



Innovative Engineering Solutions, Inc.

April 2015 Newsletter

ANOTHER LARGE IESI SOLAR PROJECT JUST GETTING STARTED!!!

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.

5 Renewable Energy (Solar) Facts

1. Solar thermal technology can convert over 90% of available sunlight directly into usable heat.
2. PV Efficiency is the range of 20%.
3. Commercial solar pool heating systems usually pay for themselves in a few years and require only a modest investment.
4. Pool solar systems can sometimes use simple, low cost, unglazed plastic collectors.
5. IESI has installed solar panels on buildings, trailers, open space, landfills and parking lots.

5 Site Remediation Tips

1. A well done conceptual site model should quantify contaminant mass in the in the various subsurface strata.
2. Before recommending use of chemical oxidants, ask yourself whether these additive can be distributed in the subsurface.
3. Before recommending hydraulic or pneumatic fracturing, ask yourself if creating subsurface tunnels or "channels" can distribute additives outside of these preferred travel zones. The answer is often no.
4. Methanogenic degradation of hydrocarbons is the dominant natural attenuation pathway.
5. IESI has successfully implemented bioremediation at over 40 full scale sites including a 50-acre chlorinated VOC plume and multiple sites containing DNAPL.

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Big Grizzly Bear! - Courtesy of Mike Gaudette;

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IESI Turns 20!

April 5, 1995-2015

IESI was started by Sami Fam, Ph.D., P.E., L.S.P. in April 1995 as a one person company. Joe Higgins, P.E., L.S.P. joined IESI as a partner in 1998. We have had significant growth in number of employees and total revenues (25 million in 2014). The company owes its success to its talented and loyal employees. It's been a great ride on the team bus!

IESI has always been a leader in implementation of innovative remediation technologies with special emphasis in bioremediation. We are likely the only firm in the US to bioremediate a dilute 50-acre chlorinated VOC plume. IESI has also bioremediated multiple project sites that contained measurable DNAPL. Also a feat accomplished by few other consultants.

Our diversification into energy services in 2008 has been instrumental to our continued growth and success. IESI offers services in solar design & construction of small and utility scale solar fields. IESI also performs operation & maintenance on solar arrays. We also do work in energy efficiency and sustainability planning.

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5 Health Tips

Below are 5 super foods for healthy eating. How is this related to energy and environment? Good question. When you feel better, you make better decisions.

- Tomatoes- high in vitamin C;
- Green beans- high in fiber;
- Salmon-high in omega 3 fatty acids;
- Blueberries-helps increase HDL;
- Watermelon- fills you up and high in vitamin C!

Demand Response Meets Solar Energy

Energy storage has always been viewed as the missing and expensive piece of solar power generation. The reason that energy storage has always been missing is because it is expensive (to store energy)! So how can you make money at energy storage to defray the cost? Enter demand response. By

reducing demand charges (billed to customers by the utilities) through the use of stored energy during peak times, stored energy storage can become a potential revenue stream (by reducing demand charges). To the power grid, it doesn't matter if electricity supply goes up (by providing more energy at peak times, which is the basis of demand charges) or demand goes down (by using stored energy), as long as the two are in balance.

This could be a silver bullet for solar energy – Stored solar energy created during the sunny hours of the day, could be used during peak times, thus reducing demand charges. Solar companies can potentially get into the demand business by communicating with smart buildings to have them reduce demand (turn down the AC for example) and use stored energy during peak times. This should increase the potential revenue for each commercial and industrial installation and work to justify the cost of energy storage.



IESI's 8.6 MW project in Franklin MA.

Wanted: Site Remediation Silver Bullet for Chlorinated VOCs!

The demand for site remediation silver bullets is high. One would think that supply should catch up and provide good workable remedies at reasonable costs. In the 1990's there was air sparging which was supposed to remediate chlorinated VOCs by stripping them out in-situ just like an air stripper! Sounds great; and everyone jumped on the band-wagon. Unfortunately some plumes expanded due to air sparging. Something to do with channeling and science got in the way? In the 2000's and up until now, many want to add chemical oxidants such as permanganate or Fenton's reagent. Again, this channeling and science stuff got in the way. Now there is a new craze for different types of oxidants. Will channeling and science get in the way again? The 1990's and 2000's did bring us enhanced anaerobic dechlorination (EAD). A great technology,

but silver bullet enthusiasts started injecting additives into Geoprobe holes. Once again channeling and science have been party poopers.

Does anything actually work? Yes- Hot spot thermal remediation works- it's expensive but it works for small source areas. Physical mixing of additives (like oxidants, reductants or fixation agents) using large augers or large excavation equipment works by contacting the additives with the areas to be treated. Lastly, sustained EAD works great and is suitable for treating both source areas and large plumes. With sustained EAD, additives are delivered by groundwater recirculation and the enhanced condition is maintained for a period of years allowing contaminants to desorb from low permeability zones (enhanced back diffusion) so they can be degraded. IESI is a leader in properly implementing technologies that actually work. We are highly respectful of science!

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IESI has designed and constructed dozens of Remediation system trailers across the US



Above are photos of the interior of Remediation system trailers.

Parking Lot LEDs

Replacing traditional parking lot lights with energy-efficient, Light Emitting Diode (LED) lights can provide significant energy and cost savings. Investment pay back is also relatively short. Many commercial and institutional parking lots and parking garages are illuminated with high intensity discharge (HID) lighting sources - typically metal halide (MH) or high pressure sodium (HPS) lights. These traditional light sources use more energy than LED lights and produce overlit "hot spots" on the ground below, while the LEDs maintain consistent luminance levels. LED fixtures can be equipped with bi-level controls, or "motion sensors," that enhance the ability to manage energy use by reducing lighting levels in parking lot zones that are not being used.

Bi-level controls automatically set lights at higher luminance levels when motion is detected and then reset to lower levels when motion is no longer detected. LED lighting uses less energy and often provides better illumination than conventional HID luminaries. In addition, payback on investment can be short. Payback can be as little as 1-3 years for a new construction project and 1-5 years if installed during a retrofit.

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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.

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