

Week in Energy Newsletter

Welcome to the Second Edition of the 'Week in Energy' Newsletter (09/29 - 10/06)! Special thanks to Yogesh (Yogi) Gopalan and Alberto Giron for their contribution. In honor of the ongoing Paris Motor Show, I have included a video review of one of my favorite green cars of the year – the BMW i8, a hybrid sports car with the consumption and emission values of a compact car, emitting only 49g/km of carbon dioxide.

Watch the video here: <http://www.youtube.com/watch?v=GkUQY1Hxnu0>

Please do not forget to send your energy news and ESTP updates plus any comments to the Editor at saakshig@andrew.cmu.edu

In this Edition...

- Climate Change
- Renewable Technology
- Paris Motor Show
- ESTP at the Innovation Palooza: Impact-a-Thon
- Intelligence Workplace Spotlight
- Energy job postings for ESTP students

CLIMATE CHANGE

Global warming weakening Earth's gravity

The Antarctica has experienced massive ice loss, and has changed the Earth's gravitational force over the region. Although small climate changes have been taking place since decades, the large scale melting of ice sheets between 2009 and 2012 has caused a large enough loss to affect the gravitational pull. Although the change in Antarctic gravity is so slight that it will not be noticeable from the ground, it sure is a warning signal.

<http://www.techtimes.com/articles/16973/20141005/dwindling-antarctic-ice-messing-with-earths-gravity-blame-climate-change.htm>

India-US climate change forecast

India's visiting Prime Minister Narendra Modi and US President Obama announced a plan to work together and phase out greenhouse gases. The reason you and I should care about this is because the two nations are in the top 3 greenhouse gas emitters in the world. This is the first indication that India is willing to support the HFC phase out amendment in the Montreal Protocol. The protocol is an international environmental treaty and has successfully regulated CFCs worldwide. The

announcement is important not just for the climate, but also for India as under the protocol, India and other developing countries can gradually reduce their HFC production over several decades allowing them to explore other climate friendly alternatives. Read about this climate strategy here.

http://www.huffingtonpost.com/durwood-zaelke/a-developmentsavvy-climate-strategy_b_5896078.html

The Didymo phenomenon: The Green Algae clogging up rivers

The presence of less phosphorous in the water systems is giving rise to green snot called Didymo, which is changing the very appearance of water and costing governments expensive clean-up operations. To know who is to blame for this phenomenon, read below.

<http://www.bbc.com/earth/story/20140922-green-snot-takes-over-worlds-rivers>

How Carbon Tax helps transition to a Greener Economy

Green energy investments combined with carbon taxes can create 2.7 million jobs in renewable energy sector, transportation, technology and other services. A modest federal carbon tax could generate billions to be spent on creating jobs. Moreover, the implementation of a carbon tax will reduce carbon emissions.

<http://www.cnn.com/2014/10/03/opinion/mcgahey-climate-change/index.html?iref=allsearch>

RENEWABLE TECHNOLOGY

Solar

World's First Solar Battery

In existing solar power setups, PV panels convert sunlight into electricity. Excess electricity is sent to a battery for storage. However, only 80% of this energy is safely reserved. Researchers at Ohio State University have combined the generation and storage functions of solar power into a single device, reducing energy loss and costs. Read about this concept and advantages of this device here:

<http://www.techtimes.com/articles/17200/20141004/worlds-first-solar-battery-promises-to-reduce-cost-by-breathing-heres-how.htm>

London's iconic Red Phone Booth goes Green

Graduates from the London School of Economics unveiled a green solar box, instead of the customary red telephone booth. This box can charge phones, tablets

and cameras for all the London tourists free of charge providing a carbon-neutral source of energy in the city. Let's give this solar powered charger a green light! To see some pictures and read more about the green box, click below.

http://www.huffingtonpost.com/2014/10/01/london-phone-booth-solar_n_5915028.html?cps=gravity

Biofuel

Up to \$25 million for Biofuel Research

The U.S. Department of Energy has announced funding awards for algae biofuel which aims to reduce the costs of producing algae and increasing yield produced from algae. Three topic areas have been announced with multiple awards available in each of the topics. More information can be found on the DOE website and the link below.

<http://biomassmagazine.com/articles/11009/doe-opens-funding-opportunity-for-algae-biofuel-development>

AUTOMOTIVE

Paris Motor Show

The Paris Motor Show (Mondial de l'Automobile) is a global motor show and one of the biggest events in the 2014 automotive calendar. The show hosts the best new production and concept cars that manufacturers can muster. This year's show is special, as it shall have an event for the testing of electric and hybrid vehicles. Infact, this is the first time live testing will be carried out during an automobile event. The Paris Motor Show runs from 4 to 19 October.

Toyota Hydrogen Powered Car

The Japanese car giant announced that they would put fuel cell vehicles on sale in Japan, California, UK, Germany and Denmark by 2015. The car is powered by electricity created by the chemical reaction between hydrogen and oxygen leaving only water vapor as the tailpipe emission. However, the limitation of this design is that the cars need to be re-fueled with hydrogen, and the infrastructure for that is virtually non-existent. To learn more about the FCV Sedan and I-Road read:

<http://www.bbc.com/news/business-29459999>

Compressed Air Citroen C4 Cactus Airflow

French automaker Citroen streamlined the car's aerodynamics, thus reducing the drag, and increasing fuel efficiency. But that's not all! The car also run's on a cool

air-powered hybrid system and uses only two liters of fuel per 100 km. For a full breakdown of how Citroen's system works, check out the blog below.

<http://blog.caranddriver.com/citroen-debuts-oddly-brilliant-hybrid-air-powertrain-production-version-coming-2013-geneva-auto-show/>

Lamborghini Asterion LPI-910-4 Plug in hybrid

This all-wheel drive Sports car that can run up to 32 miles solely on electric power and gulp 57 miles per gallon, emitting just 98 gms of carbon dioxide per kilometer. Nevertheless – the Asterion can still hit 60mph in exactly 3 seconds.

<http://autoweek.com/article/paris-motor-show/lamborghini-surprises-paris-motor-show-910-horsepower-hybrid-asterion>

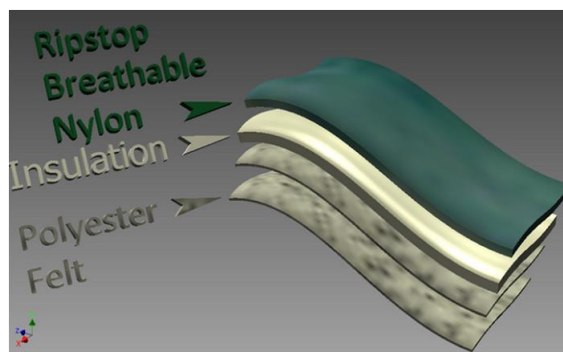
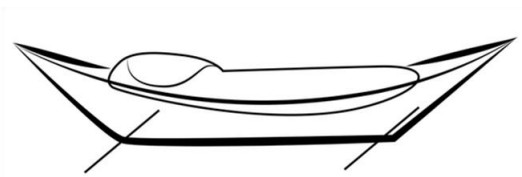
If you still have not received your fix of efficient hybrid cars, read this piece about Renault's Eolab here: <http://green.autoblog.com/2014/09/16/renault-eolab-concept-car-paris-reveal-video/>

ESTP at the CMU Innovation Palooza: Impact-a-Thon

Conductive heat transfer, R-values and great teamwork came together when the ESTP team (Sidharth Raghu, Oluwatobi Adekanye, Yogesh (Yogi) Gopalan and Alberto Giron) participated in the Impact-a-Thon during CMU's Innovation Palooza. With the harsh winters in Pittsburgh drawing near, the competition focused on designing a portable, low cost shelter for the homeless to provide warmth and cover. The lightweight shelter resembles a hammock when opened and folds up into a rucksack when portability is required. The materials chosen for the shelter are washable and designed to provide warmth for a sleeping human being in temperatures as low as 0 degrees C. Pockets for storing personal belongings double as additional insulation when stuffed with commonly available material such as newspapers, cardboard etc. Stands made from recycled plastic lumber provide enough elevation to keep the occupants off the snow in case of extreme precipitation. The entire enclosure with the plastic stands costs lesser than \$100 and weighs less than 25 lbs.



Design



A pdf of the poster can be found in the attachments.

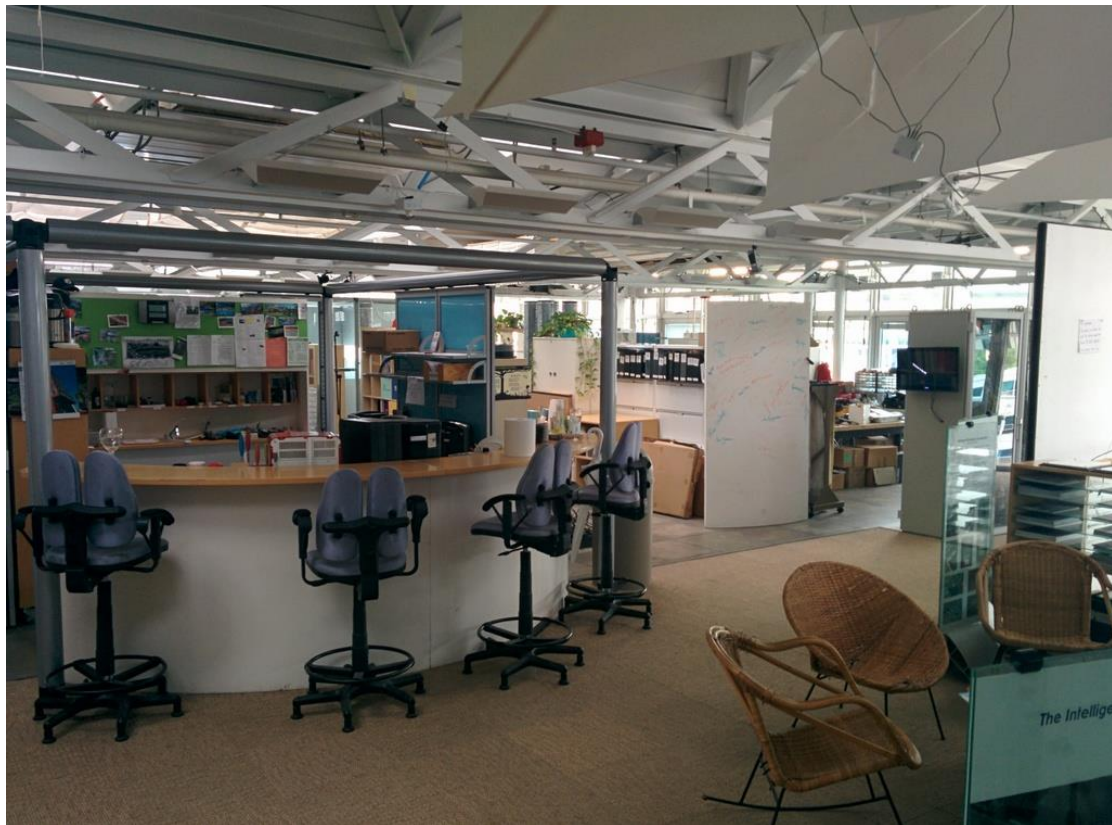
Intelligence Workplace (IW) – Yogi Gopalan

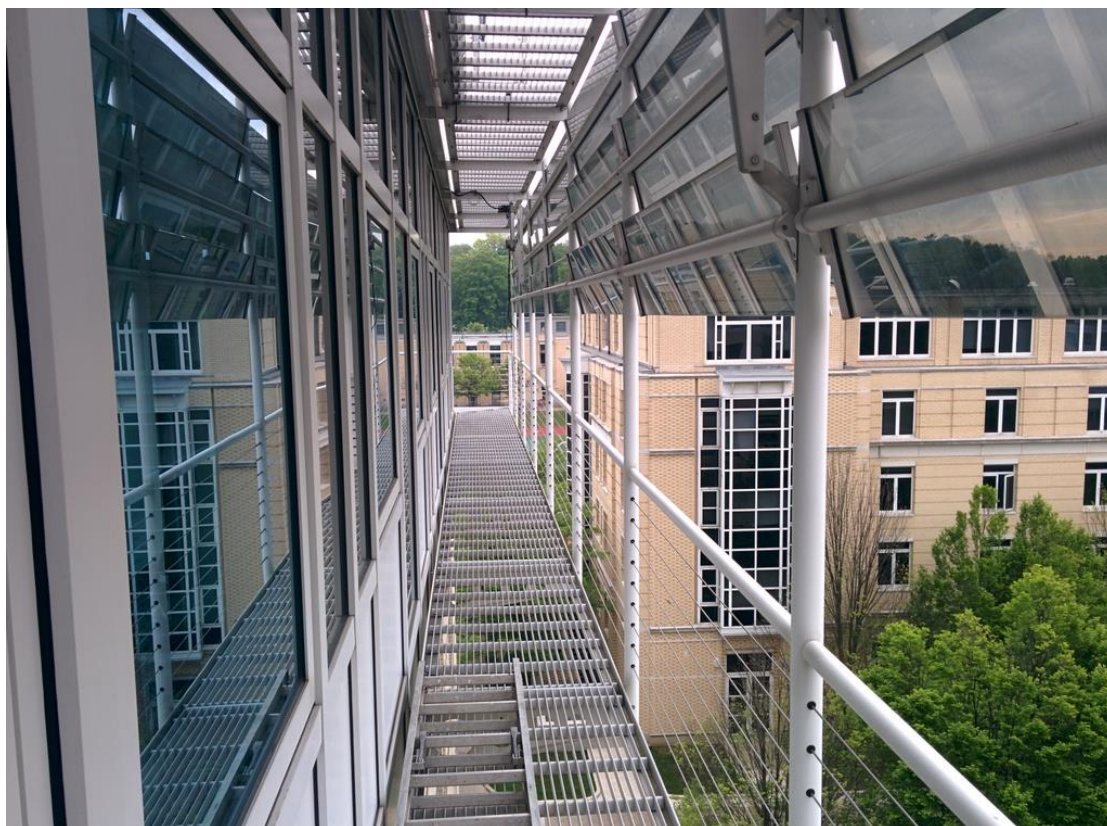
Does a reduction in energy usage in commercial buildings imply a reduction in occupant comfort as well? Does the financial investment required for a state of the art building control system justify the benefits obtained? The researchers at the Center for Building Performance and Diagnostics know all the answers (and numbers as well). The Intelligent Workplace, their home, is a 17 year old live-in laboratory nestled on top of the Margaret Morrison Building and is riddled with some of the latest technology in the commercial building sector with some good old fashioned engineering and common sense thrown in.

From the second you step in to the IW, you will notice that they take the term 'Passive Technology' very seriously. Except on the gloomiest of winter days, there is almost no need for turning on the lights thanks to the (double pane) windows that flank both sides of the workplace. Some of them are automatic too - opening themselves up when the outside air is cooler and pre cooling a space before the first occupant arrives, shaving the morning peak off of their cooling bill. A whole array of sensors feed data into a central database for monitoring environmental variables indicative of an occupants comfort level. In some workspaces, you will be able to see another passive technology at work - special phase changing materials designed to absorb heat and become semi solid.

On the non-passive side, researchers are working hard in using data to quantify the energy consumptions / savings in a building. An active field of research is using thermal data from a building to decide the best (read energy-effective) times to cool or heat a building based on weather forecasts. Another less obvious field of research is using the data from mechanical systems (HVAC units, dehumidifiers etc.) to predict possible inefficiencies in the energy usage. An example of this might be an uncleansed air filter forcing a fan to spin faster than is required otherwise, causing an increase in energy usage as well as reducing the systems life. This sort of data based modeling can even allow building facility managers to schedule maintenance accordingly.

If you want to make a difference to the way commercial buildings are built and operated - the IW is the right place for you to work. And the view is spectacular too.





Energy Jobs on Tartantrak – Month of October

Constellation Internship

Energy Solutions – Energy Associate and Project Managers

Sandia National Laboratories

General Electric: Engineering Development Program Energy Management

ICF International: Energy Infrastructure Consultant

Pacific Gas and Electric Company: Engineer Rotation Development Programs

National Fuel Gas Company: Rotational Engineer Program

Direct Energy

To learn more about the Energy, Science, Technology and Policy department, please visit the website at <http://neon.materials.cmu.edu/energy/>