STEEL HECTOR & DAVIS

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February 7, 1997

Charles A. Guyton

Blanca S. Bayo, Director
Records and Reporting
Florida Public Service Commission
4075 Esplanade Way, Room 110
Tallahassee, Florida 32399-0850

By Hand Delivery

970174-EG

Re: Petition of Florida Power & Light Company to Terminate its Gas Engine-Driven DX Air Conditioning Research Project

Dear Ms. Bayo:

Enclosed for filing on behalf of Florida Power & Light Company are the original and fifteen (15) copies of Petition of Florida Power & Light Company to Terminate its Gas Engine-Driven DX Air Conditioning Research Project. Also enclosed is an additional copy of the Petition, which I request you stamp as filed and returned to our runner.

If you or your Staff have any questions regarding this filing, please contact me at 222-2300.

Very truly yours,

Charles A. Guyton
Attorney for Florida Power & Light Company

CAG/ld
cc: Jack Shreve, Esq.
encs.
TAL/18482-1

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FPSC-BUREAU OF RECORDS

DOCUMENT NUMBER-DATE
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FPSC-RECORDS/REPORTING

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Petition to Terminate Florida Power & Light Company's Gas Engine-Driven DX Air Conditioning Research Project	**))))**	**Docket No.** **Filed: February 7, 1997**

PETITION TO TERMINATE
FLORIDA POWER & LIGHT COMPANY'S
GAS ENGINE-DRIVEN DX AIR CONDITIONING RESEARCH PROJECT

Florida Power & Light Company ("FPL"), pursuant to Section 366.82, Florida Statutes (1995), hereby petitions the Florida Public Service Commission ("Commission") to terminate FPL's Gas Engine-Driven DX Air Conditioning Research Project and remove the Project from FPL's DSM Plan. In support of this petition FPL states:

1. FPL is an investor-owned electric utility regulated by the Commission pursuant to Chapter 366, Florida Statutes. FPL is subject to the Florida Energy Efficiency Conservation Act ("FEECA"), and its ECCR clause is subject to the Commission's jurisdiction. Pursuant to FEECA and the Commission rules implementing FEECA, FPL has an approved DSM plan. See, Order Nos. PSC-95-0691-FOF-EG, PSC-95-1343-S-EG, and PSC-95-1343A-S-EG. FPL also has an approved Gas Research and Development Plan. See, Order No. 95-1146-FOF-EG. FPL has a substantial interest in research conducted pursuant to its approved Gas R&D Plan and the recovery through its ECCR clause of related expenditures.

2. FPL's address is 9250 West Flagler Street, Miami, Florida 33174. Correspondence, notices, orders, motions and other documents concerning this proceeding should be sent to:

Charles A. Guyton
Steel Hector & Davis
Suite 601
215 S. Monroe St.,
Tallahassee, Florida 32301

William G. Walker
Vice President, Regulatory Affairs
Florida Power & Light Company
9250 West Flagler Street
Miami, Florida 33174

3. In Order No. PSC-95-1146-FOF-EG issued on September 15, 1995, the Commission approved for FPL a Gas Research and Development Plan. The plan contained five individual research and development projects and was filed pursuant to Order No. PSC-94-1313-FOF-EG.

4. Among the five individual research projects included in approved FPL's Gas R&D Plan was the Gas Engine-Driven DX Air Conditioning Research Project. The Gas Engine-Driven DX Air Conditioning Research Project is a commercial/industrial project intended to determine the actual operating characteristics and cost-effectiveness of natural gas engine-driven direct expansion (DX) air conditioning (AC) equipment in Florida-specific applications. When approved, anticipated project duration was 36 months with projected expenditures between $268,000 and $323,000, depending upon whether customers utilized for new installation sites wanted to convert back to electric DX A/C equipment at the end of the project.

5. In Order No. PSC-95-1343-S-EG issued on November 27, 1995, the Commission approved a stipulation between FPL and Peoples Gas System ("Peoples") resolving Peoples protests to FPL's DSM Plan. In that stipulation FPL agreed, among other things:

> to allow Peoples to identify potential sites for FPL's Gas Engine-Driven DX Air Conditioning Research Project. In identifying potential sites Peoples will give priority to existing sites with state of

the art technology and identify sites that should yield results which are transferable to other sites.

6. Pursuant to the Commission approved stipulation between FPL and Peoples, representatives of the two companies met to discuss locating potential sites. Peoples' representatives raised concerns as to why FPL was researching this technology, for they did not believe it to be applicable in Florida except with customers with very unique circumstances. The only use of the technology in Peoples' service territory of which Peoples was aware was a site in St. Petersburg where there was not electrical service available. Based upon Peoples' reservations about whether the technology was feasible for Florida, FPL and Peoples performed a joint study of the feasibility of the technology using manufacturers' performance data. A copy of the report of the results of that joint feasibility study is attached as Appendix A.

7. The conclusion reached in the joint feasibility study regarding the use of gas engine-driven DX air conditioning solely for cooling was:

> [U]nless a customer has a specific interest in gas DX or unusual circumstances that greatly offset the higher installation costs for the gas equipment, a customer will typically not choose gas DX for straight cooling applications.

The feasibility study also examined the use on the gas engine-driven DX air conditioning in conjunction with a heat recovery application. The conclusion reached in the feasibility study regarding the use of this technology with heat recovery was:

> [B]oth the operational scenario and the amount of recovered heat utilized are critical to the economics of the gas DX technology. That is why for heat recovery customer-specific analysis is always necessary.

8 Based upon the results of the feasibility study, FPL and Peoples reached the joint conclusion

> that the best approach for Gas DX would be to discontinue the field monitoring and evaluation of the technology as outlined in FPL's Natural Gas End-Use Technology Research and Development Plan and to add Gas DX with Heat Recovery to the Gas Business Customer Incentive Research Project. This would allow FPL and Peoples to get useful data on the type of customer applications that we are more likely to see with this technology.

They further concluded that discontinuing the research project and allowing it to be an eligible technology under the Gas BCI Research Project would (1) save FPL's customers $236,000, allow the technology to be better addressed as it is more likely to be used, (3) allow FPL to gather Florida-specific data, and (4) ensure the monitoring of installations that are cost-effective.

9 Based upon the findings of the joint FPL/Peoples feasibility study, FPL seeks to discontinue its Gas Engine-Driven DX Air Conditioning Research Project. Discontinuing active research by FPL on this technology would make it eligible for inclusion as a technology which can be researched under FPL's approved Gas BCI Research Project.[1] Moreover, the feasibility assessment jointly conducted by Peoples and FPL indicates that continuation of the Gas Engine-Driven DX Air Conditioning Research Project would be wasteful and unproductive. FPL has informed Peoples of its intent to petition the Commission to discontinue its Gas Engine-Driven DX Air Conditioning Research Project, and Peoples had authorized FPL to represent that Peoples

[1] Under the Gas BCI Research Project, only gas technologies not actively being researched by FPL (other than gas desiccant cooling) are eligible for inclusion. Discontinuing the Gas Engine-Driven DX Air Conditioning Research Project would terminate FPL's active research on this technology, making it eligible for incorporation into the Gas BCI Research Project.

supports the termination of the research project and making the technology eligible for the Gas BCI Research Project.

WHEREFORE, FPL respectfully requests that the Commission authorize FPL to discontinue its Gas Engine-Driven DX Air Conditioning Research Project and drop the Gas Engine-Driven DX Air Conditioning Research Project from FPL's Gas Research and Development Plan and its DSM Plan

Respectfully submitted,

Steel Hector & Davis LLP
Suite 601, 215 S. Monroe St
Tallahassee, Florida 32301

Attorneys for Florida Power
& Light Company

By [signature]
Charles A. Guyton

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that on this 7th day of February, 1997 a copy of the Petition To Terminate Florida Power & Light Company's Gas Engine-Driven DX Air Conditioning Research Project was served upon the following people by First Class United States Mail or hand delivery(*)

Robert Elias, Esq.*
Division of Legal Services
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, Florida 32399-0850

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Landers & Parsons
310 West College Avenue
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Jack Shreve, Esq
John Roger Howe, Esq
Office of Public Counsel
111 West Madison Street
Room 812
Tallahassee, Florida 32399-1400

By [signature]
Charles A. Guyton

TAL/18211-1

Natural Gas DX A/C Research and Development Project

Results of joint feasibility study by FPL and Peoples Gas Company

BACKGROUND:

In Order No. PSC-94-1313-FOF-EG, issued October 25, 1994, the Florida Public Service Commission set numeric demand-side management goals for FPL. They also determined that the IOUs' analyses lacked sufficiently accurate information to set specific goals relating to natural gas substitution for electricity. Consequently, they ordered FPL to conduct natural gas research and demonstration projects to develop Florida-specific data on performance and cost-effectiveness of gas technologies. In Order No. PSC-95-1146-FOF-EG, issued September 15, 1995, the FPSC approved FPL's Natural Gas End-Use Technology Research and Development Plan which included five natural gas-fired end-use technologies, including C/I gas engine driven DX air conditioning.

After the June 9, 1995 issuing of Proposed Agency Action Order No. PSC-95-0691-FOF-EI, approving FPL's DSM plan, protests of that order were filed, including a petition for a formal proceeding by Peoples Gas System, Inc. Thereafter, in order to avoid litigation, FPL and Peoples began settlement negotiations. FPL and Peoples filed a stipulation on September 19, 1995. As part of this stipulation, FPL and Peoples Gas agreed to work together to locate existing sites utilizing the technologies under study.

At the first meeting between FPL and Peoples to discuss locating sites for the research projects, Peoples asked why FPL was researching gas engine DX A/C. They explained that did not believe the technology was applicable in Florida except for customers with very unique circumstances. The only site they were familiar with in their territory was in St. Petersburg and was a location where they couldn't get electrical service to the location where the unit needed to be. FPL and Peoples agreed to do a joint study of the feasibility of this technology using manufacturers performance data. That is the purpose of this report.

ANALYSIS OF C/I GAS ENGINE DRIVEN DX AIR CONDITIONING:

Step 1: Data Collection

The first step in conducting this study of Gas DX was for FPL and Peoples to contact the manufacturer of the equipment in order to get performance specifications that both parties agreed upon. Per conversations with Trico Corporation, FPL and Peoples have agreed upon the following performance specifications for Gas DX based on the Trico 25 ton unit:

Assumptions	Agreed Upon Specification
Gas Equipment Cost	$1,150 per ton
Installed Cost	$1,400 per ton
Gas Usage	0.1364 therms/ton-hr
Engine O&M	1.25 ¢ per ton-hour
Auxiliary Electrical Usage	0.307 kW per ton
Unit Output	25 Tons
Heat Recovery Output	140,000 BTUs/hr max.

Peoples and FPL also agreed upon the type and size of customer to model. This would be a General Service Large Volume 1 (25,000 to 500,000 therms per year) type customer, such as a fast food restaurant with seating. In order to have the lowest possible operational costs for the gas equipment, it was determined that the analysis would look at transport gas with the Load Enhancement Discount Rider.

Type of Service	Gas Rate
Regular Tariff Rate (Nov - Mar) with transport gas	$0.50975 per therm
Regular LE Rider Discount Rate (Apr - Oct) with transport gas	$0.37859 per therm

Step 2: Modeling Criteria

It was important to look at a variety of operating situations for this technology. Because electric rates contain both a demand and an energy component, the operational strategy for gas DX will affect the feasibility of the equipment. In order to assess a variety of scenarios, this analysis looks at the following three operational scenarios:

1) Typical Operation — This scenario is based on the typical or average operation FPL has seen for electric DX equipment in our service territory. This operation can be described as being for 2,628 hours per year, with 70% of the energy consumption occurring in the summer months.

2) Full-Time Operation — This scenario was created to give an indication of the

economics of this technology when run for a very high number of hours. This operation is described by operation of the equipment for 14 hours per day for 355 days per year; a total of 4,970 hours per year, with 58% of the energy consumption occurring in the summer months.

3) Peaking Operation — This scenario was created to give an indication of the economics of this technology when run for a fairly small number of hours, but with the maximum electrical demand offset. This operation is described as being 4 hours per day only in the summer for a total of 828 hours per year, with 100% of them occurring in the summer months.

Step 3: Heat Recovery

It was the belief of both FPL and Peoples that the one way that Gas DX technology would make sense would be if the customer could make use of the heat recovery option. This is very similar to the opportunities which exist with heat recovery off of gas engine-driven chillers, in that the economics become very site specific. Both parties felt that the analysis would show that DX A/C would make sense where customers can utilize a significant portion of the waste heat and that these should be addressed on a customer-specific basis.

The parties agreed to analyze three additional heat recovery scenarios:

4) Typical Operation 100% utilization. — This is the same as scenario #1 with full utilization of the waste heat by the customer.

5) Typical Operation 50% utilization. — This is the same as scenario #4 with 50% utilization of the waste heat by the customer.

6) Full-Time Operation 100% utilization. — This is the same as scenario #2 with full utilization of all the waste heat produced by the engine.

7) Full-Time Operation 50% utilization. — This is the same as scenario #6 with 50% utilization of the waste heat by the customer. This shows the sensitivity of the project economics to the usage of the waste heat.

Step 4: Results of Analysis

The first analysis completed was that where the gas DX A/C would be utilized only for cooling. Each of the three scenarios were modeled and the paybacks ranged from 12 years in the best case, to never achieving a payback. These payback are significant when balanced against a typical equipment life for this type of equipment of 10 to 15 years.

Cooling Only Results

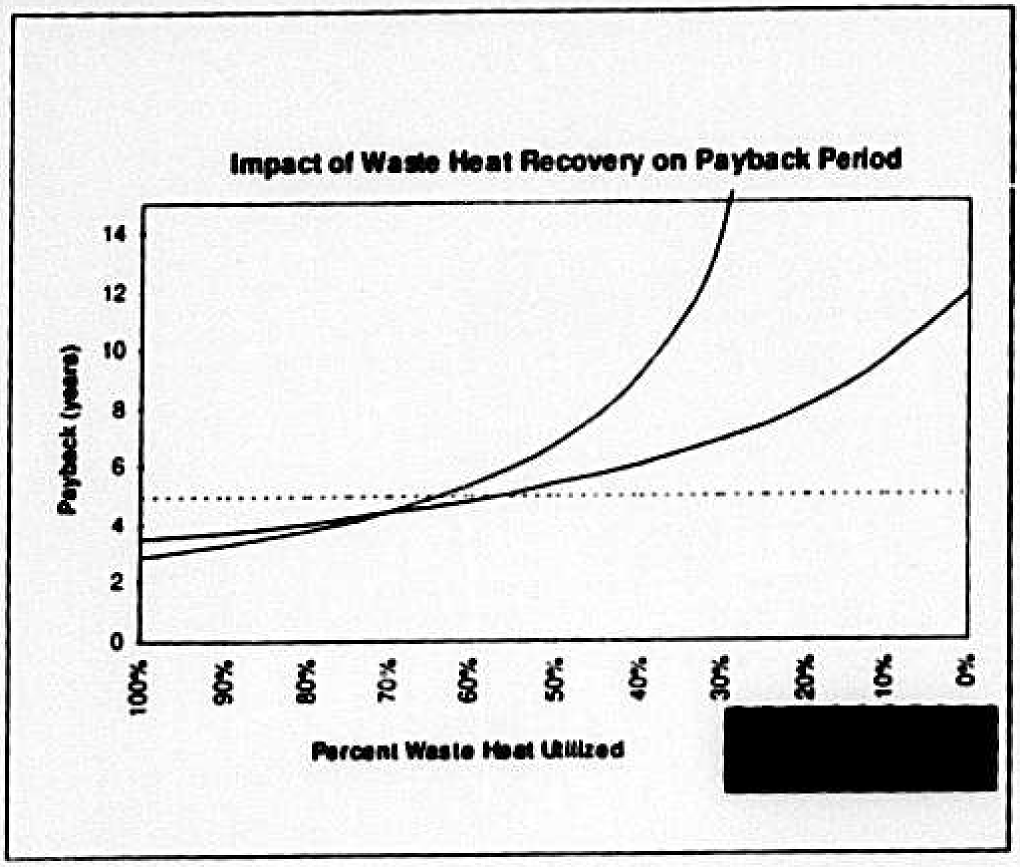
Scenario	Annual Operational Savings	Simple Payback
Typical Operation	$1,103	11.9 years
Full-Time Operation	($597)	Never
Peaking Operation	$ 844	15.6 years

These results further prove that unless a customer has a specific interest in gas DX or unusual circumstances that greatly offset the higher installation costs for the gas equipment, a customer will typically not choose gas DX for straight cooling applications.

The final step of the analysis was to determine the impact of heat recovery on the economics of this equipment. As anticipated, heat recovery had the potential to improve the economics of this technology. The results are summarized in the table and chart following.

Heat Recovery Results

Scenario	Annual Operational Savings	Simple Payback
Typical Operation 100% utilization	$3,783	3.5 years
Typical Operation 50% utilization	$3,783	5.4 years
Full-Time Operation 100% utilization	$4,480	2.9 years
Full-Time Operation 50% utilization	$2,443	6.7 years



The analysis does show that both the operational scenario and the amount of recovered heat utilized are critical to the economics of the gas DX technology. That is why for heat recovery customer-specific analysis is always necessary.

RECOMMENDED NEXT STEPS:

FPL and Peoples agree that the best approach for Gas DX would be to discontinue the field monitoring and evaluation of the technology as outlined in FPL's Natural Gas End-Use Technology Research and Development Plan and to add Gas DX with Heat Recovery to the Gas Business Customer Incentive Research Project. This would allow FPL and Peoples to get useful data on the type of customer applications that we are more likely to see with this technology.

COST IMPLICATIONS:

Moving the research for gas engine DX A/C from a stand alone project requiring FPL to install equipment at a customer's site to placing it under the Gas Business Custom Incentive Research Project results in approximately $236,000 in savings to FPL and it's ratepayers.

ITEM	COST SAVINGS
Site Selection/Incentives	$ 20,000
Equipment	$ 57,500
Installation/Labor	$ 18,750
Monitoring & Measurement	$110,000
Cost Effectiveness Analysis	$ 25,000
Draft and Submit Final Report	$ 5,000
TOTAL COST SAVINGS	$236,250

By allowing gas engine DX installations utilizing heat recovery into the Gas BCI program, FPL will be better able to address this technology as it is most likely to be used in actual customer installations. Under the Gas BCI program, FPL will still be able to monitor the performance of the technology and collect Florida-specific performance data. Furthermore, under the standards for the Gas BCI program, FPL will be ensured of only having to monitor installations that are cost-effective for both customer and FPL.

APPENDIX

Gas Technology Analysis Worksheets

Gas Technology Analysis Worksheet

CASE 1: **Typical Operation for DX RTU in FPL's Program**

Gas Engine Driven DX A/C							
Operating Hours	2,628			Demand	GSD	$8.39	/kW mth
EFLH	2,628			Energy	Rate	$0.04210	/kWh
Summer Gas Rate:	$0.3786	/ therm	70%	Size		25	Tons
Winter Gas Rate:	$0.5098	/ therm	30%	Water Rate		$4.00	/ 1000 gal

Participant Analysis

Code Baseline: Standard Efficiency Direct Expansion Roof Top Unit

	Rating		Annual Usage		Annual Cost
Package RTU	1.38	kW/Ton	90,683	kWh	$7,291
Auxiliaries	0	included above	0	kWh	$0
Engine O&M	$0.00	/Ton-Yr			$0
				Total	$7,291

Gas Option Gas Engine Driven DX A/C

	Rating		Annual Usage		Annual Cost
Package RTU	0.1364	therms/tonHr	8,963	therms	$3,746
Auxiliaries	0.307	kW/Ton	20,152	kWh	$1,620
Engine O&M	$0.0125	/Ton-Hr			$821
				Total	$6,188

Annual Participant Savings	$1,103

Gas Installed Cost:	$1,450	/Ton	$36,250
Baseline Installed Cost:	$925	/Ton	$23,125
Net Incremental Installed Cost:			$13,125
Equipment Life	15	years	
Simple Payback			11.9 years

Gas Technology Analysis Worksheet

CASE 2: **Operated 14 hours per day, 355 days per year**

Gas Engine Driven DX A/C						
Operating Hours	4,970			Demand	GSD	$8.39 /kW-mth
EFLH	4,970		1	Energy	Rate	$0.04197 /kWh
Summer Gas Rate:	$0.3786	/ therm	58%	Size		25 Tons
Winter Gas Rate:	$0.5098	/ therm	42%	Water Rate		$4.00 / 1000 gal

Participant Analysis

Code Baseline: Standard Efficiency Direct Expansion Roof Top Unit

	Rating	Annual Usage	Annual Cost
Package RTU	1.38 kW/Ton	171,465 kWh	$10,670
Auxiliaries	0	0 kWh	$0
Engine O&M	$0.00 /Ton-Yr		$0
		Total	$10,670

Gas Option Gas Engine Driven DX A/C

	Rating	Annual Usage	Annual Cost
Package RTU	0.1364 therms/tonHr	16,948 therms	$7,342
Auxiliaries	0.307 kW/Ton	38,103 kWh	$2,371
Engine O&M	$0.0125 /Ton-Hr		$1,553
		Total	$11,267

Annual Participant Savings	($597)

Gas Installed Cost:		$1,450 /Ton	$36,250
Baseline Installed Cost:		$925 /Ton	$23,125
Net Incremental Installed Cost:			$13,125
Equipment Life	15 years		
Simple Payback			-22.0 years

Gas Technology Analysis Worksheet

CASE 3: **Operated 4 hours per day in summer**

Gas Engine Driven DX A/C						
Operating Hours	828			Demand	GSD	$8.39 /kW-mth
EFLH	828			Energy	Rate	$0.04129 /kWh
				Size		25 Tons
Summer Gas Rate:	$0.3786	/ therm	100%	Water Rate		$4.00 / 1000 gal
Winter Gas Rate:	$0.5098	/ therm	0%			

Participant Analysis

Code Baseline: Standard Efficiency Direct Expansion Roof Top Unit

	Rating		Annual Usage		Annual Cost
Package RTU	1.38	kW/Ton	28,578	kWh	$3,206
Auxiliaries	0	included above	0	kWh	$0
Engine O&M	$0.00	/Ton-Yr			$0
				Total	$3,206

Gas Option Gas Engine Driven DX A/C

	Rating		Annual Usage		Annual Cost
Package RTU	0.1364	therms/tonHr	2,825	therms	$1,069
Auxiliaries	0.307	kW/Ton	6,351	kWh	$1,034
Engine O&M	$0.0125	/Ton-Hr			$259
				Total	$2,362

Annual Participant Savings **$844**

Gas Installed Cost:		$1,450	/Ton	$36,250
Baseline Installed Cost:		$925	/Ton	$23,125
Net Incremental Installed Cost:				$13,125
Equipment Life	15 years			
Simple Payback				15.6 years

Gas Technology Analysis Worksheet

CASE 4: **Typical Operation with 100% utilization of waste heat**

Gas Engine Driven DX A/C							
Operating Hours	2,628			Demand	GSD	$8.39	/kW-mth
EFLH	2,628			Energy	Rate	$0.04210	/kWh
				Size		25	Tons
Summer Gas Rate:	$0.3786	/ therm	70%				
Winter Gas Rate:	$0.5098	/ therm	30%	Heat Output		140,000	btu/hr

Participant Analysis

Code Baseline: Standard Efficiency Direct Expansion Roof Top Unit

	Rating			Annual Usage		Annual Cost
Package RTU	1.38	kW/Ton		90,683	kWh	$7,291
Auxiliaries	0	[illegible]		0	kWh	$0
Engine O&M	$0.00	/Ton-Yr				$0
Boiler	2,000	Btu/hr input		17,520.0	therms	$8,931
	140,000	Btu/hr output	70% efficiency			
					Total	$16,222

Gas Option Gas Engine Driven DX A/C

	Rating			Annual Usage		Annual Cost
Package RTU	0.1364	therms/tonHr		8,963	therms	$3,746
Auxiliaries	0.307	kW/Ton		20,152	kWh	$1,620
Engine O&M	$0.0125	/Ton-Hr				$821
Boiler	1,400	Btu/hr input	30%	12,263.0	therms	$6,251
Heat Recovery	140,000	Btu/hr runtime		367.99	MMBtu/yr output	
	100%	Utilization			Total	$12,439

Annual Participant Savings	$3,783

Gas Installed Cost:		$1,450	/Ton	$36,250
Baseline Installed Cost:		$925	/Ton	$23,125
Net Incremental Installed Cost:				$13,125
Equipment Life	15 years			
Simple Payback				3.5 years

Gas Technology Analysis Worksheet

CASE 5: **Typical Operation with 50% utilization of waste heat**

Gas Engine Driven DX A/C						
Operating Hours	2,828			Demand	GSD	$8.39 /kW-mth
EFLH	2,828			Energy	Rate	$0.04210 /kWh
				Size		25 Tons
Summer Gas Rate:	$0.3786	/therm	70%			
Winter Gas Rate:	$0.5088	/therm	30%	Heat Output		140,000 btu/hr

Participant Analysis

Code Baseline: Standard Efficiency Direct Expansion Roof Top Unit

	Rating			Annual Usage		Annual Cost
Package RTU	1.38	kW/Ton		90,683	kWh	$7,291
Auxiliaries	0	included above		0	kWh	$0
Engine O&M	$0.00	/Ton-Yr				$0
Boiler	2,000	Btu/hr input		17,520.0	therms	$8,931
	140,000	Btu/hr output	70% efficiency			
					Total	$16,222

Gas Option Gas Engine Driven DX A/C

	Rating			Annual Usage		Annual Cost
Package RTU	0.1364	therms/tonHr		8,963	therms	$3,746
Auxiliaries	0.307	kW/Ton		20,152	kWh	$1,620
Engine O&M	$0.0125	/Ton-Hr				$821
Boiler	1,700	Btu/hr input	15%	14,891.5	therms	$7,591
Heat Recovery	140,000	Btu/hr runtime		183.99	MMBtu/yr output	
	50%	Utilization			Total	$13,779

Annual Participant Savings	**$2,443**

Gas Installed Cost:		$1,450 /Ton	$36,250
Baseline Installed Cost:		$925 /Ton	$23,125
Net Incremental Installed Cost:			$13,125
Equipment Life	15 years		
Simple Payback			5.4 years

Gas Technology Analysis Worksheet

CASE 6: **Operated 14 hours per day, 355 days per year, 100% utilization of Heat**

Gas Engine Driven DX A/C						
Operating Hours	4,970			Demand	GSD	$8.39 /kW-mn
EFLH	4,970			Energy	Rate	$0.04210 /kWh
Summer Gas Rate:	$0.3786 /therm	58%		Size		25 Tons
Winter Gas Rate:	$0.5098 /therm	42%		Heat Output		140,000 btu/hr

Participant Analysis

Code Baseline: Standard Efficiency Direct Expansion Roof Top Unit

	Rating			Annual Usage		Annual Cost
Package RTU	1.38	kW/Ton		171,465	kWh	$10,692
Auxiliaries	0	[illegible]		0	kWh	$0
Engine O&M	$0.00	/Ton-Yr				$0
Boiler	2.000	Btu/hr input		17,520.0	therms	$8,931
	140,000	Btu/hr output	70% efficiency			
					Total	$19,623

Gas Option Gas Engine Driven DX A/C

	Rating			Annual Usage		Annual Cost
Package RTU	0.1364	therms/tonHr		16,948	therms	$7,350
Auxiliaries	0.307	kW/Ton		38,103	kWh	$2,376
Engine O&M	$0.0125	/Ton-Hr				$1,553
Boiler	0.865	Btu/hr input	57%	7,580.0	therms	$3,864
Heat Recovery	140,000	Btu/hr runtime		695.80	MMBtu/yr output	
	100%	Utilization			Total	$15,143

Annual Participant Savings $4,480

Gas Installed Cost:		$1,450 /Ton	$36,250
Baseline Installed Cost:		$925 /Ton	$23,125
Net Incremental Installed Cost:			$13,125
Equipment Life	15 years		
Simple Payback			2.9 years

Gas Technology Analysis Worksheet

CASE 7: **Operated 14 hours per day, 355 days per year, 50% utilization of Heat**

Gas Engine Driven DX A/C						
Operating Hours	4,970		Demand	GSD	$8.39	/kW-mth
EFLH	4,970		Energy	Rate	$0.04210	/kWh
Summer Gas Rate:	$0.3786 / therm	58%	Size		25	Tons
Winter Gas Rate:	$0.5098 / therm	42%	Heat Output		140,000	btu/hr

Participant Analysis

Code Baseline: Standard Efficiency Direct Expansion Roof Top Unit

	Rating			Annual Usage		Annual Cost
Package RTU	1.38	kW/Ton		171,465	kWh	$10,692
Auxiliaries	0	included above		0	kWh	$0
Engine O&M	$0.00	/Ton-Yr				$0
Boiler	2,000	Btu/hr input		17,520.0	therms	$8,931
	140,000	Btu/hr output	70% efficiency			
					Total	$19,623

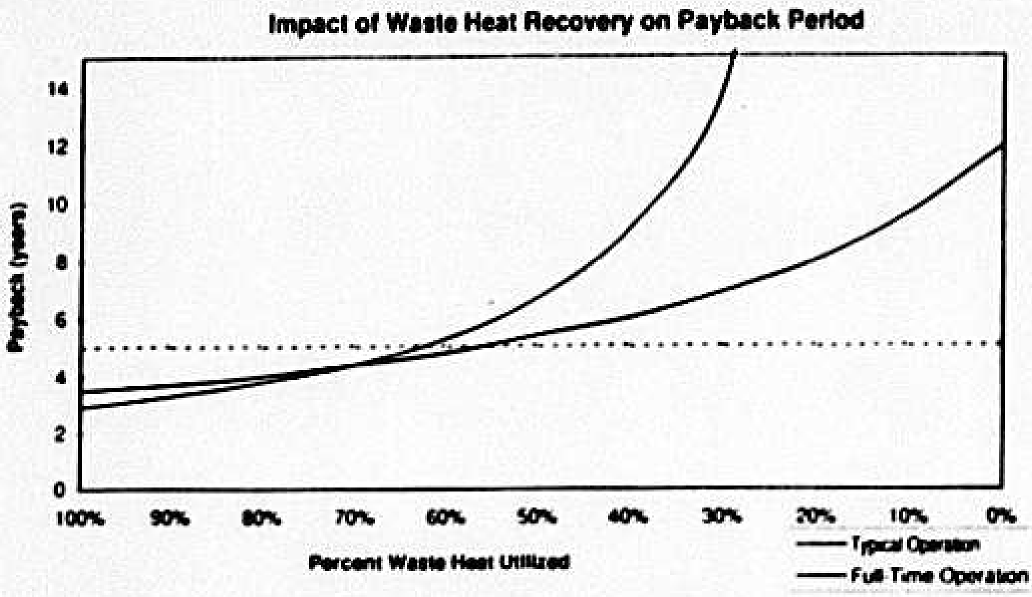
Gas Option Gas Engine Driven DX A/C

	Rating			Annual Usage		Annual Cost
Package RTU	0.1364	therms/tonHr		16,948	therms	$7,350
Auxiliaries	0.307	kW/Ton		38,103	kWh	$2,376
Engine O&M	$0.0125	/Ton-Hr				$1,553
Boiler	1,433	Btu/hr input	28%	12,550.0	therms	$6,397
Heat Recovery	140,000	Btu/hr runtime		347.90	MMBtu/yr output	
	50%	Utilization			Total	$17,676

Annual Participant Savings **$1,947**

Gas Installed Cost:		$1,450 /Ton	$36,250
Baseline Installed Cost:		$925 /Ton	$23,125
Net Incremental Installed Cost:			$13,125
Equipment Life	15 years		
Simple Payback			6.7 years

payback graphs



	Typcial	Full-Time	
100%	3.5	2.9	5
90%	3.70	3.3	5
80%	4	3.8	5
70%	4.4	4.4	5
60%	4.8	5.3	5
50%	5.4	6.7	5
40%	6	9.1	5
30%	6.9	14.1	5
20%	8	30.8	5
10%	9.6		5
0%	11.9		5