



SOLAR CARPORTS ARE COMING TO A PARKING LOT NEAR YOU!!! (PHOTO COURTESY OF RBI SOLAR)



October 2014 Newsletter

IN THIS ISSUE

IESI- Interesting News You Can Use!

Welcome to the Innovative Engineering Solutions, Inc. (IESI) newsletter. Our newsletters present interesting and relevant information for environmental and energy services customers and practitioners. In each newsletter, we provide at least one article related to renewable energy, site remediation and energy efficiency.

For more information contact Rich McCarthy, CEM RMcCarthy@IESIonline.com

5 Renewable Energy (Solar) Facts

1. The US government spends more money in tax subsidies for fossil fuels than solar energy!
2. Solar panels are virtually maintenance free. Once, solar panels are installed, there are no/minimal recurring costs.
3. By relying on battery backup, solar energy can even provide electricity 24x7.
4. Artificial photosynthesis research is ongoing... which would be another great clean way to use the sun's energy!
5. IESI has installed solar panels on buildings, trailers, open space, landfills and parking lots.

5 Site Remediation Tips

1. Groundwater recirculation is more effective (and cost effective in the long run) at additive distribution than batch injection.
2. Separation of electron donor addition from groundwater recirculation reduces fouling.
3. During most natural attenuation situations, more hydrocarbons are degraded anaerobically than aerobically.
4. Vapor intrusion by methane is rarely a concern due to very active methanotrophs in the vadose zone.
5. Vapor extraction is more about induced air flow velocities than induced vacuum. Vacuum is just how you induce air flow.

For more information contact Sami Fam, Ph.D., P.E., LSP: Sami@IESIonline.com

In This Issue

- 5 Renewable (Solar) Energy Facts
- 5 Site Remediation Tips
- 5 Health & Safety Tips
- 5 Energy Efficiency Tips
- IESI Completes Landfill Solar Project
- Solar Carports Are Coming
- Groundwater Recirculation
- Micro Cogeneration



Top-IESI Solar Project; Bottom- Yellow Eyed Penguin – Courtesy of Mike Gaudette

5 Health & Safety Tips

Below are listings 6-10 (1-5 are in last month's newsletter!) of the most frequently cited standards violations following inspections of work sites by the federal Occupational Safety and Health Administration (OSHA) during fiscal year 2013.

- Powered Industrial Trucks (1910.178)
- Ladders (1926.1053) –
- Lockout/Tagout (1910.147)
- Electrical – General Requirements (1910.303)
- Machine Guarding (1910.212)

For more information contact Joe Higgins, P.E., LSP: Joe@IESIonline.com

5 Energy Efficiency Tips

1. Use fans to maintain comfortable temperature, humidity and air movement, and save energy year round. Moving air can make a somewhat higher temperature and/or humidity feel comfortable.
2. Ask employees to set their computers to go to sleep automatically after 30 minutes of inactivity and to turn them off at night along with printers and copiers. According to the EPA, this can save anywhere from \$50 to more than \$150 annually *per device*
3. Smart Strip power cords sense when a device is turned off and cut their phantom power, or the power that electronics use even when turned off. They claim to pay for themselves within six weeks of use and serve as surge protectors.
4. Consider eco-friendly landscaping that does not require significant watering.
5. Fix AC air duct leaks. That can often save 20% on your cooling bills!

For more information contact Kathy Stanley: KStanley@IESIonline.com

IESI Completes Landfill Solar Project

IESI completed the Engineering, procurement and Construction for a 1,722.8 kW solar array on the Concord Landfill in Concord, MA for Kearsarge Energy. IESI finalized all equipment selections, permitting changes, and design changes bringing the conceptual design to construction over difficult winter construction season. A ballasted ground mounted system was selected to meet the "no penetration" of the landfill cap permit condition. In addition to saving money on the purchase of green power, the Town of Concord will also save money in reduced maintenance cost of the landfill cap. IESI engineers are currently designing and permitting a Phase II array to be installed on the south facing slopes (30% slope!!) of the landfill.



Above and below are photos of the landfill ground ballasted system.



Solar Carports are Coming!!!

Europe and California (as is often the case!) have been the trend setters for solar carport installations. New Jersey and Arizona take second and third place for solar carports. Relatively high costs and a lack of scale have

kept this appealing approach from moving forward. Turnkey prices for carport structures have fallen dramatically since 2010, and even though the majority of structural costs are tied to commodity steel, improved module efficiencies, lower financing costs, and increased scale has pushed prices down even further.

Consider the following: 1) some roofs may not be able to handle the weight load of solar panels 2) many businesses do not have the available space to dedicate to ground mounted systems for 20 years 3) Many businesses have plenty of parking lots 4) the costs of solar carports have dropped a lot 5) covered parking protects cars from the sun and snow and is preferred by most drivers, 6) you can get a power purchase agreement (PPA) for a solar car port system with no money down and you can save on your utility bill for the next 20 years!!

Quiz:

What would you do:

- a) Don't believe this stuff
- b) This makes too much sense. Stop Making Sense (Talking Heads 1984)
- c) Enter into a PPA agreement soon before the federal tax credits are reduced in 2017 and these great PPA deals disappear.

Correct answer: C - contact IESI RMcCarthy@IESIonline.com

Groundwater Recirculation for Bioremediation

Recirculation systems can overcome many of the limitations of batch injection systems since they can manipulate groundwater flow velocity and travel times, move and inject large volumes of substrate-amended groundwater, and can be operated to provide pH buffering by adding small amounts of alkalinity continuously (or in batch mode) to the recirculated groundwater. Recirculation enhanced anaerobic dechlorination (EAD) systems use similar substrates as liquid phase batch systems, but with the addition of extraction and injection wells to increase gradients and move substrate faster than under existing conditions. Substrate addition can occur either continuously with the liquid substrate added to the extracted groundwater and re-injected, or batch added to the subsurface and the groundwater

recirculated through the area of substrate addition. The area targeted for treatment with EAD should be determined from the lateral and vertical extent of impacts to determine total groundwater volume to be treated. In addition, the aquifer hydraulic conductivity and the hydraulic gradient need to be determined to assess groundwater velocity, associated travel times across the target area, and expected yield of extraction and injection wells. The targeted area volume and the aquifer parameters are then used to determine the recirculation system parameters based with the half-life of the substrate to be used. Empirical evidence indicates that electron donor concentrations need to be maintained at levels above 50 mg/l as TOC in the aquifer to establish effective EAD conditions. Limitations in the maximum substrate concentration combined with the substrate degradation half-life constants indicate that substrate concentration can only effectively be maintained for between 120 and 250 days (depends on substrate), and this holds true for both batch injection and recirculation systems. A recirculation system should therefore be designed to turn over the targeted treated volume in a period of time that is less than the time it takes the substrate to degrade from its initial injected concentration to a residual concentration of 50 mg/l TOC. For more information, please read the full article in Proceedings of the Annual International Conference on Soils Sediment Water and Energy; Volume 16, 2011 or contact Sami@IESIonline.com



IESI has designed and constructed dozens of Groundwater recirculation trailers.

Photos of some of the dozens of groundwater recirculation trailers designed, constructed and installed by IESI.



Micro Cogeneration

Gas fired micro cogeneration systems (cogen) are small units that generate electricity using natural gas. By connecting a cogen unit to a building to supply power and hot water, a low cost high level of energy efficiency can be achieved. This energy efficiency has the added benefit of reduced CO₂ emissions compared to line power. For higher power applications, multiple micro cogen units can be controlled together as a higher output system. This kind of larger cogeneration system made up of multiple units has higher efficiency over a wider range of outputs as well as being more robust and flexible. It's a tremendous technology with great greenhouse gas and cost savings reductions. The only downside is that the owner becomes responsible for system up time, which is not a problem if you have multiple units and have a mechanical staff on site.

About IESI

Innovative Engineering Solutions, Inc., is a leading provider of environmental consulting services for the remediation of contaminated properties - including chemical facilities and manufactured gas plants.

IESI provides the consistent, high quality, responsive, and low-cost environmental services associated with smaller firms, but with the depth and expertise of larger traditional environmental consulting firms.

IESI offers a wide variety of remediation services to its clients, which can generally be grouped into four categories: Bioremediation, Hydrocarbon Cleanup, Regulatory Compliance, and Manufactured Gas Plant Cleanup. Please explore the rest of this site or contact one of our principals for

further information. The combination of our technical, design, laboratory, and most importantly practical common sense and experience, makes us the best remediation firm in the United States

IESI Energy Services provide customers with comprehensive solutions to energy efficiency and renewable energy concerns. Our competencies include the expertise required to develop, engineer, design, permit, procure, build, project manage and commission energy efficiency projects from the audit stage through project completion. Our projects take advantage of all available utility incentives. Our sustainable technology team provides an integrated sustainable design process, working with all stakeholders, to deliver successful renewable and sustainable energy projects including solar, biogas, geothermal, biomass and landfill-gas-to-energy technologies. Through June 2014, IESI has constructed over 30 MW of solar projects and has an additional 15 MW under contract. In 2013, IESI installed approximately 6% of all solar panels in Massachusetts. We work with our customers in taking a creative financing approach to projects and can incorporate leasing, debt financing, asset-based lending and power purchase agreements as well as other financing methods into projects.



Photo of a solar powered remediation trailer for 1,4 dioxane.

For More Information:

Corporate Office
 Innovative Engineering Solutions Inc.
 25 Spring Street
 Walpole MA
 508-668-0033 x 221
 Website: www.IESIonline.com