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Jerrod Bley
bley83n04@yahoo.com

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By Jerrod Bley
Email: bley83n04@yahoo.com

If you take a drive around Nebraska's cities or the countryside you will see a prime example of heartland living on the high plains. What you won't see a great deal of, is residential size renewable energy (RE) systems. Nebraska ranks 13th in the nation for solar power potential, according to the National Renewable Energy Laboratory (NREL), and 3rd in wind power potential at 80 meters. Why is there so little happening in the RE industry at the homeowner level when the potential is so great? Why is the public not interested in RE systems in an urban home or farm/ranch-sized application in Nebraska?

With overwhelming scientific analysis that anthropocentric CO_2 emissions are increasingly changing global climate patterns, it seems logical that nations, states, and individuals should work to reduce our impact on the planet. To do nothing could result in higher average global temperatures that scientists point out may lead to ice cap melt off, loss of biodiversity, increases in epidemics, and increased severe weather events worth billions in damage. It is imperative that we deviate from business as usual and make fundamental changes to our living habits. We simply cannot afford to do nothing. Intro level finance class teaches us that money has time-value; the environment does as well. Humans have discounted the future of this planet long enough. Our future will rely on the decisions we make now as an individual and more significantly, as a society. Action and reason must

override complacency and the illusion that we are not responsible for the environmental degradation that is altering the natural cycles humans have to come to rely and depend upon for survival on this planet.

It stands to reason, that with current technology, we really can make a difference in the size of our carbon footprint. With the implementation of renewable energy systems we can reduce Green House Gas (GHG) emissions and lower the alarming CO_2 concentration in the atmosphere. Distributed generation may play a key role in achieving this goal. Although, it sounds simple and easy to retrofit every house with a solar array mounted on the roof, or a wind turbine spinning in the back yard, the truth is, getting residents to invest in RE systems is no easy task. There are many factors and obstacles that contribute to the lack of renewable energy systems in the state.

Nebraska is a unique state, in that it is the only state in the nation that has a publicly owned electric utility system. The goal of this relationship is to ensure Nebraska residents have access to affordable and reliable electricity. Nebraska is also located near cheap, low-sulfur coal reserves from Wyoming to the west. According to the U.S. Energy Information Administration (EIA) Nebraska averages $0.721 per kilowatt-hour (kWh). This Residential Sector rate is very inexpensive compared to average rates of other states. The state's two power districts, Nebraska Public Power District (NPPD) and Omaha Public Power District (OPPD), operate as subdivisions of the state government and work to ensure electricity rates are as low as possible for end-users. Nebraska is located in the EIA's West North Central Division, and in 2001 the average household consumption rate was 10,930 kWh per month. In a report by the Nebraska Energy Office residents paid on average $23.06 per million British Thermal Units (Btu) in electricity in 2008, and in that same year the Net

Energy consumed by the Residential Sector was 89.2 trillion Btu. Electricity is cheap in Nebraska and residents use a lot of it. Overall, the state emitted 22.2 million metric tons of CO_2 in 2008 via coal-fired power plants. The need for cleaner energy persists, but what is holding Nebraska residents back?

Nebraska has class 3 wind power potential and greater than 0.6 $kWh/m^2/day$ potential of solar power. The natural resources for RE are substantial, and each additional unit will reduce GHG emissions in the state. The largest barrier to overcome is the economic and financial constraints of implementing residential scale RE systems in the home. Many households cannot afford the upfront costs of purchasing, installing, and regular O&M costs of even a low capacity system. Other factors, such as associated psychological issues of anxiety from product overload and information overload exist for the common homeowner. Not to mention, the complexity of trying to design and install a home system, like many self-sufficient, hard working Nebraskans would want to do. Furthermore, the state has regulations, guidelines, and policies that hamper the ease and ability for interconnection to the grid. For instance, RE systems that generate 25kW or less are required to meet the guideline safety standards of at least four different entities and a final inspection by the State Electrical Division before being interconnected to the distribution grid. When conducting a cost-benefit analysis of a residential scale distributed generation system the payback period typically is longer than the useful life of the application.

However, the state does provide some financial incentives to promote RE, such as personal tax credits and property tax exemptions for RE generation facilities. Also, in May 2009 LB 436 established net metering in Nebraska. Current rates through NPPD are

$0.908/kWh in the summer and $0.458/kWh in the winter via PV systems and $0.483/kWh in the summer and $0.382/kWh in the winter via wind power.

Even with incentive programs the overall costs of a residential scale RE system in Nebraska is not cost effective. Until the energy companies internalize the costs to society of generating electricity with coal-fired power plants and other fossil fuel based generating facilities, the incentives for residents to implement RE systems in their homes and on farms is not great enough to be cost effective at current public power electricity rates, and therein lies the solution and the problem! The state's public power utility system is designed to provide the cheapest electricity rates to individuals, as I mentioned previously. Think back to Econ class and the supply and demand models. The rates, which the Residential Sector pays, are the Marginal Private Cost of electricity. This cost does not include the externalities, or the Marginal Social Cost. If you believe that Global Climate Change is human-induced, and it is, then it seems logical for the state government to create policy or modify existing policy that would reduce GHG emissions and stimulate the economy with new jobs in an infant industry. A public entity, like our public power, should work to provide positive benefits to society as a whole, not the individual consumer reflected in low rates. Reducing GHGs and mitigating Global Climate Change is a public benefit with a positive externality that will be felt worldwide. The state could accomplish this with a solution that is fitting for our capitalist democracy. One example would be implement the true Marginal Social Cost of electricity rates. Higher rates would create incentive for consumers to explore new options and stimulate R&D that will most likely lead to more efficient technology, and drive down the price of solar panels and wind turbines. The increase in electricity rates would potentially reduce the cost of equipment and installation

rates enhancing the marketability to the residential sector, thereby boosting sales and creating a sustainable industry. Increases in rates would not doubt meet with stiff opposition by those who pay the monthly electric bill, but if residents are able to generate their own electricity via home scaled RE systems, the savings seen through increased rebate, tax credit, and net-metering programs could generate a payback rate that exceeds the newly increased monthly bill. Homeowners could produce their own cheap renewable energy, sell excess back to the grid, and reduce their carbon footprint. The energy companies would enjoy higher rates and thus increased profits. A pareto optimum could be achieved in Nebraska. Residents see the benefits, the power companies see the benefits, and the environment would feel the improvement.

Nothing in this world is free, and until WE devise a method for safeguarding our biosphere for future generations, they will bear the true cost of our inaction here and now.