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OTC Commodity Derivatives Trade Processing Lifecycle Events

An ISDA Whitepaper

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This whitepaper provides a summary of key trade processing lifecycle events in the over-the-counter (OTC) commodity derivatives markets, with an overview of the current state of processing, related issues and opportunities for further improvement. Additionally, the paper analyzes existing and potential opportunities for further standardization in these markets.

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SECTION I: OTC COMMODITY DERIVATIVES MARKET OVERVIEW

1. Introduction

In March 2011, the International Swaps and Derivatives Association (ISDA) Commodities Steering Committee (COSC) and Commodities Major Dealers Implementation Group (CMD) made a commitment to global supervisors¹ to continue to drive a high level of product, processing and legal standardization, with a goal of securing further operational efficiency, mitigating operational risk and increasing the netting and clearing potential for appropriate products.² This whitepaper (the Paper) analyzes existing and, where appropriate, potential opportunities for further standardization in the over-the-counter (OTC) commodity derivatives market. Additionally, the Paper includes a summary of key commodities' trade processing lifecycle events, aligned, where appropriate, with established industry programs concerning metrics, documentation and electronic processing.

Listed trades and cleared OTC trades have been specifically excluded from the scope of this Paper due to the high degree of automation inherent in the processing of such trade types.

2. Current level of standardization in the commodity derivatives markets

OTC commodity derivatives have been in existence for centuries, far longer than some of the other OTC derivatives asset classes. The vast majority of commodity derivatives products have become standardized over time and, since the 1990s, additional standardization has occurred with a specific focus on electronic confirmation, lifecycle event processing and clearing.

OTC commodity derivatives are a highly standardized asset class with the majority of its turnover occurring on regulated exchanges globally. The ISDA Commodities Steering Committee conducted a 2010 survey of members to ascertain the volume of financial oil business that is conducted on exchange or cleared OTC. The essential conclusion from this survey was that the significant majority of business is conducted through exchange or is cleared,³ meaning that the data is readily accessible in support of post-trade transparency. There is a proportion of business that is more structured in nature which will be client driven, with the payouts, contract terms and collateral arrangements designed to meet the risk management needs and requirements of the particular target end-user client base.

Within the OTC commodity derivatives market there is already a high degree of standardization. The OTC commodity derivatives market features:

- Well-understood product mechanics
- Robust, proven legal framework

¹ See the March 2011 Supervisory Commitment Letter available via http://www2.isda.org/attachment/MjkwMw==/Supervisory_Commitment_Letter-31_March_2011_FINAL.pdf.

² Recognizing that standardization is only one of a number of criteria for clearing eligibility.

³ According to the survey, approximately 55% of OTC financial oil for all counterparties is conducted via exchange, 19% is cleared and the remaining 26% is OTC.

- Standardized documentation⁴
- Electronic trade affirmation / legal confirmation
- Extensive electronic execution capabilities
- Active clearing across a variety of central clearing counterparties (CCPs)
- High and improving rates of straight-through-processing (STP)
- Robust bilateral settlement

The OTC commodity derivatives market benefits from a diversity of market participants ranging from commercial producers to local energy distribution companies to banks.⁵ Many individual asset classes are covered within the broader commodities umbrella. The OTC commodity derivatives market is comprised of several different market segments including the trading of agriculture, base metals, coal, commodity index products, crude oil, emissions, freight, gas, oil products, plastics products, power, precious metals and weather.⁶ Therefore, the concentration of market risk is diversified and not in any one particular product. A large amount of commercial information in relation to OTC commodity derivatives transactions is already publicly available from commercial service providers.⁷

2.1 Definitions

Almost all OTC commodity derivative trades are executed under standard legal terms. Typically, they are contained in the ISDA Master Agreement between the parties, although in a limited number of cases they are contained in the national equivalent such as Rahmenvertrag in Germany, AFB in France (or in another master agreement between the parties). At the trade level, the standard trade incorporates the ISDA definitions, supplements, protocols and other documentation as set forth for that particular product in the ISDA Commodities Documentation Matrix, all of which have been developed over the past decade. This development has included incremental modification and standardization over time in order to make trades on the same underlying, to the same maturity date fungible in order to facilitate compression and clearing, where appropriate. For trades confirmed electronically, these standard provisions are typically incorporated via the rules and procedures governing use of the platform. For trades confirmed on paper, these standard provisions are usually incorporated via the relevant standard documentation forms. It is important to note that standardized agreements still require bilateral agreement for novations.

2.2 Contracts

Across the OTC commodity derivatives market, the vast majority of all contracts are confirmed electronically via confirmation matching platforms. To date, more than 85% of eligible inter-CMD metals trades and 90% of energy trades are confirmed electronically. There is no material backlog of unexecuted confirmations.⁸ The small subset of transactions that are not confirmed electronically are confirmed via paper. The monthly metrics provided by the CMD also include data on G15 to non-G15 electronic matching. The metrics indicate that the average percentage of

⁴ The ISDA Commodities Documentation Matrix summarizes various types of OTC commodity derivatives documentation and their current state. The Documentation Matrix is also available on the ISDA website via the following link: <http://www2.isda.org/functional-areas/market-infrastructure/commodity-derivatives>.

⁵ The G15 comprise approximately 24% of the OTC commodity derivatives market, according to the Q4 2011 metrics reporting.

⁶ See ISDA Commodities Documentation Matrix: <http://www2.isda.org/functional-areas/market-infrastructure/commodity-derivatives>.

⁷ See service providers list on page 17.

⁸ The level of outstanding confirmations continues to fall, with the business days outstanding Q4 2011 average at 0.059, down from 0.106 for Q3 2010. Source: Markit Metrics.

total volume that is electronically eligible has increased for G15 to non-G15 transactions from 70% in March 2009, trending at around 90% across all quarters in 2010 and into 2011, and has shown a steady 95% average for the G15-to-G15 transactions.⁹

The confirmation matching process is accomplished by the bilateral electronic submission or affirmation of confirmable transaction details by each party to the trade. Any unmatched trades (or unmatched fields of linked trades) are investigated and resolved by the parties to the trade. The electronic confirmation platforms provide both detail and summary analysis of the current status of all transactions within their respective platforms for efficient risk management of the confirmation process. Market participants have well-established processes for escalation and resolution of trade breaks.

2.3 Market Practices

Standardized Terms:

OTC commodity derivatives transactions are effectively standardized through product templates and market practice standards for the majority of non-economic fields. The industry framework enables end users to customize transactions to meet their specific requirements without having to forego the benefits that a standardized infrastructure delivers.

2.4 Lifecycle Events

Confirmable Events:

- New trades
- Amendments
- Partial unwinds
- Notional increases/decreases (relative to commodity index transactions)
- Novations/partial novations

As outlined above, electronically eligible activity on trades is typically confirmed via electronic confirmation mechanisms or bi-lateral agreement to modify master agreements and supporting annexes. This item will be further discussed later in this Paper.

2.5 Other Standardization Features

STP: The OTC commodity derivatives market has developed a very high level of straight-through-processing (STP). From the use of electronic trade booking to central clearing counterparty (CCP) processing, the industry continues to leverage the established infrastructure to drive further efficiency in trade processing and a reduction in operational risk.¹⁰

CCPs: central clearing has been in place for a number of years across a variety of products. See below for further information.

Collateral: For non-cleared transactions, there is widespread use of bilateral collateral arrangements (via the ISDA Credit Support Annex (CSA), and approximately 60% of all

⁹ Source: Markit Metrics

¹⁰ See ISDA 2011 Operations Benchmarking Survey; available via <http://www2.isda.org/functional-areas/research/surveys/operations-benchmarking-surveys>.

commodity derivatives trades are subject to such arrangements.¹¹ Additionally, the dealers in the CMD are meeting the daily reconciliation requirements for portfolios greater than 500 trades,¹² in line with the ISDA Collateral Steering Committee commitments. There has been significant progress with regard to agreement for standardization of fields needed to improve portfolio reconciliation matching rates, as well as setting the groundwork for the commodities trade repository.

3. Execution

OTC commodity products are traded across both exchange and OTC venues, providing adequate pre-trade transparency to market participants. A significant percentage of the commodity futures, options and forwards are executed on exchanges and settled via central counterparties. In terms of pre-trade execution venues, there are voice execution venues, electronic trading venues and exchanges available. Hence, exchanges, brokers, MTFs and clearing houses¹³ provide data that is already sufficient to their participants on the most pricing-relevant transactions.

4. Confirmation

As highlighted above, the combination of the established documentation and electronic affirmation/confirmation rates means that there is a highly standardized and efficient legal framework in place. Market participants and supervisors continue to work with the confirmation platform providers to expand the population of transactions covered by electronic confirmation.

Continued industry efforts, in conjunction with continued documentation take-up,¹⁴ will move more types of products onto electronic confirmation platforms and will further mitigate risks and increase automation in this process. For cleared transactions, the prime record of the transaction is automatically processed and maintained within the respective CCP.

5. Settlement

Current levels of nostro breaks outstanding on bilateral trades are extremely low, evidencing the effectiveness of existing settlement mechanisms.¹⁵ These are typically managed via in-house automated derivatives processing systems and via standardized messaging to correspondent banks, with any settlement netting pre-agreed on a bilateral basis.

Additionally, all cleared transactions have settlement automatically executed via the respective clearing process.

¹¹ According to the ISDA 2011 Margin Survey; available via <http://www2.isda.org/functional-areas/research/surveys/margin-surveys>.

¹² Achieving matching rates greater than 97%.

¹³ See 'Execution and Clearing' appendix for further information in relation to a sample list of various service providers that offer these types of services.

¹⁴ See ISDA Documentation Matrix via <http://www.isda.org/publications/isdacommderivdefsup.aspx>.

¹⁵ See ISDA 2011 Operations Benchmarking Survey; available via <http://www2.isda.org/functional-areas/research/surveys/operations-benchmarking-surveys>.

6. Clearing – CCPs

The OTC commodity derivatives market has a significant number of central counterparty and clearing infrastructures in place today. Examples include:

– Agriculture	CME Clearing / ICEClear US
– Base Metals	LCH / CME ClearPort
– Coal	CME ClearPort
– Crude Oil	ICEClear / CME ClearPort/ NGX
– Emissions	ICEClear / NOS Clearing / ECC / CME GreenEx
– Freight	NOS Clearing / LCH
– Gas	European Commodities Clearing (ECC) / ICEClear / CME ClearPort / APX / NGX
– Oil Products	ICEClear / CME ClearPort
– Plastics Products	LCH
– Power	European Commodities Clearing (ECC) / APX / ICEClear / CME ClearPort / NGX
– Precious Metals	LCH / CME ClearPort
– Weather	CME ClearPort

- A significant percentage of the commodity futures, options and forwards are executed on exchanges and settled via central counterparties.
- Several of the institutions named above provide for central counterparties for non-exchange-traded transactions.
- Based on Q4 2011 metrics provided by the CMD, ~30% of the CMD OTC commodity derivatives are settled via central counterparties (~50% for Energy)); YTD 2011 metrics¹⁶ evidence an uptick in energy cleared OTC in line with increased overall reported volumes.

7. Transparency

The OTC commodity derivatives market is relatively transparent (pre and post-trade), with a significant proportion of transactions centrally cleared, electronically confirmed and bilaterally collateralized.¹⁷ The market is a heterogeneous market, although there are some market niches with great standardization. Market participants are varied and financial investors coexist with non-financial investors, whose main purpose is to hedge risk. Additionally, there are several different market segments that allow for diversification of product risk.

The OTC commodity derivatives market already provides central clearing for swaps that are suitable to be centrally cleared. Based on monthly metrics provided by the CMD, over 35% of

¹⁶ Note: Volume reported to the supervisory community includes OTC financial, physical and cleared OTC products transactions with G15 and non-G15 counterparties and clients. Listed derivatives volume is reported separately (at present) to the CFTC and other supervisors.

¹⁷ See http://www.meti.go.jp/english/press/data/20101109_02.html, which includes output from the ISDA COSC process and partnership with FRB-NY and the co-chairs of the IOSCO Commodities Futures Task Force (UK FSA and CFTC). Also see http://isda.org/c_and_a/pdf/CMD-CommoditiesSupervisoryLetter.pdf.

their OTC commodity derivatives are settled via central counterparties (over 45% for Energy). Other market-led initiatives include monthly reporting on a number of key performance indicators, a 61% decrease in the gross number of outstanding confirmations since September 2008 and an increase in the average percentage of total volume that is electronically eligible from 52% (Dec 07) to a high of 70% (March 09).¹⁸

7.1 Pre-Trade Transparency

There is excellent pre-trade transparency, via a variety of platforms, to a wide array of end-users. The sources of pre-trade information that the OTC commodity derivatives markets utilize include brokers, price reporting agencies, electronic trading platforms and bilateral price discovery methodologies. The sources of post-trade information utilized within the OTC commodity derivatives markets include electronic trading platforms, electronic confirmation services, and clearing venues.

Pre-trade transparency is available via a variety of mechanisms including exchanges, brokerages, electronic trading platforms and bilateral arrangements. Pre-trade information in relation to exchange prices can be accessed on reasonable commercial terms. The information is consolidated via exchanges, electronic trading platforms and major dealer pricing information. There is already a highly developed exchange-traded market with high levels of consolidated pre-trade transparency. At present, there does not seem to be demand for additional pre-trade transparency for non-standardized OTC deals.

The vast majority of OTC transactions in commodity derivatives markets are priced with reference to readily observable market prices (either a benchmark futures contract or physical underlying).. Potential drawbacks include exposing firms' proprietary positions that could impact trade size and frequency. Also, there are potential risks to liquidity and the willingness of market participants to commit liquidity. There are no clear benefits on what would accrue as a result of increased pre-trade transparency, particularly in respect of non-standardized bilateral OTC contracts, as the pricing of each deal is different and takes into account a wide range of factors specific to that deal (i.e, creditworthiness of counterparty, physical market conditions, etc.). In a market where market participants are hedging against specific risks, pre-trade transparency would do little good and significant harm (exposing commercially sensitive risk positions to other market participants). Ill-conceived pre- and post-trade transparency requirements for commodity derivatives risk negatively impacting liquidity and exacerbating volatility in the market.¹⁹

7.2 Post-Trade Transparency

Post-trade transparency is available to global supervisors, who receive reports on a regular basis. Commodity derivative volume reported to the supervisory community includes OTC financial, physical and cleared OTC products transactions with CMD and non-CMD counterparties and clients. Listed derivatives volume is reported separately (at present) to the CFTC and other supervisors. Post-trade transparency is available to the broader marketplace via commercial venues and processes that provide various types of information, examples below.

¹⁸ Source: Markit Metrics

¹⁹ Additionally, CESR and ERGEG, in their advice to the European Commission "came to the conclusion that there is no need to take action in relation to purely bilateral trading which often is so bespoke that transparency information would not add materially to the price discovery process".

- **CCPs:** Clearinghouses provide end of day prices for contracts that are eligible to be cleared. The clearinghouse end-of-day process typically requires executable pricing from all participating members.
- **Valuation Reports:** Another important source of post-trade transparency to clients can be found in the valuation reports that are provided to clients by dealers, which typically include a position level mark-to-market valuation on the positions that the client has facing the dealer.
- **Industry Metrics:** There are extensive metrics across a variety of indicators provided to primary regulators on a monthly basis providing strong transparency regarding the performance of the industry in the areas identified as important by regulators.

8. Future Standardization Initiatives

8.1 Electronic Affirmation/Confirmation/STP

The markets continue to strive for further operational standardization. There is a strong industry focus on the industry utilities keeping up with developing volumes in the marketplace. This is tracked and managed via an established and mature reporting process that confirms the level of penetration of electronic versus paper confirmation.

8.2 Trade Repository

In June 2011, the COSC selected DTCC/EFETnet to partner with them in building the commodities trade repository. The industry has met its commitment to establish a central trade reporting repository to deliver a first phase by Q1 2012.²⁰ There are concerns in relation to the likely proliferation of global, regional and local/country-specific trade repositories. The industry view is that a single global trade repository per asset class would provide Supervisors and market participants with valuable efficiencies.²¹ In particular, there would be no redundancy of platforms, no need for additional levels of data aggregation and reduced risk of errors and greater transparency. A single trade repository per asset class would avoid the risk of errors associated with transmitting, aggregating and analyzing multiple sources of potentially incompatible and duplicative trade data. A single global trade repository would also reduce the risk of reporting to multiple repositories in different jurisdictions.

²⁰ See 2011 March Supervisory Commitment Letter and ISDA Commodities Trade Repository RFP, available via www.isda.org.

²¹ See http://www2.isda.org/attachment/MzIwMg==/SwapData_Recordkeeping_and_ReportingRequirements_Pre-Enactment_and_TransitionSwaps.pdf.

SECTION II: SUMMARY OF COMMODITY MARKETS' TRADE PROCESSING LIFECYCLE EVENTS

The following bilateral OTC trade processing lifecycle events are considered in this Paper:

1. Trade Capture and Revisions	initial trade capture, trade capture revisions
2. Controls Processing	broker recap, counterparty affirmation, confirmation
3. Settlement	pre-settlement activity, post-settlement activity
4. Option Exercise	financially-settled options, physically-settled options
5. Collateral Margining	
6. Close-Out	terminations, trade compressions, assignments/novations
7. Natural Maturity	

1. Trade Capture and Revisions

(a) Initial Trade Capture

Once a transaction has been executed, both of the parties to the trade must enter the full terms of the transaction into their respective trade capture systems. The Trade Capture System, either independently or through a technological interface, should provide robust, accurate, reliable, real-time information related to credit risk, market risk and position exposure management, as well as provide trade support functionality to enable processes such as position verification, broker recaps, counterparty affirmations, confirmations, settlements, collateral margining, and financial control.

(b) Trade Capture Revisions

Trade capture revisions can be categorized as either economic or non-economic.

Economic trade capture revisions can arise from any post-trade capture control processes, including during the risk management and position verification processes, or the broker recaps, counterparty affirmation and confirmation or settlements processes. The need for these revisions may occur on or after trade date (T) according to the timeframe of the process that highlights such need. Regardless of the source of identification of the need for the revision, modifications to any existing transaction details recorded should always be done at the trade capture level, and not within the downstream processing environment. economic trade capture revisions will typically have an impact on downstream processing, such as the need for a revised confirmation or a revised invoice being raised.

Non-economic trade capture revisions can also arise from post-trade capture. Examples include an incorrectly identified broker, or a re-modeling of a transaction for internal purposes, where such re-modeling maintains the original economic intent of the transaction without altering the terms of the trade as agreed between the two parties. With the exception of electronic broker matching, Non-economic trade capture revisions will typically have minimal impact on downstream processing.

2. Controls Processing

(a) Broker Recap

For trades executed via a broker, the broker recap process typically occurs on T or T+1 for standardized vanilla trade types (but may take place on a longer time frame for the more structured trade types). Traditionally, the broker will send a written recap of the economic details of the trade to both parties involved in the transaction by either facsimile or email. However, there is now some take-up of both the ability of parties to download their own broker recaps from a web portal, and also, increasingly, the available use of electronic broker matching. This independent third-party verification of trade details is used by each of the two contracting parties to validate the accuracy of their trade capture in order to gain confidence that the economic details of the trade are correctly understood and reflected in the official records of the parties concerned. This process often serves as the earliest point of risk mitigation in correctly securing the economic details of the trade.

(b) Counterparty Affirmation

Counterparty affirmation also typically occurs on T or T+1. According to a party's internal organization and processes, the counterparty affirmation process may be done (i) only for transactions that are traded direct (i.e., non brokered transactions) and which are not confirmed with the counterparty by means of electronic matching, or (ii) for non-brokered transactions irrespective of the method used for the counterparty confirmation, or (iii) brokered and non-brokered trades which are not confirmed with the Counterparty by means of electronic matching, or (iv) all trades. The process is performed between the two parties to the transaction via telephone or through the delivery of a trade summary by email. It should be noted that some parties choose not to participate in the verbal affirmation process because their internal structural organization of resources' responsibilities does not support this lifecycle event.

(c) Confirmation

Confirmation is the process by which, either through electronic messaging or through the use of paper confirmations, the parties legally memorialize the terms of the trade. Confirmation is typically performed on T, or as soon as practical thereafter. Confirmation execution is the process by which the two parties confirm their agreement to the full terms of the trade as set out in the confirmation.

The parties may confirm a transaction by matching electronically on a bilateral basis, or on a third-party vendor matching platform.

Paper confirmations may be created manually, systemically with some user interaction, or systemically with full STP. According to the terms of any prevailing Master Agreement and/or the governing law, confirmations may be legally binding by (i) one party signing and returning the other party's confirmation, (ii) an exchange of confirmations between the parties, (iii) one party affirming their agreement to the terms of the confirmation by some means but without actually signing the confirmation, or (iv) one party implying their acceptance of the other party's confirmation by virtue of not having disputed it within a given specified timeframe.

Paper confirmations that are not executed/agreed by both parties may be an indication of disagreement on the terms of the trade, and in such case a verbal counterparty affirmation of the core economic trade details should occur between the parties pending the resolution of the any legal, credit, or other provision(s) that remain in discussion.

For a more detailed discussion of the controls processing lifecycle events, CMD members should refer, and adhere, to the Best Practice Guidelines as issued by the CMD, where applicable. Parties not included in the CMD are referred to the Best Practice Guidelines on Electronic Confirmation Matching for Commodities Products (which is based on the CMD Guidelines) as issued by the ISDA Commodity Operations Working Group, and published on the ISDA website (a copy of the current version is appended hereto as Annex A).

3. Settlements

(a) Pre-Settlement Activity

Settlement prices for transactions can be obtained either electronically or manually, but in any event should be done on a timely basis, at the latest the opening of business on the day following the day, or last day, of pricing in question.

When obtained electronically, the relevant prices are taken from the price source through a technological interface, most commonly by way of a Logical Information Machine (LIM) feed or a data scrape of a particular website.

When obtained manually, operations personnel will consult the appropriate price source based on the relevant pricing convention for the particular trade type and commodity product to be settled and manually input the relevant price(s). Best practices dictate that settlement prices that are input by one person (Maker) should be verified by a separate person (Checker).

Irrespective of whether the prices are taken by automated or manual means, they must be input into a system or format that will ultimately be used for the purposes of trade valuation, collateral margining and invoicing.

Once prices are updated and available for invoicing purposes, invoices are issued, reconciliation occurs between the parties, and any discrepancies between the payment amounts calculated by each of the parties are investigated and resolved. Payment affirmation is then exchanged between the parties either in the form of affirmation of settlement amounts or an exchange of invoices, and cash movements are effected for the correct value date.

(b) Post-Settlement Activity

Once cash movements are effected, operations personnel will conduct a nostro reconciliation of ledger entries against cash movement. Discrepancies between cash and ledger entries are typically the result of failure to pay, underpayment or overpayment of agreed amounts, inadvertent payment to a different legal entity, or withholding of wire transfer fees. Operations personnel will investigate the discrepancies and resolve the matter via their individual organization's escalation controls, procedures and processes, but always with the goal of obtaining complete and accurate recording of cash movements (or exceptions) to the general ledger.

(c) Nuances to Settlements Activity in Commodities

Bilateral Settlements consist of the settlement of (i) financial transactions and (ii) physical transactions for which delivery either occurs or is "booked out" by another physical transaction with similar characteristics.

Settlement frequency varies according to trade type and commodity product. For example:

- Financial transactions are typically settled a specific number of days after the final pricing date of the relevant pricing period, depending on the market convention for the underlying commodity product. For transactions involving calendar monthly pricing periods, this often results in a high volume of settlements on a few specific days during the early part of the following month. For financial transactions with pricing periods that comprise a single day, settlements will occur throughout the month, on the specified day after the pricing period. Option premiums are typically settled a specific number of days after the trade date, although they can also be netted with the final settlement.
- Precious metals and base metals settlement takes place on the day of delivery of the commodity.
- Transactions where physical delivery of electricity or gas occurs possess product-specific settlement conventions, where the delayed settlement provides for reconciliation of physical deliveries and book-out of transactions between counterparties at delivery points on natural gas pipelines and within electricity ISOs and RTOs, or at other regional scheduling locations on the grid. For example:
 - North American Physical Power and European and UK Physical Natural Gas transactions settle on a monthly cycle 20 days after the end of the delivery month;
 - UK Physical Power transactions settle on a monthly cycle 10 days after the end of the delivery month; and
 - North American Physical Gas transactions settle 25 days after the end of the delivery month.
- Bilateral physical power settlements consists of the purchase and sale of electricity as it moves across one or a series of power grids from point A to point B. Often times there are “cuts” along the way as power that has been contracted is not actually delivered. Investigating these curtailments in the power flow of buyers and sellers comprises a significant portion of the settlement effort. However, each movement along the grid(s) is tracked via a “tag” that aids in the investigation of the discrepancy. Power transacted with an Independent System Operator (ISO) must be settled according to the ISO’s invoice and timeline. Disputes may only be raised via the ISO’s dispute resolution service. ISOs also remain risk neutral; for each settlement cycle they require that all receivable payments are made before their payables are made, and if a participant fails to make a scheduled payment, the ISO remits payment, resulting in a pro-rata shortfall to the paying participants.
- Physical natural gas settlement is the settlement of the purchase, sales, storage, or transportation of natural gas either between parties or via a natural gas pipeline. Since physical natural gas being delivered from point A to point B may involve various parties and/or pipelines, imbalances may occur as the result of imbalances along the path. Volume actualization between the parties in the “daisy chain” comprises a significant portion of the settlement effort. The resolution process is manual and paper intensive, and takes place using data obtained from each individual pipeline’s Electronic Bulletin Board (EBB). CMD members should adhere to any Best Practice Guidelines as issued by the CMD, where applicable.

- As a result of the physical power curtailments and physical natural gas imbalances mentioned above, it is not atypical for portions of these invoices to have incomplete reconciliation for several months (or longer) after the initial settlement cycle.
- Physical oil settlements vary in frequency and process by the type of product and transportation mode on the transaction and are governed by the individual purchase/sale contract. For waterborne transactions (barges and vessels of varying sizes), payment terms generally range from prepayment based on an estimated volume or estimated price, to monthly settlements in the month following delivery. For pipeline transactions, a similar range can be seen, but with the majority of the US refined product pipeline business transacted under two-day payment terms after movement and receipt of the invoice and backing documentation from the pipeline company. Although some of the liquidly traded physical oil transactions are booked out against a chain of other counterparty trades or bilaterally with a single opposing trade with the same counterparty, most oil trades go to physical delivery and settlement. These transactions, like the power and gas transactions described above, have to be “actualized” with actual volumes, dates, and product quality measurements based on what actually occurred. Thus two settlements are often required: a Provisional settlement for the estimated quantity and quality, and a Final settlement to true up to the actual amount due.

In addition, some parties participate in payment netting in those instances where different commodity products settle on the same payment date and in the same currency.

(d) Current Settlement Process

(i) Over-the-Counter (OTC) Trades

The OTC commodity derivatives settlement process is a date-driven process. Certain key dates each month correspond to the settlement of different products. In many cases, specific products are settled only once a month. For example:

- Many financial commodities (such as gas, crude and refined products) settle five business days after completion of pricing; and
- US financial power settles on the 10th business day of the month.
- Physical commodities also have different settlement conventions based on the product and region. For example:
 - North America physical power settles on the 20th calendar day of the month following flow month;
 - North America physical gas settles on the 25th calendar day of the month following flow month;
 - European physical natural gas settles on the 20th calendar day of the month following flow month; and
 - Spot precious metals trade for spot value, which is two business days after the trade date.

The longer settlement times on physical energy products is reflective of the greater amount of reconciliation required in the event of a discrepancy due to the dependence upon transportation statements. Power prices are published on an hourly basis or, in some cases, every 15 minutes, which results in a large number of resets which need to be reconciled when

a discrepancy arises. In the event that agreement is not reached by parties by the settlement date, the undisputed amount is often paid.

The settlement calculation for physical transactions is volume multiplied by price. Prices are either agreed upon at the time of the transaction (“fixed”) or settled against a published index (“floating”; ex. Platts Gas Daily). Some products require a provisional invoice since the quantity, the price or even both may not be known at the time at which a provisional payment is required. Final settlement is then performed to true-up to actuals. It is not uncommon when physical commodities are settled to see an “actualization”, where the contractual quantity is updated to reflect the actual quantity delivered. In addition, physical power and gas add a level of complexity as volumetric “cuts” need to be reconciled. Cut resolution can take months as all upstream and downstream parties need to agree.

Settlement calculations for financial transactions are similar, volume multiplied by price, but more than one price is involved. One price may be fixed and compared against an index price (Fixed Swap) or there may be two index prices (Float-Float Swap or Basis Swap) multiplied by the volume and settled against one another (e.g, 310,000 mmbtu * 3.50 versus 310,000 mmbtu * Gas Daily-Texok.) Swaps are always settled net; individual legs are never settled gross. There also can be multiple prices with different weightings, which comprise a basket.

Typically, invoices are settled net, meaning multiple transactions settling on the same day with the same counterparty in the same currency and same legal entity are netted together, with only one party moving the cash. In some jurisdictions, such as the European markets, tax requirements require sellers of physical commodities to invoice the counterparty for delivered goods, and only sell trades are on the invoice.

Invoices include such relevant information as trade date, volume, fixed price and/or floating price, and settlement amount per trade. As soon as practicable after all prices are known, counterparties issue invoices to one another—and, in the case of physical gas, either on nominated volumes or after volumes are actualized. Settlement affirmation is standard in the industry, where parties confirm cash amounts prior to the settlement date. This practice reduces settlement breaks and ensures that reconciliations are performed prior to cash moving. This is a major contributing factor to the low rate of settlement fails across commodities. According to the 2011 ISDA Operations Benchmarking Survey, the percent of monthly settlement volume resulting in nostro breaks is only 8% across the industry.

There are a number of explanations for the low rate of outstanding settlement fails in commodities, partly explained by the well-controlled confirmation processes below, which allow for trade discrepancies to be remedied well in advance of settlement:

- The OTC commodity derivatives markets have a record of striving for electronic confirmation Matching. Vendor solutions such as ICE eConfirm, EFETnet and SWIFT have facilitated this approach. The industry continues to add both products and trade types to these electronic platforms in order to decrease the number of trades requiring paper confirmations. Additional vendors are also beginning to enter this market (e.g, Markitwire and Misys).
- Many transactions are brokered by a third party. A broker recap is sent out (in addition to the Confirmation) and is diligently checked to ensure that trade economics are accurately booked.
- A number of market participants perform verbal confirmation of trade economics should there be no type of affirmation by Trade Date + 1.

- Pre-settlement affirmation of cash flows identifies discrepancies early and allows for reconciliations prior to settlement date.
- At times, the movement of the physical commodity serves as a pre-settlement affirmation of economics, with the exception of price.

Discrepancies on physical transactions relate primarily to cuts in physical power and gas, where the actual quantity of the delivered commodity is different from the contractual quantity due to operational factors, e.g., congestion on the power grid. Each organization has its own, essentially similar, process for reconciling volumes (i.e., the use of pipeline statements and OATI tags) and, in the event of a volume discrepancy, the invoicing groups work together and share support to resolve any differences. Scheduling groups, and in the case of power, real-time trading desks, may get involved as well, to resolve volumetric differences. Should a difference remain at settlement time, counterparties will advise one another as to what the payment amount will be, and agree to continue working on the disputed portion of the invoice. Counterparties typically have a shared interest in resolving these outstanding items, so cooperation between counterparties is generally good. The UK power and gas markets are structured differently from North America markets and contractual obligations are usually met in full, with the financial impact of any changes in delivered volumes often managed centrally.

(ii) Listed and OTC Cleared Trades

Although this Paper does not focus on the specifics of the markets for Listed Trades and cleared OTC trades, OTC settlement risk in the OTC commodity derivatives markets has to be considered in the context of the overall commodity settlement volume. A significant percentage of commodities transaction volume is traded as futures and options on regulated exchanges run by entities such as the following:

- the CME Group, which controls the New York Mercantile Exchange (NYMEX), Chicago Board of Trade (CBOT) and Chicago Mercantile Exchange (CME);
- the Intercontinental Exchange, Inc. (ICE), which controls ICE Futures US and ICE Futures Europe;
- Commodity Exchange (COMEX);
- London Metal Exchange (LME);
- NYSE Euronext LIFFE (LIFFE);
- Singapore Exchange (SGX);
- Dubai Mercantile Exchange (DME);
- European Energy Exchange (EEX); and
- Tokyo Commodity Exchange (TOCOM) offering commodity products globally.

The OTC commodity derivatives markets pioneered the development of central clearing of OTC transactions. In the late 1990s, NYMEX was one of the first exchanges to offer the ability to clear OTC contracts. Counterparty demand for alternate solutions to complement bilateral collateral arrangements led to the development of a platform to clear OTC as futures through NYMEX's Clearport mechanism. The subsequent growth and success of OTC clearing coincided with Enron's bankruptcy and subsequent credit instability in the energy markets. In 2001, NYMEX Clearport provided the industry with the ability to clear centrally. The continued credit instability experienced during the late 2001-2002 period re-enforced the benefit of OTC clearing and its ability to provide capital efficiencies and access to a wide range of products. Other commodity exchanges and clearing houses followed the NYMEX

example with ICE Clear, CME Clearport, LCH.Clearnet, European Commodities Clearing (ECC), NOS Clearing, AsiaClear and many others offering central clearing of OTC products. Examples of commodity central counterparty and clearing organizations today include:

- Gas Trading: ECC / ICEClear / CME Clearport / APX Group
- Base Metals Trading: LCH.Clearnet / CME Clearport
- Precious Metals Trading: LCH.Clearnet / CME Clearport
- Power Trading: ECC, APX Group
- Plastics Products Trading: LCH.Clearnet
- Oil Products Trading: ICEClear / CME Clearport (formerly NYMEX Clear)
- Crude Oil Trading: ICEClear / CME Clearport
- Coal Trading: CME ClearPort, ICEClear
- Freight Trading: NOS Clearing / LCH.Clearnet
- Agriculture Trading: CME Clearport / ICEClear US
- Emissions Trading: ICEClear / NOS Clearing / ECC
- Iron Ore Trading: AsiaClear, LCH Clearnet

To date, NYMEX has launched more than 650 OTC-cleared contracts,²² and ICE Clear²³ more than 600. Market participants commonly use central clearing, and there is strong competition between exchanges and clearing houses to launch new products providing capital efficiencies and credit risk management. Some of the most recent examples include:

- ECC clearing contracts traded on the European Energy Exchange, European Energy Derivatives Exchange and Powernext;
- NASDAQ and Nordpool working together to deliver central clearing services for UK power;
- launch of Iron Ore OTC clearing by SGX/AsiaClear as well as LCH.Clearnet;
- launch of Coal Futures by EEX; and
- planned launch of gold forwards cleared by the CME Group, with LCH.Clearnet and NYSE Euronext also offering gold clearing solutions.

Settlement risk is being reduced by the shift towards central clearing. The benefit of facing the exchange on cleared trades rather than having bilateral OTC trades on with multiple counterparts is (1) the reduction in counterparty credit risk and (2) the ability to net long and short positions across a range of different product types, which may reduce the amount of collateral that is required for posting. In December 2011, the CMD processed 443,492 commodity OTC derivatives transactions of which 68,894 (16%) were OTC-cleared.²⁴

Central clearing combined with the ongoing efforts to increase electronic confirmation matching has led to a significant continued decline in OTC settlement risk and a low number of aging fails amongst the CMD group.

²² See www.cmegroup.com.

²³ See www.theice.com.

²⁴ Source: Markit Metrics

4. Option Exercise

(a) Financially Settled Options

Financially settled options are options that can be exercised automatically if, by comparing the reference price to the option strike price, the option is determined to be in-the-money. The option buyer is not required to give notice of exercise to the option seller. The automatic exercise will result in a payment by the option seller to the option buyer of the cash settlement amount, which may be netted with other transactions of the same commodity type and/or on the same settlement date. Financial settlement follows the same processes described in the Settlements section above.

(b) Physically Settled Options

Physically settled options that are in-the-money at expiry will result in the creation of a new transaction between the parties. The decision to exercise is based upon the value the option buyer places on the underlying product. Most physically settled options require the option buyer to notify the option seller (usually by telephone) by an agreed cutoff time on expiration date.

Failure of the buyer to notify the seller by the cutoff time will result in the option expiring worthless. The new trade may be a swap (settles financially) or a forward (settles physically) depending on the nature of the option traded. Depending on the market convention for the product, a written notice of exercise delivered to the option seller by the option buyer may be required, and a confirmation may be generated for the new trade.

5. Collateral Margining

Margining is the process by which collateral calls are made and collateral is exchanged between counterparties based on mark-to-market position valuation and the terms of the credit agreement between them. For any trade included within the scope of the relevant collateral provisions, collateral margining will commence the inclusion of that trade on T+1.

Credit terms may be documented in a CSA or similar document, and are incorporated into the relevant Master Agreement. Credit terms may also be included in individual confirmations, particularly the independent amount, which is a cushion of additional collateral pledged by one party to the other that is held for the duration of the trade irrespective of the movement of variation margin. The credit terms specify terms such as the frequency of valuation, timing of margin calls, types of eligible collateral, minimum amounts of collateral that can be transferred, and interest on collateral.

The ISDA Collateral Steering Committee has drafted both a Best Practices Whitepaper and a Dispute Resolution Procedure, available on the ISDA website.²⁵ Those documents are incorporated by reference herein.

²⁵ See www.isda.org

6. Close-Outs

(a) Terminations

At any time during the term of a transaction, the parties may agree to terminate the transaction (i.e, end the trade early before its natural maturity date). The parties must agree on the terms, timing, and any payment relating to such termination. A termination agreement will be drafted and executed between the parties to memorialize this agreement.

(b) Trade Compressions

While the benefits of trade compression either by moving bilateral OTC trades to be cleared OTC trades, or by participating in ‘tear-ups’, are recognized, a number of obstacles exist that prevent wide-spread participation in such exercises. There is a separate Portfolio Compression Working Group operating under remit from the COIG currently addressing these issues through its membership.

(c) Assignments and Novations

At any time during the term of a transaction, the parties may agree that one or both parties may transfer (by means of an assignment or a novation, as appropriate) their position to another party, which may be either an affiliate or an external party. All parties to the transfer must agree to the terms and timing of the transfer by executing either an assignment agreement or novation agreement, as applicable.

Depending on the nature of the transfer, the parties to the new transactions created through the transfer may draft the transfer agreement so that the New Transactions are either (i) re-confirmed between the remaining parties by separate Confirmations, or (ii) considered to have been re-confirmed between the remaining parties by way of the transfer agreement.

7. Natural Maturity

A transaction matures naturally when it has completed its term and all obligations under the contract have been met. In this event, there is no impact on downstream processing.

SECTION III: CURRENT STATE OF LIFECYCLE EVENT PROCESSING

1. Trade Capture and Revisions

(a) Initial Trade Capture

Trade capture is automated for most electronic trading platforms. The trade details are automatically fed to the risk system from external sources, greatly reducing the occurrence of errors. Bilateral OTC trades are entered manually into the trading application by the trader, marketer or trading assistant. Proper segregation of duties requires that trade capture is not performed by anyone who has access to confirmation or settlement systems.

(b) Trade Capture Revisions

Revisions are automated for most electronic trading platforms. For the remaining trades, revisions are performed manually by the trader, marketer or trading assistant. Again, proper segregation of duties requires that revisions are not performed by anyone who has access to confirmation or settlement systems.

2. Controls Processing

(a) Broker Recap

Affirmation is not required for trades that are counterparty-matched via an electronic platform, because the match takes place on T+0 or T+1, in the same timeframe that affirmation would normally take place. Electronically matched trades are binding, so the affirmation becomes unnecessary. For non-electronically bilaterally matched trades, some broker matching takes place electronically. However, the majority of broker affirmation is via faxed broker recaps that are manually reconciled against the trade entry. For direct deals, affirmation is manually performed via telephone or email.

(b) Counterparty Affirmation

Affirmation is not required for trades that are counterparty-matched via an electronic platform, because the match takes place on T+0 or T+1, in the same timeframe that affirmation would normally take place.

(c) Confirmation

Many OTC commodity derivatives transactions are electronically matched via an electronic platform. The remaining transactions are executed via the use of paper confirmations. Metrics regarding the use of electronic confirmation matching systems versus Paper Confirmations, as between the members of the CMD, can be found in the Commodities Metrics Reports that are published each calendar month.

By convention, in some physical markets, the seller's terms govern the transaction. For these trades only, the seller sends a confirmation (although in some cases the buyer may opt to also send their confirmation), and in the absence of a rejection of any terms by the buyer, the terms are deemed accepted.

3. Settlements

Settlement takes place after the receipt of a valid invoice agreed by the counterparty. Invoices are sent by facsimile or email. In financial markets, the CMD and most high-volume counterparties will also send Invoices, enabling a reconciliation of settlement amounts. Alternatively, an exchange of settlement details only occurs if the paying party disputes the invoice.

In physical markets, payment takes place after the receipt of a valid invoice, and if applicable also only after receipt of the relevant shipping documents. Invoices are sent by email and facsimile.

4. Option Exercise

(a) Financially Settled Options

Because the exercise process for most financially settled options is automatic, trading and settlement systems are typically designed to calculate the settlement amount (or zero settlement amount for options which expire out of the money) without manual intervention. These cash settlement amounts can be grouped with other derivatives payments and settled as set out in Section III.3 Settlements.

(b) Physically Settled Options

As explained in Section II.4.(b), the decision to exercise a physically settled option is typically a commercial decision made by the option buyer. If exercised, two processes must take place. The buyer must notify the seller of their decision to exercise the option, and both the buyer and the seller must cause the resulting underlying transaction to be entered into their systems. Typically, the notification will be in the form of a phone call, instant message or email from the buyer's trader to the seller's trader. The traders will then mark the options as exercised in the trading application, which will result in the automatic creation of the resulting underlying trade. These trades can then be settled in the normal manner.

However, there can be variations to this process. For instance, the risk system might not have the functionality to automatically create the underlying trade. In this case, the trader will have to manually enter the resulting trade. Additionally, for some markets the option exercise notification may not be performed by the trader. If so, the trader will have to notify the middle office or operations department of their intention to exercise, who will in turn notify the counterparty of the option exercise. This process is typically performed by facsimile.

5. Collateral Margining

For cleared transactions, the margining process is automated via the clearing house's initial margin requirements and subsequent variation margin calculations.

For bilateral (i.e, non-cleared) transactions, the parties send margin calls via email or fax, and acknowledgement is typically performed via email or telephone.

6. Close-outs

(a) Terminations

Termination of transactions prior to natural maturity occurs for only a small percentage of commodity trades. The termination agreements are manually drafted, and the degree of automation of the closeout process depends on each firm's processing capabilities.

(b) Trade Compressions

Since the summer of 2009, the commodities industry has seen a shift in transaction volume from OTC transactions to the clearing of transactions through an exchange. There is also an on-going effort to work with vendors to establish routine 'tear-up' exercises amongst both the inter-dealer and non-inter-dealer groups.

(c) Assignments and Novations

Assignment and novations of transactions prior to natural maturity occurs for only a small percentage of commodity trades. Assignments and novations are manually drafted, and the degree of automation of the transfer process depends on each firm's processing capabilities.

7. Natural Maturity

This implies settlement or option expiry, and so the processes are as described in the previous sections.

SECTION IV: ISSUES WITH CURRENT PROCESS

(a) Lifecycle Processes

A limited number of lifecycle processing issues have been identified and are attached hereto as Annex C.

(b) OTC Settlements Processes

A number of issues related to the current settlement process for OTC trades have been identified where further thought and analysis are required before a potential end-state solution can be discussed.

- Different levels of automation among market participants – The OTC commodity derivatives market is made up of a diverse range of participants of varying scale, including financial institutions, utilities, energy trading companies, hedge funds, end users, manufacturers and industrials. Levels of automation vary greatly among participants, where some have extremely high levels of automation, while others may have very manual processes. More automated groups have systems (either built in-house or by third-party vendors) which calculate settlement amounts and generate invoices to be sent to counterparties. Less automated participants may utilize spreadsheets to calculate amounts owed as well as prepare invoices.
- Invoice Distribution – (a) The sender of the invoice can spend a lot of time trying to obtain and verify new counterparty contact information. (b) Invoices are sent by fax or email, depending on counterparty preference. A potential electronic solution could create a uniform method to transfer invoices and a new method for distribution that has contact information for all participating counterparts in a single repository. Each company should maintain their own contact information to ensure the highest level of accuracy.
- Discrepancy Identification – During the process of cash flow affirmation prior to settlement date, a discrepancy may be found. Currently, to resolve the discrepancy, a manual line -by-line reconciliation is performed which can be time consuming, particularly on an invoice that can contain over a thousand line items. A potential electronic matching solution would be able to quickly compare invoice amounts and filter out the few that do not match. This could allow users to focus on the identified discrepancies rather than line -by-line reconciliations.
- Rounding – Even though there are industry standards addressing the number of decimal places a price should have for each product, because of the complexity of commodity calculations, often involving unit conversions, different counterparty systems calculate in different ways, resulting in small differences in settlement amounts, i.e, rounding in the middle of a conversion calculation from one unit to another versus truncating. The solution is usually agreed upon between the parties, often splitting the difference.
- Holiday Calendars – The maintenance of holiday calendars can become quite tedious. Not only must attention be paid to bank holidays in the various currencies traded, but holidays relating to price source publications must be kept accurate and up-to-date as well. Often the price sources publish the holidays only one to two years in advance. Since commodity trades have tenors well exceeding two years, there is continual updating that needs to

occur in order to manage the life of the transaction. Additionally, unscheduled holidays e.g., President Reagan's or President Ford's funeral, must be updated in holiday calendars together with the correct pricing treatment.

- **Different Trade Representation** – Counterparties may represent trades differently in their respective systems, often due to system constraints. For example, instead of having a single trade, e.g., a crack swaps where the differential between the two products is traded, the counterparty will enter the trade as two trades in their system. This structural difference should not affect the total value of the settlement, but it is difficult to match the two deals to the single differential deal. A potential solution would be to somehow identify that the two trades are indeed one with a “link ID”. This would assist not only in settlement matching, but also in the confirmation process and portfolio reconciliation.
- **Affirmation of cash flow amount prior to settlement** – similar to invoice distribution, it is essential to have a good list of counterparty contacts for this stage of the process. Otherwise, inefficiencies can occur.
- **Counterparties that refuse to net** – There are a number of exceptional counterparties that settle gross instead of net, usually driven by a limitation of their settlement systems. Since this poses an increased settlement risk to both parties, analysis should be done to eliminate this practice.
- **Non-standard settlement terms** – Due to technical constraints, some participants are unable to customize settlement dates, resulting in the need to manually reconcile and process.
- **Re-publishing of Settlement Prices** – There are times when published settlement prices are re-issued, i.e., a power ISO or Platts restating a settlement price. Depending on the timing of this “re-settlement”, this could require an invoice to be amended and resent or cash to be moved to compensate for the difference.
- **Physical volume changes before settlement** – Examples could be differences in what was contracted to be delivered versus what was actually delivered or a force majeure event. This could require additional reconciliations, invoice amendments and reaffirmation with the counterparty.
- **Market design changes in electricity markets** – Particularly in the US, there have been a number of market changes that impact scheduling and settlements processes. For example, on April 1st 2009, the CAISO (California) implemented MRTU, which modified delivery locations and revised market price calculations that resulted in changes to the settlement process. Additionally, an ERCOT (Texas) redesign was implemented on Dec 1, 2010. These types of changes often require extensive system development and testing and have led to re-settlements of prior periods after go-live as the market adapts to the new market design.

(c) Settlement Matching Processes

Despite the issues raised in Section IV(b), the established OTC commodity derivatives settlement process has been successful overall, as evidenced by the low rate of outstanding settlement fails for this sector. Since levels of automation for the process differ among the

diverse base of market participants, it is believed that automated settlement matching would be instrumental in reducing the inefficiencies in the process. It was therefore agreed that this functionality could be the logical first step towards a more complete end state.

The ISDA and LEAP Settlement Working Groups have been discussing automated settlement matching. The two groups have worked closely together, representing organizations such as banks, oil companies, trading houses, brokers and other service providers for the physical and financial energy trading industry. LEAP have published a whitepaper focused on settlement matching which we have leveraged in this document. The working group began to research settlement matching to help improve efficiency, provide scalability and to a lesser extent increase controls.

As discussed in Section II A, there are manual components to the current settlements process. According to market conventions, parties either exchange invoices or the seller sends their invoice, the invoice amounts are then agreed upon, with any discrepancies identified and reconciled prior to settlement date. Each of these steps is communicated by telephone, facsimile, email or web portal. For certain products it is common to share settlement data to aid the reconciliation. This data is usually in a spreadsheet format with each participant's information formatted differently and in varying levels of detail.

Automated settlement matching would allow counterparties to upload their settlement (invoice) information to an industry platform. The platform would electronically match settlement details at both the summary level, e.g., total cash flow and at the detailed level, e.g. individual trade line items. The platform would highlight any exceptions (unmatched items), saving hours of manual reconciliation. The exception process should be managed on the platform and users should have the ability to remove disputed trades from an invoice to allow for payment of undisputed amounts. Once the settlement is agreed upon on the platform, the payments would be processed bilaterally outside of the platform (at least initially).

The group also captured the following requirements:

- The platform should hold counterparty contact information.
- The platform should be able to capture settlement instructions.
- The platform should be accessible to all industry participants and should have very low barriers to entry.
- Parties should be able to agree via the platform to tolerances. Differences within the tolerance range would match without further reconciliation.
- Disputes/unmatched items should be highlighted and both parties information should be available to view side by side.
- Netting preferences can be updated on the platform.
- The platform should allow parties to communicate and resolve disputes.
- The platform should distinguish settlement items for current flow month from adjustments to prior periods (e.g. cash settlement relating to a dispute) which could appear on one invoice.
- The platform should allow real time updates (volumetric updates can be made right up to settlement due to the volume actualization process).
- The platform should provide different options depending on users' preferences, for example;
 - Both parties submit their invoice information to the platform for electronic matching. This will be an automated process in which a user's internal system

sends the information to the platform. Once matched, the platform could notify a user's internal system that payment can be processed.

- One party uploads their invoice information to the platform. The other party would be able to review this information and approve the invoice, which would mean the payment has been agreed and could be processed.
- A party could submit their invoice information to the platform and upload their counterparty's invoice to the platform if it were in Microsoft excel and formatted appropriately. This would mean the matching functionality could be utilized.

The ability to customize is important as it allows all types of market participants to choose what suits them best based on their individual circumstances and preferences. Considerations would be volume, technology budgets and products traded, among others.

To date, there have been a number of presentations and demonstrations from three different vendors focused on the development of a settlement matching platform, though none are available for use at this point. The industry will continue working with the various vendors to provide additional requirements and address other open items such as matching logic and service cost.

To summarize, a list is provided of the perceived advantages and challenges of a settlement matching service:

Advantages :

- Efficiency benefits
- Processing would be more scalable
- Increased control
- Offsetting errors would be identified
- Users can select different levels of service

Challenges:

- Difficulty/Cost of providing granular settlement data to the platform (e.g, hourly quantities and prices as seen in the power markets).
- Cost for creating an electronic settlement system would not be too beneficial given the fact that most financially settled activity is straight-through-processed (STP) for most organizations and most physical settlements will continue to need manual processing.
- Matching logic has not yet been completely defined.
- Parties structure trades differently (e.g, crack spreads may be booked as one trade by Party A and two trades by Party B). There is no clear solution for how this match would occur.
- Unlikely to improve the physical cut reconciliation and agreement process for physical power and physical gas.
- Re-publishing of settlement prices after invoice is sent or after settlement date requiring reprocessing.
- There would likely be significant implementation costs – the ongoing cost as well as internal development costs to integrate with the service. These would have to be compared to proposed efficiency gains.
- Difficulty of on-boarding counterparties due to the diverse range of market participants. Any benefit will be reduced unless the majority utilizes the service.

SECTION V: POTENTIAL END STATE

There are number of broad challenges the OTC commodity derivatives industry faces, setting it apart from the other OTC asset classes, including:

- the diverse nature of the client base, which includes traditional financial houses, but also producers, consumers, wholesalers, municipalities and utilities, many of which have limited appetite for electronic processing;
- the diverse nature of the products presents challenges in that the client base has different needs depending on the type of commodity on which they transact. For example, Bullion, electricity, emissions and freight are all commodity products with quite different market conventions; and
- the lack of a single central body of governance, such as ISDA, which limits the ability for broad industry participation. The ISDA Governance Structure, to the extent that it applies to the OTC commodity derivatives, contemplates a basis of joint collaborative efforts between the various industry organizations active for each commodity.

SECTION VI: CONCLUDING REMARKS

Whilst certain industry challenges do exist for OTC commodity derivatives which are not experienced by the other asset classes, lifecycle events in the commodities markets are not that unlike lifecycle events in the other asset classes.

The OTC commodity derivatives markets are well-controlled, as evidenced by the monthly metrics submissions to the regulators. As amongst participating firms, the asset class has the lowest number of outstanding confirmations, though not the lowest volumes.²⁶ Similarly, the rate of settlement fails is extremely low. This Paper has identified areas where further efficiencies can be introduced in continuance of bringing these numbers down.

As an asset class, the CMD laid out an aggressive plan in the July and October 2008 commitment letters to supervisors. Subsequent letters, including the March 2011 Supervisory Commitment letter, set forth a detailed industry which as of publication remains on target²⁷. Across the asset class, participants are committed to moving standardized products to cleared platforms and have made significant progress in this area. In fact, cleared OTC products were first developed in the commodities space. The CMD metrics now show increased transparency, categorizing the data in a more meaningful way and increasing the frequency of reporting. Industry working groups are driving the standardization of Annexes to the ISDA Master Agreement documentation structure to lay the groundwork for standard confirmation language and are adding both products and trade types to electronic confirmation matching systems. Participants are aggressively building out their infrastructure to add additional products like base metals, agricultural products, coal and freight onto electronic platforms. As a result, the number of electronically eligible trades will continue to increase through these efforts, while the number of outstanding confirmations should decrease. The OTC commodity derivatives markets' participants have been extremely effective in making trading more standardized and are working towards the broader goals set up by the regulators.

²⁶ Source: Markit Metrics

²⁷ See: <http://www2.isda.org/functional-areas/market-infrastructure/G20-objectives/>

This Paper discusses a number of ways in which the OTC commodity derivatives markets are unique. These differences pose challenges to recent proposals that all “standardized” OTC derivatives be cleared through regulated central counterparties. Some such challenges are as follows:

- Physical products are made more complex by the need to reconcile physical deliveries in certain markets (e.g., North American power and gas). These actualizations result in actual quantities deviating from the contracted quantity. For example, in the US power markets, it can take months to retrieve meter data and supply documentation to both upstream and downstream participants in order to agree on amounts to settle. The use of an exchange to resolve volumetric cuts would be extremely burdensome.
- Financial products are often tied to the underlying physical commodity, this would make certain transactions difficult to standardize. For example, a unit contingent financial swap in power has notional quantities which can change on an hourly basis to mimic the energy output of a power plant.
- Many market participants are producers and consumers of a commodity and regularly hedge their production/consumption with OTC derivatives. Many are not market makers, but use the OTC markets as a vital risk management tool.
- Central clearing does not provide such participants with the customization that they get from OTC structures. While standardized products are one tool in a hedging portfolio, customized OTC transactions allow producers and consumers to tailor transactions to their risk profile by eliminating mismatches with standardized products.

The recommendation is to allow the OTC commodity derivatives markets to continue on the path upon which they have conscientiously started. The number of cleared commodities products offered by exchanges is continually increasing. Most recently, there is new interest in offering a mechanism for clearing of OTC precious metals (bullion) trades. The OTC commodity derivatives markets’ participants and the regulators are aligned on the direction of focus. Settlement matching appears to be the logical first step to a potentially full-scale central settlement solution. A central repository for settlement prices, SSIs and contact information could address many of the outstanding efficiency issues. Work and further analysis is key to understanding the possibilities for formal central settlement of OTC not on an exchange, similar to CLS and FX markets. The settlement working group will continue to focus on the areas we have discussed and will update this Paper periodically to address changes as well as update on progress.

ANNEX A: **Best Practice Guidelines for Electronic Confirmation Matching**

Background

This Annex offers a collection of best practice guidelines associated with the electronic confirmation matching of the standardized over-the-counter (OTC) financial and physical products in the OTC commodity derivatives markets (the Best Practices).

The adoption of these Best Practices can mitigate operational risks that are specific to the confirmation matching process, and also help to reduce the level of risk in the OTC commodity derivatives markets more generally. In addition, these Best Practices can help reduce processing costs, encourage systems' interoperability and increase operational scalability.

These Best Practices are already used, to varying degrees, by the OTC commodity derivatives major market participants responsible for this paper and other market participants. Collectively, the OTC commodity derivatives major market participants feel that these are best practices towards which all market participants should actively strive. Therefore, these best practices serve both to provide recommendations and a checklist for organizations new to the OTC commodity derivatives markets as well as act as a benchmarking tool for all market participants as they periodically review the efficacy of their operations.

These Best Practices are recommendations that all parties engaging in the OTC commodity derivatives markets, regardless of the organization's size or role in the marketplace, should consider adopting. In addition, it is clear that the greater the number of transactions executed by the organization, the more important it is to implement these Best Practices.

Confirmation Matching Overview

A confirmation evidences the economic terms of, and defines/references the legal framework applicable to, a bilateral OTC transaction entered into between two parties. The confirmation matching process is therefore an important control in reducing market and operational risk between the parties involved.

It should be noted that certain short dated physical gas and power trades are not subject to the confirmation matching process because the scheduling of the physical flow, due to its nature and timeliness, provides a compensating control.

These Best Practices do not assume the exclusive use of one electronic confirmation matching system, since the ideal industry scenario would be that any number of Electronic confirmation matching systems could be completely interoperable in order to provide maximum coverage of products and trade types within the OTC commodity derivatives markets (and even across some/all other OTC markets), and achieve the greatest risk mitigation and economies of scale.

Best Practice no. 1: Single point of trade capture

Potential Risk: Inconsistent representation of trade details within the organization's processing systems rendering the confirmation matching process ineffectual.

Within an organization's technology infrastructure, there should be one single point for capturing the details of a transaction, and for capturing any subsequent Trade Event relating to that transaction.

To eliminate the potential errors that can occur if trade details are entered independently into multiple systems across an organization, a single point of trade capture should be employed in the organization's technology infrastructure. Consequently, whenever there is a trade event, this should be updated once within the trade capture system (either manually or automatically via a data feed from the trade execution system), and that in turn should automatically update all downstream infrastructure systems.

Where an organization is unable to support a single point of trade capture then, as a risk mitigant, comprehensive inter-system reconciliations should be employed to ensure trades are captured in a consistent and timely manner across the various systems.

Best Practice no. 2: Employ electronic confirmation matching

Potential Risk: Delays or errors in the confirmation matching process caused by manual intervention.

Electronic confirmation matching, whether via an in-house or third-party system, should be employed by the organization.

The confirmation matching process should involve the two parties to the transaction submitting electronic confirmations to either an in-house proprietary electronic confirmation matching system or a third-party vendor electronic confirmation matching system. This bilateral submission of electronic confirmations for automated matching is the most reliable and process-efficient method of confirming trades, and provides for the earliest possible means of risk mitigation within the Confirmation Matching Process.

If only one of the parties is able to send electronic confirmations to the electronic confirmation matching system then, in order to support bilateral confirmation matching, the electronic confirmation matching system should provide a facility which allows one party to submit their electronic confirmation and the other party to view and then accept or reject the submitted confirmation via a secure on-line facility. Thus a positive confirmation match is still achieved.

All parties should endeavor to utilize electronic confirmation matching system(s) to match as many standardized products and trade types as are generally available for such in the marketplace. Where a standardized product or trade type is not yet available via electronic confirmation matching system(s), parties should actively support industry initiatives to on-board such products so as to increase the range of products and trade types which are eligible via electronic confirmation matching system(s). Where a product or trade type is not yet standardized in its approach to confirmation terms, parties should actively support Industry Initiatives to reach general market agreement on standardized Confirmation terms and thereby support the evolutionary cycle of standardization facilitating automation (please reference Appendix A for a list of some of the key industry bodies that can be engaged in this respect).

Best Practice no. 3: Electronic matching of broker recaps

Potential Risk: Delays identifying inaccurate trader risk positions.

Broker recaps should be processed via an electronic confirmation matching system.

Some trades between organizations are executed via brokers as an intermediary, rather than directly between the two parties concerned. Trades brokered in this manner allow for trade details to be checked against the broker recap, which is typically sent by the broker on trade date. Economic trade mismatches can be identified in advance of the confirmation matching process. It is important to note that broker recaps are not confirmations between the two parties of the transaction and therefore Broker recaps do not supersede or negate the need for the confirmation matching process. Whilst some brokers do engage in electronic messaging as a means of sending their broker recaps, this is separate to the confirmation matching process between the two parties to the trade.

All parties should endeavor to utilize an electronic confirmation matching system for matching broker recaps. Two-way matching, with a broker, should be accomplished on trade date. Use of this process dramatically reduces the time involved in checking broker recaps and identifies errors in a timely fashion. Optimally, parties should utilize an electronic three-way match (broker and two counterparties, each matching with one another) via an electronic confirmation matching system. Where broker recaps are not yet available via electronic confirmation matching system(s), parties should actively support industry initiatives to on-board them (please reference Appendix A for a list of some of the key industry bodies that can be engaged in this respect).

Best Practice no. 4: Electronic confirmation issuance

Potential Risk: Delay in executing the confirmation matching process.

Electronic Confirmations should be issued on a timely basis.

An organization should support electronic confirmation matching on trade date. Therefore, an organization should issue (i.e, generate and make available for matching) electronic confirmations throughout the trading day (i.e, intra-day issuance).

If an organization is unable to issue electronic confirmations intra-day then, as a minimum, electronic confirmations should be issued to the electronic confirmation matching system prior to the start of the next business day following the trade date.

In the situation that a counterparty has been unable to issue a confirmation then, as part of this escalation process, it is recommended that an attempt is made between parties to verbally agree upon the trade economics.

Best Practice no. 5: Confirmation matching status tracking

Potential Risk: Ineffective escalation of confirmation matching delays or disputes.

An organization should be able to track the real-time status of every confirmation processed by the electronic confirmation matching system.

Reporting capability should exist within an electronic confirmation matching system which enables an organization to track the real-time status (e.g, unmatched, matched, partial-match, queried, etc.) of every Confirmation submitted to that electronic confirmation matching system. This reporting capability enables the operations staff to implement timely and proactive

escalation of every unmatched trade. It is recommended that intra-day escalation should be established, but if this is not possible then, as a minimum, end-of-day escalation should occur.

Best Practice no. 6: Avoid updating trade-related information directly into the electronic confirmation matching system

Potential risk: confirmation matching process is rendered ineffective as a result of data corruption.

It is essential that the electronic confirmation matching system, operations processing system and trade capture system (if this is different from the operations processing system) remain synchronized.

When an update to Trade information is required in the electronic confirmation matching system, this should be initiated by updating the information in the trade capture system (as the single point of record). This update should then automatically feed through to the electronic confirmation matching system as part of the normal deal life cycle trade event processing. Updating trade information into the electronic confirmation matching system independently of the trade capture system and/or the operations processing system should be prevented by technical system restrictions. If this is not possible then prevention should occur via the implementation of appropriate operational controls and checks, each performed by separate individuals.

An exception to this best practice exists in the situation in which parties refer to the same trade data in different ways. For example, within the gold market, counterparties confirm the delivery location (e.g, London) and can refer to this in different ways (e.g, “Ldn” versus “Lon”). In such situations, without the availability of corrective mapping rules within the in-house systems or electronic confirmation matching system, a confirmation can only be matched if either: a) the trade data is updated, and thus synchronized, directly in the electronic confirmation matching system or b) the trades are “forced matched” – matched with the acknowledgement that differences exist – within the electronic confirmation matching system. As a control, any updates of this type should be independently checked (i.e, one person performs the update and another validates that this update has been made correctly). Long-term solutions should be pursued in these situations via either establishing industry standards or creating systematic mapping tables.

Best Practice no. 7: Ensure system integrity

Potential Risk: Inconsistent representation of trade details within the organization’s processing systems rendering the confirmation matching process ineffectual.

To ensure the integrity of the confirmation matching process, the data contained in the electronic confirmation matching system must be consistent with that held in the other systems within the organization.

There is a risk, as a result of a system issue, user error or malicious intent, that system data becomes corrupted or out of date. Therefore, data integrity reconciliation checks should be implemented between each of the trade capture system, the operations processing system and the electronic confirmation matching system. These integrity reconciliation checks should occur at least once per day. There should be an effective resolution process in place so that breaks highlighted on any particular business day (B) are addressed by close of business the following business day (B+1).

Best Practice no. 8: Timely resolution of interface errors

Potential Risk: Delay in executing the confirmation matching process.

When submitting trades to an electronic confirmation matching system, Operations should regularly monitor available system interface error logs in order to identify and correct feed failures in a timely fashion.

Trades submitted to an electronic confirmation matching system could potentially be rejected (i.e., they “fail” upon submission) due to system feed errors. Operation staff should regularly monitor available error logs in real-time throughout the day so that any such failed trades are identified intra-day. Whenever a failure is highlighted, the organization should endeavor to perform corrective action, and resubmit the trade to electronic confirmation matching system, on the same day that failure occurred.

Best Practice no. 9: Timely electronic confirmation matching

Potential Risk: Ineffective escalation of confirmation matching delays or disputes.

By Trade date plus one business day, a trade should be electronically matched or, if this is not possible, an exception formally raised.

Trades processed by the electronic confirmation matching system should be matched on trade date (T).

If the electronic confirmation matching system is unable to establish a match by trade date plus one business day (T+1) then an exception, detailing an Unmatched Trade should be recorded and formally escalated by this time. In the situation that a Counterparty has been unable to upload their version of the trade, then, as part of this escalation process, an attempt should be made to verbally affirm the trade economics. Verbal affirmations do not supersede or negate the need for the confirmation matching process. Therefore a successful confirmation match is still required after a trade has been verbally agreed upon.

The Counterparties of a trade should look to resolve any exceptions relating to the economics of a trade on the same day that the exception was raised. An organization should establish benchmark resolution times for the other types of trade mismatches based upon their materiality.

Best Practice no. 10: Segregation of duties

Potential Risk: Compromising the independence and effectiveness of the confirmation matching process.

Management should ensure that appropriate segregation of duties exists between operational staff and their management, and those individuals involved in trade execution.

All individuals involved in trade execution (such as traders, marketers and sales staff) should have no responsibility for the execution, supervision or management of the electronic confirmation matching process.

Operations staff should be responsible for the execution and management of the electronic confirmation matching process. Resources permitting, there should be a distinct operational group whose sole responsibility is for matching confirmations and addressing associated exceptions.

Best Practice no. 11: Control systems' access

Potential Risk: Malicious or accidental corruption of data and/or controls by a user.

Users of any technology system should not be able to alter the functionality of that system directly within the production environment. Developers should have limited access to production systems, and only then within a strictly controlled environment.

Each system should have robust and reliable access controls which allow only authorized individuals to alter the system and/or grant user access. To support this, the creation of a set of job function-specific user access profiles is recommended.

Rigorous systems controls need to be implemented and monitored to ensure that data integrity and security are not sacrificed. External user access controls should be as robust as internal user access controls.

Access to production systems should only be allowed for those individuals who require access in order to perform their job function. When creating user access profiles, system administrators should tailor the profile to match the user's specific job requirements, which may include "view only" access. System access and entitlements should be periodically reviewed, and users who no longer require access to a system should have their access revoked. Under no circumstance should operations staff have the ability to modify a production system for which they are not authorized.

Best Practice no. 12: Reference data management

Potential Risk: Effectiveness of the confirmation matching process is impacted as a result of incomplete or inaccurate data.

The reference data associated with the electronic confirmation matching process should be managed in a robust and reliable manner.

The integrity of the confirmation matching process is reliant on maintaining reference data that is correct and comprehensive. To ensure that this is the case, an organization should look to:

- maintain data via automated feeds from external sources, where possible;
- validate data that is manually received against independent sources;
- task qualified operations personnel with maintaining the reference data mapping tables;
- store and maintain reference data in one central source only;
- have rigorous controls to ensure the timely and accurate update of data into systems; and
- monitor all system interface feed failure logs to ensure that missing/incorrect mappings are corrected in a timely fashion .

Best Practice no. 13: Contingency plans

Potential Risk: Suspension of the confirmation matching process through a loss of key personnel or infrastructure.

Operations groups should develop and test contingency plans for operating in the event of the incapacitation of any/all of their system(s), operational site(s) and/or staff.

Contingency plans should be reviewed, updated, and tested at least annually. These contingency plans should cover both short-term (up to one month) and long-term (over one month) incapacitation associated with one or more of the following scenarios:

- failure or inaccessibility of operational site(s): resultant fall-back of function and primary staff (those who usually perform the function) to contingency site(s);
- system hardware failure: resultant fallback of system(s) to contingency hardware and backup data; and
- primary staff unavailability: resultant fallback of job functions to secondary staff (those who do not normally perform the function but are capable of doing so in a contingency) in a different location to the primary staff.

ANNEX B: **Key Industry Forums**

- 1) **LEAP**: Specifically oil-focused (www.energyleap.org).
- 2) **EFET**: European gas and power trading. Coverage of regulatory and documentation issues (www.efet.org).
- 3) **IETA**: International Emissions Trading Association: Global trade association for primary emissions markets under the UN Kyoto Protocol. Standard documentation for primary markets (so-called ERPAs) and secondary trading (www.ieta.org).
- 4) **LBMA**: London Bullion Market Association: Representatives of London wholesale bullion markets. Standard documentation being ISDA based (www.lbma.org.uk).
- 5) **EEI**: Edison Electric Institute. US association of power utilities (www.eei.org) .
- 6) **FOA**: Futures & Options Association: Industry association for futures and options trading (mainly on UK exchanges). Regulatory affairs and standard docs (as administrators for UK power trading agreements -GTMA) (www.foa.co.uk) .
- 7) **WRMA**: Weather Risk Management Association: Service provider to the weather risk management industry (includes all kinds of weather protection products, insurance, exchange and off-exchange trading); global coverage. Standard documentation produced in cooperation with ISDA (www.wrma.org)
- 8) **FFABA**: Forward Freight Agreement Brokers Association: Promotion of freight trading and standard documentation (ISDA based) (www.balticexchange.com/ffaba).
- 9) **CTA**: Coal Trading Association: (www.coaltrade.org). North America-focused.
- 10) **IECA**: International Energy Credit Association (www.ieca.net/). Producers of some supplementary documentation to standardize contracts (e.g, ISDA CSA and EFET/SIFMA CPMA).
- 11) **AIPN**: Association of International Petroleum Negotiators (www.aipn.org/). Mission is to enhance cross-border trading in petroleum products.
- 12) **Energy Institute** (www.energyinst.org.uk/): Promotion of the safe, environmentally responsible and efficient supply and use of energy in all its forms and applications. Most recently the EI have started working on standard contracts for physical transactions in crude oil (in cooperation with LEAP and ISDA).
- 13) **ISDA: International Swaps and Derivatives Association, Inc.** (www.isda.org): represents participants in the privately negotiated derivatives industry and focuses its efforts on the identification and reduction of the sources of risk in the derivatives and risk management business.

ANNEX C:
ISSUES WITH CURRENT PROCESS (REF. SECTION IV(A))
BY LIFECYCLE EVENT TYPE

Early Settlements

Rationale for Inclusion	Ready for Industry Action?	Impact: documentation	Impact: Settlements	Impact: Metrics
1. No standard industry practice for documentation. 2. No standard industry utility for processing.	1. Relatively low volume of early settlements in commodities (<i>*validate with supporting metrics</i>). 2. Majority of early settlement requests come from the buy side (investors, consumers and utilities) and so successful technology solutions would require take-up by a large number of relatively lower volume market participants (<i>*validate with supporting metrics</i> .)	1. No standard early termination document. 2. Early settlement process may trigger the generation of standard invoices, which may need to be suppressed and replaced with a notification of early termination. 3. Partial early settlement (for example, early settlement of trades that do not fully offset) can require editing of existing trades and booking of new trades, potentially triggering new confirms or requiring manual intervention to prevent STP of confirms.	1. Manual calculation and booking of discount amount required.	Minimal: 1. Potential reduction in unexecuted, if early settlement precedes execution 2. Possible noise from CnC and trade bookings related to partial closeouts.

Novations

Rationale for Inclusion	Ready for Industry Action?	Impact: documentation	Impact: Settlements	Impact: Metrics
1. No standard industry utility for processing.	1. Relatively low volume of novations in commodities (<i>*validate with supporting metrics</i>). 2. Majority of novation requests come from the buy side (investors, consumers and utilities) and so successful technology solutions would require take up	1. Standard ISDA novation templates are in use. 2. Depending on how market participant's systems work, offsetting close out trades may be required to process novations. This can trigger new confirms, or require	1. Careful monitoring to ensure pricing periods that are not novated are settled with the remaining party. Often short timelines between novation date and first settlement date.	1. Novated trades can lose their affirmation status, causing noise on confirm/affirm metrics until manually overridden.

	by a large number of relatively lower volume market participants (<i>*validate with supporting metrics</i>). However, although rare, novations between CMD members can involve a high volume of trades.	manual intervention to prevent STP of new confirms.	2. Manual processing of payments for MTM gains/losses novated.	
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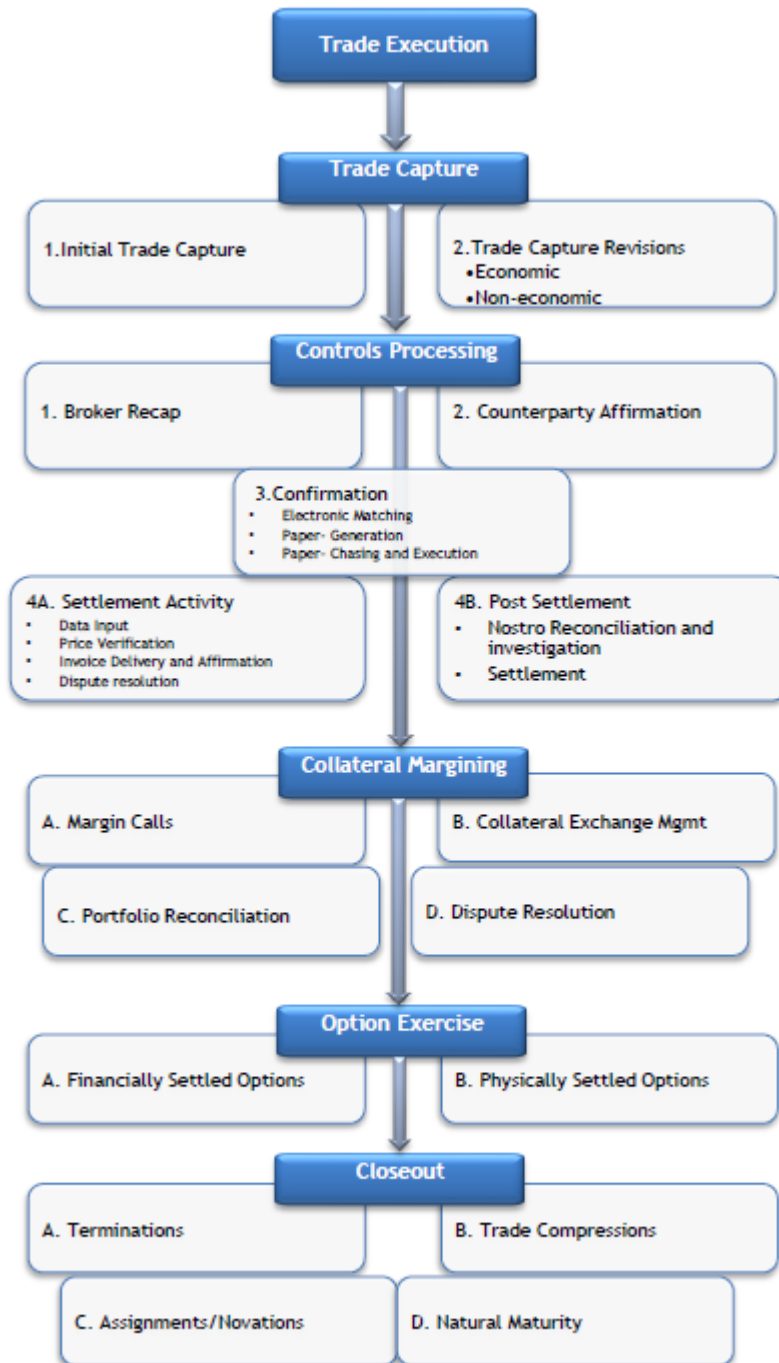
Electricity 'Cuts'

Rationale for Inclusion	Ready for Industry Action?	Impact: documentation	Impact: Settlements	Impact: Metrics
1. Cuts are a major cause of settlement discrepancies and a main driver of settlement reconciliation effort for physical electricity. Master agreements typically allow for disputes to remain unresolved for up to two years.	1. Need to distinguish between two issues: (i) incorrect entry of cuts due to human oversight, which can cause discrepancies at settlement but are quickly resolved; and (ii) settlement disputes due to disagreements between the parties regarding liability for, or the amount of, liquidated damages. The former might be reduced by better interaction between scheduling and settlement systems. The latter are disputes in interpreting the liabilities and obligations resulting from physical supply events that will not be resolved through changes to trade processing. 2. Industry dominated by utilities with established processes and systems. Buy in from these participants would be necessary for a solution to have material impact.	1. Cut trades need to be excluded from the confirm /affirm process.	1. Failure to book cuts, or disputes regarding the amount or liability for liquidated damages, are a major source of settlement disputes in the physical electricity markets.	1. Cuts are a significant cause of trial balances in the physical electricity markets.

Physical Natural Gas

Rationale for Inclusion	Ready for Industry Action?	Impact: documentation	Impact: Settlements	Impact: Metrics
1. Volume actualization comprises a significant portion of settlements effort for physical natural gas. Unlike electricity, there are no scheduling Tags to assist with the reconciliation. Pipeline Tariffs typically allow for imbalances to remain unresolved for up to two years, which over the years has developed into an accepted industry standard.	1. Need to distinguish between two issues: (i) incorrect entry of cuts due to human oversight, which can cause discrepancies at settlement but are quickly resolved; and (ii) settlement disputes due to disagreements between the parties regarding liability for, or the amount of, liquidated damages. The former might be reduced by better interaction between scheduling and settlement systems. The latter are disputes in interpreting the liabilities and obligations resulting from physical supply events that will not be resolved through changes to trade processing. 2. Industry dominated by utilities with established processes and systems. Buy in from these participants would be necessary for a solution to have material impact.	1. Cut trades need to be excluded from the confirm /affirm process.	1. Failure to book cuts, or disputes regarding the amount or liability for liquidated damages, are a major source of settlement disputes in the physical natural gas markets.	1. Cuts are a significant cause of trial balances in the physical natural gas market.

COMMODITIES TRADE PROCESSING LIFECYCLE EVENTS



*Numbers indicate the order in which each step occurs
 *Letters indicate different workflow processes