



# Electrical Tech Note — 224B

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## Rural Electrification History in Michigan

Early 1900s up to 1935

Electrical power only available to residents and businesses in and around cities and towns.

Electrical distribution lines did not extend out into rural communities.

Electrical power providers (utilities) consisted of privately owned companies and municipal utilities.

First electrical distribution line extended out into a rural area to serve rural customers was undertaken in 1927-28 as a project between the Agricultural Engineering Dept. here at M.S.U. and the Consumers Power Company. The line extended east from Mason to the town of Dansville. There were twelve customers that connected to that line. This was the first rural line constructed anywhere in the World. No more kerosene lamps for those customers and electric motors replaced some chores that were done by hand. This was a big deal and got publicity all across the U.S. and even in other parts of the world. Wasn't long before other rural residents and farmers were pressuring their legislators in Washington to do something to get electric power to rural areas all across the U.S.

In 1935 Congress passed the Rural Electrification Act which authorized the establishment of member owned Rural Electric Cooperatives for the purpose of extending electrical power lines out into rural areas. The Rural Electric Administration of the U.S.D.A. made available low interest loans necessary to finance electrical line development in rural areas.

An electric utility was granted exclusive rights to supply power to any customer in an area where they had extended an electric line. As rural electric cooperatives were established and extended electric lines into rural area the private utilities would not be able to extend lines into that same area so they begin extending electrical lines into areas not yet occupied even though at the time it may not be profitable. For the balance of the 1930s, through the 1940s, and even into the 1950s it was like a land grab as utilities competed to establish rights to serve rural territory. By the 1950s most rural areas in the U.S. had access to electric power.

A customer in an area was required to purchase electrical power from the utility that served that area. But a few years ago the electric power industry was de-regulated to the point where customers could choose from which utility they wanted to purchase power. Delivery, however, was the responsibility of the local utility at a regulated delivery cost. For many large power users this allowed them to negotiate with electric power generating suppliers for their power needs. Established utilities lost many of their large power use customers to privately operated generating companies. Presently the Michigan Legislature is looking at this issue because this de-regulation is resulting in substantial increases in cost for power to residential, farm, and small commercial customers.

A local utility has the obligation to meet the peak demand of its customers. If a large power user purchases power from some other utility, then they must deal with that provider if the power supply is not reliable.

Some of the popular renewable power sources such as wind turbines and solar photovoltaic systems provide power only when conditions are suitable. The utility must be able to supply the power demand even when there is no wind and if it is an overcast day. Biofuel powered generators are more reliable unless the supply of raw product becomes limited. Renewable energy sources are not without their issues. There are complaints about bird kill and noise from wind turbines. Solar photovoltaic systems take up a large area. For example assume a utility is to set up a 20 megawatt solar photovoltaic system. It will take about 40 acres of land just for the solar panels. A building that has an area of 1000 feet by 1000 feet can only produce, using roof mounted solar panels, about 0.1 megawatt of power not including the losses involved in converting dc power to ac power suitable for the grid. If a cloud passes by, output tanks to nearly zero immediately. Obviously a reliable renewable power supply system must consist of several different sources.

Nuclear (fission reactor) can supply power without producing greenhouse gases, but what to do with the toxic spent fuel. This is a big issue. Presently most spent fuel is stored on site. That was an issue in the recent nuclear disaster in Japan. DTE Energy has been seeking construction approval for a nuclear power plant at the Monroe site and it looks like approval may be granted. There has not been any new nuclear power plants put on line in the U.S. in the past 35 years. Other countries keep building them, but not the U.S. Right now natural gas for power production is available at a low cost, but how long will that last? Michigan utilities produce over half of electric power with coal as the fuel. Making steam with natural gas is more efficient than with coal, and produces less pollutants.