ORIGINAL

# BEFORE THE
# FLORIDA PUBLIC SERVICE COMMISSION

## DOCKET NO. 991462-EU
## Florida Power & Light Company

## Petition for Determination of Need
## For an Electrical Power Plant
## In Okeechobee County by
## Okeechobee Generating Company, L.L.C.

## Supplemental Testimony of
## Samuel S. Waters

**BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION**

**FLORIDA POWER & LIGHT COMPANY**

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**MARCH 9, 2000**

**Q. Please state your name and business address.**

A. My name is Samuel S. Waters and my business address is 9250 West Flagler Street, Miami, Florida 33174.

**Q. Have you previously testified in this docket?**

A. Yes.

**Q. What is the purpose of your testimony?**

A. My testimony addresses the modeling performed by Dr. Nesbitt, and what I consider to be a fatal error in his approach, rendering his conclusions on savings produced by OGC's proposed project meaningless. I will discuss how the market model used by Dr. Nesbitt fails to reflect the way customers in Florida actually pay for power

either retail or wholesale. I will also discuss the implications of the erroneous model, and why the Commission cannot rely on the results of Dr. Nesbitt's analysis to make any determination of the project's economics. My conclusions are based on a review of Dr. Nesbitt's testimony, and the inputs to his model. (Thus far, FPL has not been able to duplicate Dr. Nesbitt's results using his model even under his guidance. Therefore, I am not addressing specific data or modeling deficiencies at this time.)

**Q. Please describe what you believe to be the fatal error in Dr. Nesbitt's analysis.**

A. Dr. Nesbitt begins the description of his model by calling it "market based" (page 4, line 6). He further states that his NARE model "represents market clearing prices in each region" (page 57, lines 15-16).

Clearly, his market clearing price methodology is the heart of his model, and an examination of how it is used illustrates why his analysis is flawed. Dr. Nesbitt presumes that all producers receive, and thus all customers pay, market clearing price for all MWH sold, rather than the

actual cost of energy. This is a fatal error since it does not reflect reality.

**Q. Please expand.**

A. Let me begin by discussing two of Dr. Nesbitt's exhibits, Exhibit DMN-10 and Exhibit DMN-21. Exhibit DMN-10 purports to show the Price Reduction and Economic Benefits of the Okeechobee Project. As described by Dr. Nesbitt, the supply curves shown represent the "supply stacks" before and after OGC's proposed project enters the market (page 96, line 8-11). The market clearing price is the point where supply and demand curves intersect. He further states:

> The figure quantifies the economic benefit that the consumers in Florida receive as a result of the entry of the Project (the sum of areas A + B + C), which represents the price reduction that will be enjoyed by existing customers (A + B) plus new customers (C) . The figure further quantifies the economic benefit that the producers in Florida receive because of the entry of this Project (areas E + F – A), which represents the increased profit from serving old customers at the lower cost of the Project ... ( page 98, line 14 to page 99, line 2).

Now, turning to Exhibit DMN-21, I assume that this is the "supply stack" Dr. Nesbitt refers to in Exhibit DMN-10. It appears to represent the dispatch costs he attributes to the generating units in his model, although this is not at all clear from his testimony.

Putting all this together, I draw the following conclusions regarding Dr. Nesbitt's analysis.

- All customers pay, and all producers receive, the market clearing price for all electricity produced to meet load.
- The market clearing price is set to the marginal fuel cost plus Dr. Nesbitt's O & M unjustified adders for each load segment represented in Dr. Nesbitt's model.
- Producers get to keep the difference between their actual cost of production and market clearing price as margin in Dr. Nesbitt's model. This margin is the only means by which all producers recover fixed cost and any profit.
- Dr. Nesbitt's model does not recognize customer payments in the form of either base rates or fuel cost recovery.

These conclusions show that Dr. Nesbitt's analysis is fatally flawed. Dr. Nesbitt has modeled a market that does not exist in Florida. Dr.

Nesbitt's analysis cannot be relied upon to judge the economic impact of the OGC project.

Q. **What are the implications of the modeling that Dr. Nesbitt has done?**

A. There are several implications to his model, and they demonstrate just how far from reality his model is.

First and foremost, his model is incapable of distinguishing between competing new alternatives on an economic basis. Any alternative that is the same size, has the same availability, and has the same or lower dispatch cost as the OGC unit would produce the same market clearing price as OGC. For example, the same size generating unit, 550 MW, but nuclear instead of natural gas fired combined cycle, with the same 93% availability and a $5/MWH instead of a $18 MWH dispatch cost, would produce exactly the same market clearing price as OGC. Under Dr. Nesbitt's approach, consumers "would be indifferent" and would not benefit from the lower dispatch cost. Note that consumers would not see any benefit from the reduced dispatch cost, and Dr. Nesbitt's model would not guarantee any wholesale price suppression "or" savings to customers; the only effect of decreasing

the dispatch price would be to increase the "profits" to the producer. In such a case, the nuclear unit owner would receive more margin. The fact that consumers would be indifferent to whether the unit to be added was a nuclear unit such as I described or the proposed OGC unit shows the basic approach used in Dr. Nesbitt's model to be nonsensical. Of course, there are other variations that would produce the same or similar results and thus further illustrates that the model does not perform the task that it is stated to perform.

Second, his model has retail customers paying twice for all the fixed costs associated with existing generation. Dr. Nesbitt assumes that producers keep the difference between production cost and market clearing prices. Under his approach, this margin is the only means by which producers recover fixed costs and profits. Dr. Nesbitt, however, ignores that most producers recover fixed costs through base rates. Unless Dr. Nesbitt is assuming a fundamental market restructuring in Florida, his approach has fixed costs being recovered twice; once in his margin and a second time in base rates (unless he is presuming without telling the reader there is no longer base rate recovery).

Under current regulation, retail customers pay for the actual cost of fuel through rates; retail customers do not pay a marginal fuel cost based "market clearing price". Dr. Nesbitt's model has retail customers paying over $30/MWH for energy versus the $18-20/MWH they have been paying. (FPL's current fuel recovery factor for residential customers would be about $18.70 for 1000 kwh). His "savings" are actually based on an assumed starting price that is nearly twice that now paid by retail customers. This is like a department store sale where prices on items are first doubled, then marked 20% off.

Third, the effect on wholesale customers is similar to that on retail customers. Rather than wholesale customers paying an actual embedded cost for power, which is the basis for most Florida wholesale transactions, under Dr. Nesbitt's approach wholesale purchasers are paying system marginal fuel costs plus Dr. Nesbitt's unsupported adders. The effect on a specific wholesale transaction would depend on the contract or terms under which the transaction is made; but the model, again, does not reflect reality in the Florida wholesale market.

Fourth, while it is not discussed in the results of the modeling, the market model assumed by Dr. Nesbitt would result in very high costs to

consumers and enormous windfall profits to producers in the event of price spikes. For example, should there be a shortage of capacity during peak, and prices spike to $200/MWH or more (which is conservative given events elsewhere in the country under market-based pricing), all customers would pay and all producers receive $200/MWH for all of the energy generated during the period the price spike lasted. So, rather than have a few MWH purchased at $200/MWH, and the cost spread over all MWH during the period, all MWH are priced to retail customers at $200/MWH. Obviously, there would be no savings in this situation when compared to the way pricing is done in the current market.

In fact, all of these examples illustrate that Dr. Nesbitt's model bears absolutely no resemblance to the existing retail or wholesale market in Florida.

**Q. Can you demonstrate, using Dr. Nesbitt's methodology, how far his results are from reality?**

A. Yes, and I will begin a brief review of the essential features of his model.

**Q. What are the essential features of the Nesbitt Method in its calculation of "wholesale price suppression" and the $111.5 million in annual "savings" from the OGC facility.**

**A.** The first essential feature is that in calculating "wholesale price" which is the basis for the calculated "price suppression," Dr. Nesbitt totally ignores that rates charged to customers are based on actual cost. Instead, and without justification or even explanation, Dr. Nesbitt constructs an artificial system that overstates prices. The second essential feature of Dr. Nesbitt's method is the companion presumption that customers would actually be required to pay his artificially high energy prices based on market clearing prices. This gives rise to the third essential feature, which is the presumption that all suppliers of energy are paid for all energy supplied at the resulting artificially high energy prices.

**Q. What is artificial about Dr. Nesbitt's method?**

**A.** First, let me describe the cost recovery "method" used in Florida and Dr. Nesbitt's Method and then I will address why his method is artificial.

The Florida cost recovery method begins with the identification of generating sources available to meet a given level of load. Consistent with the principles of economic dispatch, a supply stack is built with the least expensive sources being placed in operation first or, "at the bottom of the stack."

The supply stack reflects the amount of generation available at any given level of dispatch. Obviously, because the supply stack is arranged to reflect the cheaper generation source operating first, the unit cost of additional generation increases as the level of electrical load that must be served with the identified generation sources increases. This concept can be illustrated easily with the following table.

| | | Cumulative | Cumulative | Cumulative |
|---|---|---|---|---|
| **Supply Stack** | | **Load Level** | **Total Cost** | **Average Cost** |
| $/MWH | MW avail. | MW x 10 hrs. | | $/MWH |
| $50 | 50 | 3,800 38,000 | $625,000 | $16.45 |
| $40 | 250 | 3,750 37,500 | $600,000 | $16.00 |
| $30 | 500 | 3,500 35,000 | $500,000 | $14.29 |
| $20 | 1000 | 3,000 30,000 | $350,000 | $11.67 |
| $10 | 1000 | 2,000 20,000 | $150,000 | $ 7.50 |
| $5 | 1000 | 1,000 10,000 | $ 50,000 | $5.00 |

Looking at this table representing the Florida cost recovery method, we see that the cheapest generation which cost $5.00 per MWH would operate first and, if load were 1,000 MW for ten hours, the total cost would be $50,000. Then, if the load level reached 3,500 MW and lasted for 10 hours, the generation costing $10 per MWH, $20 per MWH and $30 per MWH would also have to be dispatched so that the 3,500 MW load could be served. Reading across the table, we see that at this level of load, the cumulative total cost is $500,000 and the average cost is $14.29 per MWH. The cumulative average cost is simply the total cost (in this case $500,000) divided by the cumulative load (in this case 35,000 MWH). Thus, we can see that as increasingly expensive generation becomes necessary, the average cost increases to reflect the increase in MWH and cost of each added level of electrical load.

**Q. But your example shows load up to the level of 3,800 MW or 38,000 MWH for a ten hour period and shows that the last segment of generation costs $50 per MWH.**

A. Yes. And that is illustrative of a not unusual circumstance. The last block of generation necessary and available to serve peak loads is

typically available in smaller amounts and necessary in smaller amounts.

Importantly however, we see that the last 500 MWH (the 50 MWs for 10 hours) costing $50 per MWH only increases the total cost by $25,000 or 0.447 per MWH on average.

This supply stack and load illustration demonstrates that in Florida: rates are based on average cost, customers only pay rates that recover costs; and producers of electricity are paid their costs incurred to produce that electricity. Thus, if a producer's cost of production were $10.00 MWH, then that facility would be compensated at that rate and no more. This is the cost recovery method used in Florida.

**Q. Will you now describe Dr. Nesbitt's Method and contrast it to the cost recovery method used in Florida.**

A. I am going to use the same format as I used for my previous example showing the same supply stack, MWs available and the same cumulative load level. However, the cumulative total cost and the

cumulative average cost in $/MWH are significantly different under Dr. Nesbitt's procedure.

| Supply Stack | | Cumulative Load Level | | Cumulative Total Cost | Cumulative Average Cost |
|---|---|---|---|---|---|
| $/MWH | MW avail. | MW x 10 hrs. | | | $/MWH |
| $50 | 50 | 3,800 | 38,000 | $1,900,000 | $50 |
| $40 | 250 | 3,750 | 37,500 | $1,500,000 | $40 |
| $30 | 500 | 3,500 | 35,000 | $1,050,000 | $30 |
| $20 | 1000 | 3,000 | 30,000 | $ 600,000 | $20 |
| $10 | 1000 | 2,000 | 20,000 | $ 200,000 | $10 |
| $ 5 | 1000 | 1,000 | 10,000 | $ 50,000 | $ 5 |

Remember, in describing the first chart which sets forth the Florida cost recovery method, I pointed out that when the load reached the level of 3,500 MW for 10 hours that the Cumulative Total Cost is $500,000 (the sum of all actual costs to that load level). Under the Nesbitt Method the resulting cumulative total cost is $1,050,000 or more than double the actual assumed cost. Similarly, at the 38,000 MWH load level, the Cumulative Total Cost under the Florida cost recovery method is $625,000 or $16.45/MWH on an average cost basis. In stark contrast, under the Nesbitt procedure the cumulative

total cost at the 38,000 MWH load level is $1,900,000 or three times as much as the Florida cost recovery method.

**Q. What's the reason for this difference?**

**A.** Dr. Nesbitt does not use actual cost to determine total cost. Instead, Dr. Nesbitt uses Market Clearing Price. Market Clearing Price (despite the language about intersecting supply and demand curves) is nothing more than the cost of the most expensive power necessary to meet a given load level.

Thus, at the level of 3,500 MW, which produces the 35,000 MWH (because it lasts for 10 hours), we see that the most expensive power necessary costs $30 per MWH. Similarly, at the 3,800 MW load level, which produces the 38,000 MWH, the most expensive power necessary costs $50 per MWH.

**Q. But, that is the cost of that most expensive source of generation, *how does that produce the $1,900,000 cost to serve the load of* 3,800 MW for 10 hours?**

A. Because, as I pointed out before, the three essential features of the Nesbitt method are: First, in calculating the "wholesale market price suppression" one is to totally ignore that rates charged to customers are based on actual costs. Second, Nesbitt simply assumes --or would impose the requirement that customers pay the artificially high price based on his Market Clearing Prices. Third, Nesbitt simply assumes—or would impose the requirement that all suppliers of energy are paid at the artificially high energy prices flowing from Market Clearing Price.

**Q. In the example that you used, the last increment of capacity necessary to the 3,800 MW load level was 50 MW on only slightly more than 1.3% of the total capacity. How does that influence the total cost calculation of Dr. Nesbitt to the extent you describe?**

**A.** Simply because he chose to have it operate that way. Thus, because under Dr. Nesbitt's Method the total system cost is market clearing price in $ per MWH times total generation in MWH, the $50 per MWH power (the 500 MWH over 10 hours) is multiplied by not only that 500 MWH associated with the facility on the margin, but also the 37,500 MWH that was already produced at a lower dispatch, or actual cost.

Thus, the result flows from the following two relationships.

$50 per MWH (for 50 MW) x 500 MWH = $25,000

$50 per MWH (for existing 37,500 MWH) x 37,500 MWH = $1,875,000

**Q. Isn't Dr. Nesbitt's Method of Market Clearing Prices much more complicated than you have described?**

A. It is a little more complex. For instance, Dr. Nesbitt's procedure was to divide the Florida Peninsula into 12 transmission regions and use ten separate energy supply periods for each month for each region. So, as you can see, this produces multiple opportunities to calculate Market Clearing Price because it is used for each of these transactions. Another added complexity is that Dr. Nesbitt's Method also contemplates the wheeling of power from one transmission region to another and he applies both loss factors and transmission or wheeling charges to get the energy from one region to another. These added assumptions of losses and wheeling rates are not presented in evidence or justified.

**Q. What is the next step in the calculation of "wholesale price suppression" or savings under the Nesbitt procedure?**

**A.** What I presented to show the Market Clearing Price Approach represents the "Before OGC Case" and shows Dr. Nesbitt's calculation of costs he believes customers would or should bear absent OGC.

The "After OGC Case" is supposed to measure the effect under Dr. Nesbitt's procedure of making the OGC energy available. Remember that the "Before" Case had a "supply stack" showing "$/MWH" and "MW available." I now insert a new "block" of 100 MW representing OGC generation at a dispatch cost of $25.00 per MWH. Since the load is only 3,800 MW, the 50 MW costing $50/MWH and 50 MW of the 250 MW costing $40/MWH drop out or are eliminated as unnecessary, and the following supply stack results:

| Supply stack | | Cumulative Load Level | Cumulative Market Clearing Price | Cumulative Average Cost |
|---|---|---|---|---|
| $/MWH | MW avail. | MW x 10 hrs. | Total Cost | $/MWH |
| $50 | 50 | | | |
| $40 | 200 | 3,800 38,000 | $1,520,000 | $40 |
| $30 | 500 | 3,600 36,000 | $1,080,000 | $30 |
| $25 | 100 | 3,100 31,000 | $ 775,000 | $25 |
| $20 | 1000 | 3,000 30,000 | $ 600,000 | $20 |
| $10 | 1000 | 2,000 20,000 | $ 200,000 | $10 |
| $ 5 | 1000 | 1,000 10,000 | $ 50,000 | $ 5 |

We now see that the cumulative Market Clearing Price Total Cost is $1,520,000 in the After OGC Case for 3,800 MW of load and 38,000 MWH. The Before OGC Case had a cumulative Market Clearing Price Total Cost of $1,900,000. Thus, under the Nesbitt procedure, the so called price suppression is $10 per MWH (MCP of $50 minus MCP of $40) and the calculated wholesale savings is $380,000 ($1,900,000 minus $1,520,000). Another way to show the calculation of the wholesale savings is to multiply the $10 per MW wholesale price suppression by the total "Net Energy for Load" of 38,000 MWH.

Q. **Isn't it true that in your example the 100 MW or 1000 MWH of generation "from OGC" displaced more costly generation?**

**A.** Yes. However, to illustrate what actually happens under Florida's actual cost recovery, I will set out the amount and cost of the energy displaced and subtract the dispatch cost of the OGC energy.

50 MW x 10 hrs. = 500 MWH at $50 per MWH = $25,000
50 MW x 10 hrs. = 500 MWH at $40 per MWH = $20,000
Total cost displaced: $45,000

Minus OGC cost:

100 MW x 10 hrs. = 1000 MWH at $25 per MWH = $25,000

Net actual savings: $20,000

Thus, if OGC sold its 1,000 MWH at its dispatch cost of $25 per MWH, the savings would actually be $20,000, not the $380,000 Nesbitt's procedure develops.

**Q. Using Nesbitt's model, wouldn't OGC be paid the $40 per MWH Market Clearing Price?**

A. Yes. But the real reason the Nesbitt procedure would produce the $380,000 of "savings" is, as I pointed out at the beginning: Dr. Nesbitt ignores actual costs. Instead, he presumes that all customers would be required to pay the artificially high energy prices based on Market Clearing Price before and after OGC. Also, he presumes that all suppliers of energy are paid at the same artificially high energy prices resulting from Market Clearing Prices.

**Q. What does Dr. Nesbitt say about this level of savings compared to the actual displacement based on actual costs?**

**A.** Nothing. First, Dr. Nesbitt never acknowledges that his procedure was a method different from the actual cost method used in Florida. Of course, he never explains that he is not trying to replicate the existing market or to fit OGC into the existing market. Similarly, Dr. Nesbitt's testimony and documents do not fully describe or justify the Market Clearing Price Procedure that I have now determined he used. Of course, he therefore never justifies the use of the procedure he used. Instead, his justification has, from the standpoint of his testimony and documents, been a virtual secret.

**Q. But doesn't Dr. Nesbitt testify that the OGC Project will provide "direct economic benefits" to "FRCC ratepayers."**

**A.** Yes, he does (see page 103 of Nesbitt direct). Not only does he say these benefits are direct to FRCC ratepayers, but also he says that these "colossal" benefits:

> "...will accrue directly to FRCC ratepayers in the form of electric bills that are lower than they otherwise would be."

Nesbitt Testimony at page 104. These "colossal" benefits are partly a function of Dr. Nesbitt's Market Clearing Price approach. They do not reflect Florida's actual market structure or how wholesale energy is priced and how wholesale generation costs are recovered. Stated simply, his "colossal " benefits are artificial, the manufactured product of his methodology.

**Q Can the Commission draw any conclusions from Dr. Nesbitt's model?**

A No, absolutely none. There is no way to extrapolate, correlate, extend, hypothesize, or even guess what the true price effects on Florida customers might be. Since the market presented in Dr. Nesbitt's model does not now exist, nor is it forecasted to exist at any time in the near future, the results simply cannot be used for any purpose.

This is not a matter of a difference in assumptions that might change the amount of savings. This is about methodology, and the wrong methodology makes it impossible to judge whether or not there are <u>any</u> savings. As I pointed out in my previous testimony, the Commission evaluates whether an alternative is most cost-effective. In this case,

Dr. Nesbitt's model is incapable of determining if an alternative is the most cost effective at all.

**Q. Would you please summarize your testimony.**

A. The economic analysis presented by Dr. Nesbitt is fatally flawed for the following reasons:

- It does not reflect a market that exists, or is forecast to exist, in Florida. It assumes all customers pay marginal cost for all energy consumed.
- It overstates the costs of energy to customers, and bases the calculation of "savings" on the overstated costs.
- It assumes all margin between variable cost and market clearing price goes to producers, regardless of price, allowing windfall profits above cost to be retained.

For these reasons, the Commission should not rely upon Dr. Nesbitt's analysis to make any judgment on the economic effects of the OGC project on Florida customers.

**Q Does this conclude your testimony?**

A Yes, it does.