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August 9, 2016

Ms. Laurel Ross
Acting Commission Secretary
British Columbia Utilities Commission
Sixth Floor – 900 Howe Street
Vancouver, BC V6Z 2N3

Dear Ms. Ross:

**RE: Project No. 3698781
British Columbia Utilities Commission (BCUC or Commission)
British Columbia Hydro and Power Authority (BC Hydro)
2015 Rate Design Application (2015 RDA)
Opening Statement and Direct Testimonies**

BC Hydro writes in regard to the 2015 RDA and further to the Commission's August 9, 2016 letter (Exhibit A-38) outlining various aspects of the upcoming oral hearing process. First, we enclose the Opening Statement of Mr. Keith Anderson that includes, among other things, a number of recent changes to BC Hydro's Business Practices arising out of recent discussions with British Columbia Old Age Pensioners' Organization *et al.* (**BCOAPO**). We also enclose the Direct Testimony of BC Hydro in this proceeding.

BC Hydro plans to lead its Direct Testimony through three witness panels which are composed as follows:

1. BC Hydro Witness Panel 1 – Policy Panel
 - Keith Anderson
 - Randy Reimann
 - Gordon Doyle
2. BC Hydro Witness Panel 2 – Pricing Panel
 - Gordon Doyle
 - Paulus Mau
 - Anthea Jubb
 - Ren Orans

3. BC Hydro Witness Panel 3 – Terms and Conditions Panel

- Gordon Doyle
- Daren Sanders

BC Hydro notes that if its rebuttal panel is called, it will consist of Gordon Doyle and Daren Sanders who will be speaking to BC Hydro's Rebuttal Evidence, filed July 6, 2016 as Exhibit B-31.

To assist those parties intending to cross examine the BC Hydro witnesses, the Direct Testimony of each witness identifies the areas of the 2015 RDA and key information request responses that each witness either authored or co-authored and has primary responsibility for. BC Hydro notes that there will not be a witness specifically speaking to demand-side management (**DSM**) related issues as, in BC Hydro's view, that issue is more appropriately addressed as part of BC Hydro's Fiscal 2017 to Fiscal 2019 Revenue Requirements Application, filed on July 28, 2016, and which seeks acceptance of BC Hydro's proposed F2017 to F2019 DSM expenditure schedule.

BC Hydro requests that parties who intend to use aids to cross-examination provide them to counsel for BC Hydro 24 hours in advance of their use.

As a result of discussions with counsel for BCOAPO who advised that Mr. Klein is only available during the first week of the 2015 RDA Oral Hearing, BC Hydro and counsel for the BCOAPO proposed the below order of appearance for witness panels to counsel, including Commission counsel, which we advise no counsel objected to. As such, we propose the following schedule, subject to Commission review and approval:

1. Tuesday and Wednesday, August 16 and 17, 2016: BC Hydro Witness Panels;
2. Thursday, August 18, 2016: Mr. Seth Klein, witness for BCOAPO, followed by BC Hydro Witness Panels, as time permits;
3. Tuesday, August 23, 2016 until complete: BC Hydro Witness Panels;
4. Mr. Roger Colton, witness for BCOAPO; and
5. BC Hydro Rebuttal Panel (if required).

Counsel for BCOAPO has also advised that they would like to limit Mr. Colton's travel time as much as reasonably possible. In this regard, BC Hydro notes that the above schedule contemplates Mr. Colton appearing no earlier than Tuesday, August 23, 2016 which, though BC Hydro believes it to be unlikely, could result in downtime on Thursday, August 18, 2016.


BC Hydro will speak to the above proposed schedule at the beginning of the Oral Hearing and seek Commission approval, subject to any modification the Commission may have, of the schedule at that time.

August 9, 2016
Ms. Laurel Ross
Acting Commission Secretary
British Columbia Utilities Commission
2015 Rate Design Application (2015 RDA)
Opening Statement and Direct Testimonies

Page 3 of 3

For further information, please contact Gordon Doyle at 604-623-3815 or by email at bchydroregulatorygroup@bchydro.com.

Yours sincerely,



Tom Loski
Chief Regulatory Officer

gd/ma

Enclosures (8)

Copy to: BCUC Project No. 3698781 (2015 RDA) Registered Intervener Distribution List.

2015 Rate Design Application

Opening Statement of Keith Anderson

August 2016

Good Morning, my name is Keith Anderson and I am the Vice President of Customer Service at BC Hydro. I'm pleased to be in front of you today to outline some of the key components of our 2015 Rate Design proposals.

- This is our first full Rate Design application since 2007;
- Based on feedback from the Commission we've undertaken a different process than in the past - specifically we underwent an extensive stakeholder engagement process; and
- Rate Design is a complex process that must take into account multiple and competing objectives and multiple stakeholder interests. Throughout our application you will see that we have prioritized the following criteria over others:
 1. Customer Understanding and Acceptance – Rates should be clear, transparent and cost effective to implement;
 2. Stable Rates for Customers – Minimize unexpected changes that can be adverse to existing customers. Where rates are generally working and well understood they should not be replaced; and
 3. Fair Apportionment of Costs – Cost recovery of various cost drivers such as fixed demand related cost should be reflected in the charges.

I would now like to take a few minutes to highlight the key rate proposals that we're making in this application.

Residential Inclining Block

- We propose to retain the status quo inclining block rate structure that has been in place since 2008;
- This stepped rate has delivered energy conservation and is well understood by our customers; and

-
- We are also proposing to continue to apply the rate increases of future Revenue Requirement Applications equally to Step 1, Step 2 and the basic charge.

Small General Service

- We propose to retain the existing flat rate structure while increasing the cost recovery of the basic charge from approximately 33 per cent to 45 per cent which aligns with the Residential Inclining Block rate basic charge and adjust the energy rate to retain revenue neutrality for the customer class.

Medium General Service

- This is where we are proposing one of our biggest changes;
- In talking to our Medium General Service customers, we identified that the existing rate was neither well understood nor accepted by a large number of them;
- We also found that there was no conservation happening because of the rate and that customers looked at their overall bill more than their particular incremental rate;
- As such we are proposing to move to a flat energy rate as well as a flat demand charge for this customer class; and
- We also propose increasing the demand cost recovery through the demand charge from 15 per cent to 35 per cent (which better represents cost of service allocation) and to adjust the energy rate to retain revenue neutrality for the customer class.

Large General Service

- Similar to the Medium General Service rate, through engagement with Large General Service customers we know that many find the current rate challenging, with little understanding of the exact rate structure. We also know that it is essentially not driving conservation; and
- As such we are proposing to move to a flat energy rate as well as a flat demand charge. We also propose increasing the demand cost recovery through the

demand charge from 50 per cent to 65 per cent to better align charges with cost causation and to adjust the energy rate to retain revenue neutrality for the customer class.

Transmission Service Rate

- We are proposing to retain the status quo for the transmission rates;
- For Rate 1823 (which the majority of Transmission customers are on) we have proposed to continue with the application of future rate increases equally to both the Tier 1 and Tier 2 of the stepped rate starting in Fiscal 2018;
- For Fiscal 2017 we are proposing a one-time adjustment to the Tier 2 rate to align it with BC Hydro's Long Run Marginal Cost and to adjust the Tier 1 rate accordingly to achieve bill neutrality; and
- Through a streamlined review process, a Freshet Rate Pilot for our Transmission Service Customers has already been approved to encourage increased consumption during the period of May to July when BC Hydro traditionally has an oversupply of energy.

Electric Tariff

Our proposed changes to the Electric Tariff can be separated into three categories.

1. Update of Standard Charges:

- These were last updated in 2007 and we need to address general increases in the costs of delivery; and
- They also need to be adjusted to reflect the different realities of how we now deliver some services (e.g., with smart meters we now have the ability to disconnect and re-connect remotely for most meters rather than having to dispatch a crew to the site).

2. Proposed changes to the application of security deposits:

- Changes to allow for when they are applied and how much is required will allow these to be more effective.

3. Update tariff language to improve customer understanding and make more consistent with modern drafting concepts.**Residential E-Plus Service**

- E-Plus is an interruptible rate put in place in 1987 in which customers on the rate receive a discount of approximately 50 per cent in exchange for BC Hydro to have the ability to interrupt service if needed;
- We have proposed amendments to the Residential E-Plus rate terms and conditions that enable the interruption of the service to provide value to BC Hydro and its non-E-Plus customers while maintaining the discounted rate for E-Plus customers; and
- The amendments align the terms and conditions with those of BC Hydro's other interruptible rates.

Low Income Customers

- The British Columbia Old Age Pensioners' Organization (**BCOAPO**) has made a number of proposals in support of low income customers – in particular advocating for a specific rate for low income customers, as well as specific terms and conditions on matters such as payment arrangements for low income customers;
- While we are not proposing any amendments or approvals in terms of low income customers specifically, we are taking steps that will assist low income customers within the boundaries of the *Utilities Commission Act*;
- In particular, within the application we've proposed:
 1. Reducing the Minimum Reconnection Charge from \$125 to \$30;
 2. Reducing the Returned Payment Charge from \$20 to \$6; and

-
3. Sustaining the Account Charge at \$12.40 despite cost pressures, through the provision of a lower-cost, online alternative.
- In addition within customer service operations we've either implemented changes already or are working on changes which will help low income customers, namely:
 1. We have established processes with the Ministry of Social Development and Social Innovation to avoid security deposits and postpone disconnections for customers awaiting Ministry of Social Development and Social Innovation decisions on applications for support;
 2. We have opened in-person customer service desks at our Dunsmuir and Edmonds offices, with plans to explore providing similar services in other district offices;
 3. We are working on business process changes to relax installment plans to allow repayment over longer periods (has typically been only up to three months) provided that bills are paid before the next winter heating season;
 4. We are implementing changes that will delay disconnections where customers demonstrate a medical reason for requiring power;
 5. We will establish a low income advisory group;
 6. We will post business practices, in consultation with interveners and Commission staff, regarding payment plans and other customer-facing business practices; and
 7. Later this fall, we will bring forward tariff changes as necessary to allow another customer to take responsibility for a customer's account.

Some of these changes are already described on the record of this proceeding; some have arisen from recent on-going discussions with the BCOAPO and are not reflected anywhere else on the record.

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- There's one final element I'd like to raise in terms of how we're taking steps to respond to the needs of low income customers, and how we've listened to the input from BCOAPO. It's in regard to BCOAPO's request for a Winter Moratorium. We are happy to say that we will be implementing a pilot moratorium on winter disconnections for the 2016/17 winter. This will not require a Commission order so no amendment to this Rate Design Application will be required;
 - We continue to have concerns about the impacts that a moratorium on disconnections for non-payment could have on receivables and bad debts. However, we do acknowledge that being without electricity in the colder areas of our province during the winter is a significant hardship; and
 - For this reason, BC Hydro will implement a pilot temperature-based moratorium for the 2016/17 winter. In mid-2017 we will submit a report to the Commission identifying the impacts of the moratorium and a proposal for standard business practises going forward.

Module 2

BC Hydro expects to file Module 2 of the 2015 Rate Design Application in spring/summer 2017. The scope of Module 2 will, among other things, address extension policies; optional rates for commercial customers, including Commercial Energy Consumers proposed interruptible rate; an extra-large general service rate as well as the review of Non-Integrated rates. BC Hydro will begin its engagement on these topics in fall 2016 to help refine the scope and inform BC Hydro's proposals.

BC Hydro and Power Authority 2015 Rate Design Application

DIRECT TESTIMONY OF KEITH ANDERSON

Q1. Please introduce yourself to the British Columbia Utilities Commission (Commission).

A My name is Keith Anderson. I am the Vice-President of Customer Service at BC Hydro. In this position I am responsible for creating and driving the implementation of a new customer strategy for BC Hydro. I lead the team responsible for creating a positive customer experience with BC Hydro from first connecting to the BC Hydro system through billing and account inquiries. I have specific oversight over call center operations, billing, credit and collections, key account management, customer analytics and customer project delivery.

Q2. How long have you held your current position?

A I have held the position of Vice-President Customer Service with BC Hydro since early 2015.

Q3. What, if any, previous positions did you hold at BC Hydro prior to your present position?

A I previously held the following positions with BC Hydro:

- Director, Projects – Transmission and Distribution from 2012 to 2015;
- Director of Smart Metering and Infrastructure from 2008 to 2012;
- Senior Manager, Negotiation and Consultation with the Aboriginal Relations and Negotiations Department from 2006 to 2008; and
- Commercial Manager of Generation Business Development from 2004 to 2006.

Q4. What positions did you hold prior to joining BC Hydro and with whom?

A From 1997 to 2003 I worked at TransAlta Corporation in Calgary in a variety of roles including, business development and financial analysis. In these roles I was responsible for the financial evaluation of generation projects and acquisition opportunities as well as corporate growth through asset acquisitions and new generation development.

Q5. What are your educational and professional qualifications?

A I have a Bachelor of Science in Electrical Engineering from Queen's University (1997) and I also hold a Chartered Financial Analyst designation from the CFA Institute (2003).

Q6. Have you previously testified before the Commission or any other regulatory bodies?

A Yes. Earlier this year I testified before the Commission in the Freshet Rate Streamlined Review Process as part of this proceeding. I also testified before the Commission in the Interior to Lower Mainland Project Certificate of Public Convenience and Necessity Court

DIRECT TESTIMONY OF KEITH ANDERSON

of Appeal Reconsideration proceeding in 2010 in my capacity as the Manager of Negotiation and Consultation with BC Hydro's Aboriginal Relations and Negotiation Department.

Q7. What role do you have in this proceeding?

A My role in the preparation of the Application focused primarily on issues related to customer service and corporate policy that has informed the 2015 RDA. I will be speaking more specifically to the engagement process BC Hydro undertook in the preparation of the Application and the key changes we are proposing as part of the 2015 RDA. At a high level, I will be speaking to the following sections of the 2015 RDA:

- Chapter 1 (Introduction), Chapter 2 (Stakeholder Engagement and Rate Design Evaluation), Chapter 5 (Residential Rate Design), Chapter 6 (General Service Rate Design), and Chapter 7 (Transmission Service Rate Design).

I also authored and will be delivering BC Hydro's Opening Statement.

I will be addressing these materials as a witness on the Policy Panel (Panel 1).

Q8. Does this complete your direct testimony?

A Yes.

BC Hydro and Power Authority 2015 Rate Design Application

DIRECT TESTIMONY OF GORDON DOYLE

Q1. Please introduce yourself to the British Columbia Utilities Commission (Commission).

A My name is Gordon Doyle. I currently hold the position of Manager - Tariffs, Regulatory with BC Hydro and am responsible for all BC Hydro tariffs and rates. I am also the manager responsible for BC Hydro's 2015 RDA which included developing and implementing the regulatory strategy, work plan and customer engagement process that informed the proposals contained in the Application.

Q2. How long have you held your current position?

A2. I have held the position of Manager – Tariffs, Regulatory with BC Hydro since November 2012.

Q3. What, if any, previous positions did you hold at BC Hydro prior to your present position?

A I previously held the position of Tariff & Contracts Manager from May 2011 to October 2012. In this position I managed staff responsible for BC Hydro's Open Access Transmission Tariff. Prior to that I held the position of Senior Regulatory Advisor from April 2009 to April 2011 with BC Hydro.

Q4. What positions did you hold prior to joining BC Hydro and with whom?

A From 2001 to 2009 I worked at Terasen Gas Inc. (now FortisBC Inc.) and held the positions of Business Development Manager, Manager of Technical Sales Support, Key Customer Sales Manager, and Key Account Manager.

Q5. What are your educational and professional qualifications?

A I hold the degrees of Bachelor of Business Administration (2001) from Simon Fraser University and Masters of Business Administration (2008) from Royal Roads University.

Q6. Have you previously testified before the Commission or any other regulatory bodies?

A Yes, earlier this year I testified before the Commission in the Freshet Rate Streamlined Review Process as part of this proceeding. I have also testified before the Commission in the Streamlined Review Process for BC Hydro's 2013 Residential Inclining Block Rate Re-Pricing Application (January 2014).

Finally, in 2012 I testified before the Alberta Utilities Commission on behalf of BC Hydro in a proceeding regarding a market rule to allocate transmission capacity between the interties that connect Alberta to adjacent jurisdictions.

DIRECT TESTIMONY OF GORDON DOYLE

Q7. What role do you have in this proceeding?

A I directed and oversaw the development of the Application on a day-to-day basis and will be sitting on each of BC Hydro's witness panels at the oral hearing. I was responsible for the engagement process including leading each of the 13 stakeholder workshops which informed the Application. In the preparation of the Application I focused on issues related to policy, government and stakeholder engagement and the regulatory context of the Application. I also provided guidance with respect to the pricing proposals contained in the Application and the proposals BC Hydro has put forward with respect to changes to its Electric Tariff terms and conditions and standard charges.

I will be speaking more specifically to the following sections of the 2015 RDA:

- Chapter 1 (Introduction) and Chapter 2 (Stakeholder Engagement and Rate Design Evaluation Methodology) with a focus on policy related matters, Bonbright criteria, and stakeholder engagement; and
- Chapter 5 (Residential Rate Design), Chapter 6 (General Service Rate Design), Chapter 7 (Transmission Service Rate Design) and Chapter 8 (Electric Tariff Terms and Conditions) with a focus on the rationale for setting default rates, the proposals regarding residential, general service and transmission service rates and proposed changes to some of BC Hydro's Electric Tariff terms and conditions and standard charges.

I directed, reviewed and either authored or co-authored most of BC Hydro's information request (IR) responses such that there are too many to practically list. I am generally available to speak to any IRs related to the topics identified above and I will be addressing these materials as a witness on the Policy Panel (Panel 1), Pricing Panel (Panel 2) and the Terms and Conditions Panel (Panel 3).

Q8. Does this complete your direct testimony?

A Yes.

British Columbia Hydro and Power Authority 2015 Rate Design Application

DIRECT TESTIMONY OF ANTHEA JUBB

Q1. Please introduce yourself to the British Columbia Utilities Commission (Commission).

A My name is Anthea Jubb. I currently hold the position of Manager, Conservation and Energy Management Evaluation with BC Hydro. The purpose of the Evaluation Department is to estimate demand side management (**DSM**) savings from programs, rates, codes and standards, and to identify DSM program improvements. We use methods from economics, statistics, engineering and the social sciences to evaluate DSM impacts in a rigorous and objective manner in support of DSM and integrated resource planning decisions, risk management and stakeholder confidence.

Q2. How long have you held your current position?

A I have held the position of Manager, Conservation and Energy Management Evaluation with BC Hydro since 2012.

Q3. What, if any, previous positions did you hold at BC Hydro prior to your present position?

A I previously held the position of Manager, Power Smart Quality Assurance from 2010 to 2012 and prior to that I held the position of Senior Engineer from 2008 to 2010 with BC Hydro.

Q4. What positions did you hold prior to joining BC Hydro and with whom?

A Previously, I held the positions of Project Manager and Engineer in Training with Willis Energy Services.

Q5. What are your educational and professional qualifications?

A I am a Professional Engineer registered with the Association of Professional Engineers and Geoscientists of British Columbia (since 2007) and a Licensed Professional Engineer with the State of Washington (since 2008). I am also a Certified Energy Manager (since 2006) and Certified Measurement and Verification Professional (since 2007) with the Association of Energy Engineers.

I hold the degrees of Bachelor of Applied Science, Chemical Engineering (2003) and Masters of Business Administration (2010) from the University of British Columbia.

Q6. Have you previously testified before the Commission or any other regulatory bodies?

A Yes, I previously testified before the Commission in the Streamlined Review Process for BC Hydro's 2013 Residential Inclining Block (**RIB**) Rate Re-Pricing Application (January 2014).

DIRECT TESTIMONY OF ANTHEA JUBB

Q7. What role do you have in this proceeding?

A I will be speaking to the primary research findings on the performance of the Large General Service (**LGS**), Medium General Service (**MGS**) and RIB rates. This research verified the historical energy savings achieved by these rates and the customer understanding of and experience with them.

I will be speaking more specifically to the following sections of the 2015 RDA:

- Chapter 5 (Residential Rate Design) and Chapter 6 (General Service Rate Design) with a specific focus on the evaluation of conservation rates, the methodology used and results;
- The *Evaluation of the Residential Inclining Block Rate F2009-F2012* which is found in Appendix C-3B starting at page 105 of 609 or pdf page 1900;
- The *Evaluation of the Large and Medium General Service Conservation Rates: F2014* which is found in Appendix C-4A starting at page 399 of 813 or pdf page 3287; and
- The *Evaluation of the Large General Service and Medium General Service Conservation Rates Calendar Years 2011 and 2012* which is found in Appendix C-4A, Appendix A starting at page 607 of 813 or pdf page 3495.

In addition to providing guidance, coordination and review of numerous information request (**IR**) responses related to the topics identified above, I also authored, co-authored and reviewed the following IRs:

Round 1

BCUC IR 1.38.1	BCUC IR 1.87.1	BCUC IR 1.89.1	COPE IR 1.9.1
BCUC IR 1.38.1.1	BCUC IR 1.87.2	BCUC IR 1.89.3	COPE IR 1.36.1

Round 2

BCUC IR 2.178.1	CEC IR 2.100.1	CEC IR 2.112.1
BCUC IR 2.178.2	CEC IR 2.100.3	

I will be addressing these materials as a witness on the Pricing Panel (Panel 2).

Q8. Does this complete your direct testimony?

A Yes.

British Columbia Hydro and Power Authority 2015 Rate Design Application

DIRECT TESTIMONY OF PAULUS MAU

Q1. Please introduce yourself to the British Columbia Utilities Commission (Commission).

A My name is Paulus Mau. I currently hold the position of Senior Regulatory Specialist, Regulatory and Rates with BC Hydro. I am responsible for leading the modelling team that computes and forecasts rates for the Residential Inclining Block (**RIB**), Large General Service (**LGS**), Medium General Service (**MGS**), and Small General Service (**SGS**) rate classes as well as forecast rate-induced conservation from the conservation rates.

Q2. How long have you held your current position?

A I have held the position of Senior Regulatory Specialist, Regulatory and Rates with BC Hydro for approximately four years.

Q3. What, if any, previous positions did you hold at BC Hydro prior to your present position?

A For the period 2009 to 2011, I held the position of Senior Regulatory Advisor in the Regulatory and Rates group at BC Hydro. From 1999 to 2002, I worked as a contractor for BC Hydro Generation Environment to help with the implementation of the ISO 14001 Environmental Management System, and as a co-op Student for BC Hydro Generation Environment.

Q4. What positions did you hold prior to joining BC Hydro and with whom?

A Previously, I held the position of Senior Project Manager, Market Research for InterVistas Consulting for approximately three years. I also held the position of Research Consultant for Mark Jaccard and Associates for approximately three years, and the position of Research Associate for the Canadian Industrial End-use Data and Analysis Centre (**CIEEDAC**) at Simon Fraser University for approximately four years. I currently serve on an advisory basis for the Energy and Materials Research Group, CIEEDAC, and the Tourism Research Group at the School of Resource and Environmental Management at Simon Fraser University.

Q5. What are your educational and professional qualifications?

A I hold the degrees of Masters of Resource and Environmental Management with a concentration in resource economics (2005) and a Bachelor of Environmental Science (2002) from Simon Fraser University. I also hold a Project Management Professional Designation from the Project Management Institute which I obtained in 2010.

DIRECT TESTIMONY OF PAULUS MAU

Q6. Have you previously testified before the Commission or any other regulatory bodies?

A No.

Q7. What role do you have in this proceeding?

A I will be speaking to the rate and conservation forecast modelling performed for the RIB, SGS, MGS, and LGS rates contained in the Application. I will be speaking more specifically to the following sections of the 2015 RDA:

- Chapter 5 (Residential Rate Design), Chapter 6 (General Service Rate Design), and Chapter 7 (Transmission Service Rate Design) with a focus on modelling rate structures and quantitative analysis of outcomes; and
- Appendix H-1A, the *Residential and General Service Rates Modelling Assumptions* (pdf page 4838), which describes the modelling assumptions and calculations used in deriving the rates and conservation estimates in the 2015 RDA.

I reviewed and either authored or co-authored information request (**IR**) responses related to rate structures, modelling, conservation outcomes, and bill impacts for Residential and General Service Rate Design such that there are too many to practically list. I am available to speak to any IRs related to the topics identified above and I will be addressing these materials as a witness on the Pricing Panel (Panel 2).

Q8. Does this complete your direct testimony?

A Yes.

British Columbia Hydro and Power Authority 2015 Rate Design Application

DIRECT TESTIMONY OF DR. REN ORANS

Q1. Please introduce yourself to the British Columbia Utilities Commission (Commission).

A My name is Ren Orans. I am the founder and Managing Partner of Energy and Environmental Economics, Inc. (E3), located at 101 Montgomery Street, Suite 1600, San Francisco California 94104, USA.

Q2. Please summarize your professional qualifications and work experience?

A With over 30 years of experience in the electric utility business, I have worked extensively in wholesale and retail ratemaking, transmission planning and pricing, and integrated resource planning. Prior to forming E3 in 1989, I worked at Pacific Gas and Electric Company, which was at the time the largest electric utility in North America, where I was responsible for electric rate design.

I received my Ph.D. in Civil Engineering from Stanford University in 1989 and my B.A. in Economics from U.C. Berkeley in 1981. The attached *curriculum vitae* further describes my qualifications, experience and publications.

Q3. Have you previously provided expert evidence in proceedings before the Commission?

A Yes. I provided expert evidence in the following proceedings:

- Heritage Contract Inquiry (2003); and
- Large General Service Rate Application (2009).

Q4. Have you previously provided expert evidence and oral testimony before the Commission?

A Yes. I provided expert evidence and oral testimony before the Commission in the following proceedings:

- Electricity Market Structure Review (1995);
- Wholesale Transmission Services Application (1995);
- Wholesale Transmission Services Application (1997);
- British Columbia Transmission Corporation (**BCTC**) Open Access Transmission Tariff (**OATT**) proceeding (2004);
- Residential Inclining Block Application (2008);
- BCTC Application to Amend the OATT and Complaint by TransCanada Energy Ltd. Regarding Firm Sales to Alberta (2008); and
- Long-Term Acquisition Plan proceeding (2008).

DIRECT TESTIMONY OF REN ORANS

Q5. What is your rate design experience?

A I have extensive experience in both wholesale and retail electric ratemaking. While working at Pacific Gas and Electric Company, I had responsibility for the design of all electric retail rates. As a consultant, I have also worked extensively on retail rate design and wholesale transmission pricing for many utilities including Ontario Power Generation, Hydro-Quebec, TransEnergie, AltaLink and Nova Scotia Power. I was also the primary rate design witness in the seminal cases approving the use of open access transmission tariffs in British Columbia, Ontario and Quebec.

Q6. What role do you have in this proceeding?

A I was retained in mid-2014 to assist BC Hydro with its 2015 RDA. My involvement over the past two years has included the following tasks:

Initially, I assisted BC Hydro with its review and evaluation of the existing default Residential Inclining Block (**RIB**) rate, Small General Service (**SGS**), Medium General Service (**MGS**), and Large General Service (**LGS**) rates, and alternatives to those default rates.

In 2015, with the assistance of my colleagues under my direction, I supported BC Hydro in the creation of the presentations for the January 21 and February 11 SGS, MGS, and LGS workshops and the April 28 workshop on residential rates.

I was also asked to provide a literature review to inform the discussion on RIB rate-induced conservation. Presented at Appendix D-2 of the Application, the literature review is titled, "Will Extending the RIB Rate Encourage Conservation? Evidence from the Literature" and focuses on the relative price elasticities of small and large customers.

I also assisted BC Hydro in its evaluation of the RIB rate and reviewed the report, *Evaluation of the Residential Inclining Block Rate F2009-F2012*, which is found in Appendix C-3B starting at page 105 of 609 or pdf page 1900. I was also asked to review BC Hydro's estimates of forecast conservation induced by the residential rate design to assess its consistency with both the empirical evidence as well as the broader industry experience in similar jurisdictions.

Finally, I provided guidance and assistance to BC Hydro in responding to information request (**IR**) responses with a focus on IRs related to the RIB rate and general service rates (Chapter 5 and Chapter 6 of the Application) as well as general rate design principles. I authored, co-authored and reviewed numerous IRs, including the following:

Round 1

BCUC IR 1.38.2	BCUC IR 1.40.6	BCOAPO IR 1.83.1	CEC IR 1.10.1	COPE IR 1.9.1
BCUC IR 1.40.2	BCUC IR 1.41.2	BCOAPO IR 1.93.1	CEC IR 1.36.1	
BCUC IR 1.40.3	BCUC IR 1.60.4	BCOAPO IR 1.111.1	CEC IR 1.38.1	

Round 2

BCUC IR 2.140.1	BCUC IR 2.178.1	BCUC IR 2.178.2	MOVEUP IR 2.4.1
BCUC IR 2.175.1	BCUC IR 2.178.1.1	BCUC IR 2.178.2.1	MOVEUP IR 2.4.2

DIRECT TESTIMONY OF REN ORANS

I am available to speak to the report and IR responses that I prepared. I will also speak more generally to any of the above topics at the hearing and will be addressing these materials as a witness on the Pricing Panel (Panel 2).

Q7. Does this complete your direct testimony?

A Yes.

ENERGY AND ENVIRONMENTAL ECONOMICS, INC.

San Francisco, CA

Founder and Managing Partner

Dr. Orans founded Energy and Environmental Economics (E3) in 1989. An economist and engineer, he has focused throughout his career on the challenges facing the electricity industry. He is a trusted advisor to a broad range of clients that have included government agencies, utilities, system operators, regulators, independent power producers, energy technology companies, public interest organizations, and investors. He has led E3 teams on numerous high-impact and high-profile projects that have required both rigorous technical analysis and the ability to effectively distill actionable insights to help E3's clients make informed decisions as they develop innovative projects, programs or policies.

Dr. Orans' pioneering work in utility planning has centered on the design and use of area and time-specific (ATS) marginal costs for both pricing and evaluation of grid infrastructure alternatives. This seminal work has led to detailed area costing applications in pricing, marketing and planning for many utilities throughout North America. He is an expert in designing wholesale transmission tariffs and has served as an expert witness in regulatory proceedings on retail rate design and wholesale transmission pricing, including that of Canada's three largest utilities -- BC Hydro, TransEnergie and Ontario Power Generation.

In a recent forward-looking study, Dr. Orans provided his expertise to California's energy and environmental regulators in evaluating the operational challenges, feasibility and cost consequences of a higher Renewables Portfolio Standard (RPS) in California by 2030¹. This assessment included technical input from the California Independent System Operator (CAISO) as well as independent reviews from a distinguished four-member advisory panel. The study utilized E3's first-in-class Renewable Energy Flexibility (REFLEX) model. Additionally, in consultation with advisors to California's Governor and principals and staff from the energy agencies and the CAISO, E3 has developed a set of technology deployment scenarios that meet California's goal of reducing Greenhouse gas (GHG) emissions to 80% below 1990 levels by 2050², using E3's California PATHWAYS model -- an infrastructure-based GHG and cost analysis tool that captures the interactions among the buildings, industry, transportation, and electricity sectors of the entire California economy, which becomes increasingly important in a low carbon future.

E3, in collaboration with Lawrence Berkeley National Laboratory (LBNL) and Pacific Northwest National Laboratory (PNNL) has also conducted research for a recently published report *Pathways to Deep Decarbonization in the United States*³ for the Deep Decarbonization Pathways Project (DDPP) -- an initiative led by the Sustainable Development Solutions Network (SDSN) and the Institute for Sustainable Development and International Relations (IDDRI). The DDPP is a collaborative global initiative to explore

¹ https://ethree.com/public_projects/renewables_portfolio_standard.php

² https://ethree.com/public_projects/energy_principals_study.php

³ http://unsdsn.org/wp-content/uploads/2014/09/US_DDPP_Report_Final.pdf

how individual countries can reduce energy-related CO2 emissions through a transformation of energy systems, a transition referred to by the DDPP as “deep decarbonization.”

Dr. Orans is a respected thought leader who is often asked to share his expertise and vision for the energy industry. He regularly publishes in refereed journals and has taught a graduate course on electric utility planning at Stanford University. He received his Ph.D. in Civil Engineering from Stanford University and his B.A. in Economics from the University of California at Berkeley.

DEPARTMENT OF ENERGY
NATIONAL RENEWABLE ENERGY LABORATORY
ELECTRIC POWER RESEARCH INSTITUTE

Washington, DC
1992 – 1993

Lead Consultant

Dr. Orans developed new models to evaluate small-scale generation and DSM placed optimally in utility transmission and distribution systems.

PACIFIC GAS & ELECTRIC COMPANY

San Francisco, CA

Research and Development Department

1989 – 1991

Dr. Orans developed an economic evaluation method for distributed generation alternatives. The new approach shows that targeted, circuit-specific, localized generation packages or targeted DSM can in some cases be less costly than larger generation alternatives. He also developed the evaluation methodology that led to PG&E’s installation of a 500kW photovoltaic (PV) facility at their Kerman substation. This is the only PV plant ever designed to defer the need for distribution capacity.

ELECTRIC POWER RESEARCH INSTITUTE

Palo Alto, CA

Consultant

1988 – 1992

Dr. Orans developed the first formal economic model capable of integrating DSM into a transmission and distribution plan; the case study plan was used by PG&E for a \$16 million pilot project that was featured on national television.

DEPARTMENT OF ENERGY

Washington, DC

Lead Consultant

1989 – 1990

Dr. Orans was the lead consultant on a cooperative research and development project with the People's Republic of China. The final product was a book on lessons learned from electric utility costing and planning in the United States.

PACIFIC GAS & ELECTRIC COMPANY

San Francisco, CA

Corporate Planning Department

1989 – 1992

Dr. Orans was the lead consultant on a joint EPRI and PG&E research project to develop geographic differences in PG&E's cost-of-service for use in the evaluation of capital projects. Developed shared savings DSM incentive mechanisms for utilities in California.

PACIFIC GAS & ELECTRIC COMPANY

Rate Department Economist

San Francisco, CA

1981 – 1985

As an economist at PG&E, Dr. Orans was responsible for the technical quality of testimony for all electric rate design filings. He was also responsible for research on customers' behavioral response to conservation and load management programs. The research led to the design and implementation of the first and largest residential time-of-use program in California and a variety of innovative pricing and DSM programs.

Education

Stanford University

Ph.D. in Civil Engineering

Palo Alto, CA

Stanford University

M.S. in Civil Engineering

Palo Alto, CA

University of California

B.A. in Economics

Berkeley, CA

Citizenship

United States

Refereed Papers

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2. Mahone, A., B. Haley, R. Orans, J. Williams (2011) "Electric Vehicles and Gas-Fired Power: A Strategic Approach to Mitigating Rate Increases and Greenhouse Price Risk," *Public Utilities Fortnightly* (Dec 2011) 42-50, available at: http://www.fortnightly.com/exclusive.cfm?o_id=918
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15. Pupp, R., C.K.Woo, R. Orans, B. Horii, and G. Heffner (1995), "Load Research and Integrated Local T&D Planning," *Energy - The International Journal*, 20:2, 89-94.
16. Chow, R.F., Horii, B., Orans, R. et. al. (1995), *Local Integrated Resource Planning of a Large Load Supply System*, Canadian Electrical Association.
17. Feinstein, C., Orans, R. (1995) "The Distributed Utility Concept," *The Annual Energy Review*, 1988.
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15. Orans, R. and C.K. Woo (1992), *Marginal Cost Disaggregation Study*, Report submitted to Wisconsin Electric Power Corporation.
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3. Orans, R., *Western EIM: Status Report and Implications*, Law Seminars International, November 3, 2015.
4. Orans, R., "Getting to 2050, Pathways to Deep Reductions in GHG Emissions," CFA Society Presentation, October 25, 2011, San Francisco, CA.
5. Orans, R., "Renewable Resource Opportunities in the West," Law Seminars International, British Columbia, August 2010.
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7. Orans, R., "Comparable Treatment of Resource Options," FERC Technical Conference, Phoenix, AZ., September, 2009.
8. Orans, R., "A GHG Compliant World in 2050," Law Seminars International, San Francisco, September, 2008.
9. Orans, R., "Gaps in State Energy Policy Coordination, A View from the Cheap Seats" Napa California, CFEE, September, 2007.
10. Orans, R. Evaluating Generating Resources based on an Equivalent Reliability Methodology, 2nd Annual Resource Planning Symposium, January, 2004, Vancouver, Canada.
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12. Orans, R. (1997), "Getting the Transmission Prices Right," Facilitating Cross Border Trade, New Mexico.
13. Orans, R. (1997), "Deregulation on the Mainland, What is Happening and What is Not, PCEA Conference, Hawaii.
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16. Orans, R, Integrated Local Area Planning, (1995), Prepared for NELPA and presented in Calgary.
17. Orans, R., Local Area Planning for Profit, "Annual Review of Distributed Resource Studies," Prepared for EPRI, Lake George, New York.
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British Columbia Hydro and Power Authority 2015 Rate Design Application

DIRECT TESTIMONY OF RANDY REIMANN

Q1. Please introduce yourself to the British Columbia Utilities Commission (Commission).

A My name is Randy Reimann. I am the Director, Energy Planning with BC Hydro and am responsible for the BC Hydro team that develops BC Hydro's integrated resource plans (**IRP**) and load forecast. In my role, I have overseen the development of three BC Hydro IRPs including the November 2013 IRP, the 2008 Long Term Acquisition Plan (**LTAP**), and the 2006 Integrated Electricity Plan (**IEP/LTAP**).

Q2. How long have you held your current position?

A I have led the Energy Planning function with BC Hydro since 2005.

Q3. What, if any, previous positions did you hold at BC Hydro prior to your present position?

A Prior to Energy Planning, I was in Strategic Issues and Planning for five years and was responsible for market and transmission issues. In that role, I was responsible for considering electricity markets and transmission business models in corporate restructuring work which included overseeing the initial analysis and development of the key agreements creating British Columbia Transmission Corporation (**BCTC**). I began my career at BC Hydro working for seven years in the key accounts area managing transmission voltage customer electricity supply agreements, facility agreements and related tariff issues.

Q4. What positions did you hold prior to joining BC Hydro and with whom?

A Prior to working for BC Hydro, I worked for three years as a consulting engineer for Universal Dynamics Limited and Franssen Engineering, both electrical engineering firms, where I specialized in power systems design and analysis for large industrial plants. I also worked for seven years with Alberta Power Limited (now ATCO Power) as a generation planning engineer, load research engineer, and Customer Services Representative.

Q5. What are your educational and professional qualifications?

A I am a Professional Engineer registered with the Association of Professional Engineers and Geoscientists of British Columbia (since 1989). I have a Bachelor of Applied Science in Electrical Engineering from the University of British Columbia (1982) and a Masters of Business Administration from the University of Alberta (1988).

DIRECT TESTIMONY OF RANDY REIMANN

Q6. Have you previously testified before the Commission or any other regulatory bodies?

A Yes. Earlier this year I testified before the Commission in the Freshet Rate Streamlined Review Process as part of this proceeding. I have also testified before the Commission at the following hearings:

- BCTC Open Access Transmission Tariff proceeding (2004);
- Integrated Electricity Plan and Long Term Acquisition Plan proceeding (2006/2007); and
- Long Term Acquisition Plan proceeding (2008).

I also testified on behalf of BC Hydro in front of the Joint Review Panel for the Canadian Environmental Assessment Agency/BC Environmental Assessment Office joint review of the Site C project.

Q7. What role do you have in this proceeding?

A I will be testifying on matters related to BC Hydro's long-run marginal cost of new supply and how the long-run marginal cost is informed by the approved 2013 IRP and subsequent load resource balance updates. I will also be speaking to various technical issues relating to system impacts and benefits from rate designs. I will be speaking more specifically to the following sections of the 2015 RDA:

- Chapter 1, section 1.3 with respect to the relationship of the IRP and BC Hydro's long-run marginal cost in this application;
- Chapter 2, sections 2.3.2.2 and 2.3.2.3 on the energy and capacity long-run marginal cost; and
- The August 4, 2016 Evidentiary Update (Exhibit B-37).

In addition to providing guidance, coordination and review of numerous information request (IR) responses related to the topics identified above, I also specifically authored and have primary responsibility for the following IRs:

Round 1

BCUC IR 1.9.1	AMPC IR 1.8.8	BCOAPO IR 1.22.3	CEBC IR 1.3.1
BCUC IR 1.43.1		BCOAPO IR 1.22.5	
BCUC IR 1.60.5		BCOAPO IR 1.63.1	

Round 2

BCUC IR 2.137.2	BCUC IR 2.177.2	BCOAPO IR 2.239.2	CEBC IR 2.1.2	CEBC IR 2.1.8	CEC IR 2.109.5
BCUC IR 2.143.1	BCUC IR 2.177.3	BCOAPO IR 2.241.1	CEBC IR 2.1.3	CEBC IR 2.4.2	
BCUC IR 2.177.1	BCUC IR 2.184.2.1	BCOAPO IR 2.243.1	CEBC IR 2.1.4		

I will be addressing these materials as a witness on BC Hydro's Policy Panel (Panel 1).

Q8. Does this complete your direct testimony?

A Yes.

British Columbia Hydro and Power Authority 2015 Rate Design Application

DIRECT TESTIMONY OF DAREN SANDERS

Q1. Please introduce yourself to the British Columbia Utilities Commission (Commission).

A My name is Daren Sanders. I currently hold the position of Senior Manager, Customer Service Operations with BC Hydro. I am responsible for most aspects of BC Hydro's revenue cycle operations, including: meter reading, billing, payments and collections; call centre operations; escalations investigation and resolution; claims processing; damage recoveries; and BC Hydro's Underground Locate Centre. I am also a Director of BC One Call Limited.

Q2. How long have you held your current position?

A I have held the position of Senior Manager, Customer Service Operations with BC Hydro for approximately three years.

Q3. What, if any, previous positions did you hold at BC Hydro prior to your present position?

A I first joined BC Hydro in 1991 as an Engineer-in-Training and until I left in 2000, I held various positions that included Production Field Manager; Business Services Specialist; Business Planning Manager and Manager, Product Development. In 2000, I left BC Hydro for a number of years and since returning in 2009 I have held the positions of Manager, Financial Evaluation; Senior Finance Manager, Business Support Services; Manager Power Smart Business Processes and Acting Senior Manager, Customer Service Operations.

Q4. What positions did you hold prior to joining BC Hydro and with whom?

A Immediately prior to rejoining BC Hydro, I was a Senior Manager at Grant Thornton LLP. Prior to that I had roles as Vice President, Professional Services at CopperLeaf Technologies; Senior Consultant at IBM Global Services; and Principal Consultant at PricewaterhouseCoopers Consulting. I spent most of my nine years in these consulting organizations providing services to energy and utility companies, in the areas of operational strategy, business process improvement, physical asset planning and investment, and regulatory support.

Q5. What are your educational and professional qualifications?

A I am a Professional Engineer registered with the Association of Professional Engineers and Geoscientists of British Columbia (since 1994) and I am also a Chartered Professional Accountant (Certified Management Accountant) (since 2013) in the Province of B.C. I hold the degrees of Bachelor of Applied Science in Mechanical Engineering (1991) from the University of British Columbia and Masters of Business Administration (1999) from Simon Fraser University.

DIRECT TESTIMONY OF DAREN SANDERS

Q6. Have you previously testified before the Commission or any other regulatory bodies?

A No.

Q7. What role do you have in this proceeding?

A I will be speaking to the proposals BC Hydro has put forward with respect to changes to its Electric Tariff terms and conditions and standard charges. I will be speaking more specifically to the following sections of the 2015 RDA:

- Chapter 5 (Residential Rate Design) and Chapter 8 (Electric Tariff Terms and Conditions) with a specific focus on updates to the terms and conditions and standard charges.

In addition to providing guidance, coordination and review of numerous information request (**IR**) responses related to the topics identified above, I also specifically authored and have primary responsibility for the following IRs:

Round 1

BCUC IR 1.128.1	BCUC IR 1.135.2	BCUC IR 1.135.5	BCOAPO IR 1.183.1
BCUC IR 1.124.1	BCUC IR 1.135.4	BCUC IR 1.135.6	BCOAPO IR 1.192.1
BCUC IR 1.135.1	BCUC IR 1.135.3		BCOAPO IR 1.198.2

Round 2

BCUC IR 2.164.1	BCUC IR 2.164.3	BCUC IR 2.164.5	BCOAPO IR 2.316.1
BCUC IR 2.164.2	BCUC IR 2.164.4		BCOAPO IR 2.339.1

I will be addressing these materials as a witness on the Terms and Conditions Panel (Panel 3).

Q8. Does this complete your direct testimony?

A Yes.