



# ENERGY STRATEGIES REPORT

Providing Valuable Strategic Insights to the Energy Industry

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## Windy City Electricity

### Transmission School Offers Insight

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The Transmission Business School held every year in Chicago serves two purposes. First, it provides four days of intensive class work on how the modern transmission system works, taught by an impressive array of academics, consultants and executives. Second, it provides an opportunity for attendees from four continents to discuss issues, make discoveries and look for solutions and opportunities. Here is what I took away from the June 2011 session as a result of talking to or listening to participants:

- The Feds set rates for transmission but state regulators have oversight over just about everything else. Don't ever forget that. They can impact and shape the direction of projects, and they do.
- Roughly 70 percent of U.S. transmission lines and transformers are more than 25 years old, and the system is both aging and not adaptive enough.
- Network improvement and expansion requires a long-term strategy, not patchwork improvements. High voltage lines take up less space than multiple sets of low voltage lines, save energy, have no thermal limits. But there is no appetite right now for high voltage (765 kV) lines.
- There is a lack of self-diagnostic technology on the transmission system. "My wife's Honda Civic has more intelligence about the condition of its parts than does the transmission network," a transmission expert at the meeting said.
- Building new lines requires decisions about who pays, who plans, and where to site them, but there is no lack of builders or investors, and they don't need the incentives to get them interested.
- The old network was built for large, baseload power plants. Now it has to serve smaller power plants close to load centers. In the future, it might have to serve more renewables or even big nuclear plants.
- The installation of a competitive market induced generator owners to improve the availability of power plants from 87 percent to 92 percent. Some of the old utility owners did not like to spend money on maintenance, or they weren't convinced the cost-benefit was there for the percentage increase that could be achieved.

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- A recent change in tax law could change the valuation of transmission assets and open the way for the electric equivalents of real estate investment trusts. If you are not sure what that means, take a look at the gas transmission industry.
- Not having a coherent or cohesive (or pick another adjective) energy policy really messes up long-term decision making. Renewables will require transmission lines to connect those distant resources to the load centers. Replacement of old coal-fired power stations with something else will change the flows on the grid and might require new transmission lines as well. The new resources need lines to connect them to customers, but who would build a line without a firm customer to use it, and who would build a power station without a transmission line in place? Then again, would the network need all that new transmission investment if regulatory incentives made it more profitable to run the existing line more efficiently?

You get the idea. We had plenty to talk about, and it was not the standard stuff. What bothered me was the feeling, however, that decisive, forward-looking decision-making -- the kind had produced the 765 kV lines, the Interstate Highway System and the New York City water supply -- has fallen prey to a muddle of committees, stakeholder gratification and regulatory caution, in which people fear to make mistakes, and therefore avoid making decisions that matter. Under such circumstances, would Henry Ford have produced the Model T or an improved bridge? Thomas Edison, I suspect, would never have gotten to first base, because he worked on not just the light bulb (bad enough because it might have required approval from a committee of gas light and kerosene stakeholders) but rather on an entire system, which would have stirred up the need for even more approvals. Maybe real innovation will have to come from outside the regulated transmission sector? Maybe we will learn more at the next Chicago session of the Transmission Business School.

### Carbon Dioxide Emissions and the Economy

|  | US        |           | UK        |           |
|--|-----------|-----------|-----------|-----------|
|  | 2000-2009 | 2009-2010 | 2000-2009 | 2009-2010 |
| Percent change in :  |           |           |           |           |
| Real GDP   | 15.7      | 2.8       | 14.0      | 1.3       |
| CO2 emissions (total economy)                              | (7.7)     | 3.8       | (13.8)    | 3.9       |
| Million metric tons per year change in CO2 emissions from: |           |           |           |           |
| Total economy  | (246)     | 207       | (70)      | 18        |
| Coal-fired electric generation                             | (185)     | 94        | (15)      | 3         |
| All electric generation                                    | (150)     | 118       | (8)       | 6         |

Source: UK and U.S. government publications

### CARBON UPDATE

Okay, right now, nobody here cares about carbon dioxide emissions. The economy, jobs, the deficit, hot-button social issues, yes, but not carbon emissions. That was yesterday's issue. But it could return, especially with nukes out of favor and emissions rising.

When the economy crashed, CO2 emissions actually declined, with the 2009 numbers a hopeful sign for those who believed that progress was possible. Then the economy picked up, and so did emissions. The *table below* shows some of the numbers for the United States and for the UK.

Basically, the UK from 2000 through 2009 continued a process of reducing carbon emissions begun in the previous decade, with the reductions hitting a bottom during the Great Recession. A significant part of the pre-2000 reduction can be traced to reduced use of coal for electric generation. Then, in 2010, the economy bounced back (however weakly) and so did emissions, even more so.

The United States, in contrast, did not show steady reductions in carbon emissions over the decade, but rather a big drop when the economy fell apart (notice the huge impact of using less coal in electric generation) and the a sharp recovery in 2010 .

The numbers seem to indicate two morals for the story. First, although electric generators like to talk about having all sectors share the burden of carbon emission reductions, what the electric generators do counts more than what other sectors can accomplish, and the generators cannot move their assets to some other country, so they might as well get used to the idea that the government will target them disproportionately. Second, coal-fired generation has to figure in any solution that involves reduced combustion of fossil fuels. Life isn't fair? Sorry, people, there are more SUV owners that vote than power plant executives.

## VALUATION REDUX

Not long ago (April 26, 2011, *Energy Strategies Report*), I wrote about how investors value stocks. Basically, stocks of companies that earn higher returns on equity, all other things being equal, sell at higher prices relative to their book values. No surprise, then, when I picked up a brokerage report on banks<sup>1</sup> which reported a strong relationship between the ratio of stock-price-to-tangible-book-value and return on equity ( $r^2 = 0.73$ ) and return on total assets ( $r^2 = 0.65$ ). "So it happens in other industries too," I thought.

All this does make sense. An asset that earns more than its cost of capital will rise in value. Think of this example. The U.S. government has a cost of capital of 4 percent. That's what investors demand for lending money to the government. A \$1,000 bond due in 30 years has to pay \$40 per year in interest. If it does, the bond sells at \$1,000. Let's say that the Treasurer of the United States makes a mistake and issues a bond that pays only \$20 per year (2 percent) and you (not having read the fine print) buy it for \$1,000. You will now earn less than the cost of capital for that type of investment. Will the bond sell at \$1,000 in the market, just because the owner will get \$1,000 back in 30 years?

Next, let's say that the Treasurer had a big night out, stumbles in the next morning, and inks in \$140 (14 percent) as the annual interest payment on the first bond sold that day,

and your sister, who did read the fine print, buys it and gets out of the Treasury fast before somebody discovers what happened. Will that bond sell at the same price as the 4 percent bond or the 2 percent bond, given that all will mature at the same time and pay \$1,000 to holders at the end of 30 years? The answer, of course, is no. Who in his right mind would pay the same price for those different flows of income from securities with exactly the same risk level? By my calculation, the 4 percent bond will sell at \$1,000, the 2 percent bond at less than \$700, and the 14 percent bond at \$2,700. You can do the math to check me out.

Does this work in other parts of the world? A brokerage report on Latin America popped up on my screen, so I decided to check whether the relationship held south of the border.<sup>2</sup> First I tried out the relationship between the market-to-book ratio (BR mb) and return on equity (BR ROE) for 18 Brazilian industry groups. The results, in percent (See *Figure 1 below*):

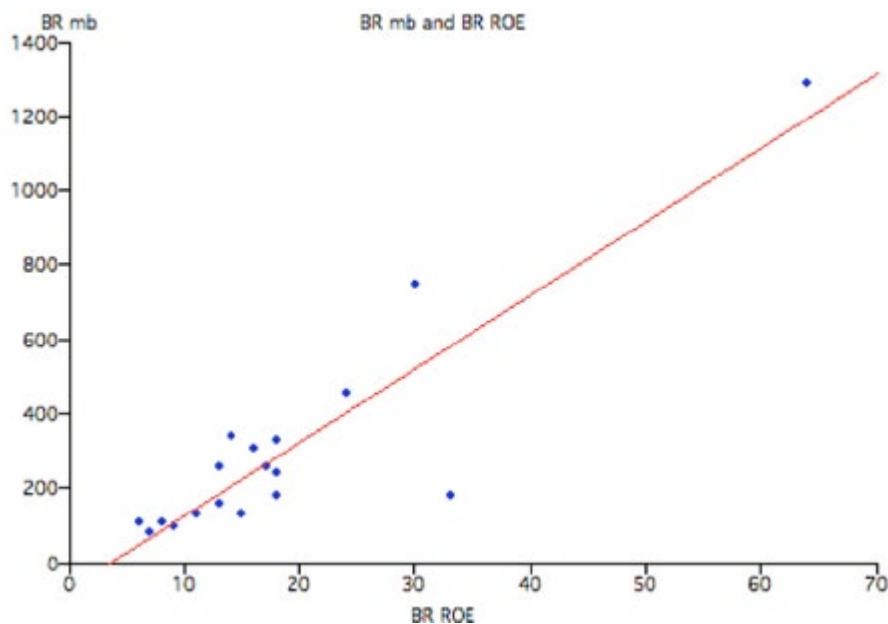
$$(\text{BR mb}) = -64.8 + 19.7 (\text{BR ROE})$$

and  $r^2 = 0.85$ . Not bad at all for a first try. The graph really looks good, too.

Okay, but we are interested in utilities, not in 18 different industry groups. The report showed data for 14 large Brazilian utilities (average market capitalization of \$8 billion) but the data for one of the smaller companies were rendered useless due to gigantic derivative losses,

**FIGURE 1**

**Brazilian Industry – Market-to-Book Ratio and Return on Equity**



<sup>1</sup> Ken A. Zerke, et. al., "Mid Cap Banks," Morgan Stanley, June 17, 2011, pp.6-7

<sup>2</sup> Guilherme F. Paiva, et.al., "Latam Equity Strategy Weekly Stock Guide," Morgan Stanley, June 5, 2011, pp. 4 and 10.

so I had to settle for 13 utilities. Sure enough, the analysis produced, in percent, where (BR U mb) is the market/ book ratio of the Brazilian utility stocks and (BR U roe) is their returns on equity):

$$(BR U mb) = -15.8 + 11.9 (BR U roe)$$

and  $r^2 = 0.87$ . The graph of the relationship makes the point better (See Figure 2 below):

Interestingly, the formula for U.S. utilities, based on calculations made early in the year, was:

$$MB = 36.6 = 10.8 ROE$$

and  $r^2 = 0.75$ . In other words, in the case of utilities in the United States and in Brazil, a one percentage point increase in ROE produced an 11 to 12 percentage point change in the market-to-book ratio.

This analysis does not say that higher returns automatically lead to a higher price of a certain magnitude. The market will mark down the valuation of higher returns derived from taking bigger risks. It just says that among companies with similar risk profiles earning a higher return will lead to a higher price. The real trick is to figure out how to enjoy a high return without taking commensurate risk. The market will reward that achievement.

That brings me to the lessons for management (this is a strategy letter, right?) which I can't repeat enough. You want a higher price for your stock? You can't persuade the regulators to raise the allowed return? Then figure

out how to reduce risk levels at the company so that the allowed return is more than adequate for the risks taken. You want to do a merger? Preferably, sell your company at an outrageously high price to someone else. That's how to make money in a merger. Barring such a strategy, if you intend to buy instead, don't do it to produce earnings per share "accretion" (a favorite term of bankers) but rather to earn more than the cost of capital, which means don't overpay. Not earning cost of capital will reduce your market-to-book ratio. You might learn why the stock of the buyer in the merger often goes down despite the accretion.

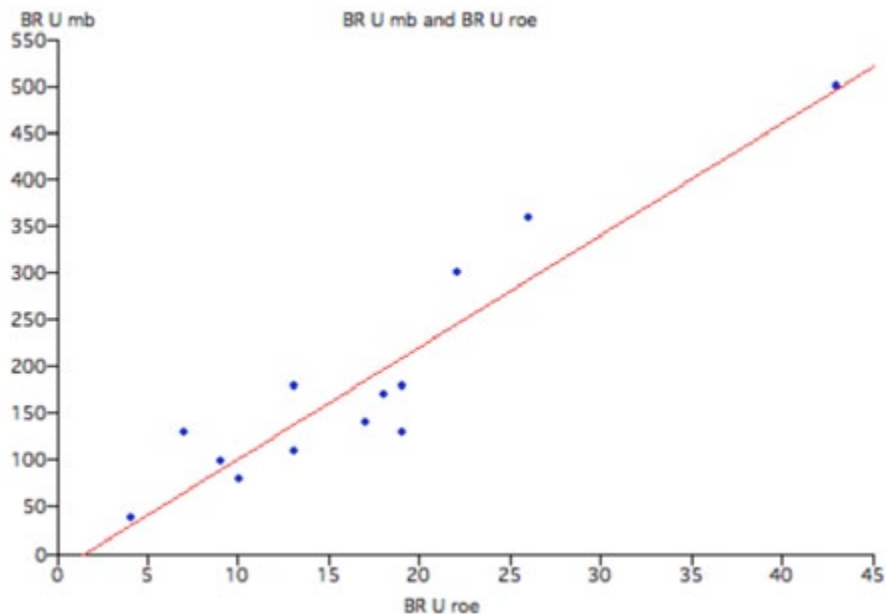
## WATER DRIPS

The Environmental Protection Agency (EPA) has undertaken another survey to determine the spending needed to maintain, upgrade, modernize and expand America's aged water and wastewater infrastructure. Based on all the numbers out there, I would guess that the EPA survey will declare that the industry will have to spend at least \$50 billion per year in 2011 dollars (as opposed to current spending that may exceed \$25 billion per year, although I don't get a sense that I should rely on these numbers too much). That \$50 billion is less than 5 percent of total capital spending in the United States. The electric industry, in contrast, probably spends \$100 billion per year.

What will it cost to add \$50 billion per year to infrastructure, assuming no offsetting benefits from replacement of old and inefficient equipment? Figure that operation, maintenance and depreciation expenses on the new equipment would add up to 10 percent of

**FIGURE 2**

**Brazilian Utilities – Market-to-Book Ratio and Return on Equity**



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investment, at most, and capital costs another 5 percent (most financing via sale of municipal debt and government grants). Thus, prices to consumers would have to rise about \$7.5 billion per year to cover the added costs, which works out to less than \$30 per year per American, or less than 10 percent of the annual water bill. But remember that water bills are small potatoes compared to other utility bills in most places. Admittedly, other expenses will push up the water bills as well, and the price of water will have to rise more than the rate of inflation, but what are we talking about, a dime a day per person?

That brings me back to the puzzle. If we should spend \$50 billion per year, why don't we spend it? It can't be for lack of capital, because huge sums of investment money have been going into infrastructure all over the world. It can't be for lack of construction workers or of manufacturing time, considering how weak the economic upturn has been and how many people can't find work. Consumers can spend those \$30 on bottled water that comes out of a municipal water system but advertises "all natural" and "no carbs or fats" and "naturally caffeine free", and not notice it, but not on an improvement to the water supply system? Either the politicians and regulators haven't got the nerve to set the higher price, or the water suppliers haven't learned how to sell a product. I'm ready to invest or pay the extra \$30. Make me an offer.

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## THE TEPCO STORY

No, we still do not know the full impact of the Fukushima nuclear accident. The German, Swiss and Italian governments have taken steps to either close down or stop the building of nuclear plants. China's authorities called a pause for new plants not yet under construction in order to study the matter, but nobody I know thinks that China will abandon its huge nuclear construction program. In the United States, the government continues to stand behind its nuclear program but, in truth, the program has produced only a few projects where construction is under way. Japan, which lacks significant fossil fuel resources, seems to have pulled away from nuclear energy, and the government has embraced renewable energy as a replacement, but the existing government may not last long, so there is uncertainty.

That brings us to Tokyo Electric Power (TEPCO), the owner and operator of the Fukushima nuclear station, where the disaster took place after the tsunami swept in. The rating agencies have reduced TEPCO's bonds down to junk status. TEPCO's stock fell 85 percent (versus drops of one-third for other Japanese utilities and less than one-tenth for the Japanese stock market as a whole). Now for the prosaic financial problems that do not make the headlines. TEPCO had \$110 billion of debt outstanding at the end of its last fiscal year. If the creditors bailed out of

their bonds, who knows how much those securities would decline, or what would happen to the financial institutions that would have to recognize losses, or to a still weak Japanese economy? Furthermore, TEPCO might have to come up with \$100 billion to pay damages to the victims of the accident. Does anyone have a real number yet? Where will that money come from if the junk bond rating and low stock price preclude raising money in the markets except on the most onerous terms, if at all? To further complicate matters, Japanese bondholders, apparently, have first dibs on all assets in case of bankruptcy, ahead of those claiming damages due to the accident.

For the moment, the government's chosen solution consists of setting up an organization that will lend the needed funds to TEPCO, which TEPCO will have to pay back over time, somehow. That solution would keep TEPCO out of formal bankruptcy but how would the company repay the government and get back on a commercial footing? TEPCO, ultimately, depends on revenues from its customers to pay its financial charges. The only ways to reduce those charges would be to restructure the payments to existing security owners, or to offer government funds to TEPCO on easy terms (meaning that taxpayers cover costs).

Some might argue that TEPCO's creditors and shareholders took the risk and should suffer the consequences, but that moral judgment does not produce the needed cash. Most of the money they put into TEPCO is now in fixed assets (some of which no longer function). TEPCO might have a hard time raising cash on its own, and the victims of the accident need cash, not shares in assets. The company may be too big to fail, and if it does, the victims of the accident might not collect much from the estate.

In some respects, one might argue, the government's preferred solution kicks the can down the road, and might even create another of those zombie corporations that populated the Japanese business sector during the long downturn, but it also acknowledges that the government has the ultimate responsibility in any nuclear debacle. More to follow, no doubt.

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## NOW YOU KNOW

The headline reads, "Ohio UFOs Caused the Big Blackout?" The story on the Internet reports that a Special Forces veteran videotaped "lake-freighter-size ... cylinders" flying overhead during the August 22, 2003, blackout.<sup>3</sup> I didn't know, and I took part in an expensive inquiry of the event. Neither did one of the other investigators until he made the discovery and forwarded me the news. I also discovered that UFOs had been sighted hanging out over electrical installations in the Northeast before the Great Northeast

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<sup>3</sup> "Ohio UFOs Caused the Big Blackout?," [godlikeproductions.com/forum1/message476531/pg1](http://godlikeproductions.com/forum1/message476531/pg1).

Blackout of November 1965, but the Feds blamed the event on a broken relay and a reporter who thought otherwise went silent. UFOs were sighted during other 1965 blackouts, during an Iowa blackout in 2003, and green helicopters were seen during a Massachusetts blackout in 2003. Now you know. Amazing, isn't it, what you can learn on the Internet?

## PREDICTING THE FUTURE

Everyone agrees. Manufacturing will move abroad, probably to China, assuming there is any manufacturing left in the United States. As a result, industrial demand for natural gas or electricity will grow at an anemic pace, if at all. You can bet on it.

But can you? Chinese wages have begun to rise sharply. Chinese currency has moved up in value. The United States produces roughly the same manufacturing output as China, so one cannot argue that all manufacturing has left our shores. U.S. productivity has risen. Other industrial nations have managed to compete in the world market, too. Germany, as an example, manages to succeed in the export trade despite high wages. The country manufactures high-value products and people buy them.

This brings us to a report issued by the Boston Consulting Group that predicts that the United States will undergo an industrial renaissance, thanks to a combination of high productivity and low wages. (You read that right: low wages.) And, get this, "By 2015, China is unlikely to have a cost advantage over U.S. factories in making many products for the U.S. market."<sup>4</sup> The chief executive of Li &

Fung, one of the largest trading and outsourcing houses in the Far East, put it more plainly: "It is the end of cheap goods."<sup>5</sup> That comment comes from a man whose firm has reaped enormous benefits from the movement of manufacturing to China.

Consider next how the fading of American manufacturing has affected demand for natural gas and electricity in the recent past:

|   | % changes |           |
|---|-----------|-----------|
|   | 1992-2002 | 2002-2010 |
| Total Electricity Sales                         | 25.6      | 6.7       |
| Electric sales to industrial customers          | 1.9       | (5.2)     |
| Total Natural Gas Sales                         | 8.6       | 13.7      |
| Natural gas sales excluding electric generation | (7.3)     | 5.4       |
| Natural gas sales to industrial customers       | (0.3)     | (12.1)    |

What if industrial customers come back? They account for roughly one-third to one-quarter of utility sales. A resurgence of the manufacturing sector could affect those almost flat predictions for demand, and they might require a revamping of plans to take into account the needs of growing manufacturers: not only in usage patterns but also in location of demand. Furthermore, high value-added industry might demand more of a quality product from the utility industry. Wouldn't that be a delightful change?

<sup>4</sup> Peter Marsh, "US set to regain industrial crown," *Financial Times*, May 5, 2011, p.8.

<sup>5</sup> "The end of cheap goods?," *The Economist*, June 11, 2011, p.71

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