



South Asia Energy Series

Electricity Derivatives: Mitigating Power Market Risks with Electricity Derivatives

February 19, 2024 – Part: I

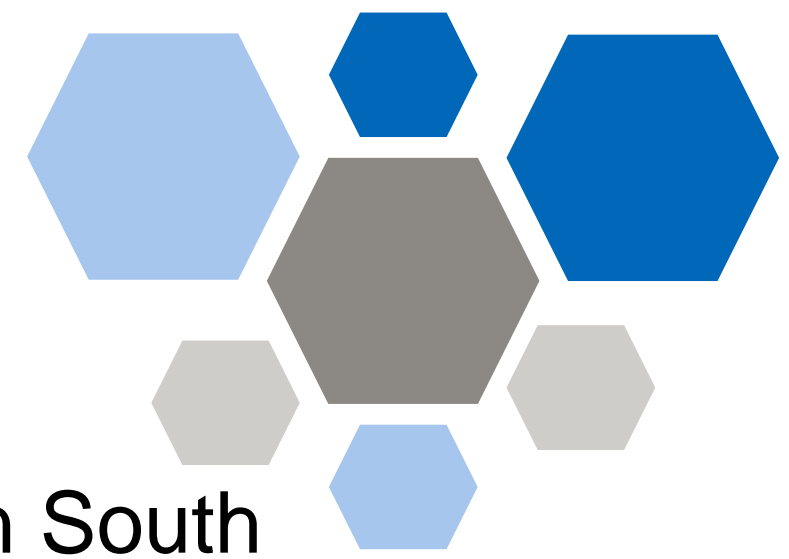
Session: Program Plan and Context

Pramod Thakur, SAREP

South Asia Regional Energy Partnership (SAREP)



Key objectives of this **South Asia Energy Series**



- **Promote sustainable market based trade mechanism** for electricity in South Asia region.
- Facilitate the **creation of Electricity Derivatives markets** and suitable products through dialogue, facilitation of policy and regulatory actions, and support for implementation.
- Enhance the **Institutional and Individual's capabilities** among policy makers, regulators, utilities, private sector organizations on hedging products
- **Increase awareness of concept** of Electricity Derivatives, sharing international experiences, case studies among power market participants



Context

Power sector overview in the South Asian countries



Nepal



- Bi-lateral trades are predominant,
- Periodically buying and selling through power exchanges (PX), becomes net exporter
- Increasing CBET

Bhutan



- Selling through bi-lateral route,
- Buying power during lean season and started selling through power exchanges
- Significant increase in demand due to industrial activities
- Increasing CBET

India



- ~7-8% is being traded through exchanges, majority through long term
- Rapidly expanding renewable portfolio
- Changes in the regulatory landscape and market
- Increasing demand (peak)
- Increasing CBET

Bangladesh



- Bi-lateral trades, dependence of electricity change from domestic gas to imported fuel
- Increase in reliance on imported fuels (coal, gas, oil), also import electricity from India on bilateral basis
- Evaluating options for CBET through exchanges

Sri Lanka



- Significant focus on renewable energy
- Reforms and Restricting is underway
- Discussions around cross border electricity trade (CBET) is at advance stage

Increase in:

- Market Based Trade
- Reliance on imported Energy sources
- Intermittent renewable energy
- Developing power market

Variation in Demand patterns

Variation in Generation

Increasing Renewable energy generation as well focus of clean energy

Rapid adoption on technologies

Market opportunities

Increasing complexities in power markets (market structure, policies and regulatory changes, newer products etc)

Infrastructure development (smart metering, operating data availability, enterprise information etc)

Increasing customer's expectations

Some of concerns in Electricity Trade



Change in the Power market structure

Increase in the peak demand

Variation in demand Vs actual requirements

Regulatory risks

Focus on alternate energy, shift from traditional once

Technological changes

Geo-political disturbances

Weather change/climate impact

Price variation

Political

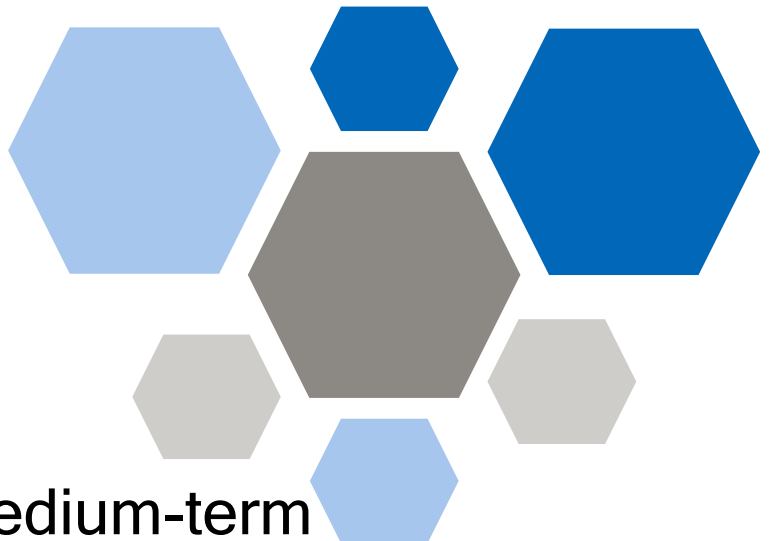
Delays in the projects (Generation/Transmission)

Commercial matters like payments, forex

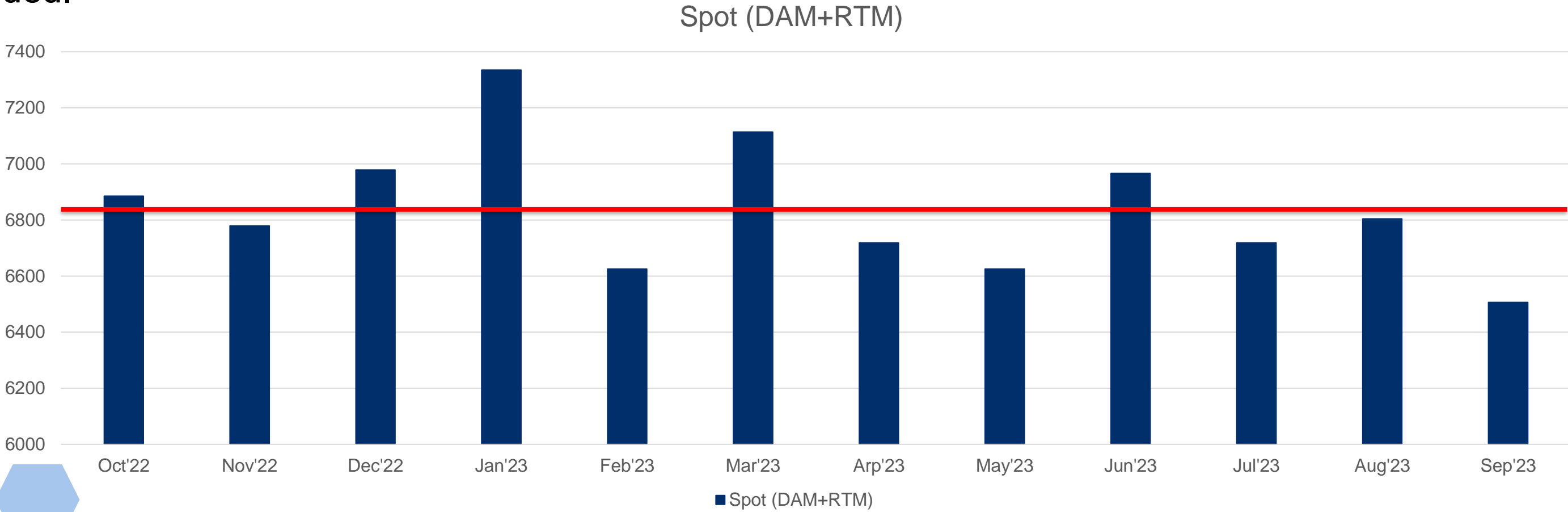
Increasing customer's expectation



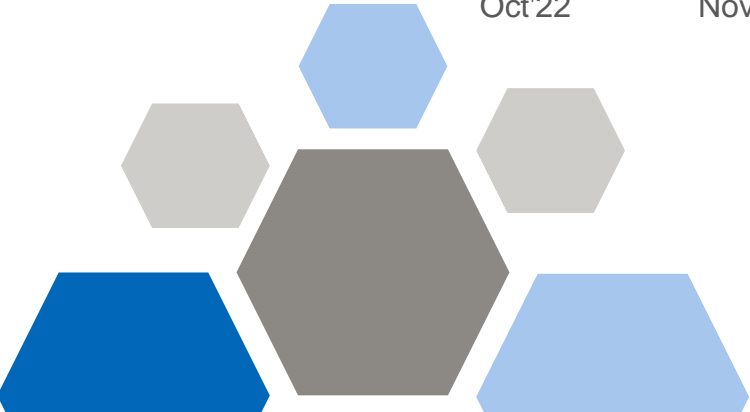
Key trends South Asia- India



- In the South Asia region, India's power market is among most developed and vibrant.
- Short-term trade (less than 1 year) comprises approximately 14%, with 86% from long/medium-term contracts.
- The country has three power exchanges and one centralized portal (DEEP) for short-term and spot trading.
- Power exchange-based trade constitutes approximately 6-7% of total trade, with about 80 BUs being traded.



Avg. 6838 MUs per month
5.7% of total generation

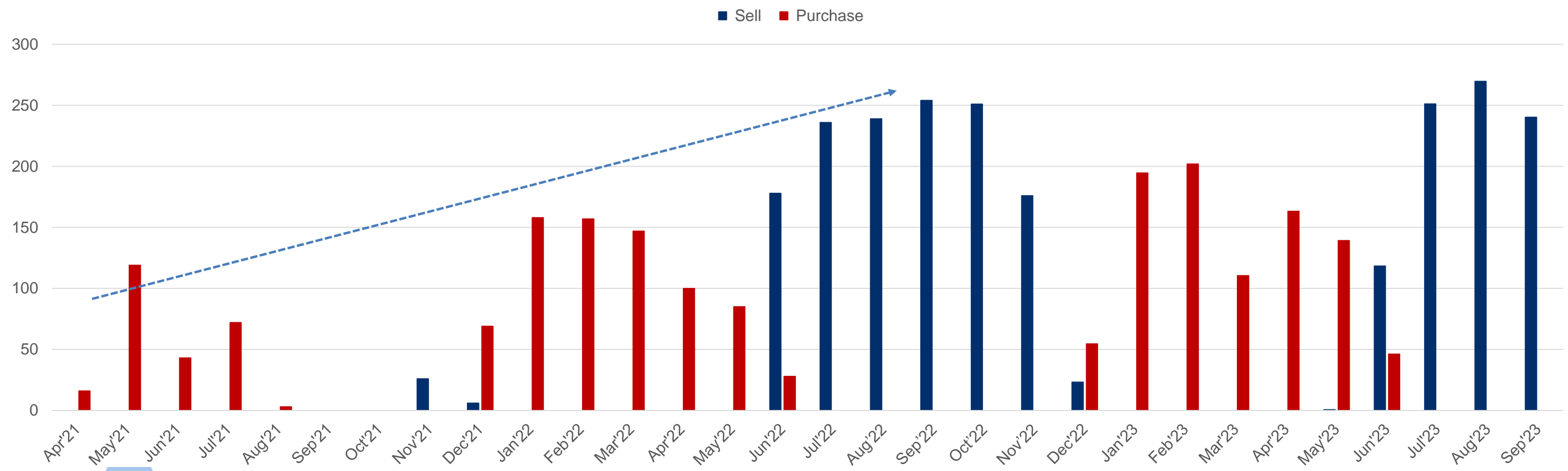


Key trends South Asia-Nepal



- Nepal began procuring power from the Indian power exchange in April 2021 and has consistently utilized the power exchange for trading.
- Additionally, Nepal has sold electricity from various approved hydroelectric projects in the Indian Day-Ahead Market (DAM) and Real-Time Market (RTM).

Trading quantum (MUs) by Nepal in Indian PX

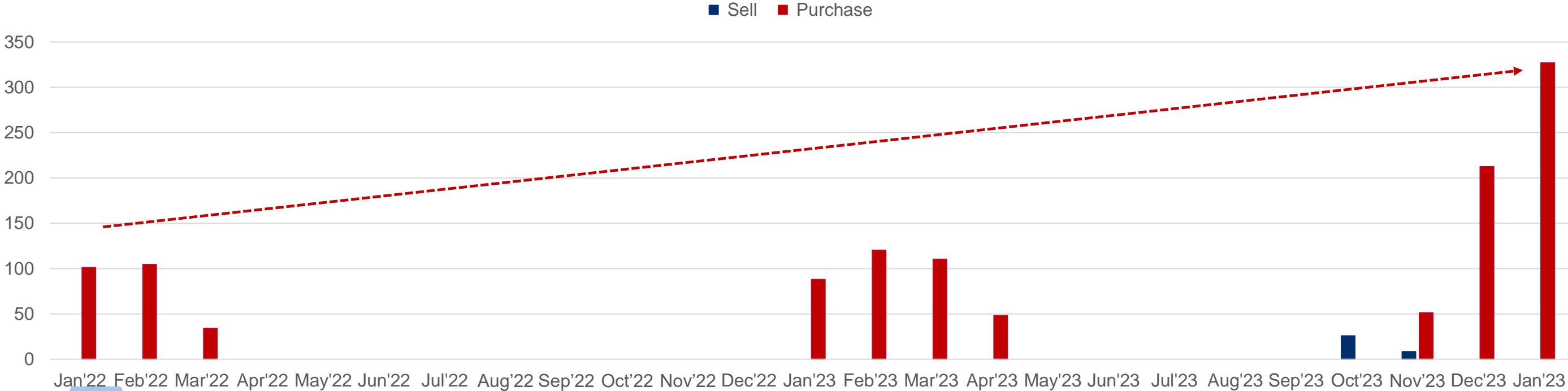


Key trends South Asia- Bhutan



- Bhutan commenced trading power through the Indian power exchange on January 1st, 2022.
- Since then, Bhutan has consistently drawn electricity from Indian power exchanges during the lean season.
- Bhutan primarily buys from the power exchange but has recently begun selling electricity from the Basochhu Hydroelectric Project.
- Bhutan engages in trading through both the Day-Ahead Market (DAM) and Real-Time Market (RTM) segments of the power exchange.

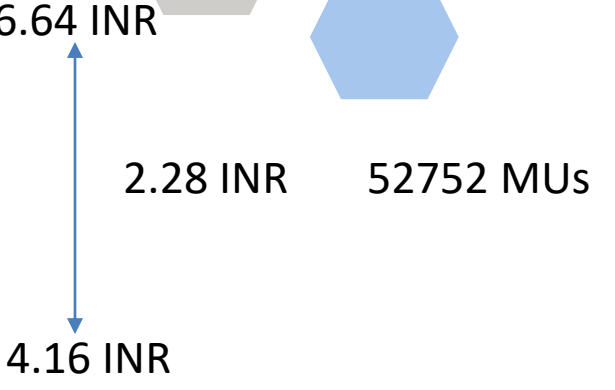
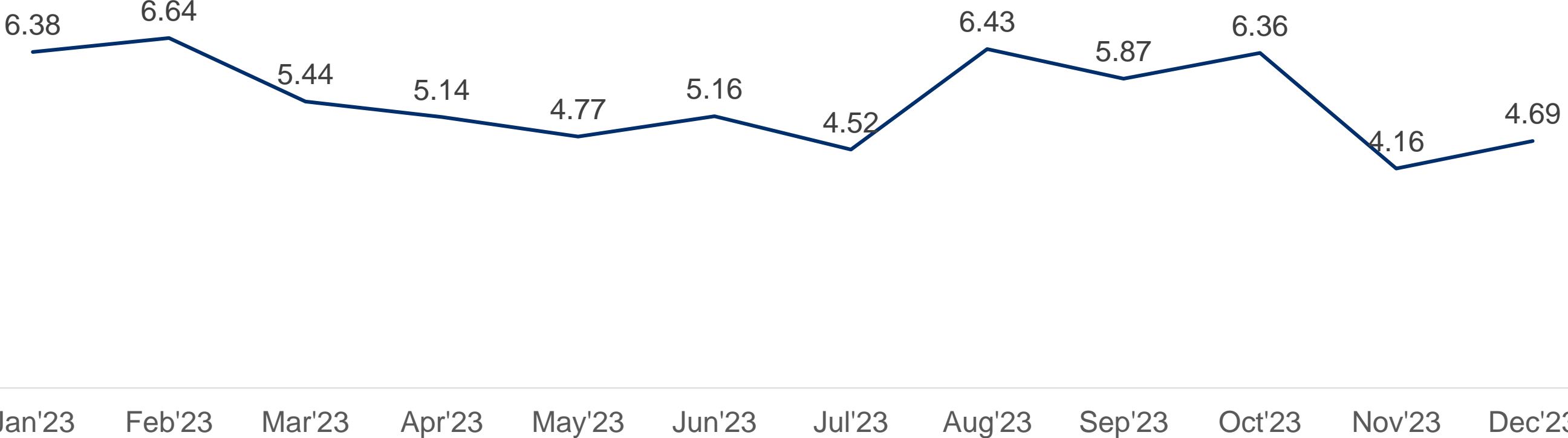
Trading quantum (MUs) by Bhutan in Indian PX



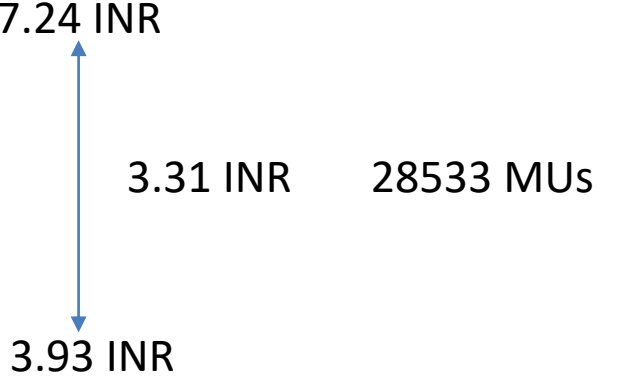
Monthly Trends in spot markets (DAM, RTM)



Monthly Wt. Avg. clearing price-DAM (INR)



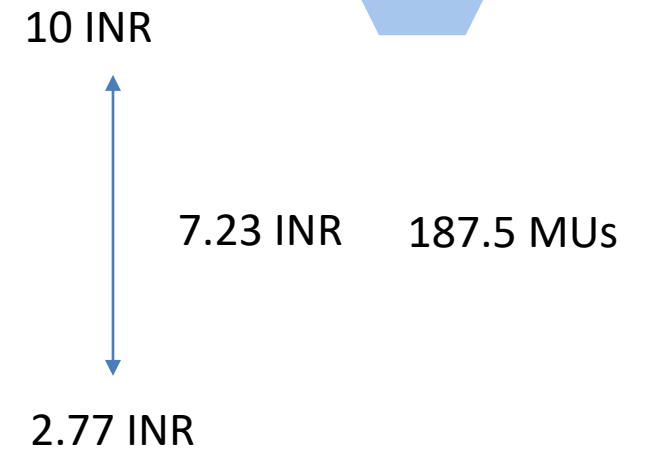
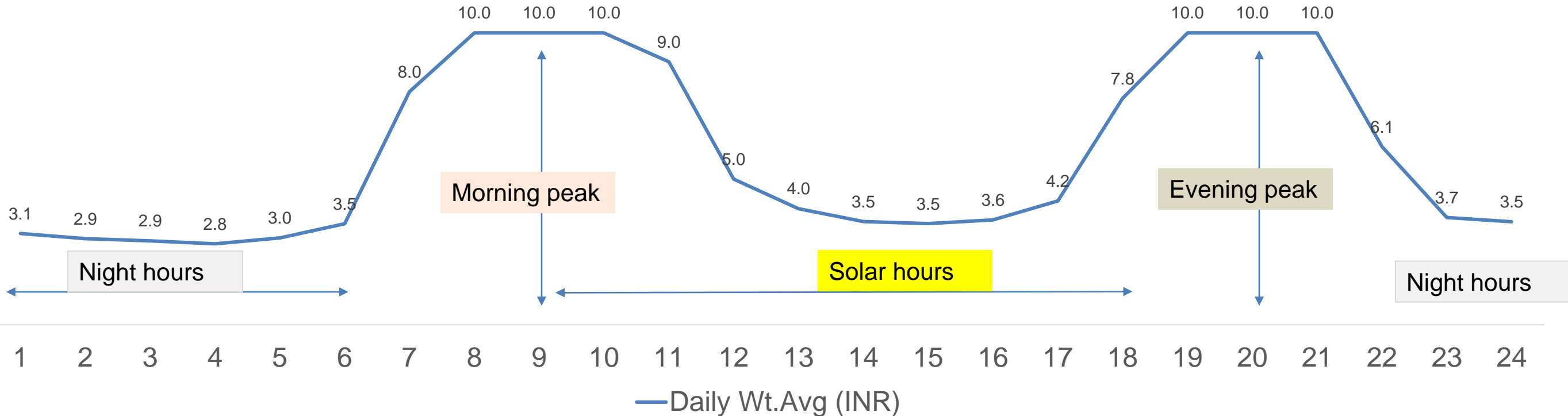
Monthly Wt. Avg. clearing price-RTM (INR)



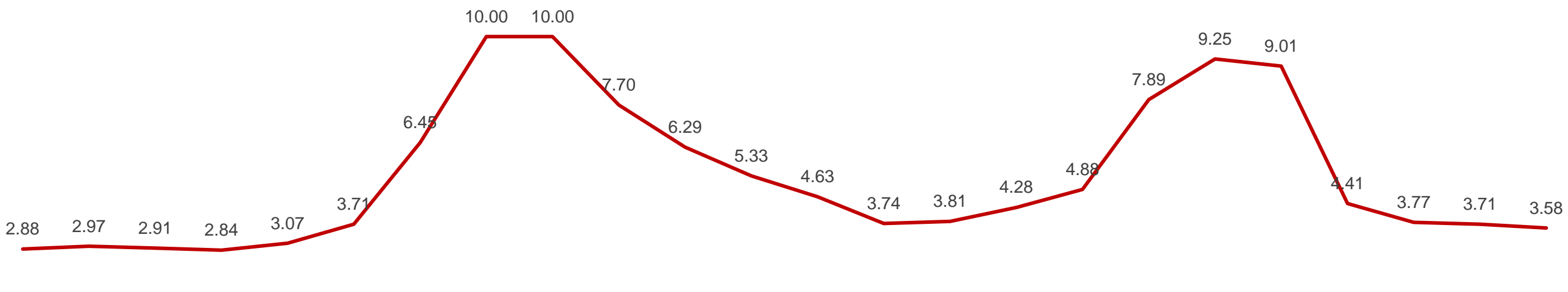
Daily Trends in spot markets (DAM, RTM) - 13 Feb 2024



Monthly Wt. Avg. clearing price-DAM (INR)



Monthly Wt. Avg. clearing price-RTM (INR)



How to handle the volatility from utility perspective

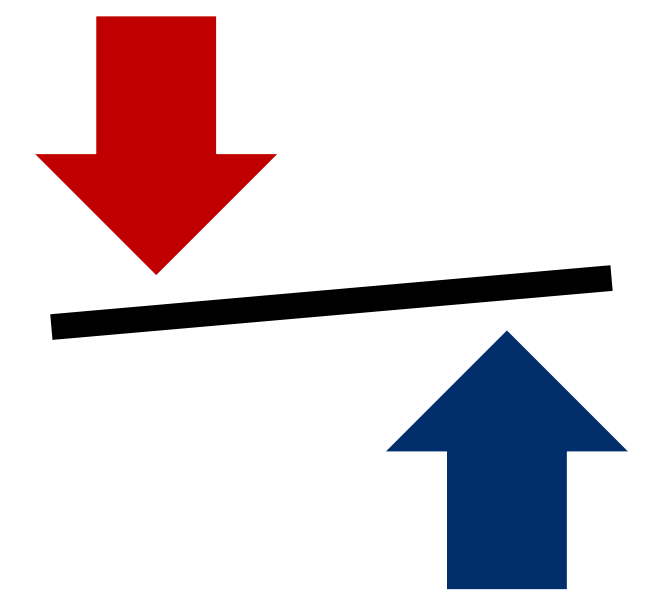


Improve Business Operations

- Enhance demand assessment accuracy
- Predict and plan generation carefully
- Enhance capabilities for power trade using advance tools
- Improve power system operations
- Manage Imbalances (due to variation in demand, generation, outages etc) efficiently

Hedge your risk

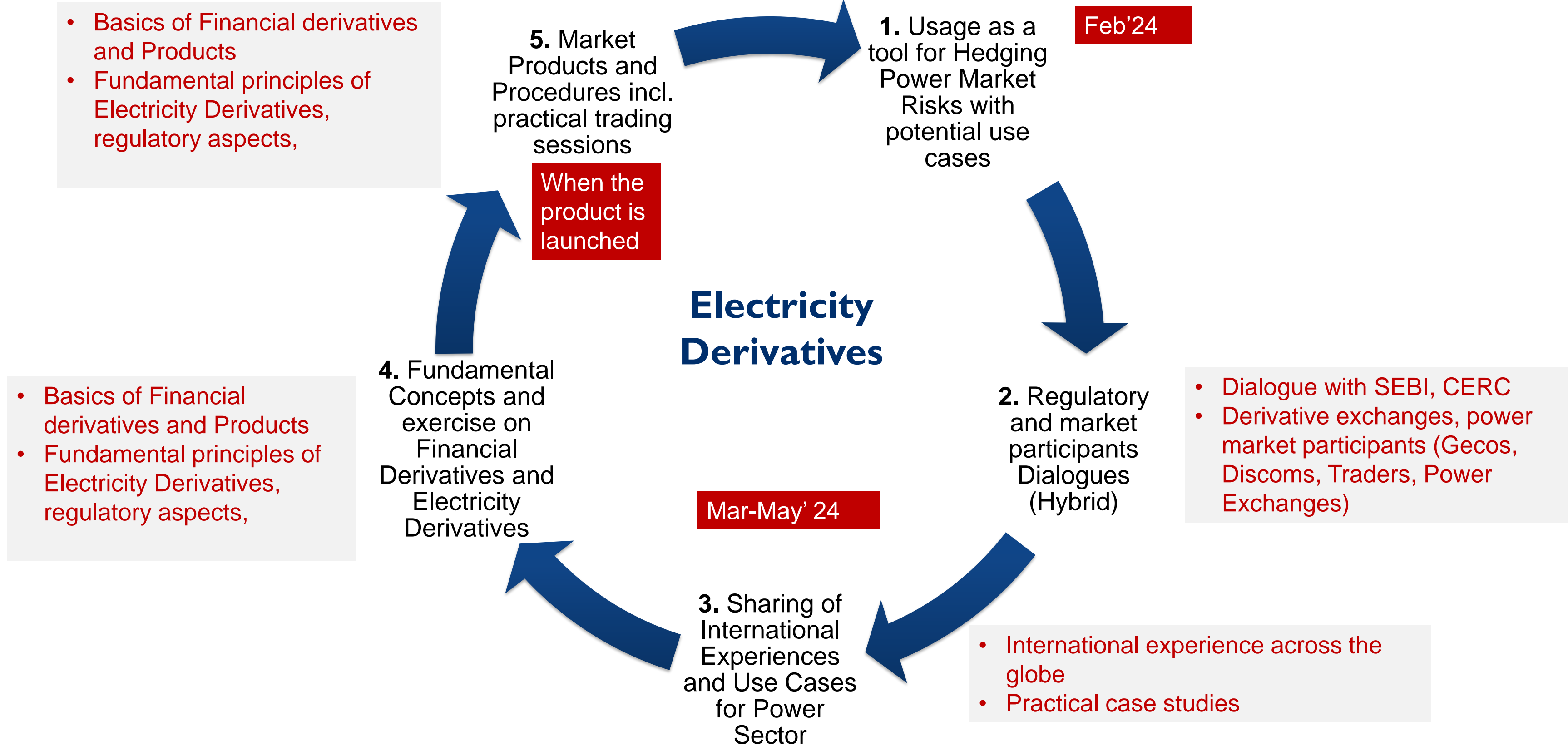
- Electricity Derivatives



Combined Approach

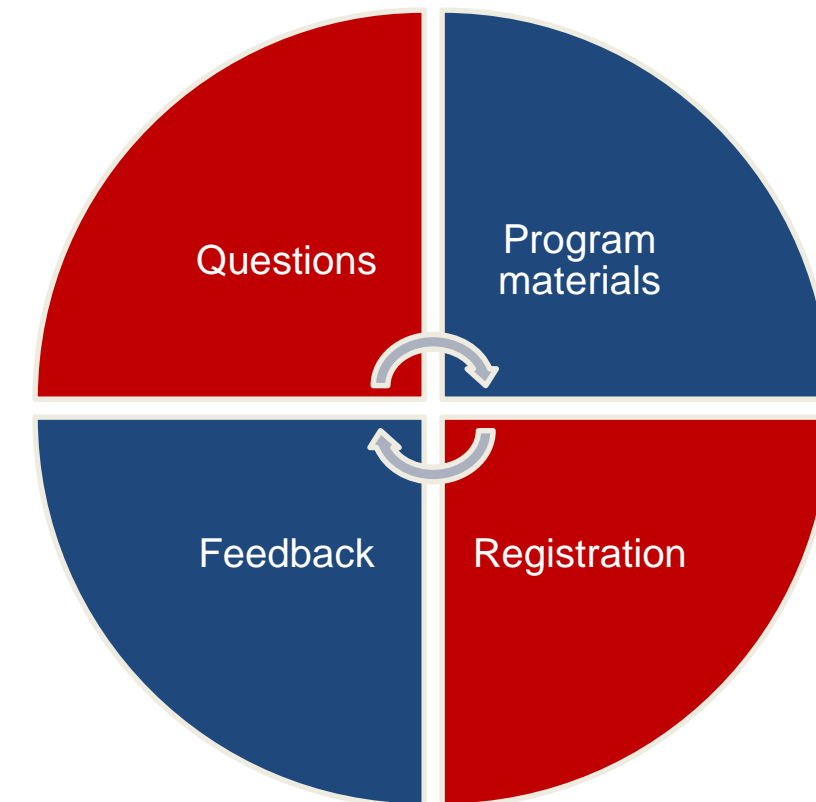


Plan of South Asia Energy Series on Electricity Derivatives





Key aspects relating to the Program

- Please enter your **questions in the** designated **Q&A text boxes**, and the speaker will address them towards the end of the session.
- **Presentations/recording** will be **circulated** in a 10 days time.
- **Separate registrations** will be required for subsequent sessions, however intimation to all the registered participants for Part-I will be provided
- **Provide your feedback** to the link shared by us.



Today's agenda

Technical Session 1: Commodity's Exchange Perspective		
14.20 -15.35 pm (75 minutes)	<ul style="list-style-type: none"> • Introduction to Electricity Derivative Markets • International experience on usage of Electricity Derivatives • Current status of development of Electricity Derivative market in India • Product Features and key benefits • Derivative pricing, trading, clearing and settlement • Procedures and requirements for trading in electricity derivatives • Q&A 	 <p><i>Largest commodity derivatives exchange</i></p>
Technical Session 2: Electricity Trader's Perspective		
15.35-16.06 (30 minutes)	<ul style="list-style-type: none"> • Electricity Trader's perspective on electricity derivatives • Potential use case of electricity derivatives for generators, discoms/C&I consumers (cases on hedging and speculation) • Q&A 	 <p><i>Largest Electricity Trader in the South Asia</i></p>
Conclusion		
16.05-16.10 pm (5 minutes)	<ul style="list-style-type: none"> • Conclusion, and valedictory 	SAREH

Speaker's profile



Ms. Ruchi Shukla
Head - Energy
MCX India Ltd



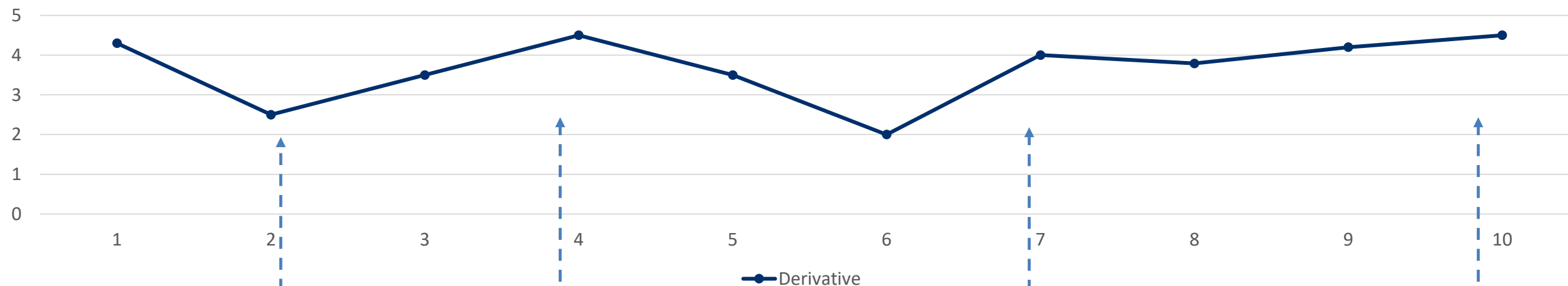
Mr. Rajesh Cherayil
Chief Strategy Officer
PTC India Limited

Financial Derivatives Basics

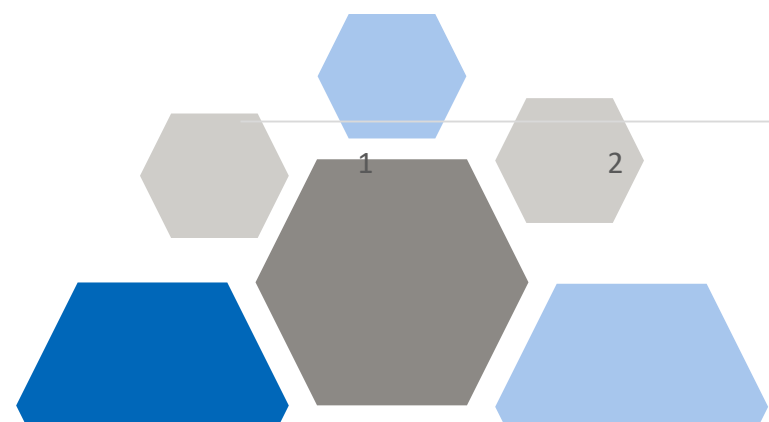
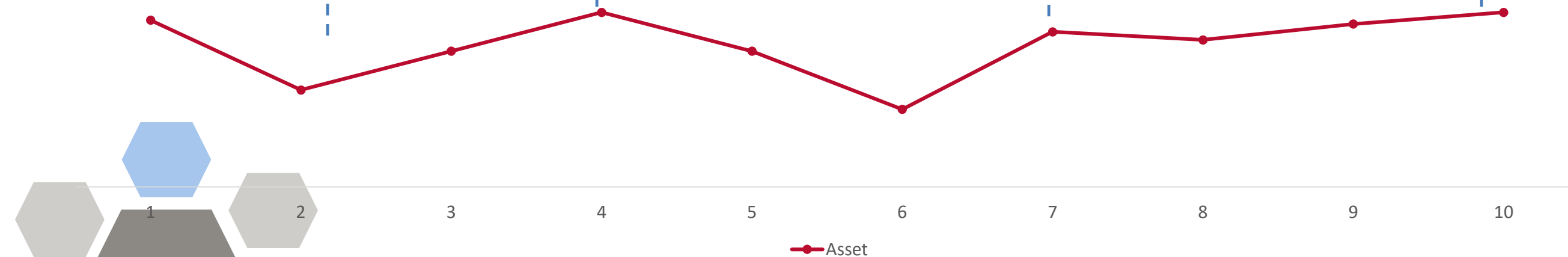


- Financial derivatives are financial instruments whose value is derived from the value of an underlying asset, index, or rate.
- They are used for hedging risks, speculation, and arbitrage.

Derivatives price



Underlying asset



Financial Derivatives Basics



Futures Contracts: These are standardized agreements to buy or sell a specified asset at a predetermined price on a future date. Futures contracts are traded on exchanges and are used for hedging or speculation.

Options: Options give the holder the right, but not the obligation, to buy (call option) or sell (put option) an underlying asset at a predetermined price (strike price) within a specified time period. Options provide flexibility and can be used for hedging or speculation.

Forwards Contracts: Similar to futures contracts, forwards are agreements to buy or sell an asset at a future date at a price agreed upon today. However, forwards are customized contracts traded over-the-counter (OTC) and are not standardized like futures contracts.

Swaps: Swaps are agreements between two parties to exchange cash flows or other financial instruments over a specified period. Common types of swaps include *interest rate swaps*, *currency swaps*, and *commodity swaps*. Swaps are used for managing interest rate or currency risk, among other purposes.

Contract for Difference (CfD) is a financial contract between two parties, typically a seller and a buyer, where the seller agrees to pay the buyer the difference between the current value of an underlying asset and its value at the time the contract is settled.

Speaker's profile



Ms. Ruchi Shukla

**Head - Energy
MCX India Ltd**

- A Chartered Accountant, with over **20 years of experience in Financial & Capital Markets** across various functions - *Product Development specializing in Energy Sector, Policy Research & Advocacy with Ministries, Regulators & Government Bodies and Risk management.*
- She has also done DISA, Securities Market Law and Advanced Business Analytics from IIM Ahmedabad.
- She has worked with a wide range of organizations including Regulator, Stock Exchange and Bank and was also appointed as expert consultant by Forward Markets Commission, Govt. of India.
- Presently she is spearheading Energy Products and Strategic Initiatives at MCX. She manages relationships with large members/broking houses (pan India), corporates in financial sector and forges alliances with industries for energy price risk management.
- She is a regular speaker & panelist at strategic & product conferences organized by the Exchange, premier product association, ICAI, Business schools etc.
- She received the 'CA CXO Award' during the 17th The Institute of Chartered Accountants of India (ICAI) Awards in January 2024. She was awarded 'Women in Commodities Award' at the Commodity Trading Awards 2023, at Commodity Trading Week in London, organized by Commodities People.

Speaker's profile



Mr. Rajesh Cherayil
Chief Strategy Officer
PTC India Limited

- Rajesh Cherayil, currently serving as the Chief Strategy Officer at PTC India Limited since August 2019, has been pivotal in spearheading crucial capital allocation projects and strategic transactions within the organization.
- He has handled treasury operations at PTC India and PTC Financial Services, investing in capital markets and commodity markets, including derivatives markets.
- His role extends to overseeing the operations of the Data Analytics Department, providing critical support to various internal departments and external stakeholders.
- Prior to this, Rajesh Cherayil served as the Managing Director at Nereus Consultants Private Limited from 2011 to 2019. During his tenure, he successfully raised capital for the Nereus India Alternative Energy Fund and led investments in diverse renewable energy sectors, including wind, solar, small hydro, biomass, and energy efficiency projects.
- He was responsible for seamless execution of various solar PV projects, even in challenging terrains and demanding contract negotiations. Earlier, he was also the first Head-Investments and Project Finance at Green Infra Limited, an IDFC PE platform
- Rajesh is B.Tech graduate from IIT Delhi and PGDBM from IMT, Ghaziabad

Thank You

Contact:
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