

# alternative energy

## Systems

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The nutrients from the biogas reactor will hopefully provide better nutrition. So could fish waste, though an aquaponics system is just on the wish list for now, Helzer said.

The right nutrient mix could eventually help the team produce tomatoes that have optimal taste and appearance, Helzer said.

The team also wants to get a light timer to get six more hours of growing time as the days get shorter, Helzer said.

While hydroponics provide a great opportunity for season extension and minute control of nutrient intake, the current setup won't be usable when winter really sets in. "We'd have to bury the pump" to keep it from freezing, DeCray said.

The team's challenges go beyond engineering. They are working on ways to manage an aphid infestation introduced by pepper plants from Helzer's massive home garden.



Paul Pietrinferni and Morgan DeCray move plants in the Green Team's hydroponic greenhouse.

Photo by Philip Gruber

Helzer said he has never had problems with aphids at home, presumably because of predatory insects, but a hot, humid spell in the greenhouse prompted the pests to multiply.

"I wish I had some ladybugs," he said.

One apparent problem, algae growing in the hydroponic water tubes, is actually positive. "That means our system itself is really

healthy," DeCray said.

The team's outreach efforts, part of the Eco Challenge criteria, have introduced hundreds of people to efficient agricultural practices.

A Scout night attracted hundreds of people, while kids and parents saw the hydroponics during a safe trick-or-treat night at the school. "Superman and Batman were among the visitors," Helzer said.

Enthusiastic visitors, though, are not always conducive to plant growth. The younger kids like to pet the exposed roots, which set the plants back, Helzer said.

Still, the Green Team is shining a positive light on agriculture. "I love explaining it to people," Elena said of the biogas project.

Five universities — Albright, Rosemont, Syracuse, Temple and Villanova — have expressed interest in working with or learning from the high school students. "It was kind of neat to have colleges calling us," Helzer said.

So far the Green Team has been an extracurricular activity, and a

fairly time-consuming one at that.

That will change next year. Harwood's new environmental science class will integrate Green Team projects into its labs.

The current members' post-high school plans — as various as engineering, forensic science, military service and paleontology — show how agricultural advances can link to other scientific fields.

It's powerful to see even the interconnectedness of the digester, hydroponics and algae projects, biogas team member Uma Bhatt said.

For Amelia Fox, on the hydroponic side, learning how to grow plants has become its own reward.

Once a self-proclaimed "brown thumb" who could not grow anything, she now avidly experiments with plants at home. "They're actually living," she said.

Amelia has shared her plants and growing strategies with the school hydroponics project, extending the team's innovation even further, Helzer said.

## DEP Extends Alternative Fuel Vehicle Rebate Program

HARRISBURG, Pa. — The Department of Environmental Protection announced Dec. 29, 2014, the extension of the Alternative Fuel Vehicle Rebate program, which will continue to provide \$2,000 rebates for large-battery system plug-in hybrid electric and battery-electric vehicles until June 30 or until the 500 vehicle benchmark is reached. To date, DEP has more than 150 rebates remaining at this amount.

"DEP remains committed to seeing the alternative fuels market grow," DEP Acting Secretary Dana Aunkst said. "Our commitment represents an impressive total investment of \$4.35 million towards the deployment of electric vehicles in Pennsylvania since 2011."

Large-battery vehicles that have battery system capacities equal or greater than 10 kilowatt hours, including models such as the Nissan Leaf, Ford Focus, BMW, Tesla and Chevy Volt, are eligible for the highest rebate amount of \$2,000. DEP is also extending rebates of \$1,000 for plug-in hybrid electric vehicles and battery-electric vehicles with battery system capacities of less than 10 kilowatt hours, including models such as the Toyota Prius plug-in, Ford C-Max

Energi, Ford Fusion and Honda Accord.

Rebates of \$1,000 are being extended for natural gas, propane, hydrogen or fuel-cell vehicles, such as the CNG-powered Honda Civic or any 2014-15 CNG-powered car or pickup truck. CNG original equipment, manufacturer retrofits or certified conversions to CNG or propane are also eligible for the \$1,000 rebate. A \$500 rebate is available for electric motorcycles and scooters.

DEP provides these rebates as incentives to assist Pennsylvanians with the incremental cost of purchasing an alternative fuel vehicle.

To qualify, the vehicle must be registered in Pennsylvania, operated primarily in-state and be purchased no more than six months before the rebate application is submitted. The rebates are funded by the Alternative Fuels Incentive Grant Program, which is supported by a gross receipts tax on utilities.

Rebate applications and updated guidelines are available on DEP's website, [www.dep.state.pa.us](http://www.dep.state.pa.us). Enter keywords "Alternative Fuel Vehicle Rebates." Information on rebate availability will be updated regularly.

## Va. Regs: New Rules Would Raise Electricity Costs

RICHMOND, Va. (AP) — The cost of electricity would increase substantially and service reliability could be significantly affected under proposed federal environmental rules, the staff of the Virginia State Corporation Commission said in comments filed in October 2014 with the U.S. Environmental Protection Agency.

Federal officials are calling for cutting carbon emissions from existing power plants 30 percent below 2005 levels by 2030 in an effort to fight climate change, improve public health and provide affordable energy.

Those rules would lead to a rise in electricity prices because much of today's electricity production would be replaced with costly generation and expensive programs to decrease energy use, the SCC staff said.

The EPA predicts that Virginia utilities will have to shut down fossil fuel power plants reliably producing 2,851 megawatts of electricity, and replace that generation with just 351 megawatts of wind power.

"This raises alarming regional reliability concerns," the staff said.

But the SCC staff said it takes no position on the broad policy questions involving carbon emission reductions on a national level and said its comments

should not be construed as representing the views of the SCC's commissioners, who may have to decide on utility plans to comply with the federal rules.

The Richmond Times-Dispatch reports that the staff said it made an "indicative cost analysis" of the incremental cost for Dominion Virginia Power to achieve the EPA's carbon reduction goals. For example, complying with the rules would likely cost Dominion Virginia Power customers alone an extra \$5.5 billion to \$6 billion, the staff said. Richmond-based Dominion is the state's largest electric utility.

However, environmental groups questioned the SCC staff's analysis, saying Virginia is already 80 percent of the way to meeting the state's carbon pollution target under the Clean Power Plan.

"The SCC staff analysis is just plain wrong," said Glen Besa, director of the Sierra Club's Virginia Chapter. "They're playing politics with climate change science and they have no business doing that, and they're bringing discredit on the commission."

Cale Jaffe, director of the Southern Environmental Law Center's Virginia office, said almost all of those reductions are coming from coal plant retirements and natural gas conversions that the utilities put in place long before the Clean Power Plan was released.

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