

Engineering economy: generating clean energy at home

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Engineering Economy: Generating Clean Energy at Home BY Fun College of Engineering Mechanical Engineering Department Cleveland State University 282 Spring Semester, 2012 Project #2502705 Introduction I am rued of paying too much for the electricity and It has to stop! Being an engineer, Vive decided to consider alternative ways of generating clean energy at home. It even gets better, if I buy the Ionians LEAF, which is an all-electric car, I will not have to pay for gas any more. My car will be charged up by the electricity I generate at home.

In this report, I will do research and decide whether or not, investing in a new Ionians Leaf and solar power source is the most economical solution to my problems. I will conduct two scenarios, the first one is that I sell my current car and purchase the Ionians Leaf and solar panels, the second one will be I keep everything the same with my current car (Toyota Pries c). These are the current financial conditions: Savings: \$20, 000. 00 Yearly Income (before tax): \$80, 000. 00 certificate of Deposit (1-2%, biyearly): \$12, 500. 0 Mortgage (monthly, 20 years left to pay off): (\$825. 00) Current car value: \$14, 500. 00 Car insurance (bi-yearly): (\$600. 00) Property tax (yearly): \$5, 000. 00) utilities (electricity excluded) (\$300. 00) Electricity Gas (\$200. 00) 3% interest rate Research The past few years, gas prices have been on the rise. However whenever they drop, car dealerships can see a rise in sales for small Subs and other large trucks. Now with our new technology advancements on electric cars, electricity may prove to be a better source or power than gasoline at a certain price.

The Ionians Leaf has an shocking 73 miles for every charge on its 24

kilowatt-hour battery, given that 3. 3 miles per kilowatt-hour of charge.

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Charging the car's battery at the current cost, it averages about \$2.97 in electricity. The Theory That Electric Cars Are More Efficient Electric motors are very efficient, converting over 90% of electrical power supplied into motion, while gasoline engines manage only 20% efficiency. On a full life cycle basis including power plants and oil wells, electric vehicles manage about 34% efficiency versus only 14% for gasoline vehicles.

In theory electric vehicles are much more efficient. Electrical energy is created by burning fossil fuels in a power plant at 40% efficiency, followed by transmitting it to your house at 93% efficiency, and using it in an electric vehicle at 92% efficiency, providing a total efficiency of around 34% for an electric vehicle. Crude oil refineries operate at 75% efficiency, and gasoline distribution might cause another 6% energy loss. Since internal combustion engines are only 20% efficient, total efficiency would be around 14%.

I also deducted my saving, current car value, and my CD to lower the amount. I continued to calculate the time per year. The total amount of time came out to be around 12 years after my 20 year mortgage payment. This would mean I would have had my Ionians left for over 32 years. However the Ionians left's battery has an average life span of 8 years. That means I would have to purchase around 4 batteries during that duration. With each battery running about 18,000 each.] That comes out to about \$72,000, almost one years' salary.

Also not to mention that my solar panels only have a life span of about 30 years. I would have to invest another \$12,000 to replace my current panels. However, with the 3 sets of panel systems I've had, I was able to produce

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more electricity than the Ionians required to run each year. An excess of about \$70. 20 per year, which would come to a sum of \$2246. 40 for the 32 years. Results and Conclusion The idea of going green by reducing our consumption of oil is an ideal theory; forever the costs and expenses outweigh the average middleman's working individual.

The car takes a long time to pay for itself, and also the life span of the solar panels and batteries would create greater costs in place of gasoline. Also, it will take longer to get out of debt if you bought the Ionians leaf, not including the maintenance that will be needed for future years. The best solution to minimizing gasoline and maximizing clean energy is to purchase a high MPEG gas powered vehicle. The Toyota Pries c would be a great substitute, with its low MPEG and reasonable MSP; it seems to be the more logical choice to make.