

# **International Green Energy Conference (IGEC-1)**

## **Conference Program**

### **For Oral Presentation**

- For each presentation: please target for 15 min presentation and 5 min for Q&As (questions and answers) as well as for change over.
- A notebook computer and digital data projector will be available in each meeting room. Please load your PowerPoint presentation file (or .pdf file) before each session (you can ask the volunteer for help). You can also use your own notebook computer, please let the session chair know beforehand.

### **For Poster Presentation**

- For poster papers: Poster board dimensions are 58” (1.47 m) long by 46.5” (1.18 m) high.

### **For Tours to Toronto and Niagara Falls**

- Tour to Toronto will be leaving at 9:00 am on Sunday, June 12, at Ron Eydt Village, University of Waterloo, and will return around 5:00 pm.
- Tour to Niagara Falls will be leaving at 9:00 am on Thursday, June 16, at Ron Eydt Village, University of Waterloo, and will return around 5:00 pm.

### **Poster and Exhibition Setup**

- Posters and exhibitions will be located in Room 208, Arts Lecture Hall; the setup time will be 4:30 – 6:00 pm on Sunday, June 12, and they will be in place for the entire duration of the conferences, and can be viewed during coffee breaks and lunches. The formal viewing time for the posters and exhibitions is scheduled on Tuesday, June 14, from 4:40 to 5:40 pm.

## IGEC 2005 Schedule – Sunday June 12, 2005

Both the workshop and the registration will be held in the Arts Lecture Hall (ALH)

Time	Activities	
8 am – 7 pm	<b>Conference Registration</b> (in the foyer of Arts Lecture Hall building)	
	<b>Workshop on Fuel Cells and Hydrogen</b> <b>Organizers: Pierre B�nard and Robert Varin</b> <b>Room 105</b>	<b>Tour to Toronto</b>
9:00 am	Opening remarks	Tour to Toronto will be leaving at 9:00 am at Ron Eydt Village, University of Waterloo, and will return around 5:00 pm.
9:15 am	Fuel Cells & Issues Brant Peppley, Royal Military College, Kingston, Canada	
10:00 am	Storage of Hydrogen on Carbon, Richard Chahine, Universit� du Qu�bec � Trois-Rivi�res, Canada	
10:45 am	<b>Coffee Break</b>	
11:00 am	Chemical Hydride Storage Boyd Davis, Queen’s University, Ontario, Canada	
11:45 am	<b>Lunch Break</b>	
1:00 pm	Crystal Structure of Ball Milled Hydrogen Storage Materials, Jacques Huot, Universit� du Qu�bec � Trois-Rivi�res, Canada	<b>Mini-Green Energy Symposium</b> (for Gifted Pre-College Students)  Organizers:  Diane McInnis, Association for Bright Children Roydon Fraser, University of Waterloo
1:45 pm	Computational Modeling of Polymer Electrolyte Fuel Cells, Jon Pharoah, Queen’s University, Canada	
2:30 pm	How SOFCs Can Help to Turn a Fossil Fuel to a Kyoto Friendly Fuel, Fran�ois Gitzhofer, Universit� de Sherbrooke, Sherbrooke, Canada	
3:15 pm	<b>Coffee Break</b>	
3:45 pm	Hydrocarbon Fuel Reforming Eric Croiset, University of Waterloo, Waterloo, Canada	
4:30 pm	End of Workshop	
4:30 – 6:00 pm	<b>Poster and Exhibition Setup (in Room 208)</b>	
6:00 – 9:30 pm	<b>Registration Reception (In Arts Lecture Hall)</b>	

**IGEC 2005 Schedule – Monday June 13, 2005 (Morning) – All sessions are held in Arts Lecture Hall (ALH)**

<b><i>Time</i></b>	<b><i>Room 116</i></b>
8 am – 4:30 pm	<b>Conference Registration</b>
9:00 – 9:30 am	<b>Opening Session:</b> Conference Chair, Dr. Xianguo Li UW President, Dr. David Johnston Government Representatives CSME Representative
9:30 – 10:00 am	<b>COFFEE BREAK</b>
10:00 – 10:40 am	<b>Theme Presentation: Xianguo Li, University of Waterloo Green Energy for Sustainable Development and Energy Security: What, Why and How</b>
10:40 – 11:20 am	<b>Plenary Lecture: Vicky J. Sharpe, President and CEO, SDTC (Sustainable Development Technology Canada)</b>
11:20 – 12:00 noon	<b>Keynote Lecture: Charles Stone, Vice President of Research &amp; Development, Ballard Power Systems Inc., Canada, Technology Leadership: A Road Map to Commercially Viable PEMFC Stack Technology</b>
12:00 – 1:30 pm	<b>LUNCH</b>

**IGEC 2005 Schedule – Monday June 13, 2005 (Afternoon) – All sessions are held in Arts Lecture Hall (ALH)**

<b>Time</b>	<b>Room 116</b>	<b>Room 105</b>	<b>Room 124</b>
1:30 – 2:10 pm	<b>Keynote Lecture: <a href="#">Dr. Adrian Bejan</a>, Duke University, Constructal Theory of Energy-System and Environment Flow Configurations</b> Session Chair: Ibrahim Dincer		
	<b>PEM Fuel Cells I</b> Session Chair: Zuoming Dong	<b>Emission Abatement I</b> Session Chair: Eric Croiset	<b>Energy Efficiency Improvement I</b> Session Chair: Kalyan Annamalai
2:10 – 2:30 pm	153: PEM fuel cell modeling at NRC-IFCI, by Zhong-Sheng (Simon) Liu	152: Current status of NOx prediction by conditional moment closure method for turbulent nonpremixed flames, K.Y. Huh	ID02: Appliance choice functions in Canadian households, by M. Aydinalp, A. Fung and V.I. Ugursal
2:30 – 2:50 pm	148: Sustainable design of fuel cell systems and components, by David Frank	053: Fugitive vapor gas emissions from fuel tanks, by Papa Cisse and Ghazi A. Karim	004: Similarities between pinch analysis and classical blast furnace analysis methods. Possible improvements by synthesis, by C. Ryman, C.E. Grip, Per-Åke Franck and Jan-Olov Wikström
2:50 – 3:10 pm	010: Relative permeability and capillary pressure for two phase flow in porous media: a capillary network analysis, by B. Markicevic and N. Djilali	058: Impacts on CO <sub>2</sub> emission allowance of EU emission trading scheme (ETS) in a Swedish steel plant by clean development mechanism (CDM), by C. Wang, M. Larsson, JinyueYan and J. Dahl	003: Experimental and theoretical development of a thermal design tool for radiant domestic stoves, by K. Ghali, N. Ghaddar and M. Salam
3:10 – 3:30 pm	035: Water removal characteristics of parallel serpentine channels, by Kui Jiao, Biao Zhou and Peng Quan	031: Active burner-aerodynamics control for pulverised-coal combustor pollutant abatement, by S. A. M. Zaidi, P. G. Costen, and F. C. Lockwood	134: Experimental investigation of cooling oil flow in disk-type transformer windings with zigzag flow passages, by J. Zhang and X. Li
3:30 – 3:50 pm	<b>COFFEE BREAK</b>		
	<b>Fuel Cell Application</b> Session Chair: Biao Zhou	<b>Wind Energy I</b> Session Chair: Andrew Rowe	<b>Hydrogen Storage</b> Session Chair: Peter Berg
3:50 – 4:10 pm	125: Modelling and design optimization of low speed fuel cell – battery hybrid electric vehicles, by M. Guenther and Z. Dong	156: MEP family of wind speed distribution function and comparison with the empirical Weibull distribution, by M. Li and Xianguo Li	105: Specific surface effects on the storage of hydrogen on carbon nanostructures, by Philippe Lachance and Pierre Bénard
4:10 – 4:30 pm	087: Optimization of a fuel cell powertrain for a sport utility vehicle, by M.B. Stevens, C. Mendes, T.J. Mali, M.W. Fowler and R.A. Fraser	097: Utility-scale Wind Power: Impacts of increased penetration, by L.Pitt, C. van Kooten, M. Love and N. Djilali	080: Impacts of External Convection on Release Rates in Metal Hydride Storage Tanks, by Brendan MacDonald, Andrew Rowe, Jeremy Tomlinson and Jonathan Ho
4:30 – 4:50 pm	145: Fuel cell two-wheelers: good market potential in shanghai and the suggestions for development, by Liguang Li, Z. Yu and H. Gong	025: Incorporating wind into a utility's energy mix through hybrid generation, by Larry Hughes, Kathleen Bohan, Ariesta Ningrum and J. Singh	006: Hydrogen desorption properties of Mg-based nanocomposites with catalytic metals V, Y and Zr for solid state hydrogen storage, by T. Czujko, R.A.Varin, S. Józwiak and Z. Komorek

**IGEC 2005 Schedule – Tuesday June 14, 2005 (Morning) – All sessions are held in Arts Lecture Hall (ALH)**

<b>Time</b>	<b>Room 116</b>	<b>Room 105</b>	<b>Room 124</b>
8 am – 4:30 pm	<b>Conference Registration</b>		
8:30 – 9:10 am	<b>Keynote Lecture: <a href="#">Dr. Chung K. (Ed) Law</a>, Princeton University, The Role of Combustion in Hydrogen Economy</b> Session Chair: Xianguo Li		
	<b>PEM Fuel Cells II</b> Session Chair: Jin Hongguang	<b>Distributed Power Systems</b> Session Chair: Paul Parker	<b>Low Emission Engines I</b> Session Chair: Ida Wierzba
9:20 – 9:40 am	014: Finite element analysis of a PEM fuel cell membrane-electrode assembly under compression, by D.J. Brodrecht, S. Liu and N. Djilali	045: A review of energy conversion technologies, and trends in development of micro-power production systems for stand-alone distributed sensor applications, by J. Gagliardo & E. Hensel	065: The application of H <sub>2</sub> in S.I. engines, by Hailin Li, W. Stuart Neill and Ghazi A. Karim
9:40 – 10:00 am	051: A multi-phase, multi-component pem fuel cell model, by J.J. Baschuk and Xianguo Li	ID09: Optimal planning of gas turbine cogeneration system based on linear programming, by Si-Doek Oh and Ho-Young Kwak	127: Impacts of internal fuel reforming and varied levels of EGR on ethanol/air HCCI combustion - a second law analysis, by G. Gnanam, M. Johnson, A. Sobiesiak and G. Reader
10:00 – 10:20 am	046: Yield condition for the water droplet mobility in the channel of a PEM fuel cell, by Amirreza Golpaygan and Nasser Ashgriz	054: Role of green energy towards India's energy security, by Amitkumar Rawool and Sushanta K. Mitra	140: A study on the criterions of lean burn limit for an LPG EFI engine, by Li Liguang, Z. Wang, Z. Xiao, H. Wang, Deng Baoqing and Su Yan
10:20 – 10:40 am	<b>COFFEE BREAK</b>		
	<b>PEM Fuel Cells III</b> Session Chair: Francis Chang	<b>Energy Economics</b> Session Chair: Michael Collins	<b>Low Emission Engines II</b> Session Chair: Ghazi Karim
10:40 – 11:00 am	126: Optimization of a fuel cell system based on empirical data of a PEM fuel cell stack and the generalized electrochemical model, by J. Wishart, M. Secanell, Z. Dong and G. Wang	150: Alternative fuels for power generation options in medium-range planning: thermo-economic analysis, by J.O. Jaber and A. Al-Sarkhi	108: A preliminary dynamic thermal model for diesel oxidation converters with active flow control, by L. Zhang, G. Zhao, X. Xu, G.T. Reader and Ming Zheng
11:00 – 11:20 am	061: Effect of sulphuric acid concentration on electroosmotic flow through polymer electrolyte membranes in PEM fuel cells, by G. Karimi and Xianguo Li	147: Environmental and economic aspects of hydrogen production and utilization in fuel cell vehicles, by Mikhail Granovskii, Ibrahim Dincer and Marc A. Rosen	151: Cold-start characteristics at low temperatures based on the first firing cycle in an LPG engine, by Zhimin Liu, Liguang Li, Baoqing Deng, Yongping Zhang, Zongcheng Xiao and Changming Gong
11:20 – 11:40 am	034: Liquid water behavior in straight-parallel-channels for PEMFC cathode, by Kui Jiao, Biao Zhou and Peng Quan	078: Economical analysis of hydrogen production by autothermal reforming of hydrocarbons in a novel membrane reformer, by Z. Chen and Said S.E.H. Elnashaie	ID20: Performance Simulation of a Basic Combined Cycle Cogeneration System, by B. Law and B.V. Reddy
11:40 – 12:00	044: Mathematical modeling of transport processes in 2-dimensional PEMFC, by Santosh Mishra and Sushanta K. Mitra	007: Impact of environmental cost on economics of thermal power plant, by H. Chandra, S.C. Kaushik and A. Chandra	154: The effect of test apparatus material on the values of flammability limits of gaseous fuels at elevated temperatures, by Q. Wang and I. Wierzba
12:00 – 1:30 pm	<b>LUNCH</b>		

**IGEC 2005 Schedule – Tuesday June 14, 2005 (Afternoon) – All sessions are held in Arts Lecture Hall (ALH)**

<b>Time</b>	<b>Room 116</b>	<b>Room 105</b>	<b>Room 124</b>
1:30 – 2:10 pm	<b>Keynote Lecture: <a href="#">Dr. Chao-Yang Wang</a>, Pennsylvania State University, Recent Advances in Micro and Portable Fuel Cells</b> Session Chair: Pierre Benard		
	<b>PEM Fuel Cells IV</b> Session Chair: Sushanta Mitra	<b>Wind Energy II</b> Session Chair: Roydon Fraser	<b>Hydrogen Production I</b> Session Chair: Kristopher Ahlers
2:10 – 2:30 pm	073: Evaluation of AECL catalysts for hydrogen fuel-cell applications, by Jintong Li, S. Suppiah, H. Li, K.J. Kutchcoskie and S. Strikwerda	133: Assessment of wind energy potential for Waterloo Region, Canada, by Meishen Li and Xianguo Li	083: Impacts of seasonality on hydrogen production using natural gas pressure letdown stations, by J. Maddaloni, A. Rowe, R. Bailey and J. D. McDonald
2:30 – 2:50 pm	081: Investigation of concentration overpotential distribution in a polymer electrolyte fuel cell, by K. Tajiri, X. G. Yang, C. Y. Wang and K. Shinohara	017: Integrating wind power in electricity grids: an economic analysis, by Jia Liu, G. Cornelis van Kooten and Lawrence Pitt	079: Optimization of process parameter and reformer configuration for hydrogen production from steam reforming of heavy hydrocarbons, by Zhongxiang Chen and Said S.E.H. Elnashaie
2:50 – 3:10 pm	062: Flow network analysis in pem fuel cells incorporating minor losses, by G. Karimi and Xianguo Li	055: An assessment of energy options for a remote first nation community, by C. Ianniciello, P. Wild, L. Pitt and S. Artz	143: Potential of producing renewable hydrogen from livestock animal waste, by Francis H. Chang
3:10 – 3:30 pm	<b>COFFEE BREAK</b>		
3:30 – 4:40 pm	<b>Expert Panel Session on Fuel Cells</b> <b>Panellists:</b> <ul style="list-style-type: none"> <li>• Dr. Charles Stone, VP R&amp;D, Ballard Power Systems</li> <li>• Dr. David Frank, Director of Technology, Hydrogenics Corporation</li> <li>• Dr. Nguyen Q Minh, GE Energy, U.S.A.</li> </ul> <b>Moderator:</b> Xianguo Li		
4:40 – 5:40 pm	<b>Poster Presentation and Exhibition (Room 208)</b>		
6:00 – 9:30 pm	<b>Conference Banquet</b> <b>At Transylvania Club, Kitchener</b> (Bus will leave at 5:45 pm from Ron Eydtt Village, University of Waterloo)		

**IGEC 2005 Schedule – Wednesday June 15, 2005 (Morning) – All sessions are held in Arts Lecture Hall (ALH)**

<b>Time</b>	<b>Room 116</b>	<b>Room 105</b>	<b>Room 124</b>
8 am – 4:30 pm	<b>Conference Registration</b>		
8:30 – 9:10 am	<b>Keynote Lecture: <a href="#">Dr. S.S.E.H. Elnashaie</a>, Auburn University and University of British Columbia, Efficient Production and Economics of the Clean Fuel Hydrogen</b> Session Chair: Xianguo Li		
	<b>PEM Fuel Cells V</b> Session Chair: Simon Liu	<b>Ocean Energy</b> Session Chair: Lawrence Pitt	<b>Hydrogen Production II</b> Session Chair: Torii Shuichi
9:20 – 9:40 am	110: Fluid mechanics of serpentine flow-fields on a porous media, by J.G. Pharoah	085: Wave power integration with a renewable hydrogen energy system, by L. St.Germain, P. Wild and A. Rowe	092: Circulating fluidized bed reformer-regenerator system for hydrogen production from methane, by Pradeep Prasad and Said S E H Elnashaie
9:40 – 10:00 am	096: potential integration of gas infusion into a fuel cell system, by L. Qiu, M.W. Fowler, M. Ioannidis, J. Archibald and C. Glassford	039: Worldwide tidal current energy developments and opportunities for Canada's Pacific coast, by Niel Pearce	094: Co-generation of hydrogen from nuclear and wind: the effect on costs of realistic variations in wind generation, by A.I. Miller and R.B. Duffey
10:00 – 10:20 am	036: Water behavior in a u-shaped flow channel of pem fuel cells, by Peng Quan, Biao Zhou, Andrzej Sobiesiak and Zhongsheng Liu	137: Ocean renewable energy and the technological development in Canada, by Nigel Protter	144: Methanol steam reforming using an internal recycle reactor, by Aidu Qi, John C. Amphlett, Christopher P. Thurgood and Brant A. Peppley
10:20 – 10:40 am	<b>COFFEE BREAK</b>		
	<b>PEM Fuel Cells VI</b> Session Chair: Jon Pharoah	<b>Exergy Analysis</b> Session Chair: Alan Fung	<b>CO<sub>2</sub> Capture and Sequestration</b> Session Chair: Jerry Yan
10:40 – 11:00 am	135: Conducting polymer and biofuel cells, by Yujie Han, Y. Furukawa and M. Takeyuki	ID24: Micro-gas turbine performance optimization by off-design characteristics prediction, by M.B. Asgari and H. Pahlevanzadeh	009: Photo-reduction of CO <sub>2</sub> into gaseous hydrocarbon through photocatalytic process, by Seng Sing Tan, Linda Zou and Eric Hu
11:00 – 11:20 am	089: Thermoplastic composite bipolar plates for polymer electrolyte membrane fuel cells, by T.J. Mali, M.W. Fowler, M.B. Stevens, C. Tzoganakis and L. Simon	ID23: Exergetic optimization of the part-flow evaporative gas turbine cycles, by M. Yari and K. Sarabchi	107: Techno-economic study of CO <sub>2</sub> Capture processes for cement plants, by S. M. Nazmul Hassan, Peter L. Douglas and Eric Croiset
11:20 – 11:40 am	086: Construction of a dynamic model for a PEM power module with applications to distributed power generation, by Z. Zhang, J. Jiang & B. Wu	ID19: Optimal design of a multifunctional aircraft skin with energy harvesting via entropy generation minimization, by K. Ahlers, R., McCarty, K. Hallinan and B. Sanders	091: Experimental studies on mass transfer of CO <sub>2</sub> in a saline aquifer, by Chaodong Yang, Asok Kumar Tharanivasan and Yongan Gu
11:40 – 12:00	124: The effect of test configuration on the true operating conditions of PEM fuel cells, by Todd Simpson and Xianguo Li	022: Exergetic optimization of a PEM fuel cell for domestic hot water heater, by M.H. Saidi, A. Abbassi, M. Aliehyaei	070: Modeling acid-gas injection in deep saline aquifers for geological sequestration, by Jing Zhou and Peng Luo
12:00 – 1:30 pm	<b>Sit-down LUNCH At Festival Room in South Campus Hall</b>		

**IGEC 2005 Schedule – Wednesday June 15, 2005 (Afternoon) – All sessions are held in Arts Lecture Hall (ALH)**

<b>Time</b>	<b>Room 116</b>	<b>Room 105</b>	<b>Room 124</b>
1:30 – 2:10 pm	<b>Keynote Lecture: <a href="#">Dr. Peter Frise</a>, AUTO21 Program Leader &amp; CEO, Innovations for the Automobile of the Future</b> <b>Session Chair: Marc Rosen</b>		
	<b>Solid Oxide Fuel Cells</b> <b>Session Chair: Andrzej Sobiesiak</b>	<b>Renewable Energy Systems</b> <b>Session Chair: David Jackson</b>	<b>Waste Management</b> <b>Session Chair: Ian Rowlands</b>
2:10 – 2:30 pm	099: Mathematical modeling of current density distribution in composite cathode of solid oxide fuel cells, by Ben Kenney and Kunal Karan	093: Renewable regenerative energy systems: practical integration challenges, by A. Bergen, N. Djilali, L. Pitt, A. Rowe and P. Wild	106: Fleet-wide CO <sub>2</sub> emissions reduction using mixed integer linear programming (MILP), by Haslenda Hashim, Ali El kamel, Peter Douglas, Eric Croiset
2:30 – 2:50 pm	103: Mechanistic modelling of a cathode-supported tubular solid oxide fuel cell, by R. Suwanwarangkul, E. Croiset, M. D. Pritzker, M. W. Fowler, P. L. Douglas and E. Entchev	114: Replacing coal power in Canada with renewable energy, by C. Hadlock, V. Kansal and M. Kegel	090: Interfacial tension phenomenon and mass transfer process in the reservoir brine-CO <sub>2</sub> system at high pressures and elevated temperatures, by D. Yang, P. Tontiwachwuthikul and Yongan Gu
2:50 – 3:10 pm	100: Comparison of LSM and LSCF cathodes of solid oxide fuel cells by AC-impedance spectroscopy, by Ben Kenney and Kunal Karan	123: Sustainable energy strategies for green energy supply, by A. Midilli, M. Ay and I. Dincer	ID22: Modeling of pollutants emissions from utility boilers, by K. Sarabchi and H. Khaledi
3:10 – 3:30 pm	048: Multi-component mathematical model of SOFC anode using coal gasified fuel, by M.M. Hussain, X. Li and I. Dincer	117: Estimation of land surface temperature based on satellite image data, by Shuichi Torii, T. Yano and N. Iino	024: Waste and energy management at airports, by Vildan Korul and Mustafa Ozen
3:30 – 3:50 pm	<b>COFFEE BREAK</b>		
	<b>Fuel Cells</b> <b>Session Chair: Liguang Li</b>	<b>Geothermal Energy</b> <b>Session Chair: Birol Kilkis</b>	<b>Biomass Energy</b> <b>Session Chair: Barry Hyman</b>
3:50 – 4:10 pm	098: Process modeling of a wastewater-biogas fuelled solid oxide fuel cell system Based on a survey of WWTP in Ontario, by I. R. Wheeldon, C. Caners, K. Karan and B.A. Peppley	066: Performance investigation of the Turkish geothermal district heating systems (GDHSs), by Leyla Ozgener, Arif Hepbasli and Ibrahim Dincer <b>(moved to poster presentation)</b>	128: Feedlot biomass co-firing: a renewable energy alternative for coal-fired utilities, by S. Arumugam, B. Thien, K. Annamalai and J. Sweeten
4:10 – 4:30 pm	122: Life cycle analysis of fuel cell vehicles and internal combustion engine vehicles based on Canadian situation, by N. Zamel and X. Li	ID15: Performance analysis of a single-flash - binary cycle geothermal power plant: A case study for Kizildere and Germencik in Turkey, by H.K. Ozturk, O. Atalay and A. Yilanci	ID01: Technoeconomic Analysis of a Biomass Based District Heating System, by H. Zhang, V.I. Ugursal and A. Fung
4:30 – 4:50 pm	142: A Comparative evaluation of energy Storage systems for a fuel cell vehicle, by J. Marshall and M. Kazerani	067: Energy and exergy efficiencies of ground-source heat pump systems (GSHPs) for residential applications, by Onder Ozgener, Arif Hepbasli and Ibrahim Dincer <b>(moved to poster presentation)</b>	ID14: A calibrated energy end-use model for the U.S. chemical industry, by Nesrin Ozalp and Barry Hyman
4:50 – 5:10 pm	101: Fabrication of thin electrolyte film by electrophoretic deposition for intermediate-temperature solid oxide fuel cells, by Mike Lankin and Kunal Karan	116: Thermal-Fluid Characteristics in Diffusion Flame Formed by Coaxial Flow Configuration, by Shuichi Torii	071: Reproduction of fresh water by desalination installations, by V.N. Slecarenko



**IGEC 2005 Schedule – Thursday June 16, 2005 (Morning) – All sessions are held in Arts Lecture Hall (ALH)**

<b>Time</b>	<b>Room 116</b>	<b>Room 105</b>	<b>Room 124</b>
8 am – 4:30 pm	<b>Conference Registration</b>		
8:30 – 9:10 am	<b>Keynote Lecture: <a href="#">Dr. Brant Peppley</a>, Royal Military College of Canada, Biomass for Fuel Cells: A Technical and Economic Assessment</b> Session Chair: Robert Varin		
	<b>Direct Methanol Fuel Cells</b> Session Chair: <b>Jingtong Li</b>	<b>Solar Energy</b> Session Chair: <b>Ho-Young Kwak</b>	<b>Refrigeration &amp; Air Conditioning</b> Session Chair: <b>Thomas P. Seager</b>
9:20 – 9:40 am	021: Intelligent structure design of membrane cathode assembly for direct methanol fuel cell, by K. Furukawa, K. Makino, K. Okajima, H. Minakuchi, Y. Okano and M. Sudoh	136: Combined photovoltaic and solar-thermal systems: overcoming barriers to market acceptance, by M. Collins	131: Scheme-selection optimization of the air-conditioning cool and heat sources system based on exergy analysis method, by G.C. Gong, W. Zeng, S.J. Chang, J. He, K.Q. Li and K. Chen
9:40 – 10:00 am	075: A methanol crossover model for Flowing Electrolyte Direct Methanol Fuel Cells, by E. Kjeang, J. Goldak, M. R. Golriz and J. Gu	149: Cost-effective Silicon-based Solar Cells: Material and Technology Issues, by Siva Sivorthaman and Mahdi Farrokh Baroughi	084: Near room-temperature magnetic refrigeration, by A. Rowe, A. Tura, J. Dikeos and R. Chahine
10:00 – 10:20 am	060: Lattice Boltzmann simulation on the liquid junction potential in a concentration fuel cell, Jaewan Park, Kang Y. Huh, Xianguo Li	020: A novel thermal cycle with chemical looping combustion, by Hui Hong and Hongguang Jin	008: Renewable Energy Systems - The Environmental Impact Approach, by C. Koroneos
10:20 – 10:40 am	<b>COFFEE BREAK</b>		
	<b>Fuel Cell Initiatives</b> Session Chair: <b>Michael Fowler</b>	<b>Energy Policy</b> Session Chair: <b>B.V. Reddy</b>	<b>Energy Efficiency Improvement II</b> Session Chair: <b>Kambiz Rezapour</b>
10:40 – 11:00 am	138: Hydrogen Village, Hydrogen Highway, Vancouver Fuel Cell Vehicle Program and Hydrogen Corridor: Program and Progress, by Ry Smith, Manager, Hydrogen Village Program	032: The quest for a zero GHG emission province: Can Manitoba offer Ontario energy lessons? by P. Parker and I.H. Rowlands	013: Management of energy challenges at SSAB Tunnsplåt AB, the largest steel producer of strip products in Scandinavia, by Carl Erik Grip and Göran Andersson
11:00 – 11:20 am		111: The need for consistent policy, education and social change in the pursuit of greenhouse gas emission reductions, by J.G. Pharoah	041: Separation of magnetic fractions from coal by magnetic separation method, by Meryem Seferinoğlu
11:20 – 11:40 am	159: A computational study of enzyme patterning on microfluidic biofuel cell electrodes, by E. Kjeang, D. Sinton, D. Harrington and N. Djilali	038: Aspirations and expectations: public views on electricity supply in Ontario, Canada, by Ian H. Rowlands and Paul Parker	002: Cost & performance optimization of natural draft dry cooling towers using genetic algorithm, by Dr. H.Shokuhmand and B.Ghaempanah
11:40 – 12:00		074: Business cycles and the financial performance of fuel cell companies, by Irene Henriques and Perry Sadorsky	042: Measurement of diffusion coefficients of pyridine in çayirhan lignite, by Meryem Seferinoğlu and Yuda Yürüm
12:00 – 1:30 pm	<b>LUNCH</b>		

**IGEC 2005 Schedule – Thursday June 16, 2005 (Afternoon) – All sessions are held in Arts Lecture Hall (ALH)**

<b>Time</b>	<b>Room 116</b>	<b>Room 105</b>	<b>Room 124</b>
1:30 – 2:10 pm	<b>Keynote Lecture: <a href="#">Dr. Marc Rosen</a>, University of Ontario Institute of Technology, The Role of Exergy in Increasing Utilization of Green Energy and Technologies</b> Session Chair: Sadik Dost		
	<b>Heat Pumps</b> Session Chair: Kazim Sarabchi	<b>Energy Education</b> Session Chair: Siva Sivoththaman	<b>Sustainable Energy</b> Session Chair: M.Y. Jaber
2:10 – 2:30 pm	129: Study on CO <sub>2</sub> automobile heating system, by Shitong Zha and Armin Hafner	005: Hydropower engineering, by Michel Cervantes	121: Is nuclear power environmentally sustainable? By David P. Jackson
2:30 – 2:50 pm	132: Exergy analysis for an air-source heat pump system with economizer coupled with scroll compressor, by Guoyuan Ma and Xianguo Li	047: Green energy education programs and demonstrations at Kortright Centre for Conservation, by Alex Waters	ID05: A hybrid wall panel HVAC system, by B.I. Kilkis
2:50 – 3:10 pm	ID07: On optimizing the performance of an air cycle heat pump using a recuperator, by Kayvan Sadeghy, Meghdad Saffaripour and Reza Ramazani-Rend	119: Energy, Environment, sustainable development and the new challenges of the information era, by Luís Miguel Pereira Horta	155: Exergoeconomic analysis of glycol cold thermal energy storage systems for building applications, by K. Bakan, I. Dincer and M.A. Rosen
3:10 – 3:30 pm	ID06: Distillation curves under the influence of temperature and particle size of Ellajjun oil shale, by Omar Al-Ayed	146: A study on the possibility of cooling of schools by natural wind flow, by K. Setodemaram, A.A. Golneshan and Kh. Jafarpur	ID04: On the thermodynamic treatment of diffusion-like economic commodity flows, by R.Y. Nuwayhid, M.Y. Jaber, M.A. Rosen, and G.P. Sassine
3:30 – 3:50 pm	<b>COFFEE BREAK</b>		
		<b>Energy Efficiency Improvement III</b> Session Chair: Xianguo Li	<b>Low Emission Engines III</b> Session Chair: Ibrahim Dincer
3:50 – 4:10 pm		069: New General Correlations for Pure Chevron Plate Heat Exchangers, by Mazen M. Abu-Khad	068: Study of mixing enhancement by a bump ring in a combustion chamber, by Wanhua Su and Xiaoyu Zhang
4:10 – 4:30 pm		104: Analysis for SEER of variable speed room air conditioner in China, by Ma Yitai, Liu Shengchun, and Ma Lirong	072: Analysis on reduced chemical kinetic model of n-heptane for HCCI combustion, by Mingfa Yao and Zhaolei Zheng
<b>IGEC-1 Concludes</b>			
<p><b>Note:</b> Tour to Niagara Falls will be leaving at 9:00 am at Ron Eydt Village, University of Waterloo, and will return around 5:00 pm.</p>			

## ***Other Important Events and Meetings:***

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<b>Event</b>	<b>Time</b>	<b>Place</b>	<b>Details</b>
Tuesday, June 14 Editorial Board Meeting, International Journal of Green Energy	11:30 am – 1: 30 pm	University Club	For direction to the meeting room, ask at the registration desk
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