# The Environmental Synopsis

A Monthly Update from the Joint Legislative Air and Water Pollution Control and Conservation Committee

AUGUST 2015

## The Chairman's Corner

### Senator Scott E. Hutchinson, Chairman

In last month's Synopsis, I brought you the story of MeterHero, a California startup using market incentives to help reduce water usage across the country. Not to be outdone here in Pennsylvania, a Pittsburgh-based business called PittMoss has recently taken their peat moss alternative from a humble kitchen experiment to the stage of ABC's hit show Shark Tank. Using recycled newspaper, PittMoss' green peat could preserve our wetlands and store large amounts of carbon dioxide.

Sphagnum, commonly known as peat moss, is a plant fertilizer widely used among commercial growers, nurseries and home gardeners. Found in wetlands and other low-lying areas known as peat lands or bogs, the decaying organic matter is used as a conditioner to increase soil's ability to retain water and nutrients. Its unrivaled ability to help cultivate healthy flowers and plants makes peat moss indispensable to growers, and represents an industry worth several hundred million dollars.

The problem with traditional peat is that peat lands are scarce and must be drained in order to produce the popular fertilizer. In fact, peat lands are estimated to comprise only 3 percent of the total land and freshwater surface of our planet. The prehistoric bogs develop over millions and millions of years, accumulating at a rate of only a millimeter per year. This extremely slow growth essentially makes peat moss a non-renewable resource.

Aside from their scarcity, peat lands also play a pivotal role in the health of our environment. The bogs store massive amounts of carbon dioxide from our atmosphere, nearly twice as much as our planet's forests. Despite their small surface area, the world's peat lands are estimated to hold 33 percent of all of soil carbons, which are released into the air when drained or disturbed. It is said that the loss of just 1.5 percent of the planet's peat lands is equivalent to an entire year's release of carbon dioxide.

***Pittsburgh-based PittMoss is using recycled newspaper and a secret blend of organic compounds to create a more sustainable and effective alternative to traditional peat moss***

Realizing the problems associated with peat land depletion, Pittsburgh resident and nursery employee Mont Handley began to experiment in his kitchen with various alternatives to traditional peat moss after graduating college in 1994. Treating the experiments as a hobby, Handley worked at a local nursery during the day and tweaked his peat recipe in his spare time, eventually upgrading the operation from his kitchen to garages and small nurseries over the span of roughly 20 years.

*Continued on page 8*

## In This Issue

**August 2015**
**Volume 16, Number 8**

# Notes from the Director

Tony M. Guerrieri, Executive Director

Before coal and steel dominated Pennsylvania's landscape, timber was the industry that fueled the state's economy. Now, a radical new approach toward sustainable construction – building high rises from wood – could bring timber back into the spotlight, stimulating rural economies and promoting forest health in a way that many industry stakeholders can get behind.

Tall wooden buildings – nicknamed "woodscrapers" or "plyscrapers," depending on your preference – have been rising in Europe and Canada, and soon could come to U.S. skylines. A growing number of architects, designers and government agencies are reexamining the case for using wood more exclusively in the construction of skyscrapers. Although residential construction uses wood framing extensively, for larger commercial structures incorporating many levels, it simply does not offer the necessary support.

But recent advancements in engineered mass timber products – cross-laminated timber (CLT) panels and glued-laminated timber (glulam) beams – have opened the door to taller and bigger buildings with wood as the primary building material. These composites are made from lower-grade lumber set down in layers at 90 degree angles to each other and fully glued over. While the raw materials themselves might be weak, such products can be engineered to create an exceptionally-strong product that retains its static strength and shape, and allows the transfer of loads on all sides.

Fire protection is a particular concern, but advocates for wooden buildings say mass timber products do not ignite easily and form a layer of char that slows burning. Though no practical building materials are 100 percent fireproof, CLT's thick cross-section is credited with making it fire-resistant. Advocates say wooden structures made of timber panels can meet fire safety standards for steel or concrete buildings.

***Last year, the USDA, in conjunction with the forest products industry, announced a $2 million competition for developers to design the first commercially-viable 'plyscraper' in the U.S.***

Another bonus of the material is the speed of construction; panels can be made to measure in the factory complete with openings, windows and doors. Typical CLT blocks can be made as thick as 16 inches and thinner panels can be up to 10 feet wide and 64 feet long.

The largest benefit of using wood products in skyscraper construction, though, is environmental. Products like CLT and glulam are naturally renewable, take less energy to make than concrete and steel, and sequester carbon dioxide rather than pumping out greenhouse gases during their production. According to one federal government estimate, the near term use of CLT and other emerging wood technologies in buildings between 7 and 15 stories could have the same effect on emissions as taking more than two million cars off the road for an entire year.

What makes CLT so compelling is that it can be manufactured using "junk" trees with diameters as small as 4 inches, including many dead trees. Recent mild winters in the United States have unleashed an outbreak of voracious pine beetles much worse than anything seen before. The trees they kill are useless for traditional lumber and, if left standing, may pose a fire risk if they are not removed. However, even this dead wood can be used for CLT – if harvested in time.

The United States has some of the most highly productive forests in the world. In Pennsylvania, for example, the forest products industry generates $5.5 billion in sales annually and employs nearly 90,000 individuals at over 3,000 facilities across the state. If commercial wooden buildings can create new demand for Pennsylvania timber, this trend will raise prices and encourage landowners to remain in the forestry business.

But CLT is still a relatively newcomer to an industry where it often takes years for innovative construction methods to catch on. While several other countries have been quick to embrace engineered timber products, restrictive building codes in the United States have often limited wooden structures to just four stories or fewer. But things are beginning to change. In 2014, the U.S. Department of Agriculture, in cooperation with lumber industry groups, announced a $2 million nationwide competition to help developers navigate the paperwork and build the next wooden skyscraper.

In the United States, the only major example of non-residential CLT construction is a 78-foot church bell tower in Gastonia, North Carolina. Perhaps as the popularity of so-called plyscrapers continues to rise other countries, the idea will gain more traction here at home.

# Research Briefs

*Each month, the committee's staff researches and prepares a number of "briefs" on several topics relevant to the committee's mission. Very often these briefs include references to reports and further research on the topics so that readers may pursue issues on their own. Please note that the information and opinions expressed in the Research Brief articles do not necessarily represent the opinions or positions of the Joint Legislative Air and Water Pollution Control and Conservation Committee, nor those of the Pennsylvania General Assembly.*

## Chemical Facilities Misreported Toxic Release Threats

**Tony M. Guerrieri, Executive Director**

A report by the U.S. Government Accountability Office (GAO) concludes that the U.S. Department of Homeland Security (DHS) is unable to verify threat level reports from thousands of chemical plants across the country, weakening the department's ability to respond to a chemical attack or emergency.

The GAO report reviews the Chemical Facility Anti-Terrorism Standards program that identifies and assesses the risk associated with chemical plants, and then requires those facilities to impose better protection measures.

Since 2007, the Office of Infrastructure Protection's Infrastructure Security Compliance Division (ISCD), within the DHS, has identified and collected data from approximately 37,000 chemical facilities and categorized approximately 2,900 as high-risk based on the data. The ranking is based on the amount of toxic or flammable chemicals on site, such as chlorine, a corrosive, or ammonium nitrate, which can be used to make explosives. Final rankings, based on a tier of one to four, are determined with additional information provided to the department.

The GAO report states that the ISCD has not been verifying reports on each facility's risk level and toxic release threat. A toxic release threat exists where chemicals, if released, could harm surrounding populations.

The ISCD requires chemical facilities to report the "distance of concern," which represents the radius of an area in which exposure to a toxic chemical cloud from a release could cause serious injury or fatalities from short-term exposure. Millions of people live, play and work within high risk zones near hundreds of chemical facilities. Facilities calculate the radius using a web-based tool and DHS guidelines. The ISCD, however, does not verify facility-reported data for facilities it does not categorize as high-risk for a toxic release threat.

***Federal investigators found that more than 44 percent of facilities with a toxic chemical release threat misreported information regarding their public exposure risk***

Following DHS guidelines and using a sample of facility-reported data in a DHS database, GAO investigators determined that more than 2,700 facilities (44 percent) of an estimated 6,400 facilities with a toxic release threat misreported their distance of concern. Additionally, at least 1,200 of those 2,700 facilities (43 percent) underestimated the radius of exposure.

Individuals intent on using or gaining access to hazardous chemicals to carry out a terrorist attack continue to pose a threat to the security of chemical facilities and surrounding populations, according to the report. However, the DHS has not taken steps to mitigate errors in some facility-reported data and does not have reasonable assurance that it has identified all of the nation's highest-risk chemical facilities.

For example, in one instance, a chemical facility holding more than 200,000 pounds of anhydrous ammonia reported a distance of concern of 0.9 miles. But investigators believe the actual distance is closer to 2.4 miles at least.

Meanwhile, the ISCD faces a huge backlog of security plans that need to be approved for hundreds of chemical sites. As of April 2015, the GAO estimates that it could take between 9 and 12 months for the ISCD to review and approve security plans for approximately 900 remaining facilities. Investigators noted that this number is a substantial improvement over earlier estimates of seven to nine years.

In addition, the report noted that the ISCD did not establish procedures for facilities that are out of compliance with agency-approved security plans. GAO inspectors reviewed 69 facilities as of February 2015, but 34 did not yet meet one

*Continued…*

or more deadlines for implementing security measures.

Given that the ISCD will need to inspect about 2,900 facilities in the future, having documented processes and procedures could provide the agency more reasonable assurance that facilities implement planned measures and address security gaps, the report said.

A copy of the GAO's report, Critical Infrastructure Protection: DHS Action Needed to Verify Some Chemical Facility Information and Manage Compliance Process, is available at: **http://www.gao.gov/assets/680/671570.pdf**.

## Fungal Disease Threatens Timber Rattlesnakes

**Coleen P. Engvall, Research Analyst**

Timber rattlesnakes are an integral part of Pennsylvania's ecosystems, and are being increasingly recognized as an important predator and even as a contributor to medical science. This was not always the case, however.

In recent decades, timber rattlesnakes have been hunted and pushed out of their territory to the point that they may be listed as a species of concern in the near future. This has prompted efforts to educate the public, as well as study and protect the habitats where these snakes are found.

Unfortunately, the timber rattlesnake is facing a deadly new obstacle on its way towards population recovery. Ophidiomyces ophiodiicola, or snake fungal disease, is a malady that has been killing snakes in many states in the eastern region of the United States. So far, little is known about the fungus.

Recently, researchers from the University of Illinois began a study to try to understand how the disease is transmitted, how it survives in its environment, and where it came from. They published their report, The Natural History, Ecology, and Epidemiology of Ophidiomyces Ophiodiicola and its Potential Impact on Free-Ranging Snake Populations in June of this year.

The results of the study can be seen as rather grim for our timber rattlesnakes. So far, the mortality rate of snake fungal disease is 100 percent. It affects the scales of the snake, causing lesions, scarring and growths, eventually killing the animal. To make matters worse, the fungus can survive in the decaying matter found in nearly all forests. Matter such as dead animals, other fungi, or even in soil. This makes containing the fungus or limiting the snakes' exposure to it virtually impossible.

***Researchers at the University of Illinois question if snake fungal disease is new to the eastern United States, or if snakes are now more susceptible to disease due to environmental changes***

So far, the disease has been documented in nearly all of Pennsylvania's neighboring states, however it is suspected to occur in more places than have been reported.

In the last decade, a similar affliction has been ravaging bat populations. Commonly-known as white nose syndrome, pseudogymnoascus destructans is described by the University of Illinois researchers as very similar to snake fungal disease. One major difference is in the visibility of the problem. Bats live in large colonies that are more easily accessed. One dead snake on the forest floor is less startling than piles of afflicted bats, even if the threat to the population as a whole is on a similar scale.

While researchers have recently succeeded in using bacteria to fight white nose syndrome, it is unclear if this will be helpful for our snakes.

The researchers recommend several additional studies for minimizing the effects of the disease. Understanding the disease at a molecular level can reveal its characteristics, and perhaps a way to cure infected snakes.

Additionally, the origin of the disease as well as the way it travels and is effected by its environment are important for containment strategies. The report warns that it is possible for this to spread further and faster if the animal trade is factored in. This should be considered for domestic as well as international trade. Lastly, more studies concerning treatment and therapy of individual snakes should be explored.

While the disease has not officially been documented in Pennsylvania, the research is critical to the conservation

efforts that are currently underway. While rattlesnakes are often viewed with fear rather than sympathy, they are an important part of the commonwealth's ecosystem.

The full article, The Natural History, Ecology, and Epidemiology of Ophidiomyces Ophiodiicola and its Potential Impact on Free-Ranging Snake Populations, is available at: **http://www.sciencedirect.com/science/article/pii/S1754504815000422**.

## California's Economy is Among the World's Greenest

**Tony M. Guerrieri, Executive Director**

When it comes to the green innovation sector, there is California and then there is everybody else. California not only leads the nation in the fight against climate change – in some ways it leads the world.

The Golden State has the world's second least carbon-intensive economy, according to a report from the public policy group Next 10. The report states that only France emits fewer greenhouse gases for each dollar, or euro, of economic activity.

The Next 10 report, California Green Innovation Index: International Edition, examines the world's top 50 countries in terms of their greenhouse gas emissions, ranks California among them, and tracks trends that matter including economic growth, productivity, renewable energy generation and emissions per capita. California and U.S. collectively lead the world on several critical indicators, including the production of renewable energy.

California has more electric cars than any other state or country, leads the world in clean technology investment, and boasts a fast-growing fleet of renewable power plants.

And according to the report, the state's economy has continued to grow as its emissions have decreased. From 1990 through 2012, California's greenhouse gas emissions decreased by 25 percent per person – largely the result of more efficient homes, appliances and cars – while per capita gross domestic product rose 16 percent.

State law requires California utilities to get 33 percent of their electricity from the sun, wind and other renewable sources by the end of 2020. The state also has created a cap-and-trade system to rein in emissions from factories, power plants, oil refineries and other sources.

California ranks as the world's eighth-largest economy. And while some of its key industries, including technology and entertainment, have relatively low greenhouse gas emissions, California is also one of the nation's largest oil producers and home to a significant number of refineries along the West Coast. Among large economies, the report lists California as 20th in terms of total emissions, with China occupying the top spot.

***Between 1990 and 2012, California's greenhouse gas emissions decreased by 25 percent per person, while per capita GDP increased 16 percent, representing one of the least carbon-intensive economies in the world***

About 23 percent of the state's electricity came from renewable sources during the first half of 2014 (the full-year tally is not yet available). For comparison, renewable sources accounted for 27 percent of Germany's electricity during the same period, according to the report.

More than one-third of global electric vehicles were sold in the U.S., more than any other country in 2014. About half of U.S. sales occurred in California.

California's clean technology industry attracted more venture capital in 2014 than any other state or country, totaling $5.7 billion. While industry endured a boom and bust during the last decade, investment is growing again, rising 153 percent from 2013. Most of that jump came from investments in Uber, which the report counts as a clean technology. But even with Uber stripped out, California clean tech investments rose 20 percent in 2014.

Along the same lines, the U.S. and European Union lead the world in clean tech patents. The U.S. produced 18,937 patents compared to 11,330 produced by the E.U. Germany lead the E.U. and California leads the U.S. in clean tech patents. Japan and South Korea were other leaders in the clean tech patent category.

The report found that the average monthly residential electricity bill in Cal-

*Continued…*

ifornia declined 4 percent between 1993 and 2013 when adjusted for inflation, likely due to more energy efficient homes and appliances. For large industrial utility customers, the drop was far more dramatic – 57 percent. Bills for smaller commercial customers, in contrast, increased about 8 percent.

Each year, Next 10 publishes a California Green Innovation Index, tracking the progress of the state's clean energy economy. But this is the first time the index has ranked California against other countries. The Next 10 report, California Green Innovation Index: International Edition, is available at: **http://next10.org/sites/next10.huang.radicaldesigns.org/files/2015-Green-Innovation-Index.pdf**.

## Tracking Methane Emissions in the Natural Gas Industry

**Coleen P. Engvall, Research Analyst**

One of the arguments for using more natural gas is the fact that it burns cleaner than other common fuels used today. However, much of the technology used to extract this resource is relatively new and still changing. Because of this, much of the data that currently exists on the industry is incomplete.

Researchers at Colorado State University began a study in partnership with seven oil and gas companies in order to gain a better understanding of how much of the gas was being captured and funneled into the economy and industry, and how much was being lost during extraction and transport. As a baseline, they point to EPA's Greenhouse Gas Inventory (GHGI).

In the report, they recognize the economic and environmental benefits of using natural gas, but warn that excessive emissions of methane is counterproductive to both. They refer to the "lifecycle emissions," which not only look at what is emitted when it is combusted, but the emissions produced by extraction, transportation, as well as during final use.

Their report, released in July of this year, is entitled Methane Emissions from the Natural Gas Transmission and Storage System in the United States.

At first glance, the report seems to reach a slightly lower or similar volume of emissions as that shown by the EPA. However, the authors warn that this distracts from the most important finding of their research. While the total emissions detected are similar, certain sectors showed significant reductions, while others were a much higher than shown in the GHGI.

In other words, their report agrees with the GHGI on how much methane is escaping, but not where it is happening in the process and what is responsible for the losses.

***Scientists at Colorado State have identified two major emission sources in the natural gas industry that require further study: super-emitters and compressor technology***

Of all of the methane emissions present in the transport and storage sector, three quarters of those were considered "fugitive," which they describe as the unintentional leaking of methane. Fugitive emissions are broken up by the report into two major categories: super-emitters and equipment-level emissions.

Super-emitters are producers which account for a large amount of the total methane which escapes during extraction and transport, generally due to an anomaly or faulty equipment. The authors predict that one out of 25 facilities account

for up to a quarter of annual emissions. Because the data could be so drastically altered by just a few of these super-emitters, and because some of these facilities contribute these emissions in short, intense bursts, the writers stress the importance of a large and comprehensive data sample.

Equipment-related emissions accounted for the other fugitive methane, with the main culprits being technology like natural gas compressors. The authors note that the EPA does not mandate monitoring in some places where major leaks were detected in their study.

In general, with the expansion of the natural gas industry, the stagnant total of escaped methane shows the incorporation of more efficient practices and technology. However, gathering more accurate data on pollutants is a must if the country wants natural gas to truly be a cleaner alternative.

The full version of Methane Emissions from the Natural Gas Transmission and Storage System in the United States is available at: **http://pubs.acs.org/doi/full/10.1021/acs.est.5b01669**.

# On the Horizon *A Look at Upcoming Events*

## Monday, September 21, 2015
## *Environmental Issues Forum*

**12 noon – Room 8E-A/B, Capitol East Wing, Capitol Complex, Harrisburg, PA**

Joining us for the first Environmental Issues Forum of the fall legislative session will be Mr. Andrew Heath, executive director of the Pennsylvania Growing Greener Coalition. Mr. Heath will be discussing the coalition's guide to state funding opportunities for community conservation, recreation and preservation projects, titled "Finding the Green." The presentation will provide an overview of the major state funding programs for conservation-related projects, as well as specific grant opportunities administered by Pennsylvania's state agencies.

***Please call the committee office at 717-787-7570 if you plan to attend the Environmental Issues Forums***. And be sure to check the committee website at **http://jcc.legis.state.pa.us** for more details and events as they are added to the schedule.

## Check Us Out on Social Media!

You can now receive updates on committee events, new research and more by following the Joint Legislative Conservation Committee on social media. You can find us on Facebook at **www.facebook.com/jointconservationcommittee**, or on Twitter at **www.twitter.com/PA_JLCC**. Take a moment and follow us today for the latest on issues related to Pennsylvania's diverse natural resources!

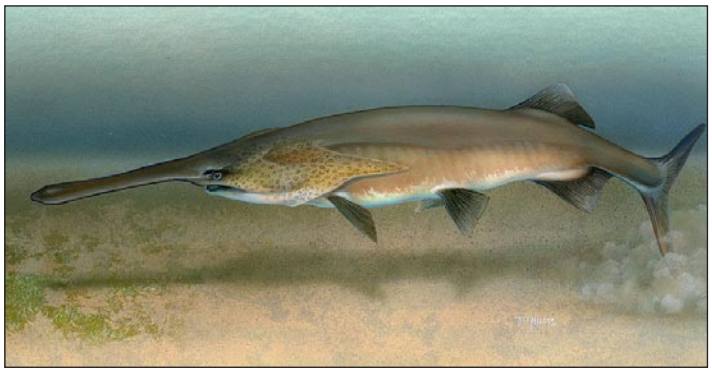
# This Month in Conservation History

## *Exploring the evolution of environmental stewardship*

### 50 Years Ago: Massive Fish Kill in Delco

As many as 800,000 fish were killed during the course of two days in Darby Creek, Delaware County, in August of 1965. According to the Delaware County Times, chemicals and sludge from an industrial plant in Darby Township flowed into the creek, killing scores of minnows, catfish and carp. At the time, firms found liable for fish kills were fined by the Fish and Boat Commission for the market value of the fish. The deputy fish warden estimated the total value to be between $10,000 and $16,000.

### 25 Years Ago: Paddlefish Thrives in the Ohio River



Once plagued by a legacy of pollution, the Ohio River made a resurgence during the 1980s as industry, municipalities and regulators worked to reduce the effects of wastewater discharge. An August 1990 article from the Bedford County Gazette highlighted the increasing range of the paddlefish, a close relative of the sturgeon, which is highly sensitive to water pollution. The paddlefish, along with several other species, were largely absent from the upper Ohio, until biologists discovered the fish making its way north into Kentucky and West Virginia, increasing its range by 20 miles per year.

Joint Legislative Conservation Committee

**CONTACT INFORMATION**

**LOCATION**
*Room 408*
*Finance Building*
*Harrisburg, PA 17120*

**PHONE**
*717-787-7570*

**WEBSITE**
*jcc.legis.state.pa.us*

**MAILING ADDRESS**
*Joint Legislative*
*Conservation Committee*
*PA House of Representatives*
*P.O. Box 202254*
*Harrisburg, PA 17120-2254*



# The Chairman's Corner

*Continued from page 1*

The key ingredient in Handley's peat substitute was recycled newspaper which he was able to obtain from local landfills. By finely shredding the newspaper and mixing it with organic compounds, Handley found that he was able to replicate the composition and growing qualities of traditional peat moss.

It wasn't until the project received funding from the EPA's Small Business Innovation Research program and Pittsburgh's Idea Foundry that the company PittMoss was born. Using these grants, Handley conducted formal growth trials, scientifically proving the product's effectiveness and securing patents and licensing. The good news continued when an academic evaluation found PittMoss could be used by commercial growers and nurseries at a 50 percent replacement rate.

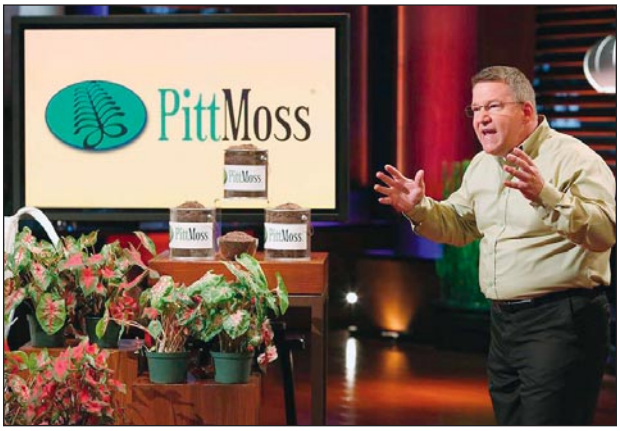
So how did Handley plan to convert customers of traditional peat moss to the relatively unknown PittMoss? With traditional peat moss having such an established client base, he need to find a way to distinguish PittMoss from the competition.

For one, the product is pitched as not only as a sustainable alternative to peat but also more effective. PittMoss can retain 50 percent more water than regular peat, which improves plant growth. PittMoss can also be more cost-effective for growers, because the production is less labor-intensive and not susceptible to seasonal climate changes.

With some targeted marketing and a lot of hard work, orders for PittMoss began to roll in. Soon Handley realized that his small nursery was unable to keep up with the demand for this innovative product. It became obvious that a larger facility was needed to keep up with production, but the high cost was prohibitive.

That's when PittMoss stumbled upon an once-in-a-lifetime opportunity earlier this spring – to appear on ABC's popular reality show, Shark Tank. The show gives entrepreneurs the chance to pitch their business idea to a panel of highly-successful "shark" investors, which was exactly the kind of promotion PittMoss was looking for.

The sharks' tough reputation didn't deter Handley, who confidently pitched the need for a more sustainable, and more effective alternative to traditional peat moss. Handley even brought some of the plants he grew with PittMoss as proof of the product's success. After asking some hard-hitting questions on PittMoss' sales and production capacity, the sharks began to bite at the lucrative idea.




In a rare event, PittMoss was not only able to secure an investment from one of the sharks, but three out of the five investors. Mark Cuban, Kevin O'Leary and Robert Herjavec offered Handley $600,000 to help build a larger facility in exchange for a 35 percent stake in the company. After a few minutes of weighing the proposal, he agreed.

While it is still too early to tell how the investment from Shark Tank will play out in the long run, PittMoss' innovation and commitment to sustainability are a positive example for small businesses here in Pennsylvania. It's amazing how with some recycled newspaper and an entrepreneurial spirit, a company like PittMoss can create jobs and help power the economy while protecting the environment.