Optimizing the Profitability of Solar Power

David Wright, University of Ottawa

Abstract: After a brief review of energy yield models for PV and CPV, and optimal module orientation, this seminar focuses on the dollar value of that energy in distributed generation. In grid-connected, behind-the-meter applications, the value of solar electricity is equal to the reduced cost of purchasing from the grid, which varies with time of day/year according to the electricity tariff. We therefore include batteries in the analysis so as to be able to schedule the times at which solar electricity is used, and the schedule is dollar-optimized using linear programming. A discounted cash flow analysis over the life of the solar modules gives the optimal battery size and Internal Rate of Return (IRR) for examples in Ontario, Prairies and SW USA. In off-grid applications, batteries become even more important, and a different economic measure, Lifetime Cost of Electricity (LCoE) is appropriate. However the economically optimal system may generate excess electricity that cannot be used, examples of which are given from Saudi Arabia.

Bio: Professor David Wright combines an Engineering PhD from Cambridge University with his current position as Full Professor at the University of Ottawa’s Telfer School of Management to provide a business perspective on the Cleantech Industry, currently focusing on solar power. His present work evaluates capital cost trends for photovoltaics and identifies situations in which solar technologies can be economically viable without government incentives. Dr. Wright has experience in academia, industry and government in three continents. His current university research is conducted in collaboration with industrial partners in the Cleantech sector. His previous research involved working with telecommunications equipment vendors and network operators on market analysis, network evolution, service requirements, distance education and the strategic impact of new technology on business. Earlier, in government, he developed systems dynamics models to evaluate the impact on industrial society of natural resource depletion, population growth and the ability of the environment to absorb pollution. Dr. Wright is cited in Who’s Who in the World; Who’s Who in Canadian Business; and, Who’s Who in Science and Engineering.

TOP-SET is a training program that aims to form a cohort of highly qualified personnel with comprehensive understanding of optoelectronic systems, capable of joining advanced R&D teams.

For further details regarding TOP-SET, go to create-topset.eecs.uottawa.ca.

TOP-SET is funded by the Natural Sciences and Engineering Research Council of Canada.

This seminar is funded by the University of Ottawa.