Colorado Springs Utilities
It's how we're all connected

UNDERSTANDING LARGE COMMERCIAL ELECTRIC BILLS

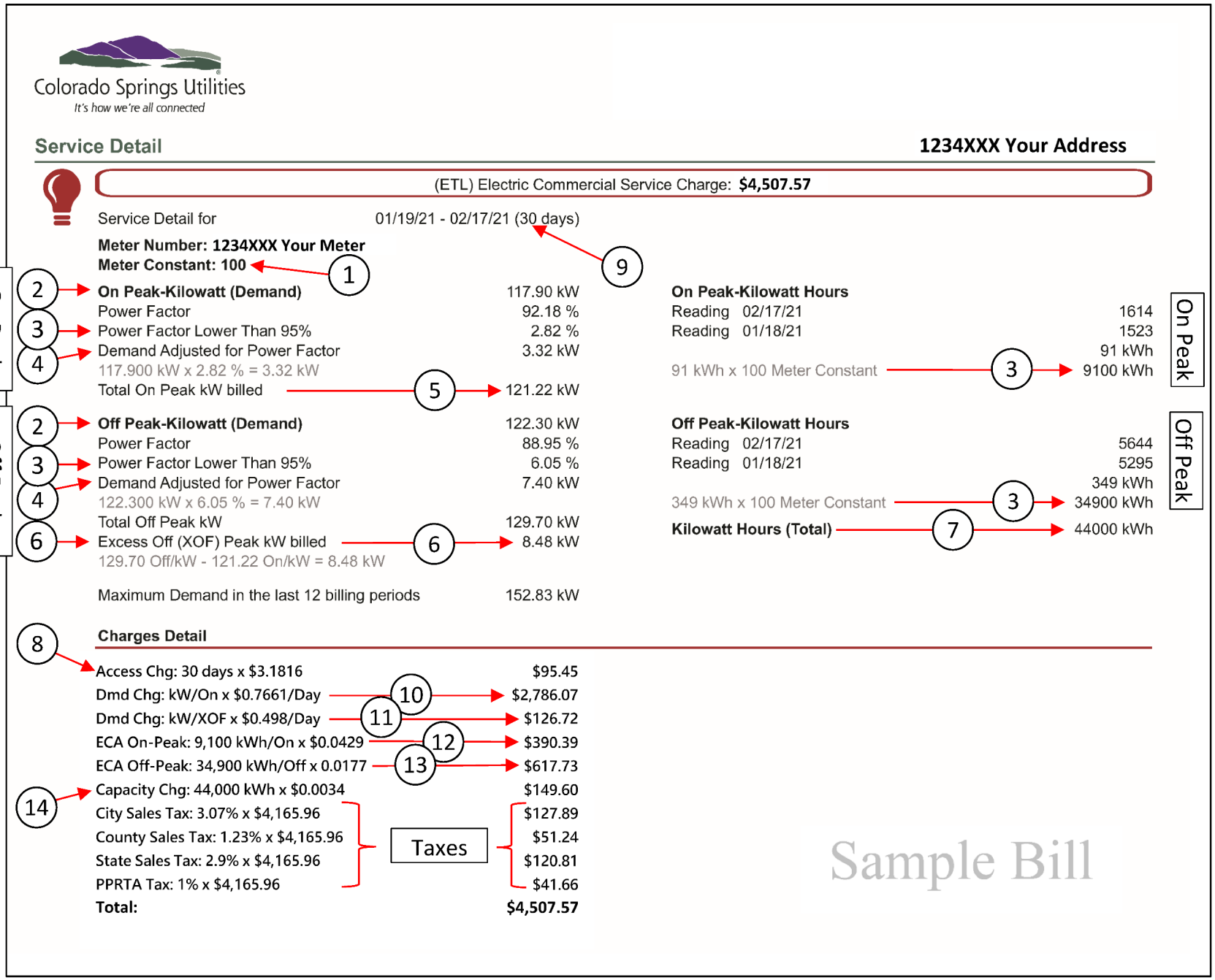
WHITE PAPER #22

Demand-Based Time of Use Electric Rates Have Some Unique Terms

It my seem ironic that the electricity bills is complex enough to need an instruction manual. We divide the charges into pieces so we can most fairly recover the cost.

Note: This paper's purpose is to explain the basic concepts and components used in time-of-use electric billing, plus some insight as to what is behind each one. Some bill formats look a little different, but the same concepts apply. If your bill contains additional terms or if you have questions, please call us at 719-448-4808

Thank You!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Service Detail
1234XXX Your Address
(ETL) Electric Commercial Service Charge: $4,507.57
Service Detail for 01/19/21 - 02/17/21 (30 days)
Meter Number: 1234XXX Your Meter
Meter Constant: 100
On Peak
On Peak-Kilowatt (Demand) 117.90 kW
Power Factor 92.18 %
Power Factor Lower Than 95% 2.82 %
Demand Adjusted for Power Factor 3.32 kW
117.900 kW x 2.82 % = 3.32 kW
Total On Peak kW billed 121.22 kW
On Peak-Kilowatt Hours
Reading 02/17/21 1614
Reading 01/18/21 1523
91 kWh
91 kWh x 100 Meter Constant 9100 kWh
Off Peak
Off Peak-Kilowatt (Demand) 122.30 kW
Power Factor 88.95 %
Power Factor Lower Than 95% 6.05 %
Demand Adjusted for Power Factor 7.40 kW
122.300 kW x 6.05 % = 7.40 kW
Total Off Peak kW 129.70 kW
Excess Off (XOF) Peak kW billed 8.48 kW
129.70 Off/kW - 121.22 On/kW = 8.48 kW
Off Peak-Kilowatt Hours
Reading 02/17/21 5644
Reading 01/18/21 5295
349 kWh
349 kWh x 100 Meter Constant 34900 kWh
Kilowatt Hours (Total) 44000 kWh
Maximum Demand in the last 12 billing periods 152.83 kW
Charges Detail
Access Chg: 30 days x $3.1816 $95.45
Dmd Chg: kW/On x $0.7661/Day $2,786.07
Dmd Chg: kW/XOF x $0.498/Day $126.72
ECA On-Peak: 9,100 kWh/On x $0.0429 $390.39
ECA Off-Peak: 34,900 kWh/Off x 0.0177 $617.73
Capacity Chg: 44,000 kWh x $0.0034 $149.60
City Sales Tax: 3.07% x $4,165.96 $127.89
County Sales Tax: 1.23% x $4,165.96 $51.24
State Sales Tax: 2.9% x $4,165.96 $120.81
PPRTA Tax: 1% x $4,165.96 $41.66
Taxes
Total: $4,507.57
Sample Bill

Table 1. Specific Line Items

General concepts and some notes on how we recover costs are found in the pages following the table

O	Line Item	How it is Calculated	Explanation
1	Meter Constant		Meter hardware factors that convert raw meter readings to bill quantities. Values depend on the installed equipment and voltage.
2	Demand Measurement	Units of kW (Kilowatt) The maximum meter reading for the bill period, multiplied by the meter constant. Measured separately for On-Peak and Off-Peak periods.	Power or maximum rate of energy draw from the system during the period.
3	Energy Measurement	Units of kWh (Kilowatt Hours) The difference between the meter reading for this bill and the prior reading, multiplied by the meter constant. Measured separately for On-Peak and Off-Peak periods.	Energy consumed during the period.
3	Power Factor Lower than 95%	The difference between measured power factor and 95%. Calculated separately for On-Peak and Off-Peak periods.	See discussion at the end of this table on 'Power Factor Adjustment'. This is the amount, in percentage points, lower than 95%. A value of "5%" would mean a power factor of 90%
4	Demand Adjusted for Power Factor	Measured demand multiplied by the number of percentage points lower than 95%. Calculated separately for On-Peak and Off-Peak periods.	See discussion at the end of this table on 'Power Factor Adjustment'. The measured electrical demand is adjusted (increased) if customer power factor is too low. For example, if a customer power factor is 85%, the measured demand is adjusted up by 10% since it is ten percentage points below the 95% threshold. The amount of the demand kW adjustment is also known as power factor charge.

O	Line Item	How it is Calculated	Explanation
5	Total On-Peak kW (billed demand)	Sum of measured on-peak demand and any demand increase from low power factor	
6	XOF Excess Off Peak kW (billed demand)	The difference between adjusted Off-Peak and adjusted On-Peak demand, in kW.	This forms the billable kW for Off-Peak demand charge. Billable off peak demand is only the Off-Peak demand kW that is greater than the On-Peak kW. For most customers, the off-peak demand is much smaller than on-peak demand and often zero. For example, if on peak adjusted demand is 100 kW and adjusted off-peak demand is 110 kW, the off-peak billable demand is 10 kW.
7	Kilowatt-Hours (Total)	Sum of On-Peak and Off-Peak kWh. The difference between the meter reading for this bill and the prior reading, multiplied by the meter constant.	This is the total electric energy usage for the period.
8	Access Chg. (Access Charge)	Daily fee multiplied by the number of days in the billing period.	
9	Bill Days	The number of days since the prior meter reading.	
10	Dmd Chg: kW/On	On-peak kW demand, adjusted for low power factor if applicable, multiplied by the per-day demand charge and number of days in the bill period	On-Peak Demand Charge
11	Dmd Chg: kW/Off	Off-peak kW demand, adjusted for low power factor if applicable, multiplied by the per-day demand charge and number of days in the bill period	Off-Peak Demand Charge
12	ECA On-Peak	Energy used (kWh) during On-Peak periods multiplied by the rate per-kWh On-Peak	Electric Cost Adjustment (ECA), on-peak

O	Line Item	How it is Calculated	Explanation
13	ECA Off-Peak	Energy used (kWh) during Off-Peak periods multiplied by the rate per-kWh Off-Peak	Electric Cost Adjustment (ECA), off-peak
14	Capacity Chg.	All energy used (total kWh) multiplied by the per-kWh rate	Electric Capacity Charge

General Concept Descriptions

Meter constants. An easy example is a large water meter where each revolution of the meter corresponds to 100 gallons. This meter would have a meter constant of "100".

➔ Please note that if your meter has a constant of 200 while your neighbor's meter has a constant of 100, it does not mean you are paying twice as much for the same usage.

Electric Energy (kWh). Electric energy is measured in kilowatt-hours "kWh". It's like the quantity of fuel used by a car in a month's time. Depending on the time of day, we may run different types of equipment and use different types of fuel. For reasons such as these, the cost of the energy component of the bill varies between On-Peak and Off-Peak times.

Electric Demand (kW). Electric demand is measured in kilowatts "kW" which is instantaneous power we provide to the facility. It's like the horsepower rating of a car engine and is a rating irrespective of time. The demand for power from the facility must be met with installed infrastructure and generation capacity and helps determine the size of the equipment and wires we install. When the overall demand of all customers combined is too great, we must increase the infrastructure. Time of Use rates charge more for On-Peak use, encouraging customers to use power Off-Peak if possible. On-Peak times are when our system is pushed the hardest.

Most business electric meters record the demand during On-Peak and Off-Peak times and electricity cost is higher for On-Peak periods. The recorded value represents the highest fifteen-minute average power draw during the period. The fifteen-minute averaging window moves ahead each five-minutes and is termed a 'moving window'.

➔ Side note: momentary 'inrush' current from large motor starts has very little impact on the demand charge since inrush lasts a few seconds and the demand period is 15 minutes. However, short term high demands that span most or all of the 15 minute window will impact the demand charges.

Power Factor Adjustment. (See separate White Paper: Power Factor Correction). Utility rates add a charge for low power factor because it increases the cost of the service. The White Paper gives detail on exactly why this is, but in general a low power factor means a poor utilization of the electric system. For example, if an electric system is supplying volts and amps capable of providing 100 kW of power but the customer connected equipment can only get 80 kW of power out of the supplied electricity, their 'power factor' is 80%. The most common culprits for low power factor, and the charges that come with it, are oversized or under-loaded motors or customer transformers downstream of the meter.

For some customers, power factor charges can be high. The referenced White Paper on Power Factor Correction provides a more thorough explanation of what power factor is and how to correct it to lower those charges.

➔ Here is how to find out how much you are paying for low power factor. The method is abbreviated since for most customers, the bulk of demand charges are on peak. Look at the bill line items and find the measured on peak demand and the adjusted on peak demand. The adjusted demand includes the PF charge.
On-peak billable kW is 121.22 kW which includes 3.32 kW of PF adjustment (added kW)
3.32 / 121.22 = 2.7% of the billable demand,
Line item for on peak demand is $2,786 // 2.7% of this is the PF charge, or $75 this bill. (ans)