

 <p>THE AMERICAN SOCIETY OF</p>	<p>The Section is located at: Oklahoma Engineering Center, 220 Northeast 28th Street, Oklahoma City, OK 73105</p> <p>The Central Oklahoma Section Newsletter is nominally published nine times per year to convey monthly meeting dates, meeting topics, section activities, and/or other ASME information to its membership.</p>
<p>Central Oklahoma Section Newsletter Volume 17, Number 1, August 17, 2015</p>	

******* MEETING AND PLANT TOUR *******

PROGRAM: "Second Life Batteries" Presentation and Plant Tour of [Spiers New Technologies](#)

PRESENTORS: Mr. Dirk Spiers, President, and Mr. Bryan Schultz, Director of Engineering

DATE: Thursday, August 27, 2015 **LOCATION:** Spiers New Technologies, 50 NE 42nd Street, OKC

Note: For directions see the map and building entry instructions on Page 2.

This program and tour focuses on battery and battery pack recycling. Spiers New Technologies Inc (SNT) is the leading full-service provider of "4R" services (repair, remanufacturing, refurbishing and repurposing) for advanced battery packs used in hybrid and electric vehicles. These services allow vehicle OEM's to optimize the life cycle management of their battery pack inventory and maximize its value.



Services include: **Qualitative Analysis** and safety screening of battery packs that have been removed from their original vehicle. **Logistics Management** of vehicle battery packs and modules, including monitored, climate-controlled storage, dealer network management and end-of-life recycling preparation. **Repair and Refurbishment** of vehicle battery packs for redeployment in vehicles. **Remanufacturing** vehicle battery packs and modules for second life deployment in non-vehicle applications.

Please join us on August 27 to begin our 2015-2016 ASME-Central Oklahoma Section program year!

Attendees will receive 1-PDH Continuing Education credit!

Time: 5:30PM Meet & Register at Spiers New Technologies. 6:00 – 8:00PM: Program and Plant Tour

Cost: **NO MEAL OR COST.** Please place your reservation with Albert Janco (Ph: 405-848-1991 (leave message); e-mail: JANCOA@asme.org) **by 5:00PM on Tuesday, August 25.** PLEASE furnish the name of each person attending and their affiliation (ASME, etc). If a student, please indicate school/university. If a P.E. please indicate if a PDH certificate is desired.

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ADDITIONAL AUGUST MEETING INFORMATION



Mr. Dirk Spiers (pictured here), is a native of Amsterdam, Holland. He arrived in Oklahoma City in 2006 on a consulting assignment for ATC Drivetrain.

Bryan Schultz is an electrical engineering graduate of the University of Oklahoma.

--- A RELATED ARTICLE ---



http://www.afdc.energy.gov/vehicles/electric_batteries.html

Batteries for Hybrid and Plug-In Electric Vehicles

Energy storage systems, usually batteries, are essential for electric drive vehicles, such as hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and all-electric vehicles (EVs).

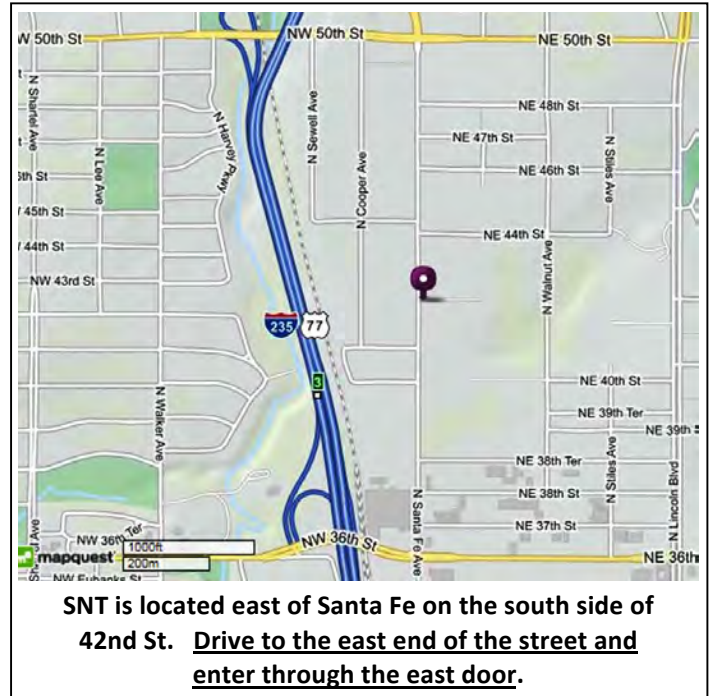
Types of Energy Storage Systems: The following energy storage systems are used in hybrid electric vehicles (HEVs), plug-in hybrid electric vehicles (PHEVs), and all-electric vehicles (EVs).

Lithium-Ion Batteries: Lithium-ion batteries are currently used in most portable consumer electronics such as cell phones and laptops because of their high energy per unit mass relative to other electrical energy storage systems. They also have a high power-to-weight ratio, high energy efficiency, good high-temperature performance, and low self-discharge. Most components of lithium-ion batteries can be recycled. Most of today's plug-in hybrid electric vehicles and all-electric vehicles use lithium-ion batteries, though the exact chemistry often varies from that of consumer electronics batteries. Research and development is ongoing to reduce cost and extend their useful life cycle.

Nickel-Metal Hydride Batteries: Nickel-metal hydride batteries, used routinely in computer and medical equipment, offer reasonable specific energy and specific power capabilities. Nickel-metal hydride batteries have a much longer life cycle than lead-acid batteries and are safe and abuse tolerant. These batteries have been used successfully in all-electric vehicles and are widely used in hybrid electric vehicles. The main challenges with nickel-metal hydride batteries are their high cost, high self-discharge and heat generation at high temperatures, and the need to control hydrogen loss.

Lead-Acid Batteries: Lead-acid batteries can be designed to be high power and are inexpensive, safe, and reliable. However, low specific energy, poor cold-temperature performance, and short calendar and cycle life impede their use. Advanced high-power lead-acid batteries are being developed, but these batteries are only used in commercially-available electric drive vehicles for ancillary loads.

Ultracapacitors: Ultracapacitors store energy in a polarized liquid between an electrode and an electrolyte. Energy storage capacity increases as the liquid's surface area increases. Ultracapacitors can provide vehicles additional power



Most new plug-in hybrids and all-electric vehicles will use lithium-ion batteries (above) rather than the nickel-metal hydride batteries used in many hybrid electric vehicles.

during acceleration and hill climbing and help recover braking energy. They may also be useful as secondary energy-storage devices in electric drive vehicles because they help electrochemical batteries level load power.

Recycling Batteries: Electric drive vehicles are relatively new to the U.S. auto market, so only a small number of them have approached the end of their useful lives. As a result, few post-consumer batteries from electric drive vehicles are available, thus limiting the extent of battery-recycling infrastructure. As electric drive vehicles become increasingly common, the battery-recycling market will likely expand.

Widespread battery recycling would keep hazardous materials from entering the waste stream, both at the end of a battery's useful life, as well as during its production. Work is underway to develop battery-recycling processes that minimize life-cycle impact of using lithium-ion and other kinds of batteries in vehicles. But not all recycling processes are the same:

- **Smelting:** Smelting processes recover basic elements or salts. These processes are operational now on a large scale and can accept multiple kinds of batteries, including lithium-ion and nickel-metal hydride batteries. Smelting takes place at high temperatures, and organic materials, including the electrolyte and carbon anodes, are burned as fuel or reductant. The valuable metals are recovered and sent to refining so that the product is suitable for any use. The other materials, including lithium, are contained in the slag, which is now used as an additive in concrete.
- **Direct recovery:** At the other extreme, some recycling processes directly recover battery-grade materials. Components are separated by a variety of physical and chemical processes, and all active materials and metals can be recovered. Direct recovery is a low-temperature process with minimal energy requirement.
- **Intermediate processes:** The third type of process is between the two extremes. Such processes may accept multiple kinds of batteries, unlike direct recovery, but recover materials further along the production chain than smelting does.

Separation of different kinds of battery materials is often a stumbling block for the recovery of high-value materials. Therefore, battery design that takes disassembly and recycling in mind is important to the success of PEV sustainability. Standardization of batteries, materials, and cell design would also make recycling easier and more cost-effective.

Battery Swapping: For long-distance travel, where fast charging is not available, battery swapping might be a solution. Tesla Motors is testing battery swap infrastructure that enables drivers to pull into a station and exchange a depleted battery with a fully charged one in less time than it takes to fuel a conventional vehicle. Use of battery swap stations requires a vehicle that has been designed with a swappable battery pack.

More Information: Learn more about research and development of batteries from the National Renewable Energy Laboratory's energy storage subsite and the U.S. Department of Energy Vehicle Technologies Office's energy storage pages. Also, learn about the advanced battery projects for electric drive vehicles funded by the U.S. Department of Energy under the American Recovery and Reinvestment Act.

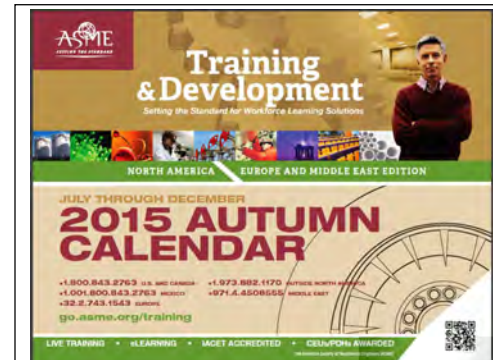
HELP NEEDED – Oklahoma City Northeast H.S. Pre-Engineering Academy EXPO

Two or three ASME members are needed to help staff our ASME display table at the upcoming NE Academy Pre-Engineering Expo. Volunteers will also answer questions that students have about engineering as a career.

The EXPO is Friday, August 28 from 10:00AM till 2:00PM. NE Academy H.S. is located at 3100 N. Kelly Ave in OKC. For details and to help please contact Albert Janco, P.E. at (Ph) 405-848-1991 or (e-mail) JANCOA@asme.org. Please let Albert know what hours you are available to help. Thanks!

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NEWS ITEMS OF INTEREST

House Panel Holds Hearing on UAV Regulations

(courtesy NSPE's Daily Designs publication, June 18, 2015)

The **AP** (6/18, Ohlemacher) reports that FAA Deputy Administrator Michael Whitaker testified to a House panel yesterday on domestic UAV regulations, indicating that the "rules should be finalized within a year." Whitaker is quoted as telling the committee, "We are working diligently to develop a regulatory framework that will allow for innovation while ensuring the safety of other users of the airspace and people and property on the ground." However, the article notes that Paul E. Misener, vice president of global public policy for Amazon, called on the FAA and lawmakers to expedite the rules and "to reconsider some of the restrictions for commercial drones." The House Oversight and Government Reform Committee held the hearing yesterday to discuss drone regulations' potential economic impact, and address concerns about privacy and safety.

Bloomberg News (6/18, Adams-Heard, Levin) reports that Amazon and other companies have been waiting for the FAA to issue a "final set of rules that would regulate the use of small commercial drones weighing less than 55 pounds." The article notes that "while Amazon's relationship with the FAA hasn't always been smooth," Misener said during Wednesday's hearing that the online retailer is "pleased that the FAA has streamlined its approval process and the company has been able to perform test flights in the U.S."

SELMA Sniffs Out Gas Leaks to Keep the Country Safe

(courtesy New Zealand Herald, May 25, 2015) (abridged for length)

A machine with a 'moustache' to sniff out gas leaks across Vector's vast pipeline network will soon become a common sight on New Zealand's roads.

The new technology called SELMA (Street Evaluating Laser Methane Assessment) is being introduced by Vector to improve reliability and lower costs across its 7245km gas distribution network.

The 'moustache' at the front of the vehicle samples the air above the gas pipes and funnels it to low-powered laser detectors. They identify the presence of gas by analyzing the amount of laser light reflected by the samples.



The technology, developed in Switzerland, enables the vehicle to travel at up to 30 km/h to sniff out pipes buried underneath roads and berms across the North Island. Previously field crews had to walk the pipelines with hand-held detectors so SELMA means a big improvement in efficiency, according to Graham Green, Vector Manager.

SELMA will help guard against natural disasters, including earthquakes: "One of the great benefits of this technology is in disaster recovery. If one of our regional networks was hit by an earthquake, this vehicle could survey the network within a day, whereas in the past it would have taken weeks to determine how well a gas network survived such an incident," says Green.

"The new system accurately records the location of any leaks using GPS data - which can then be downloaded onto our mapping system, enabling us to further improve public and network safety," says Green. "The high quality of the data will assist planning of maintenance and upgrade programs for the future. It is state-of-the-art technology."

It's not the only state-of-the-art work being undertaken by Vector, including projects to ensure the network keeps pace with Auckland's projected population growth. An upgrade of the Auckland and Hamilton gas distribution networks saw 176km of old gas pipes replaced by polyethylene pipes that are more hard-wearing and allow gas to be carried at higher pressures, ensuring a more consistent flame and better reliability and security for the next 80 years.

Vector is the largest energy infrastructure company in New Zealand, with their gas and electricity networks covering more than 25,000km and serving more than 700,000 customers. Annual expenditure to maintain the networks and prepare them for growth last year amounted to more than \$200 million.

Innovation is also being applied in the electricity network. With service provider Northpower, Vector is using acoustic technology allowing field crews to listen for irregularities in the sound electricity makes as it passes through overhead lines. This also can be done from a vehicle, leading to cost and time savings, and is more accurate than inspecting the lines visually.

Vector is also investing in new technologies such as solar panels, battery storage, electric vehicle charging stations, metering and smart grid technologies, all of which will have significant implications for the future configuration and maintenance of energy networks.

"Each of our 700,000 customers rightly expects the lights to come on and the gas to flow on demand. We meet this expectation while achieving standards of reliability and cost efficiency that are among the best in the world," says Mr Mackenzie.

[Best New Tool: The Snapper SP80 Lawnmower and its Carefree EXi Engine](#)

Most people forget to change their mower's oil. With this one built by Briggs & Stratton, you don't have to.

(courtesy Roy Berensohn, *PopularMechanics.com* publication, June 12, 2015)

Lawnmower manufacturers have studied the habits of lawnmower owners, and they've discovered something about us: We're not maintaining our mowers. In fact, these machines are one of the least maintained items that a homeowner regularly uses. We've heard stories that the vast majority of mowers never have their oil changed and rarely get a clean air filter or even a fresh spark plug. Kind of scary. And a sharp blade? Forget it.



Perhaps Briggs & Stratton had these people in mind when it engineered the EXi series engines. You never need to change their oil. Just check the dipstick and add oil as required. The engines are further simplified by not having a manual choke or purge bulb. Just pull their recoil handle to start. About the only thing you have to do is change the spark plug and air filter once a season.

We're intrigued by this—it has great potential for busy homeowners, or even teenagers who run a small lawn cutting business. So we checked in on 13-year-old James, who's running a small lawn-cutting business near where I live. His key piece of equipment is a Snapper SP80 equipped with a 163-CC EXi engine that develops 7.25 ft. lbs of torque.

The report: So far, so good. The Snapper rolled out of the box and needed no assembly. After it was fueled and its crankcase filled, the mower roared to life with a couple of pulls. This was particularly encouraging, James' father reported, because many of the other small engines that the family uses for work and recreation are hard to start.

The grass had grown high on the family homestead, but the SP80 sliced through it as you'd expect from a brand new mower with a razor-sharp blade. Having polished off the family lawn, James moved on to the neighbors' yards, earning some pocket money in the process and feeling pretty good about his new mower. And his parents are feeling pretty good about their son's work ethic.

The SP80 is front-wheel drive, a bonus for tight spot maneuvering. And it bags, if you want to compost the grass clippings. For tall grass, its side-discharge chute slips under the spring-loaded hatch on the side of the mower.

After hearing James' report, and considering our previous positive experience with Snapper mowers, we'd have to say that the SP80 looks like a good bet for homeowners weary of spending time on oil changes and busy teenagers out to conquer the world, one neatly mowed lawn at a time.

Chair's Corner

To those who were able to join us at the May 28 Gouvernair plant tour meeting – what an informative and entertaining experience! What was especially interesting was the large modular air handling units they build, especially the one specifically designed for the rugged environment of the Aleutian Islands!

As we kick off the new ASME year, we plan on having a plant tour at a new company in OKC, Spiers New Technologies on August 27th at 5:30 PM. The subject presentation will be “second life batteries” and how they recycle Lithium-Ion batteries (including those used for hybrid cars) and battery paks. Please note the times & details listed above – specifically that there will be no meal provided so as that you can plan accordingly. All ASME-Central Oklahoma Section members, SWE Section member, AIAA Section members, students, and guests are welcome to join us.

Tom Betzen, Chairperson, ASME Central Oklahoma Section

Future ASME-Central Oklahoma Section Events

Date	Location	Program Topic and Speaker
Thursday August 27, 2015	Spiers New Technologies 50 NE 42 nd Street, OKC	Plant Tour and Presentation: “Second Life Batteries” Repair, Remanufacturing, Refurbishing and Repurposing) of advanced battery packs used in hybrid and electric vehicles
Thursday Sept. 24, 2015	Okla. Engr. Center 220 NE 28th Street, OKC	Speaker: Mr. Scott Meachan, President & CEO, i2E Innovation to Enterprise is an OCAST program to spawn industry and engineering student cooperative projects.

Please visit our Section website:

https://community.asme.org/central_oklahoma_section/default.aspx

IT'S BEEN REVAMPED. Check event updates and other useful information!