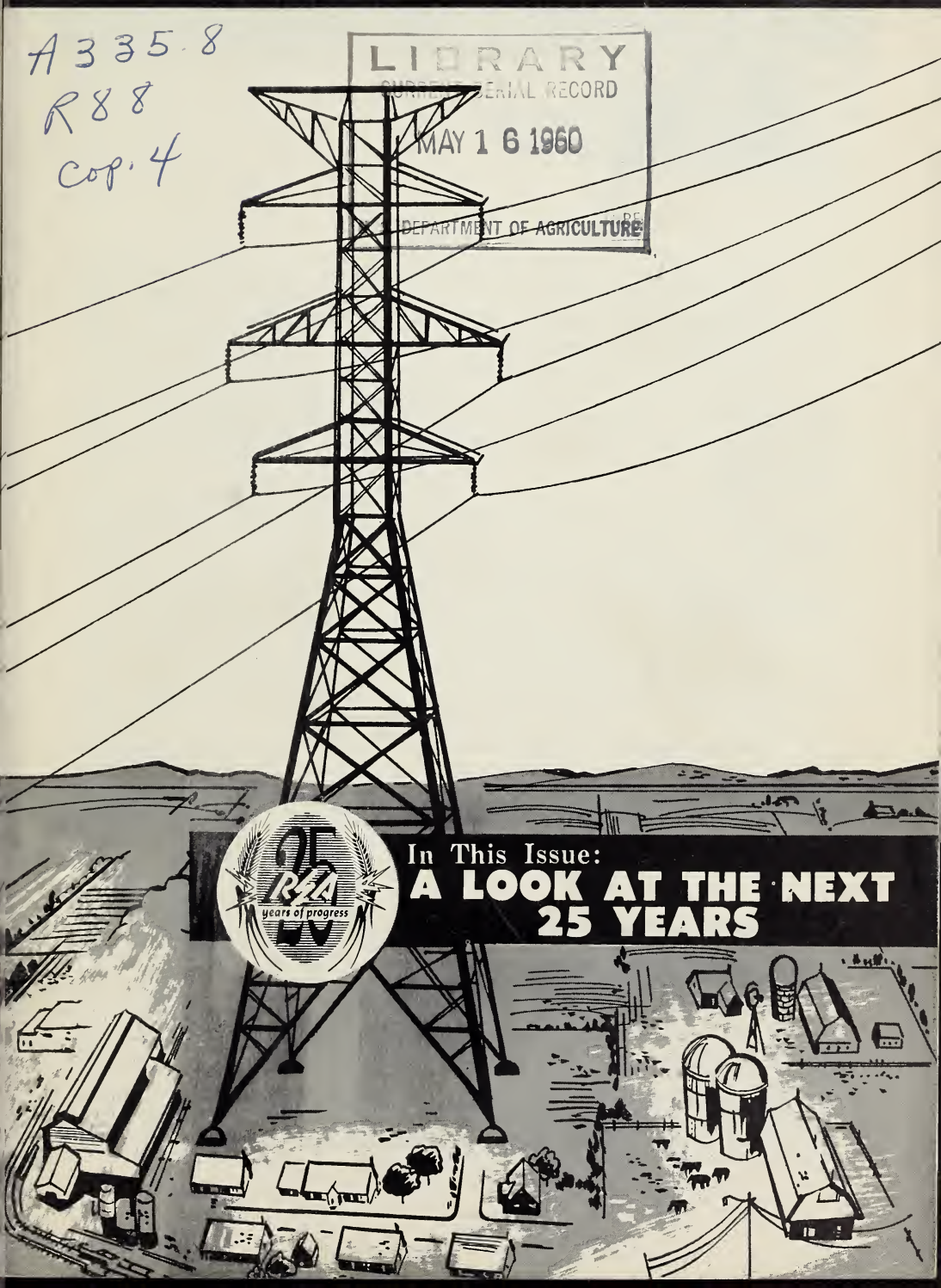
Rural Lines

RURAL ELECTRIFICATION ADMINISTRATION • U. S. DEPARTMENT OF AGRICULTURE

APRIL
MAY
1960



In This Issue:

A LOOK AT THE NEXT 25 YEARS

out in 1937 with 590 members, and borrowed $285,000 with the hopes of building 280 miles of line to serve 800 consumers. The members had misgivings at first, and it was a little tough going for a while. But the co-op kept right on growing. Now Rosecrans has more than 1,300 miles of line, and 3,750 consumers. Out of $3.4 million in loans approved, it has been advanced, so far, $2.7 million to invest in its plant.

With farmers using more than 320 kilowatt hours of power each month nowadays, the co-op has annual revenues of over a half million dollars. With a sound plant and more uses of electricity, our margins are growing constantly. It is about $462,000 now, 17 percent of our investment.

There are rural electric co-ops that are prosperous. There are some that have special problems — operating in underdeveloped areas or coping with idle services because the farming population is moving out. But most of them are in the black and all of them look forward to better days.

The big national picture is a rosy one. More than 4.7 million rural consumers use rural electric borrowers' power. Only about half of them are farmers any more, and 88 percent of new consumers are non-farmers. There are 1,054 rural electric borrowers; they've invested $3.4 billion in their systems. They have a net worth of more than 18 percent, and they rang up $618 million in revenues last year from sales of 25.3 billion kwh. It left them a total net margin of $87.7 million.

Looking ahead, the outlook for the rural electric industry seems almost fantastic. Since Lyle Thurlow is in the future planning business, he'll tell you why.

Thurlow Pointed to Climbing Curves on a Graph and Said: You've heard how the rural electric business stands now, and how it stood when it started. We can tell on a graphed chart what the future is apt to be by projecting our experience, keeping in mind what has happened already and what we know is going to happen tomorrow.

Here's a graph of the future of rural electrification. Look at the steep climb—sales of 2 billion kwh in 1945; 6.9 billion in 1950; 15.7 billion in 1955; 25.3 billion now. That's history. So 40 billion kwh for 1964 doesn't seem fantastic. Neither does a 89.2 billion kwh forecast for 1975. Note that the average rural electric consumer is estimated to use 14,400 kwh in 1975, and that REA borrowers will then be serving at least 6.2 million consumers.

Where are they coming from? Here's a chart that shows you another steep climb—the growth of population. It shows you that this country has added 30 million people the past 10 years. It shows you that there will be 250 million people in the United States by 1985. That's a big figure, but lower than many projections.

The baby boom began after World War II. Returning GI's produced a record crop of offspring. More people created more markets and so on. Medical advances assured most post-war babies of living to be adults. And adults they almost are in 1960, ready to start the curve climbing again to 250 million people by 1985.

Maybe Tom Bidle can tell you

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TRIBUTE TO A PLANNER

Twenty-five years ago the President of the United States signed Executive Order 7037, which created a new office: an Administrator to initiate and supervise the generation, transmission, and distribution of electric energy in rural areas. The date of the signing, May 11, was also the birthday of the first Administrator of REA, the late Morris L. Cooke. It is a fact that has given great impetus to REA's tradition of birthday celebrations.

Was the signing on that particular date happenstance? Or was it an intentional tribute to a staunch advocate of rural electrification?

"Morris Cooke was a sentimental man who would have appreciated such a gesture," says a long-time friend. "But he was too modest and unassuming to have let anyone know about it."

Planning for the future was Administrator Cooke's great gift to rural electrification. He brought with him a distinguished background of experience in rate and feasibility studies.

Soon after working his way through Lehigh University in his native Pennsylvania, Mr. Cooke became interested in engineering and management problems. As Governor Gifford Pinchot's director of Pennsylvania's Giant Power Survey, he became convinced that it would indeed be profitable to bring electricity to all rural America. The Nation's vitality, he argued, depends upon the farmer's prosperity.

When Mr. Cooke took office, the country was battling depression with public works. Rural electrification seemed destined to become a temporary employment project paid for with Federal grants. But Morris Cooke saw rural electrification as something bigger and more far-reaching than a stopgap relief project. It was Mr. Cooke who fought for a self-liquidating loan program; it was he who envisioned a nationwide program which would eventually carry electric power to every farm and ranch in America. Like other great planners, he kept his eye on tomorrow.

Mr. Cooke was to have been a guest of honor at the Silver Anniversary Celebration of REA in Washington on May 11, 1960, his 88th birthday.

He died in Philadelphia on March 5. More than 1,000 prosperous rural electric systems are a tribute to his memory.

To Morris L. Cooke, the planner, this issue of RURAL LINES is respectfully dedicated.

how all this will affect a typical rural electric system.

Bidle Said There'll Be Some Changes Made. In another 10 years, electric power consumption on our lines will more than double. It will do it again by 1980. We expect an average consumption of 800 kilowatt hours by 1975, and this should reach 1,600 in 1985. We'll have more consumers on our lines then, too, probably more than 5,000. By that time our co-op is going to have more non-farmers than farmers as members.

Most of the members today are farmers. Their farms average 200 acres in size. The average size will be larger in another 25 years, and there will be fewer farmers.

The remaining farmers, however, are going to use much more electricity. You'll see at least half of our corn farmers using crop drying and irrigation by 1985. Electric house heating will be a major load. We can expect an even bigger air-conditioning load.

Our new population is going to be suburban. Housing over in the river bluffs near St. Francis is going to grow by leaps and bounds. St. Francis is going to grow as an industrial area. It has raw material, good transportation, and an ample supply of water. The river bluff suburbs should add 500 new houses by 1975, and two or three hundred more in the following decade. A lot of these new houses will be all-electric.

There no doubt will be some industry, too, but if it comes, we'll have to be prepared for it.

Our planning shows that with our electric plant now in good shape, we will probably need $4.3 million more in plant investment by 1985.

You can say in your paper that by 1985 the Rosecrans County Rural Electric Cooperative will be a thriving institution indeed.

Thurlow Discussed Plans for More Power. The future looks bright for all rural electric systems over the nation, even those who are having it a little rough now.

They must all make plans now, though. And the plan must be based on their own outlook and past experience.

Here's what any co-op should do.

- Estimate the size of the local population 5, 10, and 25 years from now. Some co-ops are going to have idle services. Some are going to have fantastic booms. It will be a headache either way for the system unprepared for it.
- Check out future power sources and power costs.
- Estimate how much plant replacement is going to be needed, and how much heavying up and extension will be necessary to meet future demand. Construction should be planned to be finished just when needed.
- Make financial plans, so that a co-op will know how much capital it will need for plant investment at any one time.
- Plan power promotion to produce needed revenue and a balanced load. Here's where you have to know your service area's future potential.
- Plan a personnel development program to make sure there will be people competent to run the system in the next generation.
- Plan member relations. With

more and more non-farmers on rural lines, every co-op needs to give priority to this job.

If we all do these things, we'll be ready for 1985, when co-ops may be delivering 196 billion kwh to their members. REA-financed systems will be going concerns, from Kotzebue, Alaska, to Key West, Florida.

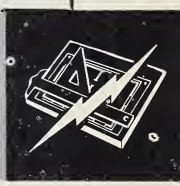
PLANS OF TWELVE RURAL SYSTEMS

In this issue we are featuring the planning experiences of 12 rural electric borrowers. Locations of these 12 are scattered throughout the country: the southern Piedmont, the corn belt, the western cattle ranges, suburban regions, and along both Canadian and Mexican borders.

The problems they solved by planning are varied, but they are by no means all the situations faced by rural electric systems which require good planning.

The co-ops featured in this issue were chosen because their planning experiences are typical of those of many electric borrowers.

OKLAHOMA: FINANCIAL PLANNING



IT PAID TO TAKE A SECOND LOOK

Things looked rosy for the Kay Electric Cooperative, at Blackwell, Oklahoma. Its area included some of the best farm land in the State, and consumers were producing wheat, alfalfa, livestock—and oil. In 1958, the 21-year-old co-op sold its 3,750 consumers more than 26 million kilowatt-hours of electricity. About half of this power was purchased by some 50 large power users, and total revenues topped $598,000. Net margin for the year was $80,885. Investment in plant stood at about $3.5 million.

Furthermore, average power use was climbing year by year, encouraged by one of the lowest rate schedules in Oklahoma. Kay Electric's low step is 1.5 cents; wholesale power costs average about 6.2 mills per kwh.

There was reason enough for optimism. But both Manager Louis Strong and Kay's Board of Directors decided that it was risky

Clyde Hukills, staff assistant, (left) and Manager Louis Strong review long range financial plan.

to run a cooperative on optimism.

Kay Electric had made its first annual work plan in 1958 for the year 1959, but the staff had projected income and expenses only one year ahead. As work began on the 1960 work plan and a new loan application to REA, management found it next to impossible to evaluate plans and programs without a long-range look at the co-op's financial future. Manager Strong assigned his Assistant, Clyde Hukills, the job of preparing a 10-year financial forecast.

As a starting point, Hukills used kwh figures approved by both the board and REA, and expense ratios, which were determined after studying costs of past operations and future trends.

Hukills took a careful look at these:

1. **Idle farm services. Kay Electric had lost 700 services in 12 years, although the present loss rate was less than at the beginning.**
2. **The annual load growth of various classifications of consumers.**
3. **The amounts of loan funds that would be needed for additions to plant between 1960 and 1969.**
4. **Variations in expense ratios.**

"In estimating future consumers," says Hukills, "I considered developments along an Interstate Highway being constructed through the center of our area; water resource development along one of our rivers, and trends in electrifying oil pumping and related operations."

He estimated kwh levels from 12-month moving average graphs, maintained for each classification of consumer. Funds for capital expansion for the next 10 years were provided for by use of the long range engineering study prepared by Kay's engineer. Work orders helped, too.

"Future expense ratios took a lot of study," recalls Hukills. "We had to consider the cost of recent programs, and take into account the automatic increases that

Results of the Kay Electric's Financial Projection for the 10-year Period

Year	Revenue Available for Debt Service and Replacement	Debt Service Requirements	Replacement Requirements	Margin Above Requirements
1960	290,000	149,000	38,000	104,000
1961	309,000	159,000	39,000	111,000
1962	315,000	166,000	41,000	108,000
1963	329,000	200,000	43,000	86,000
1964	344,000	212,000	44,000	88,000
1965	348,000	212,000	46,000	90,000
1966	354,000	212,000	48,000	94,000
1967	364,000	212,000	49,000	103,000
1968	368,000	248,000	51,000	69,000
1969	372,000	248,000	53,000	71,000

(Note: In 1959, Kay Electric's margin was $75,000, out of a total revenue of $667,000.)

Figure 1.

Typical farm grows alfalfa, wheat, and livestock.

would come under our established wage and salary program. We finally decided that we would have to maintain an annual expense ratio of about 6.9 percent to maintain enough margins to keep the co-op in sound condition and still maintain existing rates."

Hukills obtained power expense estimates from his estimates of kwh sold, applying a factor for line loss. He used present power rates. In estimating revenue, he used current rate schedules, with the slippage method of calculating average selling price per kwh.

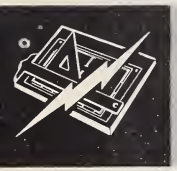
The forecast is shown in Figure 1. Note how margin falls in 1963, and even more sharply in 1968, as debt service requirements increase. There is still plenty of margin, but there might not have been if the co-op had decided to run on optimism, instead of advance planning.

Now, says Strong, the whole staff can make short-range plans that will fit into a long-range financial plan.

The directors now have a yardstick for measuring plans and programs against long-range objectives. They have guidance in handling replacement requirements and capital credits. The staff expects the projection to help them choose areas where power use promotion and education are needed most.

It will also offer a check in determining the adequacy of existing rate schedules.

Manager Strong says that the staff will review, and if necessary, revise, its financial projection each year before it prepares a new work plan and budget. Now Kay Electric Cooperative knows where it is going—and it knows how much it will cost to get there.



VIRGINIA:
SUBURBAN GROWTH

THE CITY FOLKS INVADE

Invasions are an old story around Manassas, Virginia, where the Prince William Electric Cooperative makes its headquarters. Twice during the Civil War, Federal soldiers crossed Bull Run into the rolling fields near Manassas, and twice they were thrown back by Confederate troops.

Now, there has been another invasion from the North. Federal employees from Washington, D.C. thirty miles away, are moving into housing developments around Manassas battlefield. The influx of people has just begun.

In 1941, it had only 551 members, most of them dairy farmers. By 1950, the co-op served 3,700 consumers in parts of four Virginia counties. Farmers were still in the majority.

Today, Prince William has 6,800 members, and 3,600 of them are non-farm consumers. In more than 2,000 of the families, the breadwinner commutes to Washington.

The first subdivisions around Manassas were built in 1950. Each had 100 small houses.

By late 1952, more subdivision plans were under way. Co-op manager Reuben B. Hicks realized that he would have to do something drastic about member relations. He graphed Prince William's trend into the 'sixties. It was a good projection, for his estimate for 1959 missed the actual number of consumers by only 200.

"We were going to have to teach new members how a co-op works," he recalls, "and we were going to have to convince them that they had a stake in the co-op's affairs."

Hicks developed a nine-point program to do the job:

1. Community center. Prince William's headquarters has a demonstration kitchen large enough to seat 40 or 50 people. Hicks made the facilities available without charge to any local group that wanted to use it, and he threw in free coffee and doughnuts. A new church held Sunday services there. A teen club was formed there. Today an average of four groups use the room each week.

"The coffee and doughnuts cost us only $150 a year," Hicks explains. "Making our headquarters into a community center is the single most important step we have taken."

2. Motion picture. In 1953, the manager hired a photographer to film a 35-minute color movie on co-op operations. To date, more than 12,000 people have seen the movie.

Says Hicks: "The film has an amateur look to it. Everyone who sees it recognizes half a dozen local characters. That makes it popular, and we get our message across."

3. Community meetings. In addition to the annual meeting, the co-op set up ten smaller meetings,

Manager Hicks addresses annual meeting.

held each spring in schools, churches, and fire houses. The co-op provided door prizes, and from 50 to 200 people attended each session.

"People ask more questions at small meetings," Hicks believes. "You can thrash out problems that way."

Two of the meetings are held for subdivision people.

4. Better annual meetings. Holding small meetings in advance permits the co-op to stage livelier, more informative annual meetings. Turnout has risen from 200 members to more than 3,000.

5. Improved newsletter. "Any newsletter can be made better," says Hicks. "We made sure that ours tells how a co-op works."

6. Statewide paper. Prince William sends the Virginia statewide paper to all consumers.

7. Consumer suggestions. The co-op receives a lot of recommendations from members, particularly at community meetings. Among the consumer suggestions already adopted: A new bill collection point; a mail slot in the headquarters door; free self-addressed envelopes, available in bulk; 24-hour dispatching; uniforms for all employees; clearly marked vehicles.

8. Street lighting. As a matter of policy, the co-op furnishes free street lamps for any non-profit public institution, such as a school, a church, community center, or playground. Lights in front of a home cost $20 per year; in the back yard, $36.

9. Community service. All Prince William employees are re-

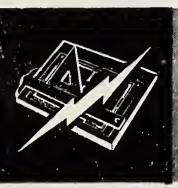
Lines go up for new housing development near Manassas.

quired to join some sort of civic, business, or service organization in the community. Many belong to several, and many were elected as officers of Manassas organizations.

As a tenth step, the manager believes that subdivision people will have to have adequate representation on the board of directors.

Hicks is looking toward 1970 now, when he believes that Prince William will serve 20,000 consumers. A new 1500-home subdivision is being constructed now near Bull Run Mountain, and Chantilly Airport, to handle Washington jet service, is being built nearby.

"We expect a lot to happen in the 'sixties," says Hicks. "We should add 10 new substations and 65 miles of transmission line. We expect our first all-electric subdivision. There will be a general heavying-up. But our single most important task is to look after our member relations. We're on top of it now, and we're going to stay on top of it."



SOUTH CAROLINA: RURAL DEVELOPMENT

KEEP 'EM DOWN ON THE FARM

Cotton was king on the rolling Piedmont land of Laurens County, S. C., when the Laurens Electric Cooperative started 20 years ago. Farms weren't large and a high percentage of them were worked by share-cropping tenants. The members used an average of 40 kwh each month.

Then cotton growing began to play out, until it had less than half the acreage of 15 years before. The tenants started moving away to the brightly beckoning North or to the textile towns on the Piedmont. Now only a third of them are left. Automation came to the big textile plants, too, cutting their payrolls by half.

You might think this would be rough on a 1,900-mile, 7,640-member rural system like Laurens. Hardly. Members now use more than 270 kwh per month on the average. The revenue per mile is around $32; and the co-op has a net margin of almost $100,000. The future looks good indeed, and much of the credit must go to Henry M. Faris, manager from the beginning.

Bringing industry into a rural electric system's service area takes a lot of imaginative planning and hard selling. It takes a great deal of poring over census figures, trade papers, and commercial reports of all kinds. It helps to become a joiner and community leader. Faris is a director of the Laurens Chamber of Commerce and president of the

Limestone plant on system furnishes the crushed rock for new roads.

Laurens Industrial Development Corporation, as well as a director of a local bank and of a building and loan association. The latter helps; it always pays to know where a prospective small industry can get financing.

A carpet company with 350 employees needed such financing. The Industrial Committee of the Chamber of Commerce helped arrange it. The Development Corporation financed a woolen spinning mill and leased it to a woolen company. Another textile outfit is about to move in, with local financing, after co-op people helped them locate a site.

Co-op people do a lot of work along this line, sometimes lending the engineering staff for surveying tracts of land that manufacturers might find interesting. It pays off. The co-op played a major role in persuading a glass fiber company to build a $20 million plant near Laurens.

The co-op staff suggests to prospective industries the possibility of electric power, of course. Whether or not the new industry becomes a consumer, the effort of locating them nearby is worth while. Sometimes the availability of rural electric power is the deciding factor. A tiny plywood plant, which located in the area on this assurance, expanded and grew in 3 years into a sizable completely electrified industry, using local labor and local hardwoods. New small plants make trailers, barrel staves, and other articles, using the raw material of the Piedmont.

The region abounds in resources. Vermiculite ore, used in insulating, is a recent development. Faris has helped two such plants locate on his line. Besides the plant operation load, the co-op sells them power to pump the large amounts of water needed for ore processing.

The co-op was quick to locate three rock quarries on its lines when it was announced that three of the Federal Interstate expressways would cross the service area. The quarries furnish crushed rock for the highways and furnish a good power load for the Laurens system.

So far, however, the total industrial load of the Laurens co-op isn't large, comparatively. But it will grow. By 1975 Faris expects to see an industrial load of 30-35 million kwh a year. It is around 7 million now. The average kwh consumption of residen-

tial consumers will probably triple in the next 10 years and reach 1600 kwh per month by 1975. There will be many more people on the Laurens lines by then, and a much smaller percentage will make any part of their living by farming.

His studies show that the co-op should be in strong financial position by 1975, with a net worth of 65 to 75 percent, financed by a combination of co-op funds and borrowed money.

OHIO:
INDUSTRIAL GROWTH

IT TAKES WATER TO GROW

Does every change mark the beginning of a trend? Is every new development a one-way street to progress?

Manager Karl B. Crawford, of Lorain Medina Rural Electric Cooperative, in Wellington, Ohio, doesn't think so.

About one-third of Lorain Medina's sale of electric power is to industrial and commercial users. In a recent month, 262 bills, for 203,619 kwh worth $4,940, went to stores, small machine shops, filling stations, restaurants, motels and other commercial enterprises. Many of these establishments owe their existence to the good highways serving the nearby cities of Cleveland, Lorain, Sandusky, and Akron.

In the same month, there were 44 large industrial users on co-op lines. They were billed $7,330 for 434,200 kwh. An oil field accounts for 14 of them. More than 900 of the field's 1,713 wells are pumped from central systems—pull rods operated from one motor.

The co-op's promotional efforts have played a big part in attracting business and industry to the area, and in building farm load generally. Changing farm technology contributes to Lorain Medina's load with grain elevators and feed mills, frozen food lockers, and processing plants. Much power goes for highway construction and transportation: batch plants, mixing plants, sand and gravel outfits, and transport truck refueling and repair stations. A concrete block maker, a sawmill, and a woodworking company are evidence that the area is building up. Pipe lines and a water works give the system big pumping loads.

Some industries on the co-op lines located in the area because of the proximity to big cities. Most of these new plants are in buildings converted from small dairies and garages. Automotive parts subcontracting is the most important industry. Another is die making for plastic and pow-

dered metal manufacturers; a big account is for dies for plastic-molded toys.

Lorain Medina presently serves more than 5,000 members over 700 miles of line, and it is estimated that some 60,000 people live within the geographical limits of its service area. The local Planning Commission, of which Crawford is a member, estimates an area population of 78,000 by 1965; of 90,000 by 1985.

It would be tempting for Crawford to chart this growth and to predict a sharp ascending curve of industrial development into the future. But the manager is wary.

"It isn't wise to make too many assumptions," says Crawford, "in using a slide rule to estimate your future growth. Our local water supply is a factor that we can't determine yet."

So far, lack of water has confined the really big industry of northern Ohio to the shores of Lake Erie. But the Great Lakes-St. Lawrence Seaway is sparking demand for greater industrial development. One idea is to run large water mains from the lake into rural areas, like the one served by Lorain Medina. Wellington is 20 miles south of the Lake.

The Planning Commission is studying such a project now, trying to determine if it is feasible. If it is, it could mean more and more industry for the co-op area. If the water mains come, Lorain Medina's industrial load could reach 20 million kwh by 1985.

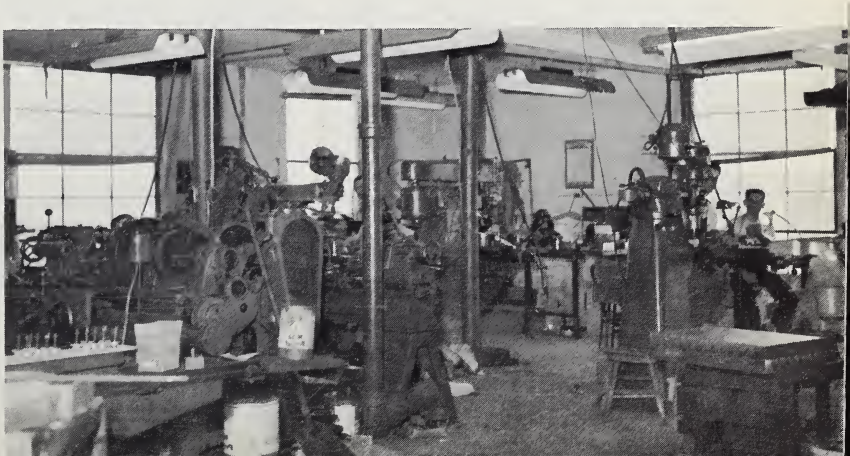
Karl Crawford is neither sanguine nor pessimistic about the possibility.

"I try to be realistic," he says, "when I talk about load growth."

Among other things, he is counting on an increase in the number of commuter consumers, as well as a steady growth in average residential consumption. Many residents can and do commute to Mansfield and Akron at present, and improved roads should attract more commuters. Thirty-eight percent of the area's rural residents already work off the farm, mostly in the steel mills and automobile assembly plants of the lake ports.

As population grows, Crawford believes that there will be even fewer farms left in his area. Remaining ones, however, will be larger and require three phase service, each using about 50,000 kwh annually.

Crawford also is cautious when he talks about average growth in kwh consumption. While the annual average was 3,600 in 1949 for all consumers, and 7,200 kwh in 1959, Crawford does not be-



Machine shops in area are automotive subcontractors.

lieve the load will necessarily double every decade. There is a high saturation of appliances and farm equipment on the lines now. While air conditioning, heating, and new appliances will build load some, Crawford makes these conservative predictions for annual consumption per member: 1965—9,000 kwh.; 1970—11,000; 1975—13,500; 1980—15,000; and 1985—18,000.

"We're going to grow," says Crawford, "but the growing is going to be done by people—by members, by industrialists, by planners. Slide rules and graphs aren't going to do it."

MINNESOTA:
G & T

POWER PLANT OF THE FUTURE

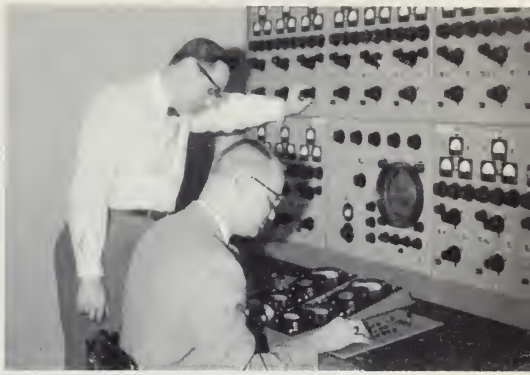
This fall, a tense group of engineers and technicians will be crowded in a room at the Rural Cooperative Power Association of Elk River, Minn. The place is the reactor control room in the large steam plant.

The engineers will remind one of a senior pilot checking his plane before take-off. "Reactor Water Temperature." "Okay." "Control Rod Position." "Okay." "Isotope Source." "Okay." Everything is checked and double checked. The moment comes. The senior engineer gently eases forward the control rod drive which pushes the control rods up out of the core.

The Elk River G&T has come a long way since June 1937. It will soon be producing power from rural America's first nuclear power reactor.

In 1937, a group of co-ops in the Central Minnesota area needed more power and decided to manufacture their own. The Rural Cooperative Power Association was born.

They immediately began to set up plans for a diesel plant at Maple Lake, Minnesota. This was complete in 1940. With an eye to the future, other diesel plants followed.



Dave Kopecky and Rey Rahko, of Planning Department, work out network problem on system analyzer.

Finally, in 1951 the large steam plant at Elk River was completed, producing power with two 11,500 kwh turbine generators. In 1959, a 22,000 kw turbine was installed with a conventional boiler. This turbine was to be ultimately turned by steam produced from the nuclear reactor.

RCPA is owned by six distribution cooperatives: Anoka Electric Cooperative, Anoka; East Central Electric Association, Braham; Kandiyohi Cooperative Electric Power Association, Willmar; Mille Lacs Region Cooperative Power and Light Association, Aitkin; North Pine Electric Cooperative, Inc., Finlayson; and Wright - Hennepin Cooperative Electric Association, Maple Lake. The association and its distribution cooperatives serve approximately 40,000 rural consumers.

The future looks bright. O. N. Gravgaard, President of the Association states that "The key to the future is planning and research. Our growth is approximately 10 percent every year, which means that every 7 years we double our electrical sales. In order to keep ahead of our growth we must plan ahead 5, 10, and even 20 years into the future."

In 1958, RCPA's planning department and the engineering departments of the six member distribution cooperatives undertook a long range engineering study to determine the future loads and the electric facilities required to serve them.

Several joint meetings were held to coordinate these studies. Design criteria and load levels were agreed upon.

The studies have been completed and the real work for the Planning Department has begun. They are now working on various transmission network designs to determine the best way to serve the load centers.

That's the function of the network analyzer, which can duplicate any set of conditions within the transmission and distribution network. "With the complicated loop systems, it is necessary to use an analyzer as a tool to test

RCPA steam plant, with nuclear reactor in background.

the adequacy of various networks," Chief Planner Kopecky says. He further states that "the use of such equipment has saved us much time and money."

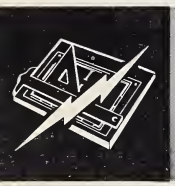
It requires the coordination of all departments to evaluate the alternatives in construction and operation. Art Bailey, head of the Power Department, is currently working on fuel costs, and Charles McQuarrie, Steam Production head, on efficiencies and other related problems. All departments must work together to assure to co-op consumers maximum service at minimum cost.

Edward E. Wolter, General Manager of RCPA, says: "We are indeed planning for the future. If we were to project our present increase in demand to 1985, it would mean that our demand would be up to 500 megawatts. Our responsibilities are cut out for us. We plan on expanding our generating facilities, by a large degree, by 1964. It is not unlikely that this new unit will be nuclear.

"It has been said, that we have advanced more in the past 15 years than any time previous to that in the history of man. The next 5, 10, and 15 years will bring revolutionary changes as it has in the past, and we are determined to keep ahead of the pace.

"Thus far, we have kept ahead, but it has not been easy. It has required long hours of hard work in planning on behalf of the board of directors, staff, management; but above all, it has the complete backing and determination of the 40,000 rural consumers we serve."

The Rural Cooperative Power Association is carving a place in history through rural electrification by atomic power.



MAINE:
REGIONAL PROMOTION

HANDS ACROSS THE BORDER

Way down east in Calais, Maine—as far east as you can get in the United States—is the Eastern Maine Electric Cooperative, managed by Robert V. Clark. He has plans—short range and long range—for the co-op and the community. Clark says: "We won't have a power supply if we sit around and wait for Quoddy."

Quoddy is short for the Passamaquoddy Bay, at the mouth of the St. Croix River just below Calais. The river and bay form the international boundary between Maine and the province of New Brunswick. Quoddy also means harnessing the bay's giant tides to generate electricity, which would make an industrial paradise of this now economically undeveloped region.

Maine always was a hardscrabble country. The soil is rocky and the resources scant. Once it had a great lumber industry, but the big sticks are gone now. Transportation hurts Maine; it's a long way to market for everything.

This has hampered industrial development. Maine's sparse population gets along on small incomes. People don't spend money for electrical appliances they can't afford. So, manager Clark is promoting more industries and resorts to get more payroll so he can sell still more kwh at lower rates.

It isn't easy, but the co-op is making headway. Two years ago the average consumer was using only 81 kwh per month. This figure has almost doubled. The system had a net margin of over $19,000 in 1958. New consumers are on the lines and Clark expects the annual requirements for kwh to rise from the current high of 10 million to 13 million by 1965.

Payrolls have been a major item in promotion plans. A timber products company recently expanded mill operations adding 60 men. It meant more income, also, for lumber truck operators, woods workers, and small farmers who could sell tree stumpage. The co-op put a diesel unit into operation, at the site to help carry the load.

A disastrous fire wiped out a local wood products factory recently. It was an old firm whose payroll was the mainstay of the area. Insurance money alone wouldn't help the firm get under way again. Local subscription to new stock shares did. The Eastern Maine co-op contributed their share in boosting the subscription, which not only helped the firm rebuild, but improved its efficiency so that new laminated wood products are in great demand.

Other new small industries have had a boost from the co-op: fiber board, furniture, cedar posts, textiles, vehicles, plywood, and boats. One of the most interesting firms which the Maine borrower has helped promote is a German metal concern with a new chipboard product which uses

St. Croix Island is a tourist attraction in Calais area.

raw material available on both sides of the border.

Clark is President of the Calais Chamber of Commerce and very active on its Planning Board. All the co-op's board and staff are active in civic works.

The communities of Calais and St. Stephen, N. B., just across the river, are noted for their international cordiality. The Eastern Maine co-op gets most of its power from the New Brunswick side. Increased demand for electricity could not be met by power suppliers on the Maine side. So the Calais area is served by a 3750 KVA substation tied into the loop fed transmission grid of the New Brunswick Electric Power Commission. Diesel equipment is maintained as standby equipment, since Canadian law requires that contracts can be made only on a year-to-year basis.

The co-op is adding new tie lines and distribution capacity at a rapid rate to take care of future needs.

Calais farmers find that tourism is replacing blueberries as a main crop. The co-op has added its voice to those on both sides of the border in promoting the region as the ideal vacation area—scenery, climate, hunting and fishing. Even history is promoted. All co-op employees donned costumes for the attention-getting parade celebrating Calais' 150th birthday. No time was lost in extending an invitation to Gen. Charles deGaulle to dedicate St. Croix Island National Monument when it was learned he would be in America for a conference at that time. The island was the first settlement north of Florida, and was made by the Frenchman, Champlain. Tourists have come to the area in large numbers recently. Many have stayed to build or buy seasonal cottages.

New street lighting and many new store buildings, along with highways and park developments, have added to the appearance and economic well-being of the Calais area since the renaissance began.

It looks as if the Eastern Maine co-op will grow, and, if it continues with planning and promoting, so will the region.

Manager Robert V. Clark (center left) visits sawmill that is temporarily furnished power by diesel unit.

99.44% SATISFIED CONSUMERS

ALABAMA: IDLE SERVICES

Service lines ran across the cotton fields to vacant tenant houses in Northern Alabama. The Joe Wheeler Electric Membership Corporation of Hartselle had 1,200 such idle services in 1956 on its 2,066 miles of line, almost 10 percent of the total. It represented a half million dollars in idle plant. Cost of maintenance was around $36,000 a year, with no revenue coming in to help meet the expense.

The idle services created a dilemma. They cost too much to keep up. Yet if the co-op took them out it might risk the wrath of its members. And what would it cost if a service taken out today had to be put back in again tomorrow?

The trouble was that there had been no firm policy in the beginning. When the lines were built, everyone wanted lights, and wanted them right away. Land owners wanted lines running to all their tenant houses. They were built. But before some of the houses were even wired, the lights of the cities began to look brighter to many of the tenants. They began to head north out of the red clay hills of Alabama.

Manager Floyd F. Anderson got together with his board and his staff. They evolved a plan.

Idle service on a tenant house.

They decided to take the idle services bull by the horns. Here's the plan they came up with:

- Everyone is entitled to one free electric service extension, if he owns his own home and lives in it.
- Any other service that is vacant must have a membership put on it, and pay a minimum monthly bill of $2.

Floyd F. Anderson

• The minimum bill and membership rule applies to unused barns and empty wells, or any unmetered point that has a separate line.

• The owner of a vacant house has his choice of being billed flat —with no meter and with the service de-energized, or to have a meter set in his name and be responsible for all current which might be used.

• If, at any time the house becomes occupied, with a meter set in the tenant's name, the owner will not be billed. If the tenant moves out again, the $2 minimum automatically goes into effect again.

• A cutoff date was set for owners to contact the co-op, if they wanted to keep the service.

• If a service is removed, a rebuilt service to the same site will be at the landowner's expense.

The new plan was publicized through the co-op newspaper, radio, and personal contact was made during a survey of idle services.

The first services taken out were on the farms of board members.

There were some complaints from consumers, but the percentage was very small, less than half of one percent. To the co-op's surprise, most people liked the plan. You could say 99.44 percent of them did. Some realized that they themselves were paying for the idle services. Some were resentful of idle lines crossing their farms; they hated to plow around the poles and guys.

Many of the empty houses weren't worth keeping. Landowners kept services in those that were, since it is easier to find a tenant for a house with service immediately available. In a little more than 2 years time, the co-op took out 1,103 services and retired more than 100 miles of line.

All told, 1,433 idle services were removed, a total of 121 miles of line. The value of these services was estimated at $547,400. Since there was about one transformer for every two services taken out, the co-op was able to salvage many of them, as well as wire and poles.

So far, 148 services have been rebuilt, at a cost of $7,550. The system has only 281 idle services on the line now; 150 of these are set flat.

Two years after the co-op's idle service policy went into effect, it was serving 12,225 consumers on 2,034 miles of line. The investment per consumer was $23 less than it had been 2 years before.

Manager Anderson is planning ahead. By 1985, it is likely that Joe Wheeler consumers will be using 345 million kilowatt-hours.

BETTER OFF THAN THEY THOUGHT

NEBRASKA: LOAD PLANNING

Grain elevator and safflower processing plant are industrial loads.

They used to raise Cain around Sidney, Nebr., when the West was young and wild, according to legend. Now they raise wheat on high arid plains—the world's best, Panhandle people say.

The Wheat Belt Public Power District, now 12 years old, has 1,720 miles of line, including 100 miles of transmission line, to serve its 2,400 consumers with Bureau power. Most of the district is in big wheat farms. However, two narrow valleys cross the service area. They are irrigated and the farmers raise diversified crops, mainly corn, sugar beets and alfalfa. On the north side of the district the system serves some of the famous cattle ranches of Nebraska's Sandhills. There is a sizable oil field along the Colorado State line. There isn't much in the way of towns or villages, only 320 such residences, 90 public buildings and 200 hookups that are rated small commercial. Forty-four services are rated as large power loads.

By and large, it is a low-density area that isn't apt to become the site of anybody's industrial metropolis. The average farm consumption of electricity per month is a little more than 350, and the average for all consumers just over 1,000.

The Wheat Belt District wasn't easy to organize. People then thought that they could never sell enough electricity to make it pay out. There were too few farms and ranches spread over too much country.

The system isn't old enough yet to have a fat net worth, but if one were in Manager Charles E. Ham's shoes, 2 years ago, they'd wonder if it ever would.

Manager Ham gave a long look at the low density, and at the big investment in the system, more than $3.2 million. Farmers then were using 329 kwh per month on the average; other residentials only 234.

Ham felt that he should build power sales. But what? If he built his farm load, could he afford to promote house heating or irrigation? Which load was his best bet? What would a heavy load of any of the three—farming, irrigation, or heating—do to the plant? What would it do to

Figure 2.

		POWER COST	TOTAL EXPENSES	REVENUES
Plan A	1963	$242,700	$572,600	$598,600
Farm Load	1985	$463,410	$959,200	$1,118,600
Plan B	1963	$259,890	$597,900	$632,600
Farm & irrigation	1985	$569,000	$1,098,100	$1,332,800
Plan C	1963	$250,660	$600,000	$622,800
Farm & house heating	1985	$571,000	$1,190,200	$1,444,900
Plan D	1963	$267,550	$629,800	$656,800
All Loads	1985	$677,000	$1,316,000	$1,659,100

operations? What about rates? Should he increase them? Would an increase boomerang in lower power sales?

Ham had an REA specialist come out and estimate his load. The specialist suggested that Wheat Belt get a consulting engineer to prepare four long range system plans. The plans would assume present rate for power, and map out where the district would be, year by year, if Ham concentrated on: (1) The farm load; (2) Farm load plus irrigation; (3) Farm load plus electric house heating; (4) Farm load plus irrigation plus house heating. The plans would take in account, of course, system investment and power supply.

It was quickly evident that system investment figures would be lower than Wheat Belt had feared. Any one of Ham's plans would require heavying up, but not as much for expansion facilities.

Power also appeared to be no future headache. Area power planning now under way indicates that there should be ample power.

Irrigation studies showed that there was plenty of water underground, that there was nothing in the way of increasing the irrigation load, and with it, the total number of farm consumers.

See Figure 2 for the study.

Lower rates than Wheat Belt's were used in making the calculations. The survey showed that the district could lower rates and still make out in the critical period while building margins and net worth. This would yield greater revenue in the long run.

Industrial loads were not taken into account. They would probably remain fairly static.

Few residential loads will be added. Only 120 more. They estimated 355 more farms, with a monthly average power use rate of 1,400 kwh. The irrigation users will increase from 150 to 790, using an average 10,000 kwh per year in 1985. There will be 850 house heating hookups in 1985, each using 16,800 per year. The system must be heavied up to stand a maximum demand of 26,700 in summer and 20,300 in winter.

Manager Ham lowered his rates and started out on Plan 4. So far, he's doing fine. The system has a DSER of 119 and a net worth of $72,301. The really prosperous years are just around the corner.

BIG ALONG THE BORDER

TEXAS:
AREA COVERAGE

The area served by the Rio Grande Electric Cooperative, at Brackettville, Texas, is big.

It includes 48,000 square miles, 16 counties in Texas and 2 in New Mexico. The domain is equal in size to the whole of Louisiana.

The lines begin near El Paso in the Hueco Mountains and extend 730 miles southeast along the Rio Grande River. The co-op will soon serve 3,500 consumers over 5,500 miles of distribution line.

At the southeastern end, irrigated vegetable farms run about 125 acres. In rough, stony Kinney County, the sheep and goat ranches average about 6,700 acres. Still farther west, in the range county of purple sage and ocotillo, cattle ranches in one county average 32,000 acres.

In the south, Rio Grande serves one consumer every ¾ of a mile; in the center, there is one consumer every 2 miles; in the west, there is but one consumer every 4 miles.

Co-op general manager Thomas J. Hurd, who believes both in faith and hard work when it comes to area coverage, can say that Rio Grande is prepared to provide electric service to any rancher who can pay the same price that his neighbors have paid. Last August, he announced a single residential rate schedule for all who have been members for 5 years or more.

"We began in the south in 1948, and were energized by 1950. We kept extending our lines, and at the end of 1953, we took power into Big Bend National Park. When 1954 began, we thought we were done with major construction and could settle down to routine operations."

The honeymoon lasted only 2 months. In March 1954, Rio Grande was asked to absorb another Texas cooperative. This

Co-op lines cross rugged range behind flowering ocotillo.

began the second great phase of building.

As lines moved west, the co-op switched from 7,200/12,500 volt distribution lines to 14,400/24,900 volt lines. Hurd is convinced that it was a smart move.

"In the south," he points out, "we needed 7 metering points for 2,000 miles of 7.2/12.5 KV line. We needed only 6 metering points for 3,500 miles of 14.4/24.9 KV line further west."

The higher voltage also permitted serving pump loads up to 300 hp per pump by using smaller conductors.

"The engineering and planning, adapted to local conditions, helped us get started," Manager Hurd notes, "but the important reason for our success is that whenever you build more power lines, things begin to happen in the area."

What's going to happen in Rio Grande's area? The co-op's long-range financial projection indicates that it will have only 4,000 members by 1968, only 500 more than now. But revenues are something else. Hurd estimates they will be up to $1.9 million in 1968, compared to $681,000 in 1958. Average power usage by farm consumers will be 590 kwh per month, versus 325 today, and consumption for all classes of consumers will be up to 1590. It is about 850 kwh today. The co-op's operating report will show a healthy net margin.

What's going to do it?

First, revenues from irrigation will double, rising to $834,000 by 1968. The discovery of an almost unlimited water supply near Dell City, Texas, already has created a whole new farming community.

Revenues from non-irrigation loads are expected to grow even faster. In the early 1950's irrigation provided 70 percent of the co-op's revenues. Now it represents only 40 percent.

Here are a few of the things Hurd expects to happen—

- Oil field pumping will nearly triple by 1968.
- More electric equipment and appliances, as well as air conditioning and heating systems. (Hurd sold his entire area on installing cable to permit use of an electric range & water heater.)
- Revenue from the comparatively new Big Bend National Park will top $7,000 by 1966. It will have all-electric accommodations for tourists and employees.
- A big new fluorspar mill now has a 500 kwh demand, and will eventually demand 1,500 kwh.
- Ten FAA omnirange stations, all converting to 3-phase service. The co-op also serves 5 unmanned radar stations.
- A big new housing development near El Paso. Co-op lines already are in the area. (This is not included in co-op estimates for the future.)
- And the unexpected. Hurd has found that wherever he builds a line, he picks up meters he hadn't counted on. Where there was no road, he built 15 miles of line along a railroad so that he could maintain it. He picked up 26 new meters from the railroad itself.

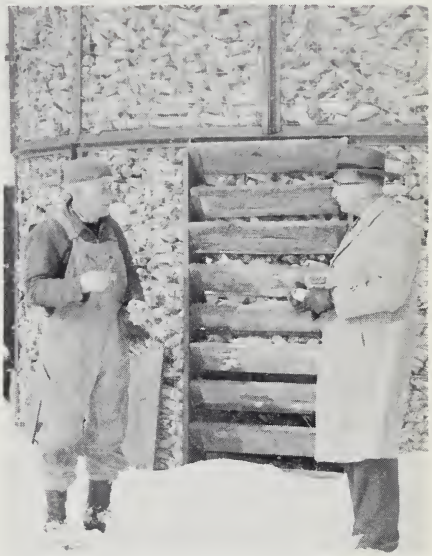
"I have just about decided that any line, anywhere, is feasible," concludes Hurd. "If area coverage works in West Texas, it will work anywhere."

SERVICE FIRST— THEN SALES

IOWA: FARM LOAD

It was wet and foggy in Iowa last winter. Corn spoiled in the crib because there wasn't enough cold, windy weather to dry it out. Farmers who hadn't been enthusiastic about artificial crop drying rushed en masse to have their corn shelled and dried. Custom crop driers never had it so good.

Frequently seen on the road was the service truck of the Benton County Electric Cooperative Association of Vinton, loaded with a heavy duty transformer. Oftener than not, Manager John D. Ruehle was with the service crew, en route to a farm where a custom drier was going to dry corn with electricity.



Manager John Ruehle (right) looks at some of G. A. Carlson's corn.

There would be no charge for the temporary transformer hook-up. A lot of trouble for one day's work? Sure, but a lot of kwh sold in one day. Maybe, if the farmer likes the job, he'll be a convert to the idea of drying all his crops. Then he'll need a bigger service entrance permanently, and he'll be a prospect for other electrical equipment which can make his farm work easier.

John Ruehle works hard at selling electric farming. Benton County farmers don't change their methods whimsically. Key to Ruehle's selling plan is service. Special service such as temporary transformers, yes, but mostly service every day. Farmers won't work with electricity if there are a lot of outages. If you are going to avoid outages you keep close track of your system's condition. You avoid outages by planning improvements a long time ahead, so they'll be done when needed.

It's all part of the Benton County co-op's long range engineering plan, designed to show what will be needed years ahead, so that financing may be planned for accordingly.

Benton County gave its name to a famous black soil, a rich loam which grows magnificent crops of corn, as well as oats, soybeans and hay. Vinton, the county seat, lies halfway between the industrial towns of Cedar Rapids and Waterloo. Either city is only

about 10 miles from a far corner of the co-op's 816 miles of line. A few, but not too many, co-op members commute to town to work. Most of the 2,400 consumers are farmers. Ruehle's sales effort, which dovetails so well with long range plans, is mostly concentrated on better farming.

He gives a lot of attention to crop drying to build a summer and fall load.

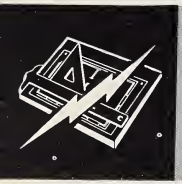
"There's a need for artificial drying at harvest time," says Ruehle. "By harvesting early, much ear dropping can be averted. More oats can be combined from the stem, and the same is true of soybeans."

The co-op also pushes house heating. It has 31 houses now taking advantage of the 1.65¢ per kwh house heating rate with all-electric heat, and the same number using supplementary heating. The wholesale rate is 1¢ delivered to the substation.

The 1959 monthly average kwh sale of 712 per consumer shows how well electric farming has advanced on the system. In 1938 the rate was 43.8.

Looking 25 years ahead, Ruehle sees a monthly meter reading of 3,500 kwh. Right now, he is aiming toward 1970, when he expects an average consumer use of 1,159 kwh each month. This will cost the co-op $480,000 in system improvements, such as larger conductors, poles, a substation, and increased capacity of distribution transformers.

He doesn't expect a big wave of population in the near future. He anticipates that 10 years from now the co-op will have 2,650 consumers. The modest increase will come from people in town building country homes and many farm people building new homes on their farms for retirement. The country is a popular place to live today. But outside of a little industry, Benton County will probably remain a farming region. That means selling electric farming to keep growing—and that means good service.



NEVADA:
NEW
BORROWER

NEW CO-OP IN THE COW COUNTRY

Rural electrification is not quite complete. A group of cattle ranchers in northern Nevada are looking forward to receiving their first central station service sometime next fall.

The Wells Rural Electric Company, the new co-op, got started 18 months ago when local cattlemen decided that they might make a project feasible by acquiring a small municipal system. The old Wells Power Company, which uses diesel generators, served some 500 meters in its home town and the nearby village of Deeth.

In a brand new contract, Idaho Power Company has agreed to build a 138-KV transmission line from Rogerson, Idaho, to serve

New co-op lines will radiate to ranches from town of Wells.

this power-starved area, as well as the town of Elko. After a year, the co-op will dispose of the diesel plant in Wells.

From a single substation on the newly acquired system in Wells, the co-op will extend new lines 50 miles north to Contact, 80 miles south past Ruby Valley, and 12 miles northwest to Metropolis. These lines will bring first-time service to 192 consumers, most of them ranchers. Practically all graze Hereford cattle. The co-op also will serve pumps at a state fish hatchery and 5 homes at a Federal bird refuge. Total consumers will number about 700.

Signing up new members in 1960 has not proved quite the chore it was in 1937. Feasibility depended on getting each new consumer to agree to a $25 a month minimum bill, for which he could use 600 kwh per month. All ranchers promptly agreed except one, who signed later after REA approved the co-op's $1,654,000 loan. The man with the biggest ranch in the area volunteered to pay a minimum of $100 per month.

Board President Robert Wright explains the eagerness to pay big minimums this way:

"Almost all our ranchers have had home lighting plants for years. They don't want central station service just to get lights. These families want electric stoves, freezers, refrigerators, television, automatic washers, and repair shops. Most of them will install enough equipment right away to use up the 600 kwh minimum. I know I will."

Wright says that he received a number of appliances for Christmas last year, and is just waiting to plug them in next fall. Considering fuel and maintenance on his home lighting system, he doesn't think his new electric bill will cost him any more.

The board of directors, which includes 7 ranchers, a merchant, and a bank manager, aren't sure what the future might bring. Banker C. J. Ballew, board secretary, believes power could bring the area's first industry, including lead, silver and tungsten mines. Two major highways—U. S. 40 and 93—pass through Wells, along with three railways.

Power could mean more motels, filling stations, resorts. There are plenty of good hunting and fishing in the mile-high area, which Lowell Thomas has called "the only real cow country left in the West."

Wells has been important to the West for a century. It was an oasis for wagon trains, before they moved down along the arduous Humboldt trail. Then it became a major cattle shipping center. Plentiful power could mean an important new chapter in the life of the area.

WASHINGTON:
POWER USE

BOTH SIDES OF THE TRANSFORMER

Beautiful farm homes are big power users.

An REA-financed cooperative with an average usage of 1,000 kwh per member per month? That goal seemed almost too ludicrous to predict in REA's early days.

Five years ago the Lincoln Electric Cooperative, Davenport, Washington, was the first borrower to break the 1,000-kwh barrier. That was in 1954, and the power use has been climbing steadily ever since. Last year, the average farm usage per member was 1,241 kwh per month; overall usage was 1,737 kwh per month.

Lincoln's achievement in kwh consumption came about because Manager N. V. Fisher and his staff did a good job of plotting sales saturation of appliances, member by member. Then they followed with a continuing sales promotion program.

Located on the rich desert soil of Lincoln, Adams and Grant counties in the central eastern portion of the state, co-op lines have been providing current at an average density of one member per mile, ever since the first energization 20 years ago. Wheat and beef are the top income crops.

Lincoln's power-use progress is a source of pride to Manager Fisher, and justly so.

"We knew that our growth had to be from within," he says, "and so we made every service-man a power use advisor." The records show how well the co-op's planning has paid off.

The Lincoln's system's area is mostly irrigated. Members have electric heat and well-equipped farm shops. Fisher looks ahead to 1985 by pencilling in a projection of 3,000 kwh per farm member per month and an overall average of 4,200 kwh per month. He also predicts an increase of 500 meters during the next 25 years.

Fisher, now serving his 20th year as manager, credits the board and the members for the co-op's steady advance.

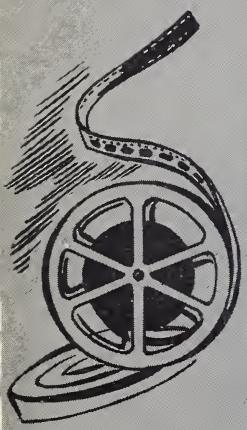
"Our members have planned to increase their power use regularly, year by year. Our directors have seen to it that sufficient power will be available for every demand. Proper planning has been the answer, on both sides of the transformer."

REA Will Celebrate in Washington

A model of the Elk River atomic energy plant . . . models of all-electric houses, kitchens of the future, laundries, dairies, poultry houses, farm workshops . . . each of them a glimpse into the electrical future. These are some of the eye-catchers in the Patio of the Department of Agriculture which will interest viewers during the REA's Silver Anniversary Celebration, May 9-13, 1960. Secretary of Agriculture Benson will open the Exhibit on May 9. In the adjoining Patio Theatre, the new movie, *The REA Story,* will play continuously all week in its premiere showing. Cooperating in putting on the exhibit are manufacturers, REA, and cooperative organizations. Among them are: Allis-Chalmers, Frigidaire, James Manufacturing Company, General Electric, Thor Power Tool Company, Hot Point Company, Clay Equipment Corporation, Whirlpool, Westinghouse, and Kelvinator.

The official ceremony of the Silver Anniversary will also occur on Wednesday afternoon, May 11, in the Department of Commerce Auditorium. Administrator David A. Hamil will introduce the featured speakers, Speaker of the House Sam Rayburn and Senator George D. Aiken.

Just Released...For REA's 25th Anniversary



A NEW FILM: THE REA STORY

Completed this spring, a full color, 27½ minute sound motion picture, The REA Story, tells about rural electrification in the South, the Middle West, and the West. Reserve a copy for a free showing, giving date needed, by writing Information Services Division, REA-USDA, Washington 25, D. C., or enclose $113.00 for a print to keep and show again and again.

A NEW BOOK: RURAL LINES • USA

Written to mark REA's first 25 years Rural Lines • USA is an illustrated history of rural electrification, in a popular style. A useful book for member relations programs, it costs only 50 cents per copy from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. There is a 25 percent discount on orders of 100 copies or more.