CFTC

COMMODITY FUTURES TRADING COMMISSION

Opening Remarks

CFTC

COMMODITY FUTURES TRADING COMMISSION

Panel 1: The State of the Metals Markets

Derek Sammann, The CME Group

The Global Copper Market: *A Key Component of the Global Energy Transition*

June 2023

Derek L. Sammann

Senior Managing Director

Global Head of Commodities, Options & International Options Markets

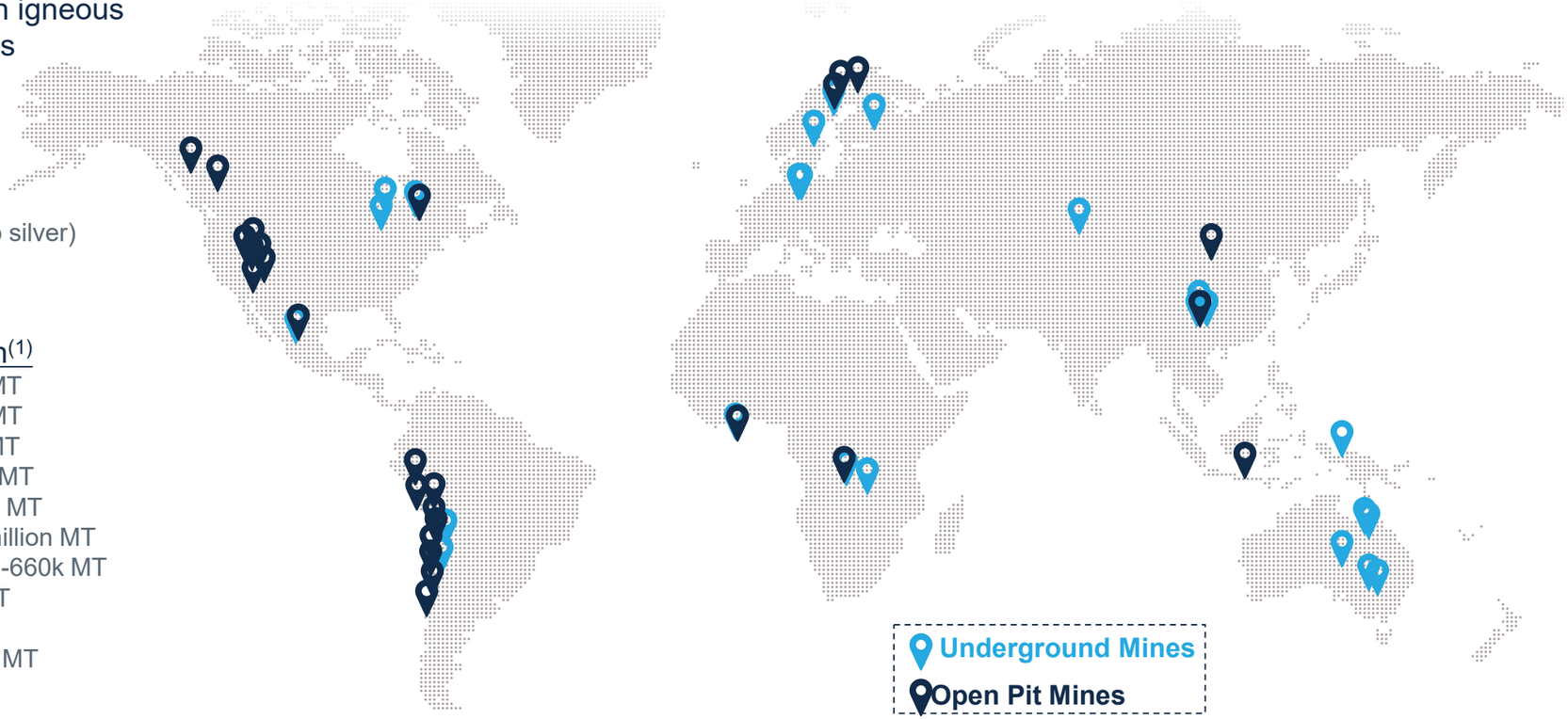
CME Group

Copper Is One of the Largest Base Metals With Significant Global Applications

The majority of the world's refined Copper is consumed by China who also maintains the largest Copper refining capacity

- Copper is a metallic, chemical element listed on the Periodic Table of Elements as "Cu", with atomic number 29.
- Usually found in nature as a primary mineral (in an igneous rock), or reduced from Copper compounds such as sulfides, arsenides, chlorides and carbonates.
- Properties
  - High ductility
  - High malleability
  - High thermal and electrical conductivity (second only to silver)
  - Resistant to corrosion
- Mine Production(1)
  - Chile-5.2 million MT
  - Peru-2.2 million MT
  - DRC-2.2 million MT
  - China-1.9 million MT
  - United States-1.3 million MT
  - Russia-1 million MT
  - Indonesia-920k MT
  - Australia-830k MT
  - Zambia-770k MT
  - Mexico-740k MT

Refinery Production(1)
- China-11 million MT
- Chile-2.1 million MT
- DRC-1.7 million MT
- Japan-1.6 million MT
- Russia-1.1 million MT
- United States-1 million MT
- Republic of Korea-660k MT
- Germany-620k MT
- Poland-590k MT
- Kazakhstan-510k MT



Source: USGS

Copper Supply Chain and Demand Dynamics

S&P Global describes Copper as *"The metal of electrification and an essential part of reaching the global goal of net-zero emissions by 2050".* As such, Copper demand is projected to double by 2050.

SUPPLY

- Copper is 100% recyclable and is one of the few materials that can be recycled repeatedly without loss of performance
- Current Copper resources are estimated to exceed 5 billion metric tons
  - Resources include reserves and undiscovered deposits predicted based on preliminary geological surveys.
- According to the United States Geological Survey (USGS), global Copper reserves are estimated at 870 million metric tons
  - Reserves are defined as deposits that have been discovered, evaluated and assessed to be profitable.

DEMAND

- Estimated annual global Copper usage is 28 million metric tons *(including approx. 9.8 million metric tons from recycled Copper)*
- Most Copper produced in the world is used by the electrical and building industries
  - Power transmission and generation, solar panels, wind farms
  - Building construction, telecommunications
  - Transportation equipment, EV charging stations
  - Industrial machinery, electrical and electronic products
  - Automotive (motors, wiring, radiators, brakes and bearings)

Copper Pricing and Market Participation

- How is Copper priced and hedged?
  - Copper is traded and priced on derivatives exchanges like CME Group and the London Metals Exchange
  - CME Group's benchmark high-grade Copper contract is referenced by Commercial participants throughout the supply chain globally.
  - CME Group Copper is priced in dollars and cents per pound and the current price of Copper is ~$4/pound.
  - Buyers and sellers can eliminate floating price risk by opening a position on an exchange.
  - For example, a Copper wire producer may want to lock in its raw material price by buying ('going long') Copper on CME Group. In the event that the price rises between the time that the wire producer puts a hedge on and the time that payment is due, the wire producer can use the gains in its future account to offset the higher costs.

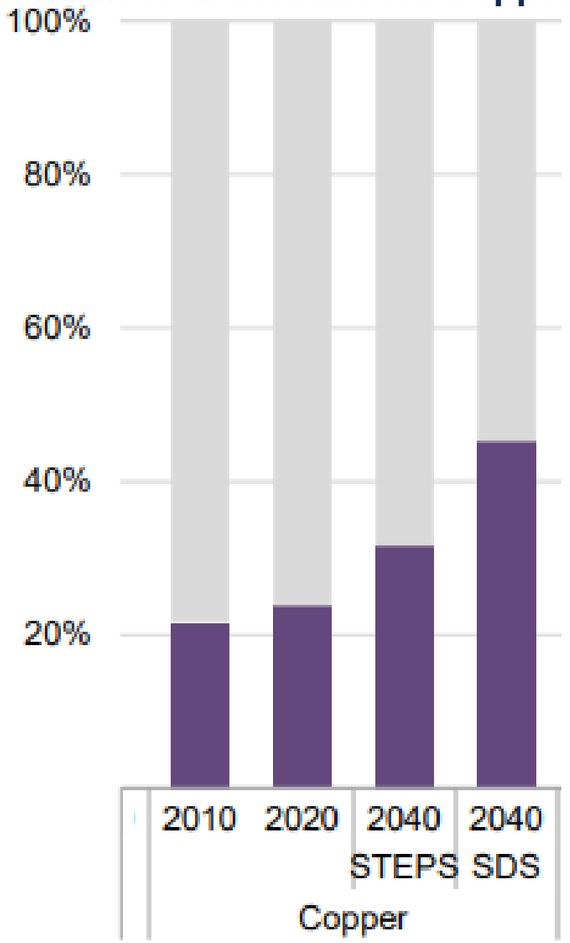
- Who participates in the Global Copper Market?
  - Industrial & Commercial participants: *Physical Traders/Merchants, Miners, Utility Companies*
  - Financial players: *Asset Managers, Hedge Funds, Pension Funds*
  - Banks: *Index Desks, House Desks, Commercial Desks*
  - Retail Traders
  - Liquidity Providers

Copper Is a Critical Component of the Global Energy Transition

Copper is a key component in all electricity-related technologies

- Copper is used in electricity-related infrastructure across numerous applications since it is a durable, highly conductive and efficient metal.
- EV adoption will significantly increase Copper demand
  - EVs require 2.5x more copper than a conventional internal combustion engine.
  - The charging infrastructure is also Copper-heavy. In the power generation sector, it is offshore wind that requires the highest use of Copper.
- Market analysts across the board see the energy transition as a significant demand driver for Copper
  - The IEA forecasts that the energy transition demand will account for 40% of total copper demand in a scenario where Paris Agreement goals are met
  - S&P Global forecast that energy transition demand growth for Copper will outstrip non-energy transition demand through 2050 – by 2035 it could amount to 21 million metric tons out of a total market of 49 million metric tons
- CME Group has a highly liquid Copper futures and options market. In 2022, Copper futures traded 970,000+ metric tons or 2.1+ billion pounds per day, making it one of the most globally relevant industrial metals contracts in the world.

Share of energy transition in total demand for Copper



STEPS refers to a scenario where current stated policies are implemented.

SDS refers to a scenario where Paris Agreement net zero goals are met.

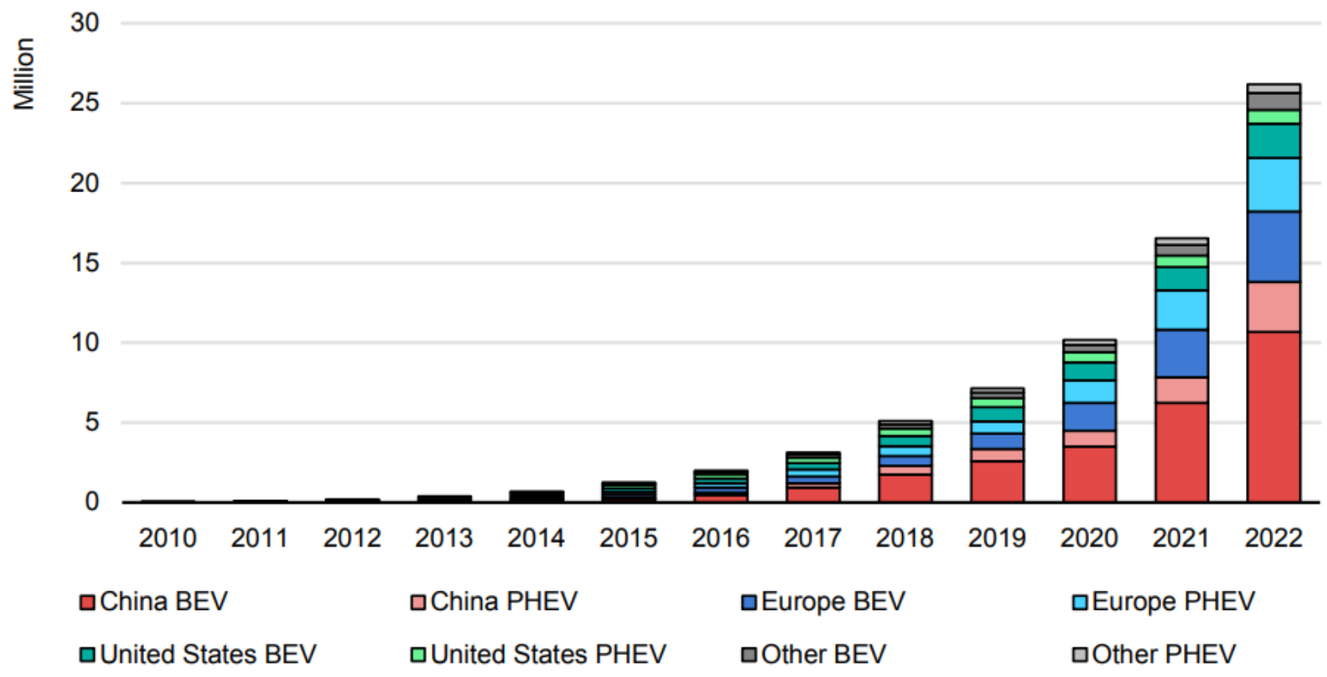
Source: IEA

Source: IEA, S&P Global

Electric Vehicle (EV) Numbers are Surging, Increasing Demand for Copper

Governments around the world continue to support the take up of EVs

Global Electric Car Stock in Selected Regions[1]



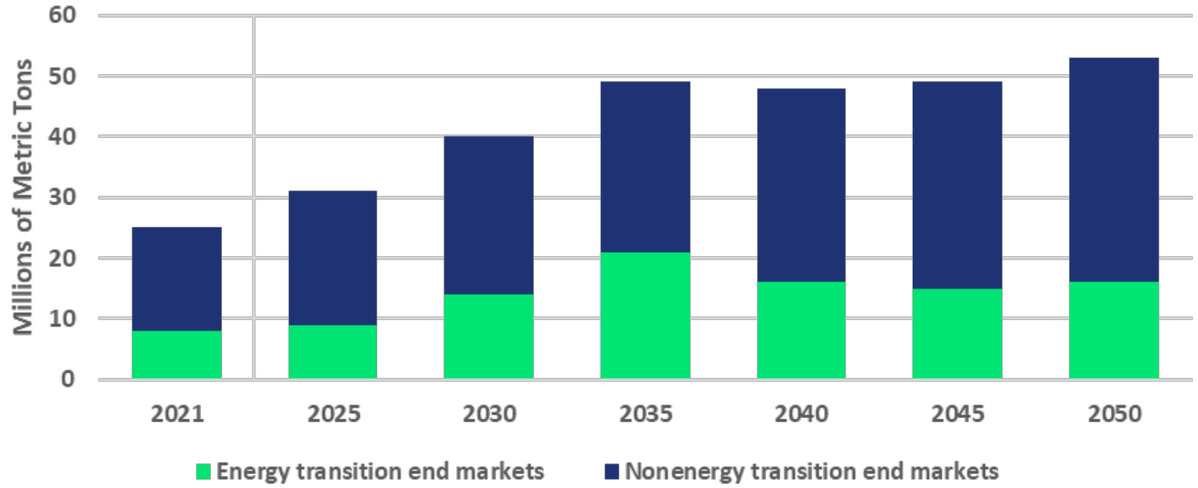
- After a decade of rapid growth, the global EV stock is at 15 million units in 2021, representing ~1% of the global fleet. The U.S. EIA projects that EVs will grow to 31% of the global stock by 2050.
- Similarly, the IEA estimates that by 2030, under a net zero scenario, EVs could represent 60% of new car sales, versus 4.6% in 2020.
- EV construction and charging infrastructure are the key drivers of the projected increase in demand for copper through 2050.
- Additionally, transmission and distribution (the infrastructure required to carry electricity from one place to another) is expected to be another key driver of increased Copper usage in energy transition end markets.

Source: : IEA analysis based on country submissions, ACEA, EAFO, EV Volumes and Marklines.
1) Notes: BEV = battery electric vehicle; PHEV = plug-in hybrid electric vehicle. Electric car stock in this figure refers to passenger light-duty vehicles. In "Europe", European Union countries, Norway, and the United Kingdom account for over 95% of the EV stock in 2022; the total also includes Iceland, Israel, Switzerland and Türkiye. Main markets in "Other" include Australia, Brazil, Canada, Chile, Mexico, India, Indonesia, Japan, Malaysia, New Zealand, South Africa, Korea and Thailand.

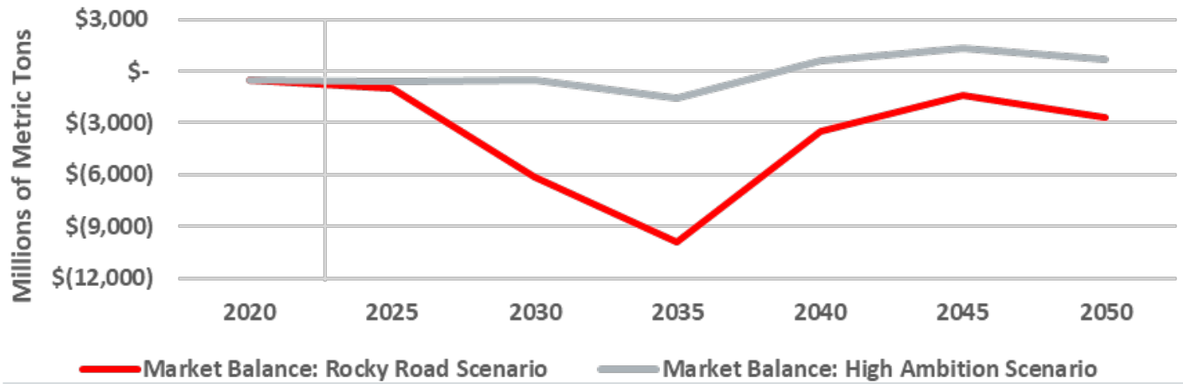
Increasing Copper Needs and the Forthcoming Supply-Demand Gap

Copper will continue to be one of the preeminent commodities as a sign of economic health and its role in the energy transition

Breakdown of Global Refined Copper Usage



Global Copper Market Balance



- Copper is one of the most important base metals because of its wide usage in many sectors of the economy.
- The demand for Copper has been a reliable leading indicator of global economic health, as YoY change in prices correlates well with the ISM Manufacturing PMI and S&P 500 Index.
- The demand for Copper is likely to be driven by energy transition end markets, including transmission and distribution, EV and charging infrastructure needs, Solar PV, wind, and battery storage.
- However, demand from non-energy transition end markets is also expected to continue to grow, rising at a CAGR of 2.4% between 2020 and 2050.
- The anticipated Copper shortfall which is projected to begin in the middle of the decade will have serious consequences across the global economy.

Source: IHS Markit, S&P Global

CME Group’s Role in the Global Copper Market

CME Metals Contracts

Complete Suite of Metals Futures and Options

Precious Metals

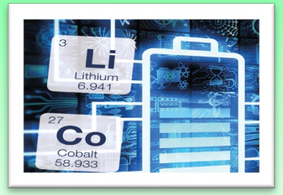
- Gold Futures & Options
- Silver Futures & Options
- Platinum Futures & Options
- Palladium Futures & Options

Base Metals

- Copper Futures & Options
- Aluminum Futures & Options
- Aluminum Premium + Alumina Suite

Ferrous Metals

- Hot-Rolled Coil Steel Futures & Options (U.S. Midwest + European)
- Iron Ore Futures & Options
- U.S. Midwest Busheling Ferrous Scrap Futures



Battery Metals

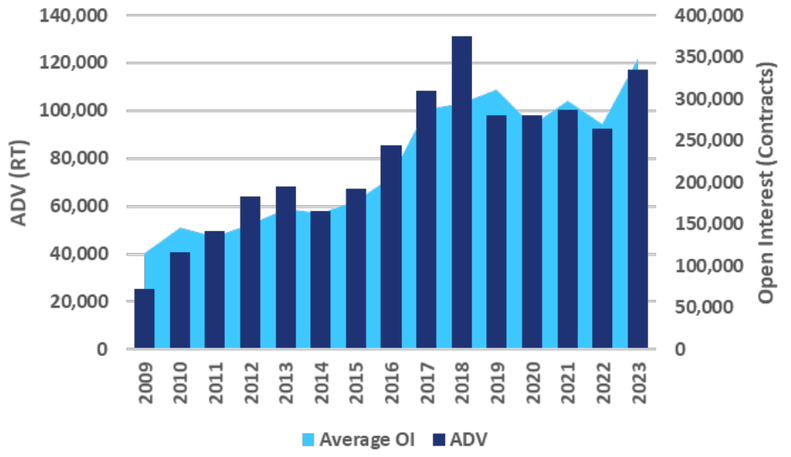
- Cobalt Futures
- Lithium Carbonate Futures
- Lithium Hydroxide Futures

COMEX Copper Market Overview

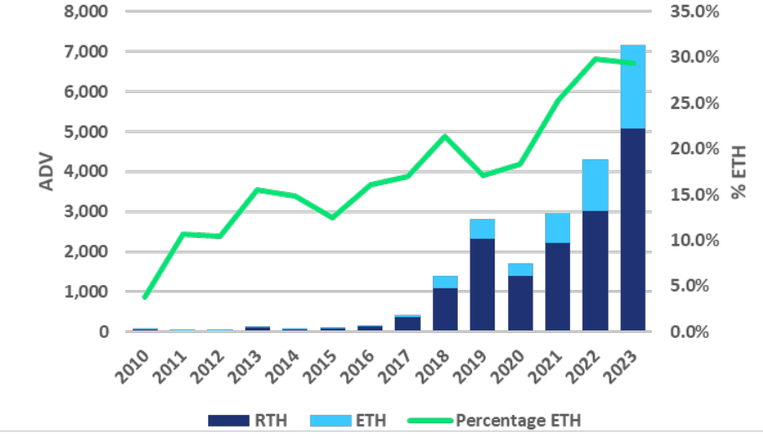
COMEX is a global leader in Copper Futures and Options and one of the best liquidity pools for electronic execution via CME Globex

- As economies boost their investments in infrastructure and renewable Energy initiatives, market participants are utilizing the transparency and global liquidity of CME Group's Copper markets to manage price risk.
- Futures: We continue to electronify the Copper market with screen-based Copper ADV representing over 99% of overall volume traded at COMEX(1).
  - High Grade Copper (Product Code: HG) – Benchmark Copper product
  - Micro High-Grade Copper (Product Code: MHG) – Micro Copper, 1/10th the size of the full-size high-grade contract
- Options: We have evolved market structure by successfully delivering electronic liquidity into a historically voice brokered market to deliver a 5-year CAGR of +48%.
  - Monthly Copper Options (Product Code: HX)
  - Weekly Copper Options, Friday Expiry (Product Code: H1E – H5E)
  - Weekly Copper Options, Monday & Wednesday Expiry (Product Code: HM1 – HM5, HW1 – HW5)
- Financially Settled Copper Futures: Improved collateral and targeted outreach to attract new Commercial participants. Open interest ended 2022 with 176K MT.

ADV and Open Interest(2)



Copper Options Historical ADV by Shift (2)

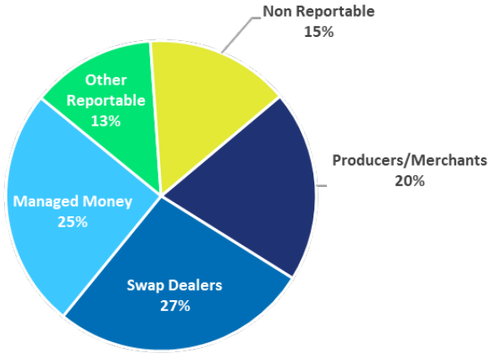


Source: CME Group, CFTC.
(1) Based on 2022 volumes
(2) Through 6/2/2023

COMEX Copper Commitment of Traders Report (CFTC)

COMEX Copper's liquidity profile has improved with growth in activity across all client segments

January 2009 Open Interest:
76K Contracts/862K MT

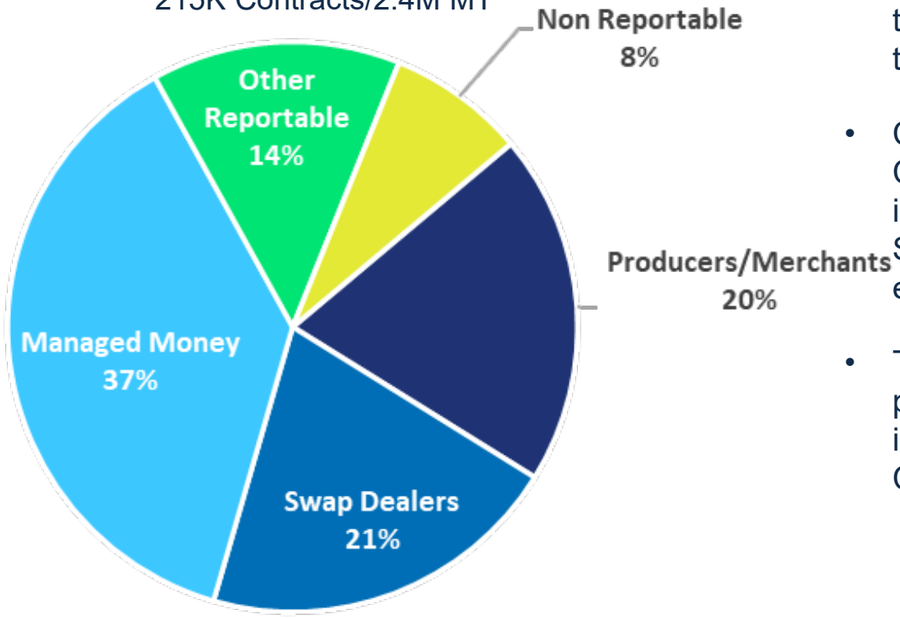


2.8x Growth in Overall Open Interest

2.8x Growth in Physical Participation

4.3x Growth in Managed Money

May 2023 Open Interest:
215K Contracts/2.4M MT



- COMEX Copper clients benefit from a broad spectrum of counterparties; the more diverse a marketplace, the greater the liquidity and the lower the implicit trading costs.
- Clients also benefit from a wide range of Copper contracts offered at CME, including Copper Options, Financially Settled Copper Futures, Micro Copper, etc.
- Trading outside of North America over the past 5 years has grown considerably, indicating the growing relevance of COMEX Copper globally
  - Volumes ex-North America grew at a 16% CAGR from the 10-year period of 2012-2022

CME Group Is Deepening Penetration of the Global Base Metals Market

Becoming the market of choice for Copper by meeting the needs of global physical market participants while adding new financial participants

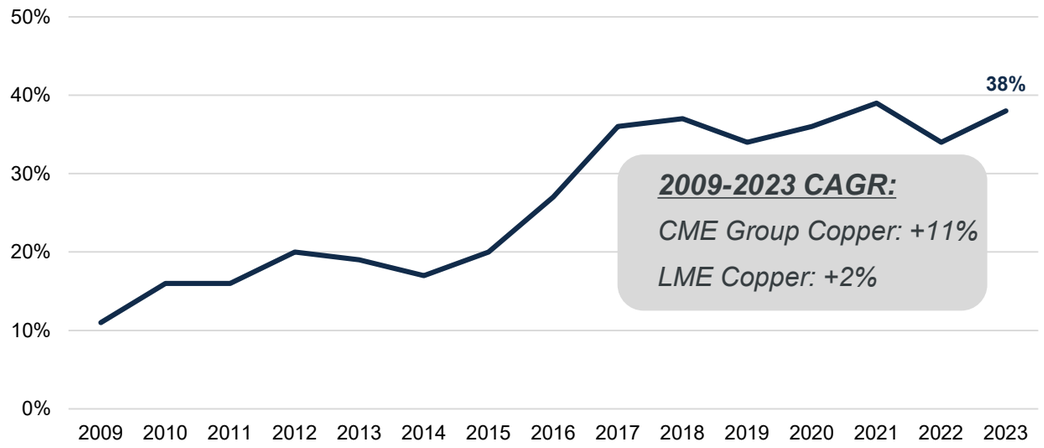
- As economies boost their investments in infrastructure and renewable Energy initiatives, market participants are utilizing the transparency and global liquidity of CME Group's Copper markets to manage price risk.

  - ✓ Futures: We continue to electronify the Copper market with CME's screen-based Copper volume representing 99% of overall volume traded.

  - ✓ Options: We have evolved market structure by successfully delivering electronic liquidity into a historically voice brokered market to deliver a 5-year CAGR of +48% with LME +4%. CME Group Copper options set a record quarterly average daily volume of 8,633 contracts, and YTD ADV is +102% through May '23.

  - ✓ Financially Settled Copper Futures: Improved collateral and targeted outreach is attracting new Commercial participants. Average open interest YTD over 176K MT.

CME Group Copper Futures ADV as % of LME Copper Forwards ADV (in metric tons)(1)



Electronic Venue	2009 Annual Volume	2023 Annual Volume(2)	CAGR
CME Globex	64 Million Metric Tons	284 Million Metric Tons	11%
LME Select	60 Million Metric Tons	108 Million Metric Tons	4%

Sources: CME, Bloomberg, CFTC and LME.
1) LME 3-month volume. 2023 volumes annualized using Jan-May activity.
2) 2023 Annual Volume is annualized using Jan-May volumes for CME and LME

CFTC

COMMODITY FUTURES TRADING COMMISSION

Panel 2: Mitigation Credits

Michael Rolband, Virginia Department of Environmental Equality

Presentation to CFTC's Energy and Environmental Markets Advisory Committee

Mitigation Credits: a Request for Technical Assistance

Mike Rolband, PE, PWD, PWS Emeritus
Director
Virginia Department of Environmental Quality
June 27, 2023

What is Mitigation Banking?

HOW IT WORKS

A Public Works Agency or private landowner needs to impact wetlands and streams, or develop uplands. In the past, they would have had to restore wetlands, streams or reduce nutrients from land development as compensation, either on- or off-site.

Under the market-oriented system, they can go to a "bank" created by a Bank Sponsor who has obtained credit for restoring impaired ecosystems elsewhere in the same portion of the rivershed.

By purchasing mitigation credits from the Bank Sponsor, the mitigation requirements of a permit for impacts is satisfied. Restorers use this pooled money to create much larger, well-designed, & ecologically valuable conservation projects.

Adapted from The Washington Post, February 15, 1996

DEQ

Mitigation Credits: a Request for Technical Assistance to Develop a Trading Platform for Wetlands, Streams and Nutrient Credits in Virginia

- Land Development projects in Virginia may impact wetlands and streams – and increase Nutrients in Stormwater Runoff
- Federal and/or State Regulations allow for a third-party trading system to supply mitigation for these impacts
- These Markets face periodic shortages and price jumps
- Commodities involved are Wetlands, Streams and Nutrient Credits

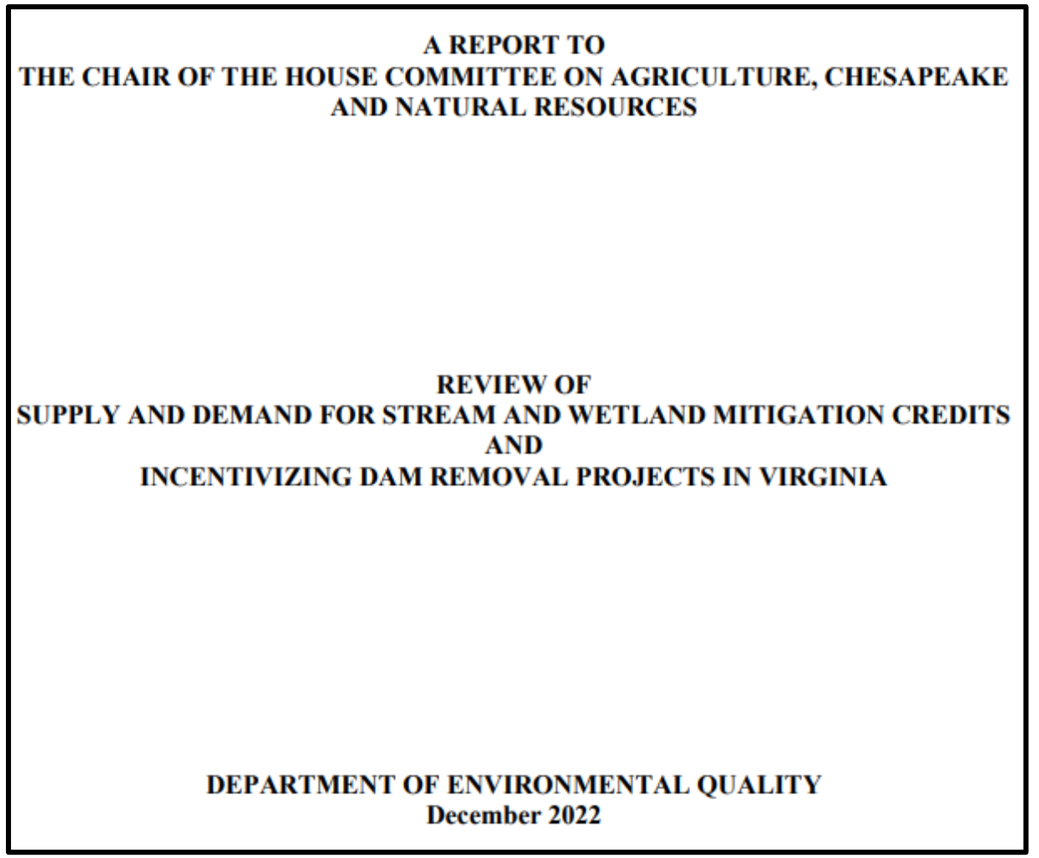
DEQ

Report to the Virginia General Assembly – December 2022

"The fundamental problem of periodic mitigation credit shortages and resulting price jumps…is a combination of:

1. Mitigation bank approval, construction, and credit release times that are slower than market demand time frames.

2. A lack of accurate and timely data on credit supply, demand and pricing- the hallmarks of a true "free market."



A REPORT TO
THE CHAIR OF THE HOUSE COMMITTEE ON AGRICULTURE, CHESAPEAKE AND NATURAL RESOURCES

REVIEW OF
SUPPLY AND DEMAND FOR STREAM AND WETLAND MITIGATION CREDITS
AND
INCENTIVIZING DAM REMOVAL PROJECTS IN VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
December 2022

DEQ

3 Step Solution:

- Speed up Approval Process by Developing an MOA with The US Army Corps of Engineers to reduce duplication and create a schedule (Signed: March 29, 2023)

Pictured (from left to right): DEQ Office of Wetland and Stream Protection Director Dave Davis, DEQ Director Mike Rolband, Virginia Secretary of Natural and Historic Resources Travis Voyles, USACE Norfolk District Colonel Brian Hallberg, USACE Norfolk District Regulatory Branch Acting Chief Andy Beaudet

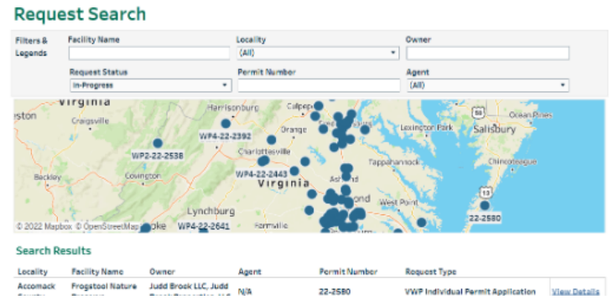
- Develop a Module in DEQ's new Permitting Enhancement and Evaluation Platform (PEEP) system to track progress against the schedule (Live data: Feb 27, 2023)

Permitting Enhancement and Evaluation Platform (PEEP)

The **Permitting Enhancement and Evaluation Platform** **(PEEP)** for Virginia Water Protection Permits and wetland mitigation banking is now available.

PEEP brings transparency to DEQ's permitting processes by providing current information about the critical steps and permitting schedules associated with obtaining permit approval(s). PEEP displays where each application is at in the permit process. The platform can be used by applicants, agents, the public, and DEQ staff to track and manage permitting and approval processes.

Try it out



- Develop a mitigation trading platform for Virginia – **RFP in Preparation**

DEQ

The Result - DEQ Initiative #4: Commodity Trading Platform

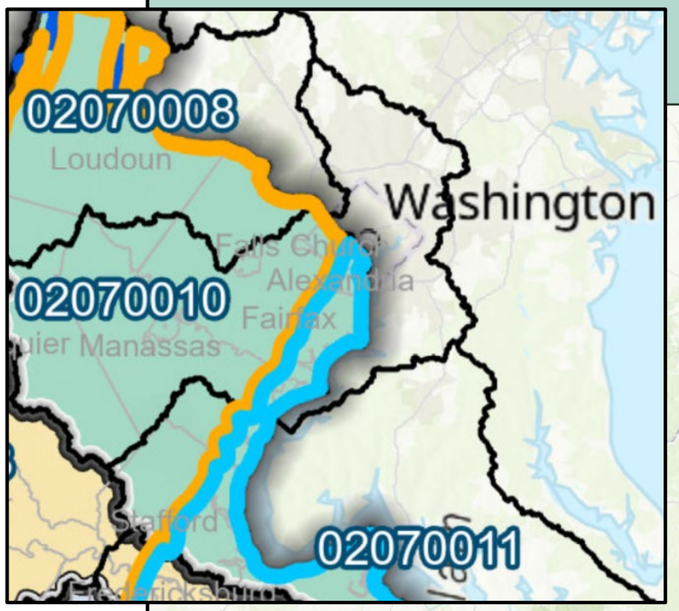
- Develop trading platform for water-related commodities to provide transparency for permittees with regard to prices and supply and demand
- Assist market in meeting demands of a strong economy
- RFP development underway
- **Coming in FY 2024!**

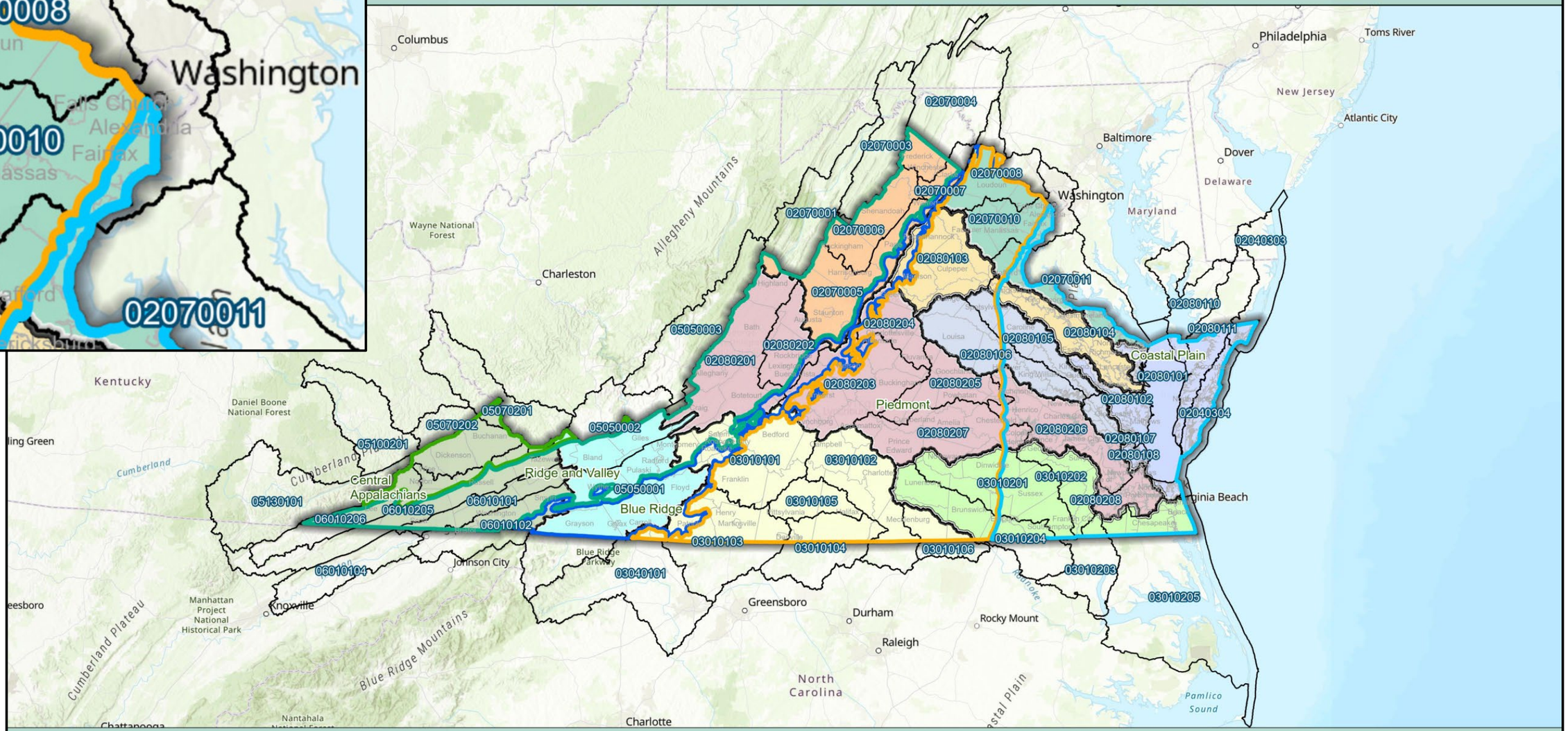
Unique Aspects in Virginia

- Need the ability to allow investors to purchase and resell credits to increase capital availability and provide market liquidity
- Credits must expire when wetland and stream impacts commence, or land disturbance commences (for nutrients)
- Currently no trading of credits are allowed – resulting in “stranded” credits.
- There is a state law establishing maximum service areas based on watersheds, and some banks have additional physiographic limitations - so each bank has a semi-unique trading area

DEQ

Virginia River Watersheds





Legend

Virginia Physiographic Regions
- Blue Ridge
- Central Appalachians
- Coastal Plain
- Piedmont
- Ridge and Valley

River Basin
- Ches. Bay and Small Coastal Basin
- Chowan and Dismal Swamp River Basin
- James River Basin
- New River Basin
- Potomac River Basin
- Rappahannock River Basin
- Roanoke River Basin
- Shenandoah River Basin
- Tennessee and Big Sandy River Basin
- York River Basin

- Subbasins (8-digit Hydrologic Units)
- Virginia County Boundaries
- Virginia State Boundary

0 30 60 120 Miles

N

Source:
Physiographic Provinces: Modified from US Environmental Protection Agency Level III Ecoregions of the Continental United States. 2013 https://gaftp.epa.gov/EPADataCommons/ORD/Ecoregions/us/us_eco_l3.zip
River Basin & Subbasins (8-digit Hydrologic Units): USGS 2023

Additional Map Credits:
VGIN, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS, Esri, USGS

DEQ

Thank you for your time!

The Virginia Department of Environmental Quality looks forward to learning if the Commodity Futures Trading Commission can help us in developing a commodity trading platform for wetlands, streams and nutrient credits.

DEQ

CFTC

COMMODITY FUTURES TRADING COMMISSION

Panel 3: Subcommittee Kickoff

Alternate Secretaries

Lillian Cardona

Physical Energy Infrastructure

JonMarc Buffa

The Role of Metals Markets in Transitional Energy

Physical Energy Infrastructure Subcommittee

Subcommittee Members

- Dr. Tim Fitzgerald, Texas Tech University – Chair
- Dr. Evren Damar, Hobart and William Smith Colleges
- Dr. Cortney Cowley, Federal Reserve Bank of Kansas City
- Rob Creamer, FIA PTG
- Demetri Karousos, Nodal Exchange, LLC
- Jackie Roberts, West Virginia Public Citizen Commission
- Dena Wiggins, Natural Gas Supply Association
- Matt Agen, American Gas Association
- Paul Cicio, Industrial Energy Consumers of America
- Frank Hayden, Calpine Corporation
- Paul Hughes, Southern Company
- Matt Picardi, Commercial Energy Working Group
- Sarah Tomalty, BP Energy Company
- Jeffrey Walker, ACES
- Peter Keavey, The CME Group

Physical Energy Infrastructure Subcommittee

Purpose

To provide a report to the EEMAC that will evaluate what is required to ensure the energy markets in the United States remain resilient despite the numerous strains on the system globally

Physical Energy Infrastructure Subcommittee

Topics

- Identify the state of infrastructure of various energy markets, including but not limited to, oil, natural gas, and electricity, and examining how investment in infrastructure in recent years has contributed to the current state of infrastructure

- Examine how the current state of energy infrastructure has impacted market fundamentals, such as supply and demand, price discovery, price volatility, and market participation

- Identify key issues facing energy derivatives markets that are related to or a result of energy market fundamentals and dynamics

- Examine if and how financial regulation can address current issues in the energy derivatives markets

The Role of Metals Markets in Transitional Energy Subcommittee

Subcommittee Members

- Dr. Ian Lange, Colorado School of Metals – Chair
- Dr. Evren Damar, Hobart and William Smith Colleges
- Dr. Cortney Cowley, Federal Reserve Bank of Kansas City
- Bill McCoy, Morgan Stanley
- Bob Anderson, Committee of Chief Risk Officers
- Greg Broussard, Cargill, Inc.
- Jean-Marc Monrad, Vitol, Inc.
- Frank Macchiarola, American Petreolem Institute
- John Murphy, Mizuho Securities USA, LLC
- Jamila Piracci, Life:Powered
- Sneha Bagri, OTC Global Holdings, LP
- Jin Chang, The CME Group

The Role of Metals Markets in Transitional Energy Subcommittee

Purpose

To provide a report to the EEMAC that will examine the role of critical metals in transitional energy sources and their potential impact on derivatives markets

The Role of Metals Markets in Transitional Energy Subcommittee

Topics

- Identify metals that are used as components in transitional energy sources and their related derivatives markets, or lack thereof
- Examine how the increased demand for certain metals impact existing derivatives markets
- Examine the issues around creating new derivatives markets for metals that will be integral in transitional energy
- Examine if and how financial regulation should change given the increased demand on and need for metals derivatives markets

Subcommittees

- Meetings will likely be monthly, but cadence will be determined within each subcommittee
- Work plan/work schedule/report writing process will also be determined within each subcommittee
- First meetings will be in July

Closing Remarks