Notes on the pricing of electric power

From Jim Blair, for Tuesday May 19, 2015.

A- Capacity vs Energy. Or why many people confuse kilowatts with kilowatt hours, and the erroneous thinking that results.

B- Two alternative price structures and the incentives each promote:

I-The Progressive Income tax model: the more you use the more each unit costs. This promotes conservation, and use-more- pay- more is "fair". Connection to grid is free. Called the "lifeline" model when proposed during the 1970's.

II- Cost of production (aka "time of day" pricing). This promotes shifting use by charging less for energy that costs less to produce. It also saves MG&E from building more capacity by reducing peak load. Elon Musk, (Tesla) home battery (Li-ion or Pb-acid?)

C- MG&E's recent change in price structure, and how it changes incentives. Double the connection charge but reduce the price per KwH. And their concept of "fairness" . The incentive is to leave the Grid? Also creates a market for H2 or fuel cell home generator.

D-
What is your average monthly KwH use? THE WEEK, May 15, 2015 claims the average US household uses 31 KwH per day (900+ per month) From January 2011 through April 2015 my average was 459 KwH per month: highs were 754 (July 2012), & 640 (August 2011). Lowest were 337 (April 2015) & 340 (January 2015). Consumption was typically highest during hot summer months and lowest in the spring and fall.

Appendix: Two letter I sent to the Wisconsin State Journal in 2014
They didn't print either :-(

EDITOR:

MG&E needs more money. Instead of just complaining about the rate increase there should be a discussion of the several ways for them to get the extra money needed.

They want to charge more to be connected to the grid but charge less per KwH. That would discourage conservation: less incentive to pay more for LED bulbs, turn off lights, buy energy efficient appliances, install solar or wind, etc. They get their money whether you use less electricity or not.

An alternative way would be what was called "lifeline Pricing" when proposed during the energy crisis of the 1970's. Free to connect, and free for the first 100 or so KwH each month. (the lifeline). Then progressively more charged for each KwH used per month. Rather like a progressive income tax with a deduction. Strong incentive to limit use.

Or, probably the most sensible, charge according to the cost of producing the power. Power used during peak load times is much more expensive to produce, so it should cost more. With monitoring and modern technology, the price per KwH could be matched to the cost of

production. This would encourage people to wash clothes and dishes at night, buy AC units that can run and store cold at off peak times and release it during peak power times of day, etc. This could save MG&E money during peak use times and shift more of the power production to the less expensive base load plants.

Each of the 3 alternatives described above changes the incentives for consumers.

But the proposed increase in connection fee coupled with reduced charge per KwH might have a longer term benefit. When the connection fee is greater than the charge for energy used (and the proposed increase will make that tipping point close for me), the incentive will be to disconnect from the grid. That would make a market for household sized power generators, probably fuel cell powered by natural gas, propane, diesel or gasoline. With one of those, roof top solar or wind would save additional money and leave MG&E out of the loop.

I wonder if MG&E considered this?

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EDITOR:

The article by Spenser Black contains an often expressed error of fact in addition to several misleading claims.

Black says that 7,500 megawatts of new wind power is equivalent to 75 fossil fuel plants like the (100 megawatt) MG&E plant in Madison. This confuses capacity (megawatts) with energy (megawatt HOURS). Look at your bill from MG&E and note that you are charged for kWH (kilowatt HOURS). I have written several letters to the Wisconsin State Journal pointing out this confusion in past articles, but they refused to print them.

Megawatts is a measure of CAPACITY to generate energy. Megawatt hours is a measure of energy. The reason that a megawatt of wind or solar is not equivalent to a megawatt of coal or nuclear capacity is that while the coal or nuclear plants operate at typically about 90+ % of capacity, solar only produces energy at capacity during clear sunny days, and wind turbines only when the wind is blowing at optimum speed, typically between 20 and 30 mph. Existing wind turbines in Wisconsin typically actually produce only about 20% of their rated capacity. So 1000 kilowatts of wind capacity is equivalent to about a 200 kilowatt coal plant. Except the coal or nuclear plant produces power when you need it rather than when the wind blows.

Black claims Wisconsin if falling behind in renewable energy because of governor Walker. But it is more likely because we don't have the sunshine of the desert southwest or the winds of the Great Plains.

Jim Blair