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#### Aggregate Construction Cost Index Evaluation Performed for Gainesville Regional Utilities February 2009

#### Introduction

The purpose of this evaluation is to review work GRU has performed to date to develop a construction cost index that can be utilized for cost escalation purposes in GRU's proposed contract with American Renewables. The scope of work outlined in this report will review this work, provide other index based format options, as well as alternatives to the utilization of pure index based escalation.

#### **Evaluation Methodology**

The following activities were performed in the development of the observations and recommendations provided. The steps performed in the process were as follows;

Reviewed all data and correspondence provided with the task direction dated January 23, 2009 and subsequent follow up with GRU

Reviewed GRU's original RFP, redacted binding proposal received from American Renewables, and the published GRU evaluation and recommendations

Reviewed both national and regional Bureau of Labor Statistics indices and associated databases applicable to this project

Reviewed market based data for critical commodities typically used in power plant construction

Utilizing experience gained from successfully negotiating and managing large scale full and partial requirement wholesale power contracts and merchant purchase power agreements, compiled and assessed the available information from both an academic and transactional perspective

Observations and recommendations are outlined in the following format:

Evaluation of the proposed indices consistent with the project task assignment

General comments and recommendations for alternative approaches to index based escalation

Alternative recommendation for construction project cost management

#### **Evaluation of Proposed Indices**

An escalation index should accurately represent changes to costs or prices that occur over a specific period of time.

Although information was not available to determine the basis for indices chosen or their weighting, it is assumed that the proposed methodology is an attempt to approximate the true changes to the cost of construction rather than to capture new pricing opportunities. In this regard, general comments related to the proposed index are as follows;

The proposed index represents a weighted compilation of a variety of commodity, finished goods, partially finished goods, professional and craft labor, aggregate indices and currency. It is recommended that a consistent format be utilized. Commodity based, finished goods based, or an industry recognized aggregate index that is inflation adjusted are options which can be considered.

The greatest contributors to cost volatility over the short term are changes in price for raw materials. The proposed index includes only Diesel and Concrete Raw steel, nickel, copper, and aluminum are commodities used heavily in power plant construction. Although partially finished steel indices are proposed, the weighting seems modest.

The indices as recommended appear duplicative. For example, two of the largest contributors to the index, the Manufacturing AHE and Manufacturing PPI have an overlapping effect in that Manufacturing AHE, the measurement of the cost of labor to produce finished goods, should already be imbedded in the Manufacturing PPI which represents the price for finished goods. The influence of raw material prices and exchange rates should already be imbedded as well although it would be reasonable to expect finished goods indicators to lag the actual volatility of the raw materials from which they were produced.

In general, manufacturing and finished goods indices should be nationally based. Construction labor should be regionally based as there are substantial differences between regional and national averages. Assuming that man-hours for the project were reasonably budgeted, the greatest cost exposure is labor productivity.

Recognizing that engineering for environmentally sound projects is mature and that the wage rates movements are relatively stable, the value of using this index is questionable. Engineering for a tightly scoped project is typically performed at a fixed price as productivity has a greater effect on outcome than a change in wage rate.

The Handy-Whitman index is a nationally recognized aggregate indicator of regional construction cost. It is widely used in the regulatory arena to support price changes in power related capital projects. As the data is typically provided in real dollars, inflation adjustment is necessary. In the absence of a compelling argument for a more accurate alternative, the Handy-Whitman index could be used as the primary mechanism for any proposed price change.

It is recommended that GRU utilize the most appropriate aggregate Handy Whitman index available for public construction projects in the Southeast. As an aggregate index should already have reasonable weightings for the contributors to total project cost, additional escalation provisions should not be necessary.

The Euro to US dollar exchange rate should already be imbedded in the indices for the cost of manufactured goods and consideration should be given to the removal of this index.

The fixed indicator should be removed unless its need can be substantiated.

As GRU has already noted, the proposed escalator applied to the timeframe that would have affected pricing cannot substantiate a requested **sector state of the sector state** increase. An additional analysis was performed utilizing the proposed weighted index to determine levels of cost impacts that could have occurred in the timeframes that pricing was discussed with American Renewables.

The analysis was performed assuming a November 2007 basis for the initial RFP response, a March 2008 basis for the binding submittal submitted in April, a June 2008 basis for the July request for the submitted of the analysis of the submitted basis for discussions that are ongoing at this time. The results were as follows:

| November 2007 to March 2008    | Price increased 3.23% |
|--------------------------------|-----------------------|
| November 2007 to June 2008     | Price increased 5.96% |
| November 2007 to December 2008 | Price decreased 2.00% |

The above three comparators are all based on the assumption that the prices originally submitted in November were sound. If the original pricing submitted is escalated based on the indices American Renewables has asked GRU to consider, the significant price ramp up that occurred in the spring and summer of 2008 have been fully mitigated at this time. In short, the price for the project should, as of December 2008, be 2% less expensive than the original price proposed.

#### **General Comments and Recommendations**

From a contractual standpoint, the use of automatic price escalators carries considerable risk. From the research performed, there appears to be no single index or compilation of indices that have excellent correlation with the underlying cost of construction. A second concern is the unstable state of the economy which could have consequences that cause even historically predictable indices to vary significantly from established norms.

It is therefore recommended that any index based automatic adjustment be capped to allow GRU the opportunity reexamine the project economics once a specified escalation level was exceeded. Should GRU and American Renewables prefer to remain with an index based format, the following alternatives are presented for your consideration. They are;

**Recommendation 1 Aggregate Index Approach:** Use the Handy-Whitman regional index for construction. Use of this index would represent a conservative escalation methodology as the index tracks cost trends over time, not short term volatility or peaks in market demand. Of the Handy Whitman indices available; it is recommended that -GRU select the index which best approximates the cost of construction (primarily labor) in the Southeast as the cost in this region can be substantially different from other areas of the country.

Use CPI to adjust for inflation as the base index is stated in real dollars. Although this is probably the most conservative method of index based escalation, it is industry recognized and has stood up to regulatory tests of its applicability.

**Recommendation 2 Average Finished Goods Approach:** Use a weighted nationally based comprehensive manufactured finished goods index, a regionally based construction labor index, and the CPI to cover miscellaneous labor and materials.

**Recommendation 3 Industry Specific Finished Goods Approach:** Use specific finished goods (steel pipe and tube, heat exchangers and condensers, etc) related to power plant construction weighted in proportion to the typical quantity percentages utilized in the facility. Use the regional construction labor index and CPI for miscellaneous material and labor.

**Recommendation 4 Raw Material Commodity Approach:** Use raw material commodity based indices for steel, concrete, copper, nickel, and aluminum weighted to the typical percentages used in the facility. Use the regional construction labor index and CPI to cover miscellaneous material and labor. This weighted index has the potential for the greatest volatility and should only be considered if a cap on escalation is used in conjunction with this methodology.

Regardless of the index based methodology chosen, the basis by which escalation is applied to each major cost component of construction is also critical to accurately capturing cost impacts. Although an argument can be made that escalation should be applied from the date the project cost estimate was generated, real world cost exposure varies with the timing of major contract awards and their associated price provisions. Much of the cost exposure is either eliminated or guantified prior to receiving a Notice to Proceed.

## Alternative Approach to Construction Project Cost Management

In general, if a counterparty requests a change in the monetary value or scope upon which they were originally evaluated, the burden of proof should be on that counterparty to demonstrate how impacts could not have been anticipated in advance or that the use of industry accepted indices are not reasonable. Without reasonable transparency, it will be difficult for GRU to determine whether requested price adjustments are due to cost based impacts or represent an attempt to capture lost market opportunities. To the point that an extraordinary situation impacting price is demonstrated, the parties should work together in good faith to achieve a reasonable resolution. There are often a number of options that can be employed to keep a promising project moving forward.....or to terminate one if the risks are deemed unacceptable.

Recognizing that mitigation of risk is a fundamental goal for this project, the following alternative approach is recommended for your consideration;

| EPC Major Equipment | Fixed Price                 |
|---------------------|-----------------------------|
|                     | Fixed or specific escalator |

Major power block, turbine generator, and some associated balance of plant equipment are typically placed under contract early in the process. American Renewables specifically referenced this in their proposal data. It should be assumed that they retained options from their Texas project for additional units or that the templates for their contract obligations are well defined.

It is therefore recommended that the EPC component be fixed or indexed based on the actual escalation terms of American Renewables contract with the EPC provider, if those escalators are acceptable to GRU.

#### Engineering

#### **Fixed Price**

Engineering is predictable and well defined, especially for power projects that are not "first of a kind" units. As wage rates and typical engineering costs as a percentage of total project cost are predictable, the only uncertainties are major scope changes that occur as a result of environmental permitting requirements that were not anticipated in advance. With scope well defined, the true cost exposure is productivity which should be left as the responsibility of American Renewables.

It is therefore recommended that the Engineering scope be fixed.

#### **Construction Labor**

#### Fixed Price Regional labor index

Estimated man-hours and the target wage rate should be estimated and agreed upon in advance. Man-hour adjustments would only occur for changes in scope that may result from unanticipated permitting requirements.

Construction labor could be indexed based on BLS regional wage rates, a Handy Whitman equivalent index (if a labor specific index is available), or another index acceptable to the parties that has reasonable correlation the indices recommended. It should be fixed no later than when the Notice to Proceed is given as the contractor should take all productivity risk from that point forward.

#### Balance of Plant Miscellaneous Facilities/Buildings/Other

#### Regional aggregate index

These balance of plant facilities outside of the EPC scope of services can be escalated based on an aggregate Handy Whitman index but should be fixed at the time of contract award.

#### Need for Power and Permitting

#### **GRU Time and Materials**

It is recommended that GRU consider taking the lead role in the Need for Power application process and environmental permitting. This is the most difficult scope to define in advance along with its corresponding price exposure. In addition, this activity creates the greatest potential for schedule slip as well as requirements for significant investment in ancillary equipment and incremental operating costs over the life of the plant. Considering that this cost exposure will flow to GRU through the purchase power agreement and that GRU has a long standing and credible relationship with the regulatory agencies in Florida, the best opportunity for risk mitigation in this phase is to self perform the function. American Renewables would remain integral to the process and provide necessary support functions as required.

#### Conclusion

Although the American Renewable proposal to use an index based escalation mechanism is plausible, it is not without inherent risk. Correlation to the actual cost of construction does not carry the level of accuracy that an entity might typically utilize as a financial hedging mechanism.

If after an examination of available alternatives, an index based approach remains the preferable alternative, it is recommended that the parties utilize an industry recognized, regionally based aggregate index such as the Handy- Whitman Index adjusted for inflation. A compelling argument should be required for any hybrid index that is requested as an alternative.

In addition, index based adjustments should be applied and prices fixed as major procurements are completed to minimize residual escalator risks that could occur between contract award and Notice to Proceed.

Frederick F. Haddad Jr. President Haddad Resource Management LLC

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## Draft Report

## McGraw Hill Engineering News Report (ENR) Index Evaluation

## Introduction

Gainesville Regional Utilities has expended a considerable amount of time and effort to develop fair and reasonable construction cost indices to be used as price adjustment mechanisms in their proposed contract with American Renewables. Based on recommendations made in the Aggregate Cost Index Evaluation Study (HRM Feb 2009), the parties are willing to consider using established aggregate indicators such as an applicable Handy Whitman index. As an alternative, American Renewables has suggested the use of a McGraw Hill Engineering News Report (ENR) based index to take advantage of more frequent reporting than a Handy Whitman index would provide. American Renewables has also suggested a hybrid index which is a weighted combination of the **Engineering** 

The purpose of this evaluation is to review the referenced indices and provide recommendations to GRU for indices that could be utilized for construction cost related price adjustments to this contract.

## Study Methodology

The evaluation performed was divided into five subtasks identified as follows;

Subtask 1: Meet with GRU staff to review the Handy Whitman indices available to GRU under their license agreement

Subtask 2: Review the available Handy Whitman aggregate indices and provide recommendations as to which might be most representative of construction cost changes in Florida

Subtask 3: Review aggregate construction cost indices published by the McGraw Hill Engineering News Report and provide recommendations as to which might be most applicable to construction cost changes in Florida

Subtask 4: Review and evaluate the American Renewables proposed hybrid index to determine its suitability for construction cost escalation purposes.

Subtask 5: Compare the recommended ENR, and the American Renewables proposed hybrid indices to determine which indices best correlate to the preferred Handy Whitman index as well as construction costs in Florida. As indices are particularly sensitive to the base year utilized, comparative analyses are performed on an 8, 5, 2, and one year basis.

### Study Results

Subtask 1: Subtask 1 was completed on March 26, 2009 and resulted in a compilation of data through July, 2008. Although this data adequately captured the rapid escalation in costs experienced by the industry during this timeframe, more recent data would better reflect which index best captures the downturn the industry seen later in the year. With the assistance of GRU staff, the data was updated to January 2009 using the preliminary Handy Whitman Report No. 169.

Subtask 2: The Handy-Whitman Index of Public Utility Construction Costs is an industry recognized means of adjusting construction costs over time. The report is published on a semi annual basis and is divided into four major construction categories, with each category subdivided into six geographic regions. The indices for this study came from the Cost Trends for Electric Utility Construction, South Atlantic Region (Reference Table E-2). Although there are 43 individual and aggregate indices in this category, the two most applicable aggregate indices for this project were determined to be the Total Plant-All Steam Generation and the Total Steam Production Plant. The indices were charted over both a 10 year and 5 year period to determine which index better followed cost trends actually experienced, particularly the rapid rise and fall of prices during the 2008 time frame. Tables 1 and 2 show these results.

Table 1:



Table 2



Based on the comparative data generated within the scope of this analysis, it is recommended that the Handy-Whitman Total Steam Production Plant Index be utilized. It appears to both specifically include the materials and construction related to this project and

## HRM - Report B - Page 4 of 7

better emulates the significant upturn and downturns experienced recently in the industry. For purposes of the comparative analyses being performed in subsequent subtasks, the Handy-Whitman Total Steam Production Plant Index will be utilized.

Subtask 3: The McGraw Hill Engineering News Report provides historical aggregate indices for Construction Cost (CCI), Building Cost (BCI), Materials Price, Skilled Labor, and Common Labor based on a 20 city average. The construction and building cost indices represent a weighting of specific quantities of material, material cost, labor hours, and labor wage rates. The Materials cost indices represent a weighting of specific quantities and types of building materials only. The Skilled Labor and Common Labor indices track wage rates and benefits for specific trade's categories. The ENR also publishes Construction Cost and Building Cost Indices specific to each of the 20 cities as well.

For the purpose of this comparative analysis, the Building Cost Index appears to be the most appropriate as the weightings of specific materials and skilled labor are more applicable to electric utility construction than other available ENR indices. The 20 City Average BCI will be utilized as well as the Atlanta specific BCI to better reflect construction costs in the Southeast region.

Subtask 4: In addition to suggesting an ENR based alternative index, American Renewables has proposed a hybrid index.

Although the primary

weighting represents one of the ENR aggregate indices under consideration in this evaluation, it is questionable whether the LIBOR swap rate and US Dollar to Euro exchange rate are applicable to physical construction cost escalation. The LIBOR swap rate is typically applicable to variable and fixed rate financing or as a hedge for other financial transactions. Although an argument can be made that the currency exchange rate can affect pricing of materials and equipment purchased globally, the magnitude of this effect as it relates to material prices already included in established aggregate indices cannot be quantified. Including these financial escalators at a time when global economic instability has put common economic fundamentals in question introduces another element of price risk to GRU that arguably is unrelated to the physical cost of construction.

Although the appropriateness of this hybrid index is questionable, it has been included in the comparative evaluation for GRU's consideration. The 25 year LIBOR used in this analysis was generated as an average of the 20 year and 30 year rates supplied by Bloomberg.

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Subtask 5: An 8, 5, 2, and one year analyses were performed and the results shown in Tables 3, 4, 5 and 6 respectively.



Table 4

| ÷ |  |  |  |  |
|---|--|--|--|--|
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Table 5



As can be seen from the comparative analyses, the cost adjustment indices vary in correlation over time. In addition, indices are sensitive to the base year utilized for comparative purposes. The widest variation occurs when the American Renewables hybrid

## HRM - Report B - Page 7 of 7

index is compared to the established Handy-Whitman and ENR indices. 2008 and January 2009. Although this drives the cost adjustment index down to the benefit of GRU, it demonstrates the volatility of this sensitivity test was performed to determine how the hybrid index might be affected if the latest index data point remained steady. If the substantial change in the had not occurred, this index would have been over the substantial change in the had not occurred.

## Conclusion:

It is recommended that GRU utilize cost adjustment indices for electric utility power plant construction costs that are established in the industry for this purpose. This would allow GRU an easily identified index and a relatively straightforward calculation of cost changes related to this project. In addition, these indices are widely utilized in the regulatory arena and can be used as well to credibly support rate changes that may be required to support the project.

In that regard, it is recommended that the American Renewables hybrid index be avoided as it is not an industry recognized method for cost adjustment and would have to be validated to be defendable to both regulatory bodies and the public. In addition, the components have the potential to add significant volatility and ultimate cost exposure to GRU independent of construction material and labor costs specific to this project.

Of the nationally recognized indices available, it is recommended that the following indices be utilized;

Handy-Whitman Total Steam Production Plant Table E-2 Line 6

If an Engineering News Report index is preferred;

ENR BCI Atlanta ENR BCI 20 City Average time 0.95 would be a reasonable equivalent

HRM - Report C - Page 1 of 5



## **Draft Report**

## **Aggregate Construction Index Calculation**

Performed for Gainesville Regional Utilities April 2009

**Introduction:** As a result of Gainesville Regional Utilities ongoing negotiations with American Renewables, a new construction cost adjustment index concept was developed from the previous recommendations provided under Task 1 and Task 2 assignments. Under the Task 3 assignment to review the proposed purchase power agreement for this project, it was requested that a new Aggregate Construction Index definition be generated and incorporated into the draft PPA document. The following represents the evaluation of alternatives for the proposed index as well as recommended wording for GRU's consideration.

# Based on the current status of contract negotiations, the parties agreed to consider using a

American Renewables agreed to consider smoothing methodologies as GRU may suggest to reduce their exposure to short term volatility. The index for the month in which the Construction Commencement Date occurs would be compared to the index for April 2008, the base month to be used for price adjustment, as was proposed in American Renewables initial aggregate construction index. The percentage change in the index would be multiplied by the base non fuel energy charge to set the contract price for the ongoing fixed at the date of project commencement

**Study Methodology:** The study methodology involved the evaluation of three alternatives. They were;

1) Use of direct monthly data posted for the month in which the Construction Commencement Date occurs compared to the base month of



**Study Results:** The resulting calculations based on the three evaluated methodologies for the time period between April 2008 and March 2009 are shown on Chart 1.



### Chart 1

The use of the direct monthly data provides the most accurate representation of the changes to the **second second second** of the index. It also would result in the greatest exposure to volatility. This is of particular concern when considering that the **second** 

## HRM - Report C - Page 3 of 5

contract exposure than it is to the accurate depiction of construction cost changes in the Southeast. Both the **construction** as a whole as well as the use of only the first day of the month as the basis for this index component contribute to the volatility concern. The January 09 data point depicts the influence the construction of the constru

Construction Commencement Date occurred in this month's timeframe.

Use of the three month average for

09 peak). It does however introduce a substantial deficit beginning in April 2008 followed by a substantial premium beginning in November 2008. The three month average lags the actual construction cost changes in an increasing price market and represents a premium to actual costs in a declining price market.

The use of a hybrid calculation as depicted in Alternative 3 both depicts an accurate correlation to the trend in construction cost changes that were occurring in the Southeast as well as eliminating the spikes that can occur due to the volatility of the spikes that can occur due to the volatility. It accomplishes this without introducing a substantial deficit or premium as well.

An additional scenario evaluation was performed to test the sensitivity of the three alternatives to significant changes in the **sensitivity of the three** 

Chart 2 shows how the index calculation would be affected if the **second second second** 



All three index calculation methodologies are influenced by the hypothetical step change in the The chart shows the influence this component of the index can have, especially when considering that actual construction cost as depicted by the is still in decline.

**Conclusion:** The use of a calculation for the Aggregate Construction Index using the with the weighting and base month proposed, can be considered reasonable so long as the volatility introduced by the exchange rate can be dampened.

It is therefore recommended that the hybrid calculation methodology as described in Alternative 3 be utilized for this purpose. IF GRU concurs, the following definition can be used to replace the defined term Aggregate Construction Index in the proposed purchase power agreement. Use of this calculation methodology would eliminate the need for the defined term, Construction Cost Adder as the April 2008 base is already included in the new calculation for the Aggregate Construction Index.



Chart 2

energy charge to set the contract price for the ongoing fixed at the date of project commencement.

For example, if the Construction Commencement Date is in January 2010, the index would be calculated as follows;

| Aggregate     | Construction  | Index=           |              |                  |                 |                 |    |
|---------------|---|------------------|--------------|------------------|-----------------|-----------------|----|
| Notes:        |   |                  |              |                  |                 |                 |    |
|               | for Apri  | 1 2008           |              |                  |                 |                 |    |
|               |   |                  |              | for              | April           | 2008            | is |
| calculated or | the sum of t  |                  |              | for              | April           | 2008            | is |
| for Fe        | bruary 2008, N  | March 2008,      | and April 20 | 008 divided      | 1 by 3.         |                 |    |
| calculated as | the sum of | ne<br>December 2 | 009, and Jar | fo<br>nuary 2010 | r Jan<br>divide | 2010<br>ed by 3 | is |

The use of the hybrid calculation methodology as recommended represents a reasonable compromise based on the interests of the parties and the risk exposure that Gainesville Regional Utilities could incur.