Referred to SARC

Memo

FACULTY OF ENGINEERING AND APPLIED SCIENCE
OFFICE OF THE DEAN

Beamish-Munro Hall, Room 200
Queen's University
Kingston, Ontario, Canada K7L 3N6
Tel 613 533-2055
Fax 613 533-6500
http://appsci.queensu.ca/

TO: Georgina Moore, Secretary to Senate

COPY: Celia Russell, Associate Secretary to Senate

FROM: Ann Messenger

DATE: October 14, 2010

SUBJECT: Motion for the establishment of the Centre for Energy and Power Electronics Research (ePower)

As required under the Senate "Procedures Governing the Establishment, Reporting and Review of Research Centres, Institutes, and other entities at Queen's University", the Engineering and Applied Science Faculty Board considered, on October 13th, a proposal, for the establishment of the Centre for Energy and Power Electronics Research (ePower). The Board approved the following motion:

"That Faculty Board recommend to Senate the establishment of the Centre for Energy and Power Electronics Research (ePower)."

Please refer to that attached proposal. An electronic version can be found at:

http://www.appsci.queensu.ca/calendar/facultyBoard/agenda/2010-2011/documents/ePowerdocumentsOct2010.pdf

Ann Messenger
Secretary
Faculty of Engineering and Applied Science
Faculty Board

Attachment: Recommendation of the Dean's Advisory Committee

Queen's UNIVERSITY
CHEMICAL ENGINEERING
Room 201, Dupuis Hall
Queen's University
Kingston, Ontario, Canada K7L 3N6
Tel 613 533-2765
Fax 613 533-6637
http://chemeng.queensu.ca

September 27, 2010

Dr. Kimberly A. Woodhouse
Dean
Faculty of Engineering and Applied Science
Beamish-Munro Hall, Rm200
Queen's University
Kingston, ON K7L 3N6

Dear Dean Woodhouse:

Re: Recommendation of the Dean's Advisory Committee on the formal centre status for the "Centre for Energy and Power Electronics Research" (ePOWER)

The Advisory Committee for the Centre for Energy and Power Electronics Research (ePOWER) has completed its task of reviewing ePOWER's proposal for full centre status and unanimously endorses ePOWER's proposal for formal centre status. Members of the Advisory Committee were:

Geoffrey Chan, Department of Electrical and Computer Engineering
Hossam Hassanein, School of Computing
Jonathan Mash, Graduate Student, Department of Electrical and Computer Engineering
Keith Pilkey, Department of Mechanical and Materials Engineering
Juliana Ramsay, Department of Chemical Engineering (Chair)
Brian Surgenor, Faculty of Engineering and Applied Science
Margaret Burns, Faculty of Engineering and Applied Science (Secretary)

A notice regarding the establishment of the Committee was published in the May 25th 2010 issue of the Queen's Gazette and members of the University were invited to send comments to the Committee. None were received.

The Advisory Committee met on June 7, 2010 and again on August 17, 2010. The committee:

1) discussed its mandate and reviewed the Senate Procedures Governing the Establishment, Reporting and review of Research Centres, Institutes, and other entities at Queen's University (revised May 29, 2002),
2) reviewed ePOWER's application for formal centre status dated March 15, 2010,
3) reviewed ePOWER's application for provisional centre status dated January 14, 2009,
4) reviewed ePOWER's 2009 Annual Report.
5) considered the recommendations as outlined in the letter from VP Research dated March 23, 2009,
6) invited Dr. Warren Mabee, Associate Director, Queen's University Institute for Energy and

...2

Environmental Policy (QIEEP) to respond in writing on how QIEEP can interact with ePOWER (see attached letter from Dr. Mabee),

7) met with Dr. Praveen Jain, Interim Director of the Centre and Mrs. Nancy Churchman, Manager, to obtain clarification on a few issues related to the proposal, and
8) recommended revisions to the original proposal (revised proposal attached, August 24, 2010).

The Advisory Committee fully supports ePOWER's application for formal centre status as it has met the Queen's definition of a centre as stated in the Senate policy. (http://www.queensu.ca/secretariat/senate/policies/ceninsen/index.html).

Some specific accomplishments are highlighted:

1) ePOWER has been operating since March 2009 under provisional centre status and has achieved a record of successful collaboration, among colleagues within Queen's in Electrical and Computer Engineering, Mechanical Engineering and Chemical Engineering as well as the School of Business. National and international academic collaborators are at University of Western Ontario, University of Waterloo, University of Ottawa, University of Toronto and McGill University. Outside Canada, they have collaborations at Cranfield University (UK), Motilal Nehru National Institute of Technology (India), University of Sydney (Australia), and University of New South Wales (Australia). Industrial collaborators include CHiL Semiconductor, Cistel Technology, EION Networks, Freescale Semiconductor, Honeywell ASCA, and SPARQ Systems.

2) ePOWER has generated external support to maintain a modest administrative structure. The position of ePOWER's manager is fully funded by ORF-RE to June 2013 and $10,000 was awarded to ePOWER by VP Research to support a part-time administrative position from Sept 2010-March 2011.

3) ePOWER has generated external funding from Ontario Research Fund – Research Excellence, Ontario Centers of Excellence and NSERC Strategic Grant to support a long term program of research and scholarship. They have 40 + students as well as post-doctoral fellows, visiting researchers and engineers.

4) ePOWER has sponsored and shown leadership in supporting the Queen's Solar Design Team and Youth Outreach Program, as well as international conferences.

5) ePOWER has prepared a formal application and has addressed the recommendations of Kerry Rowe, VP Research, by i) including a statement on intellectual property consistent with Queen's University guidelines, ii) has external representation on their Advisory Board, iii) is considering wider recruitment of faculty participation at Queen's, i.e Dr. Joshua Pearce (MechEng) and iv) plans to explore interaction with Queen's Institute for Energy & Environmental Policy (QIEEP), as the committee received a positive response from Warren Mabee, Director, QIEEP, (see attached letter).

6) ePOWER's Interim Director, Praveen Jain, was the driving force behind the establishment of the Centre and has provided excellent leadership in his role as Interim Director. If the Centre is granted formal centre status, Dr. Jain has agreed to serve as Director of the Centre for a five year period.

...3

ePOWER has chosen to focus on the strategic area of power electronics which has the potential to have a wide range of applications with strong potential for industrial funding. With the current accomplishments of ePOWER, it is fair to say that they are a world leader in fundamental and applied energy and power electronics research.

In conclusion, the Advisory Committee strongly supports the establishment of ePOWER and has no hesitation in recommending that the Centre's formal proposal be forwarded to the Engineering and Applied Science Faculty Board for review, comment and approval as outlined in the Senate Procedures Governing the Establishment, Reporting and Review of Research Centre, Institutes, and other entities at Queen's University.

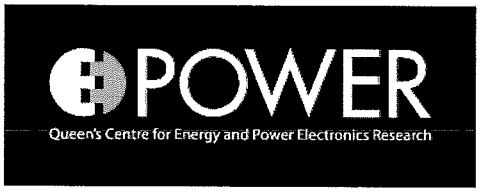
Sincerely,

Juliana Ramsay

Juliana Ramsay, Ph.D.
Professor, Department of Chemical Engineering
Chair, Dean's Advisory Committee

copy: Advisory Committee Members

Attachments



Senate Questionnaire

INTRODUCTION

Current dependence on non-renewable fossil fuels is of increasing concern. With growing energy demand, shortage of traditional energy sources and increasingly rigorous environmental standards, energy costs are growing, threatening living standards. Power electronics is playing a significant role in conserving energy and protecting the environment. For example, the world has enormous reserves of environmentally clean and safe renewable wind and solar energy resources, and the ability to process power derived from these sources efficiently and affordably is highly dependent on advances in power electronics. Recent years have seen dramatic advances in power electronics technology, with innovations in power semiconductor devices, converter topologies, power management techniques, machine drives, analytical and simulation techniques, ASIC chips, and advanced control methods.

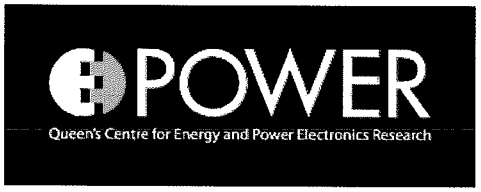
The Centre for Energy and Power Electronics Research (ePOWER) brings together academic and industrial researchers to develop a broad range of energy and power electronics applications and expertise. Fundamental and applied research conducted at ePOWER is resulting in the development of new energy efficient, cost effective and environmentally friendly technologies.

ePOWER supports Queen's University's strategic priority to enhance areas of research strength by ensuring that in the area of energy and power electronics it has a critical mass of researchers and supporting infrastructure and has developed national and international partnerships and collaborations to maximize the capacity for innovation. ePOWER also plays an important role in fulfilling goals of the Faculty of Engineering and Applied Science of enhancing capacity in key areas and emphasizing interdisciplinary, leading-edge research with a strong faculty member commitment.

1 PURPOSES AND FUNCTIONS

1a What is the main purpose of the proposed Centre?

The Queen's Centre for Energy and Power Electronics Research is a research and education centre whose mission is to foster collaboration among academic and industrial researchers to advance fundamental energy and power electronics research, to develop a broad range of commercially competitive and environmentally friendly technologies, and to train the next generation of innovators.



Senate Questionnaire

ePOWER objectives are:

- to establish Queen's University as a world leader in fundamental and applied energy and power electronics research;
- to foster academic and industrial collaboration on energy and power electronics research with a focus on commercialization; and
- to train highly-educated individuals by providing advanced energy and power electronics research opportunities in state-of-the-art facilities.

1b How will the Centre perform its functions (research, publication, etc.)?

ePOWER will:

- support applications for major funding and promote collaborative, team-based research projects;
- focus on creation of intellectual property and commercialization of new technologies in partnership with PARTEQ Innovations;
- foster synergy among members by hosting an annual conference that brings together all collaborating researchers to share ideas; and
- encourage presentation of research results at major national and international conferences and publication in leading journals.

1c Will the Centre cover a field of research not now adequately or readily covered within an existing department or group of departments?

ePOWER brings together researchers from Queen's, other universities and industry to create opportunities for knowledge sharing, collaboration and training that would not otherwise exist.

1d Is there a reasonable prospect that the Centre will avoid undesirable duplication of the functions and purposes already served at Queen's or elsewhere?

ePOWER will not duplicate functions and purposes of any existing entities at Queen's or elsewhere. ePOWER will support Queen's University's strategic priority to enhance areas of research strength by ensuring that in the area of energy and power electronics it has a critical mass of researchers and supporting infrastructure and has developed national and international partnerships and collaborations to maximize the capacity for innovation.

ePOWER
Queen's Centre for Energy and Power Electronics Research

Senate Questionnaire

1e Will the Centre facilitate or influence the work of: i) undergraduate students; ii) graduate students; iii) faculty members?

The Faculty of Applied Science Draft Strategic Framework (22 Oct 2008) refers to the establishment of a Centre in Power Electronics. ePOWER will play an important role in fulfilling faculty goals of enhancing capacity in key areas and emphasizing interdisciplinary, leading-edge research with a strong faculty member commitment.

Queen's University's world-class energy and power electronics faculty and facilities have helped to attract many undergraduates, graduate students and postdoctoral fellows. Over 40 graduate students, research engineers and postdoctoral fellows are currently receiving energy and power electronics training at ePOWER.

Because of the growing reputation and advanced research being conducted, a growing number of undergraduate students have also been attracted for summer training and to complete their fourth-year research projects. Such renown in training undergraduate students has also resulted in increased enrolment in graduate studies.

Furthermore, Queen's power electronics researchers maintain close collaboration with industry, and students have had opportunities to work with senior and experienced industry technical staff. As this is a leading-edge research facility, all participants have received and/or will receive a notable opportunity to acquire broader industry-relevant and industry-based training than is often the case in academic research, and trainees have been in great demand by industry. Establishment of ePOWER will attract a wider range of academic and industrial researchers and collaborators and talented and motivated graduate students.

1f In what respects might the Centre enhance the reputation of the University?

Fundamental and applied research conducted at ePOWER is resulting in the development of new energy efficient, cost effective and environmentally friendly power electronic technologies. With growing energy demand, shortage of traditional energy sources and increasingly rigorous environmental standards, energy costs are growing, threatening living standards. Power electronics is playing a significant role in conserving energy and protecting the environment. Recent years have seen dramatic advances in power electronics technology, with innovations in power semiconductor devices, converter topologies, power management techniques, machine drives, analytical and simulation techniques, application-specific integrated circuit chips, and advanced control methods. In bringing together talented researchers producing results in this timely field, ePOWER will further enhance Queen's reputation for leading-edge energy and power electronics research and innovation.

ePOWER
Queen's Centre for Energy and Power Electronics Research

Senate Questionnaire

2 MEMBERSHIP

2a Have the proponents of the Centre been working together informally, and if so for how long, and what numbers of students have been involved?

1. Ongoing collaboration between faculty members within the Department of ***Electrical and Computer Engineering*** (Praveen Jain, Yan-Fei Liu, Alireza Bakhshai, P.C. Sen, Geoffrey Chan) for over 5 years
2. Ongoing collaboration between faculty members within the Faculty of Engineering and Applied Science (including Praveen Jain, Electrical and Computer Engineering; Brant Peppley, ***Chemical Engineering***; Steven Harrison and Brian Surgenor, ***Mechanical Engineering***) for over 5 years, with active planning under way for future co-supervision of graduate students, participation in Master's of Applied Sustainability, joint funding applications
3. ePOWER sponsorship and support of ***Queen's Solar Design Team*** – 1 year, ongoing
4. Collaboration with Queen's-RMC ***Fuel Cell Research Centre*** on Youth Outreach program – 1 year, ongoing
5. Collaboration outside of the Faculty but within Queen's University – Jane Webster (***School of Business***) – 2 years, ongoing
6. Plans to explore collaboration opportunities with QIEEP, Dr. Joshua Pearce, School of Policy Studies
7. Collaborations with researchers at other Ontario Universities: Reza Iravani and Francis Dawson (***University of Toronto***), Gerry Moschopoulos (***University of Western Ontario***), Kumaraswamy Ponnambalam and Sagar Naik (***University of Waterloo***), Amiya Nayak (***University of Ottawa***) – 2 years, ongoing
8. Collaboration with researchers at other Canadian Universities: Dr. Geza Joos (***McGill University***) – 10 years, ongoing
9. Collaboration with researchers at international universities: Cranfield University (***UK***), Motilal Nehru National Institute of Technology (***India***), University of Sydney (***Australia***), University of New South Wales (Australia) – 2 years, with future plans for visits/exchanges of faculty and graduate students and joint funding applications
10. Industrial collaboration: ***CHiL Semiconductor, Cistel Technology, EION Networks, Freescale Semiconductor, Honeywell ASCA, SPARQ Systems*** – 4 years, ongoing
11. Total number of students involved: 40 and growing

ePOWER
Queen's Centre for Energy and Power Electronics Research

Senate Questionnaire

12. Current funding partnerships include:
    - Ontario Research Fund – Research Excellence (PI P. Jain, Queen's; Co-Inv A. Bakhshai, Queen's; G. Moschopoulos, UWO; K. Ponnambalam, Waterloo; Ind. Partners Cistel, EION, Honeywell, SPARQ)
    - Ontario Centres of Excellence (PI P. Jain, Queen's; Industrial Partner EION)
    - NSERC Strategic Grant (PI S. Naik, U. Waterloo; Co-Investigator P. Jain, Queen's)

2b Will membership be restricted to staff of Queen's University? If not, what outside groups will be represented, to what extent, and how chosen?

ePOWER will have several categories of membership:

Regular members:

Faculty members who hold an appointment of Assistant, Associate or Full Professor at Queen's University involved in energy and power electronics research and/or educational activities related directly to the ePOWER.

Adjunct members

Faculty who hold an appointment of Adjunct Professor at Queen's University involved in energy and power electronics research and/or educational activities related directly to the ePOWER.

Emeritus members

Faculty who hold an appointment of Emeritus Professor at Queen's University involved in energy and power electronics research and/or educational activities related directly to ePOWER.

Postdoctoral fellow members

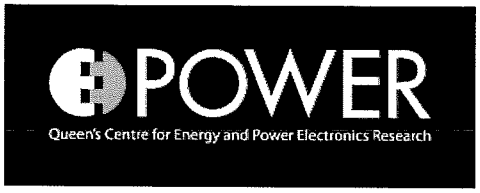
Individuals who hold an appointment at Queen's University as a postdoctoral fellow involved in energy and power electronics research and/or educational activities related directly to ePOWER.

Student members

Graduate and undergraduate students enrolled at Queen's University involved in energy and power electronics research and/or educational activities related directly to ePOWER.

Associate members

Individuals involved in energy and power electronics research and/or educational activities related directly to ePOWER and who are: (a) visiting scholars, researchers or research students at Queen's University; or (b) industrial, academic, or consultant collaborators or co-investigators of Regular members.



Senate Questionnaire

Regular, Adjunct and Emeritus members will be approved by the Director. Postdoctoral fellow and Student members will be nominated for ePOWER membership by Regular, Adjunct or Emeritus members and approved by the Director. Associate members will be nominated for ePOWER membership by Regular, Adjunct or Emeritus members and approved by the Advisory Board.

2c Will the Centre draw members from several departments? From which? Is the participation of certain departments critical?

The initiative to establish ePOWER originated with energy and power electronics researchers in the Department of Electrical and Computer Engineering, and ECE participation is critical to ePOWER's ongoing success. The Faculty of Engineering and Applied Science is in the process of establishing a 'mega centre' focusing on sustainable energy where ePOWER together with the Fuel Cell Research Centre will play key roles. This new sustainable energy centre will attract wider participation from faculty members throughout Queen's.

2d Will all members of the Centre also hold positions in an established department? Will members seek exemption from any normal departmental responsibilities?

There will be no change to the departmental responsibility of current Queen's University faculty who are ePOWER members.

2e Will membership be continuing or short term?

ePOWER membership will be continuing pursuant to an ePOWER Membership Agreement that will clearly state the rights, privileges, requirements and responsibilities of ePOWER members. The Membership Agreement will be a document separate from the Constitution and will be reviewed annually by the Advisory Board.

2f Will members be brought to Queen's to work on their own projects? If so, what are the sources of such members and the probable means of financing them?

Most current Queen's members are part of a common project and are paid from that project. Some members using ePOWER facilities finance their research activities from their own research funds. It is expected that ePOWER will follow the same practice in the future.

ePOWER
Queen's Centre for Energy and Power Electronics Research

Senate Questionnaire

3 ORGANIZATION AND LIAISON

3a In what ways, if any, will the constitution of the proposed organization differ from that envisaged in Appendix II?

The ePOWER Constitution will not differ from that proposed in the Senate Procedures outline.

3b Does the formation of the Centre have the support of the heads of all departments involved?

ePOWER has the support of the initiating departments within the Faculty of Engineering and Applied Science, and the provisional Centre application was signed by the department heads of Electrical and Computer Engineering and Mechanical and Materials Engineering.

4 STAFFING AND PHYSICAL REQUIREMENTS

4a Will a space allocation be required? If so, how extensive might this be: i) immediately; ii) within five years; iii) within ten years?

Research will be centred at Queen's University's Communication Power Laboratory and the Energy and Power Electronics Applied Research Laboratory, modern facilities co-located on the first floor of Walter Light Hall and occupying a combined space of over 5,000 square feet.

Communication Power Laboratory

Established in 1999, the Communication Power Laboratory's up-to-date facilities comprise a power electronics laboratory containing the latest network, spectrum and impedance analyzers, digital oscilloscopes, power supplies and electronic loads and a computing laboratory providing laptops for students and two Sun workstations at which the latest simulation and analysis tools are used.

Energy and Power Electronics Applied Research Laboratory (ePEARL)

ePEARL is a state-of-the-art facility established in 2002 with over $3 million in funding from the Canada Foundation for Innovation (CFI) and the Ontario Innovation Trust (OIT). Adjacent laboratory and office space on the first floor of Walter Light Hall has recently been renovated and equipped with computing and office equipment with funding from the Ontario Research Fund-Research Excellence (ORF-RE).

ePOWER
Queen's Centre for Energy and Power Electronics Research

Senate Questionnaire

4b Is it necessary that any space required be directly associated with certain departments? Is it necessary that this space be on the main campus?

We anticipate increased activities in the future and will require additional space adjacent to the current facility on the first floor of Walter Light Hall. With increased integration of activities with the Integrated Learning Centre, there is ample underutilised space that can be made available to ePOWER in the future.

4c Is it proposed that there be a professional staff of the Centre who are not staff of a department?

There are no plans for ePOWER to include professional staff who are not staff of a department.

4d What office and administrative staffing is proposed?

The position of ePOWER Manager is fully funded by ORF-RE to June 2013. $10,000 in funding was awarded to ePOWER by the Vice-Principal (Research) to be used for part-time administrative support from Sept 2010-March 2011.

4e What technical staffing is proposed?

The position of ePOWER Senior Laboratory Manager is fully funded by ORF-RE to June 2013.

4f What special demands might be made on library, computing or other University services?

ePOWER will operate as any Queen's Centre. Library facilities will be used by ePOWER researchers and students, and ePOWER will use existing services provided by departments such as Human Resources, the Office of Research Services and Financial Services. ePOWER will use Queen's computer infrastructure, purchasing computing equipment and software from researcher grant budgets as required.

ePOWER
Queen's Centre for Energy and Power Electronics Research

Senate Questionnaire

5 TENTATIVE FIVE-YEAR BUDGET

Expenditures	Year 1 (2010)	Year 2 (2011)	Year 3 (2012)	Year 4 (2013)	Year 5 (2014)
Salary & benefits					
Manager (80% time)	72,000	74,000	76,000	78,000	80,000
Admin Assistant (25% time)	10,000	11,000	12,000	13,000	14,000
Services					
Computer services	500	1,000	1,000	1,000	1,000
Graphic and website design	500	1,000	1,000	1,000	1,000
Equipment					
Computers	1,500	1,500	1,500	1,500	1,500
Supplies					
Office supplies	1,500	1,500	1,500	1,500	1,500
Miscellaneous					
Repairs and maintenance	2,000	3,000	4,000	5,000	6,000
Board meeting expenses	2,000	2,000	2,000	2,000	2,000
Total Expenditures	**90,000**	**95,000**	**99,000**	**103,000**	**107,000**

Revenues	Year 1 (2010)	Year 2 (2011)	Year 3 (2012)	Year 4 (2013)	Year 5 (2014)
ORF-RE Funding (*see note below*)	74,000	76,000	77,000	78,000	79,000
Vice-Principal (Research) Funding	10,000	11,000	12,000	13,000	14,000
Overhead	6,000	8,000	10,000	12,000	14,000
Total Revenues	**90,000**	**95,000**	**99,000**	**103,000**	**107,000**

Note

Most Centre expenses through June 2013, including staff salaries, computing services, equipment and supplies, will be met by existing funding support from the Ontario Research Fund – Research Excellence. See Appendix B for a summary of the ORF-RE budget by category.

Centre expenses that are not eligible ORF-RE expenses, including some marketing and communications expenses, are currently met by research funds from Centre members derived from industrial overhead. In addition, $10,000 in additional funding was awarded to ePOWER by the Office of the Vice-Principal (Research) to employ a part-time administrative support person.

ePOWER
Queen's Centre for Energy and Power Electronics Research

Senate Questionnaire

6 FINANCING AND SUPPORT

6a As direct University financial support usually cannot be provided, the budgetary expenses must be met by grant and contract funds or by contributions from departments, Faculties or the School of Graduate Studies. What method is proposed in this case?

ePOWER's expenses for its first three years of operation will be covered by existing funding, including $3.3 million from the Ontario Research Fund – Research Excellence for the period 2011-2013, $200,000 from the Ontario Centres of Excellence for 2011, and support from industrial partners EION, Cistel, Honeywell and SPARQ Systems of $1 million for the period 2011-2013.

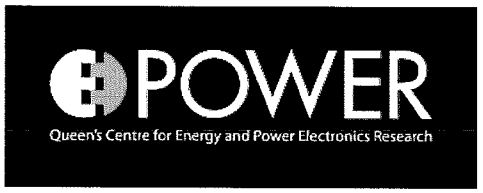
ePOWER is already teaming with PARTEQ Innovations to create a new national Centre of Excellence, Smart Power Canada, that has potential to bring substantial funding to ePOWER. We also expect that new spin-off company SPARQ Systems will support ePOWER research activities. Moreover, current ORF-RE project deliverables are ahead of schedule, and our success in commercializing new energy efficient and renewable energy generation technology has enhanced our chances to get substantial funding from ORF-RE beyond June 2013.

6b Is there a need for any deviation from normal University financial and administrative policies?

There is no need for deviation from normal policies.

6c Will members of the Centre who are full-time members of a department receive any personal remuneration from the Centre at any time?

No members of ePOWER who are full-time members of a department will receive any personal remuneration from ePOWER.



Appendices

ePOWER
Queen's Centre for Energy and Power Electronics Research

Appendix A
Proposed Constitution

1 MISSION

The Queen's Centre for Energy and Power Electronics Research (ePOWER) is a research and education centre whose mission is to foster collaboration among academic and industrial researchers to advance fundamental energy and power electronics research, to develop a broad range of commercially competitive and environmentally friendly technologies, and to train the next generation of innovators.

2 OBJECTIVES

ePOWER's objectives are:

- to establish Queen's University as a world leader in fundamental and applied energy and power electronics research;
- to foster academic and industrial collaboration on energy and power electronics research with a focus on commercialization; and
- to train highly-educated individuals by providing advanced energy and power electronics research opportunities in state-of-the-art facilities.

3 MEMBERSHIP

3.1 Membership categories

3.1.1 Regular members

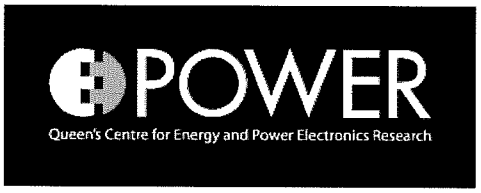
Faculty members who hold an appointment of Assistant, Associate or Full Professor at Queen's University involved in energy and power electronics research and/or educational activities related directly to ePOWER.

3.1.2 Adjunct members

Faculty members who hold an appointment of Adjunct Professor at Queen's University involved in energy and power electronics research and/or educational activities related directly to ePOWER.

3.1.3 Emeritus members

Faculty members who hold an appointment of Emeritus Professor at Queen's University involved in energy and power electronics research and/or educational activities related directly to ePOWER.



Appendix A
Proposed Constitution

3.1.4 Postdoctoral fellow members

Individuals who hold an appointment at Queen's University as a postdoctoral fellow involved in energy and power electronics research and/or educational activities related directly to ePOWER.

3.1.5 Student members

Graduate and undergraduate students enrolled at Queen's University involved in energy and power electronics research and/or educational activities related directly to ePOWER.

3.1.6 Associate members

Individuals involved in energy and power electronics research and/or educational activities related directly to ePOWER and who are: (a) visiting scholars, researchers or research students at Queen's University; or (b) industrial, academic, or consultant collaborators or co-investigators of Regular members.

3.2 Eligibility for membership

Regular, Adjunct and Emeritus members are approved by the Director.

Postdoctoral fellow and Student members are nominated for ePOWER membership by Regular, Adjunct or Emeritus members and approved by the Director.

Associate members are nominated for ePOWER membership by Regular, Adjunct or Emeritus members and approved by the Advisory Board.

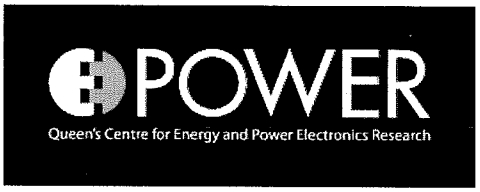
3.3 Membership designation

All ePOWER members are entitled to identify themselves as "A member of the Queen's Centre for Energy and Power Electronics Research (ePOWER)." All members will sign a membership agreement, to be developed by the Advisory Board, outlining their roles and responsibilities as members of ePOWER.

4 ADMINISTRATIVE STRUCTURE

4.1 Administration

A Director and an Advisory Board administer ePOWER.



Appendix A
Proposed Constitution

4.2 Appointment of the Director

The Director is appointed by the Provost and VP (Academic) of Queen's University on the recommendation of the Dean, Faculty of Engineering and Applied Science. The Director serves for a term of five years, and is eligible for re-appointment for another five years, to a maximum of 10 years. If the Director is unable to complete a full term, the Advisory Board will recommend a new Director to the Dean, Faculty of Engineering and Applied Science.

4.3 Advisory Board: composition, appointment, term

The Advisory Board comprises seven members:

- the Director;
- a representative appointed by the Dean, Faculty of Engineering and Applied Science;
- two Regular members;
- two representatives of industry; and
- one representative of PARTEQ Innovations.

Advisory Board members are appointed by the Provost and VP (Academic) of Queen's University on the recommendation of the Dean, Faculty of Engineering and Applied Science.

The Advisory Board Chair is elected by members of the Advisory Board.

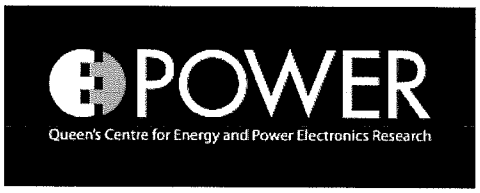
Advisory Board Members serve for a term of up to three years, renewable once. Terms of appointment are staggered to maintain consistency.

4.4 Advisory Board: meetings, voting, quorum

The Advisory Board meets a minimum of once per calendar year. An Advisory Board member is deemed to be in attendance at the meeting if present in person or by conference call.

ePOWER's Manager attends Advisory Board meetings in an ex officio non-voting capacity and serves as Secretary to the Advisory Board.

All Advisory Board members are entitled to vote at meetings of the Advisory Board. The quorum for a meeting of the Advisory Board is a majority of the Advisory Board members. A simple majority of the votes cast by those Advisory Board members at the meeting is sufficient to carry a motion except on issues specifically identified in the Constitution where a two-thirds majority is required to carry the motion.



Appendix A
Proposed Constitution

In the case of a tie, the Advisory Board Chair is not entitled to cast a second vote and the motion is deemed not to carry.

If an extraordinary issue arises between Advisory Board meetings that the Director or Advisory Board Chair determines requires Advisory Board approval, Advisory Board members may indicate their vote on the issue by email to the Advisory Board Chair. The motion and results are recorded in an addendum to official minutes of the previous Advisory Board meeting.

4.5 Advisory Board: conflict of interest

All Advisory Board members are required to disclose to the Director any activities or associations that could create a conflict of interest. All Advisory Board members are bound by the employment agreements established with their employer.

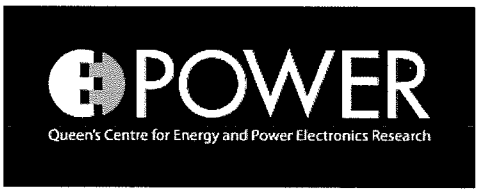
4.6 Director's role and responsibilities

The Director:

- Convenes Advisory Board meetings;
- Acts as liaison between ePOWER and Queen's University;
- Reports directly to the Dean, Faculty of Engineering and Applied Science;
- Submits annual reports on the work of ePOWER to the Vice-Principal (Research) through the Dean, Faculty of Engineering and Applied Science;
- Implements pertinent governance regulations of the Senate of Queen's University; and
- Approves members in membership categories as specified in the Constitution.

The Director's responsibilities include:

- Identifying general and specific research goals and developing a strategic plan for ePOWER;
- Advancing the research objectives of ePOWER;
- Appointing management and administrative staff as needs and funding permit;
- Supervising ePOWER staff and budgets; and
- Promoting the activities and achievements of ePOWER within Queen's University and to the wider community.



Appendix A
Proposed Constitution

4.7 Advisory Board's role and responsibilities

The Advisory Board functions as the planning and priorities authority for ePOWER and provides advice and guidance to the Director.

The Advisory Board's responsibilities include:

Financial management
- Approving ePOWER's annual operating budget.

Policies, objectives and plans
- Recommending for approval by Queen's Senate amendments to ePOWER's Constitution;
- Approving broad policies for ePOWER; and
- Advising on ePOWER long-range planning.

Organization and personnel
- Electing the Advisory Board Chair;
- Approving major changes in ePOWER's organizational format;
- Delegating management responsibility to the ePOWER Director; and
- Appointing committees as needed.

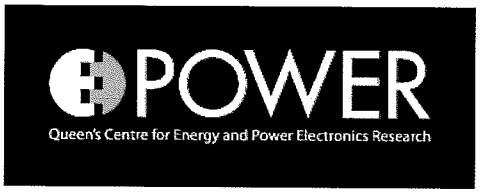
Operational controls
- Identifying the Advisory Board's need and requirement for information and requesting such information from ePOWER's Director and staff; and
- Investigating major deficiencies in operation performance and initiates appropriate corrective action.

Membership approval
- Approving members in membership categories as specified in the Constitution.

4.8 Amendments to the Constitution

All proposed amendments are submitted to the Director and considered by the Advisory Board in a consultative process prior to a vote by voting ePOWER members. A two-thirds majority of voting ePOWER members is required to amend the constitution.

All amendments and amending procedures are in accordance with relevant Queen's University policies, procedures and guidelines. Amendments require the approval of the Queen's University Senate.



Appendix A
Proposed Constitution

5 RELATIONSHIP TO QUEEN'S UNIVERSITY

5.1 University Senate governance

ePOWER is governed by pertinent regulations of the Senate of Queen's University, maintains liaison with Queen's University as specified in the ePOWER Constitution, and submits reports to the Dean, Faculty of Engineering and Applied Science at prescribed intervals.

5.2 Centre review

ePOWER is reviewed at least once every five (5) years by a committee appointed by the Dean, Faculty of Engineering and Applied Science, in accordance with the regulations of the Senate.

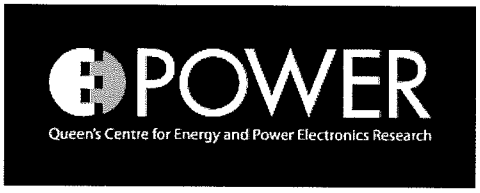
5.3 Annual report

The Director prepares a report detailing ePOWER activities each calendar year as per the Senate document on Procedures Governing the Establishment, Reporting and Review of Research Centres, amended, May 2010.

6 PROTECTION OF DIRECTORS AND STAFF

6.1 Limitation of liability

No Director or employee of ePOWER shall be liable for the acts, receipts, neglects or defaults of any other Director or employee, or for joining in the receipt of other act for conformity, or for any loss, damage or expense happening to ePOWER through the insufficiency or deficiency of title to any property acquired by order of the Board or on behalf of ePOWER, or for the insufficiency or deficiency of any security in or upon which any of the monies of ePOWER shall be invested, or for any loss or damage arising from the bankruptcy, insolvency or tortuous act of any person with whom any of the monies, securities or effects of ePOWER shall be deposited, or for any loss occasioned by any error of judgment or oversight on their part, or for any other loss, damage or misfortune whatever which shall happen in the execution of the duties of his/her office or in relation thereto unless the same shall happen through his/her own wilful neglect or default.



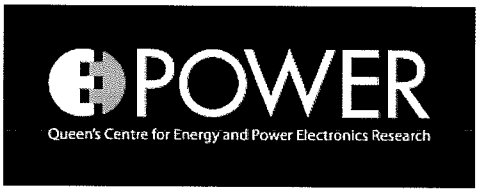
Appendix A
Proposed Constitution

6.2 Indemnity

Every Director and employee of ePOWER and his/her heirs, executors and administrators and estate and effects, respectively, shall from time to time and at all times be indemnified by Queen's University from or against all costs, charges and expenses whatsoever that a Director or employee sustains or incurs in or about any action, suit or proceedings that is brought, commenced or prosecuted against him/her for or in respect of any act, deed, matter or thing whatsoever made, done or permitted by him/her in or about the execution of the duties of his/her office; except such costs, charges or expenses as are occasioned by his/her own wilful neglect or default, a fault which is unrelated to the duties of office, or fraud. Provided however that such indemnified Director or employee shall cooperate fully with Queen's University in the defence of such proceedings and shall be subject to such direction, as the University shall deem appropriate.

6.3 Liability and worker compensation

ePOWER is not an employer. All individuals employed at ePOWER facilities are employees of Queen's University or a partner institution or organization, and as such are covered under those institutions' or organizations' respective insurance policies and their activities at ePOWER do not preclude that relationship.



Appendix A
Proposed Constitution

7. CLOSURE

7.1 Circumstances of closure

If circumstances are such that ePOWER cannot continue to fulfill its mandate, Queen's University is under no obligation to continue to operate ePOWER.

7.2 Disposition of assets and allowance for closure-related costs

In the event that the decision is taken to close ePOWER operations, any costs associated with dissolving ePOWER shall be included in the budget for the final year of operation. The proceeds of the sale of assets will be used to defray costs of dissolving ePOWER. All cash assets remaining at closure will be transferred to the office of the Dean, Faculty of Engineering and Applied Science, who will establish an account that can be drawn upon to support unique opportunities that are aligned with the original mission of ePOWER. Proposals for the use of the funds must be forwarded with the support of at least two former ePOWER regular members. In the event that closure costs exceed funds available, including proceeds of any sales of assets, such costs shall be paid by Queen's University.

7.3 Equipment disposition

Equipment purchase and disposition is generally dictated by the source of funds used to purchase the equipment, and in accordance with standard research agreements, any equipment bought with Queen's University funds remains the property of Queen's University.

8 INTELLECTUAL PROPERTY

8.1 Intellectual Property protection and disposition

Protection and disposition of Intellectual Property arising from research conducted at ePOWER follows all applicable Queen's University and funding agency guidelines. PARTEQ Innovations, the technology transfer office of Queen's University, leads intellectual property management and commercialization planning for ePOWER projects.

8.2 Senate and QUFA collective agreement guidelines

ePOWER follows all relevant guidelines regarding intellectual property as set out by the Senate of Queen's University and the QUFA collective agreement.

Appendix B

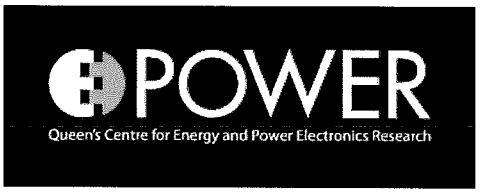
ORF Project # RE02-016 - Greenhouse Gas Emission Free and Energy Efficient Power Technology

DIRECT COSTS	Total	Cost Breakdown		
		Private Sector	Institution	ORF
Salaries and Benefits				
Principal Investigator - Praveen Jain (Queen's)	1,160,985		1,160,985	
Co-investigator - A. Bakhshai (Queen's)	408,805		408,805	
Co-investigator - K. Ponnambalam (Waterloo)	204,400		204,400	
Co-investigator - G. Moschopoulos (Western Ontario)	128,480		128,480	
Postdoctoral Fellows/Visiting Scholars	891,000		291,000	600,000
Graduate Students	2,970,000		1,970,000	1,000,000
Undergraduate Summer Students	60,000			60,000
Senior Engineers (In-kind from Private Sector)	3,500,100	3,500,100		
Senior Engineers	1,800,000	1,200,000		600,000
Laboratory Manager	426,800		182,800	244,000
Total Salaries and Benefits	11,550,570	4,700,100	4,346,470	2,504,000
Facilities and Equipment				
Installation of Wind Power System at Queen's	50,000			50,000
Equipment including computers and softwares	110,000			110,000
Renovations	75,000			75,000
Total Facilities and Equipment Costs	235,000	0	0	235,000
Other Direct Research Costs				
Prototyping and Hardware Development	150,000			150,000
Research Supplies	75,000			75,000
Conference Expenses	200,000			200,000
Travel between university and industry sites	100,000			100,000
Publication Fees	30,000			30,000
Accommodation Expenses	36,000			36,000
Total Other Direct Research Costs	591,000	0	0	591,000
Management and Admin				
Professional Fees - Accounting and Audit	30,000			30,000
Office Expenses	50,000			50,000
Youth Outreach Program Materials	1,500			1,500
Project Advisory Board Meetings	27,000			27,000
Project Manager	477,815.0			477,815
Youth Outreach Coordinator	40,173			40,173
Total Management and Admin	626,488	0	0	626,488
TOTAL DIRECT COSTS	13,003,058	4,700,100	4,346,470	3,956,488
INDIRECT COSTS	**Total**	**Private Sector**	**Institution**	**ORF**
University In-Kind Overhead	1,738,588		1,738,588	
Overhead on ORF Contribution	1,582,595			1,582,595
Overhead on Private Sector Contribution	300,000	300,000		
TOTAL PROJECT COSTS	**16,624,241**	**5,000,100**	**6,085,058**	**5,539,083**

Notes

(1) This is the overall project budget. The first of five project periods was greater than 1 year (Oct 1, 2007 to June 30, 2009), with four subsequent project periods of 1 year. The project ends on June 30, 2013.

(2) Project industrial partners are EION Networks, Cistel Technology and Honeywell ASCA.



Appendix C
List of Members

Key Queen's Researchers

Dr. Praveen Jain
Fellow IEEE, Fellow EIC, Fellow CAE

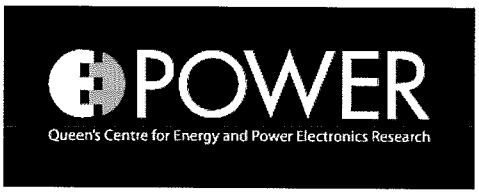
- Canada Research Chair in Power Electronics
- Recipient of PEO Engineering Medal
- Established the multi-million-dollar state-of-the-art Energy and Power Electronics Applied Research Laboratory (*e*PEARL) at Queen's University
- Founded a well funded company (>$15M) from research conducted at Queen's
- Supervised over 75 graduate students, postdoctoral fellows and research engineers
- Authored 300 technical papers and reports and 35 patents

Dr. Yan-Fei Liu
SM IEEE

- Professor of Electrical & Computer Engineering
- Previously responsible for high quality design, new products and technology development as a technical advisor with the Advanced Power System division of Astec (formerly Nortel Networks)
- Published over 50 papers in IEEE conferences and journals, 3 US patents and 10 US patent applications pending
- Winner of the "Premier's Research Excellent Award" in 2001, and the Golden Apple teaching award in 2000, both at Queen's University
- Associate Editor of IEEE Transactions on Power Electronics

Dr. Paresh C. Sen
Fellow IEEE

- Professor Emeritus of Electrical & Computer Engineering at Queen's University
- Recipient of 2008 IEEE Industry Applications Society Outstanding Achievement Award and 2006 IEEE Canada Outstanding Educator Award
- Authored or coauthored over 100 papers and authored two books in the area of power electronics and drives
- Served as Assoc. Editor for IEEE Transactions on Industrial Electronics & Control Instrumentation and Chair of Technical Committee on Power Electronics
- Received a Prize Paper Award from the Industrial Drive Committee for technical excellence at the 1986 Industry Application Society Annual Meeting



Appendix C
List of Members

Dr. Alireza Bakhshai
SM IEEE

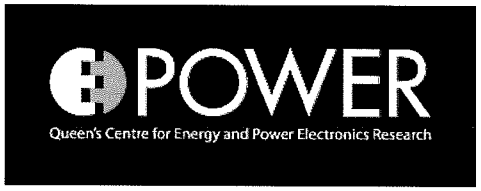
- Assistant Professor of Electrical & Computer Engineering
- Licensed Professional Engineer (PEng) in Ontario
- Supervisor or co-supervisor for 15 graduate students, and currently supervising three and co-supervising one
- Demonstrated ability to apply knowledge in an industrial context, contributing to the application of FACTS Controllers and of New Motor Drive Technologies for a Cold Rolling Mill at the Mobarakeh Steel Company, Iran, in 2001, and the design and implementation of a Unified Power Flow Controller in 2002-3

Dr. Steven Harrison

- Director of the Queen's University Solar Calorimetry Lab (SCL) and Professor of Mechanical and Materials Engineering
- Over 30 years of experience in the development and evaluation of solar energy equipment
- His patented innovations in solar hot water technology resulted in the development of a solar domestic hot water heater product now being sold on the North American market by EnerWorks
- Founder of the Queen's University Solar Vehicle Team, and as such, has led the team since 1988 in the design, construction and racing of solar vehicles in national and international competitions

Dr. Brant Peppley

- Director of the Queen's-RMC Fuel Cell Research Centre (FCRC) and Canada Research Chair in Fuel Cells, Queen's University
- Working in the field of fuel cell research since 1986 when he was hired by the Department of National Defence to test the very first Ballard fuel cells
- Internationally recognized as a leading researcher in fuel cells and fuel cell systems.



Appendix C
List of Members

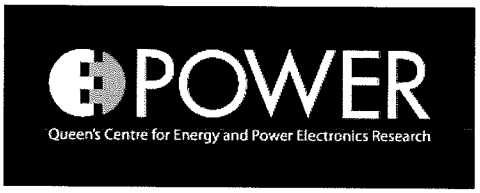
Dr. Brian Surgenor

- Associate Dean (Research, Graduate Studies & External Affairs) in the Faculty of Engineering and Applied Science
- Developed strong industrial connections through his research program and teaching initiatives in the areas of intelligent inspection systems, automatic controls and mechatronics engineering.
- Elected researcher representative on the board of the AUTO21 Network of Centres of Excellence.
- Responsible for Queen's becoming a member of the Advanced Design and Manufacturing Institute (ADMI) and the Partners for the Advancement of CAD/CAM/CAE Education (PACE).

Key collaborating researchers

Dr. Gerasimos Moschopoulos

- Associate Professor of Electrical and Computer Engineering at the University of Western Ontario
- Design Engineer with Advanced Power Systems Division of Nortel from 1996-8
- Publications include 14 articles in peer-reviewed journals and 45 articles in peer-reviewed conference proceedings
- Reviewer for eight journals and five conferences and symposia
- Member of the Program Committee for the IEEE Power Electronics Specialists Conference and the IEEE Applied Power Electronics Conference
- Member of the Power Sources Manufacturers Association-Education Committee and the Professional Engineers of Ontario



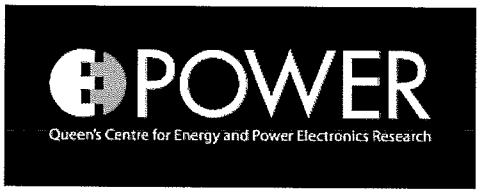
Appendix C
List of Members

Dr. Kumaraswamy Ponnambalam

- Professor and Associate Chair for Graduate Studies in the Department of Systems Design Engineering at the University of Waterloo
- Recipient of $800,000 CITO (OCE) Industrial Research Grant
- Publications include 39 articles in refereed journals and 9 chapters in refereed books
- Invited speaker at a number of conferences, including International Conference on Object-Oriented Programming, Systems, Languages and Applications and the Canadian Operational Research Society/Institute for Operations Research and the Management Sciences
- Founding faculty member of the Consortium for Software Engineering Research, funded on the order of $18 million by NSERC and five major corporations, IBM, OTI, NORTEL, BELL, and MITEL

Dr. Francis P. Dawson

- Professor in the Energy Systems Group in the Edward S. Rogers Sr. Department of Electrical and Computer Engineering at the University of Toronto
- BSc in Physics (1978), BASc (1982), MASc (1985) and PhD (1988) in Electrical Engineering from the University of Toronto
- Member of the Association of Professional Engineers of Ontario
- Consultant or project leader in several industrial projects



Appendix C
List of Members

Engineers

Mr. Djilali Hamza, Senior Engineer – ePOWER Laboratory
Dr. Sayed Ali Khajehoddin, Senior R&D Engineer – Power Electronics
Dr. Shangzhi Pan, Senior R&D Engineer – Power Electronics
Mr. Douglas Reid, Senior Systems Engineer – Wireless
Dr. Marzia Zaman, Senior Systems Engineer – Alternative Power
Mr. Haibo Zhang, Senior Engineer – Hardware Design

Visiting Researchers (Supervisors)

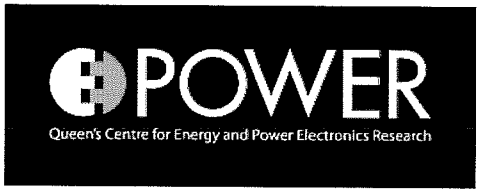
Dr. Masoud Ghartemani (A. Bakhshai/P. Jain)
Dr. Hamid Reza Karshenas (A. Bakhshai/P. Jain)

Postdoctoral Fellows (Supervisors)

Dr. Pritam Das (P. Jain)
Dr. John Lam, MITACS Elevate Industrial Fellow (P. Jain)
Dr. Davood Yazdani (A. Bakhshai/P. Jain)

PhD Candidates (Supervisors)

Mr. Hamid Danesh (A. Bakhshai/P. Jain)
Mr. Amir Dehghani (A. Bakhshai/P. Jain)
Mr. Anton Driesse (S. Harrison, P. Jain)
Ms. Suzan Eren (A. Bakhshai/P. Jain)
Mr. Djilali Hamza (P. Jain)
Ms. Joanne Hui (A. Bakhshai/P. Jain)
Mr. Eric Meyer (Y-F. Liu)
Mr. Ali Moallem (A. Bakhshai/P. Jain)
Mr. Majid Pahlevaninezhad (A. Bakhshai/P. Jain)
Mr. Alireza Safaee (A. Bakhshai/P. Jain)
Ms. Sima Seidi-Khorramabadi (A. Bakhshai)
Mr. Darryl Tschirhart (P. Jain)



Appendix C
List of Members

MASc Candidates (Supervisors)

Mr. Andrew Dickson (Y-F. Liu)
Ms. Vidisha Gupta (P. Jain)
Ms. Ting Hao (P. Jain)
Mr. Mohammad Hassanzahraee (A. Bakhshai)
Mr. James Houseman (P. Jain)
Mr. Liang Jia (Y-F. Liu)
Mr. Marko Krstic (P. Jain)
Mr. Jonathan Mash (P. Jain)
Ms. Sepide Rafiei (A. Bakhshai)
Mr. Amish Servansing (P. Jain)
Mr. Nikhil Sukesh (A. Bakhshai/P. Jain)

Visiting Research Students (Supervisors)

Mr. Anshul Agarwal (P. Jain/V. Agarwal, Mohilal Nehru Nat'l Inst of Tech, India)
Mr. Ahmad Mousavi (P. Jain/G. Moschopoulos, UWO)

POWER
Queen's Centre for Energy and Power Electronics Research

Appendix C
List of Members

Interim Advisory Board Members

Dr. Nishith Goel, Board Chair
President and CEO, Cistel Technologies Inc.

Dr. Nishith Goel was awarded his PhD in Systems Design Engineering from the University of Waterloo. He is a veteran technology executive and entrepreneur, who held positions at Bell Northern Research and Nortel before founding Cistel Technology in 1995. He is the co-founder of CHiL Semiconductor and was the co-founder of Ipine Networks. In 1995, Dr. Goel founded Cistel, which has grown to over 150 employees in Ontario with revenues exceeding $10M per year. Cistel is a dynamic and progressive IT services company whose professional services are diverse, ranging from project management, business and technical analysis, implementation of communication networks and the establishment of nationwide email systems to helpdesk, desktop and server support.

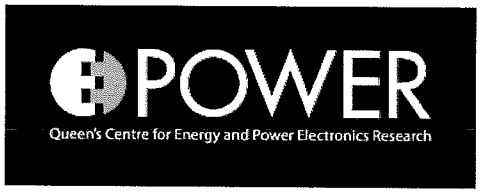
Dr. Kalai Kalaichelvan, Board Vice-Chair
President and CEO, EION Inc.

As CEO and founder, Dr. Kalai Kalaichelvan has developed EION Wireless into a world leader in IP software and wireless networking solutions. Dr. Kalaichelvan holds a PhD from the University of Toronto, and is on the Advisory Board of Samsung Electronics. Dr. Kalai Kalaichelvan brings to the Board over 20 years of experience in the telecommunications industry in business and technical leadership. For his entrepreneurial innovation, CATA Alliance and the National Research Council honoured him with the 2004 Innovator of the Year Award. EION, which he founded in 2001, has a staff of 50 and annual revenues of over $10M, and has an established track record of university collaboration and subsequent technology transfer and commercialization.

Dr. Praveen Jain, Interim Director
Professor and Canada Research Chair, Queen's Department of Electrical and Computer Engineering

Dr. Alireza Bakhshai
Associate Professor, Queen's Department of Electrical and Computer Engineering

Dr. Brant A. Peppley
Director, Queen's-RCM Fuel Cell Research Centre
Canada Research Chair in Fuel Cells, Queen's University



Appendix C
List of Members

Dr. Brian Surgenor
Associate Dean (Research, Graduate Studies & External Affairs)
Faculty of Applied Science, Queen's University

Ms. Anne Vivian-Scott
Vice-President, Commercial Development, PARTEQ Innovations

Ms Vivian-Scott (MBA, Concordia; BASc, Waterloo) trained as a chemical engineer at the University of Waterloo and worked in the design/engineering/construction field for Fluor Daniel, Kingston office, before completing her MBA at Concordia University in Montreal. Prior to joining PARTEQ in 1998 she worked in product line finance at Nortel Networks in Montreal. At PARTEQ, Ms Vivian-Scott leads a team of 10 commercialization managers and has been involved in all aspects of technology transfer: from the assessment of early stage technology, to negotiating major licenses, to hands-on management of spin-off companies. She has also been very involved with the management of PARTEQ's captive venture fund which invested over $7M in Queen's companies. Ms. Vivian-Scott has been involved in the start-up of the national technology transfer organization, the Alliance for the Commercialization of Canadian Technology (ACCT), and was co-chair of ACCT's founding conference, in 2005; currently she is a member of the Professional Development Committee. She is also involved in local economic development initiatives and sits on the board of elorin, the Eastern Lake Ontario Regional Innovation Network.

Warren E. Mabee, Ph.D.
Assistant Professor

SCHOOL OF POLICY STUDIES /
DEPARTMENT OF GEOGRAPHY

138 Union Street, Room 423
Queen's University
Kingston, Ontario, Canada K7L 3N6
T 613 533-6000, extension 77092
F 613 533-6122
E warren.mabee@queensu.ca

Dr. J. Ramsay
Chair, Advisory Review Committee
Faculty of Applied Science
Queen's University

Friday, 6 August 2010

Re: ePower linkages with QIEEP

Dear Dr. Ramsay

The Queen's University Institute for Energy and Environmental Policy is very interested in building linkages with the Centre for Energy and Power Electronics (ePower). We would like to express that interest in support of ePower's application for formal centre status.

Our Institute, as we have envisioned it, plays a unique role here at Queen's. We do not have technical research programs, although many of our Fellows have their own research programs or are linked to other groups with ongoing research in technology development. Instead, QIEEP is designed to draw upon technical expertise resident at the University, and to translate technical knowledge into policy-relevant information. One of our main goals is exploring the applications for, and limitations of, different technology solutions; we can then use this information to overcome policy and implementation barriers to sustainable energy development.

One of our lead projects at the Queen's Institute for Energy and Environmental Policy is the development and study of Renewable Energy Power Portfolios. This research takes a regional approach, encompassing all of Eastern Ontario, and seeks to balance new renewable energy technologies and to create the policy framework required to implement these opportunities. Within the context of this project, we are very interested to see the development and participation of many new small & medium-sized enterprises; these types of companies tend to be the prime movers in the implementation of new technologies. The work that ePower is focused on would greatly complement this research program.

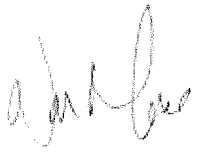
We feel that a stronger linkage with ePower would build upon our core mandate, and would bring new interests and skills into QIEEP's research program. As a policy institute, access to the expertise and knowledge within ePower would greatly increase the effectiveness and thoroughness of our own research.

Warren E. Mabee, Ph.D.
Assistant Professor

Should ePower's application for formal centre status be successful, we would be happy to have one or more researchers from ePower join QIEEP as Fellows. These individuals, who ideally have some interest in or aptitude for policy research, would help us in understanding the work that ePower does, and would be able to interact with other technical Fellows within the Institute in designing holistic policy responses. We currently have Fellows representing Applied Sustainability, the Fuel Cell Research Centre, the Green Chemistry Centre, and the Sustainable Bioeconomy Centre within the Institute, and ePower would be a welcome addition.

We would like to thank the committee for bringing this potential linkage to our attention. Should you require any additional information on QIEEP's participation in this proposal, please don't hesitate to contact me at the coordinates above.

With best regards,



Warren Mabee, Ph.D.
Director, Queen's Institute for Energy & Environmental Policy