

**Ruth Nettles**

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**From:** Richzambo@aol.com  
**Sent:** Sunday, August 10, 2008 1:10 PM  
**To:** Filings@psc.state.fl.us  
**Cc:** Karen Webb; Mark Futrell; Phillip Ellis; b\_may@cfifl.com; john.r.horne@mecsglobal.com; steve.davis@mosaicco.com; rmiller@pcsphosphate.com; ksimons@pcsphosphate.com; jebakach@cfifl.com; jay.brew@bbrslaw.com  
**Subject:** Dkt No. 080503 ---- FICA Data re: Existing and Potential Waste Heat Generations  
**Attachments:** 081108 FICA EXISTING per Revised FPSC RPS Date Request Form - AS FILED.doc; 081108 FICA POTENTIAL per Revised FPSC RPS Date Request Form - AS FILED.doc

**1. Attorney responsible for this electronic filing:**

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**2. Docket numbers and titles in which filing is submitted:**

DOCKET NO. 080503-EI -- In re: Establishment Of Rule On Renewable Portfolio Standard

**3. Party on whose behalf this filing is submitted:**

The Florida Industrial Cogeneration Association

**4. Total number of pages in filing:**

8 (eight) pages

**5. Document attached:**

Responses to FPSC Staff Data Requests. 2 (two) documents are included -- one addresses **existing waste heat** renewable energy generating capacity in Florida and one addresses **potential waste heat** renewable energy generating capacity in Florida.

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If you have any questions or require anything further in this regard, please do not hesitate to let us know immediately.

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DOCUMENT NUMBER-DATE

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SOURCE			
SOURCE	Company Name:		Florida Industrial Cogeneration Association
	Applicable Utility Service Area (if any)		Florida Power & Light, Progress Energy, Tampa Electric
	Energy Resource: (Individual Type)		Waste heat from sulfuric acid manufacturing process
	Energy Resource Type: (Category)		Waste Heat
	Resource Scale (Unit or Aggregate)		UNIT – Existing units from 8MW to 58MW (about 30 MW average)
	Unit Status (Existing or Planning)		Potential
COMMERCIAL AVAILABILITY			
COMMERCIAL AVAILABILITY	Typical Unit Annual Capacity Rating (MW)		Existing units range from 8 MW to 58 MW (about 30 MW average)
	Earliest Commercial In-Service Date (Year)		Existing
	Typical Construction & Permitting Time (Years)		Existing
	Useful Life of Unit (Years)		30 years
	Fuel Type		<b>No fuel</b> used except minimal natural gas or oil for startup
PERFORMANCE CHARACTERISTICS			
PERFORMANCE CHARACTERISTICS	Contribution to Summer Peak Demand (MW)		Existing units range from 8 MW to 58 MW (about 30 MW average)
	Contribution to Winter Peak Demand (MW)		Existing units range from 8 MW to 58 MW (about 30 MW average)
	Average Annual Heat Rate (BTU/kWh)		Not applicable/available(3)
	Equivalent Availability Factor (%)		95%
	Average Annual Generation (MWH)		Estimated at 210,000 MWH for average 30 MW unit size
	Resulting Capacity Factor (%)		Approximately 80%(2)

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ENVIRONMENTAL CHARACTERISTICS					
ENVIRONMENTAL CHARACTERISTICS	Emission Rates	Carbon Dioxide (CO <sub>2</sub> )	(lb/kWh)	<b>ZERO lb/kWh</b>	<b>ZERO lb/kWh</b>
		Sulfur Dioxide (SO <sub>2</sub> )	(lb/kWh)	<b>ZERO lb/kWh</b>	<b>ZERO lb/kWh</b>
		Nitrogen Oxide (NO <sub>x</sub> )	(lb/kWh)	<b>ZERO lb/kWh</b>	<b>ZERO lb/kWh</b>
		Mercury (Hg)	(lb/kWh)	<b>ZERO lb/kWh</b>	<b>ZERO lb/kWh</b>
	Water Usage	(gal/kwh)	<b>ZERO lb/kWh</b>	<b>ZERO lb/kWh</b>	
ESTIMATED COST DATA					
ESTIMATED COST DATA		First Year of Commercial Operation	(Year)	2008 (Existing)	2008 (Existing)
	Installed Capital	Cost <sup>(1)</sup>	(\$/kw)	Not Applicable/Not Available at this time	Not Applicable/Not Available at this time
		Escalation Rate	(%)	Greater of 5% or CPI(4)	Greater of 5% or CPI(4)
	O & M - Fixed	Cost <sup>(1)</sup>	(\$/kw-year)	\$40/kW-year (estimated and subject to change)	\$40/kW-year (estimated and subject to change)
		Escalation Rate	(%)	Greater of 5% or CPI(4)	Greater of 5% or CPI(4)
	O & M - Variable	Cost <sup>(1)</sup>	(\$/kwh)	Not available at this time	Not available at this time
		Escalation Rate	(%)	Not available at this time	Not available at this time
	Fuel	Cost <sup>(1)</sup>	(\$/kwh)	Not Applicable - nominal natural gas or oil for start up	Not Applicable - nominal natural gas or oil for start up
		Escalation Rate	(%)	Not Applicable and/or not available at this time	Not Applicable and/or not available at this time
		Discount Rate	(%)	Not Applicable	Not Applicable
		Levelized Cost <sup>(2)</sup> - Life of Unit	(cents/kwh)	10 cents/kWh (2008 dollars) plus annual CPI excluding energy (4)	10 cents/kWh (2008 dollars) plus annual CPI excluding energy(4)

**FOOTNOTES:** See Next Sheet

## FOOTNOTES / ADDITIONAL NOTES

- (1) The latest technology for additional waste heat recovery is typically available in increments of approximately 8 megawatt as a retrofit to existing sulfuric acid plants or as original equipment on new plants. Depending on site specifics incremental generating capacity could be as small as 8 megawatt or multiples of 8 megawatts
- (2) The data forms request information sufficient to calculate and compare "effective" capacity contributions each technology. FICA strongly encourages the Commission to do so. For Example:

An 800 mW coal plant, with an installed cost of \$4 Billion would equate to a nominal installed cost \$5,000 per kW. Assuming an 80% capacity factor, the effective capacity would be 640 mW and the effective cost would be \$6250 per kW. **(This cost does not include the cost of fuel or environmental costs which are substantial)**

An 80 mW solar facility with an installed cost of \$500 Million would equate to a nominal installed cost of \$ \$6,250 per kW. Assuming a 22% capacity factor, the effective capacity would be 17.6 mW and the effective cost would be in excess of \$28,000 per kW. **(This cost does not include environmental costs associated with some solar technologies.)**

At \$4,000 per kW), the effective installed cost of waste heat capacity would be \$5,000 per kW - over 80% less than the effective cost of solar. Waste heat has all the positive attributes of solar photo-voltaic but at a much lower nominal and effective capacity cost per kW. Like solar photo-voltaic, **waste heat has zero environmental costs or impacts.**

- (3) Waste heat produces both process steam for manufacturing and byproduct electricity. As such, heat rate in the sense of a dedicated "fuel consuming" generating plant is not monitored or applicable in this instance.
- (4) This number is a representative estimate that can vary by specific application and various facility specific factors.

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RESPECTFULLY submitted the 11<sup>th</sup> day of August, 2008.

/s/ *Richard A. Zambo*

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Attorney for: Florida Industrial Cogeneration Association

SOURCE			
SOURCE	Company Name:		Florida Industrial Cogeneration Association
	Applicable Utility Service Area (if any)		Florida Power & Light, Progress Energy, Tampa Electric
	Energy Resource: (Individual Type)		Waste heat from sulfuric acid manufacturing process
	Energy Resource Type: (Category)		Waste Heat
	Resource Scale (Unit or Aggregate)		UNIT --Heat recovery technology available in 8 MW increments (1)
	Unit Status (Existing or Planning)		Potential
COMMERCIAL AVAILABILITY			
COMMERCIAL AVAILABILITY	Typical Unit Annual Capacity Rating (MW)		Increments of about 8 MW dependent on site specifics(2)
	Earliest Commercial In-Service Date (Year)		2010
	Typical Construction & Permitting Time (Years)		2 to 3 years
	Useful Life of Unit (Years)		30 years
	Fuel Type		No fuel used except minimal natural gas or oil for startup
PERFORMANCE CHARACTERISTICS			
PERFORMANCE CHARACTERISTICS	Contribution to Summer Peak Demand (MW)		Heat recovery technology available in 8 MW increments
	Contribution to Winter Peak Demand (MW)		Heat recovery technology available in 8 MW increments
	Average Annual Heat Rate (BTU/kWh)		Not applicable/available(3)
	Equivalent Availability Factor (%)		95%
	Average Annual Generation (MWH)		Estimated at 55,000 MWH
	Resulting Capacity Factor (%)		Approximately 80%(2)

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ENVIRONMENTAL CHARACTERISTICS					
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		Nitrogen Oxide (NO <sub>x</sub> )	(lb/kWh)	<b>ZERO lb/kWh</b>	<b>ZERO lb/kWh</b>
		Mercury (Hg)	(lb/kWh)	<b>ZERO lb/kWh</b>	<b>ZERO lb/kWh</b>
	Water Usage	(gal/kwh)	<b>ZERO lb/kWh</b>	<b>ZERO lb/kWh</b>	
ESTIMATED COST DATA					
ESTIMATED COST DATA		First Year of Commercial Operation	(Year)	2010	2010
	Installed Capital	Cost <sup>(1)</sup>	(\$/kw)	\$3,500 to \$4,000 per kW in 2008 dollars(4)	\$3,500 to \$4,000 per kW in 2008 dollars(4)
		Escalation Rate	(%)	Greater of 5% or CPI	Greater of 5% or CPI
	O & M - Fixed	Cost <sup>(1)</sup>	(\$/kw-year)	\$40/kW-year (estimated and subject to change)	\$40/kW-year (estimated and subject to change)
		Escalation Rate	(%)	Greater of 5% or CPI	Greater of 5% or CPI
	O & M - Variable	Cost <sup>(1)</sup>	(\$/kwh)	Not available at this time	Not available at this time
		Escalation Rate	(%)	Not available at this time	Not available at this time
	Fuel	Cost <sup>(1)</sup>	(\$/kwh)	Not Applicable - nominal natural gas or oil for start up	Not Applicable - nominal natural gas or oil for start up
		Escalation Rate	(%)	Not Applicable and/or not available at this time	Not Applicable and/or not available at this time
		Discount Rate	(%)	Not Applicable	Not Applicable
		Levelized Cost <sup>(2)</sup> - Life of Unit	(cents/kwh)	10 cents/kWh (2008 dollars) plus annual CPI excluding energy (4)	10 cents/kWh (2008 dollars) plus annual CPI excluding energy(4)

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/s/ *Richard A. Zambo*

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