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Irrigation, Water, and Energy Use in Idaho:
The Social Costs of Average Cost Pricing

by
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Successful systems, founded on plentiful
resources can become unsuccessful when
faced with scarce resources.

A.E. Research Series No. 204. Paper presented to Econ - Ag. Econ. Seminar, April, 1976.

DON'T PUT STRAIGHT JACKET ON IDAHO'S GROWTH

Lewiston Tribune, April 18, 1976

By VERNON F. RAVENSCROFT
Idaho Republican State Chairman

We all read the headlines "Idaho population to double." A study group of respected Idaho scientists determined that Idaho is one of the fastest growing states in the nation and our population may well reach 1.5 million people by the year 2000.

The follow-up headline was equally disturbing "Water director says choice necessary on Snake flow." Idaho Water Resource Department Director Keith Higginson, in a follow-up article, conceded that a public policy choice was in the making between hydro-power and irrigation. Although they have not made headlines, a lot of other activities have added to the Idaho demand for energy.

The *Idaho Statesman* newspaper moved into a new modern plant and their electrical consumption has gone up 300 per cent from 1969 to 1973.

Idaho state government has been developing the Capitol Mall complex and their electrical use in that complex has increased by seven times.

On my own farm, we recently added a deep well and irrigation sprinkler system. This action increased productivity, decreased labor and improved the conservation of land and water. We added 80 horsepower to the electrical demand. There is in Idaho about two million acres of land still surface irrigated, significant acres of which will be eventually sprinkled. Just to energize surface water for sprinkler irrigation consumes approximately ½ horsepower per acre.

The Idaho governor's mansion was recently converted to electric heat. This and similar improvements in Ada County have increased electrical consumption by 6 per cent from 1970 to 1975.

There is general agreement that we will encourage the growth of so-called clean industries. Kellwood at Twin Falls created 400 new jobs and consumes 8,618,000 kilowatt hours of energy each year. American Microsystems at Pocatello: 500 new jobs and an annual energy consumption of 7,880,000 kilowatt hours.

No one who understands Idaho can intelligently argue there is not a need for increased energy from some source to meet the legitimate growth and the desirable modernization within our state. The Idaho Republican Action Committee (RAC) is a standing policy committee of our party. That committee has not and will not inflict itself into technical arguments on specific generating plants or their location. That, in our opinion, is a duty reserved for those who have technical information and for the legally constituted Idaho Public Utilities Commission.

From the standpoint of long range responsible public policy these are general points on which we do take specific strong positions:

1. There are legitimate needs for energy growth and modernization of existing Idaho facilities; that point has already been elaborated.

2. To control growth by controlling energy consumption would be to enact a planned dictatorial economy repugnant to individual liberty, opportunity and responsibility. Who among us has the intelligence, the judgment, or the dictatorial desire to say who shall improve and who shall not; who shall develop new business or new land and who shall be denied; and which homes other than the governor's mansion shall be permitted clean electric heat?

3. Importation of energy from other areas is not a satisfactory answer. Outside surplus power may be gone tomorrow. Buying part interest in an out-of-state unit like the Boardman plant gives us high costs, large transmission loss and no tax base or local payroll.

4. There has to be electrical generating opportunities on which Idaho people can reach mutual and enthusiastic agreement. What are the true opportunities at such sites as Lucky Peak, Arrow Rock and Magic reservoirs; also, additional capacity at such places as Black Canyon, Cascade, Anderson Ranch and Minidoka Dams? What can be done with undeveloped or underdeveloped Snake River sites such as Swan Falls, Dyke Site and Eagle Rock? In many of these instances the locations are under federal control. If the government can't or won't move on these sites, then they should be released for private license, and the RAC will so suggest to our Idaho congressional delegation.

There is something highly inconsistent when we say, on the one hand, sprinkle old farm land, modernize existing industries, attract new clean industry, heat homes with electricity, clean up the river and air with energy-consuming devices, develop new land, and find new sources of energy to replace the dwindling supply of gas and oil, and then turn around, on the other hand, and deny, oppose or ignore every energy alternative to meet our legitimate needs.

Idaho must not be placed, either accidentally or intentionally, into the straitjacket of a "Dictated Growth Policy." Under such a system, any governor could cut off anyone's electrical power

Irrigation, Water, and Energy Use in Idaho

Since the arrival of agriculture in the Northwest a century ago, water-use questions have stirred up passionate argument. One new thread is wound through the current version: energy. Society's energy consciousness, spawned by the events of the last few years, has complicated our understanding of water-use questions.

Water serves beneficial functions, both in-stream and out-of-stream. When water is diverted for agricultural, industrial, or municipal purposes, some of it is used consumptively, and some of it may find its way back to the stream, possibly after some quality changes. Water can also be useful without removing it from the stream. It can provide recreation, aesthetic pleasure, wildlife habitat, and hydropower. Under Idaho law, only the right to divert water from the stream is a protected right.

Historically the Northwest had access to abundant hydroelectric power. (So much so that the area developed a concentration of electricity hungry aluminum reduction plants.) The current picture is different:

> "---it is recognized that the hydropower potential is about exhausted. This has been worsened by the fact that Northwest society does not want any more large dams, and the nation has opted for wild rivers in several of the large rivers in....Idaho." (Warnick, 1973).

With the number of hydroelectric dams now quite fixed, the amount of hydroelectricity generated now depends mostly on the volume of water dropped through the given structures. (Added power plants at existing dams usually don't yield added total power--they just allow water to be dropped more quickly through the structure so the power system can meet peak energy demands.) Obviously, if water is diverted and used consumptively for municipal, agricultural, or industrial purposes, it is not then available for hydropower production. Moreover, the removal and use of water consumes energy which must be obtained from the depleted energy supply system.

The Snake-Columbia Hydroelectric System

Water from American Falls Reservoir in Southeast Idaho could potentially be passed through the power plants of 21 existing hydroelectric structures on its way to the Pacific (Fig. 1). Of the 4,297 foot drop from the American Falls Reservoir pools to sea level, just under half (2,094 feet) has been developed for power generation (Fig. 2 and Table 1). An acre-foot of water dropped through one foot of head generates about .87 kilowatt-hours of electricity. (Hamilton, 1974). Thus an acre-foot of water released from American Falls Reservoir could potentially generate 1,822 KWH of electric power if it passed through each of the 21 power plants.

If the Northwest hydroelectric system provides insufficient power to meet system loads, the only realistic way to make up the deficit is through conventional thermal and nuclear generating plants. Unfortunately it costs a great deal more to generate power this way than by hydro systems.

Figure 1: Location of Hydropower Dams on the Main Stem Snake and Columbia Rivers

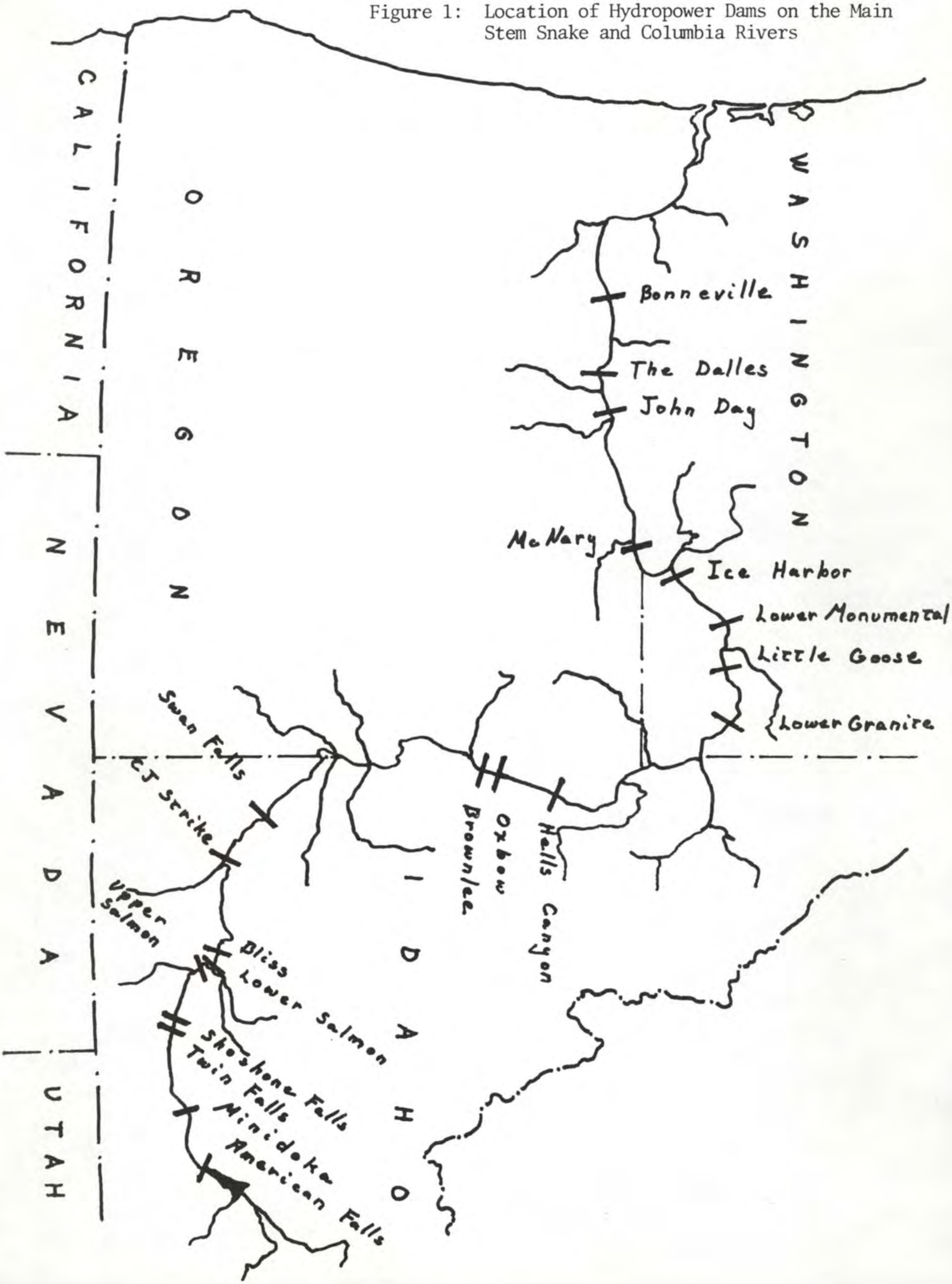
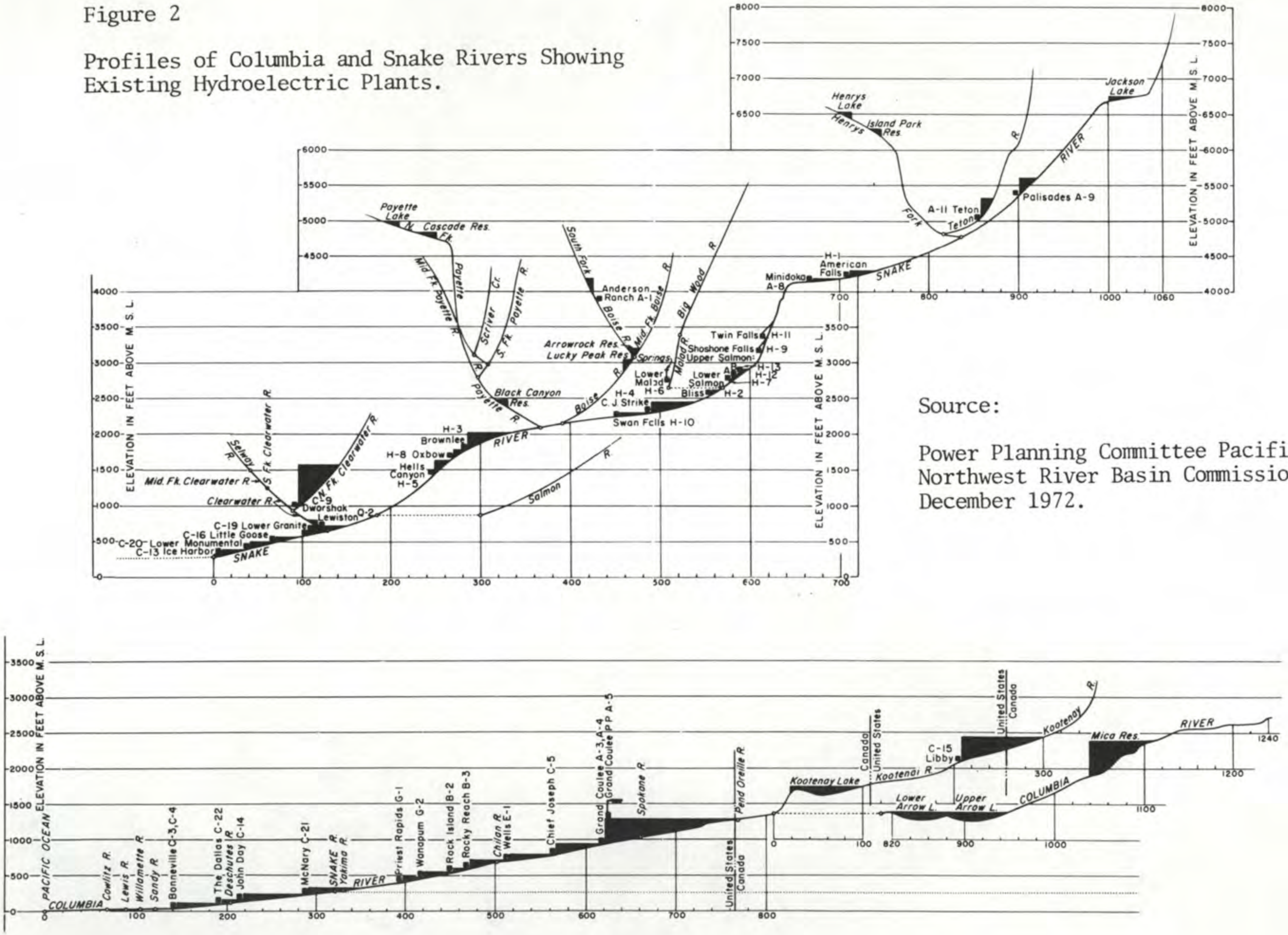


Figure 2

Profiles of Columbia and Snake Rivers Showing Existing Hydroelectric Plants.



Source:

Power Planning Committee Pacific Northwest River Basin Commission, December 1972.

Table 1: Existing Hydroelectric Power Structures on the Snake-Columbia System

	Pool Height	Gross Head	Cumulative Head	Cumulative KWH at .87 KWH/Acre ft/ft	Cumulative Cost per A.F. at 20 Mills
Columbia River (Wash.-Oregon)					
Bonneville C-3	74	59	59	51.3	$ 1.03
The Dalles C-22	160	83	142	123.5	2.47
John Day C-14	265	100	242	210.5	4.21
McNary C-21	340	74	316	274.9	5.50
Snake River (Wash.)					
Ice Harbor C-13	440	98	414	360.2	7.20
Lower Monumental C-20	540	100	514	447.2	8.94
Little Goose C-16	638	98	612	532.4	10.65
Lower Granite C-19	736	98	710	617.7	12.35
Snake River (Idaho-Oregon)					
Hells Canyon H-5	1688	210	920	800.4	16.01
Oxbow H-8	1805	120	1040	904.8	18.10
Brownlee H-3	2077	272	1312	1141.4	22.83
Snake River (Idaho)					
Swan Falls H-10	2314	24	1336	1162.3	23.25
C.J. Strike H-4	2455	88	1424	1238.9	24.78
Bliss H-2	2654	70	1494	1299.8	26.00
Lower Salmon Falls H-7	2799	59	1553	1351.1	27.02
Upper Salmon Falls "A" H-12	2841	46	1599	1391.1	27.82
Upper Salmon Falls "B" H-13	2878	37	1636	1423.3	28.47
Shoshone Falls H-9	3362	214	1850	1609.5	32.19
Twin Falls H-11	3519	147	1997	1737.4	34.75
Minidoka A-8	4245	48	2045	1779.2	35.58
American Falls H-1	4297	49	2094	1821.8	36.44

The system for pricing of electricity is based more on historical precedent than on economic rationality. Public utilities regulation generally allows the recovery of costs plus reasonable profits. In practice, this results in an average-cost-pricing system--with each of the electricity users assuming a fraction of the costs imposed on the system by marginal changes. Hence, higher average costs imposed by new thermal power generation are shared by all users rather than imposed on those people whose actions led to the cost increase.

A study by WSU (done for the Washington State Legislature) of several large proposed irrigation projects in the Columbia Basin found that each KWH of hydroelectric power potential lost when water is diverted for other uses, cost about 20 mills to replace by thermal generating plants. (Whittlesey, Gibbs, Bhagia, 1976). In arriving at this 20 mills estimate, WSU asked the Bonneville Power Administration to use its computer simulation model to determine the needed thermal capacity based on the projected load pattern, critical period stream flows, available storage, and the operating characteristics of all generating plants in the system. The 20 mills per KWH of lost hydropower potential is a social cost paid through higher electric rates charged to all power users in the region. The user of the water is not charged for the right to divert this water. The 20 mills per KWH of lost hydro potential is at least a ball park figure for the opportunity cost of water diverted in Southern Idaho.

The figure of 20 mills looks reasonable in light of the proposed Pioneer power plant near Boise. The one million KW plant would cost about $800 million. Using a 30-year life and a 8.5 percent interest rate, the capital cost alone for such a plant would approach 10 mills. The fuel, operating, and maintenance costs would easily tally up another 10 mills or more.

Using these values for the replacement cost of hydropower potential lost due to irrigation diversion, the water has a value ranging from 23 dollars per acre-foot if diverted from Brownlee, up to 36 dollars per acre-foot if diverted from American Falls Reservoir.

Irrigation and Energy Consumption in Idaho

Irrigated agriculture is itself a significant consumer of electrical energy in the Northwest. Electric power is used both to pump the water from the stream or well, and to provide the pressure needed to operate sprinklers.

A University of Arizona study notes that "A new pump and motor, properly selected and adjusted, should use about 135 KWH per acre-foot of water per 100 feet of lift". (Halderman, 1976). This is an operational standard of 75 percent efficiency in converting electrical inputs into useful work. The Arizona study notes that well pump efficiencies as low as 50 percent are typical. For surface water systems, such as the lift pumping of Snake River water, the 75 percent efficiency figure might be reasonable.

The amount of water that must be applied differs by crop, and soil type and depends on temperature, humidity, and natural rainfall. Table 2 shows the average annual consumptive irrigation requirements for Idaho crops

Table 2. Average annual consumptive use by crop for Idaho (inches).

Station	Sugar beets	Dry beans	Corn silage	Field corn	Spring grain	Potatoes	Small veg.	Winter grain	Alfalfa	Pasture	Orchards
Aberdeen	21.1	16.1	16.7	18.3	16.4	20.1	11.8	20.3	22.1	18.7	-----
Ashton 1S	17.8	-----	14.1	-----	15.3	17.4	-----	17.5	18.3	15.8	-----
Bonners Ferry 1SW	-----	-----	17.0	-----	18.0	20.0	-----	19.0	23.4	19.5	-----
Caldwell	27.8	18.6	21.1	27.3	16.7	25.9	12.8	21.8	29.0	23.8	24.3
Cascade 1NW	-----	-----	13.3	-----	14.6	14.4	-----	16.6	17.2	14.5	-----
Challis	-----	-----	16.9	-----	18.4	17.5	-----	19.2	22.8	18.5	-----
Coeur d'Alene RS	-----	-----	18.5	-----	18.7	22.3	-----	19.8	25.6	21.2	-----
Council	26.4	-----	20.7	-----	18.4	24.4	-----	20.8	28.0	22.5	-----
Driggs	-----	-----	13.4	-----	14.5	16.7	-----	17.0	16.9	14.5	-----
Dubois Exp. Sta.	22.0	-----	16.6	-----	17.3	20.9	-----	19.5	22.3	19.0	-----
Fairfield	-----	-----	14.3	-----	15.1	17.3	-----	17.5	18.2	15.4	-----
Grace	18.2	-----	14.3	-----	15.5	17.0	-----	17.8	18.8	16.1	-----
Grandview	31.3	20.3	24.8	25.1	18.7	29.1	14.8	23.1	34.1	26.8	28.7
Grangeville	-----	-----	16.9	-----	15.1	20.2	-----	17.6	23.1	19.0	-----
Hailey RS	-----	-----	15.7	-----	16.7	17.4	-----	18.9	20.9	17.5	-----
Hollister	23.4	16.2	17.8	19.6	16.8	22.6	11.9	20.5	24.7	20.1	-----
Idaho Falls AP	22.5	-----	16.8	-----	16.3	21.1	-----	19.7	22.9	19.5	-----
Idaho Falls 46W	19.7	-----	16.3	-----	17.3	20.3	-----	19.3	21.0	17.6	-----
Island Park Dam	-----	-----	11.6	-----	12.3	13.8	-----	14.4	13.8	11.9	-----
Kooskia	-----	-----	21.1	-----	18.8	24.4	-----	20.9	29.4	24.2	-----
Lewiston	-----	-----	23.6	-----	19.2	25.6	9.6	18.5	32.5	25.5	27.3
Mackay RS	-----	-----	14.9	-----	17.2	16.3	-----	18.6	20.1	17.2	-----
Malad	24.6	-----	18.9	-----	18.9	22.6	-----	19.8	25.9	21.0	-----
Montpelier RS	-----	-----	14.0	-----	15.0	17.3	-----	17.7	17.8	15.3	-----
Moscow U of I	-----	-----	17.3	-----	15.8	20.3	11.3	18.4	24.3	20.3	-----
Mountain Home	27.9	18.6	21.0	23.0	19.2	26.4	18.7	23.0	29.1	23.9	24.4
Ola 4S	23.4	-----	18.5	-----	14.9	23.2	11.3	20.5	25.1	20.3	21.0
Owyhee, Nevada	-----	-----	15.2	-----	16.7	18.6	-----	18.8	20.2	16.9	-----
Pocatello WB AP	25.5	16.8	19.5	-----	17.4	23.7	12.3	20.1	26.5	21.7	-----
Preston 2SE	24.1	-----	18.3	-----	18.9	22.4	-----	20.2	25.0	20.6	-----
Riggins RS	-----	-----	25.5	-----	20.6	28.0	-----	20.0	36.3	28.2	-----
Rupert	26.1	17.6	20.0	21.4	15.2	23.8	12.0	20.6	27.4	22.3	23.0
St. Maries	-----	-----	17.6	-----	17.9	21.0	12.2	19.6	24.2	20.5	-----
Salmon	-----	-----	16.0	-----	17.3	20.7	-----	19.6	20.9	17.6	-----
Sandpoint Exp. Sta.	-----	-----	15.8	-----	17.2	19.0	-----	18.4	21.6	18.2	-----
Saylor Creek	29.6	19.3	22.7	24.2	20.1	27.5	14.0	20.8	31.2	25.0	26.2
Sheaville, Oregon	-----	-----	15.5	-----	16.4	19.1	-----	18.9	19.8	16.6	-----
Shoshone 1WNW	24.4	17.4	19.1	19.9	15.4	23.6	12.2	22.1	25.8	21.2	-----
Strevell	21.2	-----	16.9	-----	17.7	20.9	-----	19.8	22.4	18.5	-----
Three Creek	-----	-----	12.9	-----	12.7	16.2	-----	15.3	14.7	12.4	-----
Twin Falls 2NNE	25.3	17.4	19.1	19.9	16.2	24.0	12.0	21.1	26.1	21.8	21.9
Weiser	29.0	19.1	21.3	23.7	17.2	26.3	10.0	23.0	29.6	24.8	24.9
State Average	24.3	17.9	17.7	21.7	16.9	21.2	12.1	19.4	23.8	19.7	24.6

Source: Corey and Sutter

as estimated by the UI Agricultural Engineering Department. (Corey, Sutter, 1970). To these figures must be added the water lost by deep percolation and surface runoff. In many of Idaho's irrigation systems there is heavy loss to evaporation and to canal leakage. Irrigation efficiency is the percent of the water applied which is available for consumptive use. Table 3 gives irrigation efficiencies drawn from a Utah State University study where they were presented as reasonable, but hypothetical, efficiencies for various irrigation systems. (Batty, Hamad, Keller, 1974). The Table also notes the added head necessary for pressurization and system operation for each method of applying water. Note that the higher irrigation efficiencies of the sprinkler systems are purchased at the cost of higher operating pressures.

Pumping energy to deliver an acre-foot of water to the root zone can be computed from the formula:

$$\text{KWH/acre-foot} = \frac{1.023\ (\text{Lift head} + \text{Operating head})}{\text{Irrigation efficiency} \times \text{Pumping efficiency}}$$

When this formula is applied, using the irrigation efficiency figures from the Utah study and a pumping efficiency of 75 percent, the resulting solution (Fig. 3) traces out the relationship between energy use and lift height.

In spite of their high irrigation efficiencies, the sprinkler systems use a lot of energy. If a surface irrigation system with "irrigation runoff recovery system" could actually attain the 85 percent efficiency used in the Utah study, then it would seem to be the most energy efficient system. Without some system to recover and use the irrigation tailwater from a surface system, the common sprinkler systems were the more energy-conserving system at a bit over 300 feet of lift.

If, for example, newly irrigated land along the Snake River had an average pump lift of 600 feet, and required 2 feet of net irrigation to satisfy consumptive use, then between 2,000 and 3,600 KWH per acre would be used, depending on the irrigation system chosen.

The Idaho Power Company is the major utility serving the irrigated farming areas in Southern Idaho. (Utah Power, and several REA coops serve portions of the load, and the Idaho Power service area extends over into the Ontario, Oregon area.) Data available from Idaho Power clearly illustrate the growing--even accelerating--irrigation power load. Fig. 4 shows the acreage added each year to the Idaho Power pumping load, and Fig. 5 shows the installed horsepower per acre for that incremental acreage.

The Idaho Power Company acreage data is broken down into new acreage and supplemental acreage. New acreage is receiving water for the first time, while supplemental acreage was previously irrigated, but becomes an electrical load usually because of conversion from surface to sprinkler irrigation methods. Using 1975 data on 33 power load districts gives the following zero intercept regression:

$$\underset{}{\text{HP}} = \underset{(18.22)}{1.79}\ \text{New acreage} + \underset{(5.47)}{0.35}\ \text{Supplemental acreage}$$

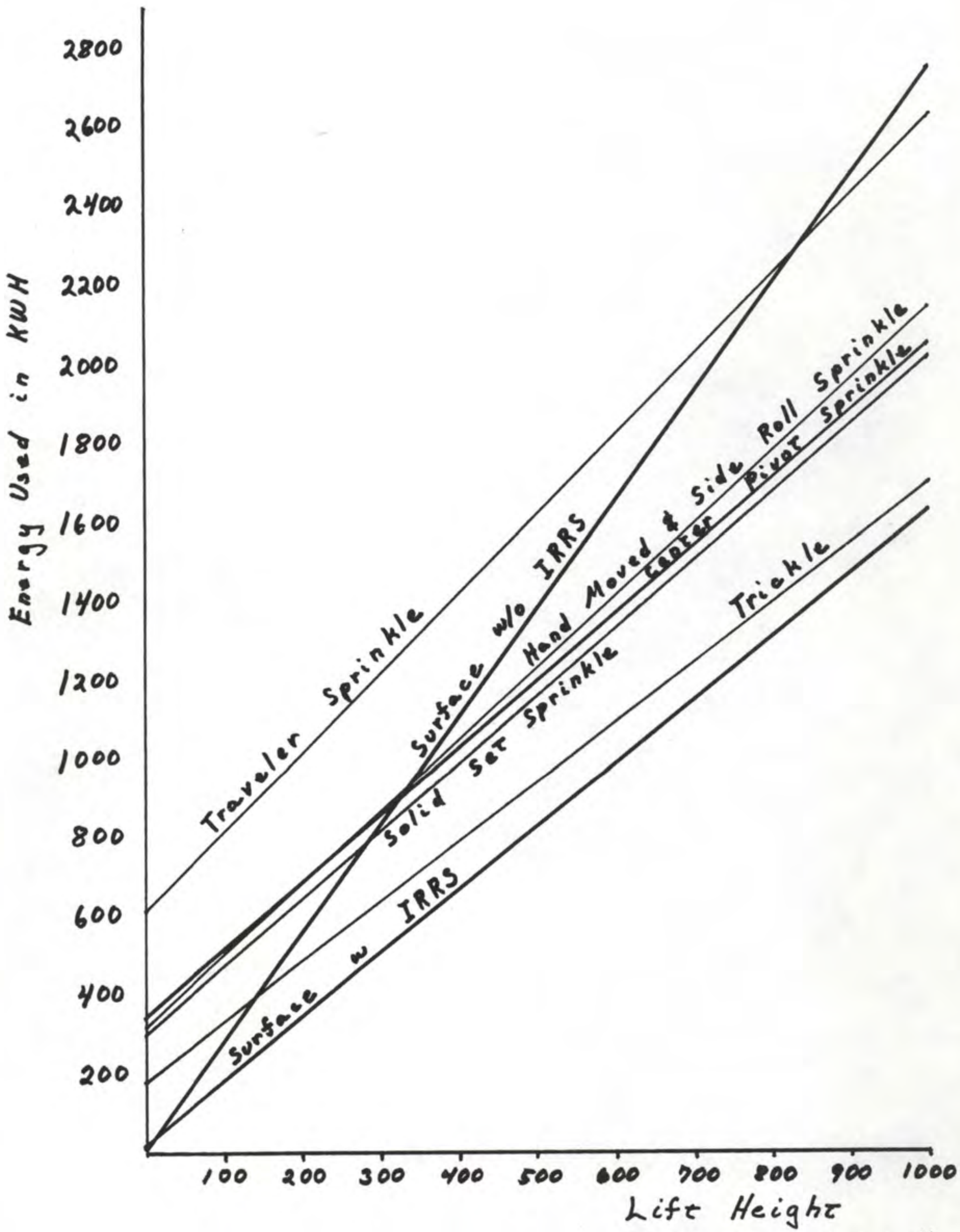
$$R^2 = .959$$

Table 3: Hypothetical Irrigation Efficiencies and Operating Heads Used in Utah Study

	Irrigation Efficiency	Operating Head
Surface w/o IRRS	.50	5
Surface with IRRS	.85	11.94
Solid-Set Sprinkle	.80	175
Hand-Moved & Side Roll Sprinkle	.75	173
Center-Pivot Sprinkle	.80	196
Traveler Sprinkle	.70	312
Trickle	.90	115

Source: Adapted from Batty, J.C., S.N. Hamad, and J. Keller

Fig. 3 Energy Used for Irrigation Pumping per Acre-Foot of Net Irrigation at Typical Irrigation Efficiencies



Source: Adapted from Batty, C.J, S.N. Hamad, and J. Keller

Fig. 4 Acres Added per Year to Idaho Power Co.'s Irrigation Load

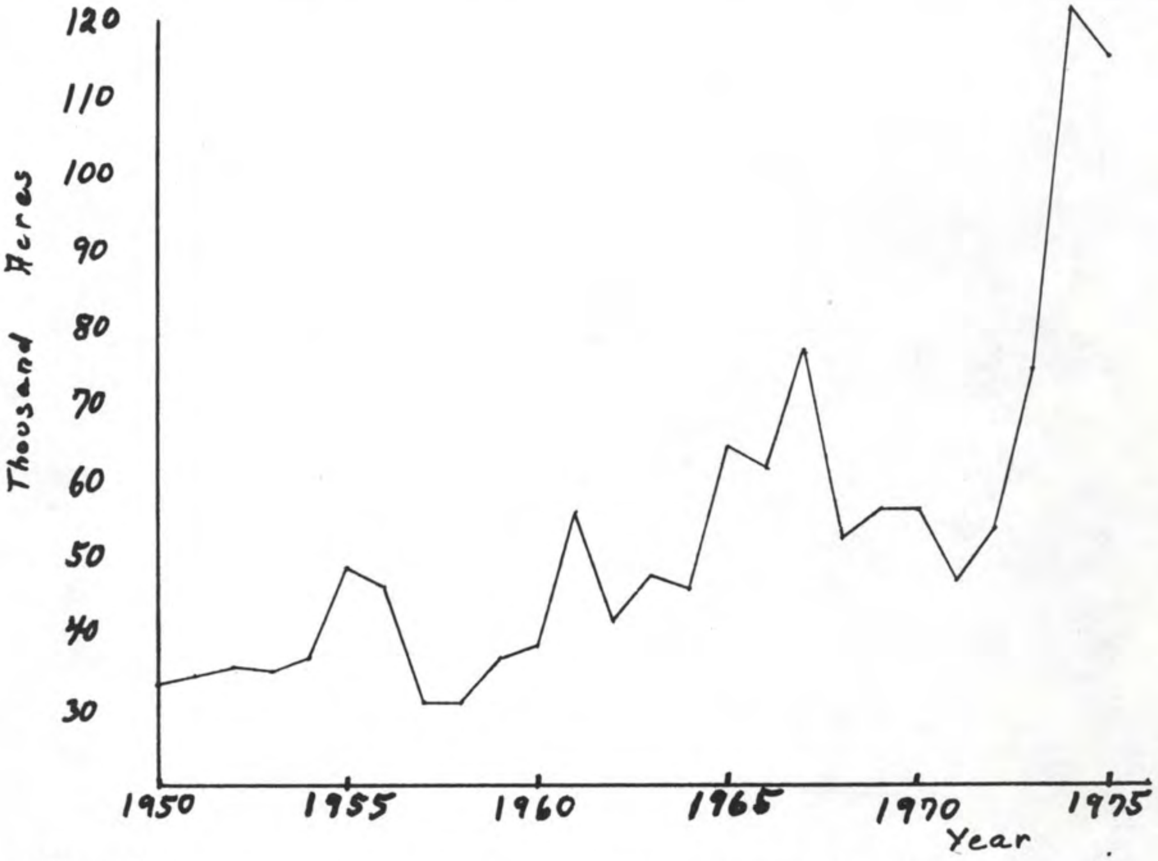


Fig. 5 Horsepower per acre for Annual Increments to Idaho Power Co.'s Irrigation Load

Source: Idaho Power Co.

It takes 1.79 horsepower to service each new acre, and only 0.35 horsepower to service each supplemental acre. If the same regression is run on 1972 data the results are:

$$\underset{(14.28)}{HP = 1.25 \text{ New acreage}} + \underset{(9.08)}{0.74 \text{ Supplemental acreage}} \qquad R^2 = .953$$

The higher new acreage coefficient for 1975 suggests that there was a higher average pump lift for incremental acreage in that year. The lower supplemental acreage coefficient for the 1975 regression probably reflects a greater concern for efficiency of water and energy use in the latter year.

The horsepower of a particular installation is related to the lift height, to the application system used, and to the desired application rate. A center pivot sprinkler system capable of applying .4 inches per acre per day would require about .5 horsepower per acre at zero lift and 3.04 horsepower per acre for a 1,000 foot lift. Such a system used to satisfy a 2 foot consumptive irrigation requirement at 80 percent irrigation efficiency and 75 percent pumping efficiency would require 668 KWH per acre at zero lift or up to 4,079 KWH per acre for a 1,000 foot lift (Fig. 6). The 1.79 horsepower coefficient from the 1975 regression thus implies an average pump lift of 509 feet for the 1975 incremental acreage and an average electricity use of 2,403 KWH per new irrigated acre. This compares to the results of the 1972 regression which would imply a 296 foot average lift and a 1,676 KWH per acre energy use.

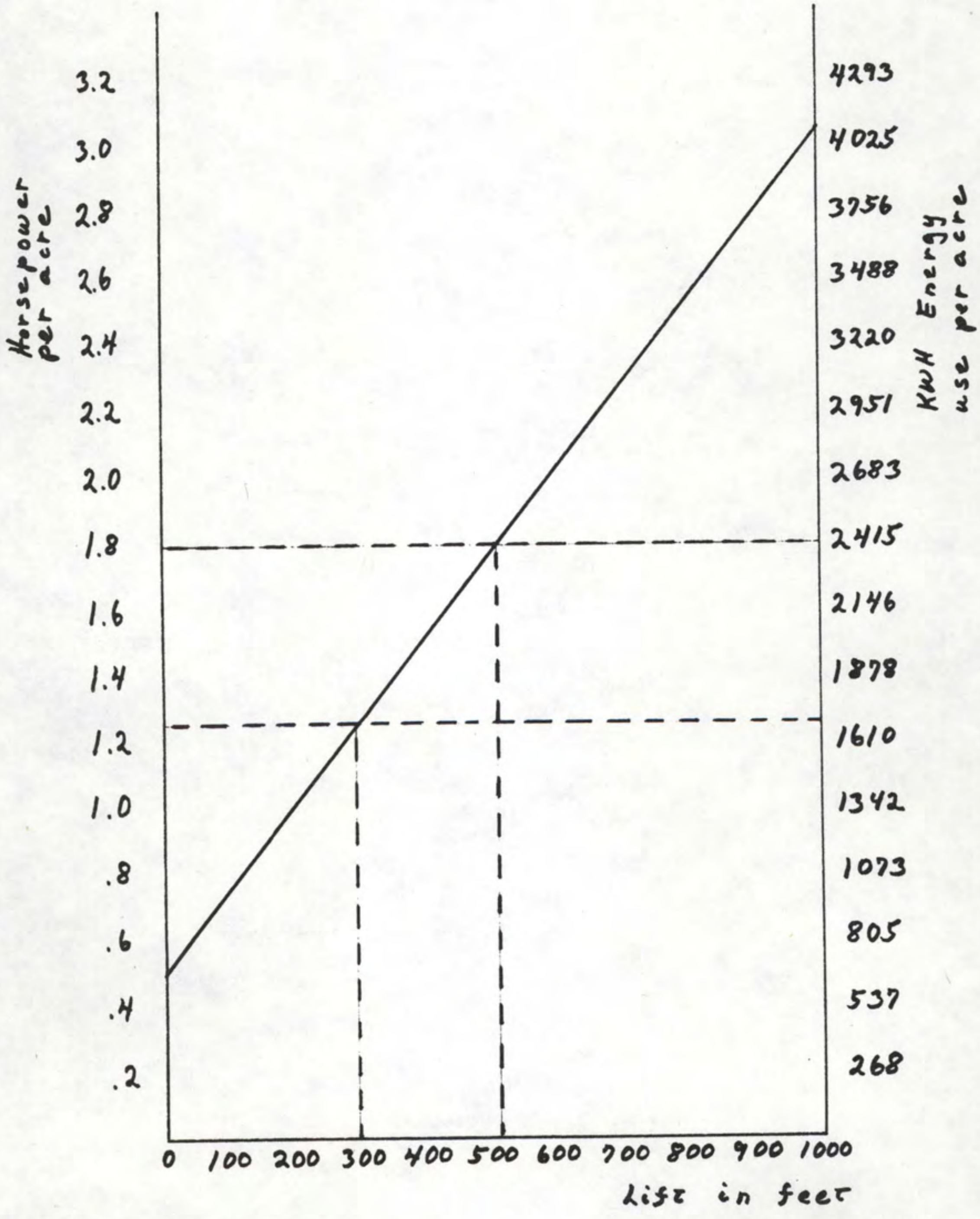
Using the figures derived so far, one can calculate the replacement cost of electricity not generated and electricity consumed by new irrigation development. An average new development would be taking water out of the Central Snake Region for a loss of about 1,300 KWH per acre-foot of diversion. If the net diversion is 2.5 acre-feet per acre (net of runoff returned to river) then this means that 3,250 KWH of electricity will have to be generated by thermal power plants at a cost of 65 dollars per acre of development. The average lift of 509 feet consumes an additional 2,403 KWH which must be replaced at a cost of 48 dollars.

Under the assumptions used here, each acre of new irrigation development consumes or prevents the production of 5,853 KWH of electricity which costs 113 dollars to generate by alternative means. The farmers who impose the added load do pay a portion of this cost with their power bill--but probably no more than 15 percent of the total. The rest of the cost imposed by this development is apportioned out to other electricity users through the working of the average cost-pricing systems.

Electricity as a Production Expense

Although farmers are not required to pay the incremental cost of producing the electricity they use, this electricity is by no means a free good. Electric power bills can be a very significant portion of production costs for a high lift pumping operation. The farmer's power bill consists of two parts, a payment for (the average cost of) energy used, and a payment for the cost of distribution. The WSU study assumed a rate structure for the Horse

Fig. 6 Horsepower and Energy use per Acre for Center Pivot Sprinkler System sized to Deliver .4 inches per day and 2 feet Net Irrigation per Year



Heaven Hills area of 3 mills for energy cost and 9 mills distribution cost, for a cost to the irrigator of 12 mills for electricity used. Current Idaho electrical rates are similar. A high lift irrigation operation in Idaho may easily have a power bill of 50 dollars per acre or more.

Irrigated agriculture will be severely impacted if rising electricity use forces up the rate structure. Use of electricity in Idaho for residences, businesses, and industry, as well as for irrigation is increasing rapidly. Historically, U.S. electricity use has doubled every 6 to 7 years--a pattern that continues undisturbed by the energy crisis. An added factor in Idaho is the rate of population growth--among the fastest in the U.S. This increased power use can only be satisfied by new, high cost generating facilities. In spite of any policy decisions that might be made regarding the encouraging or restriction of new irrigation electrical loads, the existing electrical irrigation loads are likely to be faced with escalating rate structures.

These rising power bills can be expected to have an effect on the growth of irrigated acreage in Idaho. At some point, higher power costs would slow down the development of new high lift irrigation. At some point, higher costs would slow the conversion to sprinkler systems. If rates were pushed high enough, presently irrigated land might revert to dryland crops or grazing as intensive crop production shifted to lower cost parts of the country watered by natural rainfall. The Idaho Power Company data on new irrigation loads shows that we are a long way from that point. The high farm product prices of recent years have allowed producers to shoulder the cost increases so far. The question then becomes: how high would power rates have to go or how low would farm product prices have to fall before the expansion of irrigated agriculture is halted or even reversed?

Summary and Conclusions--Irrigators Caught in the Crossfire

Idaho is an agricultural state. Agriculture is a significant--if not dominant--portion of its economy. At the moment, irrigated agriculture is a dynamic and growing component of the State's agricultural sector. This paper makes several points about the future of irrigated agriculture in Idaho and the Pacific Northwest.

1) The expansion of irrigated agriculture may involve a rather large social cost because of the actions of the average cost-pricing system used in setting electric power rates. The water diverted for irrigation use reduces the power generation potential of the hydroelectric power plants. The water pumping and sprinkler pressurization also consume large amounts of electricity. The cost of building thermal power plants to replace the energy used and that foregone, is borne by all users of electricity in the region. The total energy cost due to a typical 509-foot lift development in Southern Idaho is at least 113 dollars per acre. Of that energy cost, only about 7 dollars is paid by the farmer and the remaining cost is spread over all other users of electricity in the region.

2) Electric power bills are a significant portion of production expenses in high lift irrigation. As the move toward nonhydro electricity generation

proceeds, irrigator's power bills will move upward. This will hurt farmers' incomes. It will reduce the incentive to expand irrigated acreage and to install sprinkler systems. And if carried far enough, these higher rates could force cutbacks in Idaho irrigated farming.

Economists tend to look at the price system for answers to resource allocation problems. Peak load pricing would be one step in the right direction. A more fundamental change in the rate structure that attempts to charge each marginal user the marginal costs he imposes on the system would lead to an economically more efficient allocation of electricity use. Realistically, however, we are a long way from the time when marginal increases in household and industry power use can be charged a rate of 20 to 30 mills. Applying such a rate to each new household or factory would also be politically infeasible at this time. Applying such rates to increases in agricultural power use would also be politically difficult--imposing such rates would block any new development.

There is then, at this time, no clear solution to the dilemma that changing electricity prices is imposing on Idaho. Whether time will create the political climate that will allow a solution, remains to be seen.

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