MAEKETING OF ELECTRIC POWER AND RELATED CONTEMPORARY ISSUES

Sher Singh Bhat

OUTLINE

- Marketing and Markets of Electricity
- Nepal Power Sector
- Indian Power Market and its Operation
- Nepal Marketing Strategies

SECTION 1
Marketing and Markets of Electricity

MARKETING OF GENERAL CONSUMABLE PRODUCTS

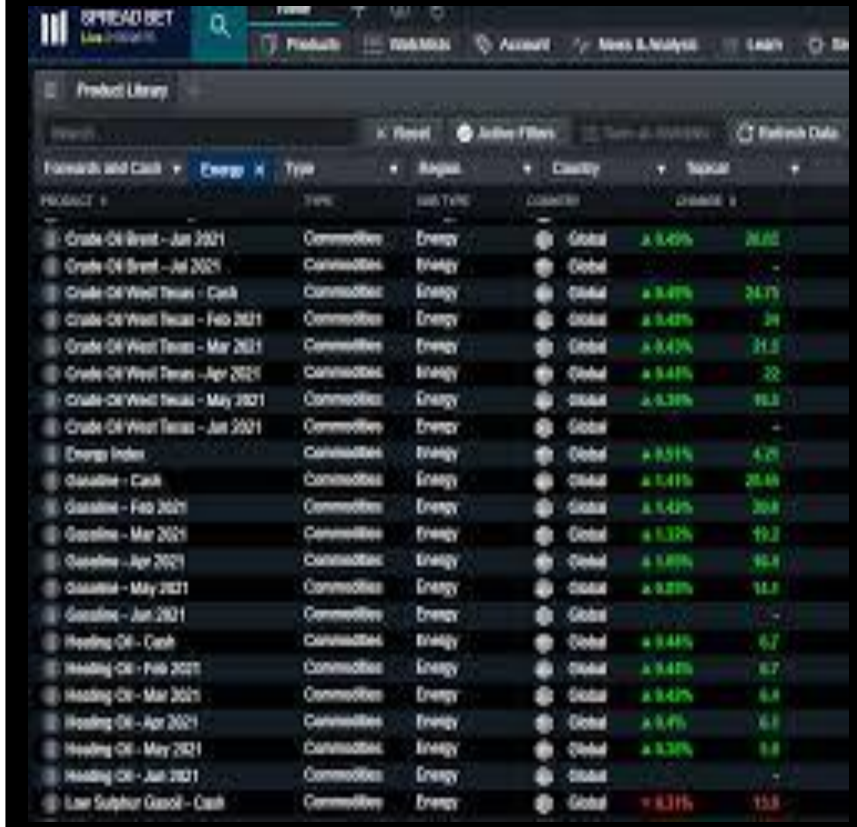
Product	Marketing
General consumable products like rice, lentils, potato and eggs etc.	▪ Physically demonstrated by producer/ supplier at the market place. ▪ Quantity of purchase sale deal at market price is finalized between seller and buyer. ▪ Finalized purchase sale quantity is measured and delivered to purchaser at the market place itself in real time. ▪ For the international marketing, the product crosses international border only after physically confirming the quantity at the customs point paying the custom duty and other applicable charges.
Note	▪ Although digital trading platforms offering home delivery are also operational now.

ELECTRICITY HAS TYPICAL ATTRIBUTES TO MARKETING IT

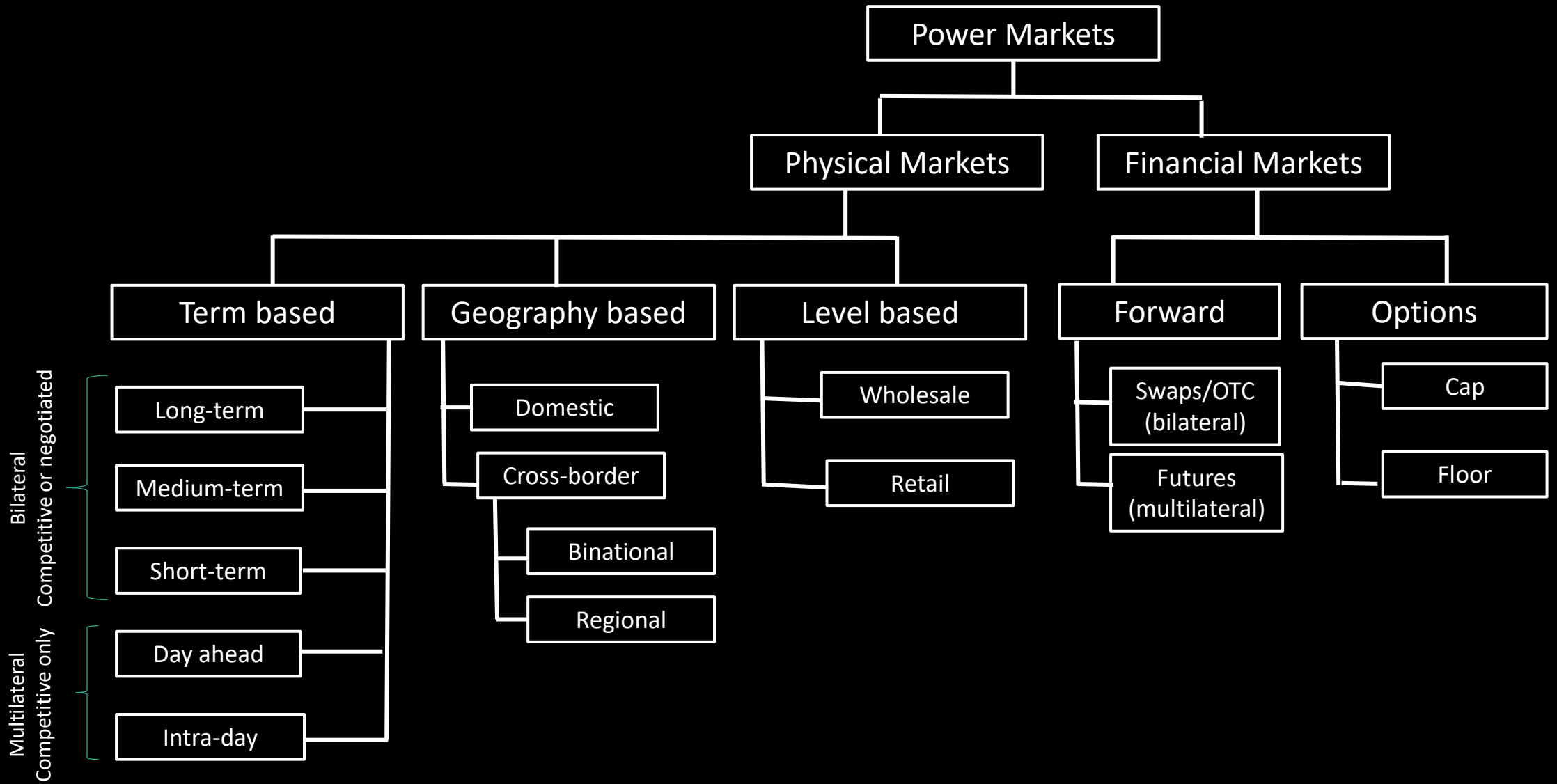
Product	Marketing
Electricity is a typical product, and its marketing is not as simple as the other consumable products	▪ **Intangible:** cannot be demonstrated in the physical form at the marketplace. ▪ **Non-storable:** Has to be consumed while generated in real time. ▪ **Direct connection:** It needs a hard wires connection from generator to consumer. ▪ **Non-measurable at custom point:** Impex Volume cannot be confirmed at custom point for international marketing. ▪ **Real time deviation:** Transaction of power in real time often deviates from the volume of purchase sale deal concluded in advance.
**Note	▪ Due to these typical product attributes, marketing of electricity has been a challenge.

TYPICAL MARKET OF ELECTRICITY

- **Special Market Rules:** Special market rules developed for operationalizing markets of electricity.
- **Deal in Advance:** Purchase and sale quantity is contracted in advance of production. Marketplaces may be virtual/digital also.
- **Generation and consumption in Real Time:** As per the deal closed in advance, electricity is consumed by purchaser and generated/delivered by producer in real time.
- **Deviation Settlement:** Irrespective of the terms of the deal, there will be deviations in consumption and/or supply in real time. Such real time deviations in supply or consumption are settled with "Deviation Settlement Mechanism (DSM)".
- **Many types Electricity Markets Operational:** Likewise for other products, various physical and financial markets of electricity have been developed and are operational.
- ****Note:** Efforts are ongoing to create all types of physical and financial markets of electricity that are available for other products to make electricity a perfect market product.



ELECTRIC POWER MARKETS



TERM BASED PHYSICAL MARKETS (1)

No classification of such markets in Nepal. India has clear categorization as follows:

- Intra-day Market : Deal closed 2 hours in advance (operated by exchanges)
- Day-ahead Market (DAM): Deal closed 24 hours in advance (operated by exchanges)
- Short-term market: Upto one year period (Court case by forward market commission)
- Medium-term market: Upto 5 years period
- Long-term market: above medium-term period but generally 25 years.

Type of Market	Details
Long-term	▪ Of the total annual energy transaction volume, still substantial volume is contributed through long term market in India. ▪ But to downsize the volume in long-term market and maximize the trading in exchanges, long term PPAs are intended to be signed for a period of 10 years with a possibility of extension after 10 years subject to terms agreeable to both parties. ▪ In Nepal, we have been signing long term PPAs for 35 years with 30 years business after COD which is of course a long-term market. ▪ To promote the short term, medium term and DAM in Nepal, we might also consider signing PPAs with "Take or Pay" terms for 10 years or until debt repayment and then market the power through market mechanism.

TERM BASED PHYSICAL MARKETS (2)

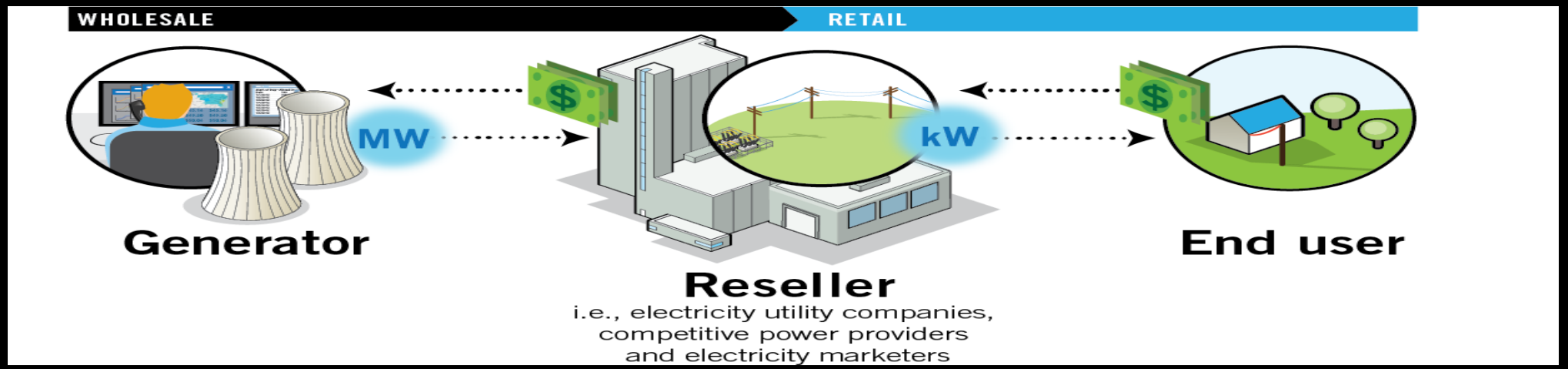
Type of Market	Details
Medium-term	▪ Nepal has not exercised the medium-term contracts in domestic market. ▪ But recently NEA has signed a medium term (5 years) contract with HSEB for sale of 110 MW electric power and another 70 MW is waiting for approval from India. Thus, NEA has accessed Indian medium-term market. ▪ **Nepal may consider Medium-term market for projects with expired long-term PPA but license period still valid. Example: Khimti HEPP**
Short-term	▪ No short-term contracts or market operating within country. ▪ But short term (seasonal) contracts were exercised in past to import from India. ▪ As short-term contracts immunize from price spikes in the purchase period, it is good option for imports in dry season. ▪ **Nepal may explore domestic short-term market for excess energy of IPPs.**
Day-ahead (DAM)	▪ There is no domestic DAM. ▪ But we have been exercising purchase and sale of electricity in Indian DAM (in IEX). ▪ Purchase/sale bid for 96 numbers of 15 minutes blocks for tomorrow are submitted by 10 :00 hrs. today.
Intra-day	▪ India has recently floated market rules allowing to close purchase sale deal in 2 hours advance the same day. ▪ It minimizes the deviations in real time, grid imbalances and the DSM process.

GEOGRAPHY BASED PHYSICAL MARKETS

Base	Market	Details
In-country	Domestic	▪ At the domestic level, there might be long-term, medium-term, short-term, day-ahead and intraday markets. ▪ But we have only long-term single buyer market only.
Cross border	Binational	▪ Indian Energy Exchanges operate under their national market rules and Nepal is treated as an Indian domestic trading participant in these trading platforms. Indian Energy Exchanges have been very fair in operating the market and there is no discrimination in part of Nepalese entities. ▪ But there is a risk that Indian government might change the market rules any time affecting us negatively. **Example: PPA with Ethena through PTC.** *Depending on such market especially when we generate thousands of MWs for export is high risk.* ▪ Ideally, we would prefer a binational trading platform operating under binational market rules ratified by both countries.
	Regional	▪ High-capacity regional transmission connectivity is key for such market. ▪ A regional (SAARC, BBIN, BIMSTEC etc.) market can be established and operated. ▪ A multi-national trading platform governed by common market rules ratified by the member states can be established. ▪ For earliest operation, domestic exchange of any member country, say India, can be extended with a regional platform to operate under regional market rules.

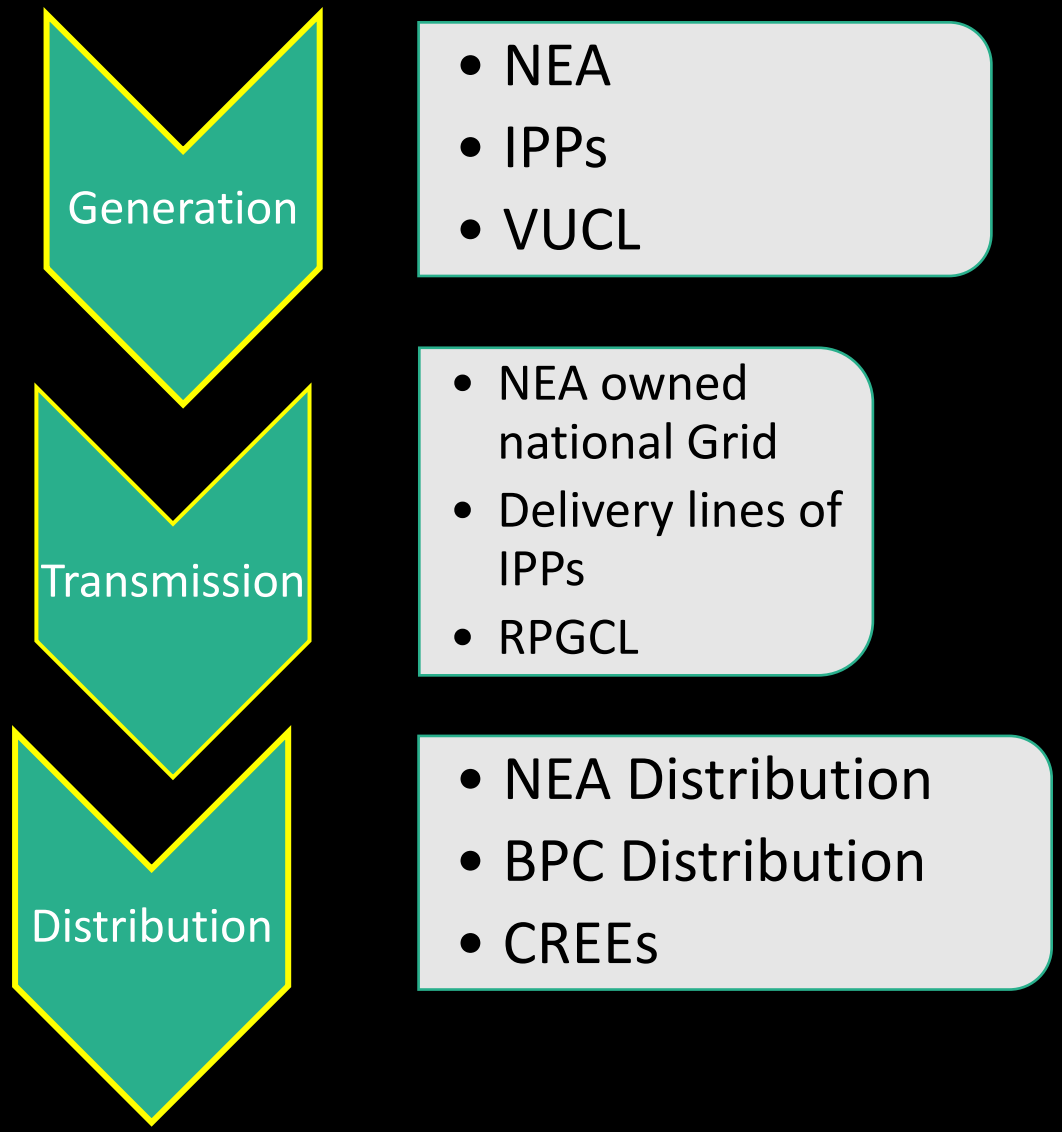
LEVEL BASED PHYSICAL MARKETS

Base	Market	Details
Level	Wholesale	▪ The sale of electricity to resellers through bilateral contracts or spot market is done in the wholesale market. ▪ In Nepal, we have non-competitive regulated single buyer wholesale market but not the wholesale spot market. ▪ Usually, large consumers have direct access to wholesale spot markets.
	Retail	▪ Retail market is for purchase of electricity by end use consumers. ▪ Like the transmission, distribution is also wires business only and retail market is operated by suppliers/traders.



SECTION 2
Nepalese Power Sector

EXISTING STRUCTURE OF NEPALESE POWER SECTOR



- NEA
- IPPs
- VUCL

- NEA owned national Grid
- Delivery lines of IPPs
- RPGCL

- NEA Distribution
- BPC Distribution
- CREEs

Policy: MOEWRI

Planning: WECS/MOEWRI

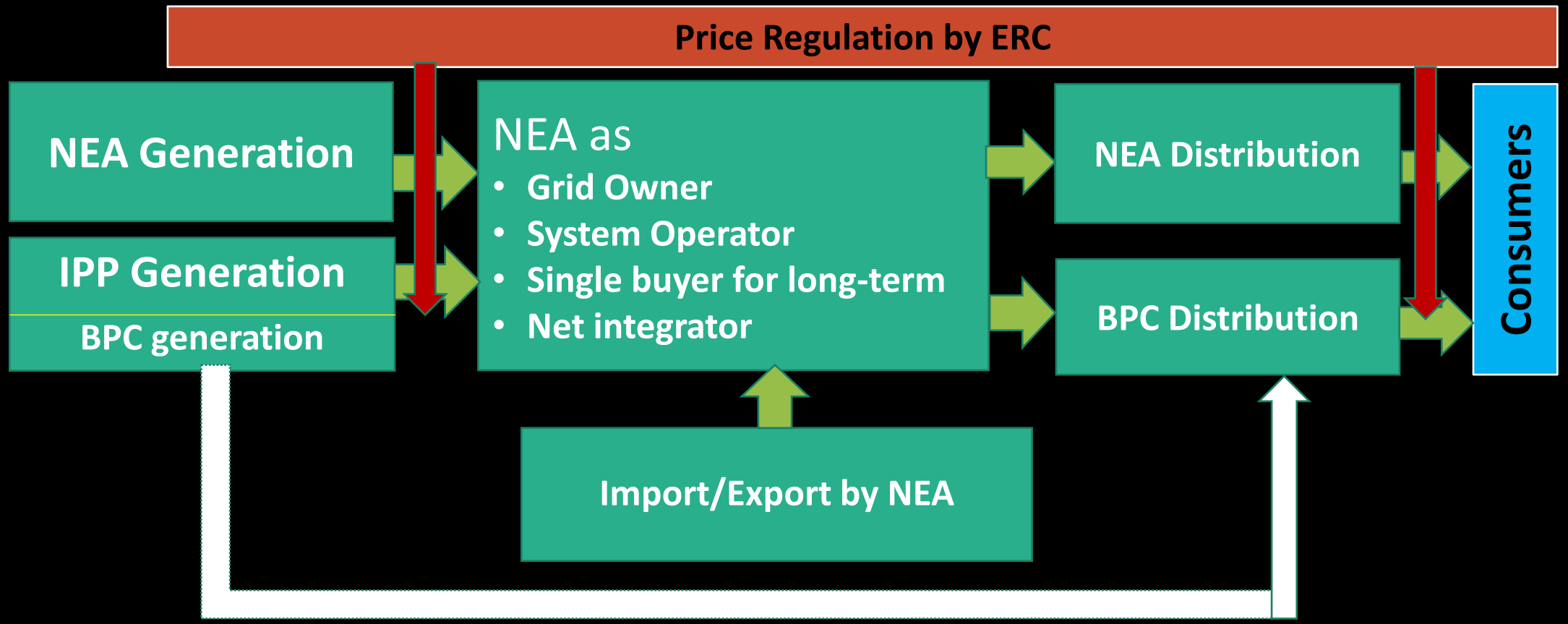
Implementing: DOED/AEPC

Regulatory: ERC/MOEWRI

Business Operations

System Operator: NEA

EXISTING MARKET STRUCTURE



ROADMAP OF POWER MARKET LIBERALIZATION

- Why to Liberalize the Power Sector?
  - End-product of political democracy is effective and efficient delivery of services to people.
  - Peoples' dissatisfaction on poor and unaccountable delivery of services under state control drives the political movement for political change for political democracy.
- Thus, sustainability of political democracy is subject to liberal economic system based on transparency, competition and accountability.
- Accordingly, restoration of political democracy initiates liberalization of the service sectors. Since electricity is an important service, liberalization of the power sector with introduction of private investment gets priority.
- Liberalization process initially operates the sector under effective regulations so that level plying field ensured by regulations provides chance to private entities to grow and compete the state-owned entities.
- Then regulations are gradually eased for phased transition of market. Depending upon the speed of deregulations, market transition is slow or fast.
- Ultimately, a market self-regulated through forces of demand and supply instead of regulations becomes apparent and operational.
- That is the full-scale liberalization i.e., operation of sectoral market through market mechanism.
- State is limited to market surveillance and intervene when market operations are default or insane.

LIBERALIZATION OF NEPALESE ELECTRICITY MARKET (1)

- Nepalese power sector remained under state monopoly entertained through Nepal Electricity Authority (NEA). NEA happened to be the only entity responsible for planning, development, operation and regulation of generation, transmission and distribution of Electricity in the country. Political change of 2047 restored political democracy in the country followed by liberalization of electricity sector in Nepal initiated through Electricity Act 2049.
- This liberalization initiated through EA 2049 introduced private investment in the sector. As a result, combined generation capacity of private generators has superseded the total generating capacity of public sector developed over a century. Limited regulatory function was mandated to ETFC.
- But further liberalization Nepalese power sector and transition to more deregulated markets could not be attained. Nepalese power sector is currently on halt at single buyer market under government control through NEA and full-fledged regulations. Prices in wholesale and retail level are dictated by ERC and not by market forces.
- In the current market structure, producers neither face price competition to market their product nor do they take marketing risk. On the other hand, consumers are deprived from entertaining the attraction of the market i.e., purchasing electricity at competitive price and select the producer of choice.
- This ugly market structure has been in place for about 3 decades. Apparently, the liberalization process initiated by EA 2049 is paused before reaching its destination.
- People are deprived of enjoying the fruits of political democracy in terms of effective and efficient delivery of service. Something must be done to activate the process of reforms further.

LIBERALIZATION OF NEPALESE ELECTRICITY MARKET (2)

- Various models of sector structure were studied to further liberalize the market and value chain- based unbundling was identified as narrative of sector reforms for further liberalization.
- Although producers blamed for not facing competition and taking market risk, sector market does not allow them direct access to multiple customers/consumers. Their access is limited to single buyer NEA.
- For producers to have direct access to customers, they should have open access in transmission system. But current sector structure neither provides open access in transmission
- Since for open access in transmission system, presence of multiple sellers and multiple buyers of power from market, restructuring of power sector by unbundling it in value chain elements was found as narrative of sector reforms for further liberalization of market.
- Accordingly, new Electricity Act was drafted and presented to parliament in 2067 to replace the Electricity Act 2049 and navigate the sector towards further liberal market. This draft and its improved versions were presented to parliament several times.
- But the new Act could not be passed from the parliament for more than a decade. This indicates strong presence of interest groups enjoying the current market structure.
- In the meantime, apart from unbundling, federal decentralization has become constitutional requirement of sector restructuring.
- Is it possible to implement unbundling and federal decentralization simultaneously? Federal decentralization is not the choice but constitutional requirement.

OPERATION OF DOMESTIC SPOT MARKET AND TRADING

- Need of a self regulated domestic market of electricity is already explained.

- But for a domestic market to operate, following **conditions precedent** should be met:
  - Market Operator, Market platform, market rules and market surveillance mechanism in place
  - Open access rules and procedures in transmission and distribution in place
  - Wheeling charge, energy accounting procedures and settlement mechanism in place
  - Presence of multiple producers and multiple customer to trade
  - Presence of independent trading licensees

- **What is the Status?**
  - No market platform, market rules and market surveillance mechanism
  - No Open access rules and procedures for using T&D infrastructure
  - No wheeling charge, energy accounting procedures and settlement mechanism
  - Yes, more than one producers but all locked in long term market
  - No multiple customer to trade
  - No trading licensees

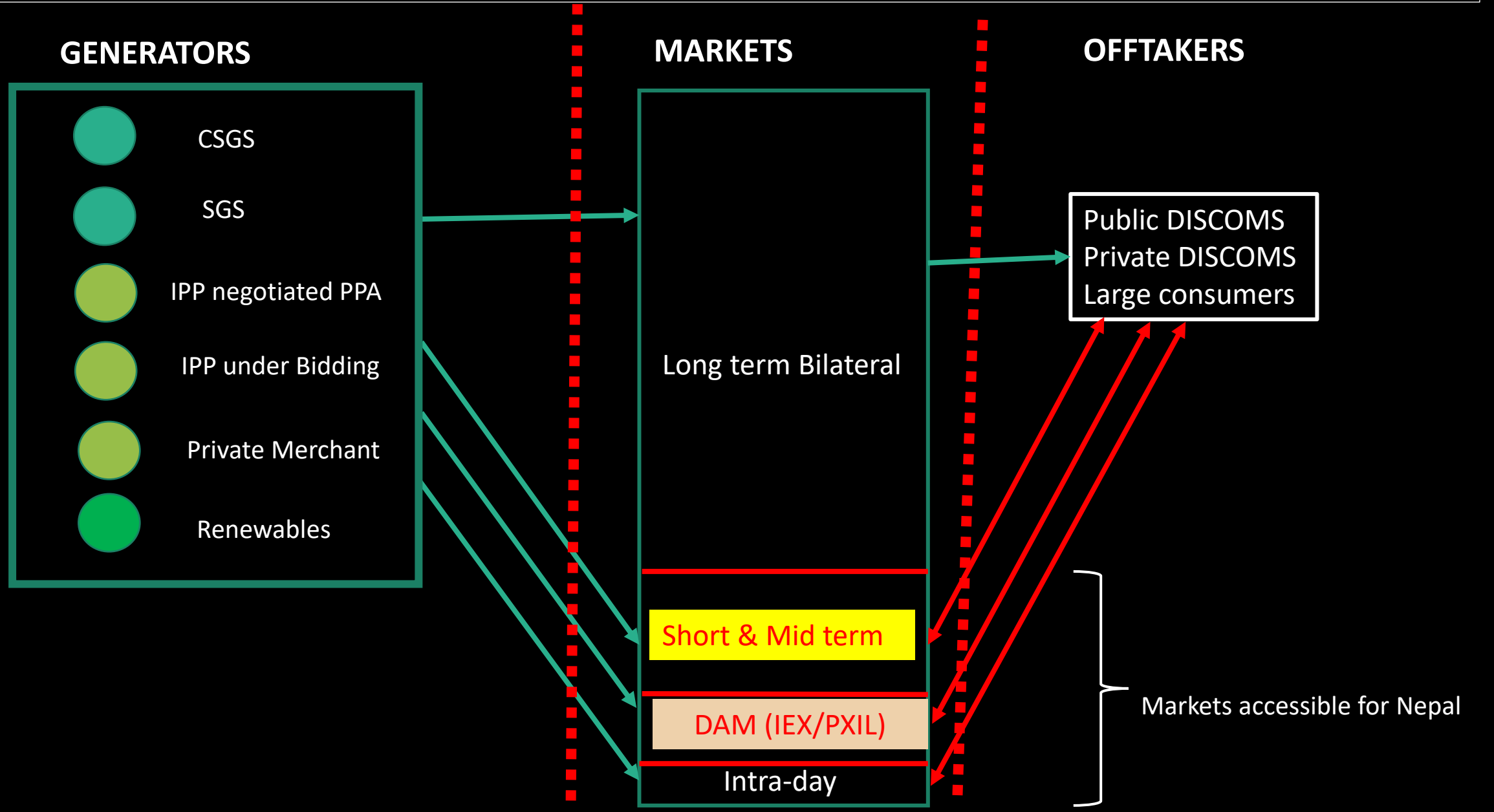
Restructuring required

- **Conclusion:**

  Long way to go for an operational market (medium-term, short-term and spot market). But however, sector restructuring is the condition precedent.

SECTION 3
Indian Power Market and Its Operation

INDIAN POWER SECTOR AND MARKET



POLICIES IN NEIGBORING MARKETS

- Two-dimensional policy trends: downsize long-term market, TAM closer to real-time.
- Long-term bilateral contracts occupy 89% of total energy trade volume whereas only 11 % is traded through short-term trading and in spot market (exchanges).
- After successful operation of energy exchanges, India is in the process of down-sizing its long-term market by giving priority to medium term, short term and exchanges i.e., day ahead markets. Effort is to push the market closer to real time transactions.
- For this, India is making a market shift by signing long-term bilateral contracts for 10 years only.
- Long-term contracts signed for 10 years are found to make the generation projects bankable as PPA rates could repay the debt in 10 years.
- Next phase of market shift may be to medium-term contracts of upto 5 years only with equity above 30% and slightly front loaded PPA Rate.
- Simultaneously, efforts to increase the trading volume in exchanges are ongoing so that the medium- and short-term markets could also be downsized in the long run.
- Reliable and voluminous trading in exchanges might attract bank financing for merchant plants as last resort.
- We should keep an eye on Indian market shifts and trading policies and design our export strategies accordingly.

OPERATION OF EXCHANGES (WCM): BUY BIDS

BID-1

00-00:15		00:15-00:30		00:30-00:45			7:45-8:00		8:00-8:15	
price	V	P	V	P	V	----	P	V	P	V
							2.5	600		
							3	550		
							3.5	500		
							4	450		
							4.5	450		
							5	400		
							5.5	350		
							6	300		
							6.5	300		
							7	300		
							7.5	300		
							8	250		
							8.5	200		

BID-2

00-00:15		00:15-00:30		00:30-00:45			7:45-8:00		8:00-8:15	
price	V	P	V	P	V	----	P	V	P	V
							2.5	550		
							3	500		
							3.5	500		
							4	425		
							4.5	400		
							5	400		
							5.5	375		
							6	350		
							6.5	350		
							7	325		
							7.5	300		
							8	200		
							8.5	175		

OPERATION OF EXCHANGES (WCM): SELL BIDS

BID-1

00-00:15		00:15-00:30		00:30-00:45			7:45-8:00		8:00-8:15	
price	V	P	V	P	V	----	P	V	P	V
							2.5	200		
							3	250		
							3.5	300		
							4	300		
							4.5	300		
							5	350		
							5.5	400		
							6	400		
							6.5	450		
							7	450		
							7.5	500		
							8	550		
							8.5	600		

BID-2

00-00:15		00:15-00:30		00:30-00:45			7:45-8:00		8:00-8:15	
price	V	P	V	P	V	----	P	V	P	V
							2.5	175		
							3	300		
							3.5	325		
							4	350		
							4.5	350		
							5	375		
							5.5	400		
							6	400		
							6.5	425		
							7	500		
							7.5	500		
							8	500		
							8.5	550		

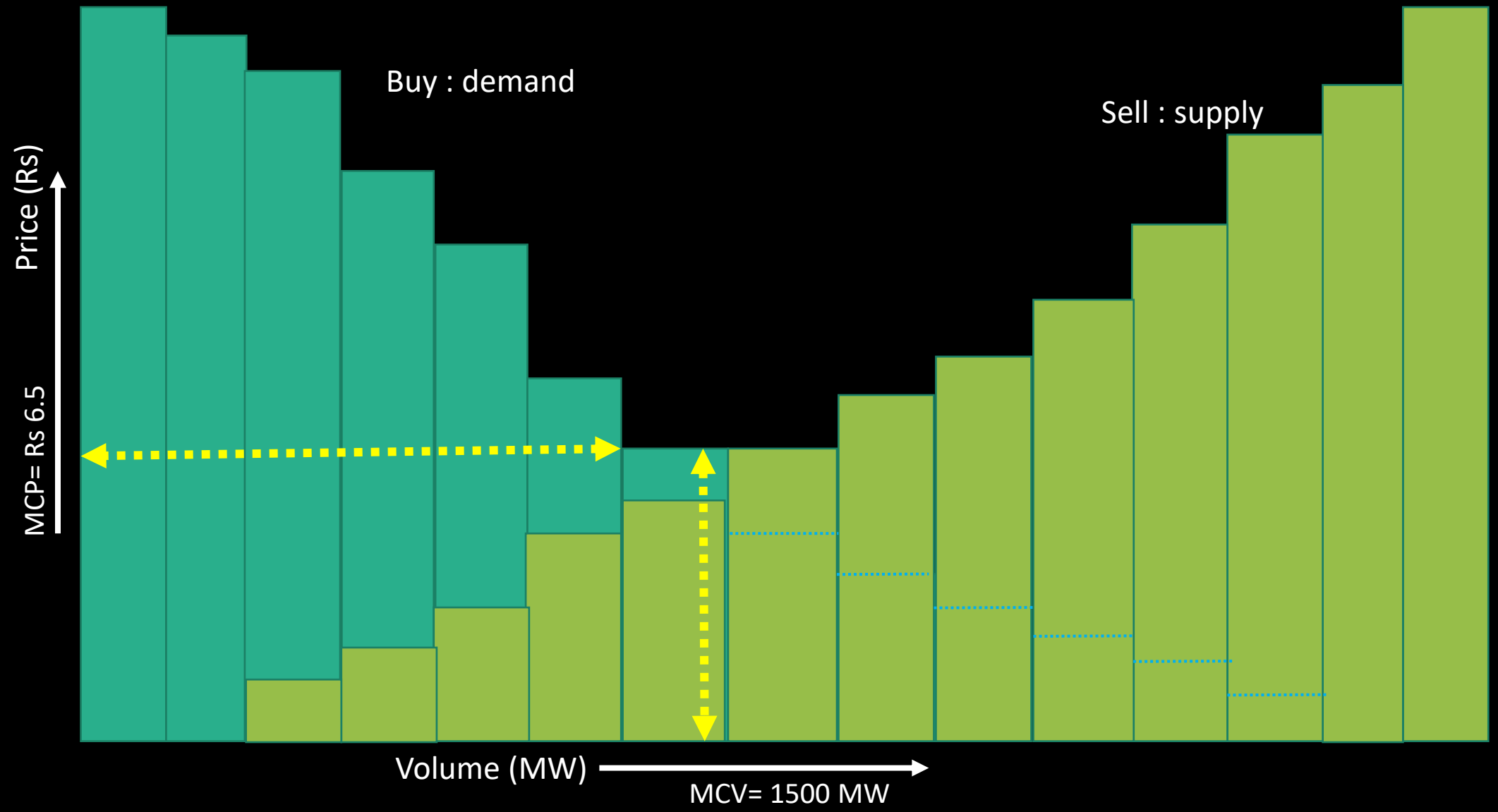
Cumulative Buy Bids for 7:45-8:00 hrs.

Price	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	10	11	12
volume	3500	3000	3000	2500	2500	2000	2000	1500	1500	1500	1200	1200	1200	900	500	200	0

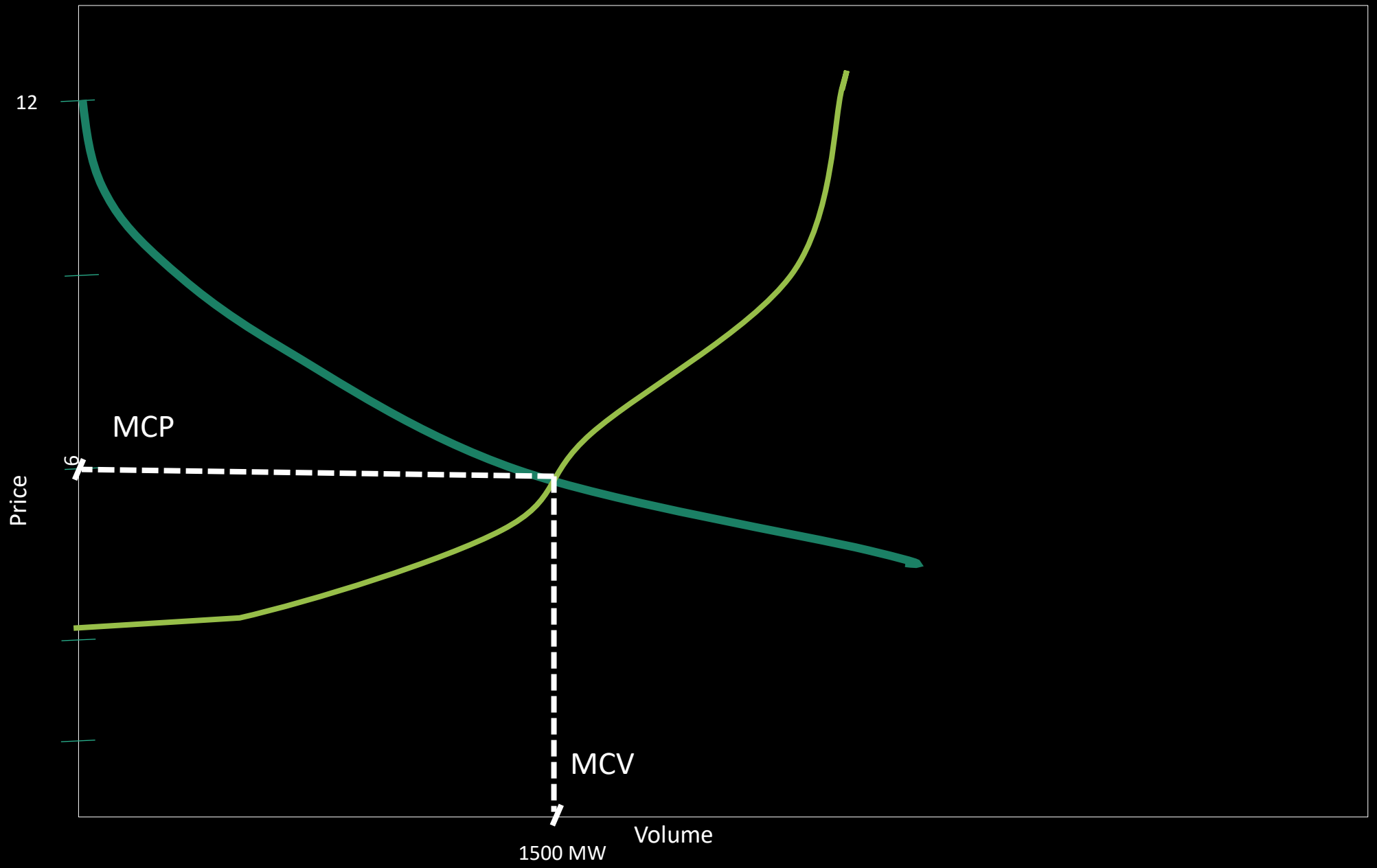
Cumulative Sell Bids for 7:45-8:00 hrs.

Price	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8	8.5	9	10	11	12
volume	0	200	500	900	900	1200	1200	1500	1500	1500	2000	2500	3000	3000	3500	3500	3500

MCV AND MCP between 7:45-8:00 hrs.



MCV AND MCP between 7:45-8:00 hrs.



SECTION 4
Nepalese Trading Strategies

ISSUES OF DOMESTIC MARKET

- Domestic consumption is the priority and domestic market System will facilitate it.
- How to provide direct access to producers to customers/consumers?
- How to provide open access in transmission system to producers?
- How to implement price competition in long-term market i.e., long-term bilateral contracts?
  - How to create multiple buyers (DISCOMS)?
  - How to create multiple sellers when all IPPs are locked in long-term market? From where does supply come for trading?
- How to operationalize medium and short-term contracts and price competition in these markets?
- How to operationalize DAM in domestic trading?
- Sector federal decentralization or value chain unbundling or both?
- If both decentralization and unbundling, unbundling up to what extent?
- But without further liberalizing the sector, we will not match with external world.
- New Electricity Bill is supposed to answer these queries. Does it?

TRADING IN INDIAN MARKETS

- **What markets accessible by Nepal?**
  - No access to Indian long-term market. In future also very unlikely as they are downsizing this market.
  - Access to medium and short-term markets is regulated through stringent non-tariff barriers.
  - Access to Indian Exchanges for DAM and Intraday trading. But access to these markets is also regulated by project- based clearance with typical non-commercial clearing terms.
  - We should frame our strategy of marketing electricity in Indian markets accordingly.
  - We should design our trading strategy in Indian markets as net exporter, as we are turning net exporter.

- **What could be our trading strategy in Indian markets?**
  a. Considering the future availability estimates and upscaled future domestic consumption, estimate the power available for export during all next 5 years. Explore medium-term markets for 5 years contracts.
  b. Now depending upon the trend of availability and domestic demand during recent past years, estimate the power available for export during following year in addition to medium-term contract. Explore short term seasonal market to trade this annual volume of energy available for export during following year.
  c. Depending upon the latest trend of availability and domestic demand, estimate volume available for export during the following day in addition to medium and short-term contracts.
  d. Create our trading folio as a mix of trading in DAM and Intra-day market. To mitigate the risk of a single market and capture opportunity in another market, we can have a portfolio say 75% in DAM and 25% in Intra-day.
  e. There may be price and volume risk in Intra-day but the opportunity also. So, trading uncertain risk with certain gain, we should trade relatively lower volume in Intra-day.

THANKS
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