Exhibit No. C12-5

BCUC Inquiry into FortisBC Energy Inc. ("FEI") regarding the Offering of Products and Services in Alternative Energy Solutions ("AES") and Other New Initiatives

Written Direct Evidence of
Dr. Mark Jaccard

21 November 2011

TABLE OF CONTENTS

1. INTRODUCTION AND SUMMARY OF WITNESS QUALIFICATIONS

Q. Please state your name, occupation and business address

A. My name is Mark Jaccard. I am a professor at the School of Resource and Environmental Management at Simon Fraser University, a position I have held since 1986. From 1992 to 1997, I took a leave from my teaching responsibilities (but continued to direct university research) to serve as Chair and CEO of the British Columbia Utilities Commission ("BCUC" or "Commission").

I am also the owner and president of MK Jaccard and Associates, Inc., a 22 year-old company focused on the analysis and modeling of sustainable energy-climate policies and on energy sector regulation.

My academic address is Dr. Mark Jaccard, Resource and Environmental Management, Simon Fraser University, Vancouver, V5A 1S6, BC. My business address is Dr. Mark Jaccard, 109 St. Patrick St., New Westminster, V3L 2P6, BC.

Q. What is your academic background?

A. I hold a Ph.D. in Economics from the Department of Economics / Institute of Energy Economics and Policy at the University of Grenoble, and a Master of Resource Management and Bachelor of Arts from Simon Fraser University. My CV is attached as Appendix B.

Q. Please outline your principal areas of research and advisory roles.

A. I develop and apply data-intensive empirical models that assess sustainability policies for energy and materials use in society. I have published over 100 academic papers on topics within my areas of research. A representative list is included in my CV.

I am a research fellow with the CD Howe Institute, a Canadian economic think-tank. My 2002 book, *The Cost of Climate Policy*, won the Policy Research Institute award for best policy book in Canada and my 2005 book, *Sustainable Fossil Fuels*, won the Donner prize for best policy book in Canada.

I have been honoured with the Nobel Peace Prize (2007) as an author with the Intergovernmental Panel on Climate Change, the SFU Outstanding Alumni Award (2007), the BC Academic of the Year Award (2009) by the Confederation of University Faculty Associations, and named a Fellow of the Royal Society of Canada (2010) for my lifetime academic contribution.

I have also been appointed by the following entities to play a lead advisory role:

- by the Canadian Prime Minister to serve on Canada's National Roundtable on the Environment and the Economy (2006-2009);

- by the China Council for International Cooperation on Environment and Development to chair its Task Force on Sustainable Use of Coal (2008-2009); and

- by the International Institute for Applied Systems Analysis in Vienna to serve as convening lead author for sustainable energy policy with the Global Energy Assessment (2008-2012) – a major international initiative of leading world energy experts in preparation for the Rio Earth Summit of 2012.

Q. Please outline your experience with public utility regulation and energy regulation.

A. From 1992 to 1997 I served as Chair and CEO of the BCUC. In that capacity, I had overall responsibility for the operation of the BCUC in the discharge of its

statutory mandate under the *Utilities Commission Act*, which included regulating the public utilities in British Columbia that fell within the jurisdiction of the Act. A large part of that mandate included the public review of applications filed by public utilities. I was responsible for the selection of Commissioners to hear these applications. I also chaired over 20 public hearings and reviews.

Of particular relevance to this inquiry, I chaired the review that lead to the Commission's *Retail Markets Downstream of the Utility Meter Guidelines (1997)* (the "RMDM Guidelines"). Those guidelines still apply today.

I have also been involved with the development of energy policy within British Columbia, Canada and internationally, particularly in relation to issues involving sustainable energy development and climate change policy. The initiatives I have been involved with include the following:

- In British Columbia:
  - In 1995, I chaired a public inquiry into electricity sector reform.
  - In 1996, I chaired a public inquiry into gasoline pricing.
  - In 1997-98, I chaired a task force on electricity sector reform.
  - In 1998, I provided modeling and expert advice to the BC Greenhouse Gas Forum, an advisory body selected by the BC government.
  - In 2002-03, I provided advice to the BC government in its development of the BC Energy Plan.
  - In 2006-2008, I provided climate policy advice to the BC government, including serving as Special Advisor to the Climate Action Team.
  - In 2008, I provided advice to the BC government in its amendments to the *Utilities Commission Act*.
  - In 2009-2010, I provided advice to the BC government in its development of the *Clean Energy Act*.

- In Canada:
  - In 2006-2009, I served on Canada's National Round Table on the Environment and the Economy.
  - In 2007, I served as "special advisor on climate policy" to the Canadian Council of Chief Executive Officers.
  - Since 2005 I have been a research fellow of the CD Howe Institute.
  - I have appeared several times as an expert witness before special committees of the Canadian House of Commons and Senate.
- In other countries and internationally:
  - In 1993-1996, I was an author of the *Second Assessment Report of the Intergovernmental Panel on Climate Change*.
  - In 1995-2002, I served as an international expert on the China Council for International Cooperation on Environment and Development.
  - In 2009-2011, I was an author of the *Special Report on Renewable Energy of the Intergovernmental Panel on Climate Change*.
  - In 2008-2009, I was co-chair of the Task Force on Sustainable Use of Coal for the China Council for International Cooperation on Environment and Development, reporting to the premier of China.
  - Since 2008, I have been convening lead author for sustainable energy policy with the Global Energy Assessment, slated for publication in 2012.

Q. Have you previously appeared as a witness before the British Columbia Utilities Commission?

A. Yes. In 2005 I presented testimony, on behalf of the Georgia Strait Crossing Concerned Citizens Coalition in the BCUC hearing "*In the Matter of BC Hydro Call for Tenders for Capacity on Vancouver Island: Review of Electricity Purchase Agreement.*"

Q. What is the purpose of your evidence?

A. I have been engaged by Corix Utilities Inc. ("Corix") to provide my views on the following topics to assist the Commission in its *Inquiry into FortisBC Energy Inc. regarding the Offering of Products and Services in Alternative Energy Solutions (AES) and Other New Initiatives* ("AES Inquiry"):

(a) Background on the growth and interest in TES
(b) British Columbia energy policy related to TES
(c) TES market characteristics and competitive dynamics
(d) Integration of FEI's TES business within FEI
(e) Recommendations for the Commission's regulation of public utility TES providers

Within the AES sector (as defined in the Commission's Scoping Decision for this inquiry), I have focussed on Thermal Energy Services ("TES").[1] In this evidence, I use the expression TES to include geo-exchange, solar-thermal and district energy systems to be consistent with how FEI is using the expression.

My evidence will review the fundamental economic principles and public policy perspectives underpinning the regulation of monopoly utility service providers, and how this ought to inform the Commission's inquiry into FEI providing both TES and traditional natural gas services. My evidence will also provide a high level policy perspective on the development of the TES markets and how public utility regulation can be applied to foster economic efficiency and other public interest objectives in this market. I will leave to Corix and other TES providers to explain the specifics of the TES enterprises in British Columbia.

[1] Exh. A-5, Order G-118-11, Appendix A, p. 6.

2. OVERVIEW OF MY EVIDENCE

Q. Please explain the basic theme of your evidence and how you have organized the presentation of this evidence.

A. In this evidence, I offer my perspective on TES and how this emerging market in British Columbia fits within the provincial policy initiatives related to development of sustainable energy and climate change action. With that context in mind, I suggest how the Commission ought to approach its role as the public utility regulator in relation to TES initiatives by FEI. Specifically, I explain how the Commission can reconcile the narrower ratepayer interests in the regulation of FEI with the broader public interest in TES market development.

The basic theme is that the emerging market for TES has the potential for a great diversity of technology-fuel options that might serve different types of customers in different locations while simultaneously meeting societal goals of economic efficiency and sustainable energy. But, for these diverse options to realize their full potential, it is important that the market be truly competitive. This can only be the case if the BCUC ensures that incumbent public utilities do not use their existing assets, human resources and financial power to bias the competitive market.

As an illustration of this principle, the provincial government has since 2003 prohibited BC Hydro from competing with independent power producers ("IPPs") to provide new electricity generation (other than for large hydro-electric projects). This policy was established so that BC Hydro could not use its monopoly position to bias the market in favour of technologies and fuel choices consistent with its interests as a monopoly, but not necessarily in the best interests of its existing customers, nor of the economy as a whole.

Similarly, FEI is motivated to promote and sell TES options that are tied to natural gas, which is its existing business base. This natural gas bias has

implications for the market and provincial energy policy objectives, as I will explain later.

Ensuring complete and fair competition in an emerging market like TES is important because it maximizes the likelihood that each individual or group of customers is able to choose those technology and fuel options that best meet their unique needs. Overall, such competition motivates innovation, maximizes customer choice, and helps ensure the realization of economic efficiency and low cost provision of TES.

I have organized this evidence to deal first with the TES market characteristics and principles of regulation, and then to deal with a suggested regulatory approach in the context of the FEI TES business.

3. PUBLIC INTEREST IN REGULATION OF MONOPOLIES

Q. Explain your views on the rationale for regulation of monopoly utilities.

A. Natural monopolies occur in sectors of the economy in which extreme economies-of-scale mean that a monopoly firm can provide service at a lower cost than two or more competing firms. In natural monopoly conditions, governments usually create publicly owned monopolies or regulate privately owned monopolies. Increasingly, governments also regulate publicly owned monopolies, as occurs in British Columbia with the Commission's regulatory authority over aspects of BC Hydro's investment, operation and rates.

A regulatory solution is typically a surrogate for the customer benefits and protections provided by a competitive market, which is why governments and utility regulators attempt to foster effective competition where possible and constrain the activities of the monopolies they regulate where these might distort the competitive environment in related activities, such as the TES market. An equally important concern, especially for the utility regulator, is that the resources

of the monopoly utility not be diverted into the competitive market in ways that might adversely affect its captive customers – its existing ratepayers.

Q. Explain your views on the benefits of competitive markets.

A. Markets pressure competing producers to find productivity gains, creating a continuous force for technological change that improves the efficiency with which resources are converted into valued goods and services. In a monopoly sector of a market economy, this same pressure is lacking. Also, in a monopoly sector consumers are not able to switch to alternative suppliers who are able to offer a lower price.

4. PUBLIC INTEREST IN TES AND SUSTAINABLE ENERGY

Q. Explain your views on what is driving the public interest in TES.

A. Like many other jurisdictions, British Columbia is undergoing a rapid shift in energy technologies and market conditions, in part due to environmental objectives and regulations, especially with respect to the development of energy systems that minimize greenhouse gas emissions.

- British Columbia has passed legislation requiring the government to implement policies to reduce provincial greenhouse gas (GHG) emissions 33% from their 2005 levels by 2020. This target will be extremely difficult to reach because British Columbia has a growing population and economy and because its development of fossil fuel resources for export (coal, oil, natural gas) causes rising GHG emissions in extraction, processing and transport. To achieve its 2020 target, British Columbia requires emissions from industry, buildings and transportation to fall dramatically over the next decade.

- British Columbia has also passed legislation requiring local governments to pursue GHG emissions reductions and to specify in their planning and zoning the mechanisms by which they would do this.

- British Columbia has passed the *Clean Energy Act* and amended the *Utilities Commission Act* to direct the BCUC to consider provincial climate policy objectives in the exercise of its regulatory mandate.

- The governments of British Columbia and Canada have implemented various programs and policies to support near-zero-emission options for energy in all facets of the economy, including in the provision of TES. This support is manifested as information and education programs and also in some cases with grants and tax credits in support of near-zero-emission options.

- Technology and fuel options for zero- and near-zero-emission provision of TES are diverse and under rapid development in competitive situations. Involving many new technologies, this competition leads to learning economies that reduce costs over time. The lowest cost option in any given location and configuration of buildings may be very different than the lowest cost option in another location and configuration. Energy sources for zero- and near-zero emission TES include electricity from distant renewables delivered by transmission, electricity produced locally from renewables like solar, wind or biomass, latent heat from electricity-driven geo-exchange, local solar heat, local heat (or combined heat and power) from combustion of biomass, biogas, or municipal solid waste, capture of waste heat from residential, commercial and industrial activities, and some minimal uses of natural gas, perhaps in conjunction with biofuels.

These diverse technology and energy options for zero- and near-zero-emission TES may have low operating costs in some cases, but the up-front capital costs can be substantial. On a life-cycle-cost basis, the simple combustion of natural gas to provide thermal energy remains a low cost option, especially given the current low prices of natural gas in North America. However, the use of natural gas as a fuel source will contribute to the rise in GHG emissions. For these reasons, governments have taxed and regulated GHG emissions as well as offered subsidies to new developments in zero-emission TES solutions.

In these circumstances, it is important that the Commission not allow the natural gas public utility to use its existing monopoly resources to bias the competition in the market towards natural gas based TES options. That outcome would frustrate government climate change and clean energy objectives.

5. TES MARKETS AND PUBLIC UTILITY REGULATION

5.1 When to Regulate

Q. Under what market conditions does economic regulation lead to more efficient outcomes?

A. Economic regulation by a utilities commission is based on the principle that activities exhibiting extreme economies-of-scale may be provided by natural monopolies (utilities), and if these monopolies are regulated to make prudent investments and charge rates that only recover costs this situation may be in society's interest. However, a related principle is that natural monopoly conditions are not static and that the economic regulator must be ever-vigilant for changes in technologies, market conditions and government regulations (such as environmental regulations) to identify situations in which natural monopoly conditions no longer exist or indeed do not yet exist (in the case of a new market).

In such cases, the economic regulator may restrict the domain of the natural monopoly and support instead the development of competitive markets. The underlying standard principle of economic regulation is that monopoly should only exist where it is not possible to replace it with competition. Competitive forces are accepted as providing societal benefits more efficiently and effectively than economic regulation.

Q. Does the TES market in British Columbia exhibit the characteristics of a natural monopoly?

A. No. At this early stage, many different options for TES are being advanced and no specific technological or fuel option is preferred from the perspective of customers, government or the economic regulator. Consider the following examples of TES options:

- A new suburban development might opt for district heating (or combined heat and power) while another might opt for biogas distribution to individual home furnaces and yet another for electricity-driven heat pumps (geo-exchange) at individual homes or as a district heating system.

- A remote, off-grid settlement might opt to connect to the electricity grid in order to import renewable electricity for resistance heating or to run heat pumps (geo-exchange) while another might opt for local development of renewable-generated combined heat and power using solid biomass or biogas and yet another might rely on low-emission combustion of wood in each residence.

- One or several adjacent commercial / residential / institutional multi-story buildings might opt for a large ground source heat pump system (geo-exchange) while others might opt to connect to a single combined heat and power system (fuelled by biomass or natural gas) while yet others might focus on waste heat from waste water local industry and other sources.

These real-world examples of new technologies and market conditions do not cover the full range of possibilities, but they demonstrate the great diversity and creativity possible today in the provision of TES to a given locale, some of which may involve a delivery network (presumably with some local economies-of-scale), some of which may not.

Thus, it may be the case in some locations that a community or group of customers – after considering fully its options for TES provision – chooses to contract to a firm that will construct an energy delivery network and in some cases such networks may become *ex poste* local monopolies, subject to appropriate regulation of some form. However, if the *ex ante* market conditions, prior to the choice of TES provider, are potentially competitive, then the public interest is best served by governments and utility regulators ensuring the fullest possible competitive conditions in the *ex ante* market for TES provision.

Q. Is the TES market competitive?

A. Yes. Unlike the large initial capital costs of the FEI natural gas utility that make it a natural monopoly, the TES arket has no such barriers to entry (there are also no franchise agreements that give the utility exclusive or near-exclusive rights to serve). The relatively small scale and locally-distinct nature of these systems makes it possible for communities, developers and individual customers to solicit competing bids for the provision of TES services. I understand that the present practice of TES developers is to actively compete against each other for projects, often through commercial tendering processes.

Q. How does competition among TES service providers benefit the market?

A. The outcome in any given locale should depend on the location-specific costs of resources and technologies for the scale in question and on the preferences of the individuals, institutions and firms seeking these energy services. It is in situations of such diversity of opportunity where competitive markets work best in meeting society's needs. Competitive markets provide the greatest opportunity for those seeking TES to acquire these in the form they desire and at the lowest possible cost. Thus, if the economic regulator has evidence to suggest that different firms will compete to offer a diversity of technological and market options in any given locale, the regulator should step back and encourage competition.

Q. What principles should guide economic regulation to promote efficient outcomes?

A. In the case of TES, the standard approach to economic regulation would manifest itself via two key operating principles. First, is the importance of ensuring that competition is not thwarted by unfair advantages that accrue to existing monopolies. Second, is the importance of facilitating cost-effective and appropriate regulation in situations in which the choice of a particular form of TES results in the creation of a public utility.

5.2 Commission Regulation of TES

Q. What role should the Commission play in the development of the TES market?

A. The Commission must reconcile the ratepayer interest in public utility regulation with the public interest in a competitive TES market. The span of its regulatory reach is defined by its statutory mandate – which is the regulation of public utilities. Within that mandate however, the Commission has considerable discretion over how it regulates public utilities engaged in TES which, in turn, will influence the TES market. With this in mind, the Commission has an important role in several respects:

- First, where a competitive market can exist for the provision of TES, the economic regulator must ensure that the natural monopolies it regulates (electric, gas, other) do not use advantages related to their monopoly powers (customer information, improper allocation of risk, cross-subsidization, etc.) to thwart fair competition. This may require several stipulations for the practices of the monopoly. Establishing rules for participation by existing non-TES utilities in these TES market protects both the existing non-TES utility customer interests and the competitive market conditions.

- Second, if the competitive process results in the creation of a *de facto* local TES public utility monopoly, such as a local network for electricity, heat, or biofuel distribution, then the Commission should regulate in a manner that suits the circumstances of this class of TES undertakings.

As noted above, it is helpful to think of competition as a desirable *ex ante* condition in all locales considering TES. However, the *ex post* outcome may be one in which a local natural monopoly is part of the chosen technology-fuel option. Thus, public utility regulation best serves the public interest by fostering fair competition *ex ante* and fair regulation *ex post*.

Q. How can the Commission foster fair competition in the TES market through the exercise of its public utility mandate?

A. The initial choice of the TES provider is not regulated by the Commission (the *ex ante* condition), but the Commission does regulate an important aspect of the competitive environment, namely the conduct of existing public utilities. The Commission has the mandate to protect both the ratepayer and the public interest through its regulation of existing utilities like FEI, where such utilities choose to compete in TES by integrating the TES business into the existing natural gas business.

The Commission exercises regulatory control over important aspects of FEI's business, including:

- the risks and costs that FEI may transfer from the TES business to the natural gas ratepayers; and
- the information, resources and market power that FEI may transfer from the natural gas business to the TES business.

Q. Has the Commission exercised regulatory control in similar situations?

A. Yes. In 1997, the Commission reviewed similar issues in relation to public utility participation in unregulated business downstream of the utility meter.

In this case, TES services are also downstream of the existing utility meter. The fact that some TES undertakings may become regulated *ex post* does not change the fundamental issues about the appropriate relationship between the natural gas business and the new TES business downstream of the existing utility meter. Thus, many of the objectives and principles developed in the 1997 case apply with equal force.

FEI's evidence in this proceeding concerning its "New Initiatives," including its TES class of service, is of concern in this regard. The New Initiatives are "a key part of its low carbon strategy to help maintain [its natural gas] throughput levels."[2] FEI explains at page 3 of its evidence that:

> The New Initiatives are a tool to attract new customers who might otherwise seek out other green energy sources, and to retain customers who may leave the FEU and natural gas for an alternative energy source....
>
> [T]he New Initiatives help to promote natural gas as part of the energy mix in British Columbia and make efficient use of the natural gas infrastructure for the benefit of both natural gas customers and the Companies. In this sense, the Companies' interest in managing increased long term business risk through the New Initiatives is aligned with the interests of natural gas customers in having access to natural gas at lower rates and having access to new ways to meet their energy needs.[3]

The pursuit of a low carbon strategy speaks to a broader public interest in the efficient development of the TES market generally, to serve the broader climate

[2] FEI Evidence, Exhibit B-2, p. 29.
[3] *Ibid.*, p. 3.

change and clean energy objectives noted earlier. However, the use of the natural gas public utility resources to promote natural gas-based TES solutions does not serve those public interests since it frustrates the achievement of GHG reduction targets. Further, to the extent the resources of natural gas ratepayers are used to support FEI's effort to develop its new TES business, the Commission must decide whether that cross-subsidy is in the ratepayer interest and the public interest.

The regulation of TES should ensure that the TES market is not biased towards the adoption of natural gas technologies, or the interests of natural gas ratepayers. It is not difficult to imagine circumstances where the interests of a TES system might be independent of, or in opposition to natural gas ratepayers.

Q. How does the Commission foster fair regulation of TES?

A. Under the *Utilities Commission Act* (UCA), the definition of "public utility" will capture some TES service providers who establish a thermal distribution system to serve the public for compensation. Even though the initial choice of TES provider is not under regulation (*ex ante* competition), the public utility may be established once the choice is made. However, the manner of regulation is within the discretion of the Commission and can assist in the development of the regulated portion of the TES market.

The Commission should regulate TES utilities in a manner that appropriately balances the regulatory burden with the intended benefits of regulation of these smaller scale utilities. Commission regulation should recognize that there will be a wide diversity in the nature and costs of the services that these systems provide. This is because these systems are not contiguous and are generally designed to reflect the specific requirements, values and intended outcomes of the communities or customers they serve. To the extent that, for example, consolidation takes place within the sector, regulation can adapt over time to take into account evolving market circumstances.

In brief, the Commission should follow an adaptive management approach. In the first instance, the Commission should:

- set rules so the actions of the existing public utility do not unfairly distort or bias the competition in the *ex ante* TES market; and

- establish flexible regulation that is responsive to the circumstances in the *ex post* TES public utility regulated market.

Then, with sufficient development and maturation of the TES market, the Commission may re-assess and adjust its regulatory approach to suit the conditions as they evolve.

Q. What sort of strategy for the regulation of small monopolies do you suggest?

A. I am not suggesting a specific strategy in this regard. Rather, I am suggesting that the Commission should cons der the circumstances of the TES utilities and decide when the conditions are right to forbear from regulation – i.e., the customers are positioned to protect themselves from any abuse of monopoly utility power so that the public interest in regulation is low. These situations may call for light-handed or no public utility regulation.

Under Section 88(3) of the UCA, with advance approval of the Lieutenant Governor in Council, the Commission may limit the application of the UCA in situations where it deems such action advisable. The exemption may apply to a particular case, a class of cases or a person. The UCA does not specify the criteria for granting a Section 88(3) exemption, so the discretion is left with the Commission. The Commission could, for example, set a minimum number of customers as a threshold for active regulation of certain classes of small

monopolies. The guiding thought is to match the regulation to balance the public interests in TES market development with protection of ratepayer interests.

5.3 Integration of FEI's TES Business within FEI

Q. What are your views on the recent action by FEI to provide TES as a separate business within the same corporate entity that provides the natural gas distribution business?

A. I understand that FEI has begun to operate the TES business and the natural gas business as separate classes of customer service. FEI now presents itself as an integrated "energy solutions" company.

I also understand that FEI believes that there should be no restrictions on the exchange of information and resources between the two business divisions.

From a high level perspective, I would comment that this development represents a return to the circumstances that existed during the RMDM review in 1997. At that time, the Commission decided that these sorts of new initiatives were best undertaken outside of the natural gas utility – i.e., via a separate company. The RMDM Guidelines were then established to create a transparent and accountable separation between the new enterprise downstream of the utility meter and the traditional gas utility.

The move to re-integrate the new TES line of business into the gas utility calls for clear principles and rules to ensure the utility ratepayer interest in fair rates, and the public interest in fair competition in the TES markets, are both met. The fact that both the natural gas business and the TES business are regulated under the same corporate entity complicates the task of separating the business activities and costs, but it also allows the Commission direct authority over both lines of business. The Commission should take steps to regulate the risks and costs that FEI may transfer from the TES business to the natural gas ratepayers and the

information, resources and market power that FEI may transfer to the TES business.

6. RECOMMENDATIONS

Q. Are there previous Commission precedents that may be helpful to consider in relation to the regulation of TES offered by an existing public utility?

A. The RMDM Guidelines could and should be adapted to this situation. Although the Guidelines deal with the interaction between a public utility and its non-regulated businesses, the issues are similar for a public utility that integrates a new TES business (a regulated, but competitive business) into its existing natural gas business (a regulated natural monopoly).

Absent such rules, the business platform and resources built up by the natural gas business gives FEI considerable market power that could be used to the detriment of the natural gas ratepayers and the TES market.

Q. What steps would you recommend to the Commission?

A. Based on the RMDM Guidelines, I have proposed objectives and principles that the Commission should adopt in the attached Appendix A to this evidence. Appendix A also contains a proposed transfer pricing policy and a code of conduct.

This approach is also similar to efforts in other jurisdictions, such as Alberta. For example, the Alberta Utilities Commission ("AUC") is currently reviewing the inter-affiliate codes of conduct that it has previously approved, with a view to establishing a general AUC Rule regarding inter-affiliate relationships. In Bulletin 2010-30 establishing the review, the AUC describes the purpose of such codes of conduct as follows:

> The overall purpose of the code is to address the possibility that interactions between regulated and unregulated affiliated companies could be conducted in a manner that results in rates for a regulated utility being too high or the unregulated affiliate having an unfair competitive advantage in the market in which it operates.

I think this succinct statement of purpose is apt for the Commission's AES Inquiry. Although the AUC review is examining the interactions between a regulated and unregulated affiliate, the same concerns arise with a single regulated public utility providing two distinct utility businesses. Because of the lack of corporate separation, the concerns for abuse of monopoly position are perhaps even greater and harder to detect.

Appendix A

Rules of Conduct Between Different Classes of Service Within a Utility

1. Objectives

(i) There must be no cross-subsidization of one class of service by the ratepayers of another class of service.

(ii) The risks associated with one utility class of service must be borne entirely by that class of service and not transferred to the ratepayers of another class of service.

(iii) Where competitive markets can exist for utility service, regulation of public utilities should strive to ensure that customers receive the benefits of competition including choice of service provider.

(iv) Existing utility service providers who compete to provide service in an emerging market should not be permitted to use their existing monopoly utility resources to compete unfairly against new service providers.

2. Principles

(i) If a utility provides two distinct energy utility services, then it must implement a cost allocation and transfer pricing policy that ensures that resources shared between the two energy services are allocated and priced fairly to each service class.

(ii) When a good or service is provided by one class of service to another class of service within the same corporate entity, the transfer must take place at fair market value, including goodwill, associated with the good or the service.

(iii) Common costs of the utility must be allocated fairly among all classes of utility services in a manner that reflects the cost burden that each class causes.

(iv) The onus will always be on the utility to prove that its transfer pricing policy mechanism will provide sufficient protection to ratepayers of each class of service.

(v) Utilities will be required to provide periodic proof that maintaining multiple classes of service within the same corporate structure benefits ratepayers, and that ratepayers are sufficiently protected.

3. Transfer Pricing Policy

(i) All costs associated with a class of service will be allocated to that class in proportion to the cost burden created by that class.

(ii) The costs of developi g new business ventures will be allocated to the new class of business or the shareholder.

(iii) The costs associated with a good or service that is shared between class of service will be accounted for in a transparent and comprehensive manner and recovered from the class of service using that good or service.

(iv) If the service provided from one class of service to another could also be obtained from an independent supplier, the price paid by the receiving class of service will be no less than the competitive market price and will never be below the incremental cost.

(v) The financial costs of each class of service will be borne by the class of service. In the exceptional case where a class of service is supported by the financial strength of other aspects of the utility, appropriate financial compensation must be provided.

(vi) Utilities will file periodic reports that demonstrate they are adhering to the transfer pricing policy. The form and timing of the report will be determined by the Commission.

(vii) The utility may not use customer or other confidential information (information that is not available publicly) related to one service class to promote the development of another service class. If the public utility customers agree to a release of customer information between classes of service, that information must also be provided to other market participants under the same terms and conditions and for the same price.

4. Code of Conduct

(i) Utility representatives may not state or imply that the utility will offer customers favored treatment to attract new customers or retain existing ones.

(ii) Utility representatives may not direct potential customers seeking competitively offered services to only the services offered by the utility or suggest that the customer will receive preferred treatment if the utility services are chosen. The utility representatives must inform the potential customer that competitive choices are available without promoting a specific service supplier in preference to any other.

(iii) The utility will formally advise all employees of expected conduct related to these principles and it will perform periodic audits of the relationships to ensure compliance with these principles. These audits will be performed no less than once a calendar year and filed with the Commission.

(iv) Complaints by non-affiliated parties about the application of these principles, or any alleged breach thereof, will be brought to the immediate attention of the senior management of the utility and subsequently a report of the complaints, and action taken, will be filed with the Commission. The report will be filed with the Commission within one month of the complaint being made.

(v) The financing of each class of service will be accounted for entirely separately with the financing costs reflecting the unique risk profile of each. No cross-guarantees or any form of financial assistance whatsoever should be provided directly or indirectly by one class of service to another without approval of the Commission.

Appendix B

CURRICULUM VITAE
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November, 2011

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EDUCATION:

Ph.D.: University of Grenoble, Department of Economics / Institute of Energy Economics and Policy, 1987.
Masters of Natural Resources Management: Simon Fraser University, 1984.
Bachelor of Arts: Simon Fraser University, 1978.

PROFESSIONAL EXPERIENCE:

2008 to 2011:
INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, SPECIAL REPORT ON RENEWABLE ENERGY
Lead Author for Renewables Policy

2008-2009:
CHINA COUNCIL FOR INTERNATIONAL COOPERATION ON ENVIRONMENT AND DEVELOPMENT
International Co-Chair of Task Force on Sustainable Coal

2007-2008:
BRITISH COLUMBIA CLIMATE ACTION TEAM
Special Advisor on Climate Policy

2007-2008:
COUNCIL OF CANADIAN CHIEF EXECUTIVE OFFICERS
Special Advisor on Climate Policy

2007 to 2011:
GLOBAL ENERGY ASSESSMENT, UNITED NATIONS AND OTHER ORGANIZATIONS
Convening Lead Author for Sustainable Energy Policy

2006-2009:
CANADA'S NATIONAL ROUNDTABLE ON THE ENVIRONMENT AND THE ECONOMY
Panel Member

2006 to present:
CD HOWE INSTITUTE
Research Fellow

2003 to present:
SIMON FRASER UNIVERSITY
Full Professor, School of Resource and Environmental Management. Teaching graduate courses in ecological economics, environmental policy, energy management and policy, and energy system modelling. Supervision of graduate student research. Director of Energy and Materials Research Group.

1992-2003:
SIMON FRASER UNIVERSITY
Associate Professor, School of Resource and Environmental Management. (On leave from teaching and administration from 1992-1997 while chairing the BC Utilities Commission and leading a government task force.)

1992 to present:
CANADIAN INDUSTRIAL ENERGY END-USE DATA AND ANALYSIS CENTRE
Director. Director of a federal government funded centre for industrial energy use research and data collection. Conducts research for governments, industries and public interest groups.

1997:
BRITISH COLUMBIA MINISTRY OF EMPLOYMENT AND INVESTMENT
Advisor to the Minister. Headed a government Task Force on Electricity Market Reform. Led a technical staff and a stakeholder group in negotiations and analysis for reform of the British Columbia electricity industry. Appointment 50% split with Simon Fraser University.

1996:
GOVERNMENT OF BRITISH COLUMBIA
Inquiry Commissioner, Chair of Inquiry into Gasoline Pricing in British Columbia. Conducted an inquiry into competition and gasoline pricing in British Columbia, providing a final report and recommendations to the provincial cabinet.

1992-1997:
BRITISH COLUMBIA UTILITIES COMMISSION

Chairman and Chief Executive Officer. Director of a quasi-judicial regulatory body charged with regulating the rates and investments of all energy utilities in B.C. Responsibilities split between administration of the commission and role as chairperson for public hearings and regulatory decisions. On leave from university for administration and teaching duties, but sustained research program and student thesis supervision.

1988-1992:
SIMON FRASER UNIVERSITY
Assistant Professor, School of Resource and Environmental Management. Taught graduate courses in Economics of Natural Resources and the Environment, Energy Management and Policy, Energy Systems Modelling, Project Evaluation, and an undergraduate course in the Department of Business Administration in Intermediate Microeconomics. Graduate student supervision and administrative duties. Consultant in various energy research contracts including energy and economic development, energy conservation, energy forecast modelling, energy planning, energy pricing and energy and the environment.

1986-1988:
SIMON FRASER UNIVERSITY
Visiting Assistant Professor, Natural Resources Management Program. Taught graduate courses in Natural Resource Economics, Energy Demand Modelling, Regional Planning and Public Policy. Graduate student supervision and administrative duties. Consultant to various agencies.

1980-1981:
CANADIAN SATELLITE COMMUNICATIONS INC. (CANCOM) Vancouver, B.C.
Socio-economic researcher with a consortium of broadcasting companies which applied for and received the CRTC licence to provide satellite television and radio service to non-metropolitan Canadians.

1979-1980:
GEMINI NORTH LTD. Vancouver, B.C.
Writer, researcher, and assistant to the president in a socio-economic impact and communications research consulting company. The company closed with the election to Parliament of the president, Pat Carney.

MEMBERSHIP IN PROFESSIONAL ASSOCIATIONS

International Association for Energy Economics

HONOURS, SCHOLARSHIPS, AND KEY APPOINTMENTS

- Erasmus Mundus Scholarship Grant for Visiting Scholars of the European Union (2011)
- Theme Leader, Low Carbon Economy Committee, Pacific Institute for Climate Solutions (2010 -)

- Sterling Prize for Controversy (2010)
- Fellow of the Royal Society of Canada (2009 -)
- Lead author, Special Report on Renewables, Intergovernmental Panel on Climate Change, (2008-2011)
- International Co-Chair of the Task Force on Sustainable Uses of Coal, China Council for International Cooperation on Environment and Development (2008-2009)
- BC Academic of the Year, Confederation of University Faculty Associations of BC, 2008
- Special Advisor to the BC Climate Action Team, reporting to the Premier (2007-2008)
- Convening Lead Author for Sustainable Energy Policy, Global Energy Assessment, a project of the United Nations and other major international organizations, based at the International Institute for Applied Systems Analysis in Vienna (2007-2011)
- Nobel Peace Prize as member of the Intergovernmental Panel on Climate Change, 2007
- CD Howe Institute, Benefactors Lecturer, 2007
- Canadian Council of Chief Executive Officers, Special advisor on environmental policy, 2007
- Simon Fraser University Outstanding Alumni Award, 2007
- Simon Fraser University President's Award for Media and Public Outreach by a Faculty Member, 2006
- Panel Member, Canada's National Roundtable on the Environment and the Economy, (2006 - 2009)
- Research Fellow of the CD Howe Institute, 2005 -
- Donner Prize for top policy book in Canada in 2005 – *Sustainable Fossil Fuels: The Unusual Suspect in the Quest for Clean and Enduring Energy*
- Editorial Board Member, International Journal of Energy Sector Management, 2006 -
- Outstanding Research Contribution Award of the National Policy Research Institute for top policy-related book in Canada in 2001-2002 – *The Cost of Climate Policy*, co-authored with John Nyboer and Bryn Sadownik (also shortlisted for the Donner prize for top policy book in Canada and the Purvis prize for top writing in economics in Canada)
- Editorial Board Member, Energy Studies Review, 2001 –
- B.C. Ministry of Water, Land and Air Protection, Advisor to the Minister, 2001 - 2003
- Canadian Information System for the Environment, Advisory Panel to the Minister of Environment, 2000 – 2001
- Editorial Board Member, The Energy Journal, 1997 -
- China Council for International Cooperation on Environment and Development, Task Force on Energy Strategies and Technologies, 1996 -
- Outstanding Alumni Award, Burnaby South High School, 1999
- British Columbia Greenhouse Gas Forum, 1997 - 1998
- Intergovernmental Panel on Climate Change, 1993-1996
- Environment Committee of the New Westminster City Council, 1992-1996
- Blue Ribbon Panel of the Royal Society of Canada, "Canadian Options for Greenhouse Gas Emission Reduction", 1992
- Doctoral Fellowship, Social Sciences and Humanities Research Council of Canada, 1983-1986
- Graduate Research, Engineering and Technology (GREAT) Award, Science Council of British Columbia, 1982-1983

- Simon Fraser University Open Scholarship, 1982
- Simon Fraser University Tuition Scholarship (annual recipient), 1974-1978
- "Reach for the Top" Team, Burnaby South High School, 1973
- Outstanding Citizen of Graduating High School Class Award, 1973
- Student Council President, Burnaby South High School, 1973

REFEREED PUBLICATIONS

Murphy, R. and M. Jaccard, "Energy efficiency and the cost of GHG abatement: a comparative modeling exercise for the US," (forthcoming – Energy Policy)

Jaccard, M., "Social acceptability and distributional issues: lessons from the carbon tax in British Columbia," (forthcoming in J. Milne and M. Andersen, Handbook of Research on Environmental Taxation Elsevier)

Beugin, D. and M. Jaccard, "Statistical simulation to estimate uncertain behavioural parameters of hybrid energy-economy models," Environmental Modeling and Assessment, V.16 (7), 2011.

Mitchell, C. (et al., including M. Jaccard), "Policy, Financing and Implementation," In Edenhofer et al., IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation Cambridge: Cambridge University Press, 2011, pp 1263 – 1396.

Johansson, T. (et al., including M. Jaccard), "Global Energy Assessment – Summary for Policy Makers," In Johansson, T., Patwardhan, A., Nakicenovic, N. and L. Gomez-Echeverri (eds.) The Global Energy Assessment: Towards a Sustainable Future, Cambridge: Cambridge University Press, 2011.

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Jaccard, M. and J. Tu, "Show some enthusiasm, but not too much: carbon capture and storage development prospects in China," Global Environ ental Change, V21, 2011, 402-412.

Rivers, N. and M. Jaccard, "Retrospective evaluation of electric utility demand-side management programs in Canada," The Energy Journal, V.32(4-5), 2011, 93-116.

Rivers, N. and M. Jaccard, "Intensity-based climate change policies in Canada," Canadian Public Policy, V36(4), 2011, 409-428.

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Jaccard, M., and J. Sharp, "Carbon capture and storage in Canada," in J. Meadowcroft and O. Langhelle (eds.) Caching the Carbon: The Politics and Policy of Carbon Capture and Storage Cheltenham, UK: Edward Elgar, 2009, 75-97.

Jaccard, M., "Combining top-down and bottom-up in energy-economy models," in J. Evans and L. Hunt (eds.) International Handbook on the Economics of Energy, London: Edward Elgar, 2009, 311-331.

Rivers, N. and M. Jaccard, "Talking without Walking: Canada's Ineffective Climate Effort," in B. Eberlein and B. Doern, (eds.) Governing the Energy Challenge: Canada and Germany in a Multi-level Regional and Global Context, 2009, Toronto: University of Toronto Press, 2009, 285-313.

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Murphy, R. and M. Jaccard, "Global carbon storage: the roles of government and industry in risk management," In G. Toner, (ed.) Innovation, Science and Environment: Canadian Policies and Performance, 2008-2009, Montreal: McGill-Queen's University Press, 2008, 151-167.

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Jaccard, M. and N. Rivers, "Canadian policies for deep greenhouse gas reductions," In Leonard, J., Raglan, C. and F. St-Hilaire (eds.) A Canadian Priorities Agenda: Policy Choices to Improve Economic and Social Well-Being, Montreal: Institute for Research on Public Policy, 2007, pp.77-106.

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