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FOSDICK & HILMER, INC.
CONSULTING ENGINEERS
309 VINE STREET
SUITE 50
CINCINNATI, OHIO 45202
513-241-5640
FAX 513-241-3659

PRINCIPALS:
J.W. PRETZ, P.E.
J.R. GRUBBS, P.E.
R.W. SAUNDERS, LEED AP

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November 8, 2012

Todd A. Snitchler
Public Utilities Commission of Ohio
180 E. Broad St.
Columbus, Ohio 43215-3793

Case: 12-2051-EL-ORD
Interested Person Comments Regarding the Public Utilities Commission of Ohio Proposed Changes Chapter 4901:1-22 O.A.C. - Interconnection Services

Mr. Chairman,

In response to the Commission's request for comments I have prepared the following comments regarding chapter 4901:1-22-11 "Backup electricity supply."

The draft code addresses division (C) of section 4928.15 of the revised code by requiring the EDU to make a backup electricity supply available, but it does not address divisions (A) and (B).

Distribution Standby Charges:
Division (A) of section 4928.15 of the revised code requires EDUs to publish a service schedule of distribution service rates that are consistent with the state policy specified in section 4928.02 of the revised code.

Division (K) of section 4928.02 of the revised code specifies the state policy is to "Encourage implementation of distributed generation across customer classes through regular review and updating of administrative rules governing critical issues such as, but not limited to, interconnection standards, standby charges, and net metering."

My review of the published distribution tariffs of AEP Columbus Southern, Duke Ohio, and First Energy Ohio Edison clearly shows that in several cases the existing standby service tariffs do not encourage implementation of distributed generation. In fact my study of the Duke Ohio tariffs (included with this letter) that I presented to the PUCO staff on October 4, 2012 shows that distribution rates increase when a customer reduces its utilization of the distribution system by installing distributed generation.

The backup electricity supply requirements in chapter 4901:1-22-11 should address this issue and require that at a minimum the distribution charges that a customer pays if distributed generation is installed do not increase above the equivalent charges a customer would be charged if distributed generation was not installed.

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Transmission Standby Charges:
Division (B) of section 4928.15 of the revised code requires EDUs to publish a service schedule of transmission service rates that are consistent with the state policy specified in section 4928.02 of the revised code.

Division (K) of section 4928.02 of the revised code specifies the state policy is to "Encourage implementation of distributed generation across customer classes through regular review and updating of administrative rules governing critical issues such as, but not limited to, interconnection standards, standby charges, and net metering."

My review of the published transmission tariffs of AEP Columbus Southern, Duke Ohio, and First Energy Ohio Edison clearly shows that there are cases where standby service tariffs do not encourage implementation of distributed generation. In fact my study of the Duke Ohio tariffs (included with this letter) that I presented to the PUCO staff on October 4, 2012 shows that transmission rates increase when a customer reduces its utilization of the transmission system by installing distributed generation.

The backup electricity supply requirements in chapter 4901:1-22-11 should address this issue and require that EDUs only charge transmission fees proportional to the amount of KWH actually delivered to the customer.

Conclusion:
Distributed generation technologies such as cogeneration can utilize Ohio's natural gas abundance to reduce the energy cost of industrial, government, and institutional users and increase the competiveness of Ohio, resulting in an economic environment that encourages growth and new jobs. By requiring transmission and distribution charges that are proportional to customer utilization the Public Utilities Commission can fulfill the state policy of encouraging the implementation of distributed generation.

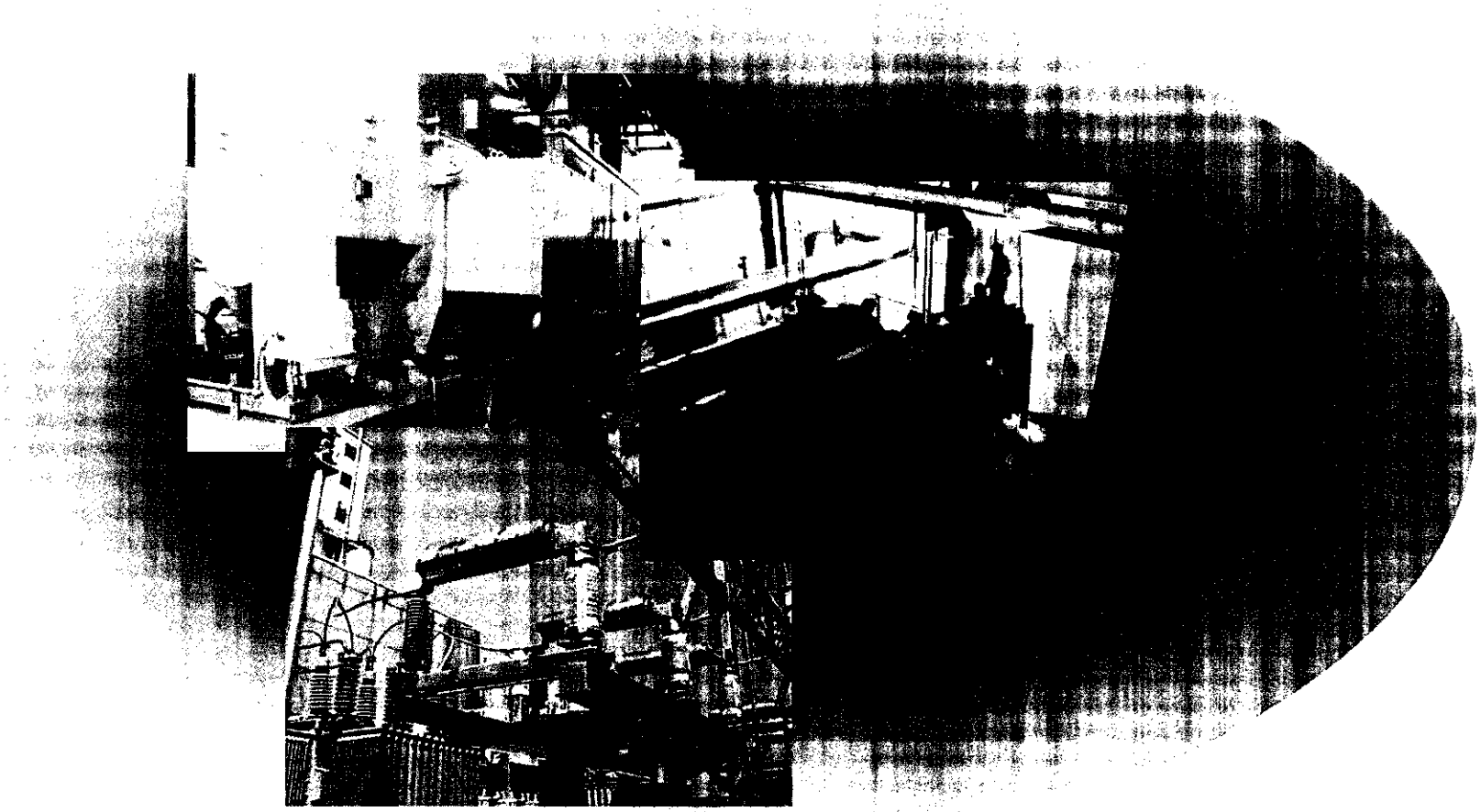
Fosdick and Hilmer is currently engaged in the design of two cogeneration plants and studying the feasibility of several others. The cost of backup electricity is one factor that weighs into project feasibility decisions. Fair transmission and distribution charges for energy delivery service will reassure our clients that Ohio supports and encourages cogeneration technologies. We eagerly await your decisions in this important matter.

Thank you,



James Landers P.E.

Cogeneration Project
Analysis of Duke Energy Tariffs

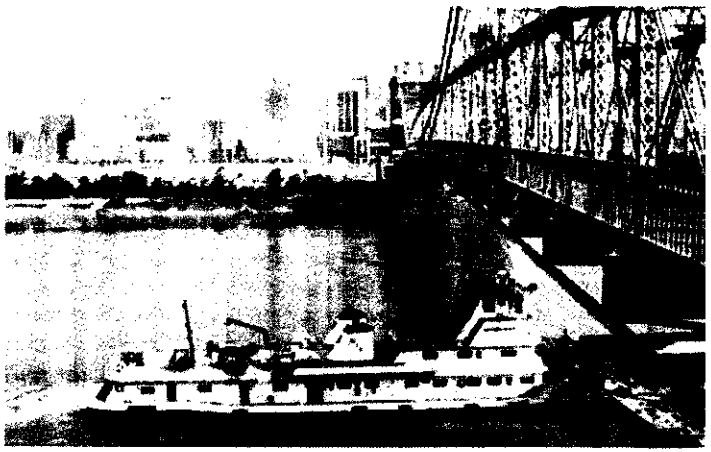


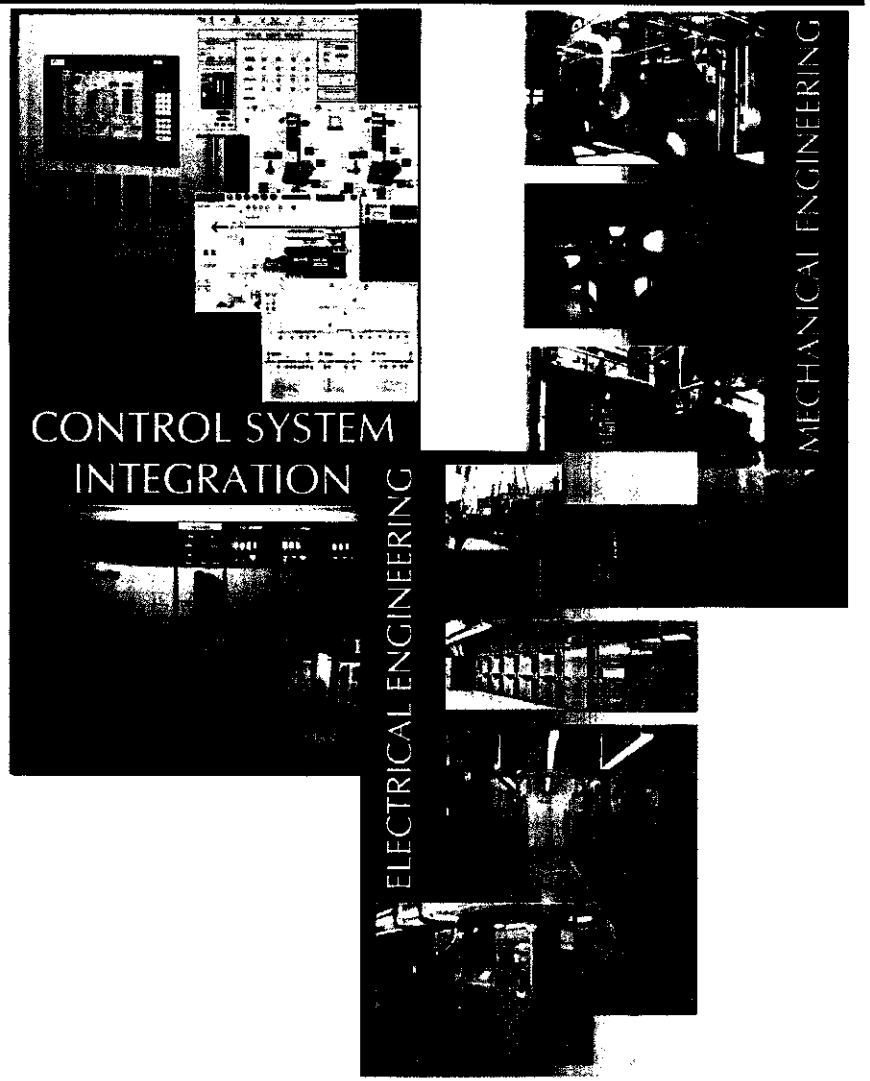
Cogeneration Project
Analysis of Duke Energy Tariffs

F&H Facts

Firm headquartered in Cincinnati, Ohio

- Firm founded in 1905
- ~70 employees
  - 18 Registered Professionals
  - 26 Degreed / Senior Engineers
- Areas of specialization
  - Mechanical Engineering
  - Electrical Engineering
  - Control/Automation





Cogeneration Project
Analysis of Duke Energy Tariffs

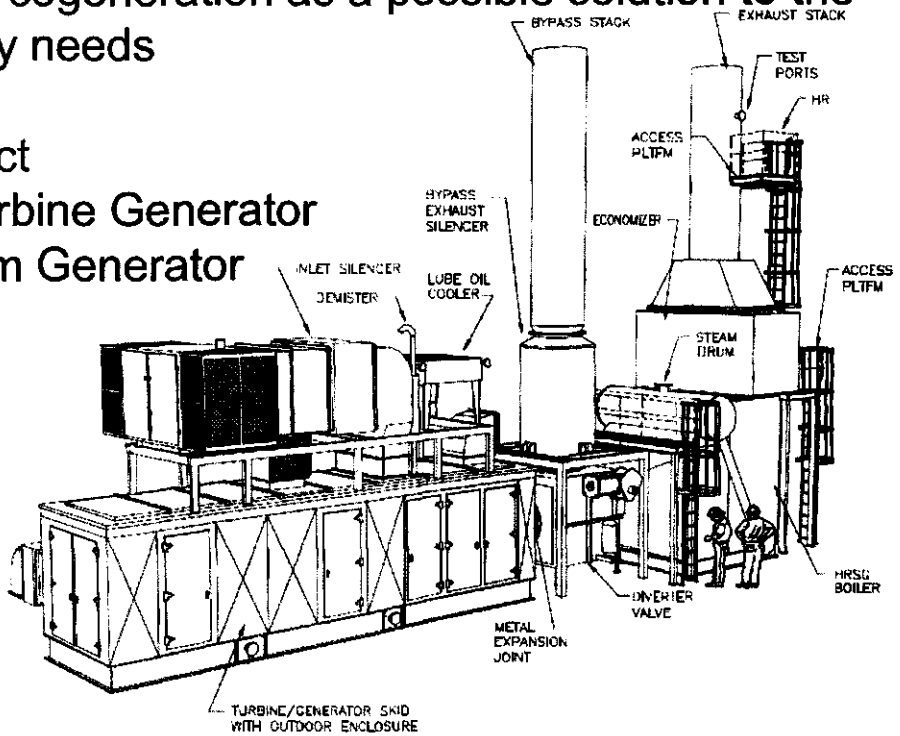
Project Overview

A Cincinnati Hospital is undergoing a large construction project

- Fosdick & Hilmer is providing MEP Engineering services for the new building
- Fosdick & Hilmer identified cogeneration as a possible solution to the hospital's increasing energy needs

Scope of the Co-Generation Project

- 6.3MW Solar Taurus 65 Turbine Generator
- 60,500 LB/HR HRSG steam Generator
- $12 Million Project



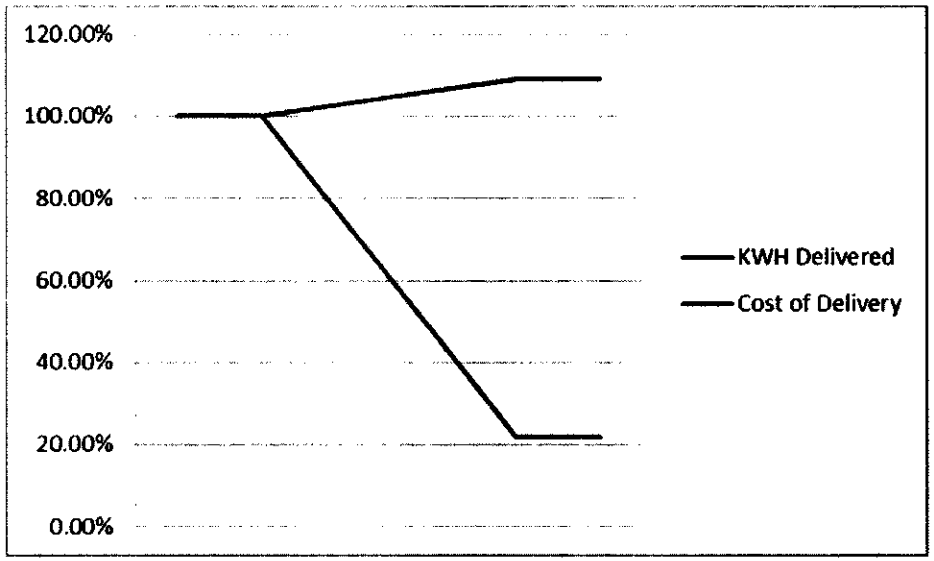
Cogeneration Project
Analysis of Duke Energy Tariffs

Summary of Tariff Analysis Results

- Under current tariffs the cost of energy delivery will increase approximately $70,000 annually if a cogeneration plant is installed.
  - This represents a 9% increase in energy delivery costs
  - Total energy delivered decreases by 78% or 48,048,600KWH

Largest contributors to increased rates:

- Rider LFA
  - $100,000
- Rider GSS
  - $85,000



Cogeneration Project
Analysis of Duke Energy Tariffs

Rider LFA - "Load Factor Adjustment"

Charges:

- $8.00 per KW of demand

Credits:

- $0.020961 per KHW of usage

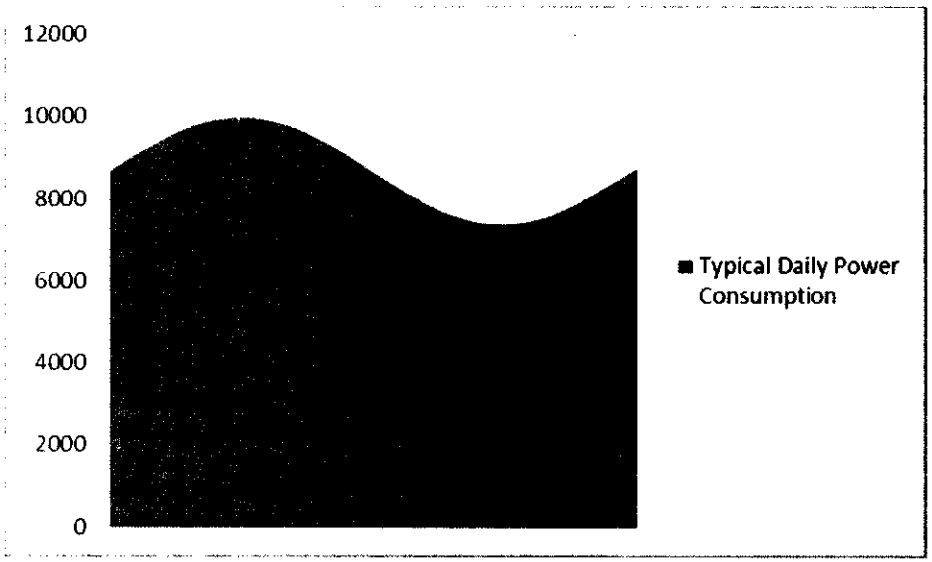
Key Characteristics of Rider LFA

- LFA encourages flattening the peak demand by charging a flat fee per KW of monthly demand, and crediting back per KHW of usage in a given month.
- If a customer uses more than 400KWH for each KW of demand their bill will receive a credit under LFA.
- Inversely if a customer uses less than 400KWH per KW of demand their bill will be charged a fee under LFA.

Cogeneration Project
Analysis of Duke Energy Tariffs

Effect of Rider LFA without Cogeneration

- Monthly credit of ~ $22,000 to $42,000
- Annually ~ $380,000 reduction in energy delivery charges



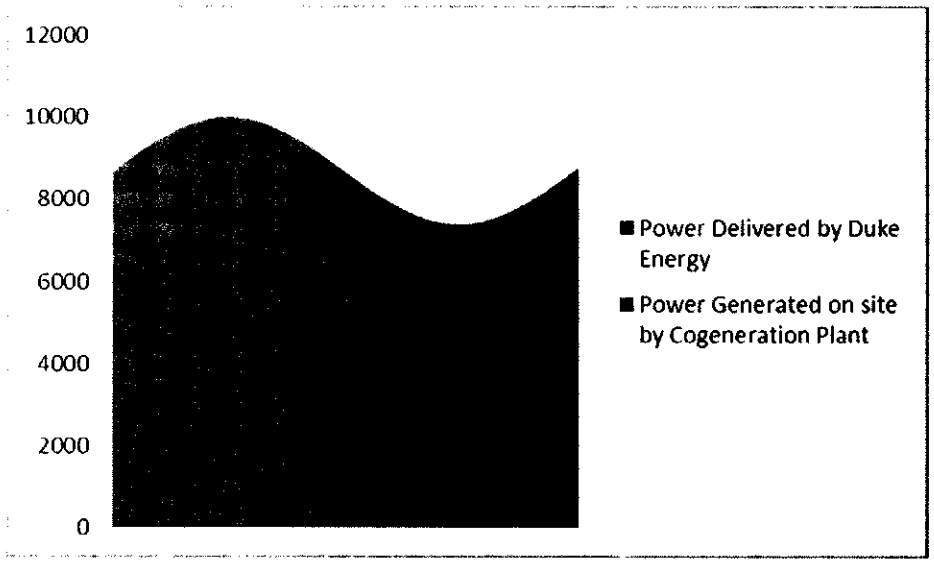
- Hospital operates 24/7
- Flatter demand than a typical customer
- Very little ripple at the top of the curve
- Hospital regularly consumes more than 400KWH per KW

Cogeneration Project
Analysis of Duke Energy Tariffs

Effect of Rider LFA with Cogeneration

- Monthly range from:
  - Credit of ~ $6,000 to a Charge of ~ $22,000
- Annually ~ $102,000 increase in energy delivery charges

From the perspective of the Duke Energy meter the hospital consumption changes.



- 6,000KW of hospital base load is served by the cogeneration plant
- The remaining load served by Duke Energy has a much steeper daytime consumption slope
- The ratio of KWH to KW demand drops below 400.

Cogeneration Project
Analysis of Duke Energy Tariffs

Items to Consider while Reviewing Rider LFA

1. Rider LFA has a laudable goal of flattening the overall demand of the bulk electric system. We should continue to promote this behavior.

2. The relatively flat energy consumption at the hospital has not changed; therefore the hospital should not pay a penalty due to the location of the energy meter in relation to the location of the cogeneration source.

3. The overall KWH delivered to the hospital decreases by 78% and the peak demand does not increase when cogeneration is installed. The hospital should see a reasonable decrease in its energy delivery bill in proportion to the reduced utilization.

Cogeneration Project
Analysis of Duke Energy Tariffs

We propose two options to modify the LFA rate structure

- Option 1 – For the purpose of calculating rider LFA the demand is determined by summing the peak KW demand of the cogen unit to the peak demand measured at the Duke Energy meter. KWH usage is measured by summing the total KWH measured at the cogen unit to the KWH measured at the Duke Energy meter. LFA charges and credits remain as they are currently written.

- Option 2 – Rider LFA no longer applies to accounts using rider GSS.

Cogeneration Project
Analysis of Duke Energy Tariffs

Rider GSS - "Generation Support Service" **Pending rate case**

Distribution Reservation Charges:

- $3.77 per KW of demand

Transmission Reservation Charges:

- $1.1823 per KW of demand
- $0.000338 credit per KWH usage

Supplemental Power:

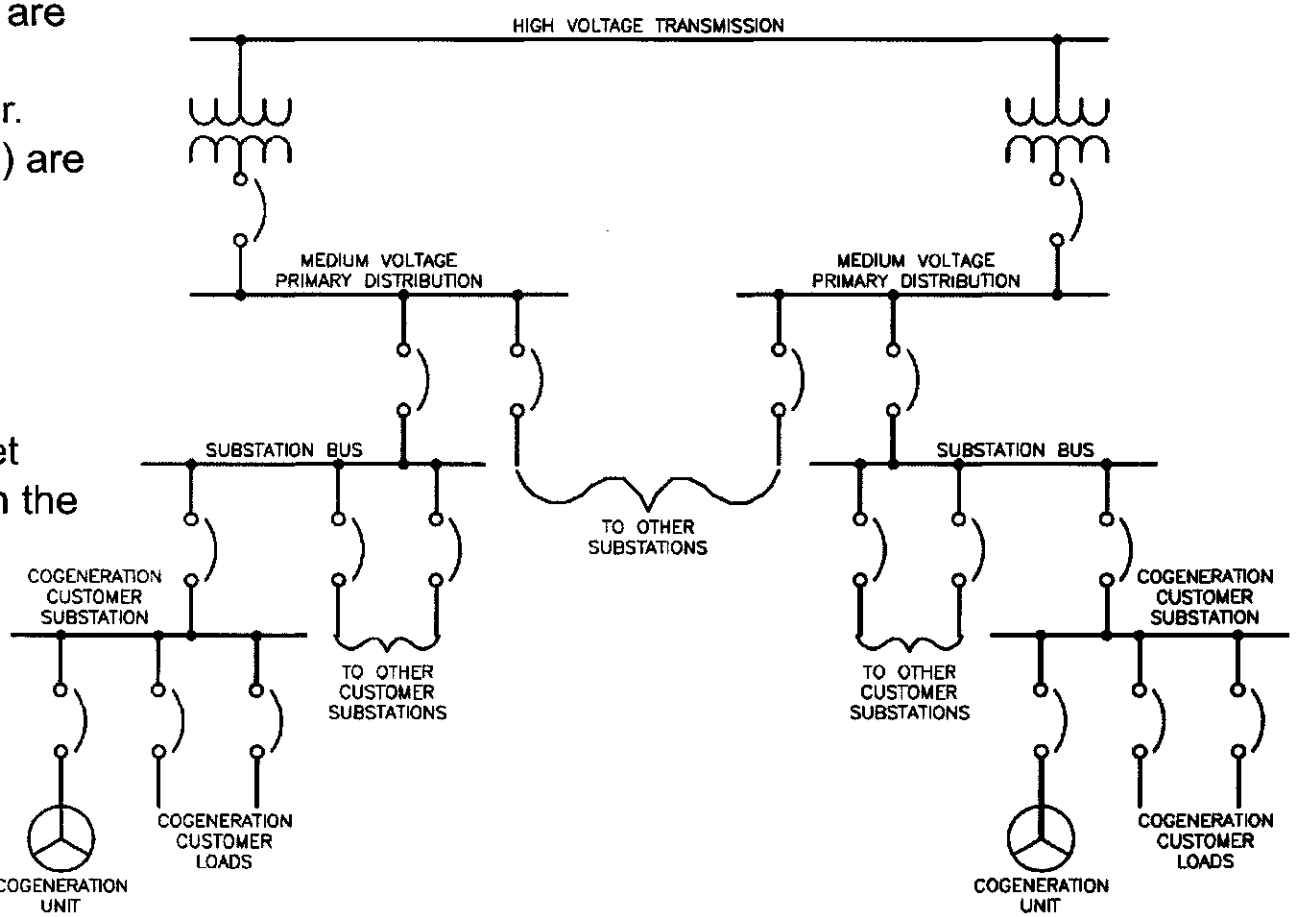
- Billed under the terms and charges of the Company's applicable full service tariff schedules.

Note: There are portions of rider GSS that were not reviewed in this analysis. We are actively working with Duke Energy to accurately interpret the rider and determine if there will be any additional charges applied to the bill.

Cogeneration Project
Analysis of Duke Energy Tariffs

Items to Consider while Reviewing Rider GSS

- Distribution lines (blue) are sized and dedicated to serve the final customer.
- Transmission lines (red) are sized and designed to serve load to an entire region.
- Two cogeneration units operating in the same region will result in a net reduction of demand on the transmission system.



Cogeneration Project
Analysis of Duke Energy Tariffs

Analysis of Rider GSS

Distribution System

- Not shared among a large pool of customers
- Under utilized capacity cannot be easily re-used for other purposes
- Peak demand on distribution lines with cogen units installed does not decrease unless multiple cogeneration units share a common substation.

Transmission System

- Designed to support hundreds or even thousands of customers
- Two cogeneration units operating in the same region will result in a net reduction of demand on the transmission system.
- The net reduction is due to the low probability of two or more cogeneration units having simultaneous forced outages.

Conclusion

- The charge for backup transmission service should be reduced proportionally with the demand on the transmission system.

Cogeneration Project
Analysis of Duke Energy Tariffs

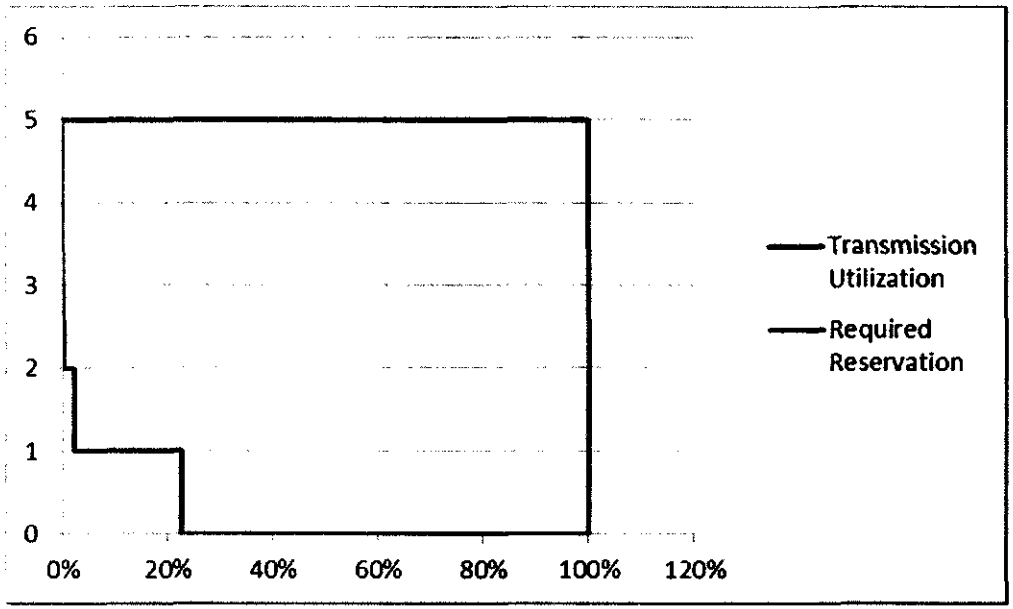
Probable Effects of Simultaneous Outages on the Transmission System

Assume the following:

- 5 cogeneration units in the region
- Each with a nameplate rating of 4-6MW
- Each unit has a annual forced outage rate of 5%

Probability of Simultaneous Failures

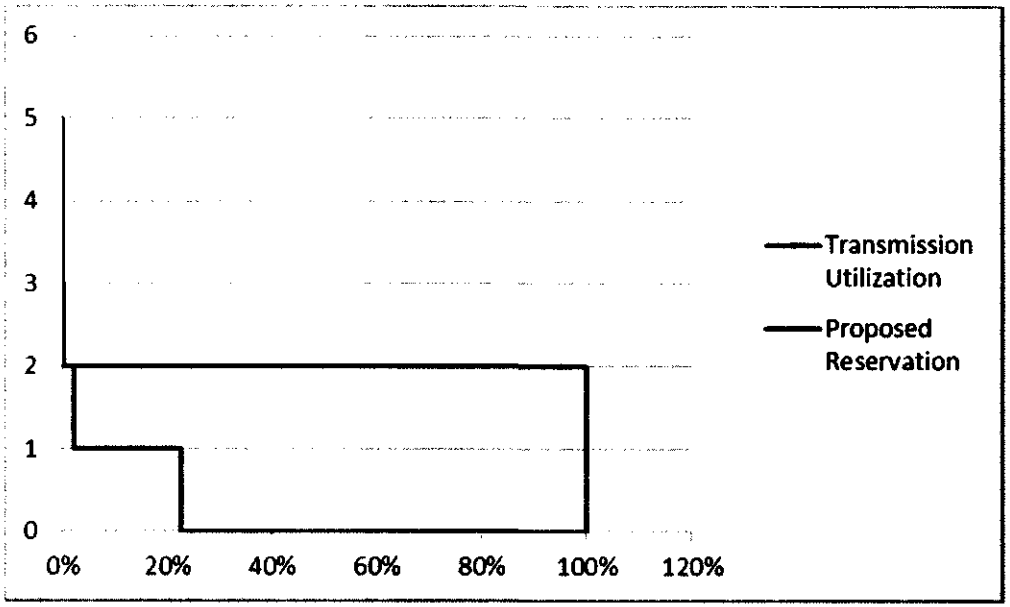
- 77.38% - All units in service.
- 20.36% - One unit forced out of service.
- 2.14% - Two units forced out of service.
- 0.113% - Three units forced out of service.
- 0.003% - Four units forced out of service.
- 0.00003% - Five units forced out of service.



Cogeneration Project
Analysis of Duke Energy Tariffs

Proposed Modification of the GSS Transmission Reservation Requirement

- 5 cogeneration units operating in parallel reduces the peak demand on the bulk transmission system by 60%.
- A reservation equivalent to two units of capacity(40% of 5 units) reserves enough transmission capacity for over 99.9% of contingencies.
- The proposed reservation will cover 99.9% of peak contingencies.
- Allows enough capacity to schedule maintenance outages during non-peak periods



Cogeneration Project
Analysis of Duke Energy Tariffs

Proposed Modification of the GSS Transmission Reservation Calculation

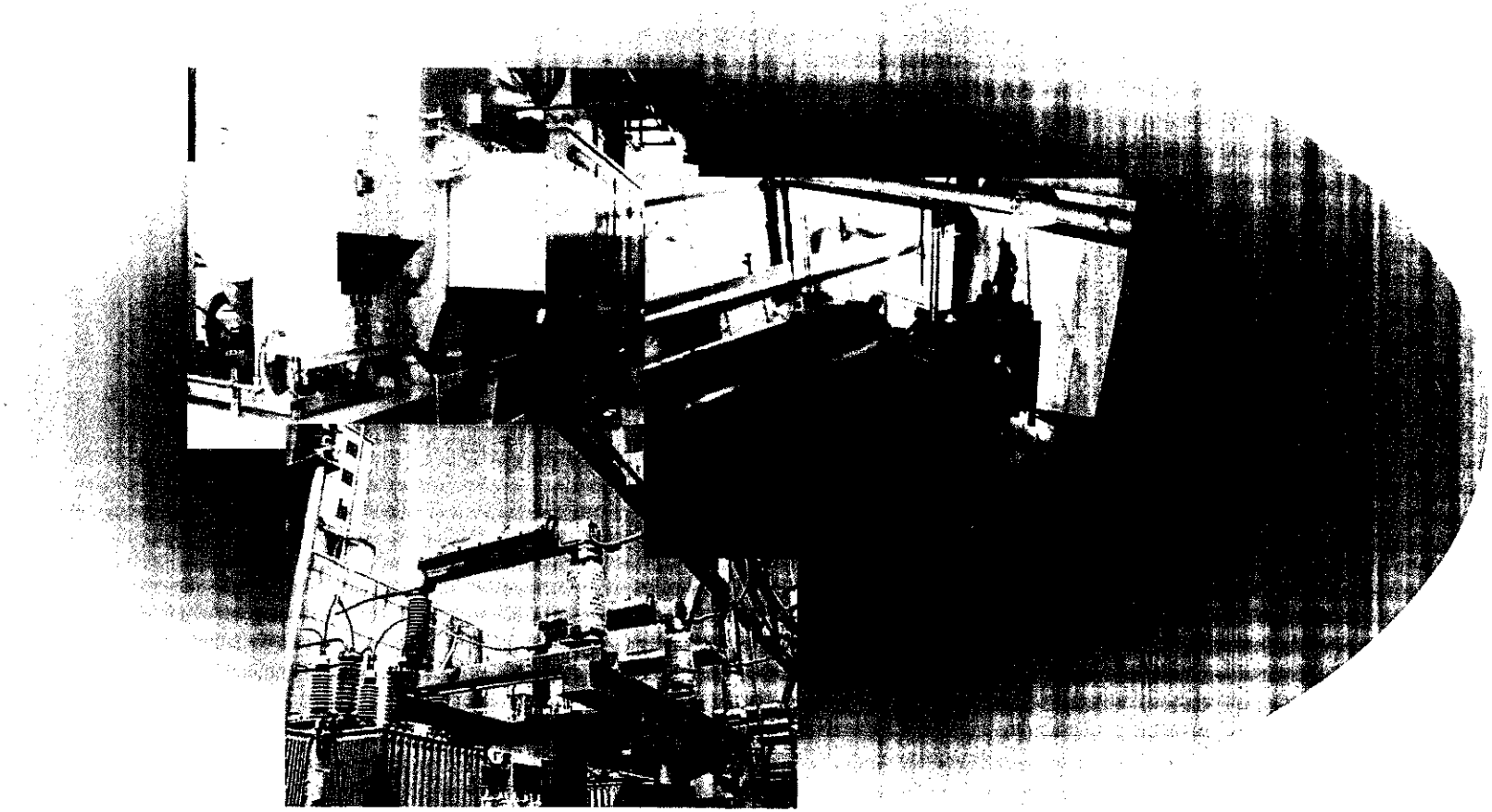
- Required Monthly Reservation = (Total plant % outage rate) x 4
  - Emergency outage usage can be no greater than 50% of the total plant outage rate

- If the emergency outage rate exceeds 50% of the contract, then the monthly reservation will be increased by this formula:
  - Required Monthly Reservation = (% forced outage rate) x 8

- If the emergency outage rate exceeds 12.5% then the required monthly reservation will equal the net output of the cogeneration unit.

Reserving transmission as proposed would result in $51,000 annual savings.

Cogeneration Project
Analysis of Duke Energy Tariffs



Analysis of Impacts of CoGeneration on Duke Energy Distribution Billing
Rider LFA Included

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Days in Month	31	28	31	30	31	30	31	31	30	31	30	31
Traditional Plant												
$ Per KWH	$0.052	$0.052	$0.052	$0.052	$0.052	$0.052	$0.052	$0.052	$0.052	$0.052	$0.052	$0.052
Peak Demand	8,266	8,610	7,937	10,027	9,746	10,701	10,110	9,560	9,534	7,787	8,047	7,776
KWH Consumed	4,814,229	4,530,624	4,623,960	5,653,440	5,678,208	6,033,600	5,890,320	5,569,584	5,375,520	4,536,912	4,536,912	4,530,624
Distribution Charge	**$66,545.03**	**$70,567.69**	**$69,243.81**	**$68,307.76**	**$63,832.25**	**$72,813.65**	**$66,168.18**	**$62,636.01**	**$65,013.68**	**$70,478.50**	**$70,478.50**	**$70,567.69**
CoGen Plant												
Capacity Factor	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Gas $/DTH	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00
Turbine Heat Rate	10373	10373	10373	10373	10373	10373	10373	10373	10373	10373	10373	10373
Supplimential Demand	2,266	2,610	1,937	4,027	3,746	4,701	4,110	3,560	3,534	1,787	2,047	1,776
Backup Reservation	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
KWH Consumed	5,186,229	4,866,624	4,995,960	6,013,440	6,050,208	6,393,600	6,262,320	5,941,584	5,735,520	4,908,912	4,896,912	4,902,624
KWH Generated	4,452,840	4,021,920	4,452,840	4,309,200	4,452,840	4,309,200	4,452,840	4,452,840	4,309,200	4,452,840	4,309,200	4,452,840
KWH Purchased	733,389	844,704	543,120	1,704,240	1,597,368	2,084,400	1,809,480	1,488,744	1,426,320	456,072	587,712	449,784
Distribution Charge	**$78,319.05**	**$77,043.02**	**$80,485.05**	**$66,029.99**	**$67,091.76**	**$70,535.87**	**$65,757.59**	**$68,632.48**	**$69,517.91**	**$81,476.00**	**$79,977.42**	**$81,547.58**
Distribution Change	**11,774**	**6,475**	**11,241**	**-2,278**	**3,260**	**-2,278**	**-411**	**5,996**	**4,504**	**10,998**	**9,499**	**10,980**

Annual Distribution Charges

CoGen Plant	$886,413.73
Traditional Distribution	$816,652.75
Annual Distribution Change	$69,760.98

9% Change

Analysis of Impacts of CoGeneration on Duke Energy Distribution Billing
Rider LFA Deleted from CoGen Billing

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
Days in Month	31	28	31	30	31	30	31	31	30	31	30	31
Traditional Plant												
Peak Demand	8,266	8,610	7,937	10,027	9,746	10,701	10,110	9,560	9,534	7,787	8,047	7,776
KWH Consumed	4,814,229	4,530,624	4,623,960	5,653,440	5,678,208	6,033,600	5,890,320	5,569,584	5,375,520	4,536,912	4,536,912	4,530,624
Distribution Charge	**$66,545.03**	**$70,567.69**	**$69,243.81**	**$68,307.76**	**$63,832.25**	**$72,813.65**	**$66,168.18**	**$62,636.01**	**$65,013.68**	**$70,478.50**	**$70,478.50**	**$70,567.69**
CoGen Plant												
Capacity Factor	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Gas $/DTH	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00	$5.00
Turbine Heat Rate	10373	10373	10373	10373	10373	10373	10373	10373	10373	10373	10373	10373
Supplimential Demand	2,266	2,610	1,937	4,027	3,746	4,701	4,110	3,560	3,534	1,787	2,047	1,776
Backup Reservation	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
KWH Consumed	5,186,229	4,866,624	4,995,960	6,013,440	6,050,208	6,393,600	6,262,320	5,941,584	5,735,520	4,908,912	4,896,912	4,902,624
KWH Generated	4,452,840	4,021,920	4,452,840	4,309,200	4,452,840	4,309,200	4,452,840	4,452,840	4,309,200	4,452,840	4,309,200	4,452,840
KWH Purchased	733,389	844,704	543,120	1,704,240	1,597,368	2,084,400	1,809,480	1,488,744	1,426,320	456,072	587,712	449,784
Distribution Charge	**$61,724.97**	**$62,782.22**	**$59,902.75**	**$69,538.46**	**$68,607.55**	**$76,618.83**	**$70,806.97**	**$67,871.41**	**$67,448.36**	**$59,069.08**	**$60,329.81**	**$59,008.86**
Distribution Change	**-4,820**	**-7,785**	**-9,341**	**1,231**	**4,775**	**3,805**	**4,639**	**5,235**	**2,435**	**-11,409**	**-10,149**	**-11,559**

Annual Distribution Charges		
CoGen Plant	$783,709.27	
Traditional Distribution	$816,652.75	
Annual Distribution Change	-$32,943.48	-4% Change