



Future Grid Initiative Workshop

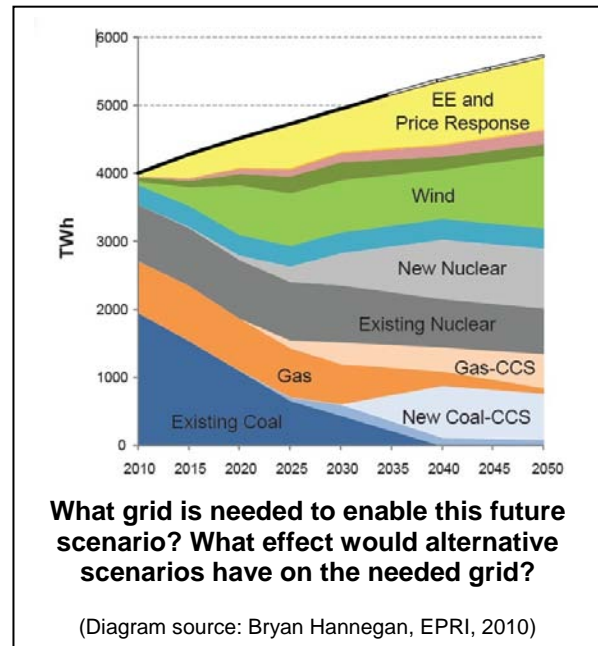
December 7, 2011

University of California, Berkeley

A systematic transformation of today's electric grid is underway to enable high penetrations of sustainable energy systems.

The grid is evolving from a network architecture with relatively few large, hierarchically-connected, tightly synchronized energy resources supplying large, medium, and very many small passive consumers. It is evolving toward a network driven by many distributed and concentrated, highly variable energy resources mixed with large central generation sources, energy storage and responsive users.

The effective transformation of the grid requires decisions based on identification and solution of major operating, planning, workforce, economic and public policy challenges. The U.S. DOE has funded the project "The Future Grid to Enable Sustainable Energy Systems.



The project's objective is to investigate the requirements of an electric grid with high penetrations of sustainable energy systems and heavy reliance on cyber systems for sensing and communication while stimulating discussion among the academic, industry and government communities on what it will take to shape the future grid for the mid-twenty-first century.

This workshop's activities and anticipated outcomes will help in meeting that objective.

Workshop Format

The workshop will begin with identification of the driving decisions that will shape the future grid. Then, there will be "gallery walks" for attendees to talk with researchers at their posters. PSERC members will be able to view the posters in advance of the workshop on the PSERC website. During the workshop, perspectives will be sought from the attendees via oral and written comments. Email and blogging options will also be available before, during and after the workshop. The workshop will close with a general discussion about how the nation's infrastructure will evolve to the future grid. Information about the Initiative is available on the [PSERC website](#). Please come to the workshop prepared to actively participate! Your feedback is essential to the success of this workshop.

Attendees

Attendees will come from industry, government and academia to provide their perspectives on the issues and the needed research in developing the future grid. It will be an open attendance event and everyone is asked to register.

Why Should I Attend?

This is your opportunity to influence a significant research effort that will help shape the future grid. You can learn about new work that is being done on the building blocks for a future grid and meet leading university researchers from PSERC's thirteen universities who are doing it.

Future Grid Research Effort

The research is divided into six thrust areas and two white paper series.

No.	Research Thrust Area	Leader
1	Electric energy challenges of the future	Gerald Heydt , Ariz. State Univ.
2	Control and protection paradigms of the future	Anjan Bose , Washington State Univ.
3	Renewable energy integration and the impact of carbon regulation on the electric grid	Shmuel Oren , Univ. of California, Berkley
4	Workforce development	Chanan Singh , Texas A&M Univ.
5	Computational challenges and analysis under increasingly dynamic and uncertain electric power system conditions	Santiago Grijalva , Georgia Institute of Technology
6	Engineering resilient cyber-physical systems	Tom Overbye , Univ. of Illinois at Urbana/Champaign

PSERC White Paper Series

As a part of this Initiative, PSERC is working to stimulate thought about solutions to what can be called "broad analysis" needs. A broad analysis need covers questions that are typically well beyond the scope of typical academic research projects in terms of size and definition. The questions are not strictly engineering, often involving issues of policy as well as stakeholder perspectives and impacts. The broad analysis topics that will be addressed through white papers and eventually a public forum are:

- The Information Hierarchy for the Future Grid (led by [Peter Sauer](#), University of Illinois at Urbana-Champaign)
- Grid Enablers of Sustainable Energy Systems (led by [Jim McCalley](#), Iowa State Univ.)

More information about the Future Grid Initiative: available on the [PSERC website](#).

Host

Our local host for the IAB meeting is the University of California, Berkeley.



Workshop Agenda
Wednesday December 7
(at the Krutch Theater on the Clark Kerr Campus)

- 7:15 – 8:00 **Registration** (with Continental Breakfast)
- 8:00 – 8:30 **Central Decisions that will Shape the Future Grid and How it is Used**
[Vijay Vittal](#) (Arizona State Univ.), Director, Power Systems Engineering Research Center
- 8:30 – 9:00 **Facilitated Discussion**
- 9:00 – 9:45 **Shaping the Future Grid: Context of the Research in Thrust Areas 1-3**
 - Design options, balancing, and wide area controls
 - Control and protection paradigms
 - Renewable energy integration[Jerry Heydt](#) (Arizona State Univ.), [Anjan Bose](#) (Washington State Univ.) and [Shmuel Oren](#) (Univ. of California, Berkeley)
- 9:45 – 10:45 **Gallery Walk for Thrust Areas 1 - 3**
- 10:45 – 11:15 **Discussion on Work in the Thrust Areas 1 - 3**
- 11:15 – 11:45 **Shaping the Future Grid: Context of the Broad Analysis White Papers**
 - Information Hierarchy of the Future Grid
 - Grid Enablers of Sustainable Energy Systems[Peter Sauer](#) (University of Illinois at Urbana-Champaign)
[Jim McCalley](#), Iowa State Univ.
- 11:45 - 12:15 **Gallery Walk for the Broad Analysis Areas**
- 12:15 – 1:15 **Lunch**
- 1:15 – 1:45 **Gallery Walk for the Broad Analysis Areas (continues)**
- 1:45 – 2:15 **Discussion on White Papers in the Broad Analysis Areas**
- 2:15 – 3:00 **Shaping the Future Grid: Context of the Research in Thrust Areas 4 - 6**
 - Computational challenges
 - Resiliency of cyber-physical systems
 - Workforce education[Santiago Grijalva](#) (Georgia Institute of Technology), [Tom Overbye](#) (Univ. of Illinois at Urbana-Champaign) and [Chanan Singh](#) (Texas A&M Univ.)
- 3:00 – 4:00 **Gallery Walk for Thrust Areas 4 - 6**
- 4:00 – 4:30 **Discussion on Work in the Thrust Areas 4 - 6**
- 4:30 – 5:30 **General Discussion on the Path to and Shape of the Future Grid**
- 5:30 – 5:45 **Closing Summary**
- 5:45 – 6:45 **Reception**

Information for Planning Your Attendance at the Workshop

General Meeting and Registration Location

The workshop will be at the Krutch Theater on the Clark Kerr campus (2601 Warring St., Berkeley, CA, 94720) which is about one-half mile from the Claremont Hotel. The Clark Kerr Campus is a Spanish mission style complex located approximately six blocks southeast of the main campus. [Click here to see a map of the Clark Kerr Campus.](#)



Hotel (Make your reservation by Monday, November 7)

Accommodations have been arranged at the [Claremont Hotel Club & Spa](#), 41 Tunnel Rd, Berkeley, CA, 94705. To register, you can contact the hotel [on-line](#) or by phone (510-843-3000 or 800-551-7266). Be sure to use the group code '**PSERC**' to receive the group rate of \$149 for Hillside rooms or \$159 for Bayview rooms.



Transportation from the Airport to the Claremont

Oakland is near two airports: Oakland International Airport (**OAK**), and San Francisco International Airport (**SFO**). No free hotel shuttles are available to/from the Claremont.

Here are some transportation options:

- A taxi will cost about \$45 one-way from the Oakland airport to the Claremont and about \$95 from the San Francisco airport.
- You can take the [BayPorter Express](#); these vans also stop at other hotels. Cost: \$25 one-way from the Oakland airport; \$34 one-way from the San Francisco airport. For reservations from the Oakland airport, call 510-864-4000; for reservations from the San Francisco airport, call 415-467-1800.
- From the San Francisco airport you can take the Bay Area Rapid Transit (BART) for about \$8. Take it to the Rockridge Station and from there take a cab. Cabs are typically available outside station or you can call 510-848-5555.
- Rent a car. The Claremont is waiving the \$24 daily parking fee.

Transportation to Campus from the Hotel

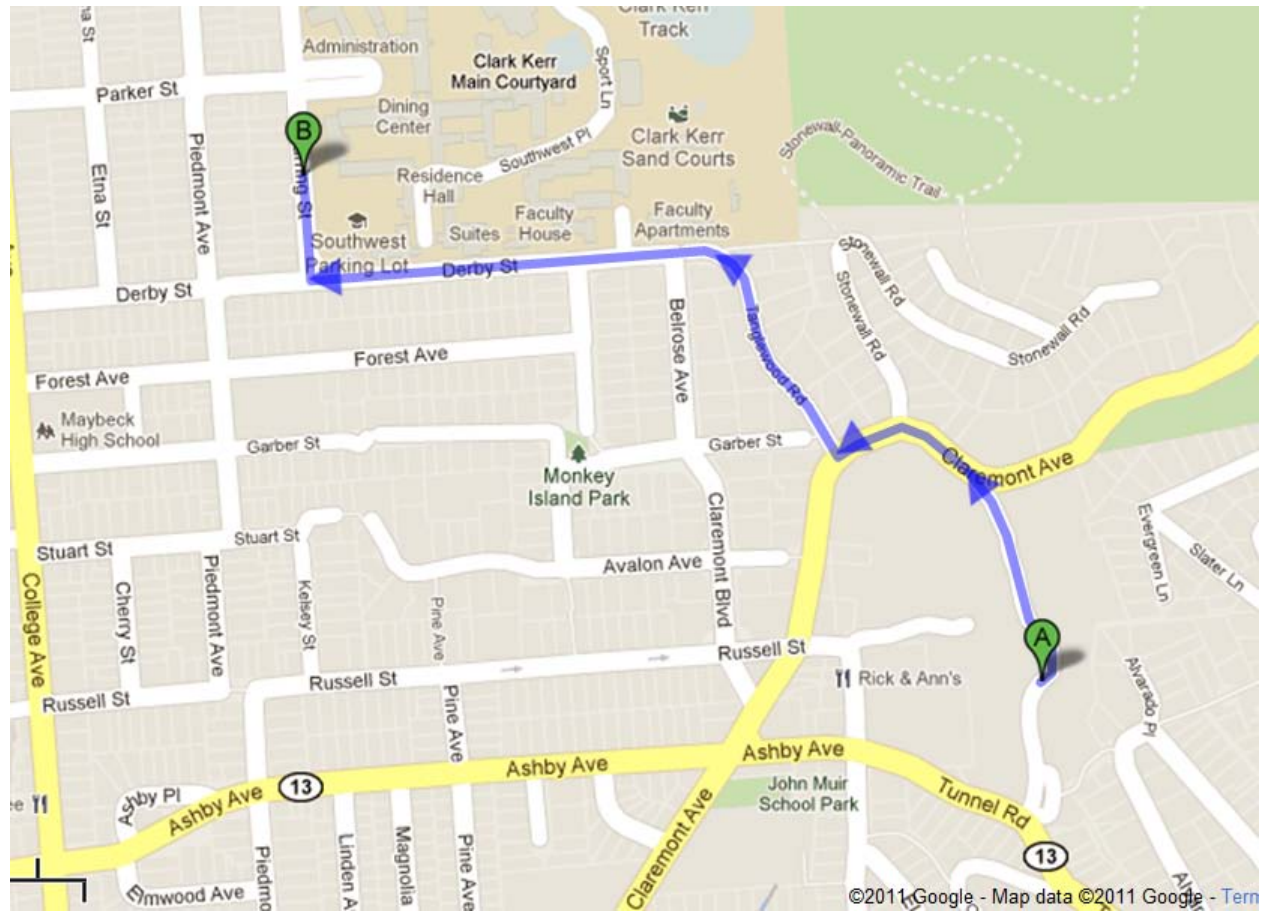
Driving Directions: From the Claremont Hotel, head northeast toward Claremont Ave. Continue straight onto Claremont Ave. Turn right onto Claremont Blvd. Claremont Blvd turns slightly right and becomes Belrose Ave. Turn left onto Derby St. Take the 2nd right onto Warring St. Destination will be on the right. There is limited parking on the Clark Kerr campus which can be reserved for \$15 per day. Add this fee when you register. You will pick the permit up on-site.

[Walking Directions \(Google map link\)](#)

A = Claremont Hotel (41 Tunnel Rd, Berkeley, CA, 94705)

B = Clark Kerr Campus (2601 Warring St., Berkeley, CA, 94720)

About ½ mile between hotel and Krutch Theater.



Registration (Registration is closed. Contact Theresa Herr at 480-965-1643 or theresa.herr@asu.edu.)

The early registration fee is \$100. Students are eligible for a 50% discount. After **November 15**, the registration fee will be \$150 (\$75 for students). The fee covers lunch, breaks, reception and materials. Note to attendees of the PSERC Industry Advisory Board meeting: your registration for the workshop is included in the IAB meeting registration process.

Additional Information

Attire for the meeting is business casual. Winter weather in Oakland is moderate but can be windy. Daytime around mid-50's to low 60's, Nighttime mid-40's to low 50's. Wireless internet service will be available for everyone. If you have questions about logistics or registration, contact Theresa Herr at 480-965-1643 or theresa.herr@asu.edu. For information about the meeting agenda or PSERC, please contact Dennis Ray, PSERC Deputy Director, at 608-265-3808 or djray@engr.wisc.edu.