

Summary for a panel presentation at the 2011 General Meeting of the IEEE/PES

Electric Vehicles in Volatile Power System Operations

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The large utilization of electric vehicles (EVs) could affect the hourly operation of electric power systems. EVs are represented as mobile storage facilities and distributed loads in power systems [1].

EVs rely on storage, are deferrable, and unlike many other electric loads, are mobile which can be satisfied at off-peak hours and different charging locations.

EVs can potentially play an important role, as storage, in the optimal operation and dispatch of hourly wind power generation in power systems. In such cases, EVs can mitigate the intermittency, the volatility, and the risk of supplying firm energy by a wind farm [2].

The integration of vehicle to grid (V2G) can offer bi-directional power flows, add to the complexity of power system operation, enhance power system reliability, and reduce congestion costs and the cost of supplying ancillary services at critical hours.

In this presentation, the optimal hourly integration of EV fleets with the stochastic operation of wind energy is presented. The stochastic security constrained unit commitment (SCUC) is proposed to procure an hourly commitment and dispatch schedule for security-constrained power generation facilities (including thermal, hydro, wind, and EV fleets) that would minimize the operation cost of power systems while satisfying the required EV charging and utilization requirements.

References

- [1] Reducing Greenhouse Gas Emissions from U.S. Transportation available online: www.pewclimate.org/docUploads/ustransp.pdf.
- [2] *Global Wind 2008 Report*, GWEC, Global Wind Energy Council, <http://www.gwec.net/fileadmin/documents/Global%20Wind%202008%20Report.pdf>.

Biography

Mohammad Shahidehpour (F'01) is the Bodine Chair Professor in the ECE Department at Illinois Institute of Technology. Dr. Shahidehpour is the recipient of the Honorary Doctorate for the Polytechnic University of Bucharest in Romania. He is an Honorary Professor in the North China Electric Power University and the Sharif University of Technology in Iran.