IEC TC114 Project Teams

- Terminology
- Design Requirements
- Mooring Systems
- Power Quality
- Wave Energy Converters Performance
- Wave Energy Resources
- Wave Energy Converters Performance - 2nd Site
- Guidelines – Wave Energy Converters
- Tidal Energy Converters Performance
- Tidal Energy Resources

Message from the Chair

Happy New Year to everyone. I am very much looking forward to 2014 as there will be significant standards related Canadian contributions and events occurring this year. The primary event to highlight is the hosting of the IEC TC114 Plenary meeting in Vancouver, the week of April 21-25, 2014. This will be only the 2nd time that Canada has hosted this international meeting (Canada hosted the very first TC114 meeting in May 2008) and the first time for a major event on the west coast. We are expecting approximately 50 international delegates over the week long session. During the week, delegates will be involved in discussions on specific standards such as mooring design, design requirements and power quality, to name a few ,and then the week finishes with a meeting of all Heads of Delegation to review work status and update the strategic plan and direction for TC114. It is guaranteed to be a very busy, but fruitful and enjoyable week.

The committee is also organizing two additional face to face meetings. One occurring late spring at a location yet to be determined in the West and the second meeting will coincide with ICOE 2014 in Halifax in November. These meetings will provide the committee members with the opportunity to more deeply discuss specific issues and continue to ensure that all work is proceeding on schedule and that any additional resource requirements are identified.

The committee is continuing to focus on areas on strategic importance to Canada. One prime example is the creation of a new TC114 project team on "River Energy Converter Performance Assessment". An international team will be formed in the spring and it will be convened by a Canadian member. This work follows on from the strong leadership that the Canadian committee is already demonstrating in the areas of Power Quality, Moorings and Conformity Assessment.

Continuing on from the very successful research that was performed by by Mavi (in partnership with University of Victoria and Clean Current) and Hatch in 2013-2014, the committee has once again issued a call for research proposals for the 2014-2015 fiscal year. The amount available has been increased to $150k and the process has been improved based on learnings from last year. We would like to encourage all interested parties to review the RFP and submit a proposal. The deadline is coming quickly so don't miss your opportunity!

One clear indication that the Marine Renewable Energy industry is

- Ocean Thermal Energy Conversion (OTEC) Systems
- Power Performance Assessment for River Energy Converters

maturing is the inclusion of a specific section in the Canadian Electrical Code on hydrokinetic turbines. A team of volunteers from within the committee, as well as several external experts, have gathered to to review the existing section on hydrokinetic turbines to make improvements and updates based on the latest knowledge as well as to broaden the scope to ensure the revised section covers both river and tidal energy converters. The document is planned to be included in the 2015 edition of the Canadian Electrical Code.

If any of the articles in this newsletter pique your interest in the standards development process, please feel free to send me a note and we can discuss potential opportunities to get involved.

Cheers,

Russell Stothers
Chair, Canadian Mirror Committee to IEC TC114

Message from Marine Renewables Canada

The Marine Renewables Canada conference in Ottawa was preceded by a face to face meeting of the Canadian committee and concluded with a review of some of the progress being made. And, despite joking references to the likelihood that having standards as the last session was a guarantee for early departures, the strength of the panel, the full house and the questions and comments all attested to the integration of the standards development into the "prototyping an industry".

Feedback on the week in Ottawa has been extremely positive with comments like "the best event so far", "it felt like a real industry", or "I know I should have been there!". The focus on prototyping an industry was there throughout but perhaps the discussion on financing and that on standards exemplified how the pieces of the marine renewables jig-saw are slotting into place. The financing at the scale needed by the world's first pilot power plants will come from organizations who typically finance projects in mature sectors where risk is managed through standards, insurance, supply chain strength and experience. In fact, supply chain strength and insurance are only going to develop through experience, perhaps leaving standards development as the one area where we can accelerate the risk reduction wanted by the "money-men".

The presenters in the Standards panel showed Canadian leadership in existing and potential standards development work, including progress on the two research initiatives launched specifically to enhance the work of the Canadian committee. In all cases, the presentations showed how members of the Canadian marine renewables community are working to strengthen the existing standards agenda or support an expanded agenda in areas deemed critical to the industry. In all of the discussion about financing and early adoption projects, there was reference to inclusion of current thinking in standards development or rallying around best practices. Russell Stothers' "standards panel" helped reinforce the value for engagement in standards development now by technology developers, supply and service companies and project developers. We may not have definitive standards or certification being looked for by financiers and insurers, but we can assure them that those leading the industry development are engaged in defining what may become those standards and certification using all the experience accumulated to date.

Quick Links

- IEC TC114 Standards Website
- International Electrotechnical Commission (IEC)
- Marine Renewable Energy Technology Roadmap

Project Partners:

Canadian Sub-Committee (SMC/IEC TC114)

- Acadia University
- AMEC Black & McDonald
- Bhuyan Consulting
- CanmetENERGY-NRCan
- Cascadia Coast Research
- Clean Current Power Systems
- CSA Group
- Dalhousie University
- Dynamic Systems Analysis
- Emera
- Glas Ocean Engineering Consulting
- Grantec Engineering
- Mavi

An important aspect of the work revealed during the conference presentations was the extent of international and national collaboration involved even at the level of the research projects. "Competing" technology developers are bringing their experiences, modeling tools and skills together. Experience from other industries is being reworked into this domain. Beyond the direct input to standards development, these projects are demonstrating the need to pool scarce resources for the sake of advancing the entire sector, and individuals within it!

But, 2014 brings a new year, and a distinct new phase in the development of the industry. We are launching another round of funding for standards related research and hope to see new consortia and new projects directly supporting the standards/practices needed by the very near-term transition to development of pilot tidal power plants. With a market-driven approach in place in Nova Scotia as much as $200m will be invested in the next few years, in what might be the world prototype of a 20-30MW tidal power system. The experience to be grown in this development goes well beyond the device performance, encompassing site assessment, design and engineering and a host of operational performance issues associated with deployment, cabling, monitoring, system operation and maintenance. If we are to maintain our place in the leadership of this emerging worldwide industry we need to focus energy in these areas, we do need to collaborate internally and with the best internationally, and, we do need to continue to carve out niches where Canada "writes the book" and will supply the solutions for this industry.

Our work with IEC TC114 (and Conformity Assessment) is a very real opportunity to build confidence in the industry, but is is an opportunity for the committee and project team members to demonstrate Canadian, company and individual strengths. Let's work with the best as well as creating opportunity and expertise for Canada.

Standards work as exemplified in all of the activity in Ottawa last November demonstrates that we are well on the way and ready for the openings that 2014 will offer.

Chris M Campbell Ph. D
Executive Director,
Marine Renewables Canada

Research Initiatives

REQUEST for PROPOSAL on RESEARCH PROJECTS

The funding received from Natural Resources Canada by SMC/IEC TC114 includes an amount in each government fiscal year dedicated to fund research projects. The intent is to support research activities related to the development of technical specifications and standards for marine energy conversion systems. Such activities are expected to accelerate the development and adoption of applicable codes and standards and also ensure that Canadian strategic interests are well represented in the international process. The funding available for the upcoming 2014-15 fiscal year beginning in April, 2014 is $150,000.

An update and revision was undertaken late last year to enhance the

Innovations

- National Research Council Canada
- Powertech Labs
- University of Victoria

consistency and transparency of the application and selection process in line with typical government grant and contribution practices. The call for proposal was announced on Jan 14, 2014 with a deadline of Feb 14, 2014 for submission. An Applicant's Guide along with the proposal templates as well as a list of frequently asked questions/answers have been distributed via Marine Renewables Canada to all its members and contacts on the circulation list. Please see below for information on this RFP and associated documents. A copy of the application documents can also be obtained from amanda@marinerenewables.ca

Highlights of the research projects funded last year can be found in the "Research Projects" section of the SMC/IEC TC114 web site (http://tc114.oreg.ca/). For this upcoming cycle, the priority focus includes research designed to complement or support active TC 114 project teams; commissioning of marine energy systems; systems operation and monitoring; sub-sea cable networks and design requirements for electrical grid connections. Other than federal government agencies and departments, all legal entities validly incorporated or registered in Canada can submit research proposals. Such entities may include companies, utilities, industry associations, research associations, standards organizations, aboriginal and community groups and Canadian academic institutions. The proposals will be evaluated by a panel consisting of select SMC/TC114 members along with technical experts. The evaluation criteria will be based on eligibility, priority focus, relevance, expected outcomes and delivery capacity. Depending on the number of proposals and the amount requested, it is expected that 2-3 projects will be selected for funding support. The funding can support up to 100% of the eligible cash expenditures of the project but cannot exceed 80% of the total project cost – i.e. at least 20% of the project cost should be covered by matching in-kind contributions.

It is hoped that the improved and more detailed Applicants' Guide, templates and evaluation process will lead to strong proposals making significant contribution towards marine energy standards development. It's time to submit!

2014/15 REQUEST FOR RESEARCH PROPOSALS - MARINE RENEWABLE ENERGY

The Canadian marine renewable energy industry has played a leading and active role in the development of International Standards through the International Electrotechnical Commission Technical Committee 114 (IEC/TC114) for "Marine Energy - Wave, Tidal and other Water Current Energy Converters" since 2007. To ensure that Canada maintains this leading role, it is critical that Canadians engage in research activities that that will accelerate the development of standards and also ensure that Canadian strategic interested are well represented in the international process.

This request for proposals is a result of this mandate to maintain a leading role and is supported by the funding received through ecoEII project, RENE-048:"'Development of Codes and Standards for Marine Energy- Wave and Tidal Energy Converters".

SMC/IEC TC114 IS SOLICITING PROPOSALS FROM CANADIAN INDUSTRY AND ACADEMIC GROUPS WHO ARE INTERESTED IN PERFORMING RESEARCH THAT WILL ACCELERATE THE DEVELOPMENT OF INTERNATIONAL MARINE ENERGY TECHNICAL

Members:

IEC-TC114

- Chair: Neil Rondorf (USA)
- Secretary: Danny Peacock (UK)
- Technical Officer: Charles Jacquemart

Sponsors:

SPECIFICATION AND STANDARDS CURRENTLY BEING DEVELOPED THROUGH IEC/TC 114.

CLICK HERE for the full request for proposals document.

CLICK HERE for an additional Q&A document, designed to answer questions you may have and provide additional information.

The proponent is requested to complete the Research Proposal Form contained in Appendices A and B of the request for proposals. Additional supporting information can be submitted with the proposal but this is not a mandatory requirement. The proposal must include sufficient detail to allow for a proper evaluation by the Panel of Evaluators.

THE PROPOSALS MUST BE SUBMITTED TO MARINE RENEWABLES CANADA BY 23:59 EST, February 14th, 2014. All responses are to be emailed to amanda@marinerenewables.ca

Questions should be directed to:

Amanda White, Operations Director
MARINE RENEWABLES CANADA
Phone: (902) 717-0716
Email: amanda@marinerenewables.ca

Committee Updates & Initiatives

Towards clean electricity from ocean waves

January, 13 2014
Scott Beatty, Senior Researcher
West Coast Wave Initiative (WCWI)
Institute for Integrated Energy Systems (IESVic)
University of Victoria

The IEC TC114 Project Team 102 was formed to develop a technical specification (IEC62600-102) for a reliable and transparent methodology to calculate the power performance of a wave energy converter (WEC) at a proposed ocean deployment site using measured data from another site. This effort reflects the current needs of the wave energy industry as there are many proposed projects but few are being developed. A standardized approach to assessing the performance of WECs at prospective locations is welcomed by an industry that is looking to gain trust; and to an investment community who is looking to shed risk.

Project team 102 is convened by the Danish representative Kim Nielsen, a known expert with multiple decades of active experience on WEC technologies. The project team has official members from Denmark, Canada, Spain, Ireland, Norway, and there are two new members joining from Germany and the UK. On November 27th, 2013, seven of the experts convened a daylong meeting in the historic city of Edinburgh, held at the Edinburgh University Kings buildings campus. The agenda was comprised of approximately 25% organizational and 75% technical discussion.

On the technical side, the project teams' ultimate goal is to provide a concrete methodology for calculation of the mean annual energy output of a WEC at the proposed location, with clearly stated uncertainty levels. For discussion here, the WEC at the proposed site

is referred to as “WEC2 at site 2” and the WEC at the existing/measured site is referred to as “WEC 1 at site 1”. Because of the possibilities for incongruence in the sites 1 and 2 as well as differences in WECs 1 and 2, there are considerable challenges that spur lengthy and heated debate amongst the members. The debates are about 1) the methodologies for calculations, 2) whether or not to implement limitations on the users of the specifications and 3) the associated consequences of choices made.

In the November 27 meeting, and in recent teleconference meetings, WEC scale was a main topic. Some members of PT102 are hesitant to allow WEC2 to be of a different scale from WEC1, yet others feel that the only way the IEC62600-102 document is to be useful for the current wave energy industry is to allow WEC2 to be larger or different from WEC1 within the technical specification.

An example where this is useful is in the common situation where a WEC developer has deployed a small scale device (~1/4 scale) at a sheltered location exposed to short wavelength waves only such as Galway Bay Ireland, but seeks to propose a project at an exposed oceanic site where wavelengths and heights are much larger. Though useful to the industry; a consequence of the allowance of scaling into the specification is an increase in uncertainty of the analysis. All uncertainties require careful treatment to ensure adequate quantification. Quantification of uncertainty due to scaling and other effects is possible and is demonstrated in recent technical work by current project team members [1].

In summary, project team 102--- now undergoing its second year as an active team--- has made considerable development of a methodology for calculation of mean annual wave energy at a proposed site based on measured information from a first site. The team is currently focussed on coming to a consensus on the treatment of WEC scaling within a robust document that will both educate and support WEC developers in providing clean electricity from wave power to the world’s electrical systems.

References[1] J.P. Kofoed, A. Pecher, L. Margheritini, M. Antonishen, C. Bittencourt, B. Holmes, C. Retzler, K. Berthelsen, I. Le Crom, F. Neumann, C. Johnstone, T. McCombes, L.E. Myers, “A methodology for equitable performance assessment and presentation of wave energy converters based on sea trials,” Renewable Energy, Volume 52, April 2013, Pages 99-110.

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WHY CONFORMITY ASSESSMENT FOR THE MARINE ENERGY SECTOR?

Let’s begin by exploring the definition of conformity assessment. Conformity assessment refers to any activity that helps to determine if a product, system or service corresponds to the requirements that are contained in a technical specification or standard. It allows for governments to protect the public against unnecessary risks, for insurers to know that equipment will not cause loss or damage and for proof that a product will be safe, reliable and perform as expected. Conformity assessment allows consumers and users to trust a product or service.

The International Electrotechnical Commission has delegated

conformity matters to a Conformity Assessment Board (CAB) which consists of elected members from twelve national committees. At the request of IEC TC 114, the CAB formed a working group (WG 15) in 2010 to assess the conformity assessment needs of the marine energy sector. TC 114's position stated that there was a need to develop a uniform system, rather than have conformity assessment schemes vary from one region to the next. The intent of implementing an international, uniform scheme was to assist in avoiding device deployment delays, reducing costs associated with obtaining different certificates from one country to the next, and in reducing safety concerns raised by insurers and interested parties who had been presented with different certification approaches.

Today, WG 15 has over 25 members each invited for their specific expertise. There is representation from certification bodies such as Det Norske Veritas and Bureau Veritas, tidal and wave device developers, electric utilities, and industry and conformity experts. Several meetings have been held to date to discuss the rules and procedures for an international marine energy scheme. These rules essentially form the basis or framework for a conformity assessment scheme. Their scope includes the governance structure, the stages of a certification process (i.e. component, prototype, type and project), the format for reports and certificates, and the qualification process for test laboratories and certification bodies.

WG 15's objective is to finalize this document by the end of 2014, obtaining approval from the CAB. Following the adoption of the rules and procedures, the group will then be tasked with developing operational documents that provide a higher level of detail and direction. These could include test report templates, procedures for conducting peer assessments, guidelines for risk based management, and procedures for the acceptance of certification bodies and testing laboratories.

As conformity assessment provides the roadmap for the development of standards and their use, WG 15 works closely with TC 114 to ensure continued alignment. Similarly, a strong collaboration exists with the wind industry as they are also in the process of developing their conformity assessment scheme.

For more information on marine energy conformity assessment, visit http://www.iec.ch/dyn/www/f?p=103:47:0:::FSP_ORG_ID,FSP_LANG_ID:3250,25

Photo courtesy of ISO

Upcoming Meetings

The SMC to TC114 meets on a monthly basis via teleconference to

provide updates on all current activities. The subcommittee also plans for two face-to-face meetings, one typically in the spring and one in the fall to make more progress on significant issues. The meeting in the spring is focused on ensuring all committee members are in agreement with the Canadian position on all issues to be discussed at the annual TC114 plenary meeting. The SMC to TC114 meeting in the fall is focused on assessing the current and projected needs for the upcoming year.

For 2014, the meeting schedule is as follows:

January 15, 2014 — Conference Call 10:00 AM PST

February 19, 2014 — Conference Call 10:00 AM PST

March 26, 2014 — Face to Face or Conference Call 10:00 AM PST

April 21-25, 2014 (Plenary) – TC114 Plenary and PT meetings In Vancouver

May 20, 2014 — Face to Face or Conference Call 10:00 AM PST

June 18, 2014 — Conference Call 10:00 AM PST

August 20, 2014 — Conference Call 10:00 AM PST

September 17, 2014 — Conference Call 10:00 AM PST

October 15, 2014 — Conference Call 10:00 AM PST

November 7, 2014 (In person) — Meeting in Halifax (ICOE 2014 Conference Nov 4-6, 2014)

December 17, 2014 — Conference Call 10:00 AM PST