

“Forward Trading in Electricity Markets: Benefits, Costs and Challenges”



Harvard Electricity Policy Group
Seventieth Plenary Session
Dana Point, California
March 8th, 2013

What is Nodal Exchange?

- **Cash-settled electric power and natural gas futures exchange**
- **Operating for ~4 years as an exempt commercial market (“ECM”)**
 - Over 80 signed participants; 11 clearing members, 12 brokerages
- **Providing ability to trade power on >1,800 locations (hubs, zones, and nodes) across six organized markets: ISO-NE, NYISO, PJM, MISO, ERCOT and CAISO**
 - Monthly terms extending out 1 to 5+ years; Peak and Off-Peak; Day Ahead and Real Time settled for LMP
 - Also offer Energy + Congestion contracts (FTR-like economics)
- **Two platforms:**
 - Auction and
 - Block trade (e.g., broker) submission for clearing
- **All contracts are cleared by LCH.Clearnet; VaR portfolio margining**
- **Applied to be registered as a designated contract market (DCM) in October 2012; application has been viewed to be materially complete and is now pending**

Why was Nodal Exchange created and launched in 2009?

- **Nodal Exchange is an improved forward power market**

- Enhanced basis risk management with futures contracts on >1,800 locations (hubs, zones and nodes)
- Integrated market (e.g., inter-ISO trading and margining)
- All contracts are monthly terms with ability to trade forward at least one year and up to 5 years and 8 months forward

- **Nodal Exchange is a cleared market**

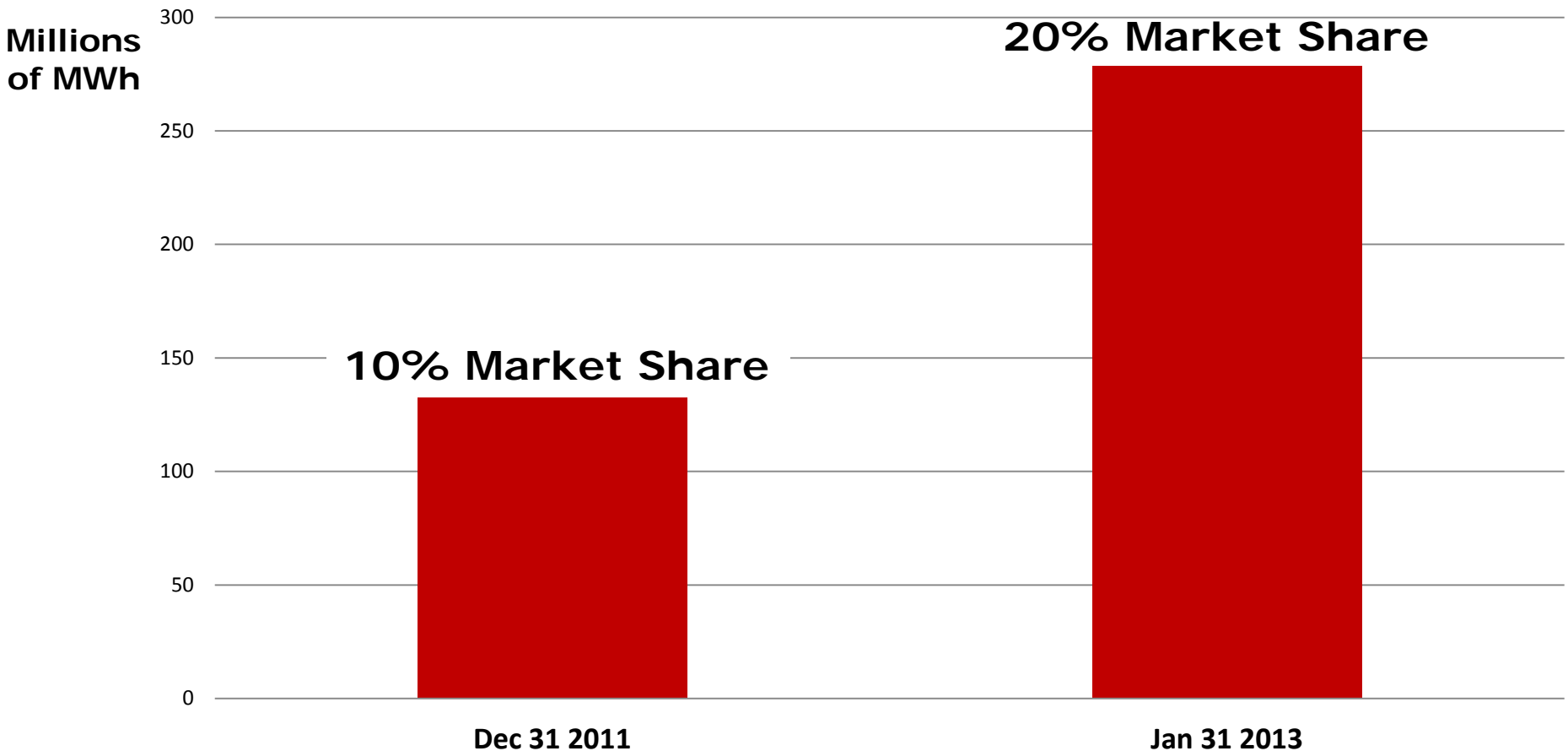
- Significant reduction of counterparty risk (credit risk) and no underfunding risk
- State of the art risk management: Value at Risk (VaR) margining
- Cross-margining of power and gas
- Collateral based on position portfolio; no bid collateral
- Central counterparty clearing through LCH.Clearnet

- **Nodal Exchange enhances liquidity at the zonal/nodal level**

- Enhanced order flexibility:
 - Outright power, spreads (calendar, locational, DA/RT) & aggregates
- Ability to match outright power bids with spread bids
- Daily (business days) auctions and ability to submit bilateral trades for clearing
- Source of price marks at nodal level; supports hedge accounting and fair pricing

Nodal Exchange open interest is growing quickly

Nodal Exchange Open Interest

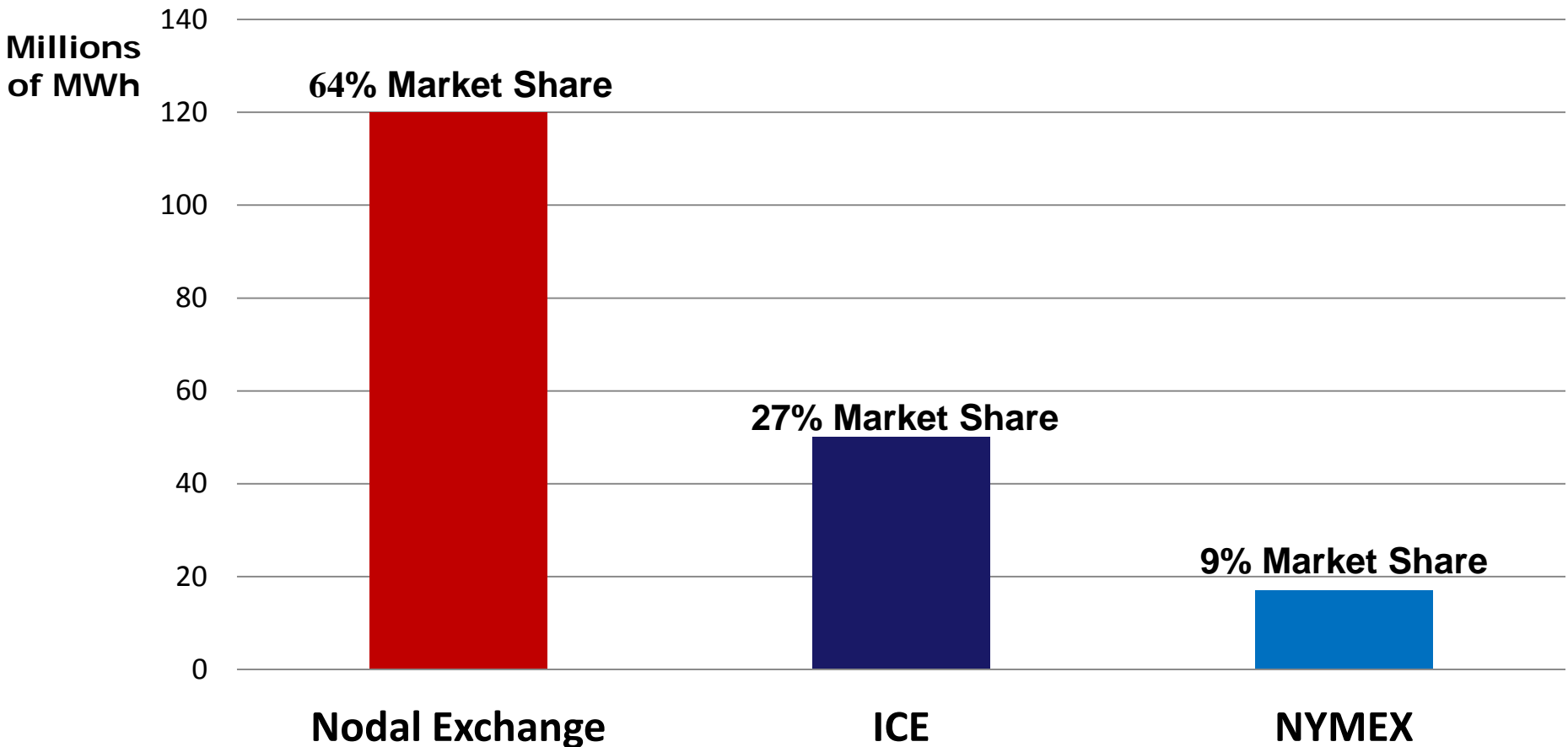


Note: Market share is for North American power cleared futures contracts. Market share excludes options which are not currently offered by Nodal Exchange.

Cleared power basis markets are growing and Nodal Exchange has a significant market share

Market Share of Open Interest in Non-Hubs: PJM, MISO & ISO-NE

(187 MM MWh as of Jan 31, 2013; up 90% since Jan 31, 2012)



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Nodal Exchange power contract settlement

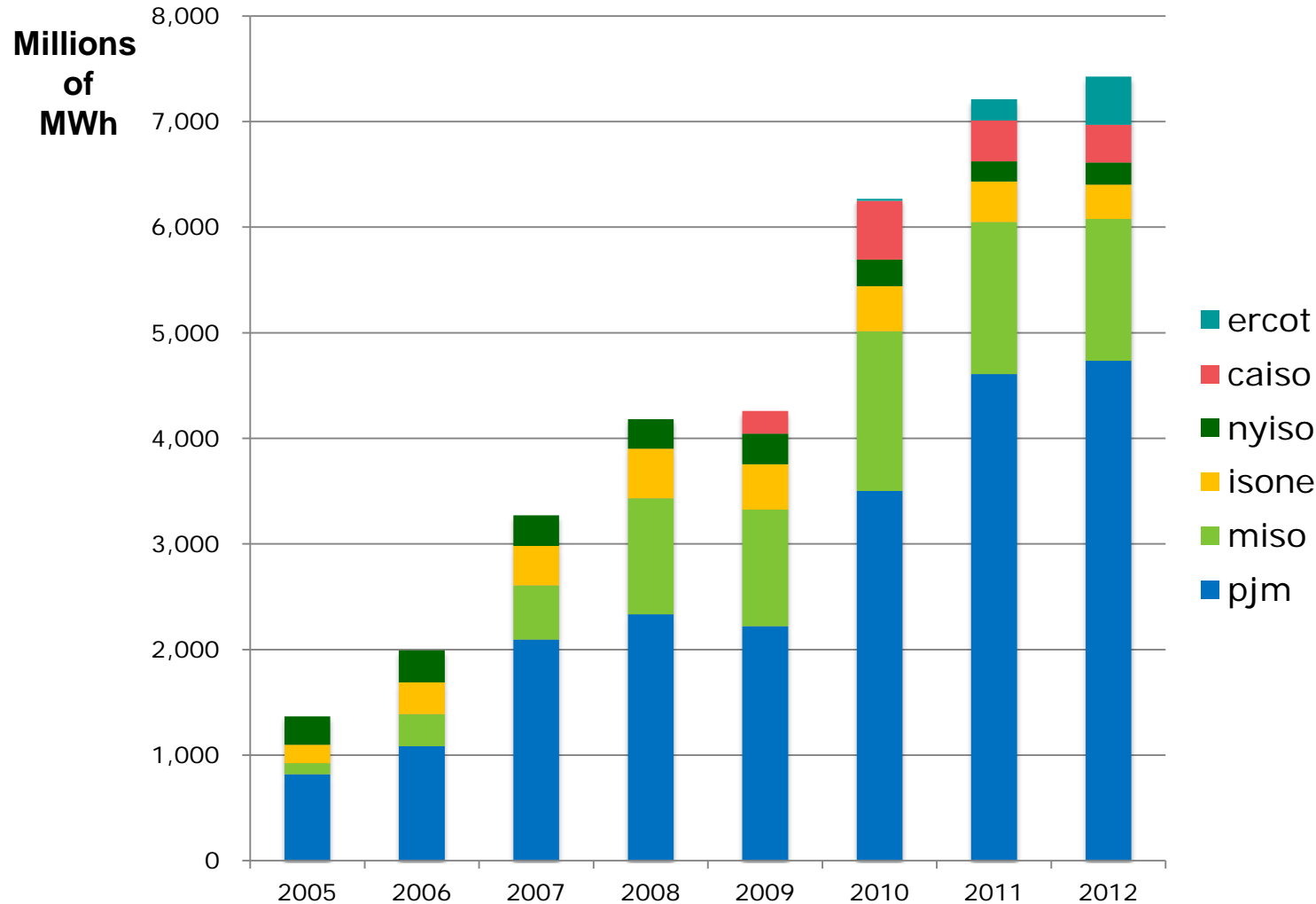
- **Financially settled using the monthly average of the appropriate hourly Locational Marginal Prices (LMPs) for the location(s) specified in the contract as published by the organized power markets, which are overseen by FERC or the PUC of Texas as well as their own market monitors**
- **Contracts settle to the average LMP prices, or its components, of all peak or off-peak hours in a month (monthly term)**
- **Contracts are structured in almost identical fashion to monthly term power contracts offered by NYMEX or ICE; however, Nodal Exchange offers contracts on a much wider set of locations**

Nodal market design provides price signals at each nodal location leading to optimal power infrastructure development

- **Locational Marginal Prices (LMP) at each node permit accurate economic information about where to best locate new generation and transmission in the organized markets in North America**
- **Future price risk exists - leading to the desire to hedge future prices (e.g., generators, load serving entities)**
- **Participants in the North American nodal markets are able to hedge using a variety of means:**
 - **Financial Transmission Right (FTR) markets**
 - **Bilateral trades (non-cleared) financially settled**
 - **PPAs; physical trades**
 - **Cleared trades (e.g., Nodal Exchange, NYMEX, ICE)**

FTR markets, with monthly auctions, have been growing and are about the same size as the cleared power markets

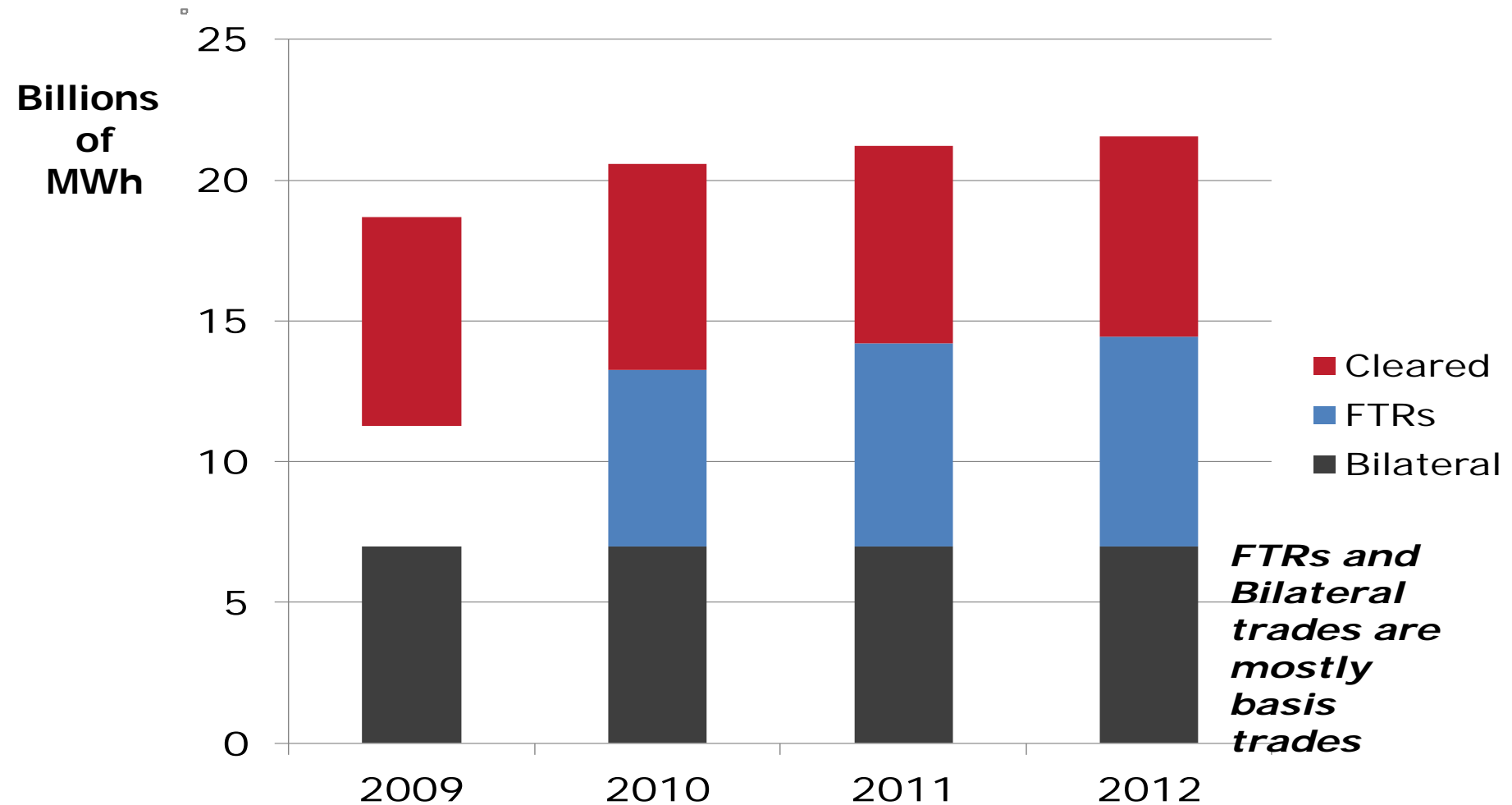
FTR Auction Volume in Calendar Year Over Time



FTR markets are a relatively new and growing market and part of the recent evolution of the power markets which have changed significantly in the past decade (e.g., post Enron bankruptcy in Dec 2001)

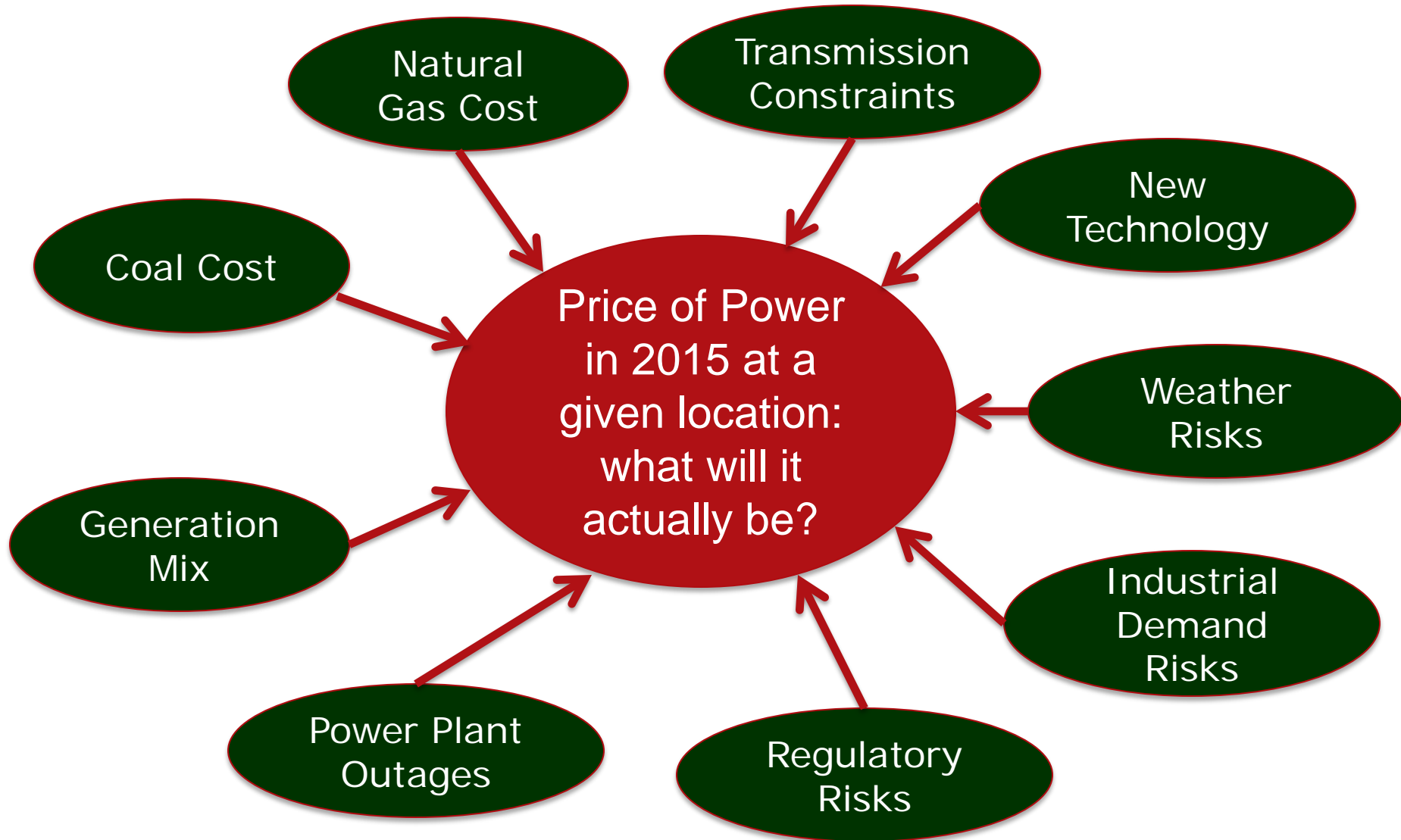
In addition to the FTR markets, cleared markets and bilateral trading represent additional significant forward/futures volume

“Forward” power trading in North America



Note: Bilateral non-cleared trading volume is estimated, but will soon be known given the reporting requirements of the Dodd-Frank Act; 2012 cleared volume may be ~1 Billion MWh overstated given discrepancies in data reported by ICE from its DCO versus its other reports

Forward price risks exist for market participants (e.g., generators, load serving entities, consumers)



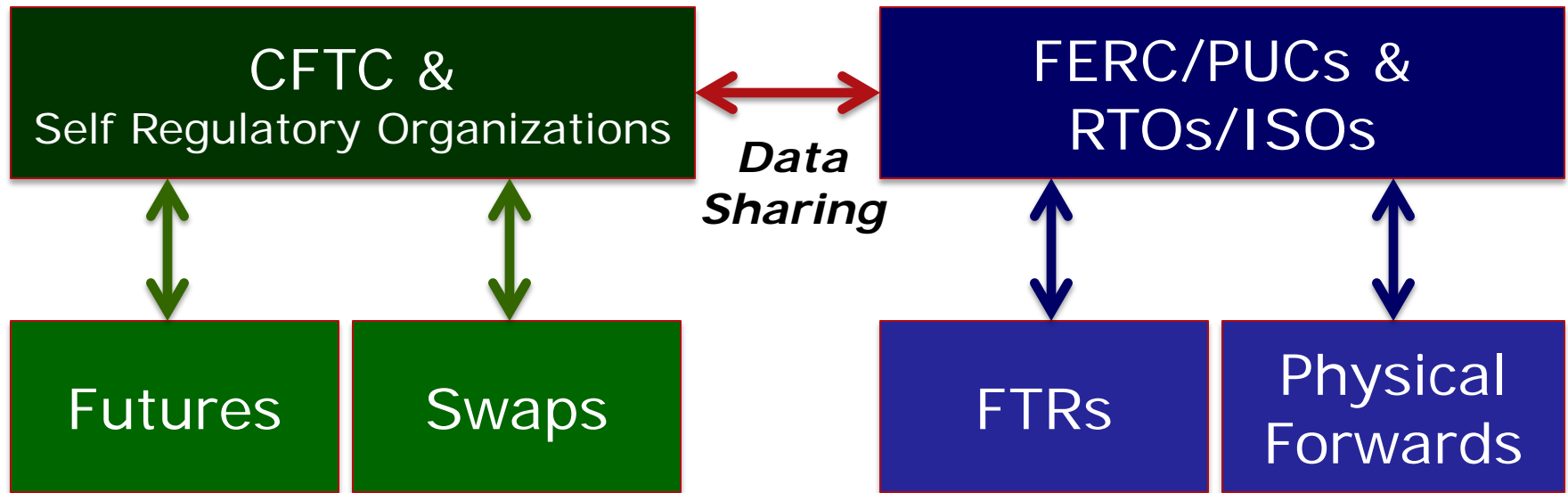
Forward/future markets are needed to allow participants to hedge

- **Forward/future price risk exists**
- **Markets permit the price risk to be accepted by others**
- **Hedging permits consumers, retailers, wholesalers, and generators to take a known fixed price now rather than accept the unknown forward/future price**
- **Forward/future contracts do not create price risk, they allow the price risk to be taken by different parties more willing to accept the price risk**

Cleared futures markets offer many benefits

- **Improved Credit risk**
 - Futures contracts have the challenge of being settled years from now creating credit risk
 - Central counterparty clearing with daily margining lowers default risk thereby addressing credit risk
 - Total transaction cost, including default risk, is often lower than bilateral transactions that are not cleared: CCRO paper “Market Clearing in the Energy Industry” Feb 2006 estimated cost of default risk for non-cleared trades at 84 basis points
- **Clearing allows netting of positions across the portfolio, lowering margin**
- **Greater liquidity**
 - Standard contracts
 - Daily markets for trading forwards/futures
 - Access to a wider range of market participants than bilateral markets; less than half of the top 50 FTR traders (95% of the volume) are rated investment grade
- **Forward curve price discovery**
 - Price marks at least twice daily on futures provides information useful in planning and infrastructure development
 - Provides signals and incentives to invest in new generation and load facilities
 - Highlights any issues with the infrastructure – higher future prices motivates actions to take advantage of those prices and thereby may lower them by actual settlement

Forward/futures markets are regulated; with increased oversight under FERC Order 741 and the Dodd-Frank Act



Regulations of markets should encourage and provide for:

- Risk Management – price, credit, liquidity
- Innovation - competition spurs creativity and drives efficiency
- Participation – robust liquidity and involvement
- Fairness – appropriately transparent and monitored; not subject to manipulation

Thank you!!!

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