

DC ENERGY

QUANTITATIVE TRADING

Electricity Markets Outlook

November 30, 2006

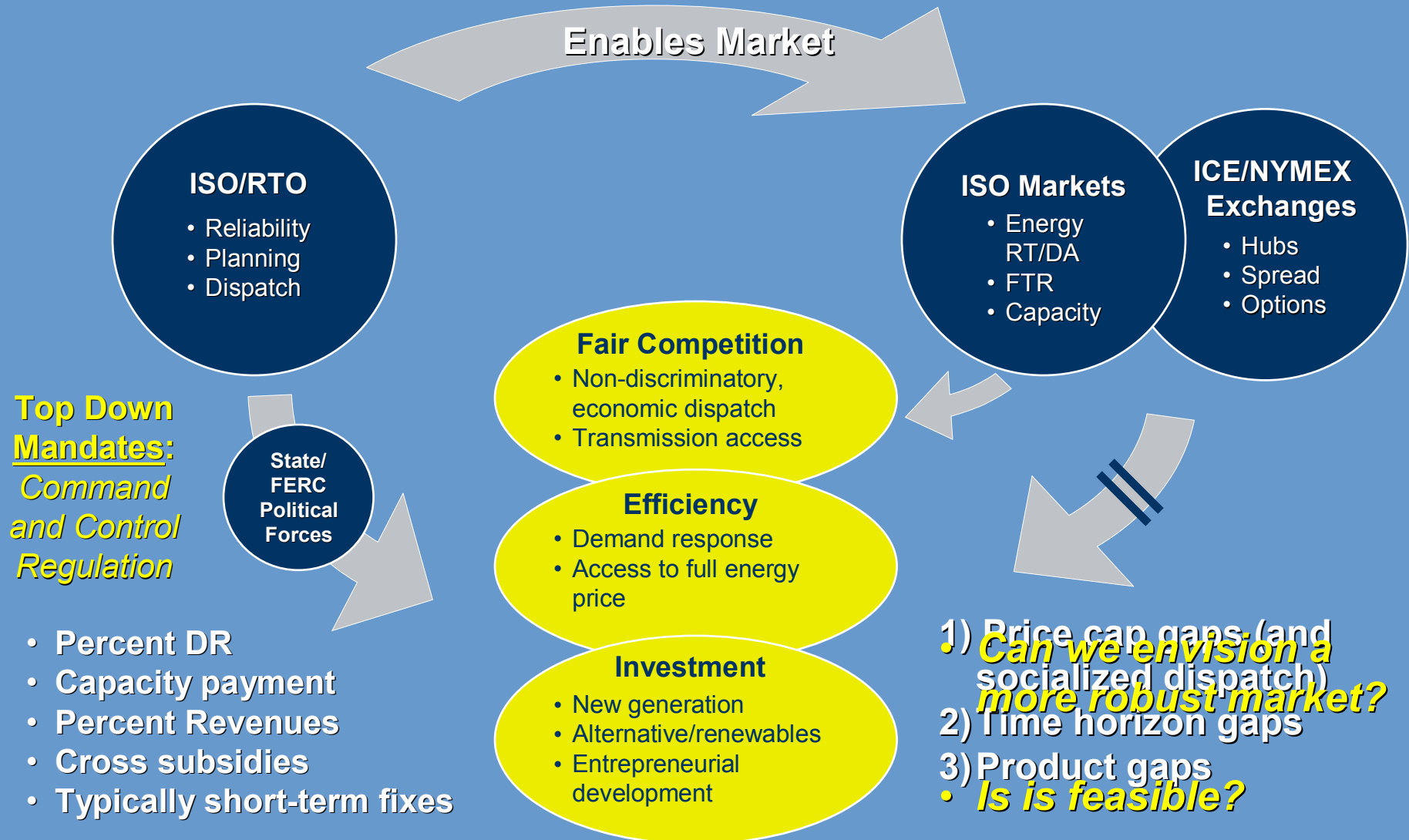
DC ENERGY
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Key Questions

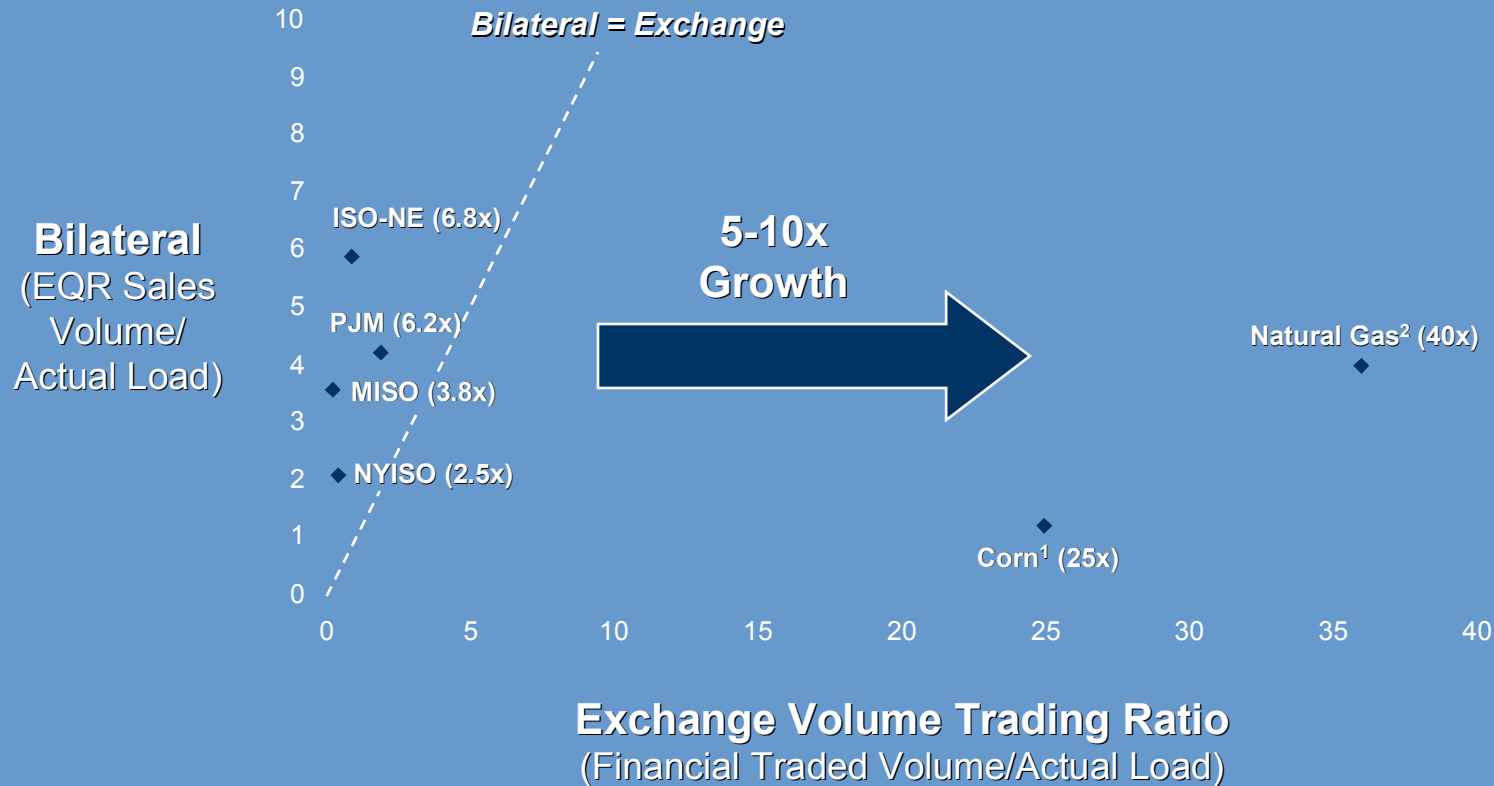
- **Is the current market adequate?**
 - Adequate infrastructure investment
 - Adequate demand response
 - Promoting increased efficiency and alternative energy objectives
- **If not, how can we get there?**
- **When is it needed?**

Today, the markets are at a fork in the road



If you build it they will come . . . Or will they?

Trading Volume Comparison – First Half of 2006 –



Note: Assumes 90% ICE and 10% NYMEX market share in financial trading

¹ Only considers CBOT trading volume on Futures products; half of the corn crop is traded 50x before delivery

² Volume from NYMEX and ICE Natural Gas Trading; broker OTC market estimated at 10% of total volume

Source: Dean & Company analysis, ICE, PJM, NYISO, MISO, ISO-NE, FERC EQR

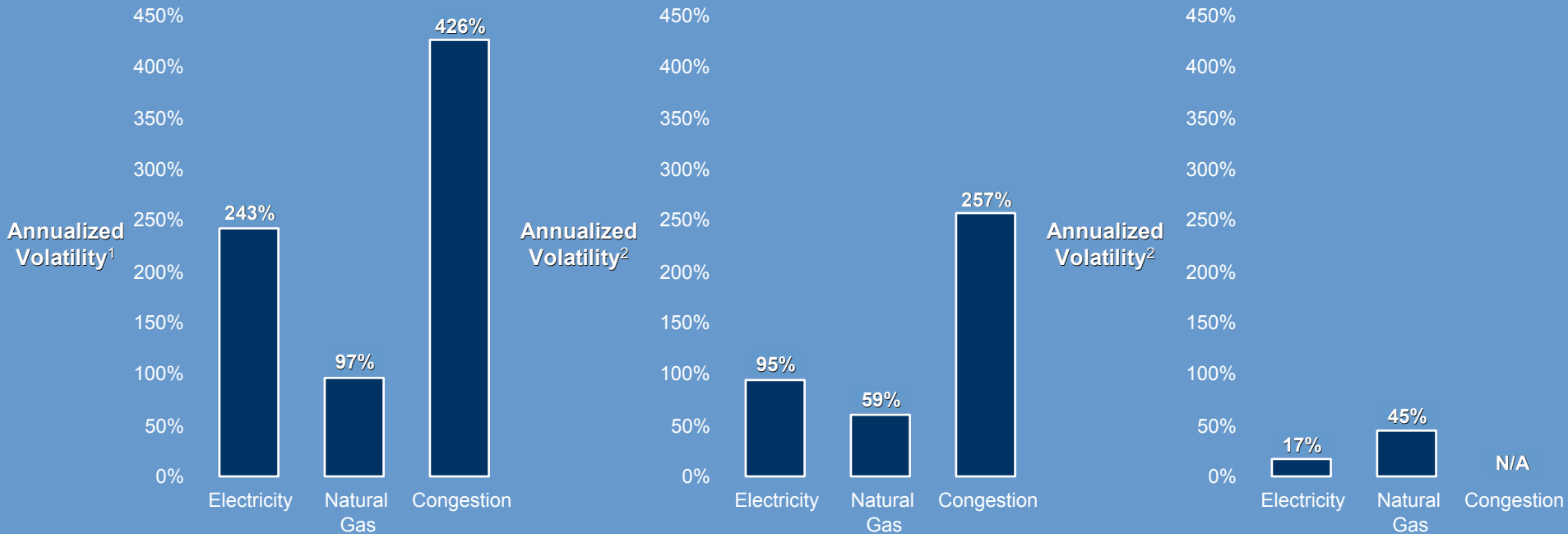
In fact, they should run to expanded markets

Annualized Volatility by Products

Short Term
– Balance of Day –

Medium Term
– Monthly –

Long Term
– Calendar Year –



Note: Power is based on the most liquid financial product: PJM Western Hub. Volatility represents buying and holding a PJM WH contract the day before, one month before or one year before settlement. Volatility is measured by the standard deviation in returns on the the hold period of 1 day (daily going to settlement) and one month for the monthly and annual contracts

¹ Annualized Volatility = Daily Volatility x \sqrt{n} where n = trading days in one year (255)

² Annualized Volatility = Monthly Volatility x \sqrt{n} where n = trading months in one year

Source: ICE and DCE analysis

Exchanges are developed around markets with a high number of suppliers, high price volatility, and low product differentiation

Commodity Comparison – U.S. View –

Category	Corn	Oil	Natural Gas	Electricity	Coal	Paper	Shipping (Truck Freight)
• Physical Suppliers	41,000	7,730	7,730	1,997	1,190	561	112,642
• Physical Wholesale Buyers	5,415	4,836 + 3,216 (non-bulk)	2,376	72 + 7,325 (non-bulk)	313	13,395	16,504
• Volume (Physical)	11.7B bushels (\$22B) (2005)	7.6B barrels (\$490B) (2005)	22B MMBtu (\$150B) (2005)	3.8B MWh (\$152B) (2005)	1.1B short tons (\$22B) (2005)	42MM short tons (\$32B) (2002)	1.5T ton-miles (\$164B) (2002)
• Price Volatility (Monthly)	23% (2006)	11% (2005)	29% (2002)	66% (2006)	6% (2004)	3% (2006)	15%–35% (2003)
• Exchange?	Yes	Yes	Yes, hub and basis	Limited	No	No	No

Source: EIA, USDA, World Bank, US Census Bureau, Corn Refiners Association, Platts, DOE, NGS, BTS, DC Energy data, *Pulp & Paper*

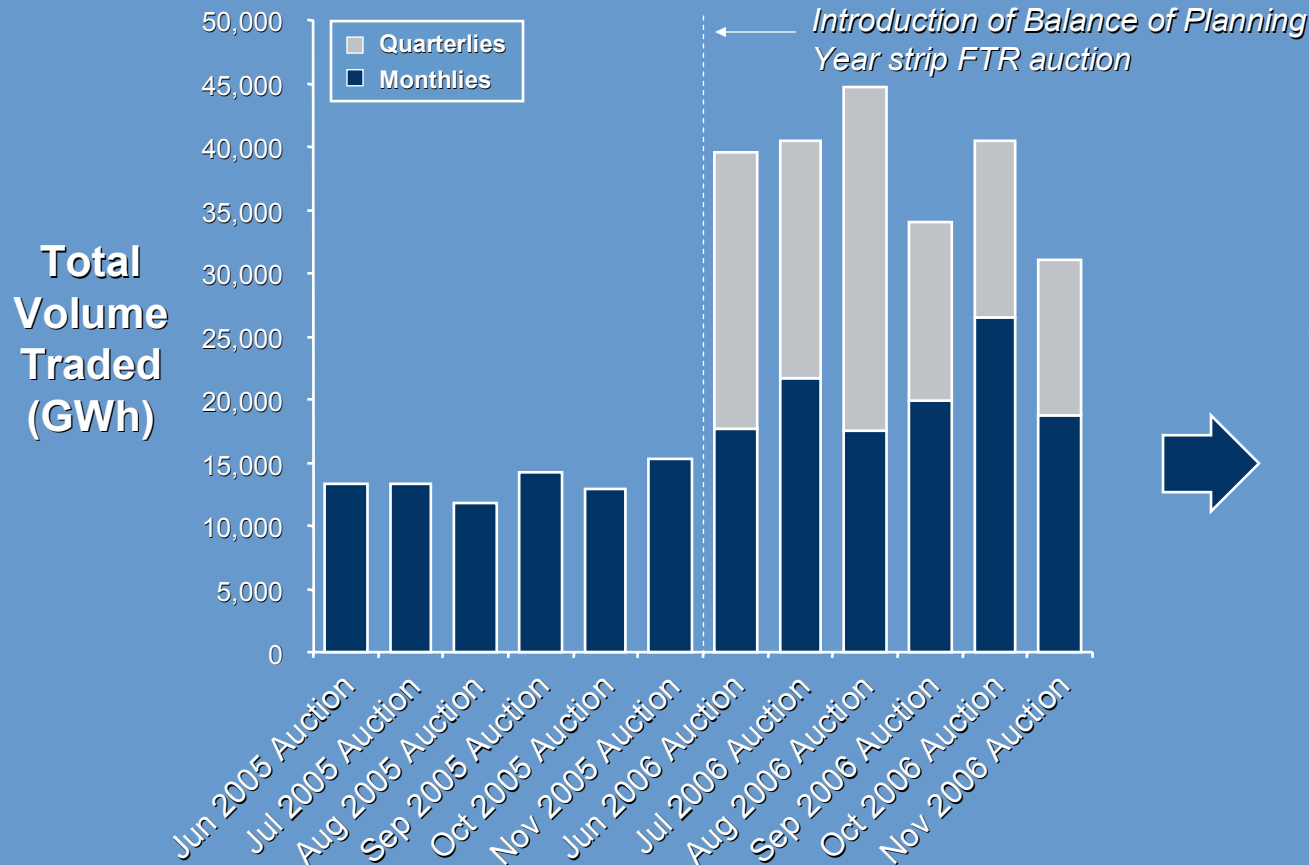
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For example, PJM influenced the availability of monthly spread products through expanding the monthly FTR auctions to include the balance of planning period

New PJM Markets

– Expanding Options & Liquidity for Participants –

Volume Traded
– PJM Monthly FTR Auction –

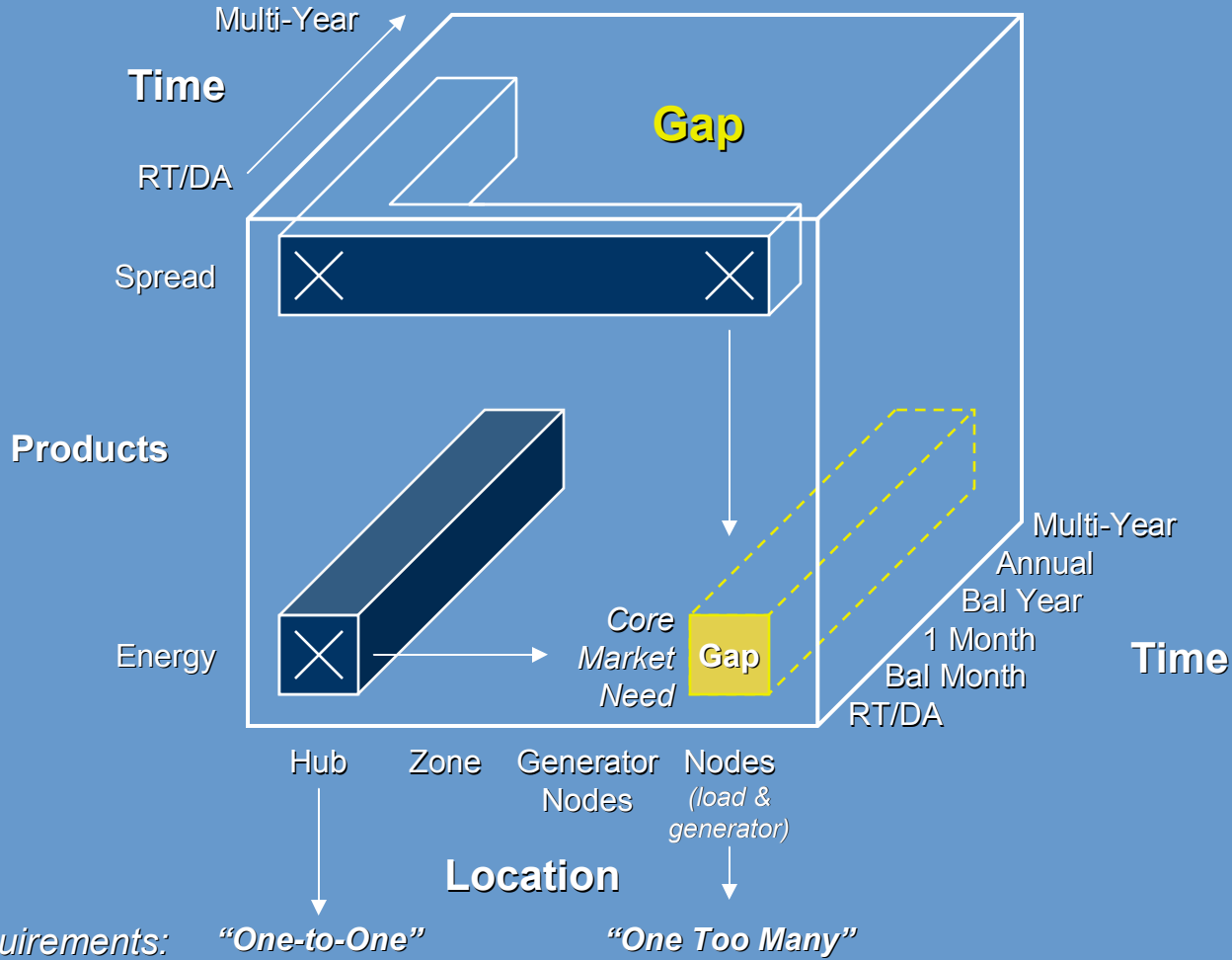


- Introduction of a “cleared” spread product through the PJM FTR Auction for future months has increased trading in bilateral/broker markets



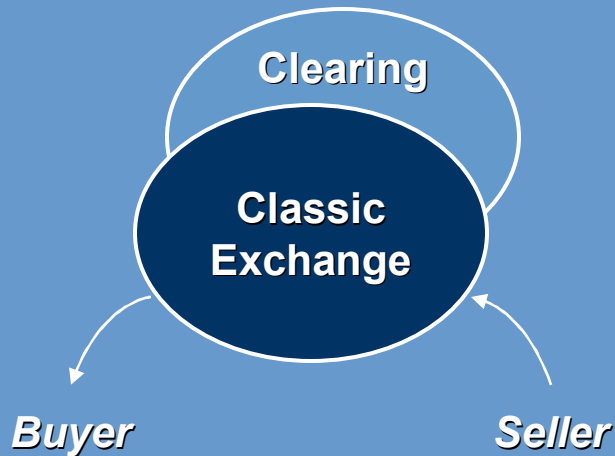
The market has yet to converge on its most practical product

Potential Market Scope – Product/Times Gaps –



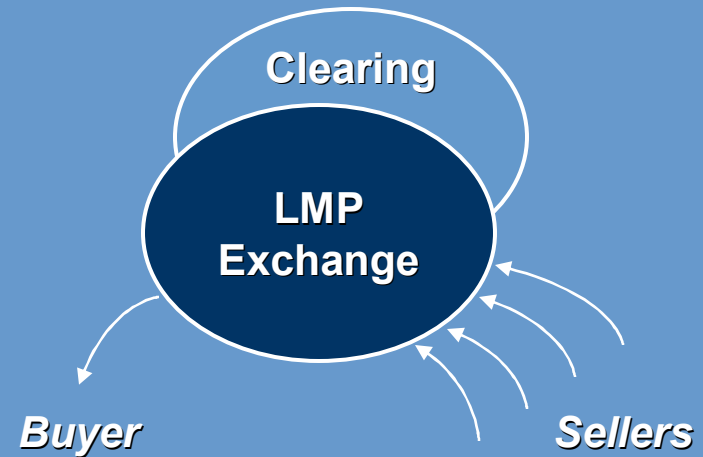
However, the expanded markets are not typical exchanges — which is the hedgehog and which is the fox?

Different Exchange Types



- Same product
- Same location(s)
- Same price

“One-to-one”



- Different products
- Different locations
- Different prices

**“One-to-many”
or,
(many-to-many)**

What the market should provide to participants. Today is come close, but more is possible.

Market Objectives

- Buy & Sell Power at Node(s)
- Hedged Price



LSE

- Muni
- IOU
- ...



**Smooth earnings,
certainty**

- LT Power Price at Node
- Ability to Hedge



Generator

- Merchant
- Regulated
- ...



Investment

- Uncapped Price at Node
 - To stimulate Demand Response
- Hedged Price
 - To limit Risk



Consumers

- Large (with metering)
- And small eventually
- ...



**Efficiency
Demand/response**

How to Get There?

PJM Reality

0. The Correct Exchange Design →
 - LMP, “many-to-many” exchange competence
1. Staffing & Budgets →
 - Budgets don’t devote sufficient resources to markets.
 - Whose money should be risked in developing new markets?
2. Governance →
 - Governance focus on reliability
3. Incentives →
 - Does it have the right incentives?
4. Regulation →
 - Will it be regulated adequately for market products?
5. Innovation →
 - Quick roll-out, willingness to experiment.

What is your wish list?

Key Questions

- What market is:
 - Adequate?
 - Desired?
 - Ideal?

- When do we need this market?

- Who can/should provide it?