Alternative Energy

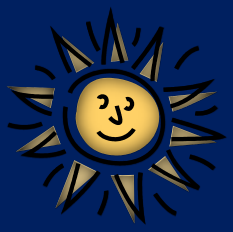
By: Garett Paap

All You Need for News on Being Energy Efficient

Alternative energy usage and sources

Using the following means of alternative energy such as solar, wind, geothermal and hydroelectric; for transportation and mundane use, we can preserve our planet by living a cleaner lifestyle.

Solar is a very common form of alternative energy. Using solar collection panels, the suns UV rays are converted it in to electricity and stored in power cells like large batteries. This simple design works anywhere you have direct access to sunlight for long periods of time daily . It is already being used by people all over the world.



Wind is another form of natural energy. The wind turbine produces power efficiently from even a slight breeze. The kinetic energy from the spinning gears to produce friction in the form of electricity. Wind turbine fields are very common upon long stretches of road. but may not be practical for single households.

A more individual form of energy is Hydrogen fuel cells. A hydrogen fuel cell is simply taking hydrogen out of distilled (or pure) water and using it as a combustion gas leaving only oxygen for the exhaust. This has already been used in cars and basic science kits to explain what hydrogen can do as a fuel source.

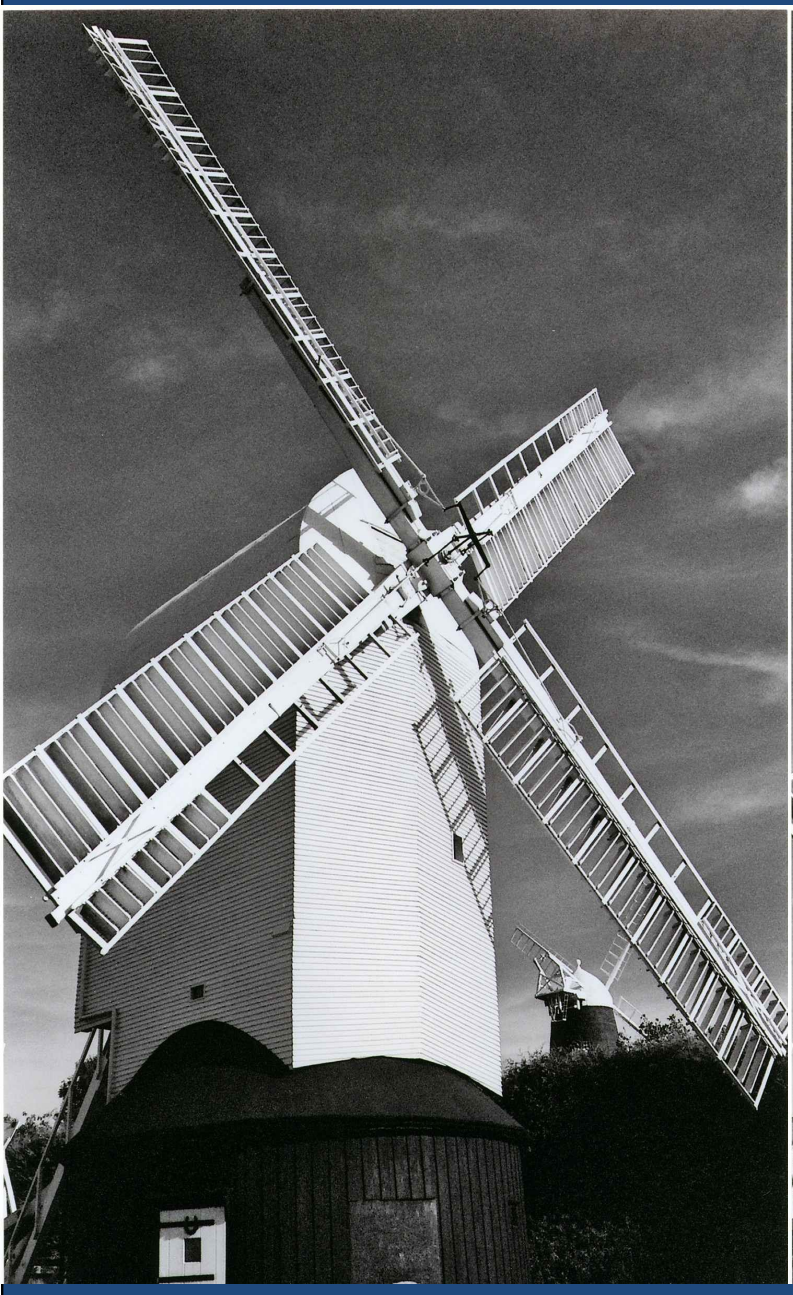
They are very efficient but can be expensive. A close competitor is electromagnetic.

Electromagnetic energy is magnetizing a steel wheel between a positive and negative fields, Tesla motor company uses this for their engines. This gives their cars great fuel mileage and the recharge time for this engine is very small. Also this engine recharges itself every slowly. This increases the engines efficiently as well.

With today's technological advancements, alternatives fuels are easier to collect and convert to energy for daily use. This would lessen the use of fossil fuels and mitigate air pollution.

The Super Windmill

It just spins faster than normal primitive windmill so it generates more electricity.



Warning: Don't spin too fast or blades may fly off

Ferrisburgh Solar Farm provides utility-scale solar power for the grid

This past November, developers Ernie Pomerleau and Brian Waxler brought the first 1-megawatt, state-incentive-supported solar project online in Vermont — bringing us closer to the possibility of clean electricity without dependence on foreign fossil fuels.

Overview of the Ferrisburgh Solar Farm under construction, with Lake Champlain in the background. The 3,806 solar panel system, installed by REV Corporate Member Alteris Renewables at the corner of Route 7 and Monkton Road, will generate enough electricity to power approximately 170 homes per year. The project was one of a limited number to be helped along by the SPEED and Standard Offer programs, and REV Member Green Mountain Power agreed to purchase the power. The Standard Offer Program guarantees renewable energy producers long-term contracts for the power they produce, at a rate that makes newer renewable energy technologies like solar competitive with older, fossil-fuel-based power sources.

Local residents, including city managers, state representatives, and the nearby Vergennes Union High School (VUHS), voiced their support of the project, as well as satisfaction that the 16-acre parcel the solar array was installed on went to good use. VUHS teachers in particular are excited about the real-world study of renewable energy, environment, math, physics and other subjects, now available to their students right next door. The Solar Farm features an open-to-the-public educational kiosk, and has posted a public view website that tracks solar energy output.

The Ferrisburgh Solar Farm was designed to minimize its the impact on the prime agricultural soils it is sited on. The installation, which required no grading and minimal excavation, used support structures that can be completely removed, allowing the land to return to its natural state after the solar farm ceases operation. By using local contractors and consultants, the project helped support Vermont businesses, jobs, and the economy.

Now plugged into the grid and powering area homes and businesses, the Ferrisburgh Solar Farm is a point of pride for the community. And for the state, it's an important showcase of progress in the right direction — evidence that the critical incentives approved by the Vermont

Legislature will lead to more utility-scale solar projects, and to a cleaner, locally-produced energy future for Vermont.

For more information on the Ferrisburgh Solar Project, please see their website, the public view website that tracks solar energy output, or stop by the Farm itself, at the corner of Route 7 and Monkton Road in Ferrisburgh, Vermont.

The World of Clean Energy

Introduction

The clean tech industry is expected to be a rapidly growing market and one that we believe is at a momentous point in terms of the expansion of technologies that will help diversify energy sources and improve the environment. By some estimates, global investments in renewable energy infrastructure are projected to double in the next 10 years and reach $395 billion annually by 2020.

THE EXPANSION OF CLEAN TECHNOLOGIES AND RENEWABLES

Clean Technology and Renewable Group

Recognizing the commercial opportunities and the role we could play in helping to address energy and environmental challenges, we established the Clean Technology and Renewable group in 2010 to focus exclusively on assisting companies in procuring the financing they need to grow and promote widespread alternatives to more traditional energy sources. Financing is obtained through the capital markets and, in some cases, through direct investments in companies. The Clean Technology and Renewable group also acts as an advisor for private placements, strategic mergers and acquisitions, and other transactions.

Clean Technology Market

Environmentally friendly and renewable sources of energy have long been a goal of policymakers, but without capital and investment, they cannot become a reality. In the United States, biofuel production has been encouraged in part by the Renewable Fuels Standard issued by the Environmental Protection Agency. The current standards set a goal of producing 36 billion gallons of biofuel by 2022.

Advanced biofuels are liquid fuels made from organic materials such as sugar or starch crops, cellulosic biomass, or waste. The advantages they offer over fossil fuels include zero to very low greenhouse gas emissions and unlimited potential supply. Advanced chemicals are chemical building blocks made from organic materials. Many products used in everyday life are derived from petroleum-based chemicals today. Biochemicals present the opportunity to reduce the dependence on fossil fuels to create products such as plastics, cosmetics and lubricants.

Our focus and commitment in advanced biofuels and chemicals has had meaningful results. In 2011, we helped two producers of renewable fuels — a clean alternative to gasoline or diesel — raise a combined total of nearly $350 million in a challenging financing environment. We are proud to be a leader in advising companies in an industry that, while only just beginning to mature, presents exciting opportunities to help solve energy and environmental challenges.

Goals

By opening the door to financing for companies with proven technologies and scalable production models, we believe we are helping to open the door to a more sustainable energy future. We believe we can play a critical role in the vital transition

to a low-carbon future by helping raise capital in the public and private markets and investing alongside our clients in clean technology sectors such as solar, wind, geothermal, energy efficiency, green transportation and advanced biofuels.

New Idea

Hydro-mechanical diesel multiple units (DMUs), multiple unit trains powered by diesel engines, are needed in regional traffic. At the Institute of Vehicle Concepts in Stuttgart, Germany, researchers have developed a new hybrid hydro-mechanical DMU concept, including a hybrid energy storage system made up of batteries and double layer capacitors. The hybrid energy storage system fits the requirements better in comparison with double layer capacitor or battery energy storage systems.

Advantages of this Idea

The main advantage of batteries is that they can store more energy than double layer capacitors, but their power is more expensive and they only last for up to 5000 duty cycles. On the other hand, double layer capacitors can give up to one million duty cycles. Another advantage of double layer capacitors is high power density, while the disadvantage is limited energy density which makes high energy applications very expensive.

Testing the new DMU

To evaluate both the electrical and thermal behaviour of the hybrid energy storage system, the researchers built up a scale energy storage in hardware on a test bench and used a DMU model to simulate train environment and drive train. The test bench makes it possible to validate models. The researchers measured the double layer capacitor and the battery currents and voltages. When they compared these values with simulated values a good agreement was seen. However, they also found that a suitable cooling concept of the hybrid energy storages has to be developed, as well as a dependable method to determine the storages' state of charge while in operation.

The results of the DMU test

This hybrid energy storage system connected to the DMU propulsion system was tested for fuel consumption and performance and compared with a conventional DMU. Depending on the characteristics of tracks and parameters such as station distance and maximum speed, simulations suggested fuel savings from 6 to 13%, which makes the CO2 emissions decrease by the same percentage. Reduced pollutant emissions and noise at stations can also achieved through the new concept, since it makes it possible to turn off the diesel engine during stops and use stored energy to power auxiliary systems. This new hybrid hydro-mechanical DMU concept has a long way to go before being widely employed on tracks. However, fuel savings between 6 and 13 percept would be an important step towards decreasing the CO2 emissions from diesel-powered trains.

Dear Editor,

I was not impressed with you magazine. I have taken a few energy courses at the tech and I was not impressed with you magazine. I didn't like this magazine because it went down in quality from the last magazine. This magazine focused on different articles than from before and I didn't like that. A recommendation for your next magazine is to write about hydraulics and solar energy more.

Sincerely,

Your Favorite Reader,

Payton Claybaugh

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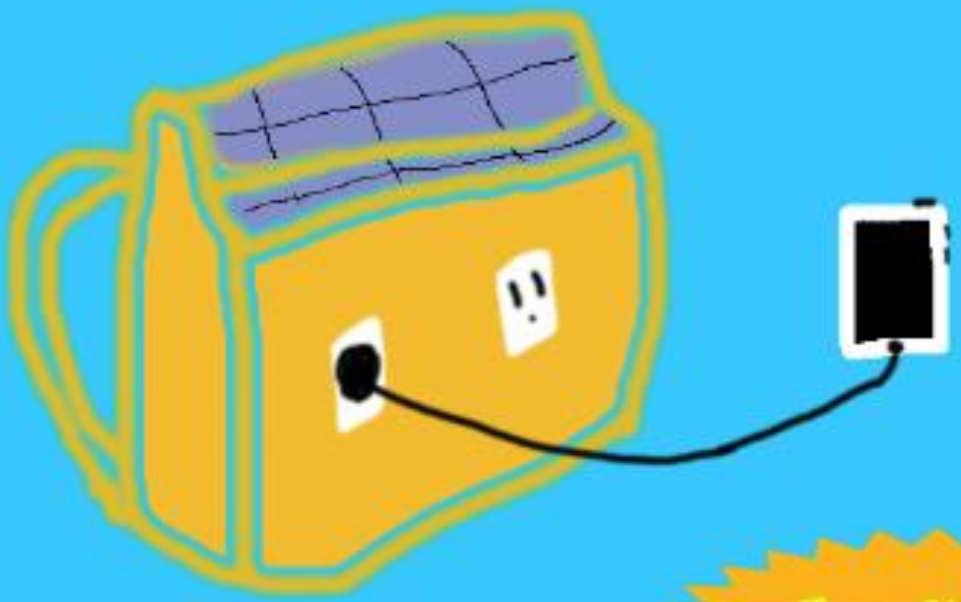
Buy the all new solar backpack!



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plus shipping and handeling

out on a hike and your phone is almost dead?
never fear! with the new solar backpack you can carge your devices any time!

You're not making heat

you're moving heat," Colorado geothermal installer Jim Lynch says. Installations like Lynch's tap into the earth below the frost line--which always stays around 50 degrees Fahrenheit--to reduce a home's heating and cooling loads. All HVAC systems require energy-intensive heat movement, a task responsible for over half of the average house's total energy demand. Geothermal works more efficiently because the system's mild starting point creates an efficient shortcut to the target temperature. Imagine a 100-degree Florida day or a 0-degree Michigan night: Spot the system 50 degrees, and it doesn't work so hard to get the house comfortable.

Unlike wind and solar, geothermal's power source never varies.

Bob Brown, vice president of engineering with equipment maker WaterÂFurnace, says, "The ground's there all the time. It's great for heating and it's great for cooling. All I've got to do is bury a plastic pipe, put fluid in and, lo and behold, I've got a great system."

How Geothermal Happens

***In the ground:** A water-filled, closed loop of 1-inch high-density polyethylene (HDPE) pipe ferries heat between the earth and the house. Pipes descend 4- to 6-inch-diameter vertical wells--the number and depth depend on the house's site and size--before ganging together in a header and bringing lukewarm water in through the basement walls. Drillers backfill each hole with bentonite grout (or new enhanced grouts, engineered with fly ash) to maximize thermal conductivity.

***In the house:** Pumps cycle water through the pipe loop to the heart of the system: the geothermal unit, which acts as furnace and air conditioner. This machine uses refrigerant and the temperate water from the underground pipes to heat or cool air. The air is then circulated through standard ductwork. With a device called a desuperheater, the unit uses excess heat to warm up domestic hot water at no added cost. The results feel the same as those from any standard forced-air HVAC system.

The Supplies

*** The bit:** This mud-drilling bit grinds soft earth and funnels it back into hollow, 20-foot drill-shank sections. Corkscrew auger bits, in contrast, pound through solid rock. A new mud bit spinning at 1000 rpm, pushing downward with between 300 and 500 pounds of pressure, is good for five 150-foot holes.

*** The pipe:** Water-filled HDPE pipes absorb heat through their walls. This sawed-off cross-section shows two pipes fused in a butt joint made by pressing the molten edges together at over 500 F. The joint, stronger than the walls of the pipe itself, resists rust, rot and leaks for a purported 200-year life span.

*** The unit:** A combined furnace and air conditioner, the geothermal unit manages all-season climate control from the basement. Using the same principles as a refrigerator, which removes heat from food.

Is CNG for you?

Natural gas has been used in our homes for generations. Americans use it to run water heaters, home furnaces, stoves, clothes dryers, and other appliances. As a fuel it accounts for 24 percent of our total energy consumption nationwide, all but 1 percent in residential applications. And as we reported last fall ("Drilling Down," September 2011), new fracking techniques are tapping domestic reserves that previously were not economically viable. Vast global supplies are projected to last well into the next century even if natural gas replaces gasoline completely. So it should be no surprise that natural gas will remain incredibly cheap. It runs at one-half to one-third the current cost of gasoline on an energy-equivalent measure. In a properly tuned engine, natural gas combustion delivers 20 percent lower carbon emissions and about a 25 percent reduction in greenhouse gases compared with the cleanest gasoline engines, all without damaging existing catalytic converter systems. So right about now you're probably wondering: Why aren't we putting this stuff in our cars?

As it turns out, there are very few technological barriers to overcome. In fact, converting existing vehicles to burn natural gas isn't particularly challenging. Unfortunately, if you tried to do it yourself, you'd more than likely run afoul of the Clean Air Act's rules against modifying fuel systems--a violation that could cost you up to $5000 in fines for every day you drive the converted vehicle. So if you want to green your wheels today, the only way to do it is by hiring a certified compressed-natural-gas (CNG) installer to do the job. To get the skinny on aftermarket CNG systems, I visited NatGasCar in Cleveland. It's a startup shop that augments gasoline cars by installing a parallel natural gas fuel system. They showed me their latest creation, a dual-fuel Dodge Caravan intended for airport taxi service. It starts on gasoline and switches over to natural gas once the engine warms up.

NatGasCar's biggest component is also its most crucial and expensive--the compressed-natural-gas fuel tank situated behind the rear seats in the cargo area. The company uses a Type 4 tank, the most advanced kind. It reduces weight with a plastic composite core wrapped in carbon fiber and is rated for severe impact and puncture resistance.

Between the tank and the engine is the fuel regulator, which reduces the fuel-tank pressure of 3600 psi to a usable 125 psi delivered to the engine. The fuel regulator is heated to prevent freezing from the expansion of the gas. The lower-pressure gas travels to the engine, Chrysler's flex-fuel-capable Pentastar V-6. A flex-fuel engine is important, since it has hardened valves and valve seats, which are necessary for CNG operation. The natural gas is routed through a parallel fuel rail, and a second set of injectors is plugged into a clever adapter designed to accommodate both the gasoline and CNG injectors on the same injection port. Natural gas runs at an ideal air--fuel ratio of about 16.8:1, whereas gasoline runs happily at 14.6:1 for the Pentastar engine. As a result, the programming for the new injectors has to be slightly different. NatGasCar's wiring harness intercepts the signals from the engine-control module and, depending upon which fuel is selected, turns on either the gasoline or the CNG injectors. The signals bound for the gasoline injectors are modified to deliver the appropriate amount of fuel to the natural gas injectors. This way, very little fine tuning is necessary, and the car's engine-control unit does most of the work.