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Issue: MJMEUC Contract with Grain Belt Express Clean Line LLC
Witness: John Grotzinger
Type of Exhibit: Rebuttal Testimony
Sponsoring Party: MJMEUC
File No.: EA-2016-0358

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

FILE NO. EA-2016-0358

REBUTTAL TESTIMONY

OF

JOHN GROTZINGER ON

BEHALF OF

**THE MISSOURI JOINT MUNICIPAL ELECTRIC
UTILITY COMMISSION (MJMEUC)**

JANUARY 24, 2017

MJMEUC Exhibit No. 476NP
Date 3.23.17 Reporter TS
File No. EA-2016-0358

1 **I. INTRODUCTION AND BACKGROUND**

2 **Q. Please state your name, title, and business address.**

3 A. My name is John Grotzinger. I am the Chief Operating Officer (COO) and Vice
4 President for Engineering and Operations of the Missouri Joint Municipal Electric Utility
5 Commission (MJMEUC). MJMEUC's business address is 1808 I-70 Drive SW,
6 Columbia, MO 65203.

7 **Q. Please describe your professional background.**

8 A. I joined MJMEUC in 1994 as the Planning Engineer. I was the Director of Engineering
9 for Engineering and Operations for MJMEUC before being named COO in 2008. Prior
10 to that, I worked at City Utilities in Springfield, Missouri over 14 years, with my last
11 position at City Utilities being a System Planning Engineer. Prior to working at City
12 Utilities, I was a planning engineer at Kansas City Power & Light from 1979-1980. I
13 hold a Bachelor of Science in Electrical Engineering from the University of Missouri-
14 Columbia, and am a licensed electrical engineer in the state of Missouri. I have nearly 40
15 years of utility experience in planning electrical distribution and transmission systems
16 and in planning for and meeting the generation needs of customers. My curriculum vitae
17 is attached as Schedule JG-1.

18 **Q. Do you have any experience in developing power supplies for wholesale customers?**

19 A. Yes. I have developed a number of resources to meet the needs of MJMEUC members,
20 whether as full-requirement needs or for a fixed power purchase agreement. Those
21 resources have included coal, diesel, landfill gas, natural gas, solar and wind. I have
22 extensive experience in resource planning and developing requests for proposals, as well
23 as engaging in project development. Some of the proposed projects have become part of

1 the resource mix at MJMEUC, while in other projects MJMEUC has ultimately declined
2 to participate, or the projects have not been placed into operation.

3 **Q. On whose behalf are you testifying?**

4 A. I am testifying on behalf of MJMEUC, an intervenor in this proceeding.

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

6 A. I am responding to the testimony of Grain Belt Express' witnesses Michael Skelly, Mark
7 Lawlor and David Berry regarding the transmission services agreement that MJMEUC
8 has entered into with Grain Belt Express. I will explain the economic benefit that the
9 Grain Belt Express Clean Line LLC (Grain Belt) project will provide to Missouri citizens
10 if Grain Belt were to receive a Certificate of Convenience and Necessity (CCN) and the
11 project is completed. If the project is completed, MJMEUC members will have the
12 opportunity to buy renewable energy for their customers at a competitive price delivered
13 to Missouri.

14 **Q. Please summarize your testimony.**

15 A. MJMEUC currently generates its own power from a variety of coal and natural gas
16 generators, as well as power purchase agreements that are in place with a number of other
17 entities for a variety of resources including both wind and solar. The agreement with
18 Grain Belt will allow MJMEUC to purchase needed energy for its members that is both
19 renewable and economical. This project will allow for substantial savings over other
20 proposals to supply energy to MJMEUC, particularly when including transmission costs.

21
22
23

1 **II. BACKGROUND ON MJMEUC ENERGY SUPPLIES**

2 **Q. Does MJMEUC need the energy from the Grain Belt project?**

3 A. Yes. As stated in the rebuttal testimony of Duncan Kincheloe, MJMEUC’s president and
4 general manager, our current arrangement with Illinois Power Marketing Company
5 (“IPM”) for 100 MWs of energy and capacity will expire in 2021, and that contract
6 currently serves the needs of the Missouri Public Energy Pool (MoPEP). We have been
7 actively considering sources to replace this energy and capacity.

8 **Q. Have all those sources been renewable?**

9 A. No. We have been considering multiple options.

10 **Q. Has MJMEUC engaged in resource planning to study this and other member
11 needs?**

12 A. Yes. ** [REDACTED]
13 [REDACTED]
14 [REDACTED]
15 [REDACTED]
16 [REDACTED]
17 [REDACTED] **

18 **Q. Does MJMEUC have enough resources either owned or currently under contract to
19 serve the needs of the MoPEP after 2021?**

20 A. No. MJMEUC will need to procure additional resources to meet the needs of the
21 MoPEP.

22 **Q. Does MJMEUC have resources to serve needs of MJMEUC members in MISO in
23 the future?**

1 A. No. MJMEUC members in MISO also have energy needs in the future, and those
2 connected to MISO were considered candidates for receiving power from the Grain Belt
3 project.

4 **Q. If the Grain Belt project is not completed, what will MJMEUC do to address the**
5 **needs by the MoPEP or its MISO members?**

6 A. MJMEUC will have to acquire more expensive resources to address the needs. To date,
7 we have not located an opportunity as cost advantageous as the Grain Belt project.

8 **Q. If more expensive resources are acquired, who will pay the difference?**

9 A. The customers of the 35 MoPEP cities and the customers of the other MJMEUC cities in
10 the MISO footprint will pay the additional cost.

11 **Q. Has high capacity wind from Kansas been available to MJMEUC customers at this**
12 **pricing level in the past?**

13 A. No.

14 **Q. Do you expect this type of opportunity to reoccur?**

15 A. From my 40 years of experience in the electricity industry, I know that many
16 opportunities only occur once. Parties that can take advantage of those rare cost saving
17 opportunities can save significant amounts of money for their customers over long
18 periods. I believe that the Grain Belt project offers such an opportunity.

19

20 **III. ANALYSIS OF GRAIN BELT OPPORTUNITY**

21 **Q. Why is the Grain Belt project attractive to MJMEUC to fill its need for future**
22 **energy?**

23 A. The pricing of the Grain Belt Transmission Service Agreement (TSA) is very

1 competitive. When compared to current SPP transmission rates, and the through and out
2 charge to export energy into MISO, if MJMEUC were to use the entire 200 MW path
3 option, it will save approximately \$10 million per year for MJMEUC's wholesale
4 customers in transmission charges alone. My Schedule JG-3, which is attached to this
5 testimony, illustrates the current cost of SPP transmission into MISO versus the cost of
6 the Grain Belt project, and the difference in those transmission costs.

7 **Q. Was Schedule JG-3 developed when the Grain Belt project was being analyzed?**

8 A. Yes. As with most cost estimates, some of the underlying assumptions have changed
9 since the initial analysis of the project, but Schedule JG-3 reflects the transmission cost
10 analysis that was conducted when negotiating MJMEUC's contract with Grain Belt.

11 **Q. What were the underlying assumptions in Schedule JG-3?**

12 A. I assumed transmission pricing of \$2,880 per MW-month based upon current SPP into
13 MISO point- to- point transmission pricing. I assumed a capacity factor of 50% for a
14 southwest Kansas wind farm based upon my past knowledge and experience of wind
15 farms in Kansas. These capacity factors may increase in the future due to improved
16 technology. I assumed congestion prices of between \$2 per MW to \$10 per MW based
17 upon current market conditions in SPP, and my knowledge of those markets. I based the
18 \$3,400,000 cost of the Grain Belt transmission service upon the contract MJMEUC has
19 with Grain Belt, assuming it is ultimately fully utilized.

20 **Q. Do you believe Schedule JG-3 is a realistic representation of the transmission cost**
21 **savings that MJMEUC members will see by using the Grain Belt express**
22 **transmission line versus SPP into MISO transmission?**

23 A. Yes. Congestion pricing is difficult to predict, but Schedule JG-3 gives a realistic range

1 of congestion prices inside SPP, and what a transmission user would reasonably expect to
2 pay.

3 **Q. Does Schedule JG-3 reflect future rate increases in SPP?**

4 A. No, it only reflects current prices. SPP has seen regular price increases due to its
5 transmission expansion plans, and those costs are expected to increase over the next
6 twenty years. We do not know at what rate those increases will occur, and the
7 \$2,880/MW-month point-to-point through and out rate represents only current pricing in
8 SPP.

9 **Q. Would updated assumptions affect the conclusions of Schedule JG-3?**

10 No. While there might be minor changes in the amount of benefit, my conclusion that the
11 Project saves MJMEUC money would not change.

12 **Q. What are the plans of MJMEUC members regarding the 200 MW TSA?**

13 A. As of today, the MoPEP Committee has agreed, with MJMEUC board approval, to
14 purchase 60 MW of energy from Infinity Wind Power (“Infinity”) over the TSA.
15 Individual member cities have expressed a strong interest in approximately 75 MW of the
16 TSA, also taking energy from Infinity. As the power contract has only recently been
17 completed (Schedule JG-4), we expect that the interest in the TSA with Grain Belt, and in
18 the contract with Infinity will increase. Per the terms of our agreement with Grain Belt,
19 we have until sixty days prior to operation of the Grain Belt project before we have to
20 formally reserve our needs on the Grain Belt line. That final reservation number will
21 reflect our MoPEP amount, plus other cities that wish to purchase power through
22 MJMEUC’s arrangement with Grain Belt and Infinity. See Schedule JG-5, which reflects
23 the different tranche pricing in the contracts with Grain Belt and Infinity.

1 **Q. Do the transmission cost savings decrease proportionally as less of the TSA is used?**

2 A. No. If only half of the TSA is ultimately used, then transmission savings when compared
3 to SPP tariff rates will be approximately \$6 million per year for members. The first 100
4 MWs of the TSA is even more attractively priced than the second 100 MW tranche. Both
5 provide substantial savings when compared to other transmission options. Therefore, it is
6 highly likely that at a minimum the first 100 MW tranche will be used by MJMEUC, and
7 at least a portion, if not all, of the second 100 MW tranche.

8 **Q. How much will the MoPEP cities expect to save in transmission charges if allowed to
9 use Grain Belt versus other transmission options for 60 MW of wind from SPP?**

10 A. The MoPEP cities will save approximately \$1.7 to \$3.8 million per year in transmission
11 charges. See Schedule JG-3, Total Transmission Cost Savings at 60 MW TSA.

12 **Q. Is the analysis showing the transmission cost savings from SPP into MISO the only
13 analysis that shows a savings to MoPEP members of MJMEUC?**

14 A. No. There are substantial capacity and energy cost savings as well.

15 **Q. Will the energy cost savings be substantial for the MoPEP members of MJMEUC?**

16 A. Yes. When compared to the current 100 MW contract with IPM, we expect this
17 combined capacity and energy to be cheaper.

18 **Q. Have you examined other options to supply this power to the MoPEP?**

19 A. Yes. Current market prices for a long-term PPA have been consistently higher than the
20 combination of the Grain Belt TSA and energy and capacity contract with Infinity. We
21 have not located another combination of transmission, energy and capacity that can
22 compete with the offer for transmission from Grain Belt and energy and capacity from
23 Infinity for a delivered product into Ameren's zone. Schedule JG-6 shows other options

1 for renewable energy based both out of MISO and SPP. Those options were analyzed at
2 135 MWs against the Grain Belt project and other commercial projects. The savings of
3 the Grain Belt project against using MISO based renewables is substantial for Missouri
4 customers, with the expected savings being between \$9 million and \$24 million annually.
5 When compared to using wind based resources in SPP, the annual savings is
6 approximately \$8 million if the total 200 MW path is ultimately used.

7 **Q. Does MJMEUC plan to acquire other resources to complement the wind power**
8 **delivered by Grain Belt to meet the MoPEP's full requirement needs?**

9 A. Yes, it is likely that additional gas generation will be acquired. Since we only pay for the
10 wind energy produced by Infinity, and the TSA charge is static, even coupled with a gas
11 plant or plants, we expect this transaction to be significantly more economical for the
12 MoPEP than the current capacity and energy arrangement. Schedule JG-7 shows our
13 projected energy and capacity portfolio to replace the IPM contract. That analysis,
14 limited to just replacing a 100 MW contract with a 60 MW contract with both Grain Belt
15 and Infinity, coupled with gas and other renewable resources, shows an annual savings to
16 the MoPEP cities of approximately 34% over the existing IPM contract. That translates
17 to an approximately \$4 per MWh reduction in wholesale costs, and annual savings to the
18 MoPEP cities of approximately \$10 million versus their current energy supply contract.

19 **Q. Is the IPM contract competitive today?**

20 A. Yes. However, the Grain Belt project allows us to reach a greater level of cost savings
21 than we would normally expect to achieve and surpasses other options we have
22 evaluated.

23

1 Q. Does MJMEUC plan to acquire other resources to complement the wind power
2 delivered by Grain Belt to meet other MJMEUC city needs?

3 A. If MJMEUC is directed by those cities to acquire additional resources on their behalf to
4 complement the wind power, we will.

5 Q. How will these savings be reflected to the MoPEP member cities?

6 A. They will lower wholesale energy costs. While transmission charges (point-to-point or
7 network integration transmission service) to deliver energy to individual cities are
8 different depending on the location of the member city, energy costs are socialized across
9 the pool, including the cost of transmission to deliver that energy into the respective
10 RTO. This means that the lower energy costs will be shared equally by all 35 cities.

11 Q. Can you summarize the savings you expect from the Grain Belt transaction?

12 A. It is expected that the MoPEP cities will save approximately \$10 million annually by
13 utilizing the Grain Belt Express and Infinity wind contract in their power supply after the
14 IPM contract ends in 2021. Other MJMEUC cities will also see substantial savings
15 related to the low-cost wind energy delivered from SPP into MISO. See Schedules JG-3,
16 JG-6 and JG-7.

17

18 **IV. DEMAND FOR RENEWABLE ENERGY**

19 Q. Have Missouri cities demonstrated a desire for renewable energy?

20 A. Yes. Columbia has a renewable portfolio standard that exceeds the Missouri statutory
21 standard applicable to investor owned utilities. The MoPEP has consistently been a
22 leader in the state in developing wind and solar projects, and their customers continue to
23 express a desire for more renewable energy.

1 **Q. Did the MoPEP recently begin to offer a renewable product for its wholesale**
2 **members?**

3 A. Yes. That was approved in the fall of 2016, and deliveries started in January of 2017.

4 **Q. What is that product?**

5 A. It is a 60,000 MWh option offered at a small premium over other resources. It allows our
6 wholesale customers to market a renewable product to their retail customers.

7 **Q. Did the MoPEP members have difficulty in providing that product in a retail form**
8 **to its retail customers?**

9 A. No. It was fully subscribed, with additional demand unmet.

10 **Q. Do the MoPEP members have a desire for additional renewable resources that are**
11 **more affordable than current options?**

12 A. Yes. Given that the renewable product described above was quickly subscribed, and that
13 other retail customers of our wholesale customers have expressed a demand for additional
14 renewable products, I believe that the demand for renewables by our members is still
15 unmet.

16 **Q. Do you expect industrial retail customers will want additional renewable energy in**
17 **the future?**

18 A. Yes. In particular, we have observed that industrial retail customers of our wholesale
19 customers are placing renewable energy goals in their corporate procurement policies.
20 The Grain Belt project gives our cities the opportunity to meet those policies, and remain
21 or become attractive locations for those industries.

22

23

1 **Q. Will the contracts with Grain Belt and Infinity give the MoPEP members a more**
2 **diverse renewable portfolio?**

3 A. Yes. If the Grain Belt project is completed, the MoPEP members will have another 9.5%
4 percent of their energy needs met through wind, with a total renewable portfolio of
5 approximately 23%. The MoPEP has been a leader in integrating renewable resources
6 into their portfolio mix, and this will continue that trend.

7 **Q. Do MJMEUC members want lower wholesale rates?**

8 A. Yes.

9 **Q. Do you expect lower wholesale rates to have a positive impact on MJMEUC**
10 **members?**

11 A. Yes. While retail rate setting is reserved to city governments, we expect that lower
12 wholesale rates will result in rate stabilization over an extended period of time. In the
13 past this has resulted in increased economic activity and development.

14 **Q. Has any other entity offered to provide this type of transmission rate to deliver this**
15 **quality and cost of renewable energy?**

16 A. No.

17 **Q. Does this conclude your pre-filed rebuttal testimony in this case?**

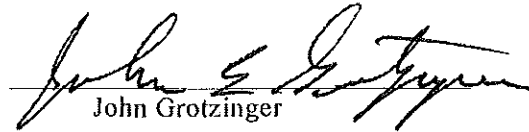
18 A. Yes. However, I wish to preserve the right to provide additional testimony in the form of
19 sur-rebuttal or at the hearing to rebut the pre-filed testimony filed by another party.

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

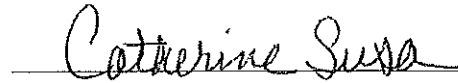
STATE OF MISSOURI)
) SS
COUNTY OF BOONE)

AFFIDAVIT OF JOHN GROTZINGER

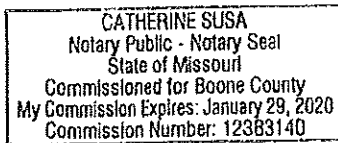
John Grotzinger, being first duly sworn, deposes and says that he is the witness who sponsors the accompanying rebuttal testimony and schedules; that said testimony was prepared by him or under his direction and supervision; that if inquiries were made as to the facts in said testimony and schedules, he would respond as therein set forth; and that the aforesaid testimony and schedules are true and correct to the best of his knowledge, information, and belief.


John Grotzinger

Subscribed and sworn to before me this 24 day of January, 2017.


Notary Public

My commission expires: 1/29/2020



JOHN GROTZINGER

1808 I-70 Drive SW, Columbia, MO 65203
Phone: 573-445-3279 Fax: 573-445-0680

Education

BS in Electrical Engineering
University of Missouri-Columbia

Professional

Professional Engineer in Missouri, #E-20968

Experience

December 1994 to present
Missouri Joint Municipal Electric Utility Commission (MJMEUC)
808 I-70 Drive SW, Columbia, MO 65203

Almost forty (40) years of experience in electric utilities from the generator to the house service with emphasis in electric system planning as well as gas and water system planning. Joined MJMEUC in 1994 and currently serves as Chief Operating Officer and Vice President for Engineering and Operations. Directed the initial development of the Missouri Public Energy Pool. Continues to oversee operations and expansion of the Missouri Public Energy Pool. Initiated and directed MJMEUC involvement in over 600 MW of new coal fired generation, as well as expansion into gas fired combined heat and power, gas fired simple and combined cycle projects, wind and landfill gas generation. Has managed the construction of these projects from the initial stages and continues to guide them as they reach operation. Continues to guide growth in pooling, generation, transmission and electric services expansion.

December 1980 to December 1994
Springfield City Utilities
301 E. Central St., Springfield, MO 65802

Last position was System Planning Engineer and was actively involved in system planning and numerous projects, including a 69 kV substation capacitor bank and Missouri's only municipally owned 345kV line.

1979 to December 1980
Kansas City Power and Light
1200 Main St., Kansas City, MO 64105

Last position held was as a Planning Engineer.

Schedule JG-3

COMPARISON BETWEEN GRAIN BELT PROJECT VS. SPP TO MISO

	SPP Trans Rate PTP Throuh/Out	Capacity Factor	Contract Price \$/MWh	\$/MWh	Congestion \$/MWh	Prices \$/MWh	\$/MWh	\$/MWh
Approximately	\$2880/MW-mo	50.00%	20	2	4	6	8	10
		Energy Generated MWh	Line Losses @ 3%	Congestion	Congestion	Congestion	Congestion	Congestion
60 MW SPP Total Cost	\$2,073,600	262,800	\$157,680	\$525,600 \$2,756,880	\$1,051,200 \$3,282,480	\$1,576,800 \$3,808,080	\$2,102,400 \$4,333,680	\$2,628,000 \$4,859,280
100 MW SPP Total Cost	\$3,456,000	438,000	\$262,800	\$876,000 \$4,594,800	\$1,752,000 \$5,470,800	\$2,628,000 \$6,346,800	\$3,504,000 \$7,222,800	\$4,380,000 \$8,098,800
135 MW SPP Total Cost	\$4,665,600	591,300	\$354,780	\$1,182,600 \$6,202,980	\$2,365,200 \$7,385,580	\$3,547,800 \$8,568,180	\$4,730,400 \$9,750,780	\$5,913,000 \$10,933,380
200 MW SPP Total Cost	\$6,912,000	876,000	\$525,600	\$1,752,000 \$9,189,600	\$3,504,000 \$10,941,600	\$5,256,000 \$12,693,600	\$7,008,000 \$14,445,600	\$8,760,000 \$16,197,600
60 MW TSA Grain Belt Cost	\$1,020,000			\$1,020,000	\$1,020,000	\$1,020,000	\$1,020,000	\$1,020,000
200 MW TSA Grain Belt Cost	\$ 3,400,000			\$ 3,400,000	\$ 3,400,000	\$ 3,400,000	\$ 3,400,000	\$ 3,400,000
Total Transmission Cost Savings at 60 MW TSA				\$1,736,880	\$2,262,480	\$2,788,080	\$3,313,680	\$3,839,280
Total Transmission Cost Savings at 200 MW TSA				\$5,789,600	\$7,541,600	\$9,293,600	\$11,045,600	\$12,797,600

Schedule JG-5

Source	Grain Belt and Infinity Wind Power				
MW	200	100	125	150	175
MWh	876000	438000	547500	657000	766500
Cap. Factor	0.5	0.5	0.5	0.5	0.5
\$/MWh	16.5	16.5	16.5	16.5	16.5
Energy \$	14,454,000	7,227,000	9,033,750	10,840,500	12,647,250
GB TX Rate	3,400,000	1,400,000	1,900,000	2,400,000	2,900,000
 Total \$	 17,854,000	 8,627,000	 10,933,750	 13,240,500	 15,547,250
 Total \$/MWh Delivered into MISO	 20.38	 19.70	 19.97	 20.15	 20.28

Schedule JG-6

Source	MISO						SPP	
	Grain Belt	Crystal Lake	Iowa wind	MO Wind	Solar	Crystal Lake II	SPP Wind	Combined Cycle
MW	135	135	135	135	135	135	135	135
MWh	591,300	378,432	532,170	449,388	212,868	413,910	591,300	591,300
Capacity Factor	0.50	0.32	0.45	0.38	0.18	0.35	0.50	0.50
\$/MWh	20.00	45.00	32.00	29.00	80.00	22.00	18.00	37.41
Energy \$	11,826,000	17,029,440	17,029,440	13,032,252	17,029,440	9,106,020	10,643,400	22,120,533
Congestion adder	-	7	5	2	(1)	7	1	1
Congestion \$	-	2,649,024	2,660,850	898,776	(212,868)	2,897,370	591,300	591,300
Total \$	11,826,000	19,678,464	19,690,290	13,931,028	16,816,572	12,003,390	11,234,700	22,711,833
Energy Delta MWh	-	212,868	59,130	141,912	378,432	177,390	-	-
2021 Avg. Ann. MWh/\$	-	10,958,445	3,044,012	7,305,630	19,481,679	9,132,037	-	-
Total \$	11,826,000	30,636,909	22,734,302	21,236,658	36,298,251	21,135,427	11,234,700	22,711,833
Annual Difference GBX/Alternative		18,810,909	10,908,302	9,410,658	24,472,251	9,309,427	(591,300)	10,885,833
							SPP trans 8,568,180	SPP trans \$8,568,180
							7,976,880	\$19,454,013

Assumptions from Leidos Study

2021 Average Annual Energy Price	\$ 51.48
Off Peak 2021 Average Annual Energy Price	\$ 41.57
On Peak 2021 Average Annual Energy Price	\$ 62.35

Schedule JG-7

MOPEP SAVINGS

MISO IPM	New			Existing			Total
	MISO Grain Belt	SPP Wind	SPP Comb. Cycle	SPP Higginsville Simple Cycle	SPP Marshall Wind	MC Power Solar	
100 MW	60	25	50	38	20	16	102
0.7 Cap. Factor	0.50	0.45	0.30	0.05	0.45	0.18	
613,200 MWh	262,800	98,550	131,400	16,644	78,840	25,544	613,778
\$ 15,435 \$/MW-month	\$ 1,416.67	\$ 2,880.00	\$ 6,000.00	\$ 1,070.00	\$ -	\$ -	
\$ 22.56 \$/MWh	\$ 16.50	\$ 27.00	\$ 21.60	\$ 56.00	\$ 36.00	\$ 75.00	
\$ 18,522,000 Ann. Capacity Cost	\$ 1,020,000	\$ 864,000	\$ 3,600,000	\$ 487,920	\$ -	\$ -	\$ 5,971,920
\$ 13,833,792 Ann. Energy Cost	\$ 4,336,200	\$ 2,660,850	\$ 2,838,240	\$ 932,064	\$ 2,838,240	\$ 1,915,812	\$ 15,521,406
\$32,355,792.00 Total	\$ 5,356,200.00	\$ 3,524,850.00	\$ 6,438,240.00	\$ 1,419,984.00	\$ 2,838,240.00	\$ 1,915,812.00	\$ 21,493,326.00
52.77 All-in Cost \$/Mwh	20.38	35.77	49.00	85.32	36.00	75.00	35.02
				Annual Savings			\$10,862,466