

## Session 1 – Modules 1 and 2

# Buying Power in Competitive Retail Markets -- Part 1

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rev010113

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## Your Instructor

**Lindsay Audin (CEM, LEED AP, CEP)**

- in energy services since 1974
- Energywiz Inc. serving large end users and consultants since 1996
- 8 yrs. en. mgr. at Columbia Univ.
- 10+ yrs. with consulting firms
- AEE's Energy Mgr. Hall of Fame
- sits on Cert. En. Procurement Prof. (CEP) board
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### Disclaimer

This seminar involves review of technical and legal issues related to contracts. The presenter is not an attorney and no claim is made regarding the legal basis of any of his statements.

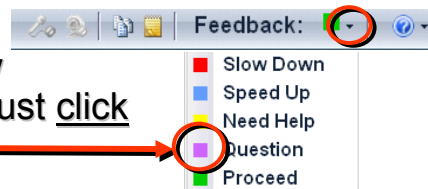
Anyone wishing to pursue options mentioned in this seminar should do so with assistance from an experienced contracts attorney licensed to practice in his/her state.

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### If You're Not Sure, Ask!

There are no “dumb” questions. To let me know that you have a question just click on your purple square.



At the end of each module, we will also have additional time for Q&A.

Rules: never put us on 'hold', and mute using \*6.

If you don't have a printout of these slides in front of you, please download/print all 3 files **now** from:

[www.aeeprograms.com/realtime/powerpurchasing/download](http://www.aeeprograms.com/realtime/powerpurchasing/download)

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### Seminar Modules/Schedule

1. What Happened And Why Should I Care?
2. Wholesale Power Markets: The Base For Retail
3. Retail Market Power Pricing
4. Preparing A Facility To Buy Power
5. Finding & Choosing Retail Power Suppliers
6. Analyzing & Negotiating A Retail Power Contract
7. Securing & Evaluating Competitive Pricing

We will complete the first two modules on Day One, the second pair on Day Two, and finish on Day Three with the last three modules.

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### Focusing On Useful Info

Much of the available information on buying power applies to small commercial / residential customers or power traders, not large commercial customers.

We instead focus on procurement techniques for commercial customers and consultants seeking to purchase retail power supply for their facilities.

Buying power is a financial (not a technical) transaction, and is mostly an information management (not an engineering) task.

For those seeking wholesale power market information, resources for further study are also provided.



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### Acronym Translation

DAM/HAM = day-ahead / hour-ahead markets (real-time pricing)  
DR = demand response  
DSM = demand-side management  
EFT = electronic fund transfer  
EWG = exempt wholesale generator (not a utility)  
ICAP = installed capacity (LICAP = locational ICAP)  
IOU = investor-owned utility  
ISO = independent system operator (a form of power pool, i.e., PP)  
IPP = independent power provider (not a utility)  
LDC = local distribution company (e.g. your local utility)  
LF = load factor (average demand / peak demand)  
LMP = locational marginal pricing (same as LBMP)  
LSE = load serving entity (a marketer or utility)  
OTC = over the counter (i.e., trades outside a regulated exchange)  
RTO = regional transmission operator  
RTP = real-time pricing (e.g., hourly based on wholesale grid pricing)  
T&D = transmission & distribution  
TOU = time-of-use (energy pricing differentiated by time)

### Basic Electricity Units/Terms

**energy** - potential to cause physical change  
**power** - how fast energy is made or consumed  
**kilowatt-hour** - unit of energy (kWh), like a BTU  
**kilowatt** - unit of power (kW), like horsepower  
**voltage** - the pressure of electric power  
**consumption** - monthly or annual kWh used  
**capacity** - ability to generate/deliver kW  
**load factor** – average kW divided by peak kW;  
i.e., how evenly electricity is used (do not confuse  
with power factor, which relates to power quality)

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### Typical Tariff Terms/Charges

**energy** - quantity of kWh used (also known as “consumption” charge, priced as \$/kWh)

**peak demand** - highest power draw in kW; may be based on highest kWh used in a 15 or 30-minute period during a month (\$/kW or \$/kVA)

**generation** – to make power

**capacity** – to make, move, or demand power

**transmission** - to move power at high-voltage

**distribution** - to move power and step its voltage down to levels used in buildings

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**ratchet** - monthly charge based on % of highest peak demand seen in the last year

**on-peak** - period when prices are highest, for both demand and usage (e.g., 8 am - 10 pm)

**off-peak** - period when prices are lowest (e.g., 10 pm - 8 am, and all day on weekends)

**fuel/energy adjustment charge** - covers utility fuel costs over a defined level (e.g., \$5/MMBTU)

**power factor** - adjusts for quality of power use (\$/kVA beyond a defined level, typically ~80%)

To learn more about electric tariffs, go to:  
[www.aeeprograms.com/realtime/ElectricTariffs/](http://www.aeeprograms.com/realtime/ElectricTariffs/)

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# Session 1 – Modules 1 and 2

# ***Module 1: What Happened And Why Should I Care?***

- How suppliers and rules have changed
- Who makes, moves, and regulates power
- Transitional steps: stranded costs, standard offers, shopping credits
- New kids in town: REPs and ISOs

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## Competitive Power In 3 Minutes

Where markets are open (see map), electric supply may be bought from utilities **or** competing suppliers.

Delivery of electricity by utilities remains regulated.

Parts of utility tariffs are replaced by power contracts.

Some areas are in transitional stages. Rules and incentives may change.

Retail power competition exposes you to volatility of wholesale market pricing.

Technical/contractual options help find the best pricing.



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### Where does my power originate?

Central power plants generate electricity.

Most are owned by local or out-of-state utilities, wholesale generators, or others.

The old rule was: “we make it, and you must buy it only from us”.

Most plants are regulated by state Public Utility Commissions.



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### How does it get to my region?

Through high-voltage transmission lines

grouped into regional power grids (PPs or ISOs).

Those lines may be owned by utilities and others, but all are

regulated by the Federal Energy Regulatory Comm.



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### How does it get to my buildings?

Substation transformers step down high voltage, and

local distribution steps it down further, feeding power into your facility.

Utilities own this system, and its metering, which

remains regulated by state Public Utility Commissions.



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### So What Did Deregulation Do?

Impacted IOUs in 18 states (but not munis or co-ops).

Supply and delivery became two distinct energy services.

Utility supply tariffs became optional, with retail contracts as an alternative. Delivery tariffs remain in effect.

Non-utility companies now supply power to end users.



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### Are Electric Bills Affected?

Electric bills have multiple components. Most are delineated in your utility's tariff:

- ❑ generation (energy and capacity) a/k/a “supply”
- ❑ transmission } (T&D, together called “delivery”)
- ❑ distribution }
- ❑ metering/billing
- ❑ program charges (e.g., RPS, low income)
- ❑ taxes (not found in tariff)

Generation is the only piece open to competition.

You may get 2 electric bills: *supply & delivery*.

Some supplier bills are *consolidated* onto the utility's bill. Others may invoice separately.

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### How Did This Occur?

In 1992, federal laws and regulations started fostering competition at the *wholesale* level.

Municipal/co-op utilities and large industrials were then able to choose their own power suppliers.

Between 1997 and 2010, 18 states (including New England, NY, mid-Atlantic, TX, IL, OH, CA and DC) began allowing the same for *retail* customers.

Generation was deregulated, control over most transmission was centralized in ISOs, but distribution remained a regulated monopoly.

Some customers have seen savings (2 - 20% off total bill), but many now see greater price volatility.

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### Here's The “New Order”

*Wholesale power markets* offer power in large blocks, hourly, and financially (e.g., futures).

In exchange for receiving *stranded* costs, utilities *divested* generating plants. They now *deliver* energy as “wire & pipe” companies (a/k/a LDC).

FERC-chartered *independent system operators* (ISO) now control many transmission grids.

*Retail electricity suppliers* and utilities sell power from many sources, all sent through utility lines.

But you are not required to participate. You may continue to take supply from your utility.

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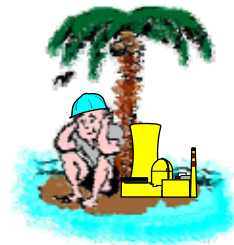
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### What Are Stranded Costs?

With competition, utilities couldn't recover some of their costs (e.g., unprofitable power plants), so a Competitive Transition Charge (CTC) was levied on all customers, regardless of supplier.

This fee became part of the distribution charges paid by all customers to the utility delivering power (for several years).

The only way to avoid a CTC is to install on-site power and unplug from the utility, which may involve increased risk and a hefty “exit fee”.



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### Independent System Operators

ISOs serve as regional power “traffic cops”.

These FERC-chartered groups control ~60% of transmission.

They provide equal access to the grid for all power suppliers.

They set and enforce standards for power entering the system.

Some also run hourly pricing (day/hour ahead) markets.



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### The Retail Electricity Supplier

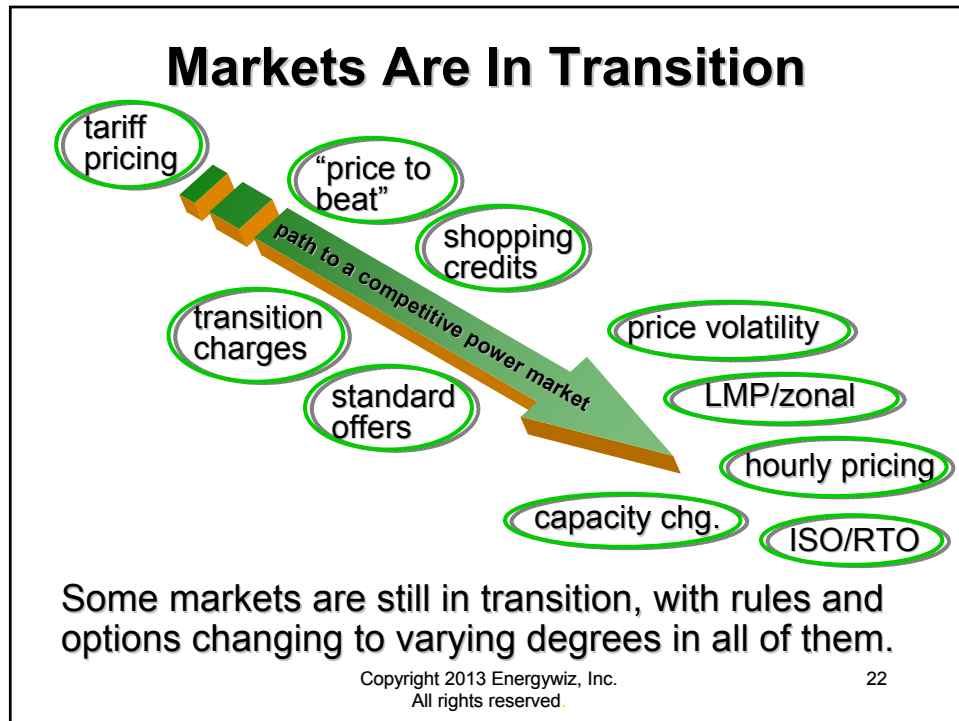


Their titles vary from state-to-state (ARES, ESCo, ESP, REP, CRES) but all perform similar functions and are licensed by PUCs.

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### Shopping Credits / Std. Offers

During this transition, intermediate stages occur:

- Shopping Credits – temporary discount off utility distribution charges when buying power from a supplier instead of the local utility
- Standard Offers / Prices To Beat – utility forward supply pricing to compare to competing pricing

As markets develop, customers see utility prices rise, pushing them to seek other suppliers and pricing options. Note: simple 'price to beat' may go away over time, making comparison more difficult.

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### Four Ways To Purchase Power



Through a Marketer  
or Aggregator...

Direct Access  
to suppliers...



Wholesale (ISO,  
OTC, power pool)

or buy from  
the Utility.



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### Review Questions

1. \_\_\_\_\_ is a unit of power and \_\_\_\_\_ is a unit of energy.
2. Deregulation requires end use customers to buy power from non-utility suppliers. True or False?
3. Which of the following was unchanged by deregulation:  
generation      transmission      distribution
4. Who licenses competitive retail suppliers:  
FERC? ISO? PUC? DMV?
5. ISOs manage \_\_\_\_\_ power markets and the \_\_\_\_\_ system.

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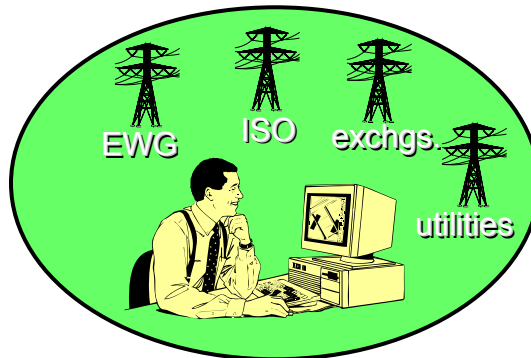
### ***Module 2: Wholesale Power Markets: the Base for Retail***

- Wholesale markets: who, where, how
- Pricing sensitivities: time, fuel, location
- Physical and financial products

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### **The Wholesale Marketer**



Wholesale marketers routinely buy and sell (i.e., “trade”) power from a variety of sources offering pricing via both physical and financial markets.

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### Wholesale Markets Are The Basis Of Retail Power Pricing

Wholesale power markets are:

- ❑ available in both physical and financial forms
- ❑ defined geographically (maps to follow)
- ❑ sensitive to supply/demand margin, fuel pricing (e.g., natl. gas), and capacity pricing
- ❑ vulnerable to transmission constraints

You will probably never buy at the wholesale level, but retail pricing parallels wholesale pricing. Retail suppliers buy power from the wholesale market and may index their pricing to it.

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### Wholesale Markets 101

Wholesale pricing is based on large blocks.

Pricing available in many forms:

- ❑ at ISO-based markets, hourly or day-ahead (24 hrs)
- ❑ at public/private exchanges (CME/NYMEX & OTC):
  - ❑ “prompt” month (that’s next month)
  - ❑ multi-month or annual strips (flat price for a block)
  - ❑ futures/forwards (running for months and/or years)

Exchange pricing: [www.cmegroup.com/trading/energy/](http://www.cmegroup.com/trading/energy/) for ClearPort futures. See [Platts.com](http://Platts.com) for various OTC data products (sample to follow).

Newsletters with OTC data may cost \$1,000s.

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Wholesale power prices are posted in \$/MWh by region and do not include transmission (unless priced by zones within a region), distribution, ancillary services, or any retail tariff-based charges.

1 MWh = 1,000 kWh, so \$.03/kWh = \$30/MWh  
= 30 mills/kWh (1 mill = .1 cent)

Wholesale power is typically sold in on-peak blocks that run for 16 hours (7 am to 11 pm), 5 days a week (called a “5 by 16”), in large constant wattage bundles (e.g., 5 MW to 100s of MW).

Retail marketers buy power from a mix of sources (e.g., 80% OTC + 20% balancing via ISO).

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### A Sample Futures Contract

A future is like a share of stock that only has value when you sell it (i.e., you don't receive the power).

- ❑ 2 MW at 100% L.F.
- ❑ 16 hours/day, from 7 am to 11 pm
- ❑ 23 weekdays/month
- ❑ 736 MWhr/month (other futures differ)
- ❑ a one-month contract may cost >\$40,000
- ❑ some features may be market-specific

#### **Cinergy**

	*Settlement	High	
November	24.35	24.40	2
December	24.75	—	
January	31.00	—	
February	27.75	—	
March	25.00	—	
April	25.00	—	
May	31.50	—	
June	77.00	—	
July	150.00	150.00	15
August	135.00	—	
September	33.00	—	
October	24.00	—	
Volume of contracts (unofficial)			
Total open interest Wednesday			

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### What Do OTC Prices Look Like?

Jan. 20 was going to be a warm winter day. Its price was relatively low. But February's forward price is based on a forecast for colder weather; price is higher.

Day-ahead markets for deliver (Jan 20 \$/MWh)						
East	Index	Change	Range	Deals	Volume	Avg \$/Mo
<b>On-Peak</b>						
Mass Hub	75.00	-6.50	75.00-75.00	N.A.	N.A.	83.96
N.Y. Zone-G	81.00	-3.50	81.00-81.00	N.A.	N.A.	86.39
N.Y. Zone-F	85.00	-4.25	86.00-86.00	N.A.	N.A.	95.43
N.Y. Zone-A	61.50	-2.50	61.50-61.50	N.A.	N.A.	67.09
PJM West	55.30	-12.50	62.50-62.50	N.A.	N.A.	66.38
PJM West	55.30	-7.47	54.75-56.25	29	2,700	62.29
Dominion Hub	51.00	-7.50	51.00-51.00	N.A.	N.A.	52.99
VACAR	51.50	-5.50	51.50-51.50	N.A.	N.A.	53.05
Southern, into	52.50	-6.00	52.50-52.50	N.A.	N.A.	54.81
Florida	60.25	-8.50	60.25-60.25	N.A.	N.A.	63.57
TVA, into	61.75	-1.25	61.75-61.75	N.A.	N.A.	61.55
<b>Off-Peak</b>						
Mass Hub	55.00	-4.00	55.00-55.00	N.A.	N.A.	60.41
PJM West	40.50	-7.50	40.50-40.50	N.A.	N.A.	44.43
Dominion Hub	37.00	-6.50	37.00-37.00	N.A.	N.A.	34.88
VACAR	44.00	-3.00	44.00-44.00	N.A.	N.A.	38.48
Southern, into	41.75	-3.75	41.00-42.50	8	400	36.76
Florida	50.25	-2.25	50.25-50.25	N.A.	N.A.	46.30
TVA, into	47.50	-0.50	47.50-47.50	N.A.	N.A.	42.41

Long-term Forward markets, Jan 19 (\$/MWh)

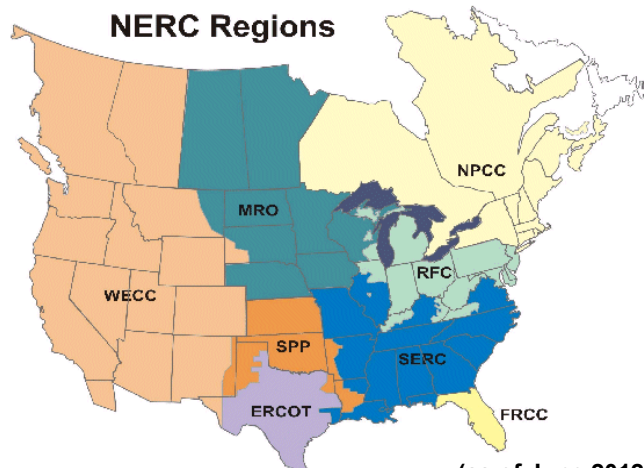
East	Feb	Mar	Mar/Apr06	May06	Jun06	Jul/Aug06	Sep06	Q406	Jan/Feb07	CY07	CY08
Mass Hub	101.85	95.40	94.55	92.60	97.10	108.95	97.50	100.25	132.15	104.25	99.50
N.Y. Zone-G	102.80	100.40	99.10	95.20	102.95	120.20	101.00	101.20	126.40	105.95	102.15
N.Y. Zone-F	121.55	118.00	117.80	111.70	119.30	144.00	120.40	119.70	148.05	124.50	121.15
N.Y. Zone-A	83.40	1.30	80.05	76.95	83.75	95.95	83.75	84.20	105.50	86.30	83.75
Ontario	85.00	85.00	84.00	83.00	97.00	108.00	93.50	93.00	119.00	104.00	102.00
PJM West	80.90	80.75	78.75	76.85	83.90	101.45	82.10	79.15	97.35	85.45	83.05
Southern, into	64.55	66.45	67.20	74.15	79.95	88.05	80.20	76.30	76.55	82.15	79.15
TVA, into	60.10	64.80	64.50	66.70	72.65	80.40	72.05	69.15	74.90	74.10	69.85

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### Origin of Market Boundaries

#### NERC Regions

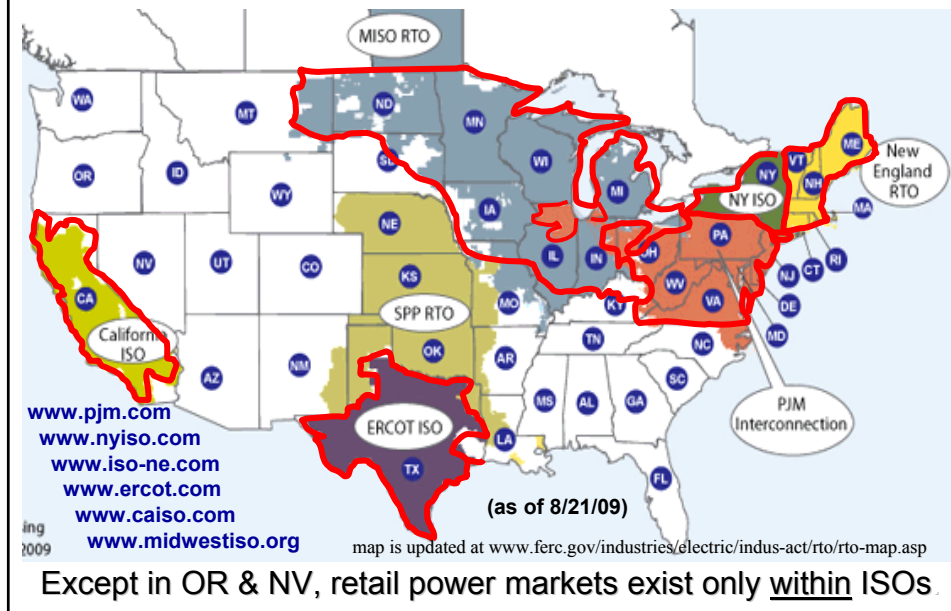


(as of June 2012)

North American Electricity Reliability Councils (NERC) were created to improve transmission grids, but some formed into power markets with pricing by region and/or sub-region.

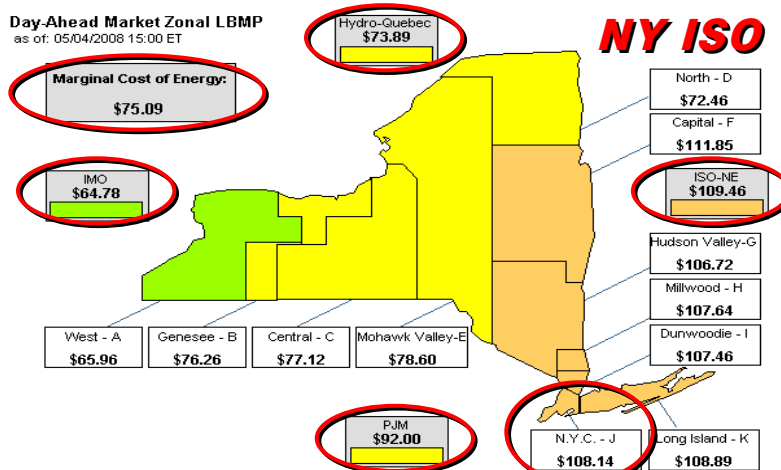
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### Markets Exist Within ISOs



### Zones/Control Areas In ISOs

Day-Ahead Market Zonal LBMP  
as of: 05/04/2008 15:00 ET



Control areas and zones are regions within ISOs that act as sub-markets with their own pricing.

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### Hourly Pricing At An ISO

Generators offer power to an ISO at fixed prices for each hour. Marketers/utilities tell the ISO their projected loads in the next hour. The ISO matches the price needed to satisfy that load. Let's say the grid needs 850 MW in the next hour

Vndr. A Bid	Vndr. B Bid	Vndr. C Bid	Vndr. D Bid	Market Clearing Price (MCP)
400 MW @ \$30	400 MW @ \$40	400 MW @ \$50	400 MW @ \$60	850 MW @ \$50

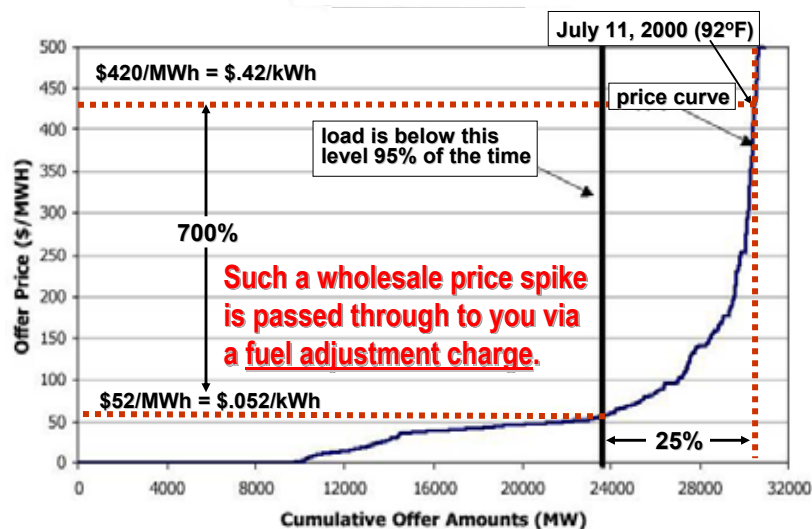
Price is bid to the hourly level needed to meet the load. All supplying vendors get that price.

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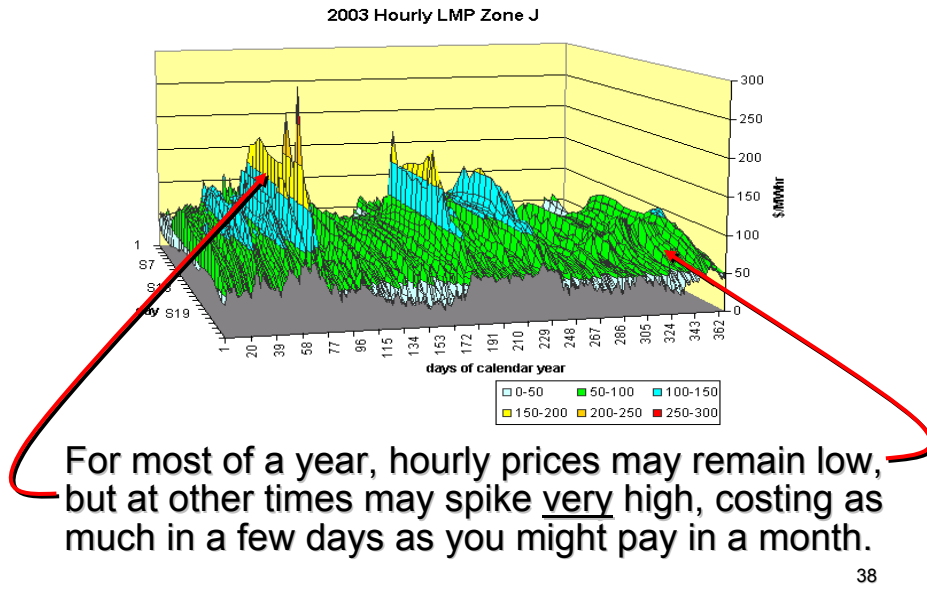
### Impact On Wholesale Pricing

Supply Curve for Day-Ahead Energy



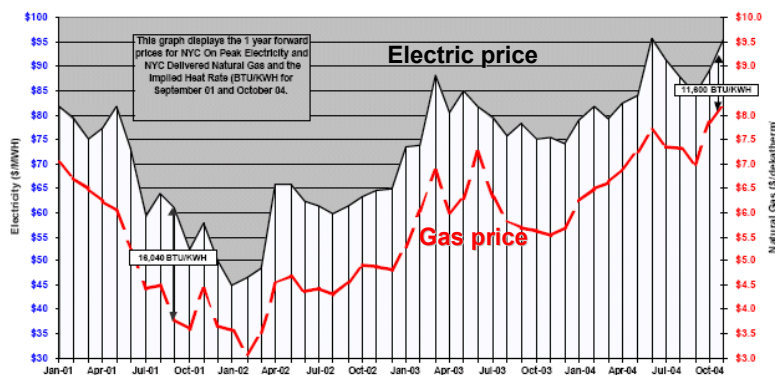
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### Hourly Pricing Over A Year



### Natural Gas Pricing

Where natural gas-fired power plants are common, wholesale natural gas prices may strongly influence wholesale (and thus retail) power pricing. Such pricing occurs even where coal or hydro is “king.”

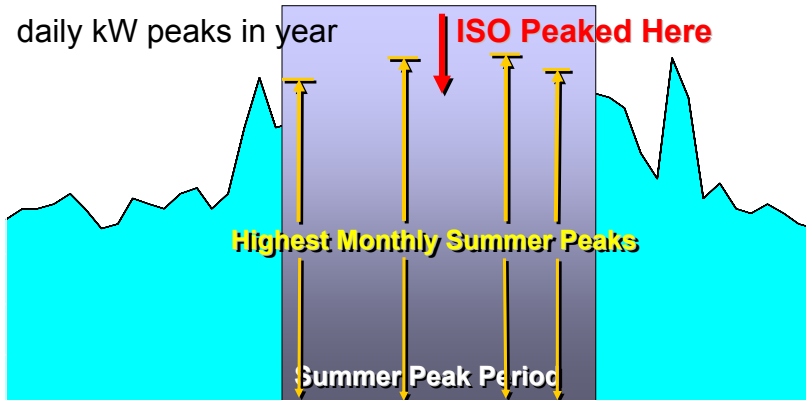


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### Wholesale Capacity Charge



In a wholesale capacity market, your summer peak(s) will set a kW capacity level (a/k/a a “tag”) that acts like an annual ratchet charge.

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### Transmission Congestion

Today's transmission lines are like local highways. When there's no traffic, it's easy to get around. When too many cars are on the road, traffic slows down.



The same thing happens as power lines get “congested.” Cheaper power can't get through to your area. Power must be generated locally, at prices subject to little or no competition.

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### “Load Pockets” See Higher Pricing During Peak Periods



LMP = Locational Marginal Pricing

In some areas, peak load exceeds the available transmission capacity many hours each year.

At such times, ISOs may apply a “locational marginal pricing” (LMP) formula to value locally generated power. That differential is reflected in OTC pricing, which is outside the ISO.

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### Review Questions

1. Wholesale markets are \_\_\_\_\_ defined, \_\_\_\_\_ and \_\_\_\_\_ sensitive, and vulnerable to \_\_\_\_\_ congestion.
2. The MCP is the highest price needed to meet the hourly \_\_\_\_\_ and \_\_\_\_\_ vendors get paid that price.
3. LMP stands for \_\_\_\_\_.
4. Market pricing may be posted by \_\_\_\_\_ in \_\_\_\_\_ and at \_\_\_\_\_ intervals.
5. One MWhr = \_\_\_\_\_ kWhr and, when bought at wholesale, does not include: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, or \_\_\_\_\_.

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**Tomorrow:**  
***Modules 3 & 4:***  
***Retail Market***  
***Power Pricing***  
***and***  
***Preparing A Facility***  
***To Buy Power***

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