The Living Without Oil Series: An Elder Academy Event

Are Big Hydro and Run of River Resources Maximised?

University of Victoria Retirees Association

Heather Matthews

Saturday, March 7
10:00am – 12:00pm
David Turpin Building, Room A110

This presentation looks at BC Hydro's strategies for electrification and the shift away from fossil fuels to clean electricity. Heather Martin will provide an overview of how the BC Hydro system and hydroelectric facilities are used to maximize value, integrate other renewables such as wind and solar, and manage large swings in our 'fuel' supply between wet and dry years. She will discuss trends and developments in the market of neighboring jurisdictions, such as in the U.S Pacific Northwest and California, and look at how the characteristics of the 'Grid' are charging as more renewables are integrated. Finally, we consider the Integrated Resource Plan, BC Hydro's long term plan to meet B.C's future electricity demand.

Bio: Heather Matthews' specialty is Water Resources Engineering and she has worked at BC Hydro since 2000 in various positions in Engineering, Energy Planning, and Operations. In her current role as Director of Generation System Operations, she is accountable for planning the use of BC Hydro's generation facilities to ensure that generation is available to meet load in the 0 to 3-year timeframe. She is also the Canadian Coordinator for the Columbia River Treaty between the U.S. and Canada

To Register: https://www.eventbrite.ca/e/oil-part-two-tickets-85419466925. Students may register for free by emailing uvraevents@uvic.ca

The Living Without Oil Series: An Elder Academy Event

Solar: Cost and limiting efficiency of silicon solar panels

University of Victoria Retirees Association

Tom Tiedje

Saturday, March 14
10:00am- 12:00pm
David Turpin Building, Room A110

Over the last 40 years the cost of silicon solar panels has decreased by more than a factor of 300, annual production has increased by five orders of magnitude and energy conversion efficiency has doubled. Recent power purchase agreements in the Middle East, Brazil and the US have come in at less than 2 cents/kwh. The net result is that "wind and solar have won the race to produce the lowest cost bulk electricity" (Bloomberg, New Energy Finance, 2018).

This seminar will explain what is likely to happen in the future with respect to solar panel cost, production volume and efficiency. Future projections for efficiency are guided by thermodynamics and the optical and electronic properties of silicon; cost can be projected with a learning curve, similar to Moore's law for integrated circuits. A recent innovation is the bifacial panel which is sensitive to light incident on both sides and gives 10-30% more output power than a single-sided panel.

Dr. Tiedje is a faculty member in the Electrical and Computer Engineering Department at the University of Victoria. Before coming to Victoria in 2008 as Dean of Engineering, he was a faculty member in the Faculties of Science and Applied Science at the University of British Columbia and before that he worked for ExxonMobil in New Jersey. He is a fellow of the American Physical Society, the Royal Society of Canada and the Canadian Academy of Engineering.

To register: https://www.eventbrite.ca/e/oil-part-one-tickets-85417396733. Students may register for free by emailing uvraevents@uvic.ca

The Living Without Oil Series: An Elder Academy Event

Energy Storage and Electrification

Andrew Rowe

University of Victoria Retirees Association

Saturday, March 21
10:00am- 12:00pm
David Turpin Building, Room A110

Numerous policy, technology, and market forces are driving the need for energy storage. Increased penetrations of variable energy sources are changing the structure and operation of electrical systems. Electrification of heating and transportation, and deployment of distributed energy resources such as PV, are altering historical patterns of net electricity demand. The flexibility provided by storage can help manage variable energy resources and respond to new and more dynamic loads. This seminar will examine various ways of providing energy storage and review grid-scale storage services and their characteristics. The economics of storage are presented with a focus on learning rates and projections of future costs.

Dr. Andrew Rowe is the Director of the Institute for Integrated Energy Systems and a Professor in the Department of Mechanical Engineering at the University of Victoria, Canada. He served as an Engineering Officer in the Canadian Navy where he was involved in the operation and maintenance of propulsion, power generation and ancillary systems. He earned an M.A.Sc. degree for research on fuel cell performance modeling and went on to complete a Ph.D. in magnetic cycles for heat pumping and hydrogen liquefaction. His current research areas include energy system analysis, caloric cycles, electrification, hydrogen systems, and energy storage. Dr. Rowe is a member of the editorial board for Cryogenics, the scientific committee of THERMAG, a registered Professional Engineer in the province of British Columbia, and a member of the Electrochemical Society.

To Register: https://www.eventbrite.ca/e/oil-part-two-tickets-85419466925. Students may register for free by emailing uvraevents@uvic.ca

*This event is presented in partnership with **IESVic***

University of Victoria | Institute for Integrated Energy Systems

The Living Without Oil Series: An Elder Academy Event

Series Summary & Panel Discussion

University of Victoria Retirees Association

Saturday, March 28
10:00am- 12:00pm
David Turpin Building, Room A110

Moderator:
Dr. Chris Kennedy, Professor and Chair, UVic Civil Engineering

Dr. Chris Kennedy applies principles of Industrial Ecology to challenges of developing sustainable cities and global infrastructure systems. Much of his work has involved the study of urban metabolism – the energy and material flows through cities – which underlies greenhouse gas emissions and other environmental impacts of cites. He draws upon qualifications in civil engineering, economics, and business to advise governments and other organizations on policies and planning for sustainable infrastructure. In 2011/12 he was seconded to the OECD in Paris, to work on Cities, Green Growth and Policies for Encouraging Investment in Low Carbon Infrastructure, and has been a visiting professor at Oxford University and ETH Zürich, as well as President of the International Society for Industrial Ecology. Dr. Kennedy is also a Senior Fellow at the Global Cities Institute and author of *The Evolution of Great World Cities: Urban Wealth and Economic Growth.*

Panelists:

Dr. Madeleine McPherson is an Assistant Professor in the Civil Engineering department at the University of Victoria and principal investigator of the Sustainable Energy Systems Integration &Transitions Group. Her research focuses on integrating high penetrations of wind and solar PV onto electricity systems around the world. She has explored questions ranging from the impact of renewable resource characteristics on integration strategies, storage assets remuneration and integration in electricity system markets, and the interaction between electric vehicle charging profiles and grid decentralization. More recently, Dr. McPherson has developed and applied a methodology for exploring the role of demand response for facilitating increasing renewable penetrations, and is currently developing an integrated modelling framework to explore the sustainable energy transition in Canada.

Dr. Katya Rhodes is an Assistant Professor in the School of Public Administration at the University of Victoria investigating economic efficiency, environmental effectiveness, and political acceptance of policies to mitigate climate change. Prior to joining the School, she worked as a Senior Economic Advisor in the British Columbia Climate Action Secretariat where she led economic analyses of BC's climate policies, including the Clean BC plan. A former Vanier Scholar, Dr. Rhodes has developed clean technology and green jobs databases for the Vancouver Economic Commission, analyzed provincial policy for the Cumulative Effects Framework in the Ministry of Forests, Lands, and Natural Resource Operations, and investigated public and stakeholder perceptions of BC's carbon tax at the Pembina Institute.

Dr. Robert Gifford is an environmental psychologist and Professor of Psychology and Environmental Studies at the University of Victoria. He is a Fellow of the Royal Society of Canada, the American Psychological Association, the Canadian Psychological Association, the Association for Psychological Science, the International Association of Applied Psychology, and is the recipient of a Career Award from the Environmental Design Research Association. Dr. Gifford is the author of over 140 refereed publications and book chapters and five editions of *Environmental psychology: Principles and practice.* His 2016 book (as editor) is *Research Methods for Environmental Psychology*. He was the Chief Editor of the *Journal of Environmental Psychology* and served as President of the Environmental Psychology division of the International Association of Applied Psychology, APA's Population and Environment Division, and CPA's environmental section.

To Register: https://www.eventbrite.ca/e/oil-part-two-tickets-85419466925. Students may register for free by emailing uvraevents@uvic.ca

*The Living without Oil Series is presented in partnership with **IESVic***

University of Victoria | Institute for Integrated Energy Systems

USEFUL INFORMATION

PARKING: On Saturday parking is $3.50 for all day. Cash or Credit Card. New parking regulations require you to enter your license plate number when purchasing your ticket. You do not have to return to your car to place the ticket on the dash as it is all done electronically.

SUGGESTED PARKING: Lot 6 at McGill Road and Ring Road

CAMPUS MAP: www.uvic.ca/home/about/campus-info/maps/pdf/parking-map.pdf

BUS ROUTES: www.uvic.ca/home/about/campus-info/maps/maps/

NEED HELP? Please contact: http://uvra@uvic.ca