

EVTC to Host EV Summit

The Electric Vehicle Transportation Center will host three days of meetings with key EV stakeholders at the Florida Solar Energy Center in late October. The event is designed to increase awareness among governmental, business and planning leaders by providing information on EV deployment, technology and planning. Additionally, there will be a review of the challenges to EV deployment, and an exploration of the future role of EVs in transportation and energy. The summit will also provide an opportunity for students of engineering, planning and other disciplines to learn about EVs.



Florida Solar Energy Center (Photo: Nick Waters, FSEC)

EVTC Staffer Articles Featured in Recent Issue of Interface

The Electrochemical Society's spring Interface issue featured five articles authored by EVTC researchers. The articles highlighted the roles the electro-chemical discipline plays in EVs and the infrastructure that supports them. The articles were written under the leadership of EVTC's Jim Fenton and Interface Co-Editor Vijay Ramani. EVTC team members Nan Qin, Paul Booker, Nahid Mohajeri, Richard Raustad, David Click and Jim Fenton provided five of the six feature articles in this issue. Jim Fenton's article examines the low fueling cost and the efficiency of EVs and how home energy retrofits and PV can fuel our cars. David Click's article traced the genesis of PV and batteries from its early applications for remote powering to the recent combinations of residential PV and home energy storage. Richard Raustad's contribution explored the role of EVs, their battery systems and the smart grid. Nan Qin and Paul Brooker teamed up with Nahid Mohajeri to discuss how fuel cell powered cars could be an alternative to conventional whole-home emergency generators.



http://issuu.com/ecs1902/docs/if_spr2015?e=15319453/12267597

Department of Energy Clean Cities Leader Visits EVTC

Linda Bluestein, Co-Director of the U.S. Department of Energy's Clean Cities program visited the Florida Solar Energy Center (FSEC) in April to meet with Central Florida Clean Cities Coordinator Colleen Kettles, EVTC Director Dave Block and other EVTC staff members. During her visit, Bluestein was given an overview of the EVTC programs and toured FSEC's labs and other facilities. Linda was in Orlando for a speaking engagement and made the trip to EVTC using a Chevy Volt, which she rented through the Drive Electric Orlando program.

Clean Cities advances the nation's economic, environmental, and energy security by supporting local actions to reduce petroleum consumption in transportation. A national network of nearly 100 Clean Cities coalitions brings together stakeholders in the public and private sectors to deploy alternative and renewable fuels, idle-reduction measures, fuel economy improvements, and emerging transportation technologies.



Linda finishes charging her Chevy Volt at FSEC (Photo: Nick Waters, FSEC)

Drive Electric Orlando

Drive Electric Orlando is a consumer education and vehicle demonstration project that provides visitors to Orlando, Florida with first-hand experience of the benefits of EVs through the availability of rental EVs. Drive Electric Orlando significantly reduces the anxiety that may accompany renting an EV by providing an enhanced level of engagement with the customer, providing a detailed understanding of the operation of the EV and the reassurance that comes with the knowledge that free vehicle charging is available at partner host hotels and theme parks. Rental of the EV is supported by a network of electric vehicle charging stations at hotels and theme parks throughout the region, as well as the City of Orlando's extensive urban EV charging infrastructure. The savings realized by renting an electric vehicle through this program are not insignificant; based on a one week rental, the estimated savings should exceed \$200. Drive Electric Orlando recently received a \$400,000 grant from the U.S. Department of Energy to expand its EV car rental program. FSEC's EVTC and Clean Cities staff will assist in the program expansion.



<http://driveelectricorlando.com/>

13th Annual EnergyWhiz Features Hydrogen Fuel Cell Race

Held on May 2nd, the Florida Solar Energy Center EnergyWhiz was a daylong event showcasing student-built energy projects. The hands-on renewable energy activities expose more than 800 students to alternative energy fuel sources and encourage scientific know-how, creative thinking, experimentation and teamwork.

A new event this year was the Horizon Hydrogen Automotive Challenge, where 18 student teams built and raced a 1:10 scale, remote controlled, hydrogen fuel cell car. Like their full-scale counterparts, the cars use a hydrogen fuel cell charging a traction drive battery. A poster-type display was also required that showcases the team's engineering and design decisions, problems encountered and solutions employed, the results of vehicle testing and photos of the final car.

The race was held inside a basketball gymnasium, with the track taking up the greater part of the court. The track was a road-course layout, featuring a configuration that included 15 turns and two straightaways. Finishing positions were determined by most laps completed within the six-hour timeframe.



(Photos: Nick Waters, FSEC)

EVTC Profile: Dr. Omer Tatari

Dr. Omer Tatari serves as the Associate Professor in UCF's Department of Civil, Environmental, and Construction Engineering, within the College of Engineering and Computer Science. He teaches courses on sustainability, green building, infrastructure systems, and construction project management. His research focuses on integrated sustainability assessment, with a focus on systematically analyzing the social, environmental, and economic aspects of engineered systems from a life cycle perspective.

Dr. Tatari is the subject editor of the International Journal of Life Cycle Assessment, a leading scientific journal in LCA research. He is the author of over fifty scientific publications in the area of sustainability and infrastructure management and is also a LEED accredited professional (AP).



EVTC Project Spotlight

Conventional, hybrid, plug-in hybrid or electric vehicles? State-based comparative carbon and energy footprint analysis in the United States

Dr. Tatari, Dr. Murat Kucukvar and doctoral candidate Nuri Cihat Onat's project analyzed the life-cycle impact of greenhouse gas emissions and electricity generation mixes on electric vehicles. Electric vehicles (EVs), plug-in hybrid electric vehicles (PHEVs), and hybrid electric vehicles (HEVs) are often considered as better options in terms of greenhouse gas emissions and energy consumption, compared to internal combustion vehicles. However, making any decision among these vehicle options is not a straightforward process when considering the sources of the electricity used and regional driving patterns. These considerations were applied across 50 states, taking into account state-specific average and marginal electricity generation mixes, regional driving patterns, and vehicle and battery manufacturing impacts. The study also includes an analysis of the use of solar energy as a power source alternative, to reduce both the green-house gas intensity and energy requirements in the production of electricity to charge EVs. The study can be found on EVTC's publication webpage at:

<http://evtc.fsec.ucf.edu/publications/index.html>

EV Technology-Motors

All EVs have electric motors, however the variation between vehicles is significant. Tesla uses AC induction traction motors; a Nissan Leaf uses a variation known as permanent magnet AC motor (PMAC), the Chevy Volt has a main drive PMAC but also routinely uses its on-board generator purely as a motor.

The debate over which type of motor works best is complex and includes considerations for performance, efficiency, size, weight and cost. For more information see:

Tesla: <http://electronics.stackexchange.com/questions/58236/why-does-a-tesla-car-use-an-ac-motor-instead-of-a-dc-one>

<http://www.teslamotors.com/blog/induction-versus-dc-brushless-motors>

Leaf: <http://www.johnwmorehead.com/nissan-leaf-ev-and-what-is-a-permanent-magnet-ac-motor/>

Volt: <http://papers.sae.org/2011-01-0355/>

<http://www.pluginCars.com/exclusive-video-want-know-exactly-how-chevy-volt-powertrain-works-95344.html>

General Interest

Zelectric Motors slogan, "California Dreaming, MIT Thinking" perfectly captures their combination of 21st century electric propulsion and 20th century auto restoration. Zelectric specializes in the restoration of vintage Volkswagens with the added twist of replacing the classic engine with a custom-built electric drive system.

Conversion to electric more than doubles traditional horsepower to 85 HP and provides a travel range of 80-100 miles. Unique to the cars is 4-on-the-floor selectable torque manual transmission and variable regenerative braking. The cars use lithium iron phosphate batteries that are charged using the standard J1772 charge port.

More information can be found at: <http://www.zelectricmotors.com/>



(Photo: Zelectric Motors)

15 New EVs Expected in 2015

Vehicle manufacturers continue to intensify their commitment to producing electric versions of many of their most popular models. In addition to offering purpose built new models such as the i3 and i8, BMW will eventually offer a plug-in version of every model in their lineup. The new 2016 Chevy Volt will be available in the second half of this year, along with Tesla's new SUV and new EVs from Volvo, Audi, Mercedes and others. For more information see:

<http://evobsession.com/new-electric-cars-market-2015-list/>



(Photo: Tesla Motors)



(Photo: Autoevolution.com)

2015 U.S. EV Sales*

	Jan	Feb	March	April	May
Tesla	1100	1150	2045	1700	2400
Nissan Leaf	1070	1198	1817	1553	2104
BMW i3	670	1098	922	406	818
Chevy Volt	542	693	639	905	1618
Fiat 500e	259	315	1310	717	420
Ford Fusion	426	603	837	711	986

Ford C-Max	395	498	715	553	715
Prius PHV	401	397	473	428	727
Chevy Spark	86	119	151	920	283
VW eGolf	181	130	195	309	410
Mercedes B	240	109	145	158	278
Ford Focus	85	145	140	124	165
BMW i8	85	113	143	138	117
Smart	147	76	103	124	102
Cadillac ELR	92	127	92	104	116
Porsche Cayenne	66	71	72	88	105
Kia Soul	69	48	63	73	108
Porsche Panamera	61	40	44	30	21
Honda Accord	28	12	5	5	5
Mitsubishi i-MiEV	3	2	10	16	18
Other	41	16	15	32	4
Total	6047	6951	10341	9094	11540

**Inside EVs-Monthly Plug-In Sales Scorecard, see website for additional information
<http://insideevs.com/monthly-plug-in-sales-scorecard/>*

Meetings & Conferences

[Tuskegee EVTC Workshop](#)

Tuskegee, AL; (July 9)

[EV Roadmap 8](#)

Portland, OR; (July 29-30)

[International Symposium on Systematic Approaches to Environmental Sustainability in Transportation](#)

Fairbanks, AK; (August 2-5)

[Fleet Technology Expo](#)

Long Beach, CA; (August 24-26)

[Electric & Hybrid Vehicle Technology Expo](#)

Novi, MI; (September 15-17)

[Tuskegee EVTC Activity Days](#)

Tuskegee, OR; (October 6)

[Electric Vehicle Transportation Center EV Summit](#)

Cocoa, FL; (October 20-22)

[SAE 2016 Hybrid & Electric Vehicle Technologies Symposium](#)

Anaheim, CA; (February 9-11, 2016)

Useful Links

Electric Vehicle Transportation Center

EVTC's website includes a complete listing of all EVTC information, research projects, reports and staff.

<http://evtc.fsec.ucf.edu/index.htm>

Alternative Fuels Data Center

Visit the U.S. Department of Energy's Alternative Fuels Data Center site for electric vehicles. The site contains information on the different types of electric vehicles, the benefits and considerations of owning an EV, a recharging station locator, information on incentives and legislation and much more. <http://www.afdc.energy.gov/fuels/electricity.html>

University Transportation Centers

This site provides information about the University Transportation Centers, including a listing of UTC centers, publications and external links related to transportation education and training sites. <http://www.rita.dot.gov/utc/>

Transportation Research Board

See the schedule of conferences and webinars hosted by the Transportation Research Board (TRB) at:

<http://www.trb.org/Calendar/Calendar.aspx>

American National Standards Institute (ANSI)

ANSI serves as a coordinator for the development of EVSE and PEV standards by the Society of Automotive Engineers (SAE), the National Highway Traffic Safety Administration (NHTSA) and many others. Their November 2014 Progress Report, "The Standardization Roadmap for Electric Vehicles" is an excellent source of information on standards development for electric vehicles and the associated infrastructure.

http://publicaa.ansi.org/sites/apdl/evsp/ANSI_EVSP_Progress_Report_Nov_2014.pdf

This e-newsletter is published by the Electric Vehicle Transportation Center at the University of Central Florida, under contract with the U.S. Department of Transportation. For additional information please contact:

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