CT Cost Offer Development

180-Day Stakeholder Process Working Group
October 24, 2006

Frank J. Racioppi
Market Monitoring Unit

- Develop A CT Cost Based Offer
  - Start With Actual Generator Performance.
  - Develop A Monotonically Increasing Energy Offer.
  - Develop A Cost Based No-load Component.

- Use A Generic Large Frame CT As An Example
  - Assumptions:
    - Delivered Variable Component Gas Price = $5.00 Per MBtu.
    - Variable O & M Of $1,000 Per Hour. (Manual M-15)
    - Use Actual Design Parameters For A New And Clean CT.
    - Develop Costs For 59 Degrees F and 60% Relative Humidity Ambient Conditions.
    - Sea Level Installation.
    - No Tariff Section 6.4.2 10% Adder Included.

Operational Assumptions

Opeational Assumptions				
Operations and Maintenance (No hours above temperature limit)			$1,000	per Hour
Delivered Incremental Gas Cost			$5.00	per MBtu
Performance Factor (New and Clean Condition)			1.00	

Design Performance

Load (%)	No-Load Sync	50.0%	60.0%	70.0%	80.0%	90.0%	100%
Ambient (F)	59.0	59.0	59.0	59.0	59.0	59.0	59.0
CT Output (MW)	0.00	85.45	102.54	119.63	136.72	153.81	170.9
Total CT Heat Rate (Btu/kWh) (LHV)		11,982	11,035	10,327	9,843	9,531	9,379
Total CT Heat Rate (Btu/kWh) (HHV)		13,264	12,216	11,432	10,897	10,551	10,383
No-Load Fuel Burn (MBtu/Hr)	405						

Total and Incremental Fuel Burn

Load (%)	No-Load Sync	50.0%	60.0%	70.0%	80.0%	90.0%	100%
Ambient (F)	59.0	59.0	59.0	59.0	59.0	59.0	59.0
CT Output (MW)	0.00	85.45	102.54	119.63	136.72	153.81	170.9
Total CT Heat Rate (Btu/kWh) (LHV)		11,982	11,035	10,327	9,843	9,531	9,379
Total CT Heat Rate (Btu/kWh) (HHV)		13,264	12,216	11,432	10,897	10,551	10,383
No-Load Fuel Burn (MBtu/Hr)	405						
Total Fuel (MBtu)		1,133.4	1,252.6	1,367.6	1,489.8	1,622.8	1,774.4
Operating CT Incremental Fuel (Btu/Hr) (HHV)		728.4	847.6	962.6	1,084.8	1,217.8	1,369.4

Incremental Heat Rate and Energy Offer

Load (%)	No-Load Sync	50.0%	60.0%	70.0%	80.0%	90.0%	100%
Ambient (F)	59.0	59.0	59.0	59.0	59.0	59.0	59.0
CT Output (MW)	0.00	85.45	102.54	119.63	136.72	153.81	170.9
Total CT Heat Rate (Btu/kWh) (LHV)		11,982	11,035	10,327	9,843	9,531	9,379
Total CT Heat Rate (Btu/kWh) (HHV)		13,264	12,216	11,432	10,897	10,551	10,383
No-Load Fuel Burn (MBtu/Hr)	405						
Total Fuel (MBtu)		1,133.4	1,252.6	1,367.6	1,489.8	1,622.8	1,774.4
Operating CT Incremental Fuel (Btu/Hr) (HHV)		728.4	847.6	962.6	1,084.8	1,217.8	1,369.4
Incremental CT Heat Rate (Btu/kWh) (HHV)		8,524.8	8,266.0	8,046.6	7,934.3	7,917.7	8,012.9
Incremental CT Energy Only Offer ($/MWh)		$42.62	$41.33	$40.23	$39.67	$39.59	$40.06

Add O & M and Develop No-Load Cost

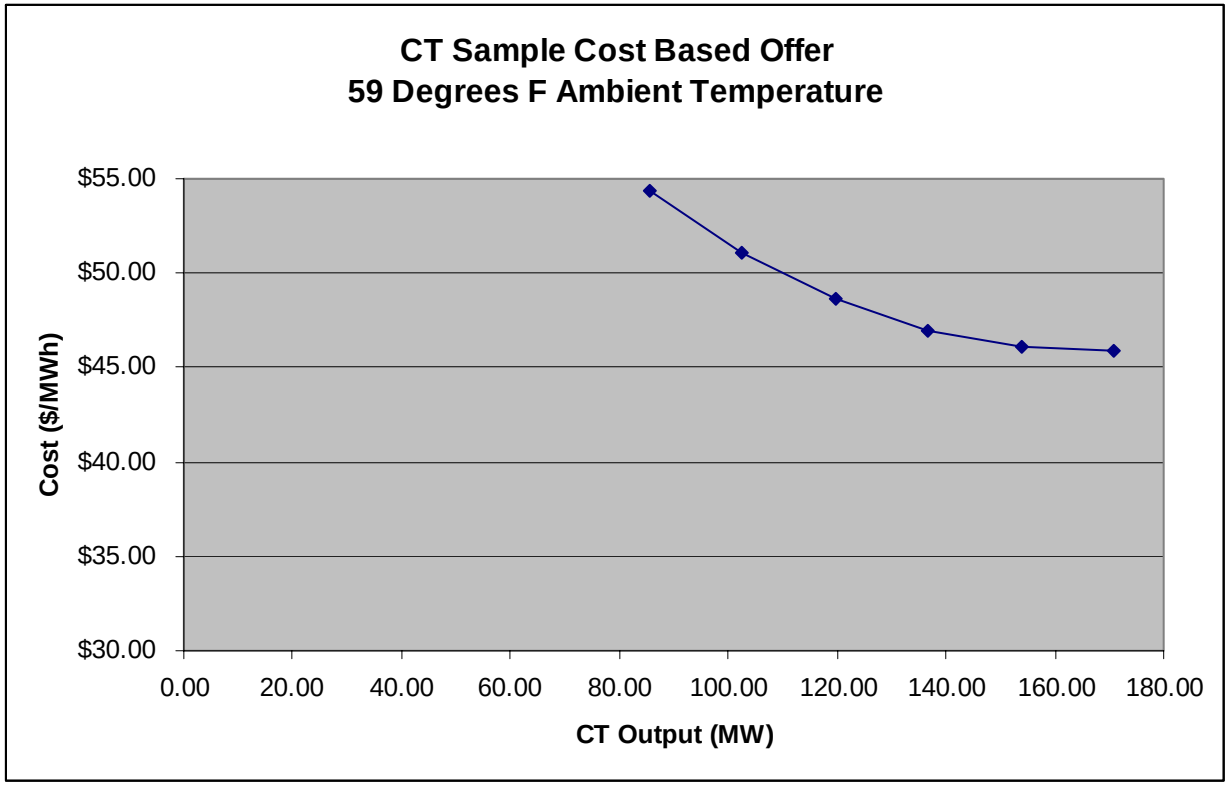
Load (%)	No-Load Sync	50.0%	60.0%	70.0%	80.0%	90.0%	100%
Ambient (F)	59.0	59.0	59.0	59.0	59.0	59.0	59.0
CT Output (MW)	0.00	85.45	102.54	119.63	136.72	153.81	170.9
Total CT Heat Rate (Btu/kWh) (LHV)		11,982	11,035	10,327	9,843	9,531	9,379
Total CT Heat Rate (Btu/kWh) (HHV)		13,264	12,216	11,432	10,897	10,551	10,383
No-Load Fuel Burn (MBtu/Hr)	405						
Total Fuel (MBtu)		1,133.4	1,252.6	1,367.6	1,489.8	1,622.8	1,774.4
Operating CT Incremental Fuel (Btu/Hr) (HHV)		728.4	847.6	962.6	1,084.8	1,217.8	1,369.4
Incremental CT Heat Rate (Btu/kWh) (HHV)		8,524.8	8,266.0	8,046.6	7,934.3	7,917.7	8,012.9
Incremental CT Energy Only Offer ($/MWh)		$42.62	$41.33	$40.23	$39.67	$39.59	$40.06
Incremental CT Total Offer ($/MWh)		$54.33	$51.08	$48.59	$46.99	$46.09	$45.92
No-Load ($/Hr)		$2,025	$2,025	$2,025	$2,025	$2,025	$2,025

Total Cost Check

Load (%)	No-Load Sync	50.0%	60.0%	70.0%	80.0%	90.0%	100%
Ambient (F)	59.0	59.0	59.0	59.0	59.0	59.0	59.0
CT Output (MW)	0.00	85.45	102.54	119.63	136.72	153.81	170.9
Total CT Heat Rate (Btu/kWh) (LHV)		11,982	11,035	10,327	9,843	9,531	9,379
Total CT Heat Rate (Btu/kWh) (HHV)		13,264	12,216	11,432	10,897	10,551	10,383
No-Load Fuel Burn (MBtu/Hr)	405						
Total Fuel (MBtu)		1,133.4	1,252.6	1,367.6	1,489.8	1,622.8	1,774.4
Operating CT Incremental Fuel (Btu/Hr) (HHV)		728.4	847.6	962.6	1,084.8	1,217.8	1,369.4
Incremental CT Heat Rate (Btu/kWh) (HHV)		8,524.8	8,266.0	8,046.6	7,934.3	7,917.7	8,012.9
Incremental CT Energy Only Offer ($/MWh)		$42.62	$41.33	$40.23	$39.67	$39.59	$40.06
Incremental CT Total Offer ($/MWh)		$54.33	$51.08	$48.59	$46.99	$46.09	$45.92
No-Load ($/Hr)		$2,025	$2,025	$2,025	$2,025	$2,025	$2,025
Total Cost ($/Hr)		$6,667	$7,263	$7,838	$8,449	$9,114	$9,872
Bid Total Cost ($/Hr)		$6,667	$7,263	$7,838	$8,449	$9,114	$9,872

Cost Based Offer Plot

No-Load Fuel = 405 MBtu/Hr



Note That the Curve Does Not Increase

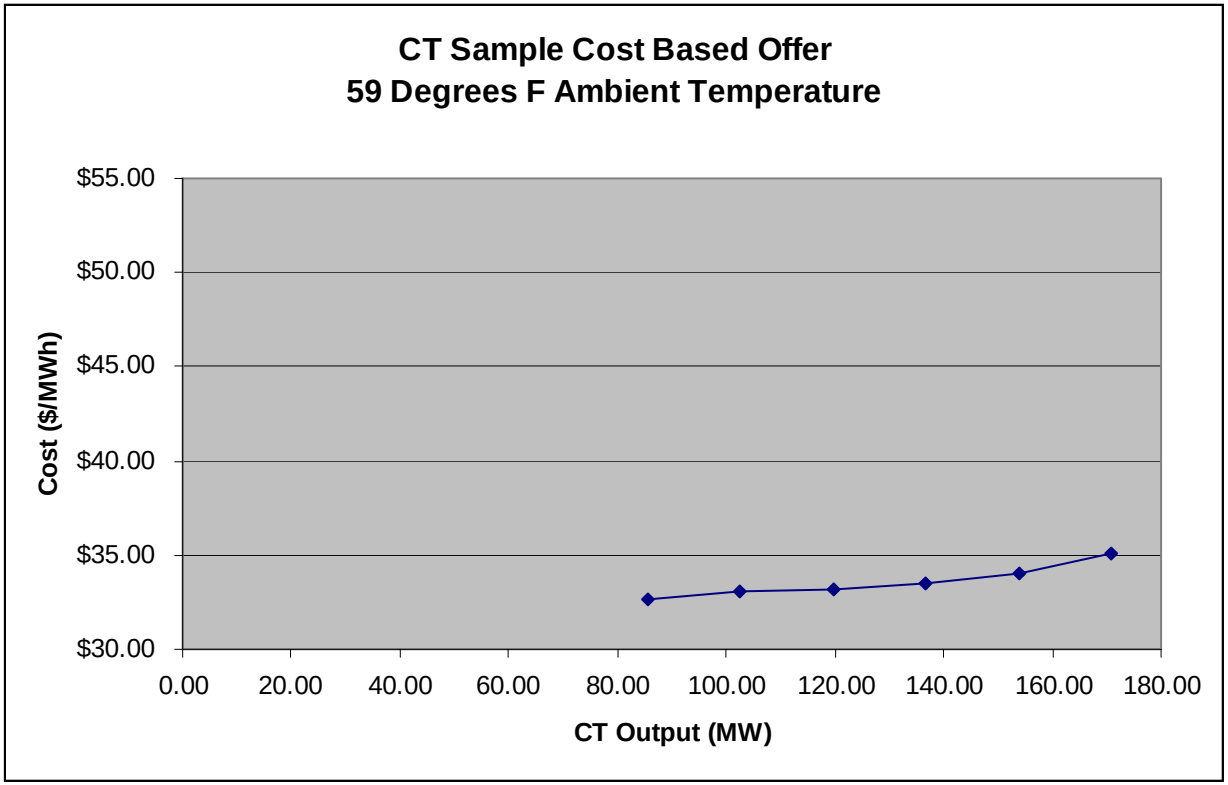
Change No-Load Fuel From 405 MBtu/Hr to 775 MBtu/Hr

Load (%)	No-Load Sync	50.0%	60.0%	70.0%	80.0%	90.0%	100%
Ambient (F)	59.0	59.0	59.0	59.0	59.0	59.0	59.0
CT Output (MW)	0.00	85.45	102.54	119.63	136.72	153.81	170.9
Total CT Heat Rate (Btu/kWh) (LHV)		11,982	11,035	10,327	9,843	9,531	9,379
Total CT Heat Rate (Btu/kWh) (HHV)		13,264	12,216	11,432	10,897	10,551	10,383
No-Load Fuel Burn (MBtu/Hr)	775						
Total Fuel (MBtu)		1,133.4	1,252.6	1,367.6	1,489.8	1,622.8	1,774.4
Operating CT Incremental Fuel (Btu/Hr) (HHV)		358.4	477.6	592.6	714.8	847.8	999.4
Incremental CT Heat Rate (Btu/kWh) (HHV)		4,194.8	4,657.6	4,953.7	5,228.1	5,512.1	5,847.9
Incremental CT Energy Only Offer ($/MWh)		$20.97	$23.29	$24.77	$26.14	$27.56	$29.24
Incremental CT Total Offer ($/MWh)		$32.68	$33.04	$33.13	$33.45	$34.06	$35.09
No-Load ($/Hr)		$3,875	$3,875	$3,875	$3,875	$3,875	$3,875
Total Cost ($/Hr)		$6,667	$7,263	$7,838	$8,449	$9,114	$9,872
Bid Total Cost ($/Hr)		$6,667	$7,263	$7,838	$8,449	$9,114	$9,872

Note That Total Cost Does Not Change

New Cost Based Offer Plot

No-Load Fuel = 775 MBtu/Hr (Lowest MBtu to Produce an Increasing Curve)



Note That the Cost Increases With MW Output

Single Block Cost Offer

Single Block Cost Offer			
Delivered Gas Price		$5.00	per MBtu
Performance Factor		1.00	
Full Load		170.9	MW
Hourly O & M		$1,000	
Full Load Heat Rate		10,383	Btu/kWhr
Fuel Cost		$8,872	$ per Hour
Total Cost		$9,872	$ per Hour
Cost Offer		$57.76	per MWh