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Energy Industry Update

Highlights of Recent Significant Events and Emerging Trends in the Energy Industry

December 2006

Contents

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An Industry in Transition

After a tumultuous 2005, energy and utility companies are now contemplating long-term strategies to grow long-term shareholder value. These involve restitching business portfolios, adopting new technologies, proposing innovative rate structures, and expanding the core business. These strategies, however, are early in development. The next couple of years will reveal the details and whether they can be effectively executed.

Commodities markets settle down	Temperate weather and improved (albeit still constrained) fuel transportation networks helped moderate fuel and power prices, as compared with the storm-ravaged situation the industry faced a year ago. Gas storage is filled to the brim, and forward gas prices are depressed given some expectation of a mild winter. However, concerns about unpredictable demand for fuel—unexpected cold weather, increased gas-fired generation, and liquefaction for transportation fuels—have put some upward pressure on prices in the long run as gas supplies could be quickly depleted. Finally, power and emissions prices have eased temporarily. However, industry members are increasingly concerned about the looming shortfall in generation. Further, rate base additions may be harder to come by with state regulatory activism at play.
Interest in demand-side options, but market penetration lags	After perennial hype, automated metering infrastructure may get a boost from improved technology and federal and state policy, which is increasingly focused on demand response, energy efficiency, and other "cleaner" alternatives to new central station generation. Momentum seems to be building for the electric industry to develop standards that make an intelligent or "smart" grid a reality, with a hoped-for increase in demand-responsive load and new products and services. Demand response nationwide has had some limited success to date, but FERC finds that only a fraction of its potential is being realized. State and federal policymakers, however, are seeking to stimulate this new capacity resource.
States flex regulatory muscle	FERC is advancing in its policy development, although it is now tackling transmission capacity availability and access through reform of the 10-year-old Order 888. Meanwhile, after years of federal policy taking center stage, state regulators and politicians are more involved in planning and policy on power supply, as many states are revising (or preparing for the first time) energy plans. State regulators and politicians, dismayed at the prospect of rate increases, have also proven to be more active—as a result—less friendly to acquisitions of utilities in their jurisdictions. Indeed, they are expanding their jurisdictional reach. For example, in the case of Exelon/PSEG, the utility commission—not deferring to federal regulators—sought to restrict the parties' activities in the wholesale market.
Energy and utility companies continue and adapt strategies	Firms continue to pursue acquisitions despite hostility in some jurisdictions. Asset acquisitions have continued unabated as players construct their portfolios and achieve scale. Other structures and types of deals—small, going private, delivery only, etc.—have been successful as well. Other strategies are being pursued as well. TXU, for example, continues to pursue blockbuster deals, recently inking a large infrastructure outsourcing deal and announcing a massive generation build-out. These announcements serve to strategically redefine their "core" utility business. Finally, energy trading and marketing may be headed for a comeback, as large banks and investment banks are filling the gap in market participation left in the wake of Enron's demise. Utilities, however, are less sanguine about this resurgence. The energy industry has mixed views; many believe the return of liquidity and enhanced risk management is beneficial, while others fear the increased price volatility that may be generated by financial and hedge fund participants.

Energy Industry Stock Prices

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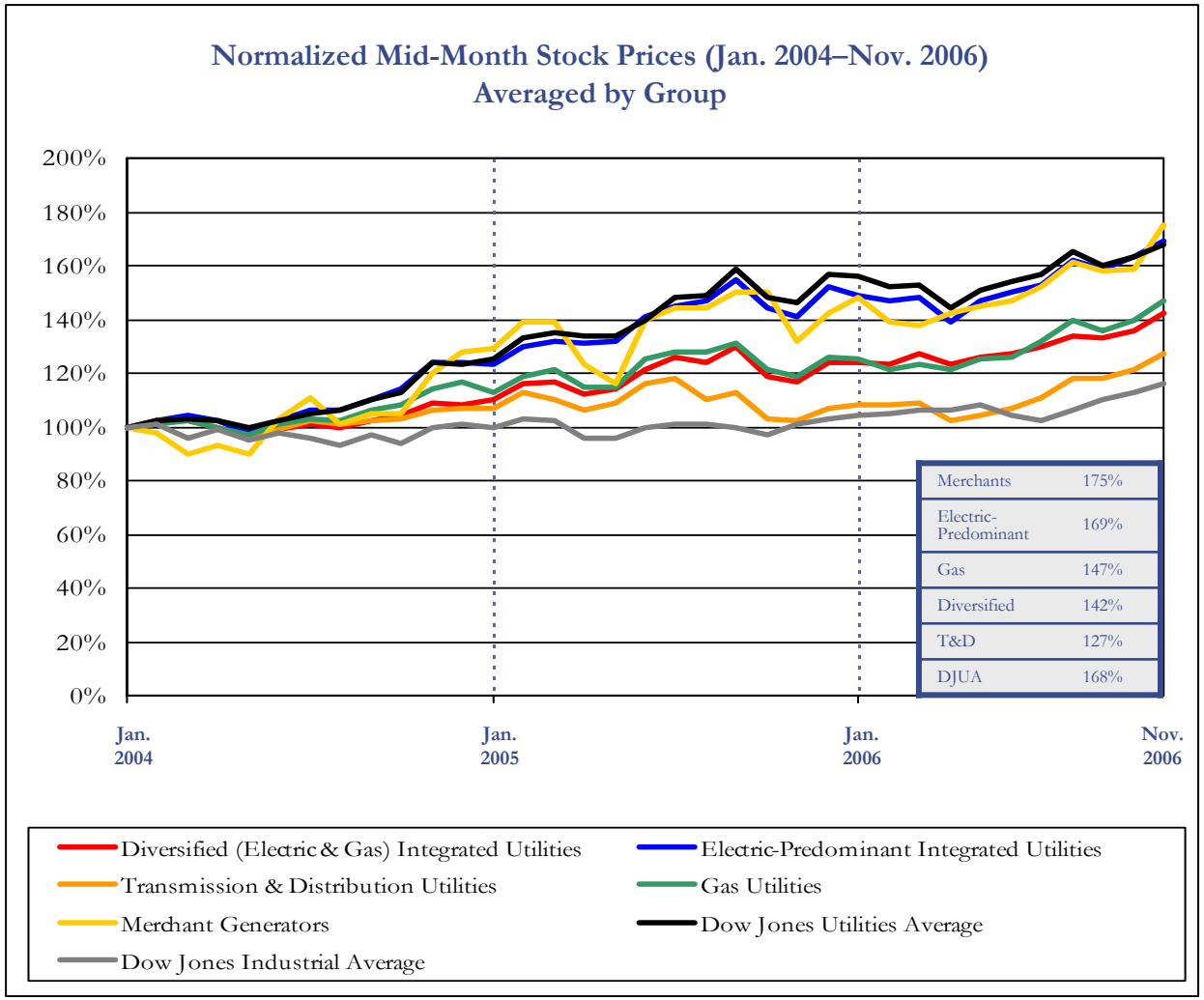
Utilities Share Appreciation Continues to Outpace the DJIA



Selected Statistics – Nov. 2006

Company		Group Averages at Nov. 2006 P/E	ROE
Alliant Ameren Aquila* CMS Energy* MDU Resources NiSource OGE Energy	PG&E PSEG Scana Corp. Sempra Energy Vectren Wisconsin Energy	20 (σ = 11)	8%
Centerpoint Con Edison Duquesne Light Energy East National Grid	Northeast Utils. NSTAR Pepco Holdings Puget Energy	23 (σ = 13)	13%
AES Calpine (restructuring)* Dynegy*	Mirant Reliant Energy* Williams	35 (σ = 21)	92%
AEP Allegheny Energy Cinergy (acquired)* Constellation Dominion DTE Energy Duke Energy Edison Int'l Entergy Exelon † FirstEnergy FPL Group	Great Plains Energy Hawaiian Electric Pinnacle West PNM Resources PPL Corp. Progress Energy Sierra Pacific Southern Co. TECO Energy TXU Xcel Energy	17 (σ = 4)	20%
AGL Resources Atmos Energy KeySpan Energy National Fuel Gas New Jersey Resources Nicor ONEOK	Peoples Energy* Piedmont Natural Gas Questar Southern Union Southwest Gas Westar Energy WGL Holdings	17 (σ = 4)	12%

Note: Recent Energy Industry Updates have used stock prices adjusted for dividends, stock dividends, and stock splits. The prices above are closing prices adjusted to reflect only stock splits.

Notes: This panel is composed principally of Fortune 1000 Energy and Utility companies.
P/E is for most recent four quarters, as available, based upon Nov. 27 stock price; ROE is trailing reported four quarters as of Nov. 28, 2006.
σ means the standard deviation of P/E ratios for the group. Figures are rounded to nearest integer.
Averages and σ exclude statistics deemed "Not Available," but include reported negative ROE figures.
* means P/E omitted because not available, recent trailing four quarters loss, or no longer separately traded (i.e., Cinergy);
† means P/E omitted from calculation of average and σ because >100.

Sources: *The Wall Street Journal Online* (accessed Nov. 28, 2006), Marketwatch.com (ROE, P/E, historical stock prices); Yahoo! Finance and NASDAQ.com (historical closing stock prices, adjusted to reflect splits)

The Investment Community's View

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Some Caution Expressed Due to Significant Upside and Downside Factors

Diversified (Electric and Gas) Integrated Utilities	Transmission and Distribution Utilities	Merchant Generators	Electric-Predominant Integrated Utilities	Gas Utilities
Neutral ⇔	Neutral ⇔	Positive ⇧	Neutral ⇔	Neutral ⇔
"Retreating commodity prices take the wind out of many a sail: Gas producers, power generators, and even utilities [that] don't make a margin on the commodity but are nonetheless incorrectly perceived as benefiting in a high energy price environment." "Why not downgrade the group? 1) we believe the weak natural gas price environment is temporal; 2) we believe the longer term thesis for energy infrastructure—ranging from power plants to pipelines—remains strong; and 3) many of the macro issues ... can turn—and indeed have—on a dime." "We see risk for the Regulated Utilities as Democrat[ic] leadership in the House pushes an agenda including carbon reduction and change in tax policy [i.e., repeal of the dividend tax cut]."	"While transmission line investment has been sparse for most utilities ... other factors, including customer growth rates and electrical demand, have seen healthy increases." "Managements ... have encountered some difficulty in securing recovery of energy delivery costs from state regulators. ... Power delivery companies are enduring notable margin pressures." "FERC's incentives to promote the separation of transmission wires from other utility assets should prompt the creation and IPO of new wires-only companies as well as further consolidation of wire assets."	"Merchant power margins continue to expand through power supply/demand imbalances." "[T]he long lead time for infrastructure projects means that power market supply/demand conditions are likely to tighten over the next several years, improving the outlook for unregulated generation." "Power generation follows two independent cycles: the natural gas cycle and the heat rate cycle. ... The former cycle has been ascendant since 2003, while the latter is just starting to have an earnings impact this year. We believe tighter supply for generation, reflected in higher heat rates and power prices, will be an incremental investment thesis for this group over the next two to three years." "Generally, [we expect] that a general consolidation of the merchant sector will result ..."	"Companies are targeting a nearly equal weighting of debt and equity ... a goal that should be met by 2009–2011." "[T]he potential for utilities to 'unlock' the inherent intrinsic value of their businesses either through consolidation, corporate disaggregation, and/or rationalization of assets remains an industry trend." "Gas prices have sharply declined. ... [T]his may place some spread pressure on the generation companies as future operating margins may face some softening." "Recent rate shocks from spiraling natural gas and coal costs are, however, difficult for regulators to pass through when the overall rate of inflation remains well behaved in the 2% core area." "[W]e do not see many headline grabbing announcements coming out of [the EEI Financial Conference] this year as compared to recent years."	"Customers are conserving energy in reaction to higher utility bills. Gas distributors reported decreased weather-normalized gas usage ... from 1% to 5% as compared with historical declines of 0.5%." "[T]he one drawback from an increased presence in nonregulated activities is that regulatory agencies seem less likely to approve rate increases." "Companies with gas production properties have hedged the majority of near-term production and should be generally insulated from recent declines in natural gas spot prices." "Gas prices have fallen sharply since the fall of 2005. ... This is an important development for diversified gas utilities because they have generally locked the price they will receive for flowing gas production but have locked in less than 50% of 2007 production."

Sources: Standard & Poor's Stock Reports; Citigroup; *Value Line Investment Survey*; Morningstar; D.A. Davidson & Co.; Credit Suisse; Scotia Capital; A.G. Edwards; R.W. Baird & Co.; Bear Stearns; Wachovia Securities

Strategies in Focus

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As the utility industry's balance sheets have improved and legislative and regulatory policies have become clearer, firms are positioning themselves to extract value from their existing portfolio of businesses and acquire or develop new ones that will offer the best growth opportunities.

"All men can see these tactics whereby I conquer, but what none can see is the strategy out of which victory is evolved."

— Sun Tzu

A Sampling of Business Strategies and Portfolios: Selected Diversified and Integrated Utilities

		DUK	D	CEG	EXC	SO	PEG	FE	AEP	EIX	FPL	SRE	ED	PGC	ETR	PGN	TXU	CNP	XEL	DTE
Structural Moves	Dis-integration or deconvergence (focus)	⊙	⊙	⊙	?		?													
	M&A	⊙		⊙	●	?	⊙				⊙					?	?			
	"Virtual" utility																●			
Competitive Businesses/ Diversification	Trading & marketing (lg. scale)	○	●	●	●		●					●			●	○	●			●
	Financial/capital business									●										
	Competitive retail E&G												●				●	●		
	International investment	●					○													
	Real estate	●																		
	Telecom/broadband												○			○	○	●		
Infrastructure Development	Rate base investment	⊙	⊙			●		⊙	●	●	⊙		⊙	●	⊙	●			●	
	Renewables development					●				⊙	●								●	●
	Transmission (stand-alone)																			
	Advanced generation	⊙	⊙	⊙	⊙	⊙		⊙	⊙		⊙					⊙	⊙			
Business Focus	Wires & pipes predominant									●		●	●	●				●		
	Nuclear developer/acquirer & operator	⊙	●	●	●	●					●				●	●				
	Core utility business (virtual/ actual vertical integration)	●	●	●	●	●	●	●	●		●				●	●	●		●	●
	Competitive generation	○	⊙	⊙	●	●	⊙		○	●		●			●	○				
Backward Integration/ Upstream Energy Value Chain	Coal mining & transport								●											●
	Synfuels	●		●		●						●				●				●
	Gas pipeline & storage	●	●									●						●		●
	Gas E&P		●	○												○				●

● Pursuing ⊙ Relatively new focus ⊙ Partially divesting ○ Exiting ? Unclear or possibly under consideration

Sources: ScottMadden analysis; Banc of America Securities; analyst reports; industry reports; company websites, investor presentations

Coal Markets: Prices Easing

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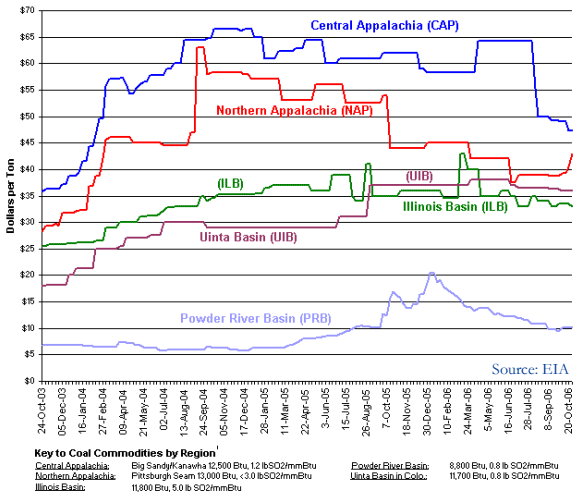
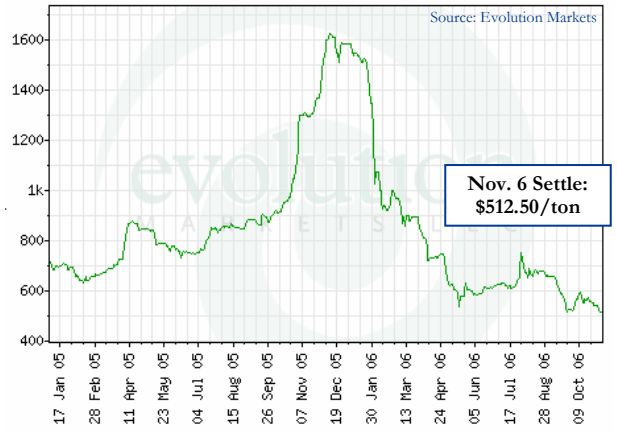
Powder River Basin and Central Appalachian Coal Prices Have Eased and Leveled Off

Coal Prices by Region
Oct. 2003–Oct. 2006 ($/Ton)



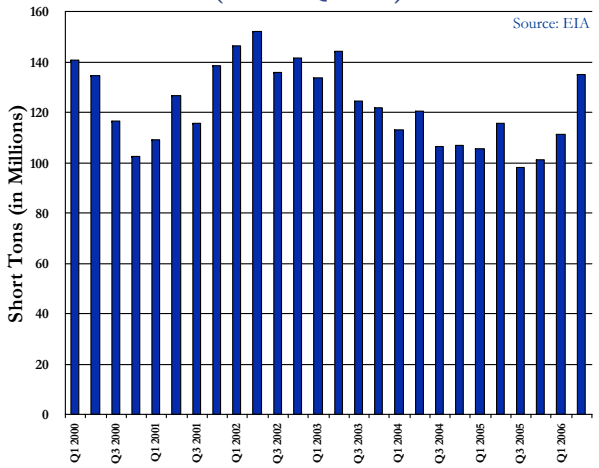
... And SO_2 Emissions Allowance Prices Continue to Move Lower after 2005's Spike

SO_2 Spot Allowance Settle Prices
Jan. 3, 2005–Nov. 6, 2006 ($/Ton)



... While Utility Coal Stockpiles Continue to Build

U.S. Electric Power Generation Coal Stockpiles (End of Quarter)



Impacts of Improved Market Conditions have Yielded Lower Coal Prices

- Easing of transportation constraints and higher mine production rates have improved supply, but PRB transport problems linger
- Falling gas prices ($6-$7/MMBTU) have caused some worries about fuel switching from coal, but this is unlikely above the $4.50/MMBTU level
- Collapse in Central App prices has caused higher-cost mines to shut down and weaker players to exit
- Expectations of consolidation in the coal sector and potential entry of distressed asset investors during this temporary trough in coal prices and the current thin margins on the commodity
- Prices still remain higher than in 2003

More Coal-Fired Plants Proposed

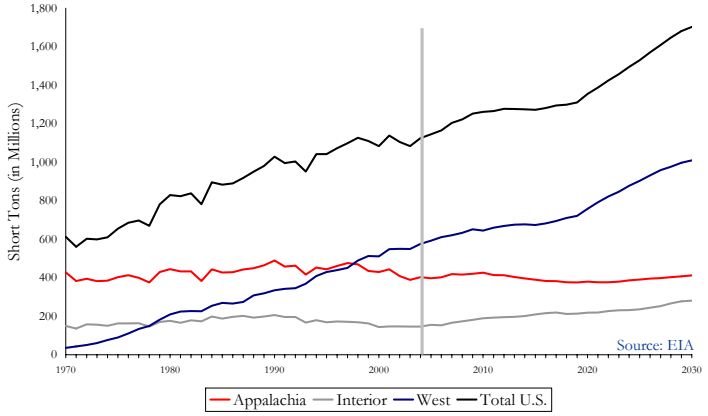
- Since 2000, more than 154 coal plants totaling 93,000 MWs have been proposed or are operational, about a third of which are expected to be completed between 2010 and 2011

Longer-Term Expectations May Reverse Price Trend

- Recent cutbacks by Massey and Consol indicate that price discipline might soon return
- Also, worldwide coal demand is expected to grow by 2.5% per year (compare U.S. at 1.8%), with Chinese consumption expected to increase a whopping 4.2% per year
- Alternative uses (coal-to-liquids and coal gasification) provide another potential demand, competing with power generation

Longer Term, Appalachian Coal Production Expected to Remain Near Flat

U.S. Coal Production by Region



Sources: Energy Information Administration; Evolution Markets; Citigroup Global Markets; DOE National Energy Technology Laboratory

Coal-to-Liquids: Competition for Coal Resources

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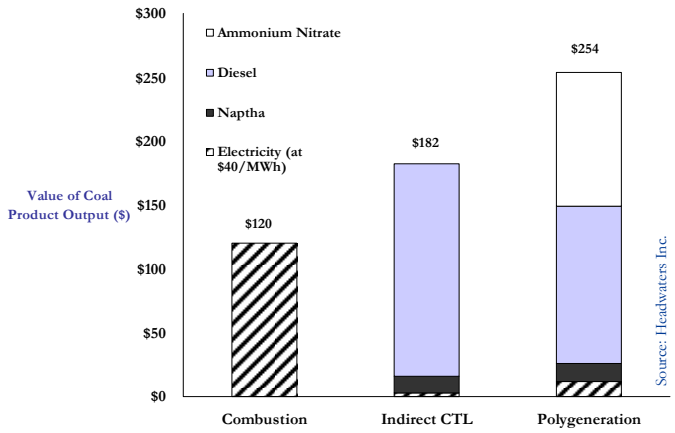
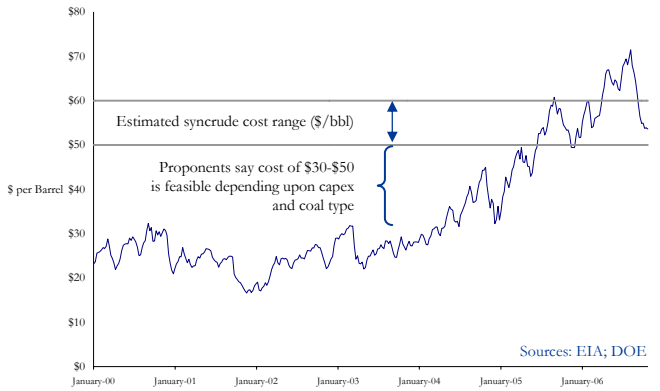
What is coal liquefaction or coal-to-liquid (CTL) fuels production?	❑ Extraction of multiple types of liquid hydrocarbon products from coal ❑ Processes—both indirect (Kohleoel) and direct (Fischer-Tropsch)—have existed since World War II, but comparatively low oil prices have made them uneconomic ❑ Some proposed hybrid processes combine both gasification (IGCC) and liquefaction ❑ EIA projects nearly 200 million short tons of coal consumed at coal-to-liquids plants by 2030 (more than twice as many as other industrial coal uses)
Drivers of current interest in coal liquefaction	❑ Growing concerns about security of oil supply due to geopolitical factors ❑ Gloomy peak oil forecasts, i.e., questions about long-term availability of oil ❑ Resulting high transportation fuel costs ❑ Abundance of U.S. coal reserves
Major players and deployment	❑ Sasol, Headwaters, and Rentech are major players, with increased interest from Conoco, other major oils
Key issues surrounding CTL	❑ Most U.S. projects are in feasibility stage; technology is not widely deployed ❑ High capital and operations cost (capital cost ~ $50,000 to $70,000 per barrel of daily capacity) ❑ Relative economics of CTL vs. other coal uses (i.e., power production) highly depending upon volatile commodity prices ❑ Easing of fuels prices may lead to renewed complacency about supply until the next oil prices/supply crisis ❑ Significant carbon emissions from process requires massive sequestration or beneficial use of CO_2 ❑ NIMBY and public resistance to coal use ❑ Possible commodity price increases for utilities with increased and different demands for coal ❑ Coal supply, the majority of which is consumed domestically, may have a worldwide output market
Existing and proposed plants (some examples)	❑ Arch Coal/Advanced Fuels $1 billion Bull Mountain, Montana plant (online 2012), producing 22,000 barrels/day of diesel and 300 MW power ❑ Rentech/Kiewit Fischer-Tropsch polygeneration facility in East Dubuque, Iowa (online date not specified) producing ultimately 920 tons of ammonia fertilizer products; 1,800 barrels of clean fuels, and 76 MWs of electric power

Estimated Value of One Ton of Sub-bituminous Coal (As Received) (2005 Commodity Prices)



World Crude Oil Price (Nominal $/Barrel) (Jan. 2000–Oct. 2006) vs. Estimated Syncrude (CTL) Cost Per Barrel



Sources: EIA; DOE; World Coal Institute; company reports, presentations, and press releases; Presentations at EUCI "Commercializing Clean Coal" Conference, Charlotte, NC (Sept. 7-8, 2006)

Gas Markets: What a Difference a Year Makes

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From Famine to Glut?

- After a mild winter, stored gas entered 2006 at record high levels. Injections over the summer only increased that cushion
- After a small spike in early August, gas prices have retreated to the $6-$7/MMBTU range. Henry Hub forecasts for 2007 range from mid-$6 to mid-$8/MMBTU (higher in Q1 2007)
- Near term, El Niño weather conditions will dictate whether supplies are drawn down; consensus is that this winter will not be as warm as last, so withdrawals are expected to bring storage levels back to normal
- Some observers believe that stable $7.50 gas prices will cause rig counts to level in 2007, resulting in less domestic production. In 2008 and beyond, however, increased LNG can fill that gap

Infrastructure Development Is Adding Significant Capacity

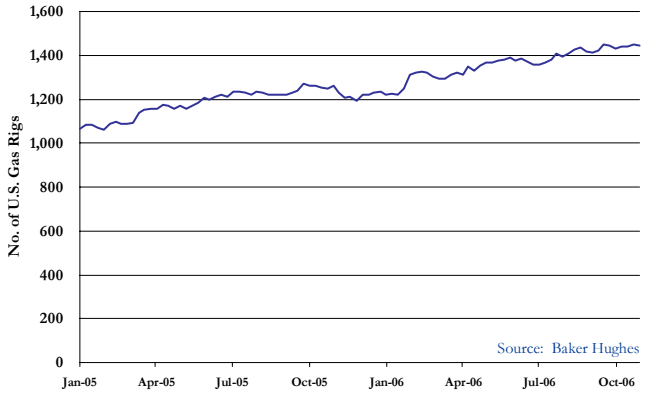
- More than 8.2 BCF/day in pipeline capacity and 24.9 BCF in storage capacity was added in 2005
- Despite softer gas prices, projections for additional pipeline and storage projects remain viable near-term

A Noteworthy Event

- Summer heatwave-driven increase in gas-fired generation's demand for gas twice caused net withdrawals during the normal injection period of May–September. These are the first times ever this has occurred
- Increasing amounts of gas-fired generation over the next two to three years could make this a more frequent occurrence and impact storage

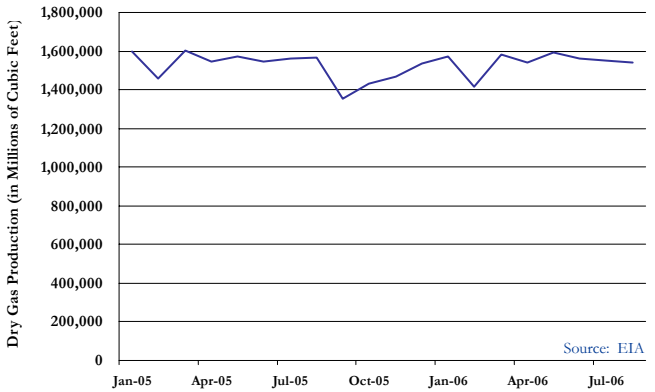
After Last Year's Interruptions, Rig Counts Continue to Climb

U.S. Weekly Gas Rig Count (Jan. 2005–Nov. 2006)



...While High Storage Levels and Lower Prices Have Slowed Production

U.S. Dry Gas Production (in Millions of Cubic Feet) (Jan. 2005–Nov. 2006)



GAO Wants Gas Market Transparency

In an Oct. 2006 report, GAO recommended (and FERC accepted) that FERC provide more information on unusual market behavior and timely information on gas market investigations

Natural Gas Prices Have Support at the $6+/MMBTU Level

Henry Hub Spot Gas Prices (Jan. 2005–Nov. 2006) and Selected Projections for 2007

Sources: Fortis Bank; A.G. Edwards, EIA; Baker Hughes; Energy Intelligence; Platts PowerDat; Natural Gas Supply Association

Gas Markets: Infrastructure on the Way

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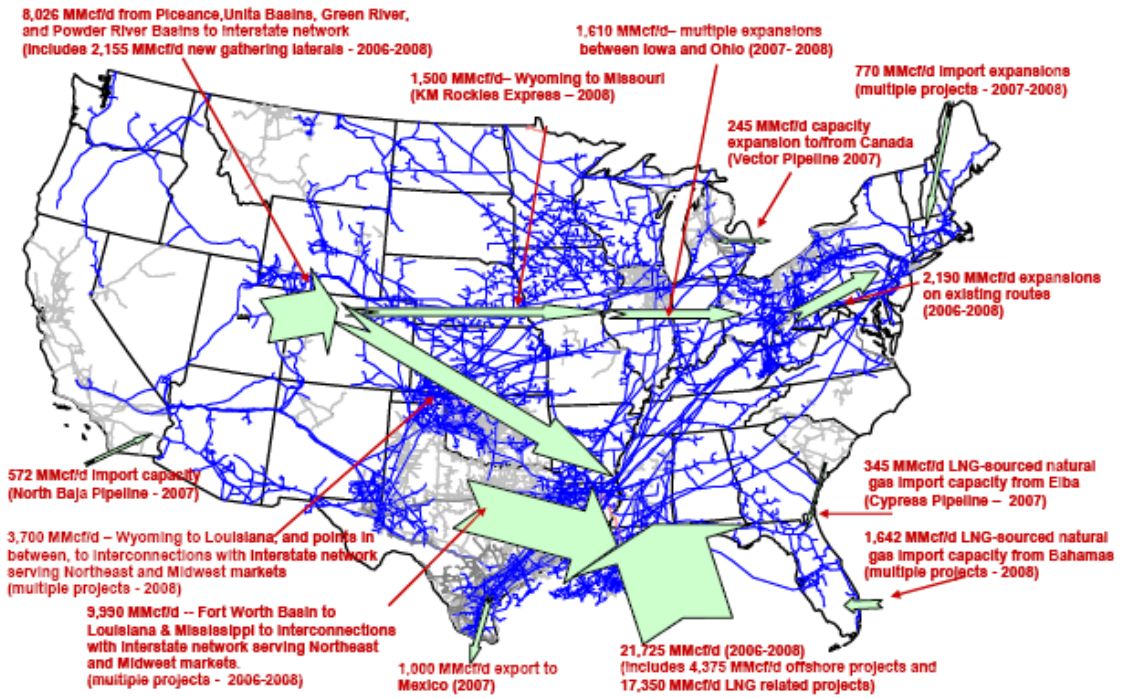
More than 76 BCF/Day Additional Pipeline Capacity Is Proposed for 2006–08, About Half of Which is in Major Corridors

Major Natural Gas Pipeline Corridor Expansions (2006–08)



Source: EIA

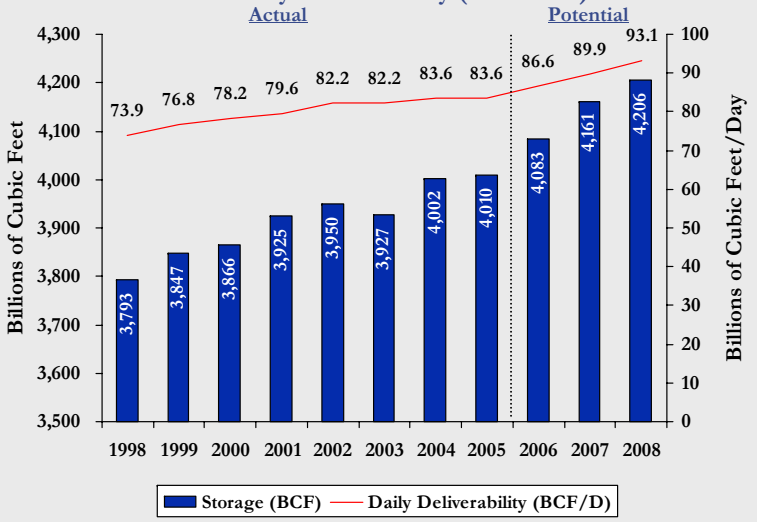
Gas Infrastructure Development Continues

- More than 8.2 BCF/day in pipeline capacity and 24.9 BCF in storage capacity was added in 2005
- Despite softer gas prices, projections for additional pipeline and storage projects remain viable near-term
- However, pipeline and storage additions in 2005 trailed those in 2004

Drivers of Gas Storage Development

- The gas industry has gone beyond its historical reason for storage capacity development: enhanced winter deliverability (reliability-based)
- Other storage development drivers now include:
  - — Mainline transmission pipelines using storage to balance flows and keep pipeline pressures within design parameters
  - — Pipeline customer/shipper withdrawal or injection to avoid protracted imbalances and related penalties
  - — Producers using storage to level production over periods of fluctuating market demand (and low prices) (market-driven)
- FERC and DOE continue to advocate continued gas infrastructure development, especially storage, to help manage scarcity and price volatility

U.S. Underground Storage Working Gas Capacity and Daily Deliverability (1998–2008)

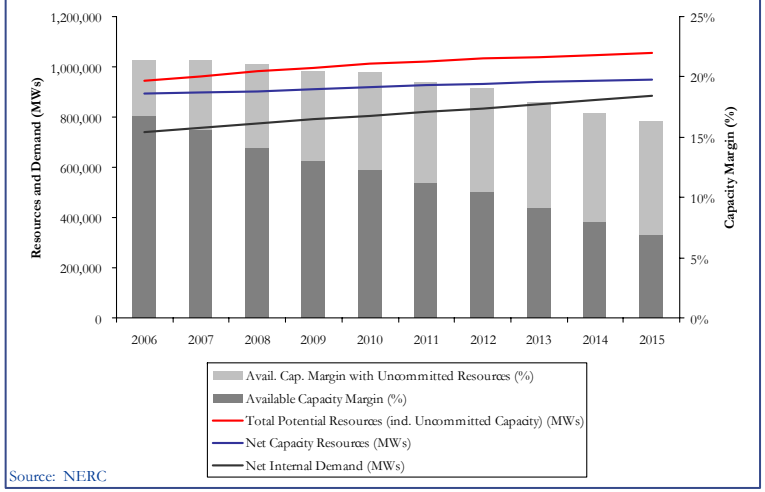


Source: EIA

Source: EIA

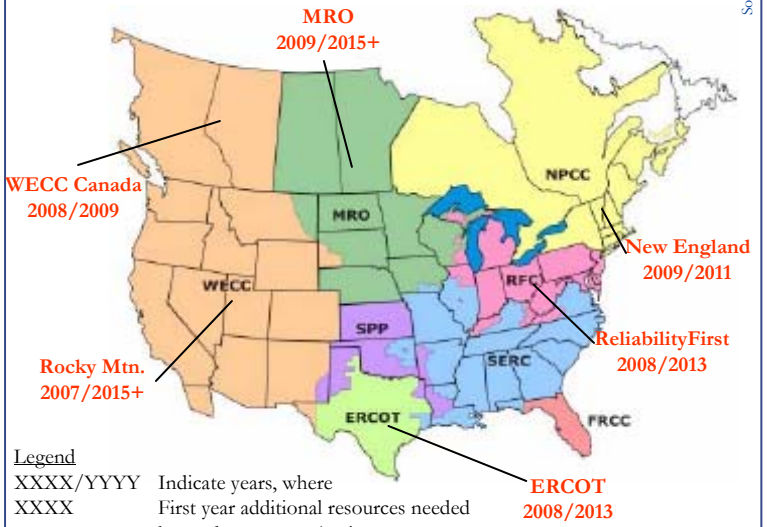
Power Markets Update: Prices Down, Worries Up

Load-Resource Balance and Capacity Margins (2006–2015)



Source: NERC

Areas Needing Resources in Next Two to Three Years



Source: NERC

Legend

XXXX/YYYY	Indicate years, where
XXXX	First year additional resources needed beyond current projections (excl. uncommitted resources)
YYYY	First year additional resources needed beyond uncommitted resources

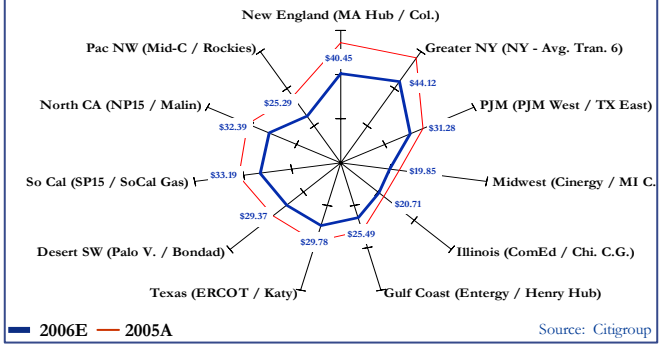
Red indicates possibly capacity short by 2010

NERC Sounds the Alarm

- In its first long-term reliability assessment as the official EPACT-empowered Electric Reliability Organization, NERC voiced concern about capacity margins in the near- (two to three years) and longer- (within 10 years) term
- Demand is expected to increase by 19% (141,000 MWs) in the U.S. and 13% (9,500 MWs) in Canada over the next ten years, but committed resources only increase by 57,000 MWs in the U.S. and 9,000 MWs in Canada
- Uncommitted resources—those that lack assurance of deliverability or are not legally committed to serve demand—potentially fill the gap. These resources will double in the next ten years and in the U.S. grow from 67 GWs (7% of net capacity) in 2007 to 96 GWs in 2011 (10% of net capacity)
- Fuel supply—gas and coal deliverability and favorable hydrologic conditions—will be a bigger factor in meeting capacity needs
- Despite projected increase in peak demand of 19%, total transmission miles are projected to increase by less than 7%, and expansion of transmission continues to lag demand growth and generation expansions in most areas

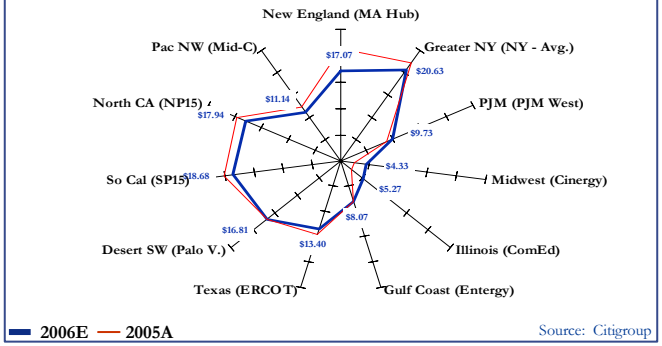
Dark Spreads Have Receded Appreciably from Last Year, While Spark Spreads Are Down Slightly

Dark Spreads (2005 Actual vs. 2006 Estimated)



Source: Citigroup

Spark Spreads (2005 Actual vs. 2006 Estimated)



Source: Citigroup

"[F]orward estimates of capacity margins from industry consortiums appear to be falling in successive fashion, suggesting excess supply is being worked off faster than initially expected."

— Citigroup (Nov. 13, 2006)

Note: Dark spread is based upon Central Appalachian coal at 12,000 BTU/lb., a 9,500 BTU/kWh heat rate, NYMEX 2007 forward pricing, and 24/7 flat power pricing. Spark spreads based upon 7,000 BTU/kWh heat rate
Sources: NERC 2006 Long-Term Reliability Assessment (Oct. 2006); Citigroup, *Spark Spread Biweekly* (Nov. 13, 2006); industry reports; Energy Information Administration

AMI: Increased Interest

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Is AMI Finally Taking Off?

Advanced metering infrastructure (AMI) is a key enabler to reduced operating costs, energy efficiency and demand response.

AMI is more broad than advanced meter-reading. AMI is a metering system that involves more than measurement of consumption at frequent intervals; it is a full measurement and collection system that includes customer meters, communication networks and data management systems.

AMI can leverage many communications technologies, such as wireless mesh or fixed networks, broadband over powerline, or other public telecom networks (cellular, paging, or land line).

There's Now More to the Business Case

As meter-reading costs have decreased, however, an AMI business case can—and must be—justified by more than reduced meter-reading costs. Additional benefits are increasingly achievable now that related technologies have matured and improved, including:

Operational Savings

- Meter reading
- Service orders
- Connects and disconnects
- Lost revenue through meter inaccuracies or theft (through tamper detection)
- Pinpointing localized outages (trouble calls)
- Enhanced customer service
- Power quality monitoring
- Outage management
- Asset management

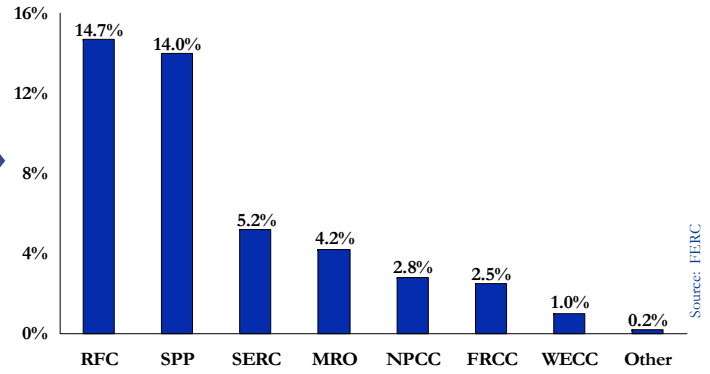
Supply Side Savings

- Demand response programs
- Distribution asset optimization through "real-time," localized usage information
- Generation or supply optimization through enhanced "real-time" load forecasting and research
- Price-responsive demand response
- Pricing event notification
- Line losses reductions
- Load control capability

Other Opportunities

- Significant customer satisfaction gains
- Network leveraging to carry other information (e.g., water and gas meter readings)
- AMR-based revenue enhancements
- Remote metering parameter changes

Advanced Metering Penetration by NERC Region



Advanced metering has room to grow

... and is spurred by some critical factors

- **Recognized cost recovery**
- **PUC support**
- **Lower or stable implementation costs**
- **Greater confidence in systems**

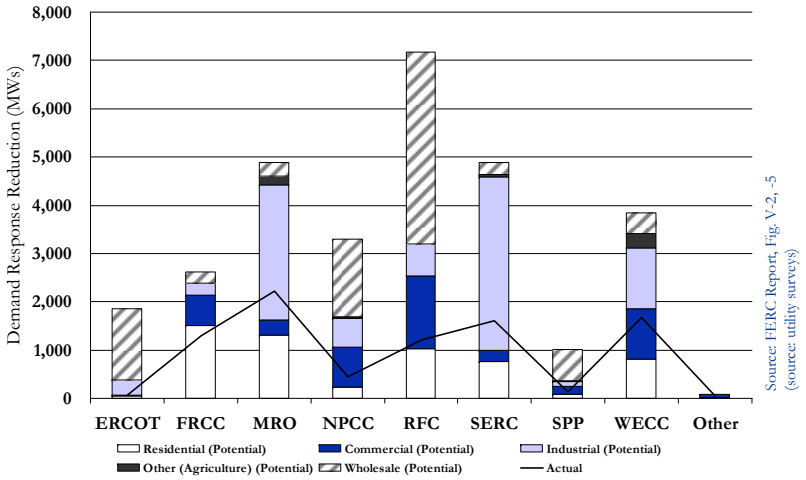
Sources: Industry reports; FERC; Off the Record Research; ScottMadden analysis

Demand Response: FERC Staff Assessment

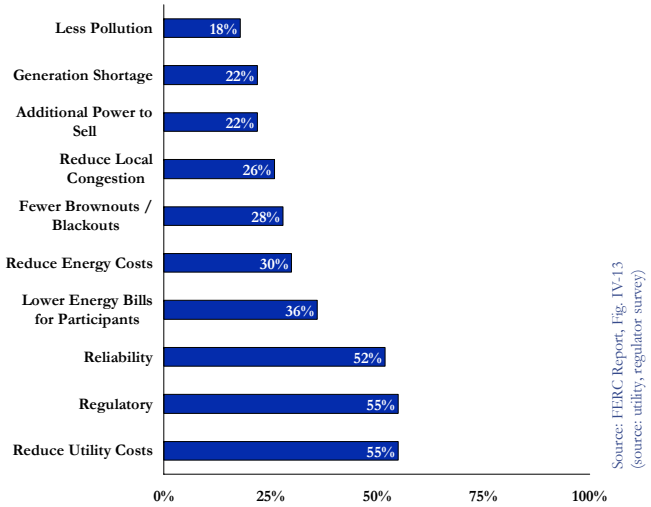
SCOTTMADDEN Management Consultants

The Energy Policy Act of 2005 required FERC to publish an annual report to assess demand response resources. In August, FERC released its first staff report focusing on demand response and advanced metering

Demand Response Resource Potential vs. Actual Penetration (by Customer Type and Region)



Drivers of Demand Response According to Utilities and Regulators



FERC's Key Findings on Demand Response (DR)

- **DR is not widespread:** Only about five percent of customers are on some form of time-based rates or incentive-based program
- **Common programs are not offered by all:** The most common DR programs offered are direct load control, interruptible/curtailable programs, and time-of-use rates, but only about 200 entities reported that they offer these programs
- **Interest is growing:** Interest in time-based rates and DR programs is growing
- **Key inhibitors exist:** Some key inhibitors of DR deployment are:
  1. Disconnect between retail pricing and wholesale markets
  2. Utility disincentives (revenue loss)
  3. Lack of regulatory support for cost recovery and incentives for enabling technologies
  4. Deficiencies in measuring cost effectiveness
  5. Explicit state-level barriers (e.g., no critical peak pricing) to increased DR
  6. Specific retail and wholesale rules that limit demand response (e.g., lengthy wholesale market settlement periods yield slow payments to DR participants)
  7. Lack of long-term regulatory commitments or contracts to incent DR technology developers and limit their risk
  8. Insufficient market transparency and access to data
  9. Need for better coordination of federal/state jurisdiction affecting DR

FERC Staff's Recommendations

- **Give DR credit:** Assure that regions that schedule resources to meet either energy or reserve needs properly recognize the capabilities and characteristics of demand resources
- **Look at DR's functionality:** Assure that requirements are specified in terms of functional needs rather than the technology expected to fill the need. This applies to ancillary services as well as to transmission enhancement
- **Accommodate DR:** Accommodate the inherent characteristics of DR resources (just as generation resource characteristics are accommodated)
- **Allow DR ancillary services:** Allow appropriately designed DR resources to provide all ancillary services
- **Incorporate DR into grid enhancement proposals:** Allow consideration of demand response alternatives for all transmission enhancement proposals at both the state and ISO/RTO level. At least allow them to be considered as solutions at congested interfaces or in load pockets along with local generation or transmission enhancements
- **Treat DR as permanent:** When appropriate, treat demand response as a permanent solution, similar to transmission enhancements
- **Improve DR forecasting tools:** Develop better DR forecasting tools for system operators to increase the usefulness and acceptability of DR

Source: FERC Staff Report, *Assessment of Demand Response & Advanced Metering* (Aug. 2006) (Docket No. AD-06-2-000)

The Intelligent Grid: Is the Time Right?

SCOTTMADDEN Management Consultants

Increasing challenges to the nation's electric infrastructure—aging distribution equipment, desperately needed transmission upgrades, a looming shortfall of baseload generating capacity, and fuel cost (including environmental costs) escalation—has rekindled interest in an intelligent or "smart" grid that can enhance energy efficiency and demand-side solutions, as well as provide a more robust and "self-healing" distribution system.

These features can help satisfy state regulators' concerns about utility cost, efficiency, and responsiveness.

Current Challenges

- **Poor asset utilization:** Massive, fixed assets sized for peak demands result in high carrying costs and low asset utilizations (barely over 50%)
- **Increasing demand**: More than $450 billion of investment is needed by 2020 to meet load growth with business-as-usual solutions
- **Changing role of transmission:** What was originally designed to support local areas is now an interstate highway for commerce
- **Demand for transmission transactions**: Increased deregulated market causes greater demand for transmission services
- **Economic uncertainty:** Volatile fuel prices and regulatory uncertainty concerning consumer utility rates create economic uncertainty and boom/bust construction cycles

Proposed Benefits: What Makes a Grid Smart?

- **Improved reliability:** A self-healing grid that anticipates and reduces power disruptions
- **Improved security:** New technology will allow better identification and response to man-made or natural disruptions
- **More economical:** Digital technologies enable demand management programs that reduce peak demand
- **Cleaner grid:** Standardized power and communications interfaces will allow customers to connect renewable generation and distributed generation on a "plug-and-play" basis

Example intelligent grid application: Energy efficiency and demand response by integrating AMI, grid management, energy procurement, and customer services

Internet

- Two-way communication between devices and utility
- Utility sends rate information to devices
- Devices send electricity usage information to utility/smart grid
- Increasing availability of Internet-addressable devices

Utility

- Time-of-use rates
- Day-ahead hour-by-hour rates
- Real-time rates
- Special rates for specific devices
- Customer operations info/ impact
- Energy controls and management
- Distributed generation options

Consumer

Meter

Secure Network

- Enabled by broadband over power lines
- Common architecture and protocols

Intelligent Energy-Consuming Devices

- High-consuming devices "learn" daily usage patterns
- Daily rate information is used to calculate most economical way to achieve user demands

SmartGrid Technology Requirements and Enablers

- ⇨ Open, standards-based architecture for integrating data communications networks and intelligent equipment: a building code for energy grid
- ⇨ Fast simulation and modeling using distributed computing architecture with focus on anticipation of events
- ⇨ Available and emerging sensors and data applications and standards
- ⇨ Wider adoption of control-theory principles (e.g., business process management, adaptability, real-time grid monitoring and adjustment)
- ⇨ Convergence of communication, information, and energy technologies (Internet, broadband over power lines, advanced metering infrastructure)

Sources: EPRI; The Utilities Project; Pacific Northwest National Laboratory; GridWise Alliance; Smartgridnews.com

Order 888 Reform: What Might Change?

SCOTTMADDEN Management Consultants

FERC Chairman Joseph Kelliher has made reforming the 10-year-old Order 888 a priority of his tenure on the Commission. In response to allegations by gencos, developers, and others that transmission service is a game skewed toward incumbent transmission owners, FERC seeks to increase access and greater transparency. Key flashpoints will likely be available capacity and transmission planning reforms.

Major Elements of Order 888 Reform Notice of Proposed Rulemaking

- **Available transfer capability (ATC)**
  - Ensure **consistency** in data inputs and modeling assumptions, as well as data exchange between transmission providers
  - Create NERC/NAESB **standards**
  - **Disclose ATC calculation methodology** in transmission tariffs and post models and data on OASIS
  - **Post transmission service approval/rejection statistics** on OASIS
- **Transmission planning**
  - Provide a **"coordinated, open, and transparent planning process"**
  - Adhere to **eight key principles**
  - Permit **regional differences** in the planning process
- **Transmission pricing**
  - **Relate imbalance pricing to its cost** to correct and possibly waive higher-end imbalance penalties to intermittent generators
  - Permit customer-owned integrated transmission facilities to receive transmission **credits** even if not "jointly planned"
  - **Eliminate price caps** on transmission capacity reassignments by customers
- **Non-rate terms and conditions**
  - If a system lacks capacity to grant point-to-point service, require transmission providers to **exhaust all available redispatch options** and permit customers to study options before it must pursue cost and delay in a system expansion study
  - Provide **rollover rights** to customers under five-year contracts (vs. current one-year)
  - Require providers to offer **hourly firm point-to-point service**

Where They Stand

Transmission providers/owners

- ✓ **There has been no showing of discrimination**
- ✓ **Minimal changes are required**
- ✓ **Flexibility of utilities to act, in absence of clear rules, is needed**
- ✓ **Prescribed planning procedures are unnecessary**
- ✓ **Transmission owner/provider should be responsible for all decisions**

Public power

- ✓ **Standardize ATC calculation and transparency**
- ✓ **Limit flexibility of individual utilities to fail to adhere to their open-access tariffs**
- ✓ **Involve transmission customers serving native load early in process**
- ✓ **Encourage joint ownership of facilities**

State utility regulators

- ✓ **Avoid one-size-fits-all ATC calculation methodology; states have been working on this already**
- ✓ **Permit deference to and authority of states, which still have interest in transmission costs via bundled rates. They need control as well**
- ✓ **Mandate active state involvement in transmission planning**

Generators/ renewables developers/ consumer advocates

- ✓ **Increase transparency beyond current "black boxes" that have "shielded discriminatory transmission service"**
- ✓ **In planning, identify costs and benefits of options on a technology-neutral and life-cycle least-cost basis (renewables advocates)**
- ✓ **Aggressively pursue enforcement of OATT compliance, conduct compliance audits, and use civil penalty and market-based rate authority to penalize infractions**

Sources: FERC; industry news

FERC Philosophy: Competition as a Goal

After shifting FERC policy in 2005 from competition "in and of itself" toward a "tool for mitigating market power," FERC appears to be steering more explicitly toward a vision of promoting competition and competitive markets, while maintaining the same detailed objectives as a year ago.

The appointment of three new commissioners in July 2006 will also change the dynamics of the Commission and potentially its focus areas, such as expanding its role in demand response.

	2005–08 Strategic Plan	Updated → 2006–11 Strategic Plan
Vision	Reliable, affordable energy through reliance on competition and effective regulation	Abundant, reliable energy in a fair, competitive market
Goals and objectives	❑ Promote development of a robust energy infrastructure ❑ Prevent exercise of market power by relying on effective competition ❑ Prevent exercise of market power by relying on effective regulation	❑ Promote the development of a strong energy infrastructure ❑ Support competitive markets ❑ Prevent market manipulation

Different Commissioners, Divergent Interests

"The question before us is not whether competition is the right policy; that's been asked and answered three times in the past 25 years. It's really how do we make competition work."

— Joseph Kelliher, FERC Chairman

"Customer protection from market power is our number-one priority. …"

— Suedeen Kelly, FERC Commissioner

"I intend to concentrate on three issue areas … : providing a platform for participation of demand response in electric markets; promoting efficiency in energy infrastructure; and opening wholesale markets to renewable and distributed resources."

— Jon Wellinghoff, FERC Commissioner

FERC's Top Priorities

Infrastructure

- EPACT infrastructure provisions
- Mandatory electric reliability standards
- Development of new natural gas storage capacity
- Environmentally safe infrastructure: hydro, gas, LNG
- Pre-filing processes for all LNG terminals and gas pipelines
- Alaska natural gas transportation projects

Competition

- Open Access Transmission Tariff (OATT) reform
- Voluntary regional transmission organizations and ISOs
- Timely action on complaints
- Merger and acquisition review
- Regional review of market-based rates

Market Manipulation

- Guidance to transmission providers on standards of conduct
- EPACT market power and enforcement provisions
- Comprehensive energy market oversight program
- Guidance to regulated entities through no-action letters
- Prohibition of market manipulation through Order 670

Sources: FERC website; FERC, *2006–11 Strategic Plan*; COMPETE Coalition

State Energy Plans: Central Planning Returns?

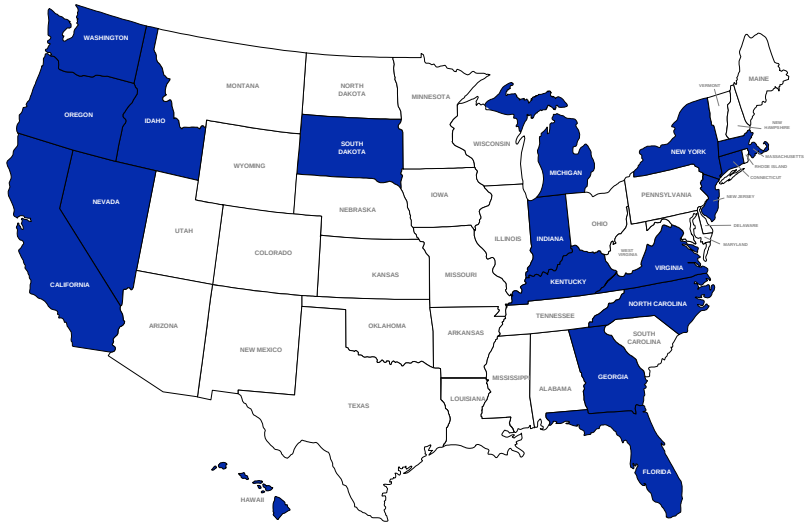
SCOTTMADDEN Management Consultants

Several states have prepared energy plans or strategies that help guide state public policy and incentives for differing kinds of energy resources.

As a result of today's energy issues—escalating fuel costs, energy infrastructure pushed to its limits, and growing concerns about environmental issues—states are revisiting their plans. Some states, like Georgia and Michigan, are preparing a state energy strategy for the first time.

Many states are considering supply-side options, with greater emphasis on renewable resources and efficiency.

Some States that Regularly Prepare State-Wide Energy Plans or Are Introducing Them for the First Time



Source: ScottMadden research

A Sampling of Energy Plans: What Some States Prioritize

	California (Sept. 2005)	Connecticut (Feb. 2006)	Florida (Jan. 2006)	Georgia (due Dec. 2006)	Michigan (due Dec. 2006)
Overarching themes	❑ Reduced per capita energy use ❑ Renewable energy ❑ Energy efficiency ❑ Demand response	❑ Solve state transmission, congestion and capacity problems ❑ Address New England's reliability problem ❑ Reduce reliance on gas-fired generation	❑ Energy conservation ❑ Energy supply ❑ Fuel diversity ❑ Energy security ❑ Incentives	❑ Renewable energy ❑ Efficiency ❑ Supply diversity ❑ Biomass-fired generation	❑ Conservation ❑ Renewable energy ❑ Reliability
Some key provisions	❑ Integrate energy efficiency into resource plans on equal footing with supply options ❑ Secure 15%–17% planning reserves by mid-2006 ❑ Reduce GHG emissions ❑ Adopt critical peak pricing tariffs for customers with advanced meters ❑ Improve energy use in all state and commercial buildings by 20% by 2013	❑ Reduce peak demand 10% by 2010 ❑ Reduce fossil fuel use by 10% by 2010 ❑ Mobilize task force to encourage distributed generation ❑ Possibly introduce uniform interconnection standards ❑ Continue construction of transmission lines by utilities	❑ Streamline and expedite siting and permitting of electric infrastructure and resources ❑ Increase generation capacity ❑ Diversify fuel supply	❑ Centralize state-wide assessment of energy supply and demand needs ❑ Invest in clean, viable next generation electricity technology ❑ Introduce state-wide interconnection standards	❑ Implement renewable portfolio standard ❑ Pursue new technology options

Sources: State energy plans; news reports; U.S. Dept. of Energy, State Energy Program; ScottMadden research

Gas Price Decoupling

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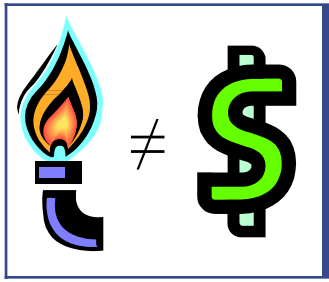
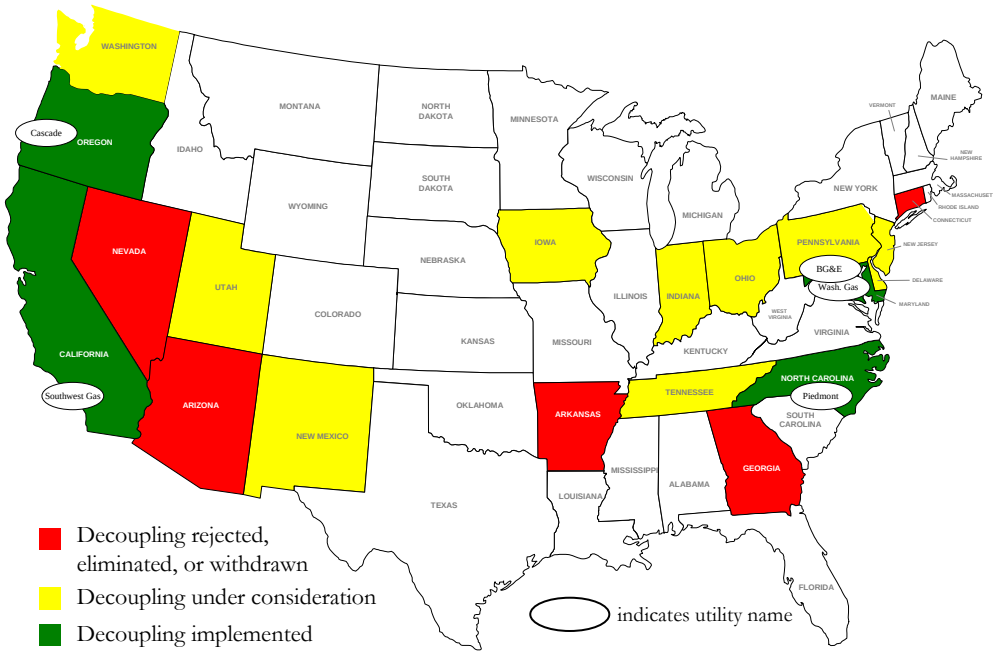


While natural gas prices have subsided from 2005's record levels, their continued high levels and volatility—together with a long-term trend toward reduced consumption—have utilities concerned about revenue and earnings reductions due to demand destruction. Conservationists and some regulators and policymakers see an opportunity to eliminate earnings disincentives utilities face when promoting energy efficiency.

Several jurisdictions are considering innovative rate designs, including revenue decoupling, to promote reduced gas consumption. Some regulators and consumer advocates oppose these efforts, citing few tangible benefits for consumers absent a history of utility conservation efforts.

What it is	Separation or "decoupling" of the utility's recovery of its fixed costs from the volume of gas delivered to its customers. Rates are adjusted between rates cases as sales volumes fluctuate, basing revenues on cost. Recovery is typically achieved through a tracker or true-up mechanism
Proposed benefits	❑ Removes the throughput incentive, aligning utility, customer, and environmental interests in efficiency ❑ Reduces utility earnings volatility ❑ Limits opportunity for gaming ❑ Limits impact of weather-driven therm sales, which are largely exogenous to utility control ❑ Reduces frequency of rate cases and eliminates controversial issue of test-year sales ❑ Historical decline in gas use per residential customer has generally not been taken into account in setting base rates
Potential drawbacks	❑ Complexity in setting up (e.g., making adjustments for weather, new customers) ❑ Unintended consequences—impacts on economic development, reduction of customer incentives to conserve gas ❑ Frequent rate changes, causing less stability and potential confusion ❑ Utilities' benefits more certain than customers' ❑ Does not consider incremental options ❑ Piece-meal approach rather than solving fundamental rate design issues
Issues and risks	❑ Alternative rate designs such as straight fixed variable (separate demand and usage charges), automatic adjustment clauses, etc. ❑ Potential for a reduction in allowed ROE if a PUC perceives lower utility risk due to "guaranteed" revenues ❑ Rate case frequency (esp. with a growing decoupling balance)

States in Which Decoupling Has Been Considered



Sources: NRRI; AGA; ScottMadden research

Simplified Revenue Decoupling Example

	Test Year (Revenue Requirement)	With 5% Volume Reduction		
		Under Traditional Rate Design	Under Revenue Decoupling	
			Period 1	Period 2
Revenue	$300,000,000	$285,000,000	$285,000,000	$315,000,000
Revenue/Customer	$300	$285 ($15 shortfall)	$285 ($15 shortfall)	$315 ($15 surplus)
Sales (MCF/Yr.)	100,000,000	95,000,000	95,000,000	100,000,000
Sales per Customer (MCF/Yr.)	100	95	95	100
Distribution Chart or Rate ($/MCF)	$3	$3	$3	$3.15

Sources: National Regulatory Research Institute; American Gas Association; Presentations at NARUC Symposium, "Aligning Regulatory Incentives with Demand-Side Resources" (Aug. 2, 2006)

Mergers and Acquisitions: Deal Scorecard

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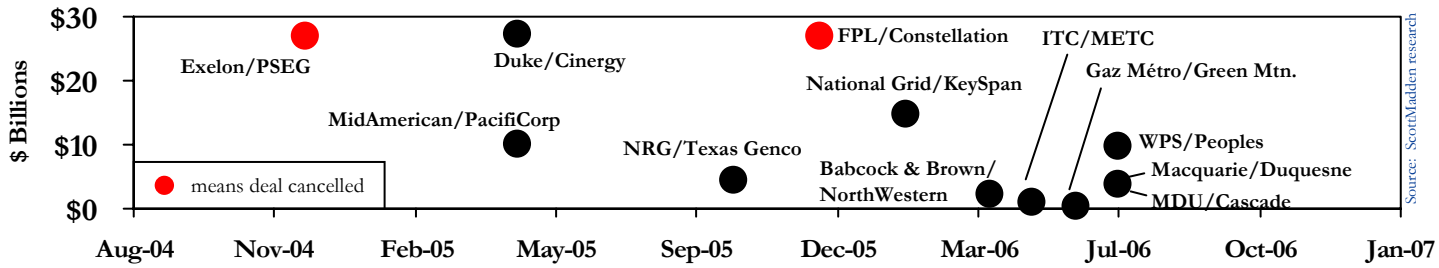
	ITC Holdings/ Michigan Electric Transmission Company	Macquarie Infrastructure Partners/ Duquesne Light Holdings	WPS Resources/ Peoples Energy	Dynegy Corp./ LS Power
Announcement date	May 2006	July 2006	July 2006	Sept. 2006
Transaction value	$867 million (incl. $331 million assumed debt)	$3.0 billion (incl. $1.4 billion assumed debt)	$9.6 billion	$2.3 billion (cash and stock) plus $1.8 billion in debt assumption
Assets/property/ business acquired	About 5,400 circuit miles of transmission lines, 43,000 transmission towers and poles, and 80 stations serving 6 million customers	Electric T&D utility serving about 587,000 direct customers in southwestern Pennsylvania (including Pittsburgh), a territory of 800 square miles	About 1 million gas customers in IL, with $3.8 billion in gas LDC assets, 102 BCF/year in non-reg. gas sales, and 1.5 million MWhs in non-reg. power sales	8,200 MWs of gas-fired capacity; JV with pipeline of 7,600 MWs in development and 2,300 MWs of repowering opportunities
Expected closing date	Closed Oct. 2006	1st Quarter 2007	1st Quarter 2007	Early 2007
Synergies expected	NOL carryforwards, $7–$8 million cost savings in 2007, $10 million in 2008	None—a strategic investment	$80 million at one-time cost of $200 million	None disclosed
Stated strategic rationales	❑ Gain operational efficiencies from simplified, joint operations ❑ Improve position to jointly identify, coordinate, and plan regional system needs, projects, and construction to improve electric reliability ❑ Facilitate a competitive energy market through capital investment and maintenance of the transmission grid ❑ Increase industry presence	❑ Provide capital for expansion and upgrades ❑ Provide Macquarie's pension fund investors with long-dated cash flow from "a strong, stable company in a market that has displayed consistent demand over time"	❑ Create a larger, stronger, and more diversified regulated utility ❑ Provide a good operational fit ❑ Link complementary and growing non-regulated energy marketing businesses ❑ Provide larger equity market capitalization with increased market liquidity	❑ Build greater scale and scope in key U.S. regions, including Midwest, Northeast, West and South ❑ Create grater financial stability through predictable cash flows from LS offtake contracts ❑ Provide a proven and mature asset development platform, leveraging LS's track record and opportunities

Is Small the "New Big"? Not Quite, but Being "Below the Radar Screen" Might Help

Selected Proposed Corporate Acquisitions: Transaction Values vs. Announcment Dates



Sources: Company new releases, financial presentations; industry news

"Deal or No Deal": Two Mergers Stumble

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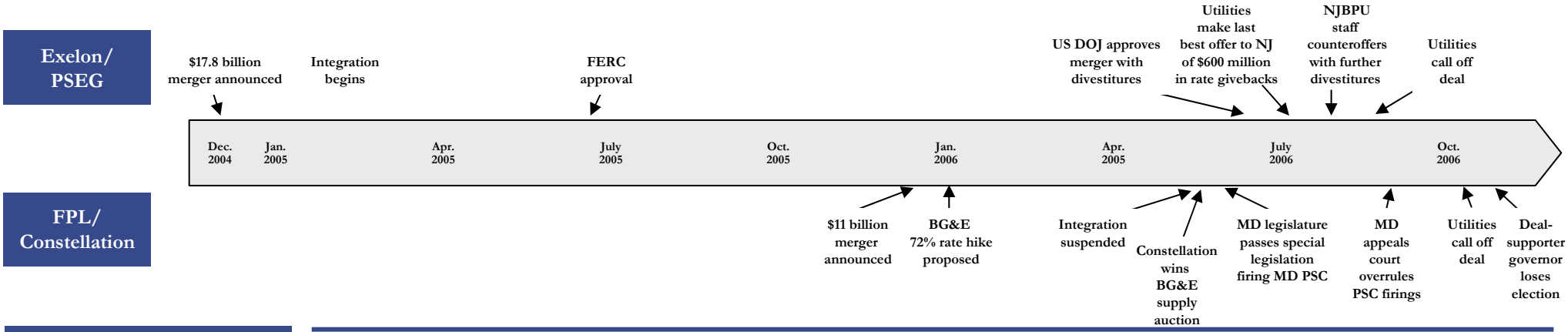


A confluence of a heated political season, escalating fuel and wholesale electricity prices, and expiring retail competition transition periods, served to make two major mergers unpalatable to state regulators and politicians, dooming them.

This calls into question future mergers, especially where regulated and unregulated businesses are combined.

Why Did These Fail and What Lessons Can Be Learned?

Powerful states	State regulators have significant, deal-stopping power over utility mergers and a wide variety of regulatory rationales they can use to control or deny deals. This power has probably increased with PUHCA repeal. Can you say "50 different PUHCAs"?
Inopportune timing	Announced, significant retail rate increases primed the pump for local political resistance. These rate increases were prompted by, among other things, escalation in fuel and wholesale electricity costs compared with the period when competition was enacted. An affiliate winning most of the supply contracts at auction, while fair, likely doesn't help optics where rates are escalating. PUCs may not feel they have complete control over their regulated entities and have not received the deal they expected when they authorized competition and spin-off of generation.
Control	NJ agreed to rate increases even after Exelon promised $600 million in rate reductions and to move headquarters to Newark. However, the BPU staff did not believe this to be sufficient and focused on market power concerns, despite the unprecedented Department of Justice mitigation settlement and the favorable FERC ruling.
Economic populism	State PUC staff and consumer advocates have been empowered by a vocal consumer advocate movement and emboldened by an increasingly populist strain across the country. Negotiations must begin with an end game in mind and likely a bold giveaway.
Cognitive dissonance	Transactions have lives of their own, and in most cases executives are rewarded for their successful execution. At some point, however, economics have to work. Resistance to compromise, lack of understanding that utilities have investors to please, and possible confusion as to who holds the political power for an ultimate resolution all erode significant shareholder value and can distract the organization.
"Plan B" back-to-basics	PSEG was quickly ready with proposed rate increases after the merger folded. A quick, follow-up game plan is key.
Divest the regulated business?	Because of concerns about customers subsidizing deregulated wholesale businesses through rates, regardless of the arm's length nature of these arrangements, strong consideration may be given to spinning off these businesses in sensitive regions.

Sources: ScottMadden analysis; industry and press reports

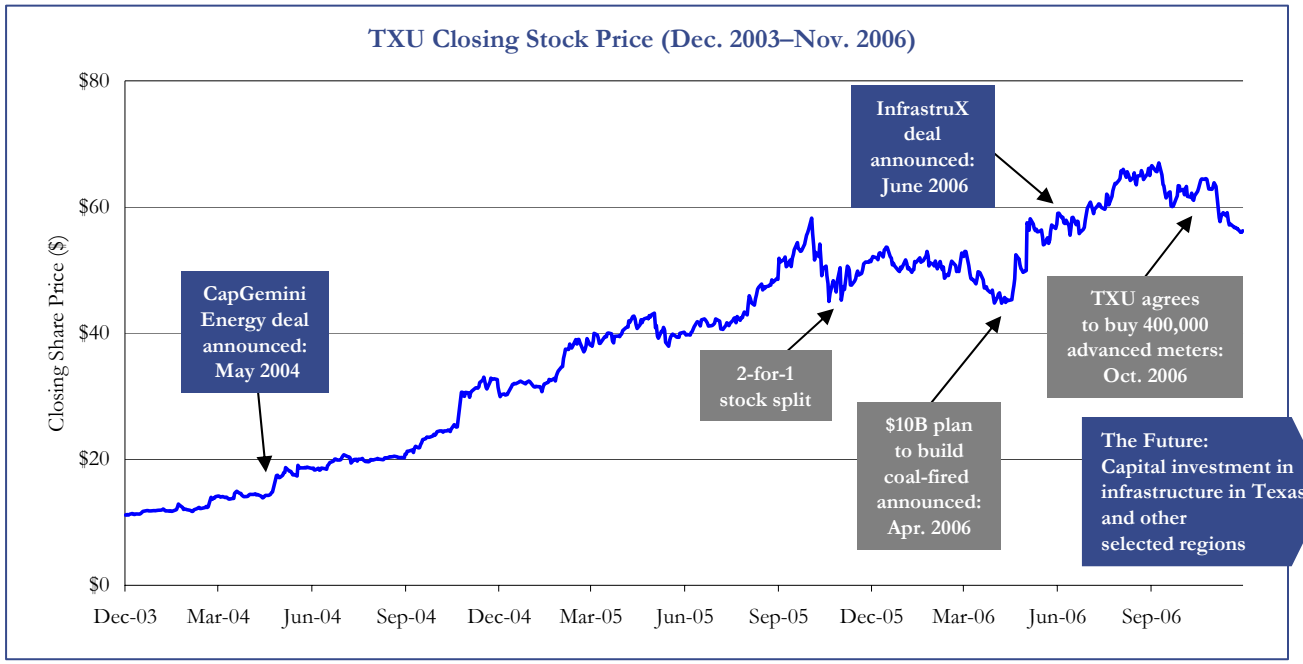
TXU's Second Bold Step

SCOTTMADDEN Management Consultants

Another Large Deal: Lower Cost and Improved Service in the Core Business

The deal	In June 2006, TXU announced a large venture with InfrastruX Group, which will provide all maintenance, construction, and restoration services for TXU's power delivery system.
The original strategic action plan	In 2004, TXU proposed a three-phase plan to improve profitability in a competitive Texas environment ❑ Rationalize, restructure, and restore financial strength ❑ Strengthen the core (fossil, delivery, N. Texas retail, and tradeco) and drive performance improvement ❑ Allocate capital and grow
Strategic sourcing and technology as strategic levers	Strategic sourcing was identified early as a potential tool for both energy delivery and power generation businesses. TXU has undertaken a number of sourcing initiatives, with a view to maintain or drive down costs while maintaining top quartile or better reliability.
The returns	Early returns are difficult to gauge, but TXU's stock price has increased nearly three-fold in three years and split in late 2005.

That Was Then	... This Is Now
CapGemini Energy, LP	**TXU/InfrastruX Joint Venture**
❑ $3.5 billion, 10-year deal	❑ $8.7 billion, 10-year deal
❑ Launched July 2004	❑ Expected launch: 1st Qtr. 2007 (pending PUCT resolution of union challenge to deal)
❑ JV between TXU (2.9%) and CapGemini (98.1%)	❑ JV between TXU and InfrastruX, now owned by Tenaska
❑ 2,700 TXU employees were transitioned to the new company	❑ 2,000+ TXU employees will be transitioned to the JV
❑ Outsourced IT, call center, revenue processing and collection, transactional procure-to-pay processes, HR, and transactional finance and accounting	❑ TXU Delivery will focus on asset management, including long-range system planning, construction and maintenance planning, T&D operations, and deploying smart grid technologies
❑ Expected benefits: 30% reduction in cost run rate; cost savings of $175 million/year, including cash savings of $140 million/year	❑ InfrastruX Energy Services, on an exclusive basis, will deliver maintenance, construction, and service restoration services for the TXU electric delivery system
	❑ Mix of flat fee payments for certain services and unit-based prices for the majority of other services
	❑ Expected benefits: $100 million savings over 10 years; reliability improvements; performance levels set forth by agreement, consistent with TXU's goals of top decile reliability and improved customer satisfaction



Sources: TXU press releases, investor presentation; investment reports; industry news. Stock prices from NASDAQ.com

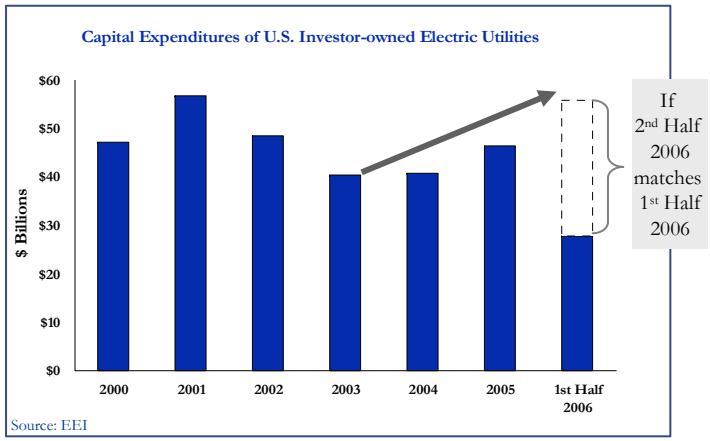
Powering Up: Capital Expenditures on the Rise

SCOTTMADDEN Management Consultants

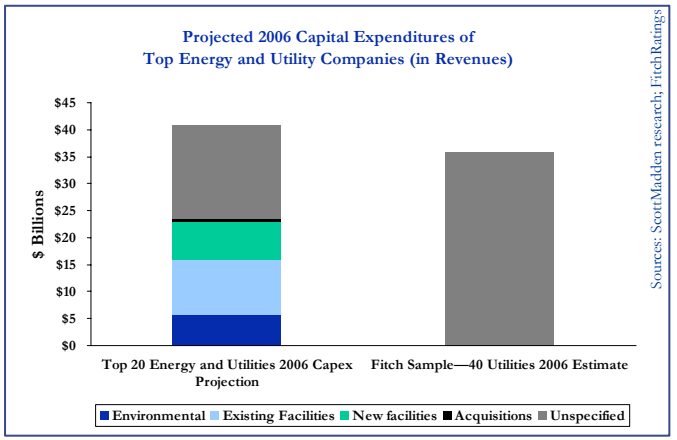
Utilities and energy companies are accelerating their infrastructure capital spending from prior years. In most cases these must be made and are not elective – grids must be maintained, new generation must be built to meet increasing demand, and emissions controls must be put in place.

At the same time, a number of uncertainties about capital availability, cost inflation, and rate recovery, among others, are causing some to wonder how to manage this capex cycle.

Capital Spending Is Accelerating



Top Firms Alone Have Huge Capex Needs



What's Driving Capital Expenditures and What Should the Industry Worry About?

Principal Areas of Capital Deployment	Why Investment Lagged	Drivers of New Investment	Key Uncertainties and Risks in Current Cycle	Skills, Capabilities, and Approaches Needed
Transmission and distribution upgrades and expansion 	❑ Balance sheet recovery ❑ Capped utility rate structures ❑ Diversification strategies	❑ Reliability concerns ❑ Customer sales and growth ❑ Reverse underinvestment trend ❑ Federal policy encouragement	❑ Full, timely rate recovery ❑ Longer permitting, stakeholder engagement, and construction cycles	❑ Strong business case development capabilities able to assess multiple infrastructure alternatives ❑ Disciplined capital allocation, prioritization, and management ❑ Robust market entry (and exit) strategies ❑ Regulatory and political action plans and communications strategies ❑ Rate case development skills ❑ Project management (e.g., alliance skills, project controls, contract management) ❑ Financing skills—different structures, different players (e.g., private equity) ❑ Strong engineering, design, construction, and commissioning skills with smaller engineering staffs
Environmental compliance 	❑ Pending resolution of environmental regulation (NSR, Clean Air Mercury Rule, Clean Air Interstate Rule, etc.) ❑ Key implementation deadlines in 2008	❑ New, more stringent air regulations (mercury, NOx, SO_2), including independent state actions on mercury ❑ In many cases, carbon controls have not been scoped	❑ Full, timely rate recovery and impact on capital costs ❑ Materials and labor availability and cost inflation ❑ Patchwork state approaches to greenhouse gas reduction, renewables, and mercury	
New generation 	❑ Overbuild in early 2000s ❑ Negative credit rating effects of significant generation builds absent long-term power purchase agreements	❑ Emerging expectation of supply shortfalls, some acute, in a number of regions	❑ Continued capital availability ❑ Overbuilding and another generation "bust" ❑ Learning curve and possible cost overruns with new technologies	

Sources: FitchRatings, Fitch 18th Annual Breakfast, at the 41st EEI Financial Conference (Nov. 6, 2006); Standard & Poor's; Edison Electric Institute; M. Burr, "Financing the Next Big Build," *Public Utilities Fortnightly* (Oct. 2006); M. Rosenberg, "Massive Build Ahead," *EnergyBiz Magazine* (Sept–Oct. 2006); ScottMadden analysis

Forcing the Issue: Greenhouse Gas Regulation

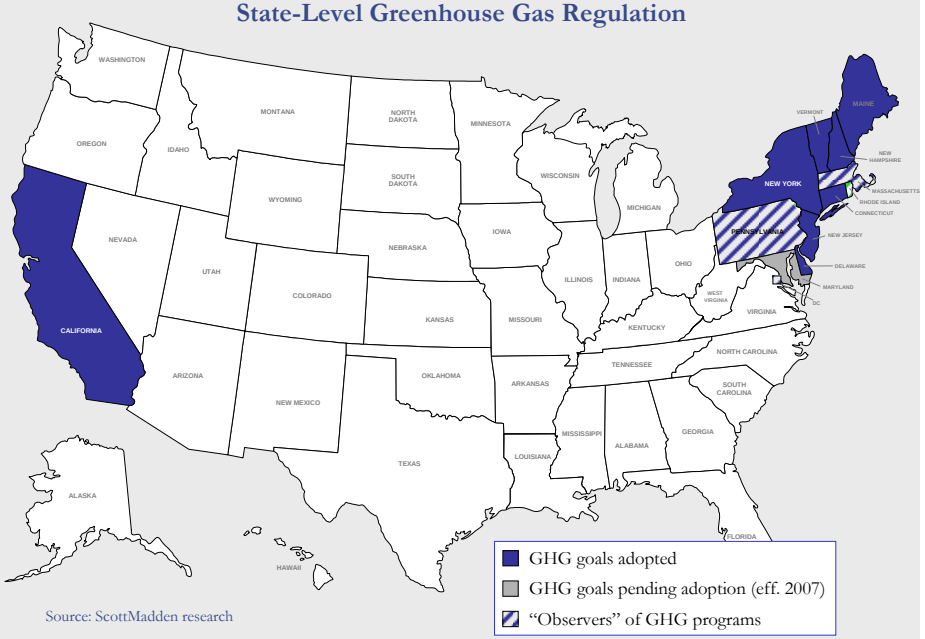
SCOTTMADDEN Management Consultants

Is U.S. Federal Carbon Regulation Inevitable?

The United States has reached a tipping point with respect to greenhouse gas regulation, specifically CO_2 emissions limits. The debate has switched from "whether" to "when and what." Several factors have aligned to make carbon regulation—likely a cap-and-trade scheme—a virtual inevitability, including:

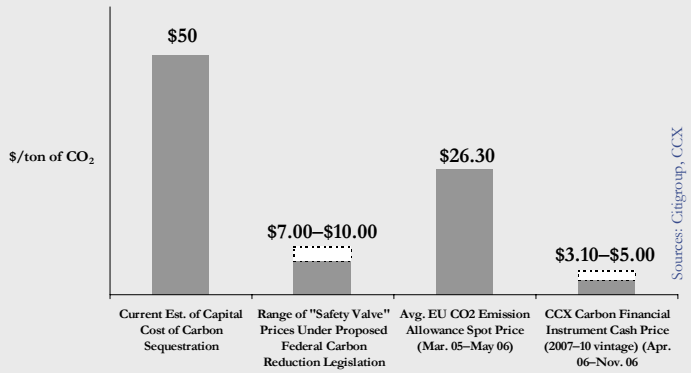
- The adoption of CO_2 regulation in the Northeast and most recently in California
- The litany of reports issued about long-term adverse impacts of growing CO_2 levels
- The growing number of states requiring utilities to purchase a portion of energy supplies come from renewable resources
- The emergence of large, vocal advocates of carbon regulation within the electric industry
- The effective capitulation of debate over causes to global warming by key Republicans in last year's debate over the Energy Policy Act
- Democrat recovery of control over the U.S. Senate and House of Representatives

State-Level Greenhouse Gas Regulation



Source: ScottMadden research

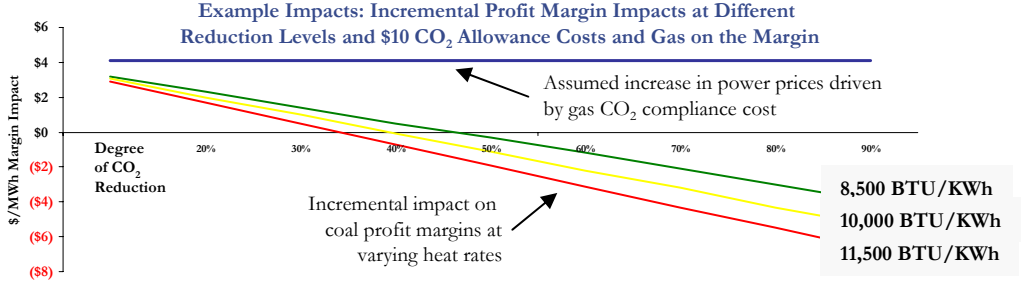
Some Recent Indicative Carbon Costs



Key drivers of CO_2 emissions credit costs		
	Stringency of regulation	Aggressive reductions increase allowance prices
	Available technology	Ultimately, allowances should converge to abatement cost/ton. Some, however, say widely available, reasonable cost carbon sequestration technology is about six to nine years away
	Safety valve prices	Legislatively imposed limits or caps on carbon credit prices will hold allowance prices down

Scenario	Impact on Margins by Type of Plant		
	Nuclear	Gas	Coal
Low rate of emission reduction High assignment of allowances	+++	++	+
High rate of emission reduction Low assignment of allowances	+++++	=	- -

Example Impacts: Incremental Profit Margin Impacts at Different Reduction Levels and $10 CO_2 Allowance Costs and Gas on the Margin



Source: Citigroup

Sources: Citigroup Global Markets, *Carbon Limits Are Coming* (Sept. 11, 2006); Chicago Climate Exchange; industry news

Energy Trading and Marketing: Making a Comeback

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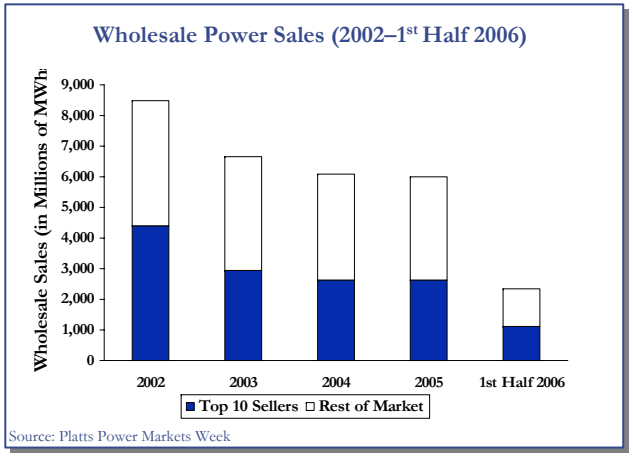
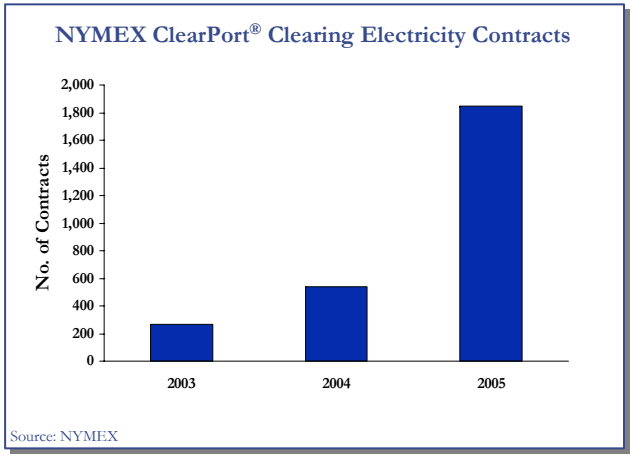
Wholesale Sales May Have Bottomed



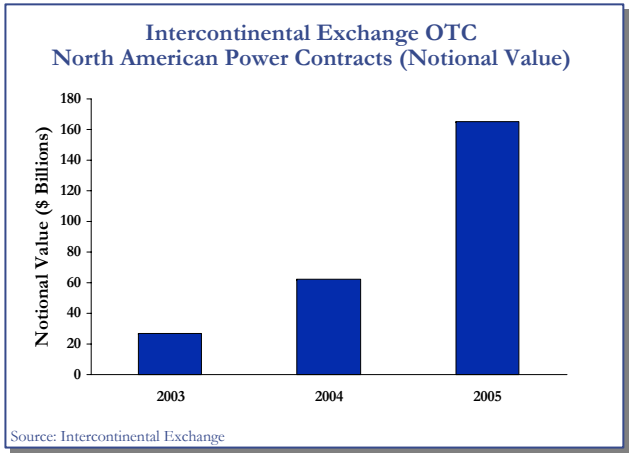
Source: Platts Power Markets Week

... While Power Futures Have Boomed



Source: NYMEX

... As Have OTC Contract Values



Source: Intercontinental Exchange

The market seems to be turning	❑ After wholesale marketers ramped down activity in 2002 and 2003 as creditworthy counterparties became more scarce, the volume of wholesale sales seems to have hit a trough ❑ In restructured markets, the current propensity to ladder (time-vary) supply contracts may mean that "strips" of available capacity and energy will be transacted ❑ Capacity shortfalls, projected to increase through 2010 and beyond, will create some scarcity and price volatility that market participants desire and also help rationalize and price available supply ❑ FERC and CFTC's focus on market integrity, data accuracy, and other safeguards have given players some confidence that some of the missteps of the early 2000s (wash trading, bogus transaction reporting, etc.) are being more diligently controlled. This has enhanced confidence and, consequently, participation
The players and their strategies have changed	❑ Many utility and merchant players were forced to exit the market because of high overhead costs, credit support requirements, refocus on balance sheets, and a return to "basics" that conspicuously excluded energy trading ❑ Investment and commercial banks retreated from energy trading in 2002–03, but are now returning and taking center stage. Many view energy trading not as a proprietary trading function but as an essential capability to deliver full commodity risk management services ❑ There is concern that hedge funds are more active and riskier participants in energy markets (e.g., Amaranth) and are increasing prices and volatility. But there is limited evidence that hedge funds are that active, especially in power markets
Product selection has improved	❑ In OTC and futures markets, the number of contracts and tenors (durations) has increased significantly. For example, NYMEX now offers 35 financially settled electric futures contracts ❑ More power products are financially settled using standardized contracts, rather than bilateral physical contracts. These contracts enhance liquidity and are well-suited to hedging and risk management (vs. speculative) trading activity ❑ Energy-related contracts—especially in carbon emissions—will become more prevalent and will require trading and management capabilities*
Utility roles are uncertain	❑ Many utilities—having returned to traditional rate base expansion growth approaches and enduring PUC scrutiny over pass-throughs of increasing energy and fuel costs—are reluctant to ramp up trading operations again ❑ Another reason for pause: Top trading talent is expensive, as investment and commercial banks and hedge funds have bid up the cost of talent. Bonuses were up 50% for traders in 2005 and banks are paying traders up to $5 million in total compensation, with top traders garnering twice that ❑ Only a few larger, well-capitalized, multi-regional, and asset-backed utilities will likely have the capability to maintain their own trading floors ❑ Utilities will likely continue to focus on asset-centric approaches to trading and will leave speculative trading to financial institutions to pursue

Note: *See related discussion on page 29, infra, "Emissions in the Portfolio Management Mix"

Sources: ScottMadden analysis; *Natural Gas Week*; Platts *Power Markets Week*; M. Burr, "Market Resurgence," *Public Utilities Fortnightly* (Mar. 2006); A. Barrionuevo, "Energy Trading, Post-Enron," *The New York Times* (Jan. 15, 2006); *EnergyBiz Magazine*; *EnergyBiz Insider*; Forbes.com; NYMEX; Intercontinental Exchange

Emissions in the Portfolio Management Mix

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New limits on power plant emissions (and those on the horizon) are constraining system operations optimization for reliability and economics. The interplay of emissions, plant operations, system and market economics, and planning functions requires a re-examination of these roles.

Areas of Renewed Focus				
Organizational Capabilities	**Strategy**	**Plant Operations**	**Environmental Controls**	**Real-time Execution**
Integrate fuel procurement, generation planning, and forecasting	Consideration of emissions-related opportunities, risks, and challenges	Impact of operations, fuel selection, and plant conditions on emissions	Interplay of capital spending and regulatory, financial, and operational functions	Commitment and dispatch linked to emissions strategy and emissions market opportunities

Time Horizon vs. Organizational Focus	Short-term (< 1 year)	Mid-term (1–2 years)	Long-term (2–5 years)
Organizational capabilities	❑ Track, monitor, and manage allowances ❑ Coordinate generation portfolio optimization with emissions, fuel, and controls	❑ Integrate fuel procurement, generation planning, and forecasting	❑ Understand, influence, and address potential emissions legislation
Strategy	❑ Implement emissions compliance strategy considering cost, operations, opportunities, and risks ❑ Update emissions and related trading strategies in real time ❑ Adjust buy/sell allowance and credit amounts based on near-term events	❑ Consider emissions strategy in financial planning and forecasting ❑ Manage allowances and credits based on short-term events, market conditions, and past performance	❑ Build new generation capacity, select fuel, technology, etc., considering impact on emissions ❑ Develop regulatory plan, including rate cases, fuel factors, and cost projections ❑ Formulate legislative strategy and take appropriate actions
Plant operations	❑ Understand plant characteristics and optimize for reliability, cost, and environmental considerations ❑ Develop plant operational performance metrics under emission control conditions	❑ Plan for plant maintenance and controls performance based on projected changes in dispatch sequence and past performance	❑ Install new environmental controls or upgrade existing controls ❑ Prepare robust evaluation of the costs and benefits of investment
Environmental controls	❑ Understand and address operating issues with use of environmental controls ❑ Plan for changes in capacity, uptime, downtime, and time-of-day-related restrictions	❑ Plan for the season and address potential optionality of controls operation vs. supplementing credits or allowances with market actions	❑ Develop intelligence and position on choice of controls based on experience with performance
Real-time execution	❑ Capture changes in the dispatch sequence and communicate this information to all functions involved in system operations and optimization ❑ Monitor and model emissions positions, i.e., season to-date emissions and model/project remaining of season emissions	❑ Plan for generation and forecasting of load, electricity sales/purchases, and system conditions such as outages, fuels availability, logistics, etc. ❑ Tailor power and emissions credit and allowance purchases and sales for the season based on market information, strategy, modeling, and planning	❑ Evaluate new technologies and options, such as use of specialized brokers, etc., for emissions

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ScottMadden, Inc. is a leading management consulting firm that specializes in the energy industry, shared services, and outsourcing. The combination of our industry knowledge, consulting experience and tailored approach distinguishes us from other firms. We assemble small teams of consultants who bring deep experience and knowledge to each challenge and combine them with active client participation to facilitate an open exchange of ideas.

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