

ICEPAG 2016  
*The Smart, Clean Energy Colloquium Series*

**MICROGRID  
GLOBAL SUMMIT**

# CONFERENCE PROGRAM



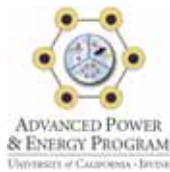
March 22-24, 2016

Advanced Power and Energy Program  
Henry Samueli School of Engineering  
UC Irvine

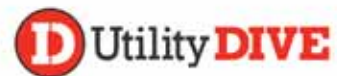
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# ICEPAG 2016: MICROGRID GLOBAL SUMMIT

The "Microgrid Global Summit" is one of two pillars in the ICEPAG (International Colloquium on Environmentally Preferred Advanced Generation) smart, clean-energy colloquium series. Presented by the Advanced Power and Energy Program (APEP) at UC Irvine, ICEPAG alternates each year between two clean energy topics: **Microgrids** and **Grid Energy Innovation**.

### ICEPAG 2016: Microgrid Global Summit

The Summit has broad support within the U.S. Department of Energy (DOE) and the California Energy Commission (CEC), and presents a gathering of energy professionals from around the world, focused on business and technology issues associated with:

- Commercial and Military Microgrids
- Utility Microgrids
- Remote Microgrids
- The Economics of Microgrids
- Microgrid Controllers

The Summit brings together experts from Industry, Government, and Academia to examine issues and share critical, cutting edge information about real-world, on-the-ground Microgrid deployments that are pushing the envelope of energy reliability, quality, and accessibility.

APEP continues to expand with cutting-edge research at the forefront of advanced energy devices and systems. The connection of our research to practical application also continues to reach new heights through our close collaborations with industry and national and international agencies and laboratories.

In one of our newest efforts in partnership with **Southern California Gas Company** (SoCalGas), **Proton On-Site**, and the **National Renewable Energy Laboratory**, **APEP** has launched the first U.S. research and development project to create and evaluate a carbon-free Power-to-Gas (P2G) system using the UCI Microgrid as the research platform. Smart integration of P2G with direct injection of renewable gas into the natural gas infrastructure provides a massive energy storage buffer that can manage and better utilize high levels of renewable power.

**APEP's** partnership with **Southern California Edison** (SCE) led the Irvine Smart Grid Demonstration Project (ISGD) to its full implementation of research, development and demonstration. In this major **DOE** initiative, **SCE** and **APEP** worked together with a host of entities that include contributions from **Toyota**, **GE**, **NEC**, **EPRI**, and **SunPower**. ISGD has provided invaluable data to **APEP**, **SCE**, and the partners in the project.

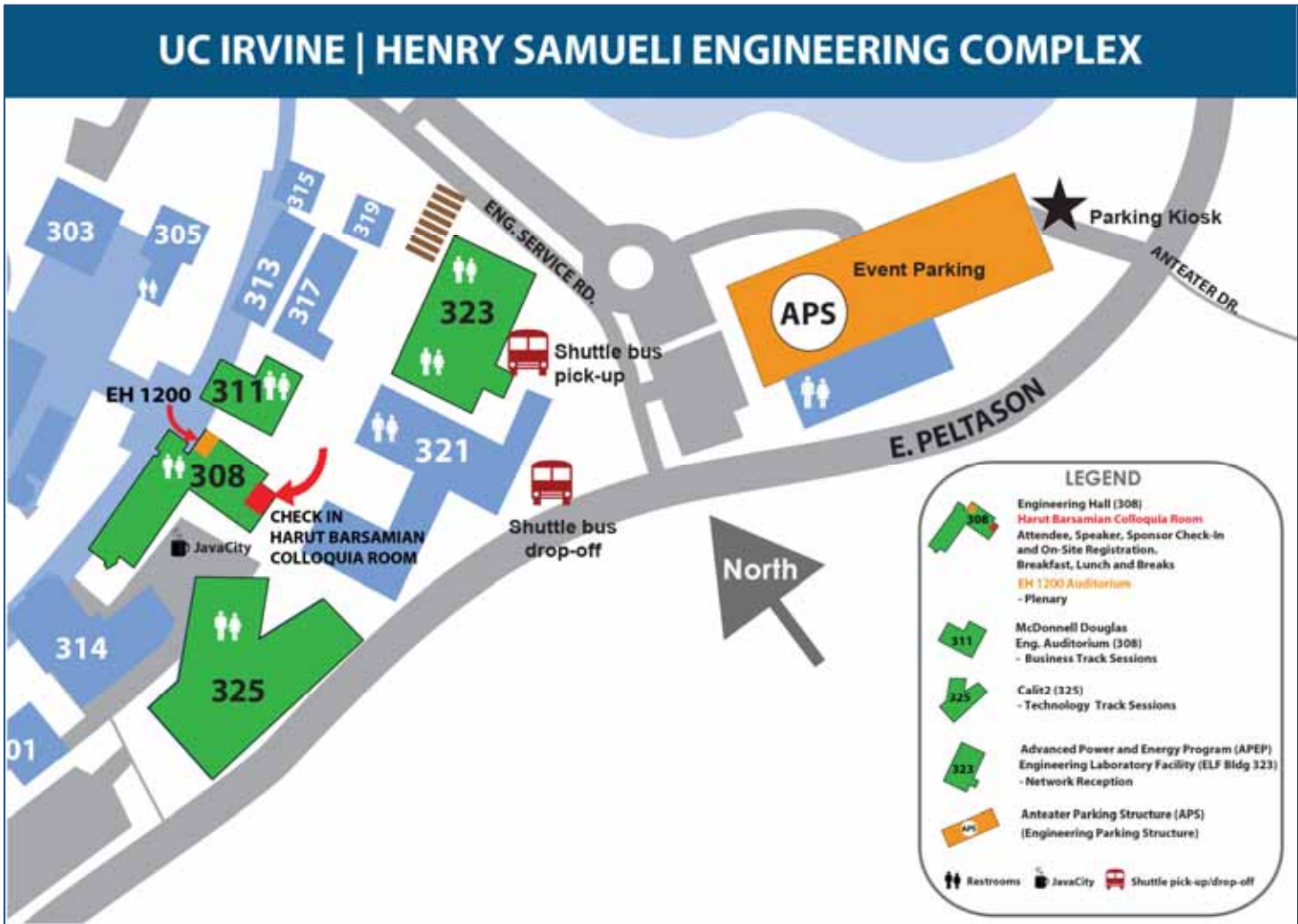
**APEP** continues to collaborate with the University Administration in the evolution of the UCI Microgrid as a major field laboratory. The UCI Microgrid includes the most stellar energy efficiency initiatives in the country, the broadest array of advanced energy and transportation technologies, and the latest in diagnostics and computer simulation resources. Key partners are **SCE**, **PG&E**, **SoCalGas**, **Toyota**, **ETAP**, **MeiRoK**, the **California Public Utilities Commission**, the **CEC**, the **DOE**, the **AQMD**, **Schweitzer Engineering Laboratories** (SEL), and **Siemens Corporate Research**.

During the tour scheduled for the afternoon of Day 3, the P2G project, the Irvine Smart Grid Demonstration project, and the UCI Microgrid will be presented. We hope that the tour will fit into your schedule.

In summary, we are indebted to our long-standing relationships that contribute in so many ways to the Summit, our research, our real world research and demonstration projects, and our students.

We thank you for attending, and for your support and contributions to the Summit.

Scott Samuelsen  
Program Chair



### Hotel Bus Schedule

Day	Departure Location	Departure Time	Arrival Time
<b>March 22, Morning</b>	Radisson Hotel	7:15am In Front of Hotel	7:30am UCI
<b>March 22, Evening</b>	UCI	7:00pm Engineering Laboratory Facility Back Lot	7:15pm Radisson Hotel
<b>March 23, Morning</b>	Radisson Hotel	7:15am In Front of Hotel	7:30am UCI
<b>March 23, Evening</b>	UCI	5:15pm Engineering Laboratory Facility Back Lot	5:30pm Radisson Hotel
<b>March 24, Morning</b>	Radisson Hotel	7:15am In Front of Hotel	7:30am UCI
<b>March 24, Afternoon</b> (For those not attending Microgrid tour)	UCI	1:00pm Engineering Laboratory Facility Back Lot	1:15pm Radisson Hotel
<b>March 24, Afternoon</b>	UCI	2:45pm UCI	3:00pm Radisson Hotel

**PROGRAM: DAY 1 – TUESDAY, March 22, 2016**

**PLENARY and SIGNATURE PANEL SESSION**

- 7:30 – 8:30 am**      **NETWORKING BREAKFAST**
- 8:30 – 9:00 am**      **Welcome**
  - Professor Scott Samuelson, Director, UCI Advanced Power and Energy Program (APEP)
- 9:00 – 10:00 am**      **Keynote: Role of Microgrids: A National Perspective**
  - Dan Ton, U.S. Department of Energy
- 10:00 – 10:30 am**      **NETWORKING BREAK**
- 10:30 – 12:00 pm**      **Signature Panel: Microgrid Role in the Future Smart Grid**
  - National Perspective  
Dan Ton, U.S. Department of Energy
  - ISO Perspective  
Peter Klauer  
California Independent System Operator
  - Academic Perspective  
Jack Brouwer  
UCI
- 12:00 – 1:30 pm**      **LUNCH**

**BUSINESS and TECHNOLOGY SESSIONS**

	Business Track	Technology Track
	<b>Moderator</b> Rich Hack UCI	<b>Moderator</b> Jack Brouwer UCI
<b>1:30 – 3:00pm</b>	<b>Emerging Microgrid Markets (I/II)</b>	<b>Microgrid Dispatchable Power Generation</b>
	<b>Microgrid-Based Electricity Markets</b> Ghazal Razeghi UCI	<b>Fuel Cells: Where Energy Sustainability and Resiliency Meet</b> Justin Miller Doosan Fuel Cells America
	<b>Microgrids - The Next Step</b> Robert Gilleskie Marine Corps Installations West	<b>The Critical Role of Fuel Cells in the Microgrid Topology</b> Tony Leo FuelCell Energy
	<b>IEEE 2030.7 Microgrid Controller Standards</b> Russ Neal UCI	<b>Clean, 24/7 Power Generation in Microgrid Operations</b> Asim Hussain Bloom Energy
<b>3:00 – 3:30 pm</b>	<b>NETWORKING BREAK</b>	

3:30 – 5:00 pm

Emerging Microgrid Markets (II/II)	Microgrid Energy Storage
<p><b>The Benefits of Utilizing Microgrid Architecture to Power Datacenters</b> Randal Kaufman ABB Inc.</p> <p><b>Local Government Training for Advancement of Microgrid Technology in Rural Communities</b> Joel Rinebold Connecticut Center for Advanced Technology</p> <p><b>Emerging Market Considerations</b> Lori Schell Empowered Energy</p>	<p><b>Breakthrough Economics in Compressed Air Energy Storage for Microgrids</b> Neel Sirosh LightSail Energy</p> <p><b>Power to Gas: An Energy Storage System Concept for Microgrids</b> Stephen Szymanski Proton OnSite</p> <p><b>Energy Storage and Microgrids - Degree of Freedom to a Just-in-Time Delivery System</b> Joseph Heinzmann General Electric Energy Storage</p>

5:00 pm

**DAY 1 PROGRAM CONCLUDES**

5:00 – 7:00 pm

**NETWORKING RECEPTION: APEP CENTER**

7:00 pm

**BUS DEPARTS FOR HOTEL**

**PROGRAM: DAY 2 – WEDNESDAY, March 23, 2016**

**PLENARY and SIGNATURE PANEL SESSION**

- 7:30 – 8:30 am**                    **NETWORKING BREAKFAST**
- 8:30 – 9:30 am**                    **Keynote: Microgrids---Role in Mitigation of Climate Change**
  - Wendell Brase, Co-Chair, University of California 2025 Zero Carbon Commitment  
Vice Chancellor, Administrative and Business Services, UCI
- 9:30 – 10:00 am**                    **NETWORKING BREAK**
- 10:00 am – 12:00 pm**                **Signature Panel: Microgrids: Reducing the Carbon Footprint**
  - Renewable Natural Gas RD&D Efforts at Southern California Gas Company  
Ron Kent  
Southern California Gas Company
  - Role of V2G in the Context of Microgrids  
Brian Tarroja  
UCI
- 12:00 – 1:30 pm**                    **LUNCH**

**BUSINESS and TECHNOLOGY SESSIONS**

	Business Track	Technology Track
	<b>Moderator</b> Lori Schell Empowered Energy	<b>Moderator</b> Vince McDonell UCI
<b>1:30 – 3:00 pm</b>	<b>Attracting Investment in Microgrids</b>	<b>Microgrid Systems Design and Optimization (I/III)</b>
	<p style="text-align: center;"><b>Microgrids: Doing Well, While Doing Good (with Impact Investment \$\$)</b> Myles E. Mangram EnTech Capital Ltd.</p> <p style="text-align: center;"><b>Investment in Distribution Resources</b> Kevin Phelan Edison Energy</p> <p style="text-align: center;"><b>A Microgrid Roadmap for Commercializing Microgrids in California</b> Mike Gravely California Energy Commission</p>	<p style="text-align: center;"><b>Challenges and Approach in High Penetration Renewable Power Microgrids</b> Bob Stojanovic ABB Microgrid</p> <p style="text-align: center;"><b>Modular, Scalable Microgrid Incorporating Traditional and Renewable Energy Systems</b> P. D. Madden Energy Technologies, Inc.</p> <p style="text-align: center;"><b>Industrial Microgrid Design and Implementation</b> Justin Day Schweitzer Engineering Laboratories</p>
<b>3:00 – 3:30 pm</b>	<b>NETWORKING BREAK</b>	

3:30 – 5:00 pm

Emerging Microgrid Opportunities	Microgrid Systems Design and Optimization (II/III)
<p style="text-align: center;"><b>Port of Long Beach</b> Christine Houston Port of Long Beach</p> <p style="text-align: center;"><b>Port of Los Angeles</b> Matt Wartian Burns &amp; McDonnell</p> <p style="text-align: center;"><b>Design Applications of Insurance Oriented Microgrid and Distributed Generation Performance Risk Models</b> Richard Jones The Hartford Steam Boiler Inspection and Insurance Company</p>	<p style="text-align: center;"><b>Modeling the Integration and Operation of Photovoltaic Power Systems</b> Frank Kling ETAP</p> <p style="text-align: center;"><b>Controlling Microgrids</b> Jim Cushman Emerson Process Management</p> <p style="text-align: center;"><b>Transportable Microgrid With Energy Storage For Military and Non-Military Applications</b> Robert B. Schainker EPRI</p>

5:00 pm

**DAY 2 PROGRAM CONCLUDES**

**BUS DEPARTS FOR HOTEL**

5:15 – 6:30pm

**OPEN DISCUSSION ON THE CEC ROADMAP FOR COMMERCIALIZING MICROGRIDS**  
(Multi-Functional Room, APEP Center)



**PROGRAM: DAY 3 – THURSDAY, March 24, 2016**

**BUSINESS and TECHNOLOGY SESSIONS**

7:30-8:30 am

**NETWORKING BREAKFAST**

Business Track	Technology Track
<b>Moderator</b> Wayne Nastri E4 Solutions	<b>Moderator</b> Ghazal Razeghi UCI

8:30 – 10:00 am

Microgrid Operating Economics	Microgrid Systems Design and Optimization (III/III)
<p><b>Microgrid Demonstration Projects Funded by the Electric Program Investment Charge (EPIC)</b>                      Eli Harland                      California Energy Commission</p> <p><b>Evolution of an Economically and Environmentally Viable 25MW Microgrid</b>                      Robert Flores                      UCI</p> <p><b>The Economics Associated with a Progressive Water Resource Recovery Facility</b>                      Paul Cook                      Irvine Ranch Water District</p>	<p><b>The Impact of Distributed Generation and Microgrids on the Distribution Network</b>                      Ron Chebra                      Schneider Electric</p> <p><b>Testing and Evaluation of Emerging Microgrid Controller Functions</b>                      Annabelle Pratt                      NREL</p> <p><b>Riding the Storm: the Trials and Tribulations of a Privately Funded Microgrid</b>                      Craig Wooster                      Stone Edge Farm</p>

10:00-10:30 am

**NETWORKING BREAK**

Business, Regulatory and Policy Brainstorming	Microgrid Dynamic Simulation and Control
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10:30-12:00 pm

<p>A session to openly discuss trends in business, and the role and trends in regulatory evolution and policy</p> <p style="text-align: center;"><b>Moderators</b>                      Lori Schell, Empowered Energy                      Wayne Nastri, E4 Solutions</p>	<p><b>Integrating Distributed Renewables into a Microgrid</b>                      Michel Kamel                      MelRok</p> <p><b>Simulation-Based Test and Validation Frameworks for Microgrid Protection and Control</b>                      Thomas Kirk                      OPAL-RT</p> <p><b>A Fully Renewable Microgrid Integrated Nanogrid</b>                      Laura Novoa                      UCI</p>
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12:00 – 1:00 pm

**LUNCH**

**TOUR: IRVINE SMART GRID DEMONSTRATION (ISGD) AND UCI MICROGRID (UCIMG)**

**1:00 pm**            **BUS DEPARTS FOR HOTEL FOR THOSE NOT ATTENDING THE TOUR**

**1:00 –2:45 pm**    **Tour: ISGD and UCI Microgrid**  
**Stops Will Include:**

- **ISGD**
  - **Car Shade Project**
  - **Battery Site for Residential Project**
- **UCIMG**
  - **UCI Substation**
  - **Central Plant**
  - **Thermal Storage Resource**
  - **Power to Gas (P2G) Project**
  - **4MW Fixed PV Arrays**
  - **CPV Tracking Solar Arrays**
  - **UCI Hydrogen Fueling Station**

**2:45 pm**            **TOUR AND COLLOQUIUM CONCLUDE**  
**BUS DEPARTS FOR HOTEL**





# ADVANCED POWER & ENERGY PROGRAM

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