



ANALYSIS GROUP
ECONOMIC, FINANCIAL and STRATEGY CONSULTANTS

An Assessment of the McCullough Research Memo on Profitability Results of Selected Power Plants in New York State

Susan F. Tierney, Ph.D.
Analysis Group

Boston, Massachusetts
September 2009

This White Paper was prepared at the request of the New York Independent System Operator.
The paper reflects the views of the author, and not necessarily the views of the NYISO, or its members.

An Assessment of the McCullough Research Memo on Profitability Results of Selected Power Plants in New York State

By Susan Tierney, Ph.D.
Managing Principal, Analysis Group
September 2009

Introduction

On June 5, 2009, Mr. Robert McCullough of McCullough Research sent a memorandum to Assemblyman Richard Brodsky, Chairman of New York State's Committee on Corporations, Authorities and Commissions. In this memo, Mr. McCullough presented results of his estimates of the profitability of 13 power plants located in New York State and operating in the electric energy markets administered by the New York Independent System Operator ("NYISO").

In response to a request by the NYISO, I have reviewed Mr. McCullough's memo. I observe that the analysis draws inappropriate conclusions in light of what appear to be improper calculations of financial returns for the power plants located in New York State. With its highly footnoted references to sources of information in the public domain, the McCullough memo appears at first blush to be grounded in empirical analysis. But upon deeper examination, the analysis is quite flawed.

The principal problems are: (1) Mr. McCullough's calculations appear not to have incorporated important variables that would affect power plant profitability for a plant's owners; as a result, these incomplete calculations on the cost side result in a gross overstatement of profits; (2) The information sources cited by Mr. McCullough to estimate financial returns on equity do not provide the kind of data that is needed to estimate important cost factors essential to calculate profits (return on equity) in any individual year; (3) Mr. McCullough's analysis focuses on a single year of power plant operations that is not only unrepresentative but by definition is also inadequate to estimate overall levels of profitability of the plants; and (4) Mr. McCullough's conclusions ignore significant contrary evidence that calls into question his assertion (on page 1 of the memo) that "...non-economic bidding practices at the New York Independent System Operator (NY ISO) made 2008 a very profitable year for generators in New York." Together, these problems entirely undermine the validity of his estimates, and contradict his representation that his conclusions are conservative.

The McCullough memo leaves out important variables that need to be included to reflect true costs to own and operate a power plant

The McCullough memo rightly describes the fact that power plants’ “profitability is seldom estimated on a plant level in standard financial reports.” The companies that own power plants in New York State typically are large companies that own power production and other assets located in many geographic regions and many product markets. As such, these companies’ publicly available financial statements and other regulatory filings typically do not provide for individual power plants the type of detailed information (e.g., annual depreciation expense, labor costs, pension costs, income taxes, property taxes, fixed operations and maintenance (“O&M”) costs (such as contracts to provide O&M services), incremental capital additions, plant-specific financing costs, and various other expenses) necessary to properly characterize a specific power plant’s full costs and overall profitability.

Although the McCullough memo recognizes the fact that this full array of information is not available, the memo goes on to explain that “many assumptions are made in the course of calculating these estimates.” The actual assumptions made, however, are not transparent in the memo. While the memo reports that “the capital costs are taken from financial statements or press coverage,” an inspection of the documents Mr. McCullough cites indicates that they provide inadequate information on the kind of plant-specific 2008 capital cost or other fixed costs applicable to the specific plants in his analysis. Most troubling, the references to “expenditure” data, combined with the referenced source documents, do not appear to include fixed costs. Fixed costs are real costs to the owner, and include debt, property taxes, labor costs, and a variety of costs that the owner bears whether or not the plant actually operates.

Apparently, the memo’s reference to “capital cost” reflects information tied to the original value of transactions that occurred many years ago and in which the current power plant owner purchased the plant from its prior owner. Most of these power plant purchase transactions involved groups of power plants, rather than stand-alone facilities, and in many cases included a variety of other things as part of the deal. For example, the memo references as a source document a 1999 news article that describes the value of the six-plant transaction involving the AES Cayuga and AES Somerset generating stations. This short article, quoted in its entirety in the footnote below,¹

¹ “AES Completes Acquisition of Six Power Plants in New York With Total Capacity of 1424 MW. ARLINGTON, Va.--(BUSINESS WIRE)--May 14, 1999--The AES Corp. (NYSE:AES) announced today that it has completed its purchase of six electric generating stations from NGE Generation, Incorporated (“NGE”) for \$953 million. The six facilities, located in western and central New York, are AES Somerset (675 MW), AES Cayuga (306 MW), AES Westover (126 MW), AES Greenidge (161 MW), AES Hickling (85 MW), and AES Jennison (71 MW). Project financing for the acquisition was structured as a leveraged lease. AES is near completion of the installation of a selective catalytic reduction unit at the Somerset facility which will reduce nitrogen oxide emissions by up to 90%. AES assumes control of operations at these facilities immediately. The energy output, installed capacity credits, and ancillary services will be marketed under an agreement with Merchant Energy Group of the Americas, Incorporated (“MEGA”). Power will be sold through bilateral arrangements as well as through spot market sales. Dan Rothaupt, President of AES New York, stated, “The combination

provides insufficient information about what was or was not in the original transaction – that is, whether it involved power purchases or sales agreements, fuel, labor, vintage sale-leaseback agreements underlying the asset, or any other elements besides the six power plant assets themselves. Additionally, it says nothing about any sums that were necessary for the buyer to finance the purchase; obtain new permits or other regulatory requirements needed to consummate the transaction; pay property, income, sales, or other taxes; provide compensation to workers; arrange for waste management costs; purchase air emissions allowances; or other fixed costs (such as demand charges or other fixed delivery charges for fuel) that the plant owner would face in 2008, the year analyzed in the memo. The information about original transaction value indicates nothing about what capital costs may have been incurred by the purchaser after it acquired the plants in question.

These analytic problems in the McCullough memo are significant. Power plants are capital intensive, and an owner's profits are highly dependent upon the character of its expenses. An owner – whether an electric utility or a non-utility generator – faces a variety of expenses that include not only ones that vary with output (such as fuel costs, which the McCullough memo attempts to track for each plant), but also fixed costs that do not vary with output but which nonetheless are a cost of owning and operating the plant. These fixed costs may be quite large for the plants in the McCullough memo, and the memo provides inadequate information to demonstrate that the profitability estimates have properly accounted for these real costs. And many of the variable costs include income taxes and other costs that appear not to have been included in the McCullough analysis.²

of high availability, high efficiency and state-of-the-art emission control technologies will make these units the low-cost electricity producers for many years to come. These plants are well positioned to serve the New York market.' Dennis Bakke, President and CEO of AES, said, 'We are delighted to complete this transaction. It gives AES a major role in the production of electricity in New York State. We would like to thank NGE for their cooperation in working with us on a smooth transition at the plants. As a result, these new businesses will join AES in full stride starting today.' Business development milestones in 1999 include the following: (i) In February, a subsidiary of AES executed a Power Purchase Agreement ("PPA") with Williams Energy Marketing and Trading Company, a subsidiary of The Williams Company, Inc., for the entire output of the planned 700 MW AES Ironwood power generating facility. (ii) In February, a subsidiary of AES was selected by the Hungarian utility, the MVM, to build, own and operate a 190 MW gas-fired combined cycle power plant in eastern Hungary. (iii) In March, a subsidiary of AES won a bid for two gas-fired power stations in Australia totaling 966 MW. (iv) In April, AES Thames reached agreement to a partial prepayment of future electricity sales with Connecticut Light & Power Company (CL&P). (v) In April, a subsidiary of AES won a bid to acquire 50 percent of the shares of Empresa Distribudora Electrica Este (EDE Este), an electric distribution company in the Dominican Republic. The AES Corp. is a leading global power company that currently owns or has an interest in ninety four power facilities, totaling over 28,000 MW, in the United States, Canada, Australia, Argentina, Brazil, Dominican Republic, Panama, India, Pakistan, the Netherlands, Hungary, Kazakhstan, Mexico, China, and the United Kingdom. AES also distributes electricity to over 13 million customers in Brazil, Argentina, El Salvador and Georgia. In addition to having assets in excess of \$10 billion, the Company has more than \$5 billion of projects in construction or late stages of development. The AES Corporation is dedicated to providing safe, clean, low-cost electricity worldwide in a socially responsible way." <http://www.thefreelibrary.com/AES+Completes+Acquisition+of+Six+Power+Plants+in+New+York+With+Total...-a054638215> [6/7/2009 10:06:37 PM]

² The U.S. Department of Energy's Energy Information Administration ("EIA"), in the documentation that describes its forecasting model of the electric industry, identifies that various types of costs are incurred by generators and must be recovered over time by the generator in order to remain in business: "It is well known that the optimal spot price is equal to the marginal cost of electricity. In this model, the costs of generation to be covered comprise (1) the marginal operating

The McCullough memo makes inappropriate assumptions about both costs and revenues in estimating the true costs to own and operate a power plant

Additionally, the McCullough analysis makes many other non-transparent assumptions to address the fact that data important to the analysis are not available in the public domain. Although the memo references a number of sources of information about individual plants' revenues and expenses in 2008, the types of information actually contained in those sources do not provide sufficient information to estimate plant profitability in a reliable way.

The first data problem (associated with treatment of fixed costs) was identified above; the McCullough report has not addressed this issue in an appropriate way. A second problem relates to the report's treatment of many variables costs. For example, the McCullough analysis uses industry-wide fuel price information to indicate the actual fuel prices of individual plants. While many analysts have to resort to industry-wide information about fuel prices to estimate power plant costs in particular regions or markets, analysts are typically more cautious when they suggest that these general costs are the specific charges faced by a specific plant. By contrast, Mr. McCullough makes many assumptions based on quite-general information and then ascribes cost information to the operations and profitability of particular plants. And yet, understanding a particular plant's specific costs is necessary to understand its particular profitability. The same concern mentioned about challenges to obtain plant-specific fixed-cost and fuel-price information is relevant for estimating a power plant's other expenses. Does the owner of the plant have an O&M contract with a third party, which obligates the owner to incur monthly costs whether or not the plant is dispatched in a particular hour? Does the plant have a long-term fuel-price contract? Does the owner buy its fuel on the spot market? Does it have contracts requiring it to pay to reserve space on fuel delivery systems (e.g., natural gas pipelines) whether or not the plant actually operates and ends up consuming fuel? Does it have a contract with another party to manage wastes from the plant, with some of the costs not tied to actual output of the plant? Mr. McCullough's analysis asserts profitability estimates for actual power plants without having answers to these types of important questions.

costs, including maintenance and marginal general and administrative (G&A) costs, (2) taxes, and (3) a reliability price adjustment equal to the marginal cost of unserved energy.... There is no explicit representation of capital recovery in the competitive price of electricity generation, *as capital and all other costs must be recovered from the difference between the market clearing price and the operating cost of each unit.*" (Emphasis added. EIA, Office of Integrated Analysis and Forecasting, "The Electricity Market Module of the National Energy Modeling System Model Documentation Report," DOE/EIA-M068(2008), September 2008, page 154.) In further explanation of these costs, EIA states that "Unserved energy is the difference between supply and demand during periods when, at a given price, demand exceeds supply. Expected unserved energy is a derived quantity based on the expectation of the joint stochastic distribution of supply and demand. Expected unserved energy does not imply a system failure. Rather, it is an expected value calculated from an uncertain amount of generating capacity and an uncertain level of demand for each pricing period." (page 155.)

Finally, on the revenue side, the McCullough memo allocates revenues for an owner's many plants to the individual plants in question using a measure of the plant's size relative to the other plants. This is problematic for a number of reasons. For example, New York's wholesale electricity markets are locational, meaning that power plant owners are paid in the hourly energy markets an amount of money that varies by the plant's location on the electrical grid. Mr. McCullough's assumptions about revenue allocation overlook this important element that affects the payments to specific power plants in New York's electricity markets.

It is one thing to generalize about the cost characteristics of prototypical plants; but it is another thing to draw conclusions about the specific profitability of particular plants. Mr. McCullough draws inappropriately confident conclusions in light of the problems inherent in the data sources and assumptions he relied upon. Nowhere does his memo present the cautionary qualifications that would be appropriate when applying general information to the specific profitability of an individual power plant.

The McCullough memo uses an unrepresentative time period to estimate power plants' overall profitability

Mr. McCullough purports to calculate the profitability of plants by estimating returns for 2008, a single year of operation of the plants. This is problematic for at least two reasons. First, power plants are expensive to build, purchase, and operate, and an owner would be foolish to judge the profitability of its investment based on a single year of operations of the plant. Traditionally, utilities that invest in power plants under cost-of-service regulation do so in a framework that assumes that the owners will recover a return of and on their investment over a long period (e.g., over 40 years); depending upon sales of electricity in a particular year, the owner may earn higher or lower than its allowed returns. Non-utility owners or investors seeking to acquire or build a power plant may do so with financing covering a shorter time period (e.g., 10 years), but never based on a single year's returns. Much has been written about the power generation sector's susceptibility to "boom and bust" cycles,³ where there are very low returns during periods when there is an oversupply of capacity relative to demand, and where there are periods of higher revenues and returns during periods of tighter supply. The effects of these periods of higher and lower profitability are smoothed over a multi-year period. And in some instances, the effect of the low-profitability years has been financially crippling for some investors in the power plant sector. For example, not too long ago, many of the owners (or recent owners) of the specific New York State power

³ CERA, "Power Plant Valuation Cycles: Living with the Boom-and-Bust Cycle," May 2007; Todd Filsinger, PA Consulting, "Power Market Business Cycles and an Outlook on Asset Valuations," May 2005; Global Energy Decisions, "Merchant Energy: the Long Climb Back to Profitability," 2004.

plants analyzed in the McCullough memo either filed for bankruptcy protection or faced extreme financial challenges at one point or another over the years since 2000.⁴

Second, the one year that Mr. McCullough studied – 2008 – was a year in which prices in New York State’s wholesale electricity markets were at their highest.⁵ For example, the annual average cost of purchasing wholesale power in the daily energy and ancillary

⁴ See, for example, AES, NRG, Dynegy, PGE-NEG (the prior owner of Athens), Constellation – all of whom have experienced financial difficulty (if not bankruptcies) since 2000. For example:

- “During 2001, AES went through an unusual and difficult experience, seeing a reduction in earnings as the result of the combined effect of currency devaluations in Latin America, soft electricity prices in the United Kingdom and the United States, and the cancellation of an acquisition attempt of a plant in the Mohave Desert, all hitting at the same time. Concurrently, in the post-Enron era global capital markets tightened and left AES scrambling for funds. The stock price fell from its high in the \$70s to a low of around \$2....Because of limited liquidity, capital spending has been reduced or delayed, costs were cut in the business around the world, and AES moved to reduce its exposure in certain markets and exist others, which contribute to undue risk.” Excerpt from page 62 of the chapter on AES Corporation in Adolf Haasen, *New Corporate Cultures That Motivate*, 2003.
- “NRG Energy Inc. filed for Chapter 11 bankruptcy reorganization yesterday, a long-expected action that includes a \$752 million commitment by its parent, Xcel Energy Inc., to help settle debts. In its filing in United States Bankruptcy Court in the Southern District of New York, NRG said it expected operations to continue as normal during restructuring. ... NRG is the debt-laden wholesale power generating unit of Xcel, which is based in Minneapolis. It operates power plants in Queens and on Staten Island.” *New York Times*, May 15, 2003. <http://www.nytimes.com/2003/05/15/business/company-news-nrg-energy-files-for-bankruptcy-protection.html>
- “PG&E NATIONAL ENERGY GROUP, INC. To Reorganize Under Chapter 11 Protection: Action Taken With Support of Major PG&E NEG Creditors. As the next step in their ongoing restructuring efforts, PG&E National Energy Group, Inc. (PG&E NEG), PG&E Energy Trading Holdings Corporation (PG&E ET) and PG&E ET subsidiaries today voluntarily filed petitions for protection under Chapter 11 of the federal bankruptcy code.... As a result of the sustained downturn in the power industry and like a number of merchant energy businesses, PG&E NEG experienced a financial downturn. This caused the major credit rating agencies to downgrade credit ratings to below investment grade. Although PG&E NEG’s operating performance was solid during 2002, the company took a loss of \$3.4 billion for the year, including the impairment charges related to the planned sale, transfer or abandonment of investments associated with the merchant power generation operation. These were steps affirmatively taken to restructure the business.... Today’s filings follow months of aggressive actions by PG&E NEG and its subsidiaries to abandon, sell and transfer assets and significantly reduce energy trading operations in an ongoing effort to raise cash and reduce debt, whether through negotiation with lenders or otherwise. Efforts to date and as previously reported, include:... Agreement in principle to transfer three power plant construction projects - Athens Generating (Athens, NY), Covert Generating (Covert, MI), and Harquahala Generating (Tonopah, AZ) - to the respective lenders or their designees.” http://www.neg.com/news_20030708.shtml

⁵ NYISO press release of April 8, 2009: “NYISO: Wholesale Power Prices Drop to Lowest Level Since 2003. *Reduced fuel costs, lower demand, and competition contribute to power price decline.* The New York Independent System Operator (NYISO) reported today that wholesale electricity prices in New York State have dropped to their lowest level since 2003. The average cost of wholesale electricity in the state was \$45.63 per megawatt-hour (MWh) in March [2009]. The last time wholesale electricity prices were this low was in November 2003 when the average cost was \$43.40/MWh. The March prices are down from \$73.28 in January of this year.” Here are the prior years’ full year and year-to-date prices as of May of each year:

Average NYISO Price (Energy and Ancillary Services) (\$/MWh)		
	Full Year Average Price	Year-to-Date Average Price as of May
2009	n/a	\$53.89
2008	\$95.31	\$93.60
2007	\$80.29	\$79.86
2006	\$76.45	\$72.19
2005	\$93.89	\$71.56
2004	\$62.81	\$63.32
2003	\$62.39	\$68.83

Source: NYISO Monthly Reports, http://www.nyiso.com/public/documents/studies_reports/monthly_reports.jsp

services markets administered by NYISO in 2008 was \$95.31 per megawatt-hour (“MWh”). As of May 2008, the year-to-date amount was \$93.60/MWh. By contrast, the year-to-date amount as of May 2009 was \$53.89/MWh,⁶ or a 42-percent reduction in year-to-date average prices over that one-year period. All else equal, these high prices in 2008 would translate into relatively high revenues compared to prior years or the current year. These high prices were driven predominantly by record-high natural gas prices in the U.S. (Within the past year, the price of natural gas rose to all-time highs as well as 5-year lows in the space of a few months.⁷) These recent decreases in prices mean that revenues for power plants in New York’s wholesale energy markets have declined substantially since 2008, just as those in 2008 greatly exceeded prices (and associated revenues) in prior years.

The McCullough Report neither qualifies nor frames its conclusions in ways that would appropriately characterize the unusual character of electricity prices in New York in 2008; nor does it temper the conclusions that should appropriately be drawn from a one-year analysis of a long-lived capital investment.

The McCullough report ignores information that would otherwise undermine his assertion that non-economic bidding has affected the profitability of these plants

Finally, the McCullough Report alludes to a “combination of high fuel costs and non-economic bidding practices at the New York Independent System Operator (NY ISO)” as making “2008 a very profitable year for generators in New York.” In doing so, Mr. McCullough alleges misconduct in bidding behavior and outcomes that ignores a body of evidence that finds that New York State’s wholesale electricity markets are functioning properly.⁸ Additionally, Mr. McCullough disregards the presence of market monitoring and mitigation plans, policies, and practices that are under the supervision of federal regulators.⁹ These include procedures that automatically mitigate (e.g.,

⁶ Rana Mukerji, NYISO Monthly Market Reports for May 2009 and May 2008, page 4.
http://www.nyiso.com/public/webdocs/documents/studies_reports/monthly_reports/May_2009_MonthlyReport.pdf

⁷ Natural gas went to record-level prices of \$10.82 per mcf (in June 2008) and \$10.62 per mcf (in July 2008), thus exceeding the prior-record-breaking prices in the months following Hurricanes Katrina and Rita (\$10.33/mcf in September 2008, and \$9.89/mcf in October 2008). Prices in November 2008 (\$5.97/mcf), December 2008 (\$5.87/mcf) and January 2009 (\$5.15/mcf) were the lowest same-month prices since 2003. EIA Monthly wellhead price of natural gas, 1-1-00 through 1-1-09, in \$ per mcf.

⁸ See, for example: David Patton, Potomac Economics, Independent Market Advisor of the NYISO, “2008 State of the Market Report – New York Electricity Markets,” May 2009; see generally the May 1st, 2009 letter of Steven Whitley, CEO, NYISO, to Assemblyman Kevin A. Cahill, Chairman, New York State Assembly Committee on Energy, and Assemblyman Richard L. Brodsky, Chairman, New York State Assembly Committee on Corporations, Authorities And Commissions, with accompanying responses to questions (especially responses to questions 2, 5, 6, 8, 9, 10, 14, and supplemental information on these responses in Attachment A) (“May 1st, 2009 Whitley letter”).

⁹ “The NYISO’s Market Monitoring and Performance Department (“MMP”) and its independent Market Advisor monitor the New York markets for prices that appear to be inconsistent with competitive market outcomes and investigate any such prices to determine whether they may have resulted from market manipulation or gaming of the market rules. If the NYISO were to identify a possible instance of “market manipulation” [footnote in the original: “Market manipulation” is

modify) certain out-of-line bids if they exceed a “reference level” prices by a pre-defined amount.¹⁰

Conclusion

In sum, Mr. McCullough’s assessment is seriously flawed. Its calculations are incomplete. The author draws conclusions unsupported by the data upon which he relies. These problems entirely undermine the validity of his estimates, and contradict his representation that his conclusions are conservative. Together, the many technical faults with his methodology render his conclusions unreliable for understanding the profitability of power plants in the State of New York.

defined by FERC, in 18 C.F.R. § 1c.2, as conduct affecting markets through fraud or deceit, such as material misstatements or omissions. Whether or not particular behavior constitutes market manipulation is a determination that can only be made by FERC. The NYISO’s responsibility is to bring the behavior to the attention of FERC.] or gaming, it would inform the appropriate government agencies, including FERC and the New York PSC, provide notice to its stakeholders consistent with confidentiality requirements, and take action in accordance with its tariffs and FERC requirements to mitigate the harmful behavior.” May 1st, 2009 Whitley letter.

¹⁰ See generally the May 1st, 2009 Whitley letter, and in particular: “The NYISO has a number of procedures in place to address circumstances in which a seller seeks a higher price for its last block of output from a power plant. In particular, when the potential exists for a seller to exercise market power (as defined above), the NYISO will compare its offer to the offeror’s “reference level,” and if the offer exceeds the reference level by a defined amount, the NYISO will replace the seller’s offer with an offer at the reference level. The reference level reflects the out-of-pocket costs of the seller’s unit based on offers that were accepted during competitive periods when the seller did not have market power. When this occurs in New York City, which has relatively stringent thresholds to address local supply conditions, there is an automatic mitigation procedure (“AMP”) that automatically replaces the seller’s offer with an offer at the unit’s reference level.... The NYISO’s Market Mitigation Measures establish criteria and procedures for determining marginal costs. These determinations are made in connection with setting a contingent offer cap (called a ‘reference level’) for a resource that might otherwise be able to affect market price outcomes by exercising power that should not otherwise affect competitive outcomes. (In organized markets, such power is known as “market power.”) The reference level is intended to reflect the generator’s marginal cost. Generator offers are routinely examined to ensure that market prices remain at competitive levels when the potential exercise of market power could otherwise enable a seller to raise prices. When transmission constraints or other conditions give rise to concentrated market conditions in which sellers might be able to exercise market power, those sellers’ offers are subject to being capped at the appropriate reference level....”