Electricity Provides Economical Farm Labor
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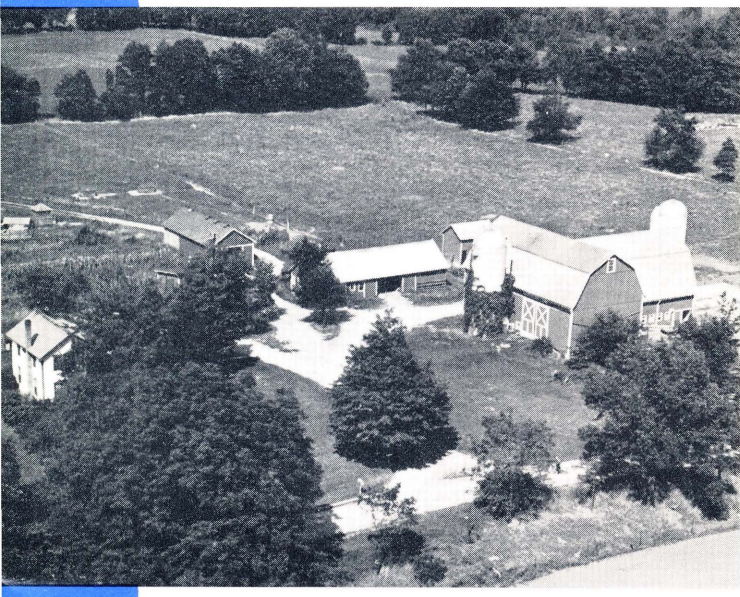
Electricity

Provides Economical Farm Labor



Ralph Cook and Sons farm, Calhoun County

A Case Study Prepared By
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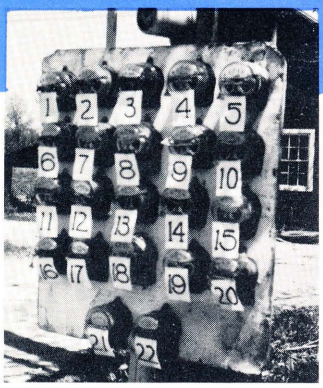


Panel of watt-hour submeters installed on Cook Farm by Consumers Power Company.

The services of a hired man are required on most farms today. However, good hired men are hard to find, and often are expensive to keep. But proper and efficient use of electric power can replace many of the services of a hired man—and at the same time provide the farm operator with efficient, economical and dependable labor.

This case study of the Ralph Cook and Sons Farm, located in Calhoun County, was carried out over a full 12-months period during 1951-52 to demonstrate that point. The Cook Farm, host to the 1951 Calhoun County "Grass Day," was selected on the basis of good agricultural practices and extensive use of electricity in the farming enterprises, and in the farm home.

With the fullest cooperation of the owners and the local power supplier, meters were installed to measure individually the electricity used by the Cooks for all their major farm and household appliances. Thus complete records were available for study at the completion of the period selected — May 1951 through April 1952. As analyzed here, those records give a good picture of power consumption by the individual appliances, and the annual cost of electricity on a modern dairy-and-livestock farm in Michigan.

CORRECT POWER DISTRIBUTION

The electrical equipment in the farm buildings and in the farm home will operate at highest efficiency only when supplied with power at the correct voltage. A distribution system using proper-sized wire, and having enough feeder circuits to connect the equipment as recommended, is essential for economical and dependable operation of electrical equipment. A well-

Gutter cleaner for the dairy barn, powered by electricity.

ITY = Economical Farm Labor . . .

TABLE ONE

Record of the Electrical Consumption on the Ralph Cook and Sons Farm, Calhoun County, 1951-1952

APPLIANCE	KILOWATT-HOUR CONSUMPTION												Annual	Annual Cost
	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.		
Welder	14	12	5	4	4	6	2	.....	3	3	2	5	60	$ 1.12
Air Compressor (½ H. P.)	1	1	1	2	1	1	1	1	.....	1	1	1	12	.22
Gas Pump (½ H. P.)	2	3	2	2	2	3	1	2	1	2	2	1	23	.43
Drill Press (¾ H. P.)*	1	2	1	.....	3	.....	.....	.....	1	.....	.....	.....	8	.15
Emery Wheel (⅓ H. P.)*	(on same meter as the drill press)													
Feed Mixer (3 H. P.)	3	6	7	9	4	2	2	3	4	1	2	2	45	.84
Feed Grinder (3 H. P.)	11	39	54	18	21	.....	.....	.....	.....	.....	.....	.....	143	3.67
Gutter Cleaner (3 H. P.)	1	.....	.....	.....	.....	9	7	8	6	5	6	4	46	.86
Hay Dryer (5 H. P.)	.....	.....	323	568	.....	.....	.....	.....	.....	.....	.....	.....	891	16.63
Corn Sheller (5 H. P.)	9	.....	.....	.....	.....	.....	12	4	14	10	9	3	61	1.14
Water Pump (¾ H. P.) (750 gal. per hour)	77	77	56	72	58	59	75	76	70	48	55	54	779	14.53
Milker (½ H. P.)	49	45	45	45	50	59	48	57	67	44	54	40	603	11.25
Silo Unloader (3 H. P.)	(installed during winter, 1951-52)								.....	31	72	66	175	3.26
Milkhouse Water Heater (12 gal.)	89	74	73	84	90	141	149	161	172	127	160	120	1,440	26.86
North Ventilator Fan (¼ H. P.)	.....	.....	.....	.....	.....	.....	.....	37	19	4	.....	.....	60	1.12
South Ventilator Fan (¼ H. P.)	.....	.....	.....	.....	.....	.....	.....	46	22	12	.....	.....	80	1.49
Manure Elevator (½ H. P.)	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.02
Ironer (1200 watts)	5	6	3	3	.....	4	3	5	4	2	2	4	41	.76
Washer (⅓ H. P.)	6	12	6	8	8	8	6	9	9	4	8	8	94	1.75
Range (12 KW)	152	142	168	210	204	145	183	187	195	132	170	141	2,029	37.86
Deep Freeze (¾ H. P.) (22 cu. ft.)	92	111	146	96	101	88	74	77	82	57	77	77	1,078	20.10
Water Heater (top unit)	52	112	91	92	55	49	14	27	30	21	32	36	611	11.40
Water Heater (bottom unit)	345	364	292	308	269	198	205	243	249	193	253	257	3,166	59.07
Lights, radio, and small appliances	227	144	160	176	237	246	301	395	423	275	293	202	3,079	57.44
Master Meter	1138	1150	1433	1697	1107	1018	1083	1340	1372	962	1204	1021	14,515	KW.
Demand KW.	7.4	7.4	10.0	11.6	7.6	6.8	7.4	7.8	8.2	10.0	9.2	7.5		
TOTAL COST	$19.27	$19.49	$28.78	$36.54	$18.89	$17.11	$18.28	$23.42	$28.43	$20.28	$23.31	$17.18		$271.97
AVERAGE KW. COST	1.69¢	1.69¢	2¢	2.2¢	1.7¢	1.7¢	1.7¢	1.8¢	2.1¢	2.1¢	1.9¢	1.7¢	1.865¢	

* Both appliances on same watt-hour sub-meter for test

† Additional sub-meter wired in to record first full month of operation.

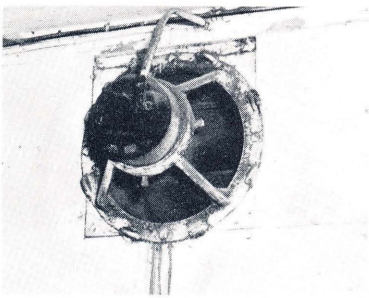
planned distribution system also permits correct fusing of the electrical circuits. Correct fusing eliminates the danger of over-heated wires and equipment failure due to incorrect voltage or overload.

The distribution center of electricity on a farm can be located at the entrance service in the house, or a central-point pole in the yard. The amount of electrical equipment used — and where the equipment is placed — will determine the best location.

Prior to the beginning of the 12-months study on electrical consumption, a central-point pole was installed on the Cook Farm. At this time the wiring system was overhauled to give correct distribution of electricity to the work areas on the farm.

FARM WORK LOAD

A picture of the work load on the farm can be gained from the following tabulation of enterprises on the Cook farm. Mr. Cook and his sons farm 300 acres of land, milk an average of 23 cows, feed out approximately 180 hogs a year, and keep a small flock of chickens. It's estimated that about 80 percent of the work load on a farm of this type will be in the area of the buildings.



Ventilator in the dairy barn.

Thirteen motors totaling 19 horsepower are located in the farm buildings, to reduce the man hours of labor required in the farming operations. In addition to the motors, there is a connected load of approximately 10 kw. for water heating, lighting, and welding.

HOUSEHOLD LOAD

Extensive use is made of electrical power in the home to reduce the labor required in maintaining a family of seven. The kitchen is equipped with an electric range, automatic washer, ironer, a 22 cubic-foot farm freezer, and small appliances such as a mixer and toaster which are used in the kitchen. In all, 8 motors are used in the home. They range in size from 55 watts used on the mixer, to ¾ H.P. on the freezer. All rooms of the home are well lighted. The connected load in the house is 31 kw.

TOTAL LOAD

The connected load or potential load on the Cook farm is 65 kw. The wide use of electricity to replace man-hours of labor make the farm an excellent location for this study on electrical consumption.

APPLIANCES METERED

On May 1, 1951, a total of 23 meters were installed on the major appliances on the Cook farm. These meters were left in place for 12 months. On the first of each month all meters were read. A monthly record was kept of the electricity used and a general account was made of the work done (Table 1).

The table shows the appliances metered on the farm and in the home. The monthly consumption and the annual consumption of electricity for each appliance is listed. The total monthly cost for electricity, the average cost per kilowatt-hour, the annual cost of electricity, and the average annual cost per kilowatt-hour are shown. The annual cost shown for each appliance has been computed by using the average annual kilowatt-hour cost.

FARM USAGE

Only 31 percent of the total electrical consumption was used in the farming enterprises, even though electricity was used to operate a number of different pieces of equipment. The cost of electricity for the farming

Kitchen in the Ralph Cook home.

enterprises was $82.60, which is about equal to 15 days' pay for a good hired hand.

For the equivalent of 15 days' pay for a good hired hand, electricity was able to grind 13½ tons of feed; mix 37 tons of feed; shell 20 tons of corn; dry 16 tons of hay; remove 61 tons of silage from the silo; remove 210 tons of manure from the barn; heat the water used in the milkhouse; ventilate the dairy barns; milk 135,476 pounds of milk; and pump all the water used on the farm.

From the kilowatt-hour consumption, rating of the pump, and metered consumption of water on other farms it was estimated that 292,125 gallons of water were used during the year. Approximately 46,000 gallons of this water was used in the home.

The Cook Farm is equipped with more motors and other electrical equipment than most farms. However, the farm operators feel that each piece of equipment is more than justified on saving of labor alone. In

Electric water heater wired to take advantage of power company's special "water heating rate." (Inset) Special meter with automatic time switch.

addition to providing economical labor, the electrical equipment is on call 365 days a year — and as many hours a day as needed.

Many of the labor-saving devices on this farm were designed and constructed in the farm shop at a very nominal cost by Mr. Cook and his sons. The electric welder has proven to be one of the most useful tools on the farm. Tools that make possible the fabrication of metal such as the welder, drill, and grinder are essential to present day farming.

HOUSEHOLD USE

It is interesting to note that 69 percent of the electricity was used in the home. During the year an estimated total of 1,080 meals were prepared for the 7-member family, at a cost of 3½ cents per meal for electricity. Approximately 150 washings were processed for the family of seven at a cost of 1½ cents each.

The heating of water for the family use was the largest single item in the electric bill. The convenience of hot water at all times is something that few families will give up, even though the cost to heat water is

Laundry area in the Cook home.

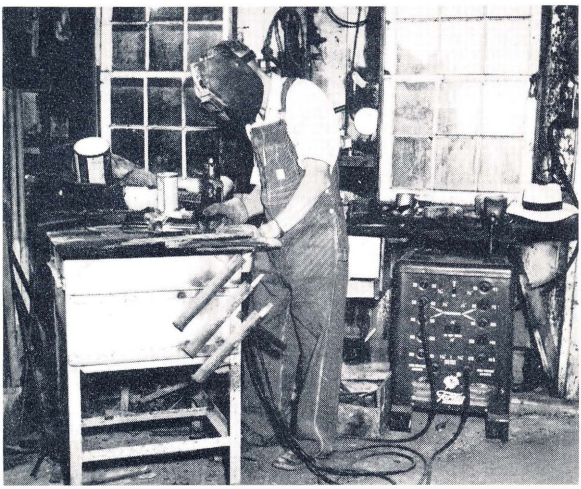
higher than other costs. This higher cost for water heating — over cooking or washing — prevails regardless of the type of heat used. The water heater was wired to gain advantage of the water-heating rate offered by the power supplier. The lower element was connected through a time clock to provide off-peak heating. The upper element was connected so as to provide heat whenever needed. Most of the heating was done by the lower element. The reduced rate for water heating is included in the total cost and is reflected in the average cost per kilowatt-hour; thus, spreading this reduced rate to all appliances rather than to the water heater only.

SUMMARY

Several high points stand out in this demonstrational study of electrical consumption on the Cook farm.

Electricity is an economical source of labor on the farm.

The work load on a dairy and livestock farm is concentrated around the farm buildings within reach of



Electric welder in the farm workshop.

electricity. For these enterprises to reduce labor, many uses of electricity can be fashioned.

The farm welder and the farm shop reduce maintenance costs on equipment and save valuable time during peak labor periods. Proper management makes possible the use of low-horsepower units to do such tasks as grinding feed, shelling corn, and loading manure.

Electricity can provide the same conveniences to a country home as are found in any city home.

Correct wiring and proper distribution of electricity to the work areas are essential for efficient and economical utilization of electricity as a source of labor for the farm and the farm house.

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(The authors wish to express their appreciation to Consumers Power Company and to Mr. and Mrs. Ralph Cook and Sons for assisting with and cooperating in this study.)

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