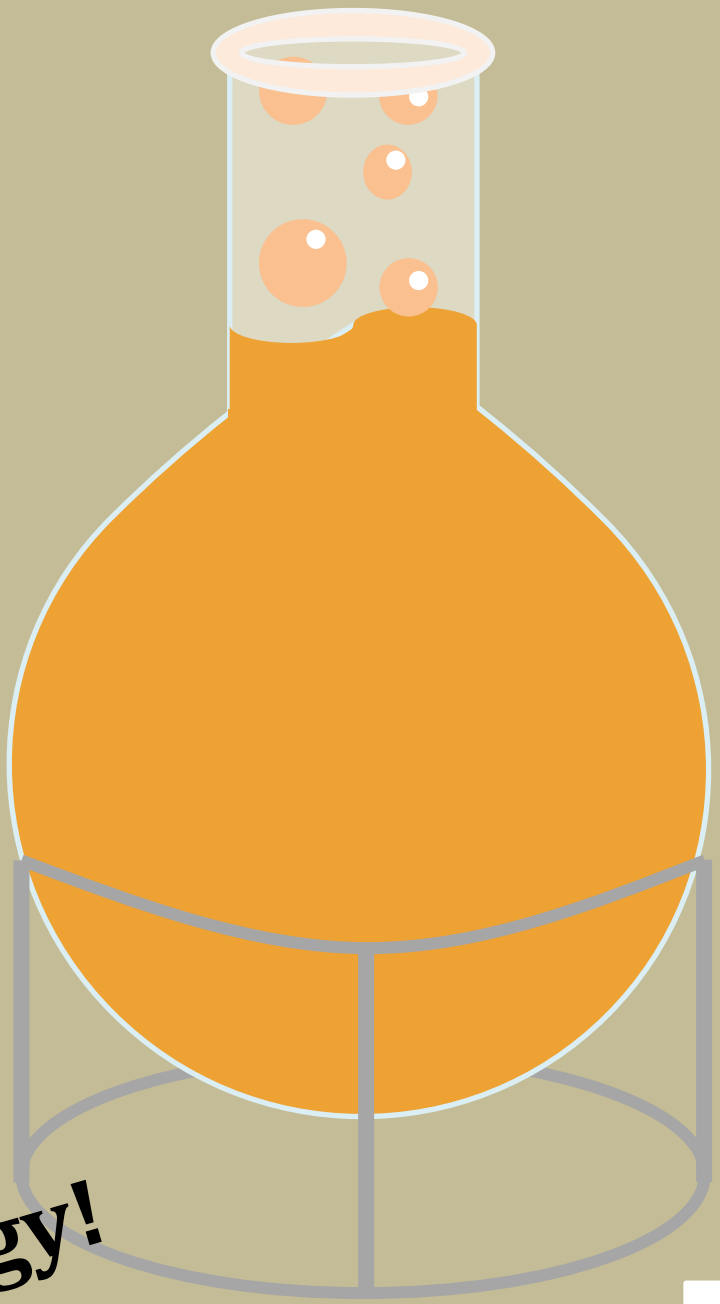
BECAUSE, SCIENCE

Geology!

Astronomy!



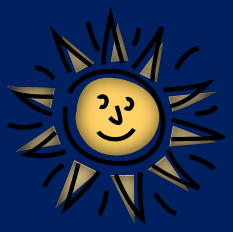
Biology!

Archeology!

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.

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.

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.

Hypergen - Incognito Element Discovered by Australian Science Team
by Dan Lundstrom

The University of Sydney in partnership with CERN (European Organization for Nuclear Research) has just lightened the load of science - literally. In a highly complicated, computer-aided process known as Aggrested Lepton-Inversion developed by Dr. Steven Irwin, the LHC or Large Hadron Collider in Geneva, Switzerland was successfully used to identify the previously unknown element known as A1.5HHe or simply *hypergen*, which falls *between* Hydrogen and Helium on the periodic table of elements.

Ever since Dmitri Mendeleev conceptualized the modern periodic table, scientists have worked to fill in the gaps and complete the periodic table based on the atomic number, or number of protons contained in the nucleus of an atom. The subatomic particles of protons, neutrons, and electrons arrange in a way that is logical and central to matter having mass - and thus density that can be measured. Protons and neutrons are made up of smaller components called quarks.

Electrons, on the other hand, do not appear to be able to be broken down any further. They are given the unique class of subatomic particles called leptons. Dr. Irwin and his team of 17 graduate and doctoral-level scientists used the particle-acceleration process of Aggrested Lepton-Inversion to speed the electrons of helium ions to near-light speed around the 27 kilometre loop and quickly saturated the speeding electrons with hydrogen isotopes. The result was a net loss of one out of the two down quarks from each proton of the hydrogen atoms.

"We knew it was theoretically possible, but this demonstrates the likelihood that previously undetected hypergen atoms are all around us! This opens up a whole new realm of newly-defined 'step-elements' with similar, but unique characteristics from their adjacent periodic table counterparts!"

To illustrate the point, Irwin demonstrates the inert nature of a compressed volume of hypergen. "As you can see, the hypergen is inflammable and doesn't react with any of the noble gases. At the same time, it's less dense than helium, and actually has the buoyancy potential of hydrogen."

"The possibilities are almost limitless," says Dr. Jamie Marsters, PhD of nuclear physics - London University. "Now that Dr. Irwin and his team have identified the existence of hypergen it's just a matter of time to determine the protocol for filtering hypergen from hydrogen-helium rich environments." She goes on to say, "If Steven [Dr. Irwin] is correct, we may even find hypergen in the presence of what we thought were mostly nitrogen dominant mixtures."

The find raises the possibility of a helium alternative, which may alleviate the current shortage in the global helium market. Furthermore, if Irwin and his team are correct about the theory of step-elements, common alternates for propane (C3H8) and the fossil fuel known as natural gas (a mixture of methane (C4H), ethane (C2H6), propane (C3H8), butane (C4H10), and small percentages of CO2, O2, and N2, hydrogen sulfide and a trace of other rare gases) could be a possibility if a step-element between hypergen and hydrogen can be found that has the flammability of hydrogen.

While revolutionary, Aggrested Lepton-Inversion is still under scrutiny and has yet to be replicated at other colliders, such as the Relativistic Heavy Ion Collider (RHIC) in New York. Irwin speculates that the difference lies in the 3.8km acceleration circumference versus CERN's 27km loop.

"It's really just a matter of time before this breaks things wide open for an acceleration of similar discoveries (pardon the pun)," says Irwin. "I feel lighter just knowing that this once-theoretical form of matter can be shared with the world!"

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.