2016 IEEE Canada Electrical Power and Energy Conference (EPEC)

Fifteen years after this now national IEEE Canada conference began as an Ottawa symposium, a formidable organizing team gives it their best again

Held on October 12-14 in Ottawa, EPEC 2016 brought attention to new concepts and technologies that are being developed, deployed, and integrated in the evolving power system. A concept explored in detail was Smart Grid, which merges together many hi-tech and traditional power engineering disciplines to a degree inconceivable only a few years ago. This is a fundamental aspect of grid modernization and of the integrated power system of the future. At the same time, the power system must remain robust, reliable, efficient, and cost-effective. With the theme *Smart Grid and Beyond: Future of the Integrated Power System,* EPEC 2016 embraced these extraordinary opportunities and challenges.

The venue for the event was Ottawa's Shaw Centre. Featuring sweeping expanses of glass and steel, its futuristic architecture was in phase with the conference's forward-looking theme. Lunch and break service under the glass dome and natural light created a very positive atmosphere.

EPEC 2016 showcased four keynote presentations, 122 peer-reviewed technical papers (out of 198 initial submissions), 19 industry presentations, three industry panels, an industry course, a workshop, three tutorials and 12 exhibitors. The Industry Program (IP) was shaped up by the IP Committee in conjunction with the Technical Program Committee. Having a track specifically targeting industry brought greater participation from that sector. This innovation was particularly successful and signals a likely future direction of the EPEC.

On Thursday morning, The Honourable Sergio Marchi, P.C., President and CEO, Canadian Electricity Association, delivered a keynote "Electricity: A Strategic Asset for a Greener, More Prosperous Future." He emphasized the importance of building tomorrow's economy on a solid foundation of clean, sustainable growth that will drive new technologies, increase productivity, and create good jobs for Canadians. By addressing existing regulatory and policy gaps, Canadian utilities can be incentivized to launch pilot projects and conduct technology trials that will help reduce emissions, increase efficiency and make Canada a leader in the high-margin knowledge-economy.

L to R: *Raed Abdullah* of Hydro Ottawa, Gen. Conference Co-Chair; *Colin Clark,* a Conference Honourary Chair and Keynote Speaker; *The Honourable Sergio Marchi,* a Keynote Speaker; *Dr. Branislav Djokic* of NRC in Ottawa, Gen. Conference Co-Chair; and *Natalie Krauser McCarthy,* representing the IEEE PES Scholarship Plus Initiative.

Mr. Marchi ended on a positive note that the Canadian electricity sector is Canada's clean energy solution, and that by harnessing the power of clean, safe, and reliable electricity, Canada is well positioned to lead. His keynote generated a lot of interest and developed into a lively discussion in which virtually everybody in the audience participated.

At the banquet, Colin Clark, CTO of Brookfield Renewable, gave an outstanding keynote: "Our Heritage and Future in Power: The Evolution and Future of Electric Power Systems." He pointed to electrification as a basis of the progress of modern civilization, with electric power systems having enabled this remarkable development. Having evolved over many decades, these systems are now accommodating unprecedented change to the methodology for the production of electricity and its delivery to users. This transition is driven by emerging social expectations, environmental standards, economics, and rapid rise of technology, reshaping power systems as we know them. After an insightful account of the evolution of electric power systems, Mr. Clark explored the outlook for the future of the sector that we all depend on.

On Friday, Dr. Tom Murad, Head of Siemens Canada Engineering and Technology Academy, gave an intriguing keynote "Smart Cities – Our Understanding." He elaborated on smart-city and smart-building concepts, and state-of-the-art technology solutions for the benefit of people, administration, business, and environment. He also stressed the necessity of efficient transportation and reliable energy supply in metropolitan areas, the latter complicated by growing energy needs and the fluctuating nature of renewable sources. The presentation caught the imagination of the audience whose numerous questions and answers ran up to the subsequent session.

The industry panels were on Hydro Power, moderated by Jean Pellerin of Brookfield Renewable; on Climate Change and Impact on the Industry, moderated by Richard St-Jean of Brookfield Renewable; and on Energy Storage, moderated by Dr. Adam

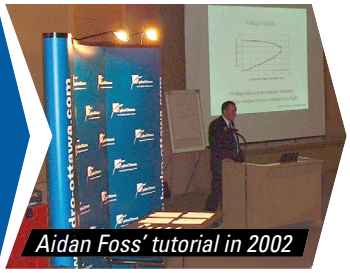
A View from Across the Pond

By Dr. Ivana Kockar, Senior Lecturer, University of Strathclyde, Glasgow, UK

THIS CONFERENCE was a great opportunity for me to compare issues and solutions related to Canadian grids with the ones in the UK. Currently, I am mainly working on developing new methodologies and tools for the integration of Renewable Generation and Distributed Energy Resources into electricity networks. This is a really complex question that needs to look not only into technical solutions, but also economics/markets, as well as social aspects of engaging with customers. My discussions with a number of colleagues on these topics were really interesting.

As someone who obtained a Ph.D. from McGill University in Montréal, a move to the UK provided me with the opportunity to expand my knowledge and learn new approaches to various issues. Thus, it was really great to hear again about approaches to demand-side participation or new techniques/solutions applied here in Canada. At the moment, in the UK, distribution networks are affected by significant penetration of distributed gen-

EPS/EPEC: Keeping pace with the changing electrical power landscape



Aidan Foss' tutorial in 2002

The Electrical Power and Energy Conference originated from a series of Electrical Power Symposia (EPS) held in Ottawa annually 2001-2006. Subsequently, the conference was held in other cities across Canada. EPEC is now an established international forum (close to 50% of attendees come from outside of Canada) for the presentation of peer-reviewed papers, industry presentations, and other learning opportunities related to power and energy research, development, and applications. It is an exceptional opportunity for experts from academia, industry, government and other organizations from Canada and abroad to get together, and discuss the latest developments, trends, and issues, including those on the potential societal impact.

From its beginnings, the conference has been highly responsive to a fast-changing electrical power landscape. The prime driver for the first Electrical Power Symposium was a need to address deregulation and its implementation in the electricity industry in Ontario in 2001. At EPEC 2016, Bashir Bhana, a Planner at the Ontario IESO, gave the first keynote "The Ontario

Photo: Manisha Wanniarachchige

Participants from the WIE Panel, one of three co-located events held the last day of EPEC 2016. *L to R, standing:* [1]Linda Tang, [2]Cheryl Tollola, [3]Manar Al-Shaebi, [4]Geneviève Favreau, [5]Elena Uchiteleva, [6]Dr. Ferial El-Hawary, [7]Dr. Joan Haysom, [8]Dr. Melike Erol-Kantarci, [9]Dr. Ivana Kockar, [10]Rachel Vanasse, [11]Alise Wang, *L to R, sitting:*, [12]Jimmy Deng, [13]Nadisha Wanniarachchige, [14]Anjali Wadhera, [15]Irem Bor-Yaliniz.

Tuck of NRC. They were well attended and generated a lot of questions and discussions. The conference offered a two-day industry course "Machine Condition Monitoring for Hydro & Turbo Industries" presented by André Tétreault, of VibroSystM, headquartered in Longueuil, Québec. This course was eligible for Continuing Education Units (CEU) registered with the Engineering Institute of Canada, and was valuable both for the attendees, who were mostly from industry, and for the course provider, as per feedback from Marc Bissonnette, Director of Sales and Business Development at VibroSystM. During the workshop on IEEE Smart Grid Standards, presenters and panelists from IEEE Standards Association stimulated lively discussions with attendees. The tutorials encompassed "Business Opportunities Created by Novel Energy Performance Indicator" by Dr. Constantin Pitis, Powertech Labs Inc.; "Introduction to Smart Grid and Distributed Energy Resources Standards by IEEE SCC21" by Mark Siira, ComRent International, and Wayne Stec, Distregen LLC; and "Planning and Integration of HVDC into the Modern Grid" by Tarek Abdel Galil and Maziar Heidari of SNC Lavalin T&D.

In addition, on Friday the conference hosted three co-located events: a Women in Engineering (WIE) panel, a Special Interest Group on Humanitarian Technology (SIGHT) session, and a joint panel dubbed horizons@EPEC of students, Young Professionals, WIE and SIGHT on "Innovation, Diversity, Sustainability, and Career Preparation." After an engaging discussion, participants explored employment opportunities over wine-and-cheese with local companies' representatives.

The IEEE Ottawa Section organizers, including several of the original EPS/EPEC founders, were enthusiastic to host EPEC 2016. Volunteers' names and roles, and more details on the program, can be found on the conference website (epec2016.ieee.ca).

The organizers extend their thank-you to the sponsors, patrons (Brookfield Renewable, ABB, Carleton University, University of Ottawa, Leidos, and Algonquin College), and exhibitors, whose support was critical for organizing the conference. The thank-you also goes to many volunteers, who dedicated their time and effort over the past two years to make EPEC 2016 a great experience for all. ■

N.Ed. Many thanks to all those who contributed to this report, and especially to Dr. Branislav Djokic, Co-Chair EPEC 2016.

Affiliations of Women in Engineering panel participants:

[1] U. of Ottawa, undergraduate student
[2] Panelist; VP Academic IEEE uOttawa Student Branch, Ottabotics President
[3] Carleton U., B.Eng Biomedical & Elect. Engin. Graduate
[4] Panelist; Toronto Hydro
[5] Panelist; WIE Chair, IEEE Canada; Western U., Ph.D. student
[6] B.H. Engineering Systems Ltd.
[7] Panelist; Leidos
[8] Panelist; U. of Ottawa, Asst. Professor
[9] Panelist; U. of Strathclyde, UK; Sr. Lecturer
[10] Brookfield Renewable
[11] Panelist; EPEC 2016 Patronage Co-Chair; U. of Ottawa, undergraduate student
[12] U. of Ottawa, undergraduate Student
[13] Carleton U., undergraduate student
[14] Carleton, U., B. Eng. graduate
[15] Carleton U., Ph.D. student

eration, while in Canada reducing peak demand seems to be the main concern. Yet, there were also similar problems, such as SmartGrids, SmartCities, and TSO-DSO interactions, which are becoming some of the main research and industrial application questions. Chairing a Technical Paper Session at the conference was an excellent way to become familiar with developments on both sides of the Atlantic.

Another great aspect of the conference was participation of the younger generation of engineers that are just starting their career or are at the end of their studies. The Women in Engineering (WIE) organized a session inviting a number of women both from industry and academia, and at different stages in their careers, to provide some insight into their daily work and place in engineering. Interestingly, none of us even once talked about being a woman engineer – we just talked about how great and rewarding the profession could be, and simply saw ourselves as "engineers." As a panelist, seeing smiling faces and nodding in the audience was so encouraging and genuinely uplifting. I really hope the audience enjoyed the event as much as the speakers did.

It was really great being back in Canada, which still feels as another home – and the great weather and festival of colours was just a cherry on top. ■

Conference Volunteering at Ottawa Section

FROM SPEEDY PASSAGE through registration, to directions in finding the next session, EPEC 2016 volunteers were there in force to help.

How was such a plentiful group brought on board? Although volunteer recruitment didn't kick into high gear until September, for the student portions, the engine was already warming up in Ottawa's blustery days of January. The Student Professional Awareness Conference (SPAC) is an annual event hosted off-campus by the Ottawa Section IEEE Student Branches of Carleton University, University of Ottawa, and Algonquin College. It is promoted as an opportunity to network with other students and with professionals and academics. A networking event it is indeed, and more!

"The student awareness conference promotes IEEE conference volunteer opportunities for the year ahead," says Wolfram Lunscher, EPEC 2016 Local Arrangements Chair. "It gives the section a chance to explain the benefits of participating." Both undergrad and graduate students have reported to him how valuable it was to meet people in their field.

There are no shortages of conferences in Ottawa Section's calendar. In July of this past year, more than a dozen Section members played major roles in EMC 2016. In May of the previous year, the Section hosted IM 2015, and in June, it was IHTC 2015, with similar strong volunteer support. The Section was also a co-sponsor of IHTC 2014 in Montreal. In 2013, the Section hosted RadarCon, and in 2012, the huge International Communications Conference with more than 3,000 delegates.

Ottawa Section has subscribed to a Volunteer Management Software product called InitLive – an investment that proved its worth during EMC 2016, according to Lunscher, who was Volunteer Co-Chair for the event. A web interface allows volunteers to pick their own roles and shifts, while a smartphone app enables organizers to make on-the-fly adjustments. A good thing, too. With sixty volunteers signed up, it was inevitable that even with the most committed recruits, there would be events occurring beyond their control.

"I checked the InitLive messaging first thing in the morning for regrets," explains Lunscher. "If the newly vacant position was high priority – such as supporting a chair – I could quickly reassign someone through the app from a less critical role such as directing attendees. Everyone was informed right away." ■

Planning Outlook (OPO): An Illustration of the Changes Taking Place Across Electrical Systems in Canada and the Western Countries." It nicely reflected on the EPS/EPEC 15-year time distance and provided an informative overview and outlook for Ontario, but also of the issues of national and international relevance.

Dr. Aidan Foss has a unique experience as an EPS founder, and as EPEC 2016 Secretary, Industry Presenter and Exhibitor. He founded two private companies in the electric power field, and EPEC 2016 offered a very good opportunity for presenting his small-hydro controls. "EPEC fills an important gap in the industry," says Foss.

"The electrical power industry has been going through major transitions in Ontario since 2001, then evolving throughout Canada. The conference provides an ideal venue for information sharing on leading edge topics, such as renewable energy and smart grids."

But increasingly, the conferences' offerings on world-wide developments are also drawing participants. Dr. Ivana Kockar is now Senior Lecturer, University of Strathclyde, Glasgow, UK. While pursuing her Ph.D. Degree at McGill University, she attended some of the Ottawa Electrical Power Symposia.

"It was great to see that EPEC has grown from the days when I attended it as a student in about 2002/3, and has established itself as a regular venue for great discussions. Meeting a number of my colleagues from EU, with whom I have common projects, was just another sign of the EPEC's growing internationalization." ■