

Conservation Committee Report

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Jack Walters—Conservation Chairman

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Stent Technology Saves Lives, Creates Jobs

Government-Industry Partnership Produces Game-changing Technology

When people think of benefits from energy research, they usually don't envision saving lives. But thanks to an innovative alloy jointly developed by Boston Scientific Corporation (BSCI) and U.S. De-

partment of Energy (DOE) metallurgists, that's what is happening.

Using a special platinum/chromium alloy, BSCI has developed a line of coronary stents that simplify medical procedures and allow treatment of a broader range of patients. Coronary stents save lives by permitting blocked

or restricted arteries to be reopened, allowing blood and oxygen to flow freely again to cardiac tissue. Coronary artery disease, or heart disease, is the number one cause of death in the United States, affecting more than 13 million Americans.

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The Conservation Pledge

I give my pledge as an American to save and faithfully defend from waste, the natural resources of my country; the soil, the water, the air, the minerals, the plant life and the wildlife.

This is my Pledge!

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EPA's Fifteen Hot Tips for a Cool Summer

Save money, water, energy while protecting health and encouraging environmental learning

The U.S. Environmental Protection Agency (EPA) released a list of 15 tips for the summer season, which kicks off

June 20th. Whether relaxing at home or off exploring the great outdoors there are many ways people can save money, cut energy costs and continue to protect the health of their families while still enjoying the summer.

Tips for a safe and en-

joyable summer:

1. Energy Star savings for your home:

The average home spends almost 20 percent of its utility bill on cooling. These cooling bills can be lowered by simply changing out

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Stent Technology Saves Lives, Creates Job

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The special alloy, developed with the Office of Fossil Energy's (FE) National Energy Technology Laboratory (NETL), is easier for coronary specialists to see via x-ray. This makes the surgeon's job easier and reduces the risk of damage to the patient's arteries, especially when multiple stents are required. The greater flexibility of the new stents allow them to be threaded through or implanted safely in arterial bends, which are typically more difficult locations to navigate during the insertion process. The greater visibility on x-ray facilitates accurate diagnosis or medical intervention during routine or emergency examinations.

The addition of platinum also increases the stents' resistance to corrosion, optimizing their longevity within the body. The alloy's strength reduces recoil, which reduces the likelihood of constriction after deployment; this means a stent's diameter tends to remain stable after deployment which leads to lower rates of blood clotting because fewer gaps are opened between the stent and the arterial wall.

The four highly successful product lines using the alloy earned

NETL researchers an *Award for Excellence in Technology Transfer* from the Federal Laboratory Consortium. Additionally, the stents developed have rapidly gained a 45 percent market share in the United States (33 percent worldwide), placing them first in sales among coronary stent products. Global sales of the new stents have topped \$3 billion since stents' introduction in 2010.

Results from the NETL/BSCI partnership also include the creation of 300 new jobs at Boston Scientific alone, many in skilled, highly paying engineering and production positions. More BSCI job creation is anticipated as new stent series are approved for marketing in the United States and the rest of the world.

In addition, well over 100 American workers are employed in the supply chain that produces these stents—exclusively in the United States—and ships them globally. For example, Carpenter Specialty Alloys, an industrial producer of the breakthrough alloy, has upgraded its research and development capability to deliver pilot-production quantities needed for pre-clinical and clinical studies, expanding pro-

duction, creating jobs, retaining workers, and invigorating the local economy.

BSCI has announced that all of their future stents will utilize this innovative alloy in their manufacture. Sales are expected to increase as cardiovascular surgeons learn more about the unique features and patient benefits using these innovative coronary stents.

Source: U.S. Department of Energy (DOE)

EPA's Fifteen Hot Tips for a Cool Summer

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incandescent light bulbs with EPA's Energy Star qualified lighting, which use less energy and produce approximately 75 percent less heat. Raising your thermostat by only two degrees and using your ceiling fan can lower cooling costs by up to 14 percent too. http://www.energystar.gov/index.cfm?c=products.es_at_home

2. Increase your gas mileage: Obey the speed limit; go easy on the breaks and avoid hard accelerations; reduce your time idling; and unload unnecessary items in your trunk to reduce weight. If you're not using your removable roof rack take it off to improve your fuel economy. <http://www.fueleconomy.gov>

3. Prevent skin cancer and be SunWise: Skin cancer is the most common form of cancer in the U.S. and is the most common cancer among 20 to 30-year-olds. Remember to practice safe sun habits. <http://www.epa.gov/sunwise/actionsteps.html>

4. Heading to the beach? Check the water: Americans take almost two billion trips to the beach every year. Beaches are a place to play, watch wildlife, fish, and swim. Learn more on how to plan a safe trip to the beach and check out state specific beach advisory and closing notifications. <http://water.epa.gov/type/oceb/be>

[aches/whereyoulive_state.cfm](http://water.epa.gov/type/oceb/beaches/whereyoulive_state.cfm)

5. Take EPA's apps with you on your smartphone: The AirNow app gives location-specific current air quality information to use to protect your health when planning daily activities and the Ultraviolet (UV) Index app provides daily and hourly forecast of the UV radiation levels from the sun so you can better prevent overexposure to the sun. <http://m.epa.gov/apps/index.html>

6. Enjoy the outdoors and capture the State of the Environment: Almost 40 years ago, EPA's Documerica project captured thousands of images across the nation as EPA's work was just beginning.. Now it's your chance to mark the progress and submit environmental photos to EPA's State of the Environment photo project. <http://blog.epa.gov/epplocations/about/>

7. Protect yourself with insect repellents: Mosquitoes and ticks can carry diseases but you can protect yourself by choosing the right repellent and using it correctly. Read the product label before using; apply just enough to cover exposed skin and clothing; and look for the protection time that meets your needs. Children can use the

same repellents as adults unless there is a restriction on the label. <http://epa.gov/pesticides/insect/safe.htm>

8. Water wisely: A large percentage of water we use at home is used outdoors. As much as 30 percent of that outdoor water use can be wasted due to evaporation by watering in the middle of the day. Water in the morning when winds are calm and temperatures are cool. Look for the new WaterSense labeled weather-based irrigation controller that uses local weather data to determine whether your sprinkler system should turn on. <http://www.epa.gov/watersense>

9. Clean greener: If you're going to wash the car, deck, boat, or RV— be sure to look for the Design for the Environment (DfE) label to quickly identify and choose cleaning products that are safer for families and also help protect the environment. Look for the DfE label on grill cleaners as well. <http://www.epa.gov/dfe>

10. Improve your indoor air: About 90 percent of people's time is spent indoors. While inside this summer, make sure to free your house of mold, test your home for radon, check your carbon monoxide detector and ask those who smoke to go outdoors. <http://www.epa.gov/iaq>

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Field Trial of Methane Hydrate Production Technologies (continued)

11. Check into an Energy Star hotel:

On average, America's 47,000 hotels spend more than \$2,000 per available room each year on energy. Look for an Energy Star certified hotel--they perform in the top 25 percent of hotels nationwide, use an average of 35 percent less energy and emit an average of 35 percent less greenhouse gas emissions than peers.

<http://www.energystar.gov/buildinglist>

12. Waste less and remember to recycle:

Each year, Americans generate millions of tons of waste in homes and communities but it's easy to reduce, reuse, and recycle. Recycled items such as glass can be used in roadway asphalt (glassphalt) and recovered plastic can be used in carpeting and park benches. Learn what you can do to waste less.

<http://www.epa.gov/waste/wycd/summer.htm>

13. Season firewood: Summer is a great time to season firewood in preparation for fall and winter. Remember to split firewood to the proper size for your wood stove or fireplace, but no larger than 6 inches in diameter; stack firewood to allow air to circulate around it; cover the top of the stack to protect it from the rain; and store your firewood for at least 6 months before using it.

<http://www.epa.gov/burnwise>

14. Looking for a summer project and tired of the heat? Try composting: Composting can be a fun and educational summer project that saves landfill space, helps feed the soil and prevents methane, a potent greenhouse gas.

<http://www.epa.gov/waste/conservation/rrr/composting/basic.htm>

15. Let summer inspire you and submit Six Words for the Planet:

Keep the creativity flowing beyond the school year and into the summer by submitting a meaningful story or idea in just six words.

<http://blog.epa.gov/blog/2012/04/sixwords/>

More local information from MyEnvironment:

<http://www.epa.gov/myenvironment/>

More hot tips for a cool summer:

<http://www.epa.gov/epahome/hi-summer.htm>

All year long you can Pick5 for the Environment:

<http://www.epa.gov/pick5/>

Source: The U.S. Environmental Protection Agency (EPA)



DEP Awards More than \$2.25 Million in Mine Reclamation Contracts

The Department of Environmental Protection announced today it has awarded \$2,252,855 for remediation projects at abandoned mine sites in Butler, Cambria, Clarion, Jefferson and Luzerne counties.

The remediation will reclaim 181 acres to pre-mining conditions by planting tens of thousands of trees, re-grading thousands of cubic yards of steep slopes left by mining, stabilizing old mine pits and shafts, and preventing more than 75,000 gallons a day of acid mine drainage from reaching waterways.

“Coal mining fueled the nation’s economy for many years, but it left Pennsylvania a legacy of sites in need of remediation,” DEP Deputy Secretary for Active and Abandoned Mine Operations John Stefanko said. “Our aggressive program is reclaiming these sites from scarred earth to the condition that they once were.”

The remediation work will take place over the next year and a half at abandoned mining sites across the state.

The contracts were awarded on a competitive basis and are being paid for out of a grant from the federal Office of Surface Mining. The federal fund is supported by a tax on the modern coal industry and is distributed to states as annual grants to reclaim mine sites that were abandoned prior to passage of the federal Surface Min-

ing Control and Reclamation Act of 1977.

For more information, visit www.dep.state.pa.us or call 717-783-2267.

Media contact: Kevin Sunday, 717-787-1323

Editor’s Note: Following are descriptions of the projects:

Parker Township, Butler County Morgan’s Excavating of Mount Union, Huntingdon County, has been awarded \$289,301 to reclaim 33.5 acres near abandoned mines outside of the community of Bruin. The site’s dangerous pits and steep highwalls will be filled in and unstable heaps of dirt, rocks and vegetation that piled up from mining will be graded and stabilized. A subsurface drain will control water runoff from the site, and grass and other vegetation will be planted. Work is expected to be completed by October 2012.

White Township, Cambria County Morgan’s Excavating of Mount Union, Huntingdon County, has been awarded \$261,587 to restore 21 acres at a strip mining pit adjacent to state game lands and Prince Galitzin State Park. The site was abandoned prior to 1960, and the work will return the site to its original contour. Dangerously steep highwalls left from mining, ranging in height from 20 to 40 feet, will be filled in with approximately 153,000 cubic yards of soil. A collapsed mine shaft that drops 15 feet from the surface will be filled in; a

subsurface drain will be installed with a limestone channel to neutralize the acidity of any water that flows through the site; and more than 15,000 trees will be planted. Work is expected to be completed by mid-September 2012.

Farmington Township, Clarion County

The Gralan Corporation of West Fort Ann, New York, has been awarded \$321,626 to reclaim an abandoned mining site outside of the community of Tylersburg. The Crown mine, abandoned in 1960, contains numerous pits, precipitous highwalls and unstable piles of coal-mining waste in need of reclamation. More than 5,000 trees will be planted across 22.5 acres at the site after 12 acres of pits and highwalls are graded and stabilized. In addition, more than 1,800 tons of alkaline will be packed into the ground to neutralize the acidity of any water that becomes contaminated from flowing through the site. Work is expected to be completed by February 2013.

Union Township, Jefferson County

The Headwaters Charitable Trust and Mill Creek Coalition of Jefferson County have been

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DEP Awards More than \$2.25 Million in Mine Reclamation Contracts (continued)

awarded \$350,000 to install an acid mine drainage treatment system at the former Orcutt and Smail mine sites. The bonds for the site were forfeited by the operator in 1991 after mining was complete, but discharge continued to go untreated. The treatment system that will be installed will prevent the 75,000 gallons of acid mine drainage that currently flow out of the site from reaching waterways untreated. The system will mix limestone slurry into collected pools of the acidic water to neutralize its acidity. Further treatment will aerate the water to remove the other contaminants, helping to restore the health of nearby Little Mill Creek, which eventually flows into the Clarion River. Work is expected to be completed by December 2013.

Plymouth Township, Luzerne County

C.E. Ankiewicz Construction and Excavation Inc. of Mountain Top, Luzerne County, have been awarded \$1,030,341 to reclaim the Avondale strip mine pit. Abandoned in 1959, the site will see 98,800 cubic yards of rock and soil re-graded; 14,390 cubic yards of soil excavated to control drainage at the site; 10,090 square yards of rock lining put down to stabilize the site; and 92 acres of vegetation and trees seeded on the site for reclamation and beautification. The grant was awarded because of inaction by the former contrac-

tor, who had been tasked with reclaiming the site. Work is expected to be completed by early February 2013.

Source: PA Department of Environmental Protection



DOE-Sponsored IGCC Project Could Lead to Lower-Cost Carbon Capture Technologies

Successful Catalyst Tests Also Increase Power Production

Changes in operating conditions coupled with changes in commercially manufactured catalysts can produce both power generation increases and significant cost savings at Integrated Gasification Combined Cycle (IGCC) power plants, according to new research from a U.S. Department of Energy (DOE)-sponsored project.

Results from the project at DOE's National Carbon Capture Center (NCCC) could ultimately lead to lower-cost carbon-capture technologies and help provide affordable, reliable, and clean energy from our nation's domestic coal resources. Carbon capture, utilization and storage (CCUS) technologies are viewed by experts as an important option in helping reduce atmospheric carbon dioxide (CO₂) emission linked to potential global climate change.

Advanced power plants using IGCC technology convert coal into a synthesis gas, or "syngas," which can then be combusted to produce electricity. The syngas contains combustible hydrogen and carbon monoxide (CO),

along with water, nitrogen, and CO₂, a greenhouse gas.

To capture CO₂ and prevent its release into the atmosphere, the syngas is "shifted" in a chemical process called the water-gas shift (WGS) reaction. The reaction converts CO into CO₂ in the presence of a catalyst and steam and produces additional hydrogen for combustion. A large amount of steam ensures maximum conversion of CO and inhibits side reactions, but it also reduces the overall efficiency of the IGCC plant. The amount of steam is quantified by the steam-to-CO ratio of the gas fed to the WGS reactor.

Testing a variety of commercially available WGS catalysts, NCCC researchers were able to significantly reduce the steam-to-CO ratio while still achieving high CO conversion without side reactions. A reduction in the ratio translates into increased net power output and a smaller increase in the cost of electricity associated with carbon capture. Specifically, the 1.0 reduction in steam-to-CO ratio that was achieved corresponds to a 40-megawatt increase in power generation in a 500-megawatt IGCC plant. This could result in cost

savings of more than \$275 million over a plant's estimated 30-year lifespan at current IGCC power costs of about \$33 per megawatt-hour.

NCCC researchers are providing the test results to manufacturers to assist them in specifying future WGS systems for IGCC plants that incorporate carbon capture. The researchers are also planning further tests with other commercially available, newly formulated WGS catalysts. In addition, the findings are being implemented at a commercial IGCC plant now under construction in Kemper County, Miss. The plant will showcase a transport gasifier technology developed at the NCCC.

Located in Wilsonville, Ala., the NCCC is a state-of-the-art test facility dedicated to the advancement of clean coal technology. The Office of Fossil Energy's National Energy Technology Laboratory, in cooperation with Southern Company Services, established the NCCC to bolster national efforts to develop cost-effective technologies to capture the CO₂ produced by fossil-fueled power plants and help secure the nation's energy future.

Source: U.S. Department of Energy (DOE)

Novel Tool Allows Quicker, More Versatile Analysis of Energy Production Technologies

A new energy production technology analysis tool that could lead to cost-effective improvements for energy generation and lower costs for consumers is now available on the National Energy Technology Laboratory (NETL) website.

Available at no cost, the Power Systems Life Cycle Analysis Tool (Power LCAT) compares seven energy-production technologies: natural gas combined cycle, integrated gasification combined cycle, existing and supercritical pulverized coal, existing and new nuclear, and onshore wind. An option for capturing and sequestering carbon dioxide emissions is also included for each of the fossil fuel technologies.

Policymakers, students, and stakeholders can use the tool, developed by NETL and Sandia National Laboratories, to consider the entire lifecycle of an energy technology—from raw materials acquisition to final product transport—and will better understand the relationship between the economics and environmental performance of different electricity-production options. NETL is the research labo-

ratory for the Department of Energy's Office of Fossil Energy.

Once loaded onto a user's computer, the intuitive tool provides tabs that easily guide the user to options and variables that can be adjusted within each of its four main sections:

- The Production Analysis section calculates the cost of electricity (in dollars per kilowatt hour) for each energy option and allows users to explore key sensitivities, such as capital cost, fuel cost, plant life, and financing.
- Users can select the Environmental Performance section to estimate aggregate greenhouse gas and non-greenhouse gas emissions, as well as water use at each stage in the lifecycle of electricity production.
- The Costs vs. Emissions section explores the tradeoffs between costs and greenhouse gas emissions.
- The Sensitivity Analysis section allows simultaneous variation of several assumptions—such as capital costs, operations and fuel costs, interest rates, efficiency, and capacity factors—and pro-

vides graphical representation of the results.

A technical guide accompanies Power LCAT and summarizes default assumptions of the tool based on detailed lifecycle analysis studies conducted by NETL. The technical guide also provides a general overview of the model's operation and provides initial results based on the model's default assumptions.

Source: U.S. Department of Energy

Natural Gas Compression Technology Improves Transport and Efficiencies, Lowers Operating Costs

Innovative Compressor Design Can Extend Productive Life of Stripper Wells, Enhancing U.S. Energy Security

An award-winning compressor design that decreases the energy required to compress and transport natural gas, lowers operating costs, improves efficiencies and reduces the environmental footprint of well site operations has been developed by a Massachusetts-based company with support from the U.S. Department of Energy (DOE).

OsComp Systems designed and tested the novel compressor design with funding from the DOE-supported Stripper Well Consortium, an industry-driven organization whose members include natural gas and petroleum producers, service companies, industry consultants, universities, and industrial trade organizations.

Conventional compressors are not optimized to handle wet gas—natural gas that contains water vapor or hydrocarbon liquids. OsComp's hybrid compressor uses an advanced rotary design, coupled with gas-cooling capabilities, that increases its efficiency and allows it to handle wet or dry gas.

Prototype testing showed the hybrid compressor's efficiency is more than 30 percent higher than conventional compressor technology. It is also one-tenth the size, so it reduces the overall footprint of well site operations. By reducing the capital and operating costs of compression, natural gas producers can continue to operate stripper wells at very low flow rates and low natural gas prices.

Backed with more than \$12 million in private funding, OsComp Systems is aggressively moving forward with commercial-scale prototype manufacturing and field testing of the hybrid rotor compression technology.

Natural gas stripper wells produce less than 60,000 cubic feet of natural gas per day. Despite their small output, stripper gas wells collectively make a significant contribution to our nation's energy supply. Based on 2008 statistics, more than 322,000 stripper gas wells in the United States account for 2 trillion cubic feet of natural gas annually, enough to supply 16 million homes.

Operators of stripper wells face a variety of challenges when it comes to keeping them on line.

Even a small drop in natural gas prices can make them uneconomical to operate, and the large volumes of water produced by these wells can reduce natural gas flow and increase operational costs. Development and deployment of technologies to improve the performance of stripper wells will extend the lifespan of these wells and contribute to U.S. energy security.

In addition to its use for stripper wells, the hybrid compressor may also aid the production of hydrocarbon-wet gas, such as the Utica and Eagle Ford shales. Other potential applications may include small-scale liquefied natural gas, enhanced oil recovery, mobile compression, sour gas, and the compressed natural gas refueling industry.

The Stripper Well Consortium is managed and administered by The Pennsylvania State University. Base funding and technical guidance to the consortium are provided by DOE's Office of Fossil Energy and the New York State Energy Research and Development Authority.

Source: U.S. Department of Energy (DOE)

New DOE "Best Practices" Manual Features Top Strategies for Carbon Storage Wells

Best practices for managing wells used to store carbon dioxide (CO₂) in geologic formations are the focus of a publication just released by the U.S. Department of Energy (DOE)'s National Energy Technology Laboratory (NETL).

The newest manual in the Department's series on current best practices associated with carbon capture, utilization, and storage (CCUS), *Carbon Storage Systems and Well Management Activities* covers the planning, permitting, design, drilling, implementation, and decommissioning of CO₂ storage wells. The manual builds on lessons learned through NETL research, the experiences of the laboratory's regional partnerships in conducting CCUS field tests, and the acquired knowledge of industries that have been actively drilling wells for more than 100 years. NETL is part of DOE's Office of Fossil Energy.

CCUS is a promising option for reducing CO₂ emissions from anthropogenic sources and helping mitigate climate change. Depleted oil and gas reservoirs, unmineable coal beds, brine-filled rock formations, and other deep underground geologic features

are all potentially suitable for safe and secure CO₂ storage. The recently released *2012 North American Carbon Storage Atlas*, estimates geologic storage capacity to permanently store at least 500 years worth of CO₂ emissions from stationary sources in the U.S., Canada and Mexico.

The new manual provides an overview of the well-management activities typically associated with CCUS projects, beginning with pre-injection planning and continuing through post-injection operations. It is not a "how to" book for developing these projects; rather, it provides a roadmap and resource for lessons learned about well-management issues and what project planners and operators can expect as a project unfolds.

The manual discusses the types of experts needed for a successful CCUS project team—from technical scientists and engineers to nontechnical legal counsel, economists, and communicators. It also informs the general public about the rigorous approach that project developers undertake to ensure human and environmental safety as they design, drill, maintain, and close these wells.

Carbon Storage Systems and Well Management Activities is the eighth CCUS best practices manual released by DOE's National Energy Technology Laboratory (NETL). Other manuals published to date are:

- Risk Analysis and Simulation for Geologic Storage of CO₂
- Regional Carbon Sequestration Partnerships' Simulation and Risk Assessment Case Histories
- Terrestrial Sequestration of Carbon Dioxide
- Geologic Storage Formation Classifications
- Site Screening, Selection, and Initial Characterization for Storage of CO₂ in Deep Geologic Formations
- Monitoring, Verification, and Accounting of CO₂ Found in Deep Geologic Formations
- Public Outreach and Education for Carbon Storage Projects.

All eight manuals, as well as numerous other publications concerning carbon storage, are available on NETL's CCUS reference shelf.

Source: U.S. Department of Energy (DOE)