

A Sustainable Environment: Our Obligation to Protect God's Gift

by
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How Important is the Electrical Grid to Renewable Energy?

The electrical transmission grid in the U.S. was developed during the 20th century, and it is a great engineering achievement. It is an extensive systems of interconnected networks in which high-voltage power lines transport electricity from generators to customers. In the late 1800's, there was a "battle" between Thomas Edison who developed a direct current technology for transmitting electricity, and the team of George Westinghouse and Nikola Tesla (Are those last names familiar?) that developed the alternating current technology. The latter proved to be superior for transmitting currents over long distances with fewer losses. As a result, in 1886 the town of Great Barrington, MA set up the first alternating current electrical transmission line in the U.S. In the years since, the products that operate with electricity have changed immensely, but in many ways, this electrical grid that transmits and delivers the power has not changed very much at all.

In the U.S. the electrical grid consists of three major interconnected power systems. The Eastern Interconnection covers all the states north and east of Texas, and the Western Interconnection covers all the states west of Texas. These two systems also cover the provinces of Canada. The third major power system is called the Electric Reliability Council of Texas (ERCOT), and covers most of Texas. Yes, there are two major power systems and Texas has its own. Within these power systems are about 200,000 miles of high-voltage transmission lines that link the power generators to the load centers.

I am sure that everyone realizes that the use of electricity continues to increase, not so much because of any increase in population, but because we are using more and more "gadgets" that require electricity directly or through charging batteries. For example, the new LCD televisions consume more electricity than the tube type and they all consume some electricity even when they are turned off – so you can operate your remote control. If all the TVs in the U.S. were turned off, they would still consume the output of two 500 MW power plants. The plasma TVs are even worse as they consume so much energy, you cannot even buy one in California. Besides most homes having more than one television, many also have electronic games and, of course, almost everyone beyond elementary school has a mobile phone that requires regular charging. And we still have the same electrical grid to bring the power to our homes.

So what is the problem? We need more energy production but new plants are not being built. Even though many of our nuclear plants will be shut down due to age, it is unlikely there will be any new ones built any time soon. The cost is very high, and the recent tsunami has put a scare in everyone here – even though we can't have one here in

the Midwest. So the real answer for additional power generation is through renewable energy such as wind or solar. The state with the most wind potential is North Dakota, but the energy is not needed there. It would have to be transmitted to other states through the grid, but the grid cannot handle additional power from North Dakota to, say, Chicago.

The real problem is that the federal government is not spending the necessary money to improve the electrical grid as electrical generation is growing four times faster than transmission. Some states like California and Texas have built more transmission lines within the state, but multistate projects are being discouraged. In states with low electric rates, elected officials fear that new lines will simply export their cheap power and drive up their own rates.

An energy plan to provide 20% of the national energy from renewable sources is a much needed goal, but it will never happen unless the electrical grid is improved – very soon.