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### [The Sun is Setting on Petrochemicals, with a Little Help from Lovley Microbes](#)

[\(http://cleantechnica.com/2010/06/01/the-sun-is-setting-on-petrochemicals-with-a-little-help-from-lovley-microbes/\)](http://cleantechnica.com/2010/06/01/the-sun-is-setting-on-petrochemicals-with-a-little-help-from-lovley-microbes/)



Written by **Tina Casey**

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[\(http://cleantechnica.com/2010/06/01/the-sun-is-setting-on-petrochemicals-with-a-little-help-from-lovley-microbes/u-mass-researcher-helps-sun-set-on-petrochemicals/\)](http://cleantechnica.com/2010/06/01/the-sun-is-setting-on-petrochemicals-with-a-little-help-from-lovley-microbes/u-mass-researcher-helps-sun-set-on-petrochemicals/) Derek Lovley, that is. The [University of Massachusetts](http://www.umass.edu/) (<http://www.umass.edu/>) researcher has already introduced a revved-up species of [electricity-generating microbes](http://cleantechnica.com/2009/08/03/researchers-coax-electricity-from-geobacter-super-microbes/) (<http://cleantechnica.com/2009/08/03/researchers-coax-electricity-from-geobacter-super-microbes/>) to the world, and now he and a team of scientists are experimenting with [microbes that can convert solar energy into chemicals](http://eponline.com/articles/2010/05/31/microbial-electrosynthesis-turns-solar-energy-into-chemicals.aspx) (<http://eponline.com/articles/2010/05/31/microbial-electrosynthesis-turns-solar-energy-into-chemicals.aspx>). As part of the growing trend in bioplastics, biofuels and green chemistry, the finding could help lead the way out of the fossil fuel mess.

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The U.S. and other countries are still racing to exploit fossil fuel riches, but as British Petroleum's catastrophic oil spill in the Gulf of Mexico clearly illustrates, it's a race into an increasingly oppressive future. As Lovley and many other researchers are demonstrating, a

safer and healthier alternative is in sight.

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### **Solar Energy, Carbon Dioxide and Microbes**

Lovley's new process is called microbial electrosynthesis. Basically, it's a way of mimicking photosynthesis at a far higher rate than plants can achieve, using bacteria that "feed" on electrons. All that is needed is electricity and carbon dioxide, and Lovley designed the system to use electricity from solar energy. The process renews itself without the need for a biomass feedstock, which eliminates the energy-sucking expense of collecting and transporting large quantities of organic matter. It also requires less water and has no fermentation stage. So far Lovley's team is focusing on the production of [acetyl-Co A](http://en.wikipedia.org/wiki/Acetyl-CoA) (<http://en.wikipedia.org/wiki/Acetyl-CoA>), which is a foundational chemical from which others can be produced.

### **Green Chemistry and a Sustainable Future**

An important part of Lovley's vision is the potential for the microbial electrosynthetic factories to be located practically anywhere a solar energy array can be installed. This feature of [green chemistry](http://www.epa.gov/greenchemistry/) (<http://www.epa.gov/greenchemistry/>) – which uses non-hazardous feedstock instead of petroleum and other hazardous substances – could enable microfactories to locate safely near communities, bringing new green jobs to workers instead of forcing people to commute long distances to earn a living. It also provides for a smaller carbon footprint by cutting down on the need to transport products over long distances. This dovetails with a trend by utilities to install local solar energy facilities, two examples being [Duke Energy](http://cleantechnica.com/2010/04/25/duke-energy-brings-solar-energy-home-with-ten-new-distributed-solar-projects/) (<http://cleantechnica.com/2010/04/25/duke-energy-brings-solar-energy-home-with-ten-new-distributed-solar-projects/>) in North Carolina and [Tucson Electric Power](http://cleantechnica.com/2010/05/31/tucson-utility-adding-160-megawatts-of-renewable-power/) (<http://cleantechnica.com/2010/05/31/tucson-utility-adding-160-megawatts-of-renewable-power/>) in Arizona. It also fits neatly with the U.S. EPA's ambitious plan to [reclaim brownfields for renewable energy projects](http://cleantechnica.com/2010/03/01/u-s-epa-unearths-green-jobs-in-brownfields/) (<http://cleantechnica.com/2010/03/01/u-s-epa-unearths-green-jobs-in-brownfields/>) that create

new green jobs.

Image: [Sunset by fdecomite](http://www.flickr.com/photos/fdecomite/313210777/) (<http://www.flickr.com/photos/fdecomite/313210777/>) on flickr.com.

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1. [Tim Gordon](#) Says:  
[June 2nd, 2010 at 2:42 am](#)

This microbial electrosynthesis is really promising. I think this could be a trend in gathering power in the future. I just hope people would have enough budget to develop this technology.

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