundaries by contract and its maturity, or a combination of absolute and relative boundaries for each contract. Analogously to what was discussed earlier, also for absolute boundaries there is evidence of diverging ranges. Converting the ranges in relative terms (using the observed market price at the time of submission of the IVM information to ESMA) leads to variations ranging from 10% to 200% for gas derivative contracts and from 10% up to 120% for electricity derivative contracts.

End-of-day closing prices

50. Article 15(1) of the Regulation specifies that the implementation of IVMs should not prevent the formation of reliable end-of-day closing prices. EU TVs ensure the formation of end-of-day closing prices, either by foreseeing the possibility to use data from other markets or index providers in case there are no trades on the TV due to the triggering of IVMs, or by switching off the mechanism in a time window¹² close to the end of the trading day to ensure it is possible to execute trades in that time window.

¹² One very illiquid TV indicates that the mechanism is switched off 90 minutes before the end of the trading day.

Publication of main features of IVM

51. Article 15(5) of the Regulation additionally mandates TVIs to make public the features of the IVMs they put in place and inform the public in case of modifications. ESMA understands that only six TVIs decided to fully publish the technical details of the mechanisms, by disclosing both the value of the reference price and the values of the boundaries used. The other TVIs made public more general information regarding the implementation and functioning of IVMs on their website or on their rulebook, without disclosing the specific reference price or parameters set.
52. At the time of drafting this Report, IVMs had been triggered only on one venue. This can be explained by the features of the IVM implemented by that TVI, in particular the boundary levels. Additionally, the TVI decided to operate the IVMs with both absolute and relative value boundaries tailored for each derivative contract, which might give rise to more frequent triggering. However, as the IVM was specified in form of a collar it did not trigger a trading halt. According to the information provided by the trading venue most cases of triggering were due to erroneous orders breaching the relative threshold.

5. IVM – efficiency evaluation and comparison with existing circuit breakers

5.1 Efficiency evaluation

53. ESMA notes that EU TVIs implemented IVMs customizing the features of the mechanism to the specifics of each contract, taking mostly the liquidity and the historic volatility of the contract into account. Considerations related to the liquidity of each contract generally affect (i) the choice of the reference prices (internal or external), (ii) the interval at which the reference price is renewed intraday, and (iii) the magnitude of the boundaries used to build the “price corridor”.
54. As a general consideration it appears that the implementation of IVMs for illiquid venues with a sporadic trading activity poses practical challenges. It appears that TVIs trading highly illiquid contracts might naturally offer wide spreads and exhibit higher volatility in the price of trades executed, since the price forming trading activity takes place elsewhere.
55. With respect to the choice of the reference price, liquidity plays a key role as it appears that TVIs with sporadic trading activity could not establish meaningful reference prices

based on their own (order book) data. As highlighted earlier, the use of on-venue prices for illiquid contracts is likely to constrain the trading activity by blocking trades that would have been accepted if prices determined on more liquid TVs were to be considered.

56. Table 2 highlights that some TVs in scope of the IVM implementation display sporadic trading activity. Some of the TVs in question exhibit (on average) one trade per day whilst others do not (on average) display daily trades but rather trading activity at less frequent intervals. In such instances the prices observed based on previous transactions on the same venue are unlikely to capture the current market conditions for the relevant contracts due to the very sporadic trading activity. Hence, if highly illiquid TVs were to use reference prices sourced on their own books for the purpose of the IVM, this would likely result in rejecting orders which could be within the set price corridor if the reference price was appropriately calibrated to reflect current market conditions.
57. At the same time, it appears that some illiquid venues decided to use reference prices sourced from their order book due to constraints (and potential costs) in accessing data on real time prices from other venues.
58. With respect to the interval of intraday updates of the reference price, it appears that more liquid TVs proceed to more frequent updates of the reference price to ensure the price is representative of current market conditions by capturing recent on-venue trading activity. At the same time to avoid sudden price variations, disorderly patterns in trading and ensure orderly trading the most liquid venues have an incentive to set tighter boundaries.
59. On the contrary, less liquid TVs have an incentive to undertake fewer intraday updates of the reference price whilst setting boundaries of a larger magnitude. As discussed earlier those TVs either rely on order book prices with a limited number of intraday trades or source prices from other TVs, though with a lower frequency than the more liquid TVs. In this context the reference prices used are less reflective of current market conditions and larger boundaries allow sufficient margins of variation to accommodate the evolution of prices and trading activity which might have taken place on other venues.
60. With respect to the several illiquid TVs that have set very large boundaries, it can be argued that those boundaries would not prevent excessive intraday price movement, rendering the implemented IVM less effective. Nevertheless, ESMA notes that without deploying such large boundaries the trading activity on those, already very illiquid, TVs might be further constrained. It can hence be considered that the use of very large

boundaries is an indication that the IVM might not be a suitable mechanism for very illiquid TVs.

61. Regarding the chosen level of the boundaries, ESMA considers that these are generally adequately calibrated at venue level considering the specifics of each contract. As the IVM has the only aim of preventing excessive price movements, it would not be feasible to set the boundaries in a very narrow manner as this could unduly limit the price discovery process, and ultimately distort the reliability of market prices.
62. Concerning the efficiency of IVMs, it should be noted that the introduction of IVMs was motivated by the desire to prevent excessive intra-day price movements for energy-related commodity derivatives in light of the events in August 2022. Following the high volatility episode in 2022, ESMA notes that since January 2023 there has been no evidence of protracted volatility episodes affecting energy commodity derivatives trading. Hence, at this stage ESMA has a limited basis to provide an assessment of the effectiveness of the IVM, neither on potential positive nor negative effects.
63. From the data gathered, only one TV reported incidences of triggering of the mechanism, and this appears related to the parameters and design chosen by the TV. The TV further specified that the triggering was not related to excessive price movements but rather to erroneous orders. The same TV indicated that they noticed a limited added value of the mechanism in terms of curbing volatility.
64. In this respect ESMA notes that the prevention of erroneous orders was not envisaged as the primary purpose of IVMs since the mechanism was introduced to curb more fundamental volatility rather than flash crash type of events (e.g. due to human error). Furthermore, it should be remarked that MiFID II requires TVs to have mechanisms in place (e.g. pre-trade controls established in the form of price collars) to deal with such type of erroneous trading activity.

5.2 Comparison between IVMs and existing circuit breakers

65. MiFID II requires TVs to have in place circuit breakers, independently from the type of asset classes offered for trading, which constitute, as per Article 48(5) of MiFID II, a mechanism “to temporarily halt or constrain trading if there is a significant price movement in a financial instrument on that market or a related market during a short period (...)”.

66. With respect to circuit breakers ESMA developed Guidelines on the calibration of circuit breakers and publication of trading halts under MiFID II¹³. The Guidelines clarified that TVs are required to have in place both circuit breakers calibrated on the basis of a 'static reference price' (i.e. static circuit breakers) and circuit breakers calibrated on the basis of a 'dynamic reference price' (i.e. dynamic circuit breakers). The aim of having both type of mechanisms in place with appropriately calibrated thresholds is to avoid price changes which are too large compared to a static threshold (e.g. the previous day closing price or the same day opening price) and to additionally avoid large variation between subsequent trades occurring on the market.
67. ESMA notes that the design of IVMs as currently designed by most TVs largely mirrors the design of dynamic circuit breakers. This is also documented by the fact that many TVs implemented the IVMs in their existing circuit breakers by slightly recalibrating those to ensure tailored boundaries and an appropriate frequency of updates of the reference price.
68. In this sense ESMA sees the merits of the Regulation in ensuring that TVs offering trading in energy commodity derivatives focussed on the implementation and calibration of such mechanisms. At the same time ESMA notes that the current implementation of IVMs and their comparability with dynamic circuit breakers suggests that this mechanism might not be necessary as an additional safeguard. In fact, the objectives of the IVM could be achieved under the existing MiFID II circuit breakers.
69. Moreover, ESMA is working on further clarification on the MiFID II circuit breaker requirements to ensure that (i) both static and dynamic circuit breakers are in place, (ii) the mechanisms are updated and recalibrated at regular intervals and that (iii) information on the functioning of the mechanisms is made public. ESMA intends to provide this guidance in the second half of 2023.
70. The guidance on circuit breakers will allow to complement the expectations on the implementation of circuit breakers under the well-established MiFID II regime with the lessons learnt from the implementation of IVMs. This would ensure an integrated and streamlined approach to manage volatility based on the circuit breakers established under MiFID II, and hence not require an extension of the IVM requirements.
71. As a more general consideration, it should be noted that any mechanism aimed at curbing volatility (in the form of appropriately calibrated IVMs or circuit breakers) could play a role in limiting dramatic price fluctuations and smoothen price patters in highly volatile markets. Nevertheless, it is unlikely that circuit breakers, or IVMs, could

¹³ https://www.esma.europa.eu/sites/default/files/library/esma70-872942901-63_mifid_ii_guidelines_on_trading_halts.pdf

completely prevent episodes of very high volatility as experienced in 2022 on energy commodity derivative markets. Those episodes appear largely motivated by a fundamental mismatch between the supply and demand of specific commodities for which there was scarce availability and there were risks of future shortages. This mismatch led to a sharp increase in the price of the related derivatives.

72. Furthermore, it should be stressed that it is important that the mechanisms aimed at managing volatility are appropriately calibrated and reviewed on the basis of evolving market conditions as such mechanisms could have detrimental effects to the price discovery process and hamper price reliability. Hence, it is key that the implementation of such mechanisms considers the specifics of each market.

6. Conclusions

73. As requested in Article 17 of the Regulation, ESMA presented and assessed in this report the implementation and the efficiency of the IVM. The analysis conducted identified differences in the approaches taken by TVs in the implementation and calibration of IVMs but also highlighted that those differences have been highly influenced by the characteristics of each TV, and notably their liquidity.
74. Illiquid TVs faced difficulties, in particular, for establishing meaningful reference prices and setting appropriate trading boundaries. The submissions received showed that several TVs among the less liquid ones sourced the reference price externally, referring to the prices of trades occurring on most liquid markets where relevant proxy contracts are traded. ESMA understands that as trades are being very infrequent on such TVs, the prices observed on their systems may often be outdated and hence not representative of current market conditions. Should the reference price not be sourced from proxy liquid contracts, those illiquid TVs might have to implement the IVM using excessively large boundaries to not restrain trading activity.
75. The report also identified the role of TV liquidity in the frequency of reference price updates and magnitudes of price boundaries noting that, in contrast to the most liquid TV, less liquid ones update the reference price less frequently and implement higher price boundaries. In a few instances, very high boundaries were implemented by illiquid TVs, which tend to make the IVM less meaningful. It can therefore be questioned whether the IVM delivers on its objectives for those less liquid venues and, more generally, whether the IVM should cover illiquid TVs for which the costs of implementing the IVM appear to outweigh its benefits, or be limited to liquid TVs where price formation occurs. ESMA suggests considering proportionality in the implementation of such mechanisms.

76. ESMA also notes that the majority of TVs integrated IVMs into existing circuit breakers, leading to the conclusion that TVs had generally already in place tools aimed at dealing with episodes of price volatility as prescribed by MiFID II.
77. ESMA believes that the introduction of IVMs might have had a positive impact by requiring TVs to review and, where necessary, slightly recalibrate existing circuit breakers. However, ESMA notes that as per MiFID II and the ESMA Guidelines on the calibration of circuit breakers and publication of trading halts, TVs are already required to have mechanisms in place, which should be regularly reviewed. In addition, trading venues are also required to have in place pre-trade controls aiming at rejecting erroneous orders, which also contribute to avoiding extreme price swings.
78. Generally, ESMA considers that circuit breakers, if implemented both as static and dynamic ones, are appropriate and suitable tools for dealing with intra-day price volatility. In this sense ESMA believes that ensuring the appropriate implementation and application of circuit breakers under MiFID II, integrating the lessons learnt from the IVM, would be preferable to having parallel requirements on circuit breakers and IVMs in different legislative frameworks.
79. At the same time, ESMA reiterates that it should not be the objective of IVMs or circuit breakers to make episodes of protracted volatility, resulting from market participants' uncertainty regarding fundamentals, disappear. Both mechanisms can help reduce volatility in prices by triggering halts to temporarily stop trading thereby giving market participants time to reflect on their assessment of fundamentals, or by rejecting orders which would lead to sharp price changes. However, none of those mechanisms is designed to prevent or stop disorderly trading in consequence of very volatile prices. In order to achieve the latter, it would be necessary to suspend trading, which is something that both trading venues and competent authorities can do/request today under Articles 52 and 69(2) of MiFID II.
80. As part of its mandate, ESMA will continue monitoring developments in the trading of EU energy commodity derivatives and stands ready to provide further technical advice upon request.

7. Annex

ESMA mandate

Article 17(2) of Regulation (EU) 2022/2576 enhancing solidarity through better coordination of gas purchases, reliable price benchmarks and exchanges of gas across borders.

“ESMA shall document any divergences in the implementation of the intra-day volatility management mechanisms across jurisdictions in the Union based on the reports from competent authorities. By 30 June 2023, ESMA shall submit a report to the Commission evaluating the efficiency of the intra-day volatility management mechanisms. On the basis of that report, the Commission shall consider whether to submit a proposal for the amendment of this Regulation to the Council.”