

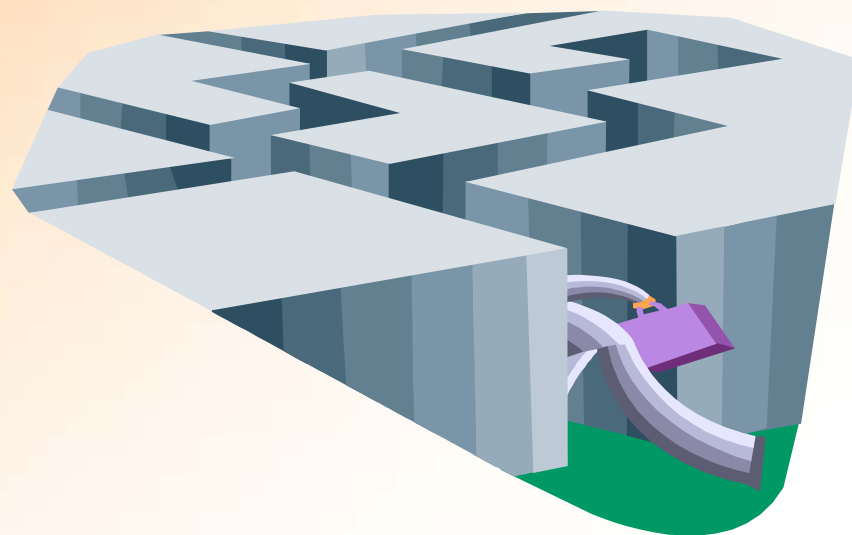
# Electric Bills

## What they tell you!

Brett Ward  
Municipal Technical Advisory Service  
Institute for Public Service  
The University of Tennessee

# Every trip has a beginning

- With Electrical Energy Management it begins with your current electric bill.



# Electric Bill Information

- Simple Bill
  - Minimal Information
  - Perhaps only Dollar Amounts
- Complex Billing Statement
  - Details of Money
    - Current charges or minimum charges
  - Details of Electrical Usage
    - Energy Used
    - Rate it was used
    - Way it was used

# Sample Statements

## Simple Bill

## Detailed Statement

AND RETURN TOP PORTION IF PAYING BY MAIL

ACCOUNT NUMBER: 100  
 CUSTOMER NAME: [REDACTED]  
 SERVICE ADDRESS: [REDACTED]  
 METER READING DATE: AUG 10 2007  
 DAYS BILLED: 30

This office is not responsible for bills or payments lost in the mail. Previous balance added to this bill is past due and is subject to disconnection if not paid by final notice date shown above.

SERVICE	PRESENT READING	PREVIOUS READING	AMOUNT USED	AMOUNT
ELECTRIC (KILOWATT HOURS)	34312	32886	95000	3,018.97
INDOOR LIGHT			210	20.23
OPERATION POCKET CHANGE				.38
VA FUEL COST ADJ FA				92.42
<b>TOTAL CURRENT CHARGES</b>				<b>3,070.00</b>

PAID  
AUG 30 2007

CATEGORY	AMOUNT	ADJUSTMENTS	BALANCE FORWARD	CURRENT CHARGES	TOTAL
PREVIOUS BILL	2,802.00	.00	2,802.00	.00	.00
				3,070.00	<b>3,070.00</b>

DEMAND 109.7  
 POCKET CHNG YTD 4.10

**COMPARE YOUR USAGE**

PERIOD	DAYS	ELECT. KWH USED	DAILY AVG. KWH
CURRENT	30	32000	1066.7
LAST MONTH	29	28760	991.7
YEAR AGR	31	25290	815.8

FIRM NAME: [REDACTED] CT/RTE/ACCT/TN RATE: 157 6SAZ CL 50

READING DATA: 34312 - DATE: 08/10/07 - REV. NO- 08 - 32558 = 1754 X 20.000 = **35080.0 KWH**

KWH METER READINGS: 5.445 (CONSTANT = 20.000) COMPUTED = 129.980 KWH  
 KVA METER READINGS: 6.453 (CONSTANT = 20.000) COMPUTED = 109.701 KVA  
 BILLED: 85% OF KVA = 93.236 KVA  
 POWER FACTOR = 84.400%

CONTRACT DEMAND .000 HIGHEST BILLING DEMAND 178.636  
 PRECEDING 12 MDS: 178.636  
 LATEST 12 MDS: 178.636

DETERMINATION OF CURRENT MONTH BILLING DEMAND:  
 HIGHER OF (1) OR (2) OR (3):  
 (1) METERED KW = 108.900  
 (2) KVA x .85 OF FIRST 5000 + .95 OVER 5000 = 109.701  
 (3) .30 x HIGHER OF CNTR KW OR PREV HI KW = 53.591  
**BILLING DEMAND = 109.701**

CUSTOMER CHARGE ENERGY CHARGES:  
 15000.000 KWH @ \$1.08369 = \$16255.35  
 20080.000 KWH @ \$1.03961 = \$20873.80  
**TOTAL ENERGY CHARGE = \$37129.15**

DEMAND CHARGES:  
 30.000 KW @ \$3.00000 = \$90.00  
 39.701 KW @ \$2.1279000 = \$84.48  
**TOTAL DEMAND CHARGES = \$174.48**

**TOTAL RATE SCHEDULE REVENUE = 3,049.19**

MINIMUM BILL CALCULATIONS:  
 (1) (A) CUSTOMER CHARGE: \$22.00  
 + (B) HI OF CNTR OR PRV HI KW X .20 X OVER 50 KW PRICE: \$509.47  
 = TOTAL: \$531.47

**TOTAL MONTHLY RATE SCHEDULE REVENUE = 3,049.19**

SALES TAX @ 0.000 % = .00  
**TOTAL EL = 3,049.19**

OUTDOOR LIGHT CHARGE = 20.43  
 SALES TAX @ 0.000 % = .00  
**TOTAL OL = 20.43**

**TOTAL BILLING CHARGES = 3,069.62**

MISCELLANEOUS CHARGE = .00  
**TOTAL WITH LOAN = 3,070.00**

# First Challenge

- Find the Distributor Representative who can thoroughly explain the detailed statement
  - Highly Technical Culture
  - Many terms, abbreviations, and acronyms
  - Person who knows the details may not be customer service oriented

# Detailed Statement

Meter Readings in kWh

Note Constant

Demand Reading in kW

#1 Demand Reading in kWA

#2 Demand billed @ 85% of kWA

Power Factor is 84.4%

Contract Demand

Highest Billing Demand (12 months)

#3 Demand 30% , highest 12 mo. Dmd

Demand Billed on 109.7 kW

Customer Charge

Energy Costs

1<sup>st</sup> 15,000 kWh + FCA

Remaining 20080 kWh

Demand Charges

1<sup>st</sup> 50 kW no charge

Remaining 59.7 kW +

Minimum Demand

FIRM NAME:	CT/RTE/ACCT/TN	CL 50
	RATE: 157 6SA2	
READING DATA:	DATE: 08/10/7	REV. MD. 08
KWH PRS RDG: 34312	PRV RDG: 32558 =	1754 X 20.000 = 35080.0 KWH
KM METER READING: 5.445	(CONSTANT =	20.000) COMPUTED = 108.900 KW
KVA METER READING: 6.453	(CONSTANT =	20.000) COMPUTED = 129.060 KVA
		BILLED 85% OF KVA = 109.701
		POWER FACTOR = 84.400%
CONTRACT DEMAND	HIGHEST BILLING DEMAND	
0000	PRECEDING 12 MOS. 178.636	
	LATEST 12 MOS. 178.636	
DETERMINATION OF CURRENT MONTH BILLING DEMAND:	DEMANDS	
HIGHER OF (1) OR (2) OR (3):		
(1) METERED KW =	108.900	
(2) KVA @ .85 OF FIRST 5000 + .95 OVER 5000	109.701	
(3) .30 * HIGHER OF CNTR KW OR PREV HI KW	53.591	
BILLING DEMAND :	109.701	
CUSTOMER CHARGE		CHARGES
ENERGY CHARGES:		22.00
15000.000 KWH @ \$.08369	\$.00353 .00093 =	\$1322.25
20080.000 KWH @ \$.03961	\$.00199 .00091 =	\$853.60
TOTAL ENERGY CHARGE		2,175.85
DEMAND CHARGES:		
50.000 KW @ \$.00000	\$.00000 .00000 =	\$.00
59.701 KW @ \$13.79000	\$.47000 .00000 =	\$851.34
TOTAL DEMAND CHARGES		851.34
TOTAL RATE SCHEDULE REVENUE		3,049.19 *
MINIMUM BILL CALCULATION:		
(1) (A) CUSTOMER CHARGE:		\$22.00
+ (B) HI OF CNTR OR PRV HI KW X .20 X OVER 50 KW PRICE:		\$509.47
= TOTAL	178.636 KW @ .20 X (\$13.790 + ADD \$.470 )	\$531.47*
TOTAL MONTHLY RATE SCHEDULE REVENUE		3,049.19 *
	SALES TAX @ 0.000 %	.00
	TOTAL EL	3,049.19 *
OUTDOOR LIGHT CHARGE		20.43
	SALES TAX @ 0.000 %	.00
	TOTAL OL	20.43 *
TOTAL BILLING CHARGES		3,069.62 *
MISCELLANEOUS CHARGE		.38
	TOTAL WITH LOAN	3,070.00 *

# Saving Money

1. Use less kWh
2. Keep Power Factor >85%
3. Minimize Demand Charges

FIRM NAME:	CT/RTE/ACCT/TH RATE: 157 GSA2	CL 50
READING DATA: KWH PRS RDG: 34312 - PRV RDG: 32558 =	DATE: 08/10/77	REV. MD. 08 1754 X 20.000 = 35080.0 KWH
KW METER READING: 5.445 (CONSTANT =	20.000) COMPUTED	108.900 KW
KVA METER READING: 6.453 (CONSTANT =	20.000) COMPUTED	129.060 KVA
	BILLED 85% OF KVA =	109.701
	POWER FACTOR =	84.400%
CONTRACT DEMAND .000	HIGHEST BILLING DEMAND PRECEDING 12 MOS.: 178.636 LATEST 12 NOS.: 178.636	
DETERMINATION OF CURRENT MONTH BILLING DEMAND: HIGHER OF (1) OR (2) OR (3):		DEMANDS
(1) METERED KW =		108.900
(2) KVA @ .85 OF FIRST 5000 + .95 OVER 5000		109.701
(3) .30 * HIGHER OF CNTR KW OR PREV HI KW		53.591
BILLING DEMAND :		109.701
CUSTOMER CHARGE		CHARGES
ENERGY CHARGES:		22.00
15000.000 KWH @ \$.08369	\$0.00353 0.00093 =	\$1322.25
20080.000 KWH @ \$.03961	\$0.00199 0.00091 =	\$853.60
TOTAL ENERGY CHARGE		
DEMAND CHARGES:		
50.000 KW @ \$0.00000	\$0.00000 0.00000 =	\$0.00
59.701 KW @ \$13.79000	\$0.47000 0.00000 =	\$851.34
TOTAL DEMAND CHARGES		
TOTAL RATE SCHEDULE REVENUE		3,049.19 *
MINIMUM BILL CALCULATION:		
(1) (A) CUSTOMER CHARGE:		\$22.00
+ (B) HI OF CNTR OR PRV HI KW X .20 X OVER 50 KW PRICE:		\$509.47
178.636 KW @ .20 X (\$13.790 + ADD \$.470 )		
= TOTAL		\$531.47*
TOTAL MONTHLY RATE SCHEDULE REVENUE		3,049.19 *
	SALES TAX @ 0.000 %	.00
TOTAL EL		3,049.19 *
OUTDOOR LIGHT CHARGE		20.43
	SALES TAX @ 0.000 %	.00
TOTAL OL		20.43 *
TOTAL BILLING CHARGES		3,069.62 *
MISCELLANEOUS CHARGE		.38
	WU	
TOTAL WITH LOAN		3,070.00 *

# Use Less Energy or kWh

- Turn stuff OFF!
  - Don't over aerate
  - Do not discharge Nitrate ( $\text{NO}_3$ )
    - If you Nitrify, Denitrify Effluent and Sludge or Biosolids
  - Lots of other actions
    - Improve efficiency and reduce waste
- Generate your own kWh



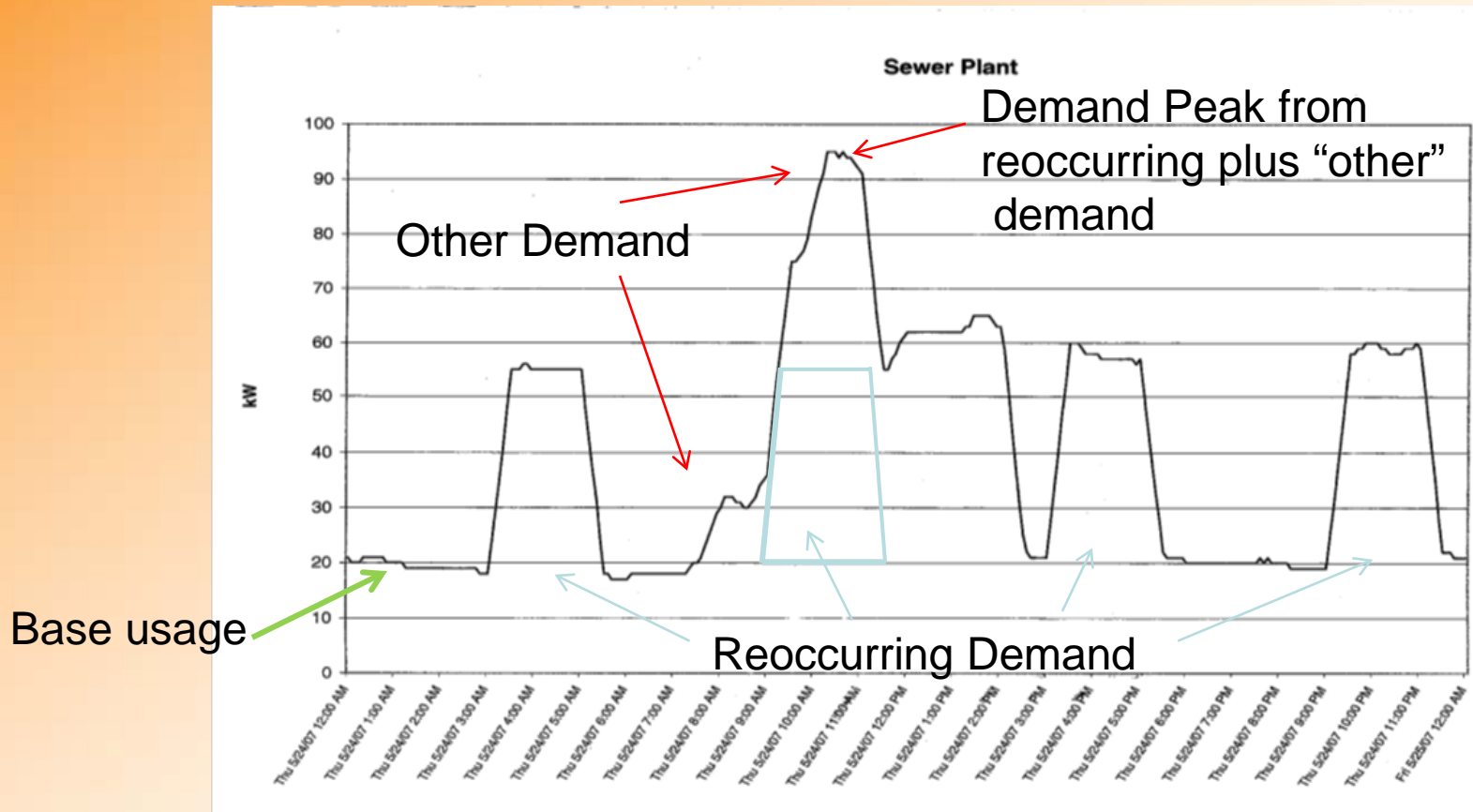
# Power Factor Penalties

- Keep it above 85%
- Distributors generally will help you
- Reduce inductive load
  - Inductive motors, ballasts, arc welders, transformers, loads with wound coils.
  - Add capacitors

# Reduce Demand Charges

- Know Thy Demand
- Demand Curve, Graph, Chart
- Reduce Demand Peaks that set the kW peaks from which charges are assessed.
- Keep it FLAT, keep it Short

# Example Demand Graph



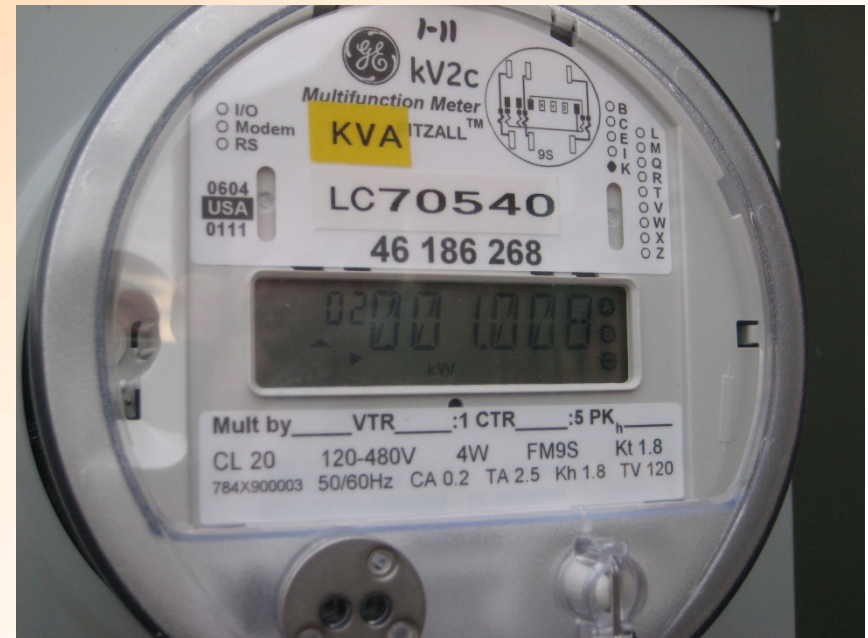
# Contract Charges

- Contract Charges
  - Know and understand any contract minimum charges, probable from construction charges
- Minimum Demand
  - Annual Peak Demand

FIRM NAME:	CT/RTE/ACCT/TN	CL 50
	RATE: 157 GSA2	
READING DATA:	DATE: 08/10/77	REV. NO. 08
KWH PRS RDG: 34312 -	PRV RDG: 32558 =	1754 X 20.000 = 35080.0 KWH
KW METER READING: 5.445 (CONSTANT = 20.000)	COMPUTED =	108.900 KW
KVA METER READING: 6.453 (CONSTANT = 20.000)	COMPUTED =	129.060 KVA
	BILLED 85% OF KVA =	109.701
	POWER FACTOR =	84.400%
<b>CONTRACT DEMAND</b> 0.000	HIGHEST BILLING DEMAND	
	PRECEDING 12 MOS.: 178.636	
	LATEST 12 MOS.: 178.636	
DETERMINATION OF CURRENT MONTH BILLING DEMANDS:		DEMANDS
HIGHER OF (1) OR (2) OR (3):		
(1) METERED KW =		108.900
(2) KVA @ .85 OF FIRST 5000 + .95 OVER 5000		109.701
(3) .30 * HIGHER OF CNTR KW OR PREV HI KW		59.591
BILLING DEMAND :		109.701
CUSTOMER CHARGE		CHARGES
ENERGY CHARGES:		22.00
35000.000 KWH @ \$0.08369	\$0.00353 * 0.00093 =	\$1322.25
20080.000 KWH @ \$0.03961	\$0.00199 * 0.00091 =	\$853.60
TOTAL ENERGY CHARGE		2,175.85
DEMAND CHARGES:		
50.900 KW @ \$0.00000	\$0.00000 * 0.00000 =	\$0.00
59.701 KW @ \$13.79000	\$0.47000 * 0.00000 =	\$651.34
TOTAL DEMAND CHARGES		851.34
TOTAL RATE SCHEDULE REVENUE		3,027.19
MINIMUM BILL CALCULATION:		
(1) (A) CUSTOMER CHARGE:		\$22.00
+ (B) HI OF CNTR OR PRV HI KW X .20 X OVER 50 KW PRICE:		\$509.47
= TOTAL		\$531.47
TOTAL MONTHLY RATE SCHEDULE REVENUE		3,049.19
	SALES TAX @ 0.000 %	0.00
	TOTAL EL	3,049.19
OUTDOOR LIGHT CHARGE		20.43
	SALES TAX @ 0.000 %	0.00
	TOTAL OL	20.43
TOTAL BILLING CHARGES		3,069.62
MISCELLANEOUS CHARGE		NU 0.38
	TOTAL WITH LOAN	3,070.00

# Electric Bill Information

- Energy usage kWh
- Rate of usage
  - Demand
  - kW
- How its used
  - Power Factor shows inductive or capacitive load
- Contract Minimums



# Questions/Comments