

Bank of China

**Power Finance:
Issues Facing CFOs in the Power Industry**

Dr. Ian Giddy
New York University

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Issues Facing CFOs

- Economics: Pricing Pressures
- Mergers & Acquisitions: Valuation Issues
- Financing: Cost and Availability of Capital
- Cash Management: Mismatch Problems
- Risk Management: Hedging Techniques

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Power in the USA – How it is Fueled

Source: EIA Electric Power Monthly, January 2004

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Coal: Dirty But Cheap?

<u>Date</u>	<u>Gas</u>	<u>Oil</u>	<u>Coal</u>
2000	\$31.12	\$33.06	\$15.23
2001	\$34.16	\$27.02	\$15.96
2002	\$25.76	\$27.85	\$14.39
2003	\$43.12	\$34.07	\$15.23

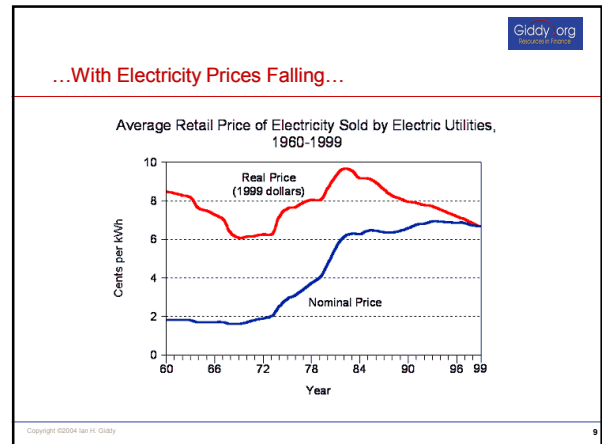
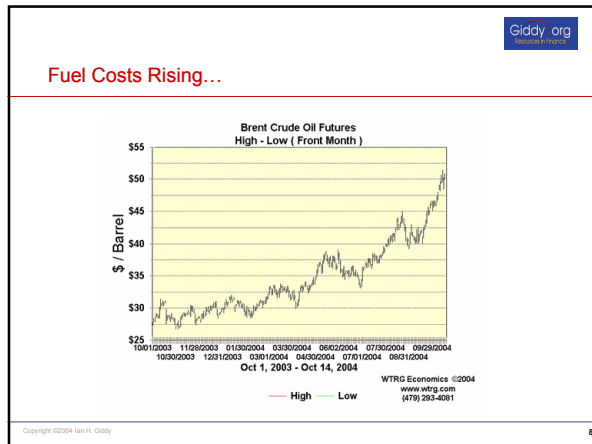
Based on gas and oil heat rate of 8,000, coal heat rate of 10,500.

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Fuel Costs Rising...

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...Led to The New Competitive Sector

- Since 1992, the face of the electric power industry has changed dramatically. No longer is it made up exclusively of regulated monopolies created to do it all — generate, transmit, distribute and sell power within a clearly defined geographic region.
- Now, a significant portion of the industry is made up of companies that must compete in order to survive, particularly in power generation and wholesale and retail energy marketing and energy services.
- These changes have given rise to a whole class of competitive power suppliers. They now supply over 30% of the market.

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Current Industry Trends

- Asset valuations negatively affected by overcapacity in some regions.
- High gas prices currently making gas plants uneconomical
- Retail environment still not liquid as only 20 states are slowly implementing retail choice
- High gas costs and low power prices continuing to pinch spark spreads
- Limited capacity additions for the 2004-2006 period coupled with a recovering US economy should lead to a recovery in the power market for 2006-2007 period

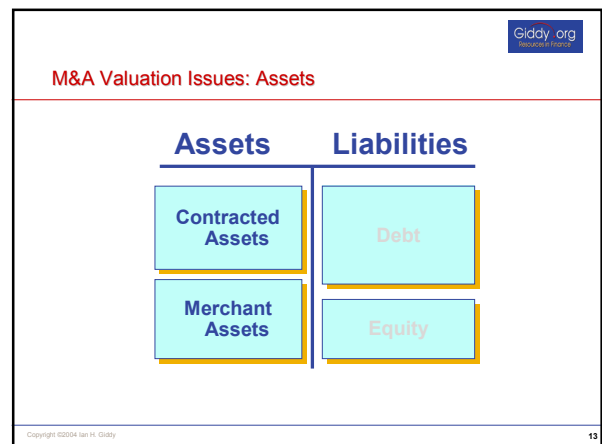
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M&A Valuation Issues: Assets

- Contracted assets** are those with power off take agreements. Typically there is a fixed capacity payment received each month which is meant to cover debt service and major maintenance costs associated with the equipment, plus room for profitability. There is a variable component for O&M, and a fuel pass through component based upon a heat rate. If an owner can operate the plant more efficiently than the amount passed through for O&M, and manage fuel so that the actual cost of fuel is less than the amount passed through pursuant to the off take agreement, additional profitability can be achieved.
- Merchant assets** are those with no power off take agreement. Energy is sold at a market price. More profit is possible if costs can be kept down. There is significant risk in volatility of both the price of power in the open market and the price of fuel. Although coal has been inexpensive for commodity, the transportation costs are high.

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M&A Valuation Issues: Liabilities

- High level of borrowings (“leverage”)
- Off balance sheet liabilities such as performance guarantees
- Costs related to environmental compliance is an issue, particularly with coal plants
- High insurance costs
- Many credit agreements have cash sweeps in place which block cash distributions if covenants are not met. Examples:
 - debt service ratios
 - debt service and maintenance reserve funding
 - high levels of reporting and compliance.

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Current Valuations

Company	Ticker	Analyst	Price	Shares Out	Market Cap	Estimote Per Share	Price/Earnings	Price/Book	EV/EBITDA	Current Dividend	Dividend Yield (%)
AES Corporation	AES	C29	70.77	446	6,439	43.61	1.70	26.36	14.74	5.46	2.2%
American Electric Power	AEP	B27	32.44	395	12,914	2.25	2.40	14.46	13.54	1.56	7.8%
Energy	DNV	A37	39.95	100	7,111	2.60	2.85	6.46	14.00	1.36	8.1%
Consolidated Edison	ED	A27	41.63	211	9,003	2.60	2.85	8.26	14.64	1.46	2.9%
Constellation Energy	CEG	B17	38.73	100	6,084	3.25	3.50	12.24	11.44	1.54	6.3%
DTE Energy	DTE	B27	40.82	174	7,083	2.75	3.00	14.00	11.36	1.36	8.0%
Domestic Resources	D	B17	44.63	283	7,100	4.75	5.10	13.64	12.74	2.36	2.9%
Duke Energy	DUK	C27	22.42	598	21,030	1.20	1.35	10.36	16.64	1.64	4.9%
Energy Corp	ETR	B17	38.28	277	13,889	4.75	4.70	14.46	12.74	1.66	2.2%
Exelon Resources	EXE	B17	32.29	62	3,431	3.30	3.45	11.04	10.34	3.64	2.9%
Exxon Corp	EXC	B17	38.32	640	24,200	2.75	3.00	13.74	12.74	2.74	3.4%
FPL Group	FPL	A17	67.09	116	11,244	5.10	5.10	12.24	13.24	1.24	2.0%
FirstEnergy	FE	C17	40.97	383	15,513	2.70	2.95	15.24	13.94	1.64	3.7%
FirstEnergy	FSE	A27	38.53	100	5,477	2.20	2.35	16.46	16.46	0.74	4.0%
FirstEnergy	FSC	C19	39.53	440	11,916	2.60	2.70	14.54	13.54	1.54	5.4%
FirstEnergy	FPL	B17	46.29	100	6,053	3.55	3.90	13.04	11.94	2.24	7.6%
Florida West	FW	B27	41.29	81	3,309	2.50	3.20	16.54	12.74	1.34	4.0%
Progress Energy	PEG	A27	42.52	247	10,440	3.60	3.60	11.74	11.94	1.44	6.9%
Quanta Corp	STR	B17	43.84	84	3,683	2.50	2.80	11.54	15.74	2.84	1.9%
Santa Fe Energy	SFE	B17	30.91	231	7,095	3.10	3.15	11.64	2.94	0.74	2.0%
Southern Company	SO	A27	29.87	338	22,040	2.00	2.10	14.94	14.24	2.24	4.0%
Southern Union Company	SUC	C19	19.90	77	1,413	1.30	1.29	15.46	1.54	0.74	0.8%
TECO Energy	TE	C18	13.00	100	2,460	6.00	6.05	15.46	13.74	1.64	5.0%
Worpar Energy	WEC	A27	31.53	131	3,698	2.30	2.40	13.14	13.14	1.54	2.7%
Xcel Energy	XEL	B27	17.35	399	6,919	1.20	1.30	14.54	13.74	1.34	4.7%

Source: World Lynch
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Current Valuations by Individual Project

- Current valuations for assets in Mirant Corp Portfolio per kilowatt
 - \$250/kw for western gas and oil plants
 - \$180/kw for northeast assets
 - \$500/kw for mid Atlantic assets due to base load coal assets with low operating costs and location within PJM.
 - \$155/kw for mid-continent fleet due to the fact that these assets are peakers located in markets with negative spark spreads
- Centerpoint's Texas Genco spin-off was a good comparable for the power industry at \$260/kw

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Cost of Financing

Assets

Contracted Assets

Merchant Assets

Liabilities

Debt
60%-70%

Equity
30%-40%

Cost:
Libor + Spread
Treasury + Spread

Cost:
Investors' required
return

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Commercial Bank Lending

- The commercial bank market for utilities is extremely favorable
- Long dated maturities (5 yrs) available for holding companies to be used for acquisition financing. Most recent deals have been oversubscribed.
- Pricing has come in after topping out in 2001 and 2002.
- Investment banks have replaced European and Japanese banks that left the sector in 2001 and 2002
- Low treasuries and spreads have pushed many Sponsors to the bond market
- B-Loan lenders are stepping up for projects

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Alternatives to Banks: Bond Markets and More

- Merchants, distressed utilities and certain projects have tapped the high yield and B-loan markets in 2003 and 2004 YTD. Proceeds have been used to refinance current maturities.
- Sponsors have been using high yield and B-loan markets as acquisition currency.
- High yield and B-loan markets are now sole source of capital for non investment grade credits.
- High yield investors now understand regulated and merchant power business models.
- Non-traditional lenders including insurance companies and hedge funds.
- Credit spreads for new issuance have tightened significantly in the past year

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Ratings and Cost

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Ratings and Cost

Rating	1 yr	2 yr	3 yr	5 yr	7 yr	10 yr	30 yr
<i>Aaa/AAA</i>	1	1	3	9	12	17	38
<i>Aa1/AA+</i>	5	5	10	25	27	31	51
<i>Aa2/AA</i>	10	11	16	27	32	42	60
<i>Aa3/AA-</i>	15	18	22	32	40	56	75
<i>A1/A+</i>	18	23	25	45	50	71	77
<i>A2/A</i>	21	23	27	51	54	75	83
<i>A3/A-</i>	30	34	40	57	67	75	101
<i>Em1/BBB+</i>	44	54	60	79	82	91	111
<i>Em2/BBB</i>	57	65	74	89	93	116	128
<i>Em3/BBB-</i>	63	81	86	97	105	128	136
<i>Ba1/BB+</i>	315	387	370	302	245	275	230
<i>Ba2/BB</i>	325	350	375	305	205	210	260
<i>Ba3/BB-</i>	305	330	350	325	220	265	320
<i>B1/B+</i>	385	425	555	460	315	375	300
<i>B2/B</i>	515	540	605	510	320	445	470
<i>B3/B-</i>	590	620	710	610	470	545	620
<i>Caac/CCC</i>	680	750	825	810	595	620	720

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Cash Management: Dividends

- Investors expect utilities to pay out all available cash.
- Many power off take agreements have adverse working capital requirements, meaning longer periods to collect receivables, coupled with the need to pay fuel invoices within 30 days.

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    graph LR
      Profits --> PowerCompany[Power Company]
      PowerCompany --> Dividends
    
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Cash Management: Mismatch

- Investors expect utilities to pay out all available cash.
- Many power off take agreements have adverse working capital requirements, meaning longer periods to collect receivables, coupled with the need to pay fuel invoices within 30 days.

Cash Gap

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Cash Management

- Regulatory environment effect on cash: will utilities be able to pass through costs to the ratepayer?
- These costs include higher gas and coal prices, environmental compliance spending, transmission and distribution infrastructure spending, and generation additions.

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Risk Management

- Volatile commodity prices create fuel cost uncertainty
- Prices can be hedged with long term forward contracts

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What Hedging Instruments?

What Protection Needed?

- Volatility & Direction
 - Options, Caps and Floors
- Direction
 - Forwards, Futures, Swaps
- Complex risks
 - "Exotics"

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A Typical Forward Contract

- A company agrees today to pay a certain price for a commodity in the future

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A Typical Forward Currency Contract

- Sony agrees today to pay Bank of America a certain price for a currency in the future

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Spot and Forward Prices

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Commodity Prices

Simple model of a commodity futures price based on the cost of carry:

$$F_t = S_0(1 + R_t + C_t)^t$$

F_t = Futures price for delivery t years from today
 S_0 = Spot price today
 R_t = Interest rate for t years
 C_t = Non-interest costs of carry.

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A Typical Forward Energy Contract

- A power company agrees today to pay a certain price for coal in the future

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Premium for Possession

For some, a barrel of oil in the hand is worth two in the bush. This "premium for possession" factor is called *convenience yield*:

$$F_t = S_0(1 + R_t + C_t - CY)^t$$

where CY = Convenience yield, in percent per annum

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Forward Prices of Power and Fuel

Based on gas and oil heat rate of 8,000, coal heat rate of 10,500

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Forward Pricing

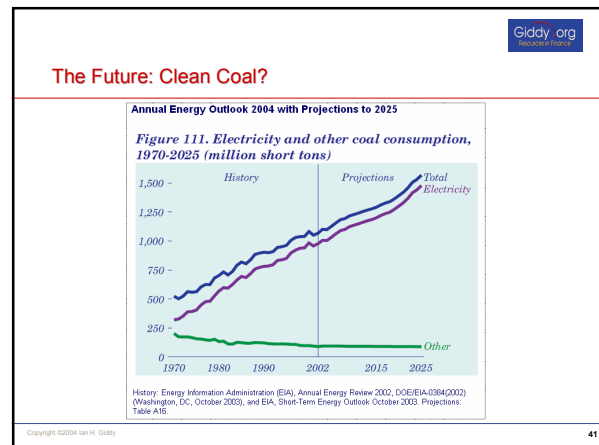
Date	PJM Price	\$/Mwh Gas	\$/Mwh Oil	\$/Mwh Coal
Nov-04	57.5	\$56.16	\$65.95	\$24.15
Dec-04	57.5	\$64.16	\$65.89	\$24.36
Jan-05	57.5	\$67.44	\$64.78	\$25.10
Feb-05	57.5	\$66.00	\$63.97	\$25.10
Mar-05	57.5	\$64.16	\$63.08	\$24.99
Apr-05	57.5	\$54.68	\$62.18	\$24.36
May-05	57.5	\$52.87	\$61.29	\$23.94
Jun-05	57.5	\$53.16	\$60.42	\$23.63
Jul-05	57.5	\$52.91	\$59.61	\$22.89
Aug-05	57.5	\$53.05	\$58.86	\$22.89
Sep-05	57.5	\$53.26	\$58.18	\$22.89
Oct-05	57.5	\$53.52	\$57.54	\$22.16
Nov-05	57.5	\$55.12	\$56.93	\$22.16
Dec-05	\$4.25	\$57.11	\$56.40	\$22.16
Jan-06	\$4.25	\$58.35	\$55.89	\$21.00
Feb-06	\$4.25	\$57.99	\$55.42	\$21.00
Mar-06	\$4.25	\$56.43	\$54.97	\$21.00
Apr-06	\$4.25	\$48.51	\$54.53	\$21.00
May-06	\$4.25	\$47.11	\$54.14	\$21.00
Jun-06	\$4.25	\$47.23	\$53.74	\$21.00
Jul-06	\$4.25	\$47.35	\$53.37	\$21.00
Aug-06	\$4.25	\$47.59	\$53.04	\$21.00
Sep-06	\$4.25	\$47.27	\$52.71	\$21.00

Based on gas and oil heat rate of 8,000, coal heat rate of 10,500

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- ### Turning the Corner
- Power and Gas Sectors have experienced a recovery fueled by three factors
 - Balance sheet repair driven by cash generation
 - Constructive regulatory environment
 - Healthy energy price environment
 - Valuations at high end of historic norms
 - Improving fundamentals
 - Favorable long term interest rate environment
 - Economic recovery and demand for power
 - Possibility of “green coal”?
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Contact Information

Ian H. Giddy
 NYU Stern School of Business
 Tel 212-998-0426; Fax 212-995-4233
ian.giddy@nyu.edu
<http://giddy.org>

Research for this report:
 Chip Wilkinson
cwilkinson@libertypowercorp.com

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