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Buy Electrical Energy Wisely

By

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TO THE RURAL ELECTRICAL CONSUMER

Electrical energy is the modern "hired man" on the farm. It is also a very efficient "maid of all work" in the farm home. You will have to pay at least a small amount each month for the privilege of having it available. Do you want it to do really useful work for you, or will you be content to have it around as an expensive luxury? Will it pay its own way, and perhaps even earn dividends for you, or is it going to be an expense? This will depend primarily upon the wisdom with which you purchase and use it.

In short, in order that you may use electricity effectively, it is necessary that you know something of the way it behaves. You should know exactly what you pay for when you buy electrical energy. This means that you should understand the rate schedule under which this energy is sold to you, and you should also know something of the effective results you can expect from each unit you buy. It also will be wise to have some idea of the amount of energy which various appliances will consume in order that you may purchase equipment which will give you the most help for the money invested.

Not all farms, of course, can make effective use of all, or even most of the equipment mentioned on the following pages. Purchase of each item should be so planned that the item will pay for itself, either in actual cash returns or in added convenience. This is not easy in many cases, for many conditions must be taken into consideration. This bulletin is prepared to give some suggestions and help with these problems, and to aid you in the purchase of your equipment so that you will find such purchases satisfactory and economical.

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What Is a Kilowatt-Hour?

Do you know that you cannot buy electricity? Even if you could, it would probably be of very little good to you, for of itself it is quite useless. You would not be able to store it, except in very small quantities which would quickly escape from you. You would not be able to see, smell, taste or hear it, and if you happened to feel it once, would probably not want to again.

True, electricity comes into our homes through wires from the power lines, but it does not remain. In fact, it comes and goes 60 times a second, not remaining while you can wink your eye.

Surely then you do not to pay for electricity, but you are certainly required to pay for something, according to the bill you receive each month. Look closely at that bill. You will see that you are charged for electrical energy, not electricity. This energy, you will notice, is sold in units of kilowatt hours. We hear this unit spoken of whenever anyone mentions electricity but many people do not understand clearly just what it represents. It will be interesting to compare it with other energy units with which we are more familiar.

"Energy" is merely another name for work. Strictly speaking it is defined as the capacity for doing work. Electrical energy is not different from other forms but can be thought of as the work which the electricity does in passing through the lamp, appliance, or other device which uses this form of energy. It is this ability to do work which makes electricity useful to us, and we pay for the work which the electricity does rather than for the electricity itself.

Since the work done by electricity can be the same as work done by other means, it should be possible to express a relationship between the

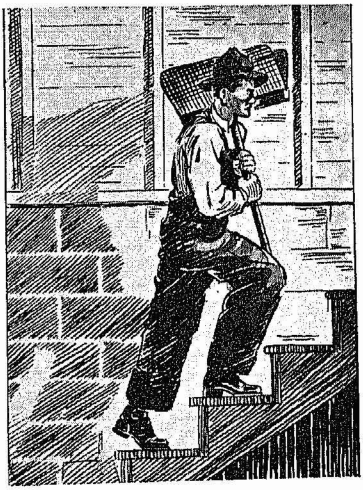

Figure 1—A man-day
(Courtesy General Electric Co.)

electrical work unit and other work units. In other words, it should be possible to express kilowatt-hours in terms of other energy (or work) units, and this can be done easily. Incidentally we have partially answered the question "What is a kilowatt-hour?" for we find that it is simply a unit of work or energy.

Work can always be expressed in terms of a certain weight lifted through a given vertical distance. The unit in the English system is the foot-pound, or the amount of work done in lifting a one pound weight one foot vertically. The amount of work that a horse can do in one hour (which could be called a horse-power hour), or the amount one man could do in a day (which we could term a man-day), are more familiar units, though we seldom refer to them by name.

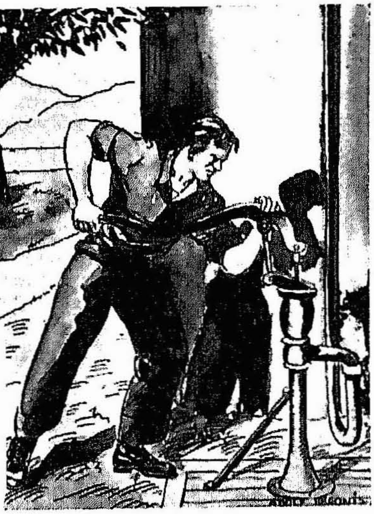

Figure 2—A day's work at hard labor. (Courtesy General Electric Co.)

One kilowatt-hour (kwhr) is equal to 2,655,200 foot-pounds. This in turn is equal to 1.341 horsepower-hours. The comparison with a man-day is not quite so simple for the amount of work which a man will do in one day will vary considerably with the man, and with the type of work done.

Figures 1 and 2 show men at work at two different jobs. It has been found that a strong man, carrying a hod for six hours, can raise 17 tons a distance of 12 feet by working steadily at an average rate. This is a total of 401,760 foot-pounds of useful work, or this man is working at an average "rate" of 25 watts. By pumping water steadily for 10 hours, he could raise 14,000 gallons of water 10 feet. This would be 1,188,000 foot-pounds of useful work, or a little less than ½ kilowatt-hour. He would be working at this job at an average rate of 45 watts.[1]

It will be noticed that the term "watt" or the corresponding term of "kilowatt" (meaning 1000 watts) are used to express the "power" developed, or in other words the rate at which the work is done. This term is of the same nature as the more familiar "horsepower." The total amount of work can be readily computed by taking the product of the average power developed and the time during which it is working. Thus 100 watts of power for a period of 3 hours will give 300-watt-hours, or 0.3 kilowatt-hours of work done.

Several tests and computations have shown that it takes a good strong man, working hard at continuous work to develop 40 watts for any period of time.[2] This means that a man working hard for a 10-hour day can do only 400 watt-hours, or 0.4 kilowatt-hour of work. The average rate per

[1]See Kent's Mechanical Engineer's Pocket Book (1916).

[2]Data prepared by C. N. Ripley of General Electric Company, Schenectady, New York.

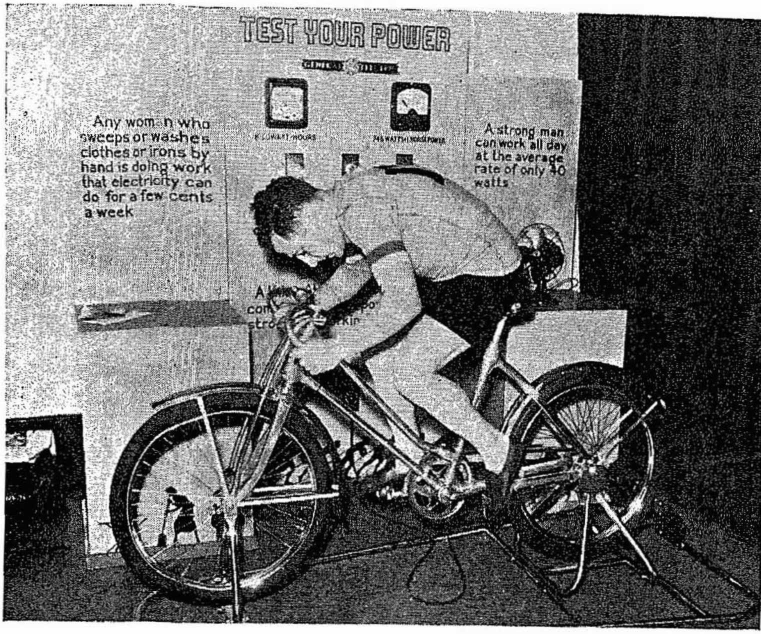

Figure 3—One man-power.
(Courtesy General Electric Co.)

Alfred LeTournier, French six-day bicycle racing champion, tests his strength on a bicycle driven generator. In one minute he was able to deliver 0.0018 kilowatt-hours, or the power he developed was 108 watts. A full week of continuous riding at this rate would represent 15.55 kilowatt-hours or less than 70c worth of electrical energy, using an average rate of 4.4c per kilowatt-hour.

kilowatt-hour for residential consumers in Montana is approximately 4.4c.[3] Taking the even value of 5c as a liberal average, it is seen that **one man-day of work is worth electrically only 2c.** Often it is possible to secure electrical energy for less than 5c a kilowatt-hour, making the equivalent cost of a man-day even less. Do you know where it is possible to secure labor at any such rates as these?

It has been found that electricity will pump water from a shallow well, and deliver to the house under pressure 1000 gallons for less than 5c. It will do work equivalent to the shoveling of **500 tons** of coal for 5c or less. It will hoist 7½ tons of hay into a 40-foot barn for less than 2c. It will do more useful work than a man shoveling dirt up to shoulder height for 1½ days for **less than the cost of one cigarette.**[2] Here is truly low cost energy.

Electrical energy at these low rates is now being made available to a large portion of the farm population by distribution systems constructed

[3]Data from Montana Power Company for 1937.

by farmer's cooperatives under the supervision of the Rural Electrification administration. Such energy will be found to be less expensive than that available from small diesel or gasoline plants, and is also more convenient and less expensive than horse power or gasoline power when it can be used as a substitute for these forms.

Generally speaking this is the lowest cost energy available today. Therefore it will be to our advantage to make wise use of a lot of it. Experience has shown that when such use is made, electricity begins to pay its own way, and in many cases it has yielded large returns on the investment involved.

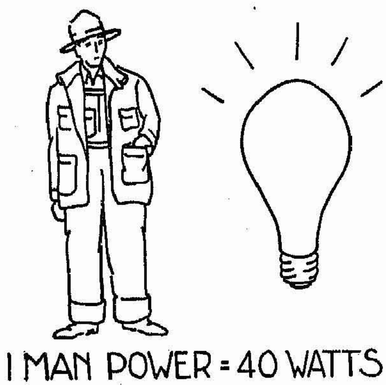

Figure 4.

Therefore we see that the kilowatt-hour, which can be purchased for a few cents, is equivalent to the work of two or three good men for a long day. It represents more work than a good horse can do in one hour. It is the equivalent of a gallon or more of gasoline used to run a small farm light plant, and in other ways it represents a considerable amount of energy for the price we are asked to pay for it. It can truly yield us worth-while returns, if we use it wisely.

Let's Look at the Rate Schedule

Electrical energy is now generally sold to residential consumers on a single sliding rate scale. A schedule typical of the rates offered farm users by cooperatives operating under the Rural Electrical administration is shown in figure 5. Here there is a minimum bill of $3.50 for any amount up to 40 kilowatt-hours. The second 40 kilowatt-hours are obtained at 5c per kilowatt-hour. The next 120 kilowatt-hours are 3c each, and all over the total of 200 kilowatt-hours cost only 2c per kilowatt-hour. The "steps" are shown by the heavy line, while the average cost per kilowatt-hour for different amounts is shown by the lighter dashed line.

It can be seen at a glance that unless the minimum of 40 kilowatt-hours per month is used the rate per kilowatt-hour is excessive. For instance, if a consumer uses only 20 kilowatt-hours in one month, he is still required to pay the $3.50 minimum bill, or a rate of 17.5c per kilowatt-hour. It will therefore be decidedly to his advantage to make full use of at least the amount he must purchase. However, we notice that as soon as this minimum is reached, the rate drops off sharply. The second 40 kilowatt-hours will cost only $2.00, or but little more than half the cost of the first. On the third level $3.60 will buy **three times** as much energy as the $3.50 did on the first rate. It is easily seen from this diagram that the more energy a customer uses, the cheaper it becomes, and the wise purchaser will use just as much as he can as long as he can use it effectively.

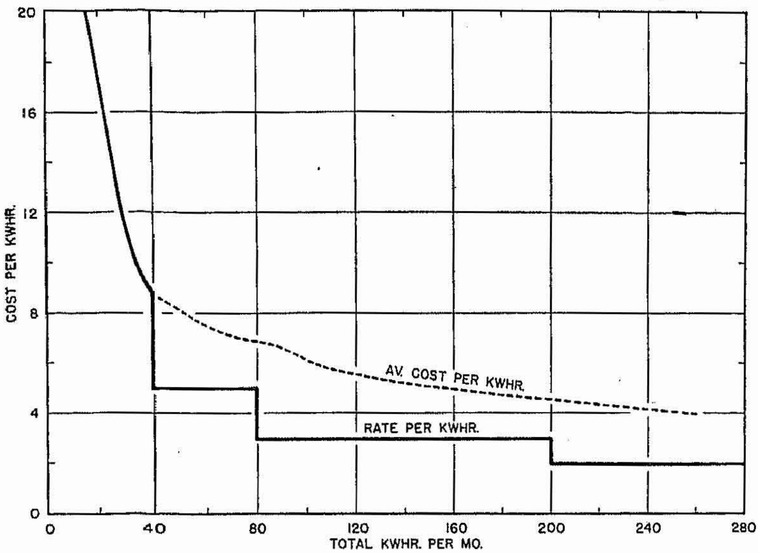

Figure 5—A typical rate schedule.

This represents a typical rate schedule as now in effect on government financed rural electrification projects. The rate per kilowatt-hour drops off in sharp steps as shown by the heavy line, while the total average rate decreases sharply with increased consumption.

Why These "Steps" in Rate Schedule?

Many users would like to understand the reasons behind the sharp "steps" shown in the heavy line in figure 5. If it is possible to furnish a heavy user with energy at the rate of 2c per kilowatt-hour, why should the small user be required to pay more than 4 times this amount? A detailed account of all the reasons and considerations behind such a rate structure would be too long and too technical to be of interest to most farm users. However, a brief explanation would perhaps be in order here, as a user should have some understanding of his rate schedule if he is to purchase wisely.

Electrical energy, like anything else, cannot be sold for less than the cost of its production and delivery. For rural districts the cost of delivery becomes a major item, and one of the primary factors is the cost of the distribution line. Regardless of the amount of energy used from such a line, certain fixed charges must be met. These will include interest on the investment in the line itself, repair and maintenance, cost of energy loss in the line and similar items. Since these costs depend almost entirely upon the fact that the line exists, and energy is available to the consumer, it has become common practice to pass them on directly in the form of a fixed minimum bill. This minimum is generally higher in rural areas because the number of customers per mile of line is considerably less than in urban communities, and a greater share of this cost must be borne by each consumer.

Since the investment in generating equipment, switchboards, transformers, thansmission lines, and similar equipment is proportonal to the size, and this size in turn depends upon the total maximum power which must be delivered at any instant, this maximum load or "peak" also enters into the rate schedule. For instance the farmer's cooperatives are asked to pay a wholesale rate which is partially dependent upon their "peak" power demand. For this reason, those appliances which can be operated in a way that will never increase the total peak demand can be given lower rates than those which may be operated at any time.

In the past it has been quite a common practice to have two or more meters with separate circuits to supply the different types of loads. However, it was observed that in general the users who had electric ranges and power loads which could be given "off-peak" rates, also had enough full time appliances to use a considerable amount of energy at the higher rates. It was therefore possible to eliminate the need for more than one meter by offering a given amount of energy (80 kilowatt-hours in figure 5) at rates sufficient to cover the cost of the peak demand, and then to offer a reduction for all consumption beyond this amount.

Once the fixed charges on the line, the carrying charges for the equipment, and the operating and management costs have been taken care of, it is possible to supply energy at very low rates, indeed. This fact accounts for the low rate for all energy in excess of 200 kilowatt-hours. It will be seen that on this basis all consumers must stand their own share of each of the various expense factors, but the heavy users obtain the advantage of cheaper rates once these expenses have been taken care of.

It can now be understood why a water heater can be given a special rate if used on a time clock which will prevent any possibility of its adding to the peak load. The cost of energy for such a use can then be set at a very small margin over actual production cost. Also, it can be seen why a special rate schedule is usually given "commercial" users. They are apt to have more full time lighting and appliance loads than a residential user, and if the steps in their schedule are allowed to drop off too quickly, low rates would be allowed for loads which might add to the peak load. Such loads would then be sold for less than actual cost of production and delivery, and the distributing association is forced to apply the higher schedules to keep from supplying energy to such consumers at a loss.

What Appliances Should Be Used?

If we are to make wise use of electrical energy, it will be necessary to know as much as possible about the equipment which will turn this energy into useful work. What kinds of appliances and equipment will be useful on the farm and in the farm home? What will be the energy consumption of the various appliances? How much will it cost per month to operate them? These are all reasonable questions, and their consideration will be necessary in connection with any purchase of electrical energy or electrical equipment.

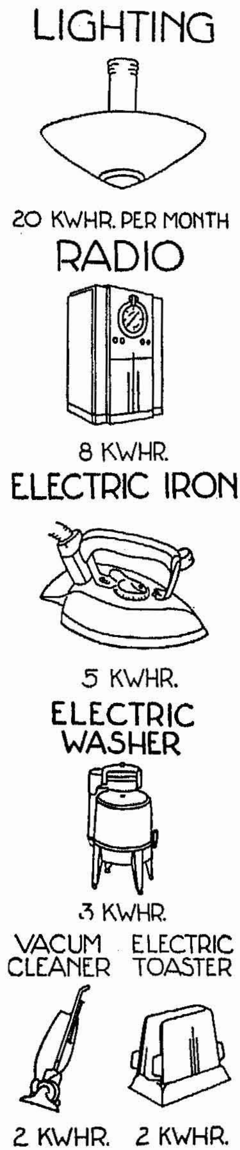

Figure 6—The minimum.

Using the Minimum Energy

The minimum monthly bill for a majority of rural electrification projects is approximately 40 kilowatt-hours per month. This is usually considerably more than enough energy to light an ordinary farm and farm home. If some use is not made of this energy, in addition to having it furnish light, therefore, the rate per kilowatt-hour is very high, and the cost for lighting alone is well above what the average farmer can afford. For this reason it is desirable to plan to use enough appliances to consume the full amount of energy covered by this minimum billing.

Figure 6 indicates some of the appliances which usually can be operated for less than a total of 40 kilowatt-hours per month. Average consumption values are indicated, but it must be kept in mind that these are very rough approximations at best, and actual consumption will be found to vary considerably under different conditions. For instance, it will obviously take far more energy to light a large, well lighted, farmstead than it will to furnish one or two small lamps in a two-room bungalow. Twenty to 25 kilowatt-hours per month, however, will generally furnish adequate light for the ordinary 5 to 7 room farm home, with a yard light used occasionally, and with a few lights in the out-buildings.

The radio has been found to be a most popular item of electrical equipment in addition to lights, and is usually one of the first to be purchased after lights are installed. For this reason, it has a logical place in the first bracket. Actual consumption will vary considerably, depending upon the size of the set and the number of hours it is operated. Small 4 or 5 tube sets will draw as low as 20 watts, and can be operated a short time each day for as little as 1 kilowatt-hour per month. On the other hand, large sets, operated several hours each day, may easily use as much as 30 or 40 kilowatt-hours. This item therefore will have a variation in operating costs greater than most of the commonly used appliances.

The electric iron is another very commonly used appliance. Its consumption is more nearly constant, depending largely upon the size of the family. The size of the iron, i. e. its wattage rating, is not a serious factor as far as operating costs are concerned because the larger sizes have automatic switches which keep the unit turned off part of the time. The value of 5 kilowatt-hours is approximately average for a family of 5 people.

The washing machine, vacuum cleaner, sewing machine, toaster, coffee maker, percolator, and other small appliances are comparatively small users of electrical energy. The washing machine, like the radio and iron, is generally found in homes of all sizes, and can rightfully be classified in this first group. Usually even small users will have one or more of the small appliances, which may or may not be those listed, but which generally can be expected to consume about the amount of energy indicated.

Users who have heavy lighting installations may find that use of all the appliances mentioned will run well over the minimum, and therefore the cost of operation of such appliances will be less than indicated since they will be operating at a lower rate. On the other hand, small users may find that this number of appliances will not use up the minimum energy. It will then be well for them to consider installing another item or two so that they can use up all of the energy they are required to purchase.

The Next "Step"

The most common of the so-called "major" appliances is the electric refrigerator, and well it may be, for it can add a convenience and comfort to living which is unknown without some such device. Furthermore, it usually pays its own way by saving waste from food spoilage, and by adding to the general convenience of the kitchen.

Refrigerators vary considerably in operating costs for the same sized units of different manufacturers. Also the size of unit, location, surrounding temperature, and number of times per day that the door is opened will cause variations in operating cost. For these reasons the consumption value indicated in figure 7 is merely an average and can be expected to vary considerably. Twenty-five kilowatt-hours will be the approximate consumption of a 5 or 6 cubic foot unit of recent design, operating under normal summer conditions in an ordinary farm kitchen. Different machines of the same size, operating under varying conditions, may consume anywhere from 20 to 40 kilowatt-hours per month.

Most users want an electric water system. One of these can be installed without too great an expense, and at first may be so arranged as to supply only running cold water at some convenient point in the kitchen. Later a complete plumbing installation can be added giving hot and cold running water, an up-to-date bathroom, and including a sewage disposal system. The cost of running water is usually very small, and will depend primarily upon the depth of the well. Five kilowatt-hours per month will usually supply enough water from a shallow well to take care of the demands of a farm family. This estimate should be doubled for a deep well. To supply all farm uses, even where a considerable number of livestock are to be watered, a maximum of from 20 to 40 kilowatt-hours can be anticipated. The heaviest of these estimates will run less than $2 a month at average rates, and the family alone can be supplied for well under $1 per month. This is considerably less than the average city user is required to pay for his water supply.

A refrigerator and water system will use up the second bracket in most cases. Small appliances will usually fill in any space that is left. We should perhaps include on this level the very popular "hot-plate." The energy used for it, will, however, usually spill over into the next level when the refrigerator and water system are used. For this reason in our division here we will include this item on the third level.

The "Heating" Step

The third level or rate bracket (see figure 8) takes the place of the old "heat" rate offered from a separate meter. Most users who reach this bracket will ordinarily have most of the appliances mentioned previously, and therefore will be using this rate to supply energy for heating purposes. Hot plates and electric roasters will quite commonly be found in homes which do not use energy enough to obtain these rates, and if so, their cost of operation will be proportionally higher. However, few if any electric ranges will be found operating on the higher rate brackets. Therefore in computing the cost of cooking on electric ranges it is common to use the rates of this level.

The consumption of energy by an electric range will depend largely upon the skill and experience of the operator. Some women can cook for a family of five using less than 100 kilowatt-hours per month. Others will use 300 or more for the same amount of cooking. There-

Figure 7—The next step.

fore, when you plan to install an electric range, learn to use it. Knowing exactly how, will make the difference between economical use and wasteful operation. Under ordinary conditions, with careful use, it is possible to estimate 1 kilowatt-hour per person per day, giving 120 kilowatt-hours per month for a family of 4. An economical user will cut below this estimate.

Walk-in coolers and other large refrigeration units are proving valuable assets on many farmsteads, and these will operate on this level if no electric range is in use. Attic ventilating fans, air conditioning units, and similar equipment should usually have their operating costs computed at these rates under similar conditions.

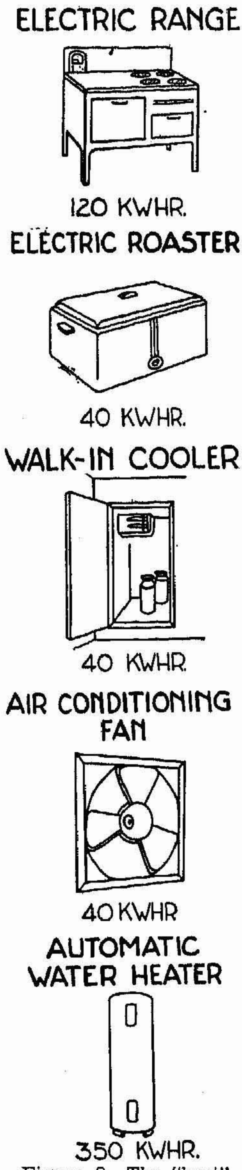

Figure 8—The "heat" level.

Electric Water Heating

The advantage of using electricity for supplying hot water is primarily in the accurate control which is possible. Ordinarily electricity will cost more per heat unit than will wood, coal or other fuels, but the amount of heat wasted when these sources are used largely offsets the difference. In most cases where the choice is between electric heat and a special coal or wood fire which will be used only to heat water, electric heating will be found to be less expensive, and a lot less trouble. Its advantages in summer when a hot fire is not deirable' are obvious.

Electric water heaters must always be very well insulated to prevent loss of heat through the walls of the heating tank. This would be equally advantageous with any source of heat, of course, but absence of an open flame makes such insulating on an electric heater a comparatively simple matter. Also, the heating can be controlled through a simple thermostat so that the water is always at the desired temperature. These features, which make it possible to have an abundant supply of hot water at any instant, at a very low cost for keeping it hot, offer an advantage which is not available in ordinary coal or wood heaters.

It is difficult to make a general statement about the economic practicability of electric water heating, as this will depend upon the number and types of uses to which the hot water will be put, the need for a fire to heat the room, the cost of fuel and the expense or trouble of preparing it for a stove, and other factors. The important point is that all such factors must be taken into consideration if electric water heating is not to prove disappointing.

Farm Power and Other Uses

The fullest benefits of electrification cannot be realized until a considerable use is made of it around the farm. Properly used it can save a great deal of labor, free the farm operator from time-taking tiresome tasks so that he can apply himself to more useful duties, and often it can help improve the quality of a farm product, or the quantity produced, to such an extent that it more than earns its own way in cash dividends. In this respect energy can be used by the farmer in exactly the same way it has been used for years by the manufacturer, and it can become as important a factor in his farm operation as it has already become in industry.

The time which can be saved by having tools sharp as a result of having an electrically driven grinding wheel will itself often pay for an entire electric installation. Some farmers have found that a complete electrically powered repair shop is a very good investment in time and repair bills saved. An electric heater will warm the car or tractor to make starting easier on a cold day, and can also be used in emergencies to keep young pigs or calves from suffering during cold winter nights. Electric feed grinding is being found to be much more convenient and less expensive than the older system of using a tractor to drive a large grinder a few days each winter, and makes possible fresh feed ground each day during chore time, automatically at the press of a button.

Perhaps one of the biggest returns for the investment, one which can be used on practically every farm, is the installation of electric lights in the poultry house. These can be simply, and automatically controlled, and will increase egg production during seasons of short daylight by as much as 50%. Electric brooders have been found to cut brooding losses more than half, and eliminate all the danger from fire found in coal or oil types.

Electricity has become practically indispensible in the modern dairy. A very few places have cold running spring water with which milk can be quickly cooled, but electrically refrigerated brine is much colder than the coldest water, will work correspondingly faster and cut bacteria growth a corresponding amount. Electric milking machines, electrically driven cream separators, bottle washing, filling, and capping machines, churns, and other dairy equipment make possible a power driven dairy which is the most economical and satisfactory to operate. Also the increase in milk yield as a result of having warmed running water more than repays the investment in a water system for any dairy operator, even where only a few cows are milked.

Uses around the farm appear to be unlimited, and new ones are being discovered daily by enterprising operators. Suggestions of some of these are listed on the following pages, and other suggestions along with more detailed information on any item mentioned, can be secured through your local county extension agent.

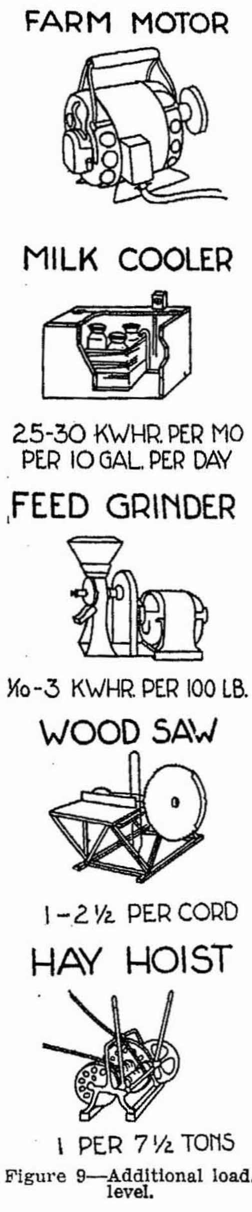

Figure 9—Additional load. level.

Use of Electricity on the Dairy Farm

MILKING—1 - 3 kilowatt-hour (kwhr.) per cow per mo.
MILK COOLING—25 kwhr. per mo. per 10 gal. per day.
DAIRY STERILIZER—3½ - 7½ kwhr. per day.
SEPARATING—½ kwhr. per 1,000 lb. milk.
WATER HEATING—30 kwhr. per 100 gal.
DRINKING WATER WARMING—5 - 10 kwhr. per 100 gal.
BOTTLE WASHING—½ kwhr. per 1,000 bottles.
BOTTLING AND CAPPING—1 kwhr. per 1,000 bottles.
VENTILATING—3 kwhr. per cow per mo.

Use of Electricity on the Poultry Farm

INCUBATING—150 - 300 kwhr. per 1,000 eggs.
BROODING—½ kwhr. per 6 weeks per chick.
ULTRA-VIOLET LIGHT.
  FOR BABY CHICKS—¼ - ½ kwhr. per brood per chick year.
  FOR LAYING HENS—½ - 1 kwhr. per hen.
LIGHTING—10 kwhr. per mo. per 1,000 hens.
FEED GRINDING—0.1 - 3 kwhr. per 100 lbs.
WATER WARMING—5 kwhr. per mo. per 1,000 hens.
EGG CANDLING—5 kwhr. per 1,000 cases.

Use of Electricity for Feed Handling

FEED GRINDING—0.1 - 3 kwhr. per 100 lbs.
GRAIN CLEANING—0.6 - 2 kwhr. per 100 bushels.
GRAIN ELEVATING—1.1 - 5 kwhr. per 1,000 bushels.
HAY BALING—2 - 4 kwhr. per ton.
HAY HOISTING—1 kwhr. per 7½ tons.
SILO FILLING—1 kwhr. for 1½ tons.
HAY CHOPPING—1 kwhr. per ton.
THRESHING—⅓ kwhr. per 100 lbs. grain.
SEED TREATMENT—2 kwhr. per 100 lbs.

Various Uses of Electricity on the Farm

FARM SHOP—½ - 3 kwhr. per mo.
WOOD SAWING—1 - 3 kwhr. per mo.
YARD LIGHT—½ - 1 kwhr. per mo.
SOIL HEATING—½ - 1½ kwhr. per day per 2 sq. yds.
SOIL STERILIZATION—1 - 1½ kwhr. per cu. foot.
INSECT TRAPS AND SCREENS—3 - 10 kwhr. per unit per mo.
FRUIT GRADING—½ - 1½ kwhr. per 100 bushels.
FRUIT SPRAYING—50 - 80 kwhr. per acre per season.
PAINT SPRAYING—1 kwhr. per 250 sq. ft.

USES OF MOTORS ON THE FARM AND IN THE HOME

Machine To Be Driven	Size Motor	Kilowatt-hour Energy Consumption
Apple Grader	¼ to ½	1 per 1000 boxes
Band Saw (shop), 8″ to 12″ circular	¼ to 1	⅓ to 1 per hour of operation
Barn ventilator, capacity 60 cu. ft.	⅛ to ½	2 to 3 per cow per month
Bone Grinder	1 to 5	1 per 100 lb. of bone
Bottle Washer (brush)	1/6 to ¼	½ per 1000 bottles
Bottle-washing Machine	1 to 5	1 to 5 per hour of operation
Churn	⅛ to ½	1 per 100 lb. of butter
Cider Mill—grinder only	½	1 per 100 gal.
Coal Stoker	¼	6 per ton of coal burned
Concrete Mixer	¼ to ½	½ per cu. yd. of concrete
Corn Husker and Shredder	5 to 7½	5 per ton
Corn Sheller, 1 or 2 Holes	¼ to ½	1 per 300 lb. shelled corn
Cream Separator	⅛ to ¼	½ per 1000 lb. of milk
Dishwasher	¼	2 to 3 per month
Drill Press	⅛ to ½	1 per 2 to 8 hours' use
Emery Wheel	¼	1 per each 4 hours' use
Ensilage Cutter	5 to 7½	1 to 1½ per ton
Fans, Domestic—8″ fan=40 watts	1/20 to 1/6	1 per 6 to 20 hours' use
Farm-chore Motor	5 to 7½	5 to 7½ per hour of operation
Feed Grinder	½ to 7½	1/5 to 1¼ per 100 lb. feed
Feed Mixer	½ to 1	1 per 2 to 5 tons
Forge Blower	⅛ to ½	1 per each 2 to 8 hours' use
Fruit Grader and Washer	¼ to ½	½ to 1½ per 100 bushel
Furnace Blower	1/12 to ¼	5 to 12 per month
Grain Cleaner	¼ to ½	⅔ to 1¾ per 100 bushels
Grain Drier	½ to 5	5 to 15 per 1000 bushels
Grain Elevator (installed)	½ to 2	1 to 3 per 1000 bushels
Grain Elevator (portable)	3 to 7½	2 to 5 per 1000 bushels
Grain-feed Cutter	¼ to 1	1 per 1000 lb.
Grindstone	⅓	½ per hour of operation
Hay Baler	5 to 7½	2 to 4 per ton
Hay Chopper	7½	1 to 2 per 1000 lb.
Hay Drier (several sizes)	5 to 135	30 to 75 per ton cut dry hay
Hay Hoist	3 to 5	1 per 7 to 10 tons
Ice-cream Freezer	¼ to ½	⅓ to ½ per hour of operation
Irrigation	3 to 50	2 to 4 per acre-foot per foot lift
Kitchen Mixer	1/10 to ¼	1 per 4 to 10 hours' use
Lathe	¼ to ½	⅓ to ½ per hour of operation
Meat Grinder	⅛ to ¼	1 per 250 lb. meat
Milk Cooler	¼ to 10	25 to 30 per mo. per 10 gal. per day
Milking Machine (Portable & pipe line)	¼ to 3	1½ to 3 per cow per month
Oil Furnace (Some require 2 motors)	1/20 to ¼	25 to 60 per month
Paint Sprayer (250-800 sq. ft. per hr.)	¼ to 2	1 per 250 sq. ft.
Pea Viner	7½ to 20	2 to 4 per 100 lb. shelled peas
Portable Drill	1/6 to ⅓	1 to 3 per 6 hours' use
Potato Grader	½	1 per 500 to 750 bushels
Refrigerator (domestic)	¼	20 to 40 per month
Sewing Machine	1/30	1 per month
Stable Cleaner (Conveyor in gutter)	½	½ per hour of operation
Stock Clipper	1/10 to ¼	1 per 4 to 8 hours' use
Stump Burner	⅛ to ¼	2 to 5 per stump
Sheep Shearer	1/10 to ½	1½ per 100 sheep
Straw Cutter (Cuts into 2″ lengths)	¼ to ¾	1 per 1000 lb.
Tool grinder	¼ to ½	⅓ to ½ per hour of use
Thresher	10	⅓ per 100 lb. of grain
Vacuum Cleaner	1/10 to ⅛	3 per year
Washing Machine	¼	⅓ per person per month
Window Ventilating Fan	1/20	1 per 8 hours' operation
Water System (shallow)	¼ to ½	1 to 2 per 1000 gallons
Water System (deep well)	½ to 1½	1 to 3 per 1000 gallons
Pump Jack	½	1 to 5 per 1000 gallons
Wood Saw (Large Size)	5 to 7½	1 to 2½ per cord

Uses for Electric Heat on the Farm and in the Home

For Cooking	Range, hot plate, roaster, toaster, percolator, coffee maker, urn, cooker, waffle iron, disc stove, chafing dish, egg cup, etc.
For Ironing	Hand irons, flat-top ironer, roller ironer, table-top ironer, laundry irons, tailor irons, etc.
Water Heating	Installed water heater, portable water heater, immersion heaters, etc.
Air Heating	Sunbowl heaters, glow heaters, portable radiators, fireplace radiators, air heaters, etc.
Around the Shop	Solder iron, glue pot, tinning pot, car heater, etc.
Around the Dairy	Water heater, water boiler, sterilizer, immersion heaters, drinking water warmers, etc.
Around Poultry	Incubator, brooder, feed sprouter, drinking water warmer, air warmers, poultry scalders, etc.
Around Farm Animals	Water warmers, sunbowl or glow heaters, etc.
For Seed Growing	Soil sterilizers, soil heating cable, hotbed heaters, etc.
Other Uses	Curling irons, hair driers, hot pads, strip heaters, heating cables (to prevent frozen water pipes), heat ray lamps, etc.

Other Uses of Electricity Around the Farmstead

Ultra-violet light for poultry, greenhouses, in the home, etc.

Insect traps and electric screens for the home, outbuildings, and orchard.

Signal systems for the home and to barn and other outbuildings.

Electric clock and automatic time control on almost any operation.

Electric fence, burglar alarm, fire alarm, electric stock counters, animal exercisers, groomers, electrically heated treatment tanks, and dozens of other similar applications.