Understanding kW and kWh
Demand & Energy

- **Demand (kW)**
  - Also known as power
  - The rate at which electricity is consumed
  - PGN measures demand in 15 minute intervals (1:00, 1:15, 1:30, 1:45, etc.)
  - Demand is average kW over that interval

- **Energy (kWh)**
  - Amount of electricity consumed over a period of time
  - One kWh is equivalent to one kW of power used over a one hour period of time

"The Speedometer Analogy"

\[
\begin{align*}
\text{kW} &= \text{speed (mph)} \\
\text{kWh} &= \text{distance (miles)}
\end{align*}
\]
The Demand Interval

- Integrated average over the 15 minute interval
- Not an instantaneous peak
- Not caused by motor current inrush
- Not the peak for 1 minute or 5 minutes
- This example - the 15 minute demand is 100 kW

15 min. demand = 100 kW
In the real world, demand measured at the utility meter is continuously changing over time.

High rates of power consumption in the interval impact the integrated average, but don’t set the “peak”.

Actual demand for this example = 86 kW (Not 113 kW).
Measuring Energy Use

- Energy use is simply power (or demand) used over time.
- Electric meter integrates the power over a fixed time interval.

\[ kWh = \text{“Area Under the Curve”} \]

88 kW demand for one hour = 88 kWh
C&I Rate Availability

- Three General Service Rates
  - Small General Service (SGS)
  - Medium General Service (MGS)
  - Large General Service (LGS)

- Two Time-of-Use Rates
  - Small General Service Time-of-Use (SGS-TOU)
  - Large General Service Time-of-Use (LGS-TOU)

- Same rates in NC & SC, but demand and energy charges vary for each state
MGS Example

- Billing Month - July
- Billing Demand - 342 kW
- Energy Consumption - 84,600 kWh

Customer Charge (3 ph service) = $21.00
Demand Charge 342 kW x $4.89 = $1,672.38
On-Peak Energy Charge 84,600 kWh x $0.06195 = $5,240.97
3% NC Sales Tax $208.03

TOTAL DUE $7,142.38
Time-of-Use Hrs - Non-Summer

On-Peak Hours for Commercial & Industrial TOU Customers
Non-summer Hours – October 1 through March 31
Monday through Friday, 6 AM – 1 PM and 4 PM – 9 PM

Weekends and holidays are off-peak
SGS-TOU Example

- Billing Month - August
- On-Peak Demand - 432 kW (Aug 30 at 11:15 a.m.)
- Off-Peak Demand - 320 kW (Aug 31 at 9:00 a.m.)
  - Less than On-Peak Demand - No Off-Peak Excess
- On-Peak Energy - 106,800 kWh
- Off-Peak Energy - 136,800 kWh

Customer Charge = $21.00
Demand Charge 432 kW x $10.10 = $4,363.20
On-Peak Energy Charge 106,800 kWh x $0.05199 = $5,552.53
Off-Peak Energy Charge 136,800 kWh x $0.03996 = $5,466.53
3% NC Sales Tax $462.10
TOTAL DUE $15,865.36
Power Factor

- **Apparent Power (kVA)** - Total power provided by utility or generation
- **Reactive Power (kVAr)** - Sustains electromagnetic field in inductive loads (i.e. motors, transformers, ballasts)
- **Real Power (kW)** - Performs the actual work (i.e. motors, lights, heat)
- Indicator of how effectively power is being used

\[
\text{PF} = \frac{\text{Real Power (kW)}}{\text{Apparent Power (kVA)}} = \cos \theta
\]

"The Beer Analogy"

- Beer (kW) quenches thirst
- Foam (kVAr) doesn’t quench thirst
- kVA is the total mug of beer
- "The Beer Analogy"
Power Factor Adjustment

- Covers the cost of providing reactive power (kVAr) below a predetermined baseline
- Progress Energy baseline PF is 85%
- $.40 \times (\text{Max Monthly kVAR} - (\text{Max Monthly kW} \times 62\%))
- Differences in cost are determined by each state’s utility commission
- Can apply to all rates
Small Piece of the Puzzle

- Only **1.6%** of all large accounts are impacted by power factor adjustment.
- The average power factor adjustment makes up only **0.21%** of a customer’s total electric bill.

Customer, Demand & Energy Charges

- **PF Adjustment**
Customer Energy Seminar

Account Summary
Includes your account number, total amount due, due date, and usage period.

Usage Information
Includes the meter number for the point of delivery (POD), meter readings, days in billing period and total kWh usage.

Demand Information
Includes actual peak kW demand, on-peak and off-peak demand, and peak reactive power (kVAR).

Metered Service Charges
Includes service address and charges for all metered POD’s.

NC Sales Tax
Typically 3%, but a discount of 0.17% is available to qualifying customers from the NC Dept. of Revenue under the provisions of G.S. 105-236(7). Potential qualifying customers include farmers, manufacturing industries, and commercial laundries or dry-cleaning facilities. Qualifying customers should fill out Form E-599U (available from NC Dept. of Revenue web site) and mail it to your account manager.

Billing Address
Customer name and address where the bill is sent.

Electric Usage History
Allows you to compare your electric usage over the past 13 months.

Rate Schedule
Indicates the electric rate for the metered point-of-delivery (POD).

Power Factor Adjustment
This billing adjustment applies if the power factor for the metered service falls below 85% during the billing period.

Additional Facilities Charges
Indicates charges for additional facilities or non-metered services for this account. This sample account has two area lighting services in addition to the main POD.

Total Amount Due
Indicates total amount due for the billing period.

Payment Stub
Return this portion of the bill with your payment.
For more information, contact your Account Executive or email us at erc@pgnmail.com