

February 2010

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What can we do about
choking on our own
pollution?



SUNDIAL

Alabama Solar Association (ASA)

P.O. Box 143, Huntsville, Alabama 35804

<http://www.al-solar.org>

Established to Promote the Use of Our Sun's Renewable Energy to Preserve Our Environment

A Step Towards Progress for Renewable Energy

Throughout history, humans have been extremely resourceful and creative when it has come to sending a man into outer space or building a marvelous structure; however, when it comes down to our own survival, why have we been so reluctant to act? There is an impending crisis looming as far as the world's energy concerns and the lack of fossil fuels. We have known this for quite some time thanks to scientific studies dating back to the 1950s.

We are expending our fossil fuels. In 1956, a geophysicist by the name of M. King Hubbert demonstrated that the Earth's supply of crude will reach a peak when about half of the original amount of oil remains leaving us in a state of irreversible decline. He predicted that the U.S. production of oil would peak between 1965 and 1970. It did peak in 1970, and the U.S. production of oil is down 40% since then. This leaves the U.S. to rely heavily on foreign oil.

Foreign sources of oil are being diminished as well though. With the current production rates, global sources of oil and gas will be used up within 40-60 years. While production is on the decline, consumption is increasing because people

are demanding more energy; the global population keeps growing. Global population should be beyond 9.5 billion by 2050.

We are aware that we shouldn't rely so heavily on fossil fuels, yet the 20th Century saw a major increase in use. The U.S. Census Bureau's statistics branch, the Energy Information Administration (EIA), states that as of 2004, fossil fuels contributed 86% of the global demand for energy.

Unfortunately, we are an oil-based society where we generally rely on fossil fuels to meet our needs. If renewable sources such as solar, wind, and geothermal energy are incorporated into the equation and used in the place of fossil fuels, we surely can help to ease the harmful effects of burning fossil fuels. These sources have absolutely no detrimental impacts on the environment, and they supply an almost infinite amount of energy. Renewable energy generation is somewhat a new idea to most people. Given the complexity of these systems on a policy level, action must be



taken in the government to support these efforts. The Obama administration has set forth a bill that would establish a slightly modified cap-and-trade plan for greenhouse gases to address climate change.

It seems that it has been the general consensus of the civilized world to try to ignore these major issues and hope that they will somehow recover themselves (generally speaking). It is without a doubt crucial for the adoption renewable energy into our mix. The passage of the American Clean Energy and Security Act (Cap and Trade) will not fix all of our problems, but it will be good progress towards helping to alleviate some of the damage that we have already done.

Jessica Glenn –
Renewable Energy
Specialist - Global
Market Consultants

Why visit our website?

If you haven't seen the ASA Website lately, or even if you have, come see it again.

Steve has already made sweeping changes in the site's function. Be sure to visit the new "About Us" page. You'll not only find the list of your Board of Directors from the old "Directors" page, but you'll find our roots and our connections around the world. Beside each officer and director position, you'll find a complete list of the duties for each position and a biography of those now filling the position. Expect to see pictures added soon.

Your new webmaster, David Lee of Huntsville, is about to give us a whole new look. He finds the present format less than exciting, and he's right. He has many ideas to correct that.

The Google search feature Steve added lets you find the solar wisdom from past Sundial articles and other sources, but we need a better way to let members find technical information. We plan to add a technical data section with indexed collections of just such articles.

But don't just drop by for a visit; take up residence there. Send us in



"Breaking News" stories we can list; something new and exciting is happening in our industry every day. Check out other websites and see why they are more exciting than ours. Make suggestions to make the ASA website the benchmark for all technical societies.

Morton

Alabama pioneers make national news:

They boldly go where no utility man has gone before. In fact, the neighborhood is nowhere near a power grid. Such efforts are commonplace across the United States today, but these folks started in Alabama thirty years ago.

Check out page 6 of your new Solar Today magazine from ASES. If you've taken a solar tour in Alabama, you have probably already seen the three featured houses.

Check them out at:

http://www.ases.org/index.php?option=com_content&view=article&id=946&Itemid=23.

If you have never taken a Solar Tour here in Alabama, come see us October 2nd or 3rd. Visit where "Living Green" is not just a topic, it's a practical way of life.

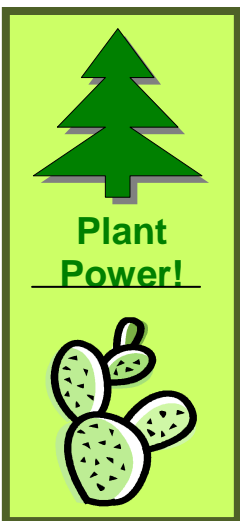
Check out this and other solar tours at: www.ases.org and click on "ASES National SOLAR Tour." Be part of the largest single solar event in the world today.

Morton



This Off-Grid house began as a weekend cabin inspired by nomadic Arabs later was expanded into a full-time home.

New Renewable Energy Sources - The President's Corner



Uh oh! Laptop battery is getting low. Better plug the power supply into that cactus over there and recharge.

What? Energy from plants? It's not a new concept.

Photosynthesis is the process by which plants convert solar energy into chemical energy. The process cleans the air we breathe and fueled the industrial revolution in America. Trees burned to

provide steam for our mighty riverboats and kept our early settlers warm during the cold winters. But now scientists are finding new ways to use Plant Power to fuel our future. Alabama farmer and inventor Wayne Keith found a way to convert wood chips into fuel for three pickup trucks and a variety of machinery on his farm. (See the photos section of our website.) Now, French scientists are learning to convert sunlight directly into electricity. See "Plant Power" on the next page and "BioFuel Cells" on page 5.

Bloom Energy has developed

a solid oxide fuel cell that converts air and nearly any fuel source—ranging from natural gas to a wide range of biogases—into electricity via a clean electrochemical process rather than dirty combustion. The process works well in large industrial operations. Although a bit pricy, Bloom hopes to make it financially feasible for homes.

Notice another trend in this issue of the *Sundial*? It's not all Morton. Thanks to the new authors from Global Marketing. I know we have a lot of expertise out there. How about some more newsletter submissions?

Morton@AL-Solar.org

Kids' Pages, January, 2010 www.AL-Solar.org

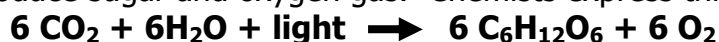
Plant Power—Coming Soon to a Bush Near You

"OK, Dad, this is a pretty campsite, but where can I plug in my Wii?"

"Try that wild azalea bush over there."

Getting electricity from a tree sound farfetched? Maybe not soon. French scientists have managed to convert the chemical energy generated by photosynthesis into electricity.

Photosynthesis is the chemical process that made America great and still lets us feed a significant portion of the world. It's the reaction that lets plants take sunlight, carbon dioxide, and water and turn it into living plants while adding oxygen back to our air. Chemically, photosynthesis takes the carbon and oxygen atoms of carbon dioxide and the hydrogen and oxygen atoms of water under the influence of light to produce sugar and oxygen gas. Chemists express this as an equation:



All animals must have oxygen to breathe. Our air is mostly nitrogen with a healthy dose of oxygen and trace amounts of carbon dioxide occurring naturally. Ironically, humans and other animals are the primary source of carbon dioxide occurring naturally in our air. In small quantities, it does not affect our breathing. We are used to it.

Our industrialization of the world today has produced new sources of carbon dioxide. Any time we burn a fossil fuel (wood, coal, oil, gasoline, etc.), we release more carbon dioxide. When we breathe in too much carbon dioxide, it can make us sick or even kill us. Athletes competing in the Beijing Olympics last year found they could not perform as well in the Chinese air laden with carbon dioxide and coal dust. While adults debate the causes and extent of global warming, one thing is clear. Extra carbon in our air makes breathing harder for us.

Trees grown through photosynthesis powered the development of the United States. Trees were first used to build log cabins and later sawed into boards for more elaborate buildings. When we began to need energy, wood was the logical first choice. Wood is the only fuel in the world that can be gathered with no tools or cut with only hand tools. Wood can be burned in a campfire or under boilers to make steam. Wood-fired steam boilers powered our earliest trains and the mighty riverboats that plied our rivers in the early 1800's. Some of the first electric generators came from burning trees to make steam which then generated the electricity. Some very poor countries still do that today, but wouldn't it be great if we could convert plant power directly to electricity while cleaning the air instead of making it dirtier?

If the French scientists' experiments develop into a useful technology, we can do just that. Researchers at the Centre de Recherche Paul Pascal (CNRS) developed a biofuel cell that functions using the products of photosynthesis (glucose and O₂) and is made up of two enzyme-modified electrodes.

The scientists then inserted the cell into a living plant, in this case a cactus. Once the electrodes, highly sensitive to O₂ and glucose, had been implanted in the cactus leaf, the scientists succeeded in monitoring the real-time course of photosynthesis in the laboratory. They were able to observe an increase in electrical current when a desk lamp was switched on and a reduction when it was switched off. The scientists were also able to observe real-time glucose levels during photosynthesis for the first time ever.

This new technology could let doctors develop tiny power generators in the body to power implanted medical devices and even measure glucose in diabetic patients.

Don't expect to find a place to plug in your electronic games at the nearest pine tree anytime soon, but the day may be coming.

Search the puzzle below to find key words to help scientists find the solution to our latest energy crisis.

N E G O R T I N Y U D Z B J E
 S S T T B I G R G P S L R N D
 B L B F N D A Q R H O N V K U
 K G R C K P T M E O J I M G E
 I A O N M Z R P N T R K Y U L
 N B O Y R W N K E O V H O X W
 R I A M E E X P N S K K K V C
 L W T L G D Z M J Y G G G R U
 E I J Y U O E M J N E S C V D
 O D X S I N S L D T S R O V J
 G O I L T U L U J H L N A F T
 W Z E X E X H F O E S I L K U
 C A R B O N K N Y S H U G B N
 F D V D Z I H Z U I T Z J H Q
 M E S Z N D D F X S Z H E V T

AIR

DIOXIDE

LIGHT

OXYGEN

CARBON

ENERGY

NITROGEN

PHOTOSYNTHESIS

COAL

ENVIRONMENT

OIL

Find the solution on our website: www.AL-Solar.org.

BioFuel Cells:

A New Source of Electrical Energy? Biofuel Cell Works in Cactus

ScienceDaily (Feb. 18, 2010) — Scientists in France have turned the chemical energy of photosynthesis into electrical with a novel biofuel cell. This offers an environmentally-friendly and renewable fuel source with possible important medical applications.

Photosynthesis is the process by which plants convert solar energy into chemical energy. In the presence of visible light, carbon dioxide (CO₂) and water (H₂O) are transformed into glucose and O₂ during chemical reactions. Researchers at the Centre de Recherche Paul Pascal (CNRS)

developed a biofuel cell that uses two enzyme-modified electrodes sensitive to glucose and O₂.

They then inserted the cell in a living plant, in this case a cactus. Scientists monitored photosynthesis real-time. They found an increase in electrical current when a desk lamp was switched on and a reduction when it was switched off. They were also able to make the first ever real-time observation of glucose levels during photosynthesis. This could help better understand the mechanisms of photosynthesis.

Researchers found that a biofuel cell inserted in a cactus leaf could generate power of 9 μW per cm². Stronger illumination accelerated

glucose and O₂ production. The cell could offer a more environmentally-friendly renewable energy source.

These cells could one day be used to power implanted medical devices or measure glucose levels ion diabetic patients.

Think green – Think Plant Power!

Sam Sparacino

Business Development Manager- Global Market Consultants

Your Alabama Solar Association Officers are here to serve you.

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Newsletter Editor	Vacant	Please Volunteer.	

Solar Happenings:

Check them out in your area.

Thursday, March 18, 2010, noon. ASA BoD Meeting—visitors welcome, Southern Solar Systems, 11807 S. Memorial Pky, Huntsville

Thursday, March 25, 2010, 6 – 7 PM, ASA Quarterly meeting on Sealing the Building Envelope at Lowe’s on South Memorial Parkway in Huntsville. Professional Engineers earn 1 PDH.

Thursday, April 29, 2010, noon, Alabama Power Lunch 'n Learn, Birmingham

May 17 – 22, 2010, 39th Annual American Solar Energy Society conference in Phoenix

Tuesday, June 22, 2010, evening, HATS Professional of the Year Dinner, Huntsville

Saturday and Sunday, October 2 & 3, 2010, Annual Solar Tour all across Alabama.

Tuesday, December 2, 2010, HATS and ASA annual Holiday Reception, Huntsville

See more events on our website calendar, <http://al-solar.org/calendar>

Please let us know what is happening in your area.



“...a passion to improve and expand all renewable energy technologies.”

Solarites

February, 2010

SUNDIAL

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Interest08@sunplans.com



Summerdale, Alabama
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251-981-8441
Capture the Gulf sunshine!
<http://www.acmesolarworks.net/>

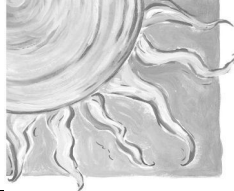
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Southern Solar has what it takes to solve your energy needs

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 Home Energy Performance Clinics
 Passive and Active Solar Applications



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Providing Exceptional Solutions
Global Market Consultants, Inc.
www.gmarketc.com

Would you rather have your *Sundial* via electrons or printed on dead trees?

ASA was established to promote the use of our Sun's renewable energy to preserve our environment. One important way is to recycle things such as paper newsletters rather than throwing them away. Actually, recycling is our third best choice. Second best is to reuse. Unfortunately, there're not many ways to reuse paper printed on both sides. The very best choice then, is to reduce, or to not use paper at all.

The Sundial is now on our website (www.al-solar.org). You can read everything online. It will be prettier (paper versions are now not in color), it will be faster than waiting for the US Mail, and it will be much more environmentally friendly.

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TO:

Will that be



or

