

Costs of Pumping Water Compared

Check Expenses of Electric & Gas Power
On 40 Irrigation Wells in Pinal County

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What does the falling water table cost the farmers of Arizona every year in the way of higher power costs and increased repair bills? Is electricity or natural gas the cheapest source of power? These, and many similar questions, are commonly heard in the pump areas of Arizona.

Recently a study was initiated at the University of Arizona to help answer such questions. During the summer of 1951, a sample of wells in Pinal County was selected for detailed analysis in order to provide data on current pumping costs. By the time the study was completed detailed cost records had been secured on 20 natural gas wells and 20 electric wells.

Two Methods Used

Two methods were used to compute the cost of pumping water. First, there was *total cost*. Total cost of water includes a charge for interest on the present replacement cost of the well and a charge for depreciation on the well and equipment.

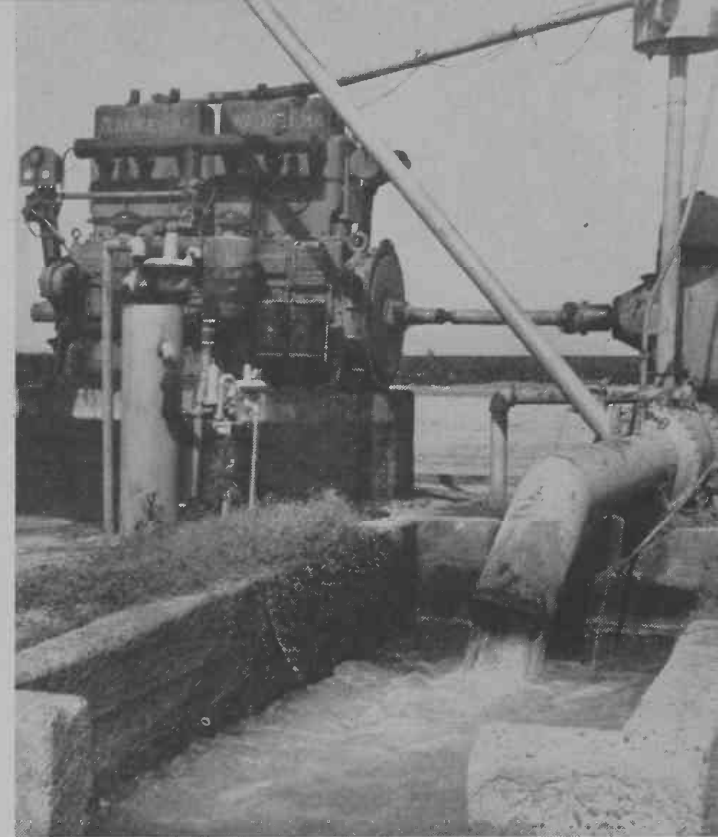
When using this method the pump and power unit was depreciated in five years and the well in ten. This rapid write-off was adopted because of the uncertainty involved in the installation of a new well in some of the critical water areas of the State.

The operating cost advantage of natural gas over electricity increase is the lift increase. The chart shows annual cash costs only.

The second method used was *operating cost*. Operating cost includes such items as power, lubricants, repairs, attendance and taxes but does not include a charge for interest on investment or depreciation. This figure is an approximation of the cost of continuing to operate the existing wells but makes no charge for replacing the well once it is depreciated.

Costs Vary

The total cost of an acre-foot of water varied from about \$7.50 at a 150 ft. lift to \$16.50 at 300 ft, for electric wells. This is an increase of approximately \$6 per acre-foot for each 100 feet increase in lift. For the natural gas wells the cost per acre-foot increased from about \$6 at 150 feet to \$12.75 at 300 feet. This represents an increase in cost of \$4.50 per acre-foot for each additional 100 feet of lift.

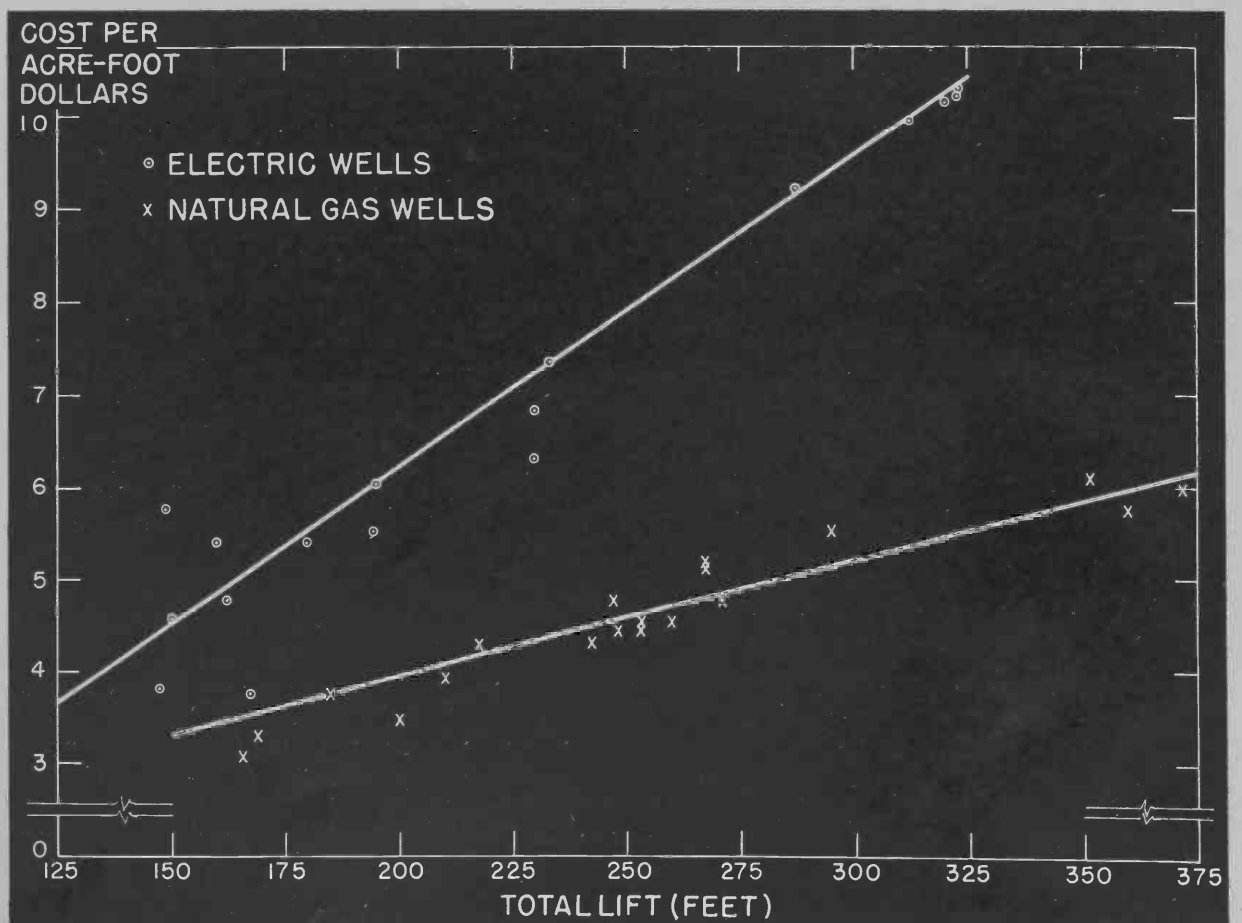


Above is a natural gas powered water pump in the Pinal County area. On the cover of this issue of Progressive Agriculture is shown an irrigation well pump powered by electricity, also in the Pinal area.

Most farmers are not interested in interest and depreciation costs once a well is installed. The operating costs, or annual cash costs, are the ones that determine whether a well will continue in operation once it is installed.

The operating cost per acre-foot of water increased from around \$4.50 at 150 ft. lift to \$9.50 at a 300 ft. lift for the electric wells. This represents an increase of approximately \$3.25 for each additional 100 feet of lift. For

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Late Spring Lettuce

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wrap, shape, butt, rib, presence of Tip Burn and Rib Discoloration for each strain. Size data were taken by individual head grading and counting from 200 feet of bed. Marketable heads included four dozen and five dozen per crate sizes only. In most of the strains, over two-thirds of the marketable heads were the more desirable 4 dozen size.

As each lot was packed in the shed, sample iced crates of fifteen strains were taken from the line and rushed to a storage room at the University of Arizona, Tempe farm. These crates were held in storage at 34°F. for thirty days, opened at room temperature for one day and then examined for keeping quality.

Best Strains Noted

Comparisons between the twenty-eight strains tested in regard to all the characteristics were made from the data assembled. Of special interest are the following: Best strains yielded well over 80% cut-out. Two strains, Imperial 615-Ferry Morse strain 383 and Woodruff's variety A36, showed poor yields.

Color was remarkably uniform between the lots, and Ferry Morse variety K1 was the best desirable dark green. There was little variation in wrap; all strains were quite satisfactory in this character. Shape was fairly good throughout.

There was more variation in rib type than in other characters. Contrary to general belief, the Imperial 615 type did not have the best ribs although their ratings were reasonably high. Desirable rib characters were shown by Dr. Thompson's #4164 which contrasted greatly with Great Lakes 428 that had extremely thick and curved ribs.

Tip Burn and Rib Discoloration are the two head maladies which most

Why Not Ag Economics?

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The Agricultural Economics Department at the University of Arizona has outlined a course of study which best prepares the student for work in the diverse group of positions listed. It offers the Master's Degree for those who care to pursue graduate study.

Students interested in this field—the business aspects of farming—should contact the Department Head and arrange a program of work which will best achieve their desired goals or which will put them in positions of high demand upon graduation.

seriously affect the marketability of late spring lettuce. While neither disease appeared in severe form in the Earl Recker Farm, their presence was noted when found and the resultant ratings given varieties on susceptibility to these troubles give good indication of the suitability of the strains for the late spring crop. Dr. Thompson's #3867 was the only strain in the test entirely free of either disease.

Storage Results

The number of marketable heads left in a crate after as long a period as 31 days gives a good indication of the ability of the strain to withstand storage shipping. Of the fifteen strains subjected to the storage test, Great Lakes 428-Loomis was the best. Ferry Morse Great Lakes 1180 had the poorest keeping quality.

In this grower cooperative test conducted as a late spring lettuce variety trial for the 1952 season, Ferry Morse Great Lakes 366A was judged best of the trial on the basis of good storing ability, good head characters and high yield.

Selected Lettuce Varieties and Strains with Yield Data (28 strains tested)

Variety	Strain	Source	Yield as % Marketable Heads
Great Lakes	366 A*	Ferry Morse	82.4
Great Lakes 59	67095	Associated	84.9
Great Lakes 428	1-505	Loomis	66.3
A 36		Woodruff	45.4
Special	3188	Thompson U.S.D.A.	69.5
Special	20965	Whitaker U.S.D.A.	64.0
Imperial 615	385	Ferry Morse	69.7
Imperial 615	27563	Associated	41.8
K 1	34362	Ferry Morse	58.6

*Best of 12 Ferry Morse Great Lakes Strains tested.

Control Mesquite By Fire

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The first of these is that everything, even range land, costs something to maintain.

The second is that if burning is done in June, the summer rains and new feed are just around the corner. Cattle won't eat the dry feed anyway when the green feed comes on. One has to decide whether he can afford to sacrifice a little feed today to do a job that 10 or 20 years from now will cost twice or four or ten times as much.

Need Grass to Carry Fire

The major obstacle to burning today is the lack of grass to carry a fire. In some places and in some years this is true. In a thick stand of mesquite the trees use up all the water and little grass can grow even without a hoof of stock on the ground.

However, there are still many areas where mesquite, cholla, burweed and other shrubs are just coming in that will burn in some years. In places of this sort fire can be used effectively in maintaining and improving a range.

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natural gas wells, an increase in lift from 150 to 300 feet resulted in an increase in operating costs from \$3.25 to \$5.25, or \$1.33 per additional 100 feet of lift.

The cost advantage of natural gas over electric wells is much less at the shallower lifts. As the lift increases, the cost advantage of gas over electricity increases. This relationship is a result of the high initial installation cost for a natural gas unit coupled with a steeply graduated natural gas cost rate. As the amount of gas used per month increases, the average cost per unit decreases rapidly.

Other factors such as dependability, convenience and initial cost should, and do, influence the type of power to be selected. Under conditions as they exist at the present time in Pinal County, natural gas appears to be a cheaper source of power than electricity assuming a five year write-off on the equipment.