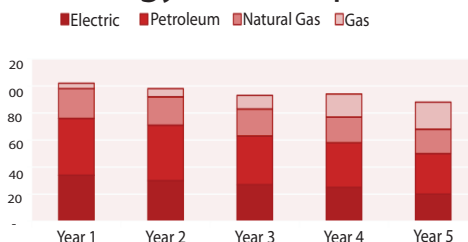


# Understanding On-Farm Utility Costs and Billing

Fact Sheet FS1128



## Energy Consumption



## Cooperative Extension

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Farm owners can often reduce the cost of energy after careful review of utility bills and making changes to improve energy efficiency. However, reading and understanding utility bills is often a frustrating and daunting task. This fact sheet provides some basic guidelines to help decipher charges for electricity and natural gas. Once costs are defined, areas of potential savings may include:

- **Changing the rate tariff** – Utilities have different service classifications, each with its own rate structure or tariff. A utility may not necessarily advise the farmer that there may be more suitable billing plans. Discussing your farm's needs with utility personnel may reveal options such as changing to tariffs with off-peak billing, interruptible service provisions, or other reductions for specific circumstances.
- **Reducing demand charges** – Whenever the cost for demand charges is a significant portion of the total bill, it is an indication that there may be large equipment that operates for relatively short periods of time, e.g., an irrigation pump. When demand charges are large, examine opportunities for reducing peak demands by using smaller equipment, shifting equipment operation to off-peak hours or using variable speed controllers for large motors.
- **Lowering energy use** – High rates of energy use as compared to customers with similar energy needs may indicate an opportunity to save costs by reducing energy consumption. An analysis and review of energy use patterns help identify opportunities for savings. In some cases it may be economically beneficial to pay for a professional energy audit.

Selecting a different supplier – Utilities, particularly electric companies, often allow customers to purchase energy from different suppliers. Although most pricing will be competitive, some suppliers may charge slightly less for energy. Alternatively, consumers may choose to select a supplier based on the nature of their energy portfolio, even when costs may be slightly higher. Some suppliers may provide some or all of their energy from renewable sources. Whatever the basis for selecting an alternate supplier (more sustainable sources, lower cost, more diverse portfolio, etc.), carefully review the information that suppliers provide. The utility can typically direct farm owners to detailed information on energy suppliers.

## Reading Your Bill

In reviewing utility bills it helps to realize that at least three types of charges typically appear on bills:

- Usage fees
- Demand charges
- Fixed and other miscellaneous charges

There may be multiple items in each of these three categories. For example, a 2008 electric bill (Table 1) shows eight charges based on usage, and two based on demand. This bill also shows a credit for interest earned on the security deposit and a fixed customer charge.

*Usage is the amount of energy used during a billing period.* For electricity, this amount is expressed in kilowatt-hours, which may appear as kW-hrs, KWH, kWh or something similar. For natural gas, usage may be expressed in therms, cubic feet, or both. A therm is 100,000 Btu (British thermal unit), or

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approximately 100 cubic feet, depending on the actual gas composition which varies according to season and the origin of the gas.

Usage for a billing period is the difference between the present and previous meter readings. The value may be based on meter readings (actual usage) or estimated. When a utility does not have access to the meter during a billing period, it typically uses estimated values. Several consecutive periods of estimated readings can affect charges in ways that may not be in the consumer's best interest, so it is usually worth ensuring utilities are not prevented from reading meters for extended periods.

*Demand is the rate at which energy is consumed, typically expressed as the maximum rate during a particular period.* Understanding demand charges is made more complicated by the fact that different utilities use different formulas to calculate maximum demand. Demand for electricity is expressed in kilowatts (KW or kW). Demand for gas could be measured in cubic feet per minute (cfm) or therms per minute. Since measuring gas flow rates is expensive and requires significant maintenance, gas demand is often expressed as average flow for a period of time, often for a month.

To further complicate billing, usage or demand charges can change based on a number of factors, including *time of day, time of the year, the amount of usage or size of the demand and what the energy is used for.*

**Unit Cost of Energy.** *Knowing the unit cost of energy is a useful way of establishing whether energy costs are reasonable.* To calculate the unit cost, divide the total charges by the usage. For the sample electric bill shown in Table 1, dividing the total charges for the period (\$383.78) by the total kilowatt-hours (2,322) yields a cost of 16.5¢ per kilowatt-hour. Similarly, the unit cost of gas in the sample bill shown in Table 2 is \$1.34 per therm. If these costs are out of line with what similar operations are paying, changes in billing rates (tariff/service classification) or equipment operating schedules can often reduce costs.

## Sample Bills

See the following pages for annotated examples of electric (Table 1) and natural gas (Table 2) bills.

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Table 1. Sample Electric Bill for a Commercial Customer

Basic Charges						Notes
<b>Customer Number: 1234567890 12345678901 - General Service Secondary - GS1 01F</b>						
<b>Customer Charge</b>					<b>\$3.25</b>	1
<b>BGS Energy Charges</b>	2,322	KWH	x	0.108803	<b>\$252.64</b>	2
<b>BGS Transmission Charges</b>	1,121	KWH	x	0.005348	6.00	3
	1,201	KWH	x	0.005071	6.09	
<b>Total BGS Transmission Charges</b>				12.09	<b>\$12.09</b>	
<b>BGS Reconciliation Charge</b>	2,322	KWH	x	-0.008682	<b>-20.16</b>	4
<b>Delivery Charges</b>	4.9	KW	x	3.160000	15.48	5
	10	KW	x	0.000000	0.00	
	1,000	KWH	x	0.057366	57.37	6
	1,322	KWH	x	0.004958	6.55	
<b>Total Delivery Charges</b>				79.40	<b>\$79.40</b>	
<b>Non-Utility Generation Charges</b>	1,000	KWH	x	0.016960	16.96	7
	1,322	KWH	x	0.016960	22.42	
<b>Total Non-Utility Generation Charges</b>				39.38	<b>\$39.38</b>	
<b>Societal Benefits Charges</b>	2,322	KWH	x	0.005707	<b>\$13.25</b>	
<b>Transitional Assessment Charge</b>	2,322	KWH	x	0.002928	<b>\$6.80</b>	
<b>System Control Charge</b>	2,322	KWH	x	0.000079	<b>\$0.18</b>	
<b>Security Deposit Interest</b>					<b>-3.06</b>	
<b>Total Charges</b>					<b>\$383.78</b>	8
<b>Meter Number</b>	S0987654321					
Present KWH Reading	58,836					
Previous KWH Reading	56,514					
Kilowatt Hours Used	2,322					8
Measured Load in KW	11.9					5
Billed Load in KW/KVA	14.9					

<sup>1</sup>Customer charge is the fixed monthly service charge.

<sup>2</sup>Energy Charges, based on **usage**, are typically the largest portion of the bill. This is the fee paid to the generator of the electricity for producing energy (BGS is “Basic Generation Service”).

<sup>3</sup>The two different transmission charges reflect a rate change in the middle of the billing period, in this case due to a difference in rates from summer to winter.

<sup>4</sup>This charge is an adjustment to compensate for the difference between what customers paid for basic generation services and what the utility actually paid the suppliers during the previous month.

<sup>5</sup>The first two delivery charges are the **demand** charges. The method of determining demand can be quite complicated. To understand exactly how a utility calculates **demand**, read the utilities service classification description or contact the utility. Whenever the cost for demand charges is a significant portion of the total bill it is an indication that there may be large equipment that operates for relatively short periods of time. An example might be an irrigation pump. When demand charges are large, consider contacting the utility to explore alternative rate structures. Also, examine the opportunities for reducing peak demands by using smaller equipment or shifting equipment operation to off-peak hours.

<sup>6</sup>In this case, the utility has a relatively large charge for the first 1,000 kilowatt-hours of electricity delivered during the billing period to cover some of the fixed cost of delivering electricity.

<sup>7</sup>The non-utility generation charges and many of the other charges may be described in the notes and definitions included with the electric bill. They are also described in the utilities published rate tariffs. Miscellaneous charges are often small, typically mandated by state government or public utility boards. Most utilities will provide a fact sheet that explains typical charges and rates.

<sup>8</sup>Dividing total charges by Kilowatt Hours used gives the cost per unit (in this case 16.5¢ per kilowatt-hour).

Table 2. Sample Natural Gas Bill for a Commercial Customer

<b>Charges</b>				<b>Rate - LVG</b>	
<b>Delivery</b>					1
Service Charge				\$91.89	2
Distribution charge					
First	1000.000 therms	x	\$0.0668400	66.84	3
Next	1316.286 therms	x	\$0.0440400	57.97	
Demand	99.707 therms	x	\$3.509082	349.88	4
Balancing charge	2205.920 therms	x	\$0.09595540	211.67	5
Societal Benefits	2316.286 therms	x	\$0.03879050	89.85	
<b>Total Delivery</b>				<b>\$868.10</b>	6
<b>Supply</b>					
BGSS Commodity	2316.286 therms	x	\$0.966873	2239.55	7
<b>Total Supply</b>				<b>\$2239.55</b>	
<b>Total gas charges</b>				<b>\$3107.65</b>	8
<b>Usage</b>		<b>Meter 123456789</b>			
Actual Reading Feb 1	17873				
Actual Reading Jan 1	15652				
Difference	2220				
Conversion to CCF	x 1.0120	<i>(CCF = One hundred cubic feet)</i>			
CCF Total	2246.640				
Conversion to therms	x 1.031				
Total therms	2316.286				

<sup>1</sup>LVG is a Large Volume Service tariff. Billing for residential and small commercial customers will often be simpler but typically includes some of the same charges.

<sup>2</sup>This is the fixed monthly service charge for the Large Volume Service tariff.

<sup>3</sup>Note that these charges, based on **usage**, which are intended to pay for the cost of delivering gas, are lower after the first 1,000 therms. This reflects the need to cover the fixed costs of operating a distribution network.

<sup>4</sup>This charge is based on **demand**, in this case the average daily **usage** in therms for the wintertime month with maximum consumption. For this bill the demand rate is approximately \$3.51 per therm.

<sup>5</sup>The balancing charge is an additional adjustment that accounts for the imbalance between summer and winter gas use. In this case the amount is calculated based on the extent to which the average daily use in winter months exceeds average daily use during the summer. The relatively large amount in this bill reflects the fact that almost all of this customer's use is for heating.

<sup>6</sup>For this bill the delivery charges are 37.5¢ per therm (\$868.10 divided by 2,216.286 therms).

<sup>7</sup>BGSS is Basic Gas Supply Service from the utility. Customers can choose to purchase gas from alternate suppliers, in which case the charges for the actual gas used may appear on a separate bill.

<sup>8</sup>Dividing total charges by the number of therms used gives the cost per unit (in this case \$1.34 per therm).

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