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June 23, 2017

Mr. Patrick Wruck  
Commission Secretary and Manager  
Regulatory Support  
British Columbia Utilities Commission  
Sixth Floor – 900 Howe Street  
Vancouver, BC V6Z 2N3

Dear Mr. Wruck:

**RE: Project No. 3698901**  
**British Columbia Utilities Commission (BCUC or Commission)**  
**British Columbia Hydro and Power Authority (BC Hydro)**  
**Supply Chain Applications Project**

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BC Hydro writes in compliance with Commission Order No. G-78-17 to provide its Final Submission.

For further information, please contact Geoff Higgins at 604-623-4121 or by email at [bchydroregulatorygroup@bchydro.com](mailto:bchydroregulatorygroup@bchydro.com).

Yours sincerely,



Fred James  
Chief Regulatory Officer

cu/tn

Enclosure

**BRITISH COLUMBIA UTILITIES COMMISSION**  
**IN THE MATTER OF THE UTILITIES COMMISSION ACT**  
**R.S.B.C. 1996, CHAPTER 473**  
**and**  
**BRITISH COLUMBIA HYDRO AND POWER AUTHORITY**  
**SUPPLY CHAIN APPLICATIONS PROJECT**

**Final Submissions of BC Hydro**

**June 23, 2017**

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## PART ONE: INTRODUCTION AND OVERVIEW

### A. INTRODUCTION

1. BC Hydro expects to spend over \$2 billion each year over the next ten years on third-party services and materials as part of providing safe and reliable electricity service to customers.<sup>1</sup> BC Hydro has over 5,000 different suppliers of materials and services, and the vast majority of BC Hydro employees have contact with the supply chain each year. Virtually every item and service purchased is the subject of multiple business processes.<sup>2</sup> Maintaining an effective supply chain system is essential to the proper management of materials and service acquisition.

2. BC Hydro's existing core PassPort supply chain IT system (also referred to as Asset Suite 8), has been in place since 2003. When it was implemented, BC Hydro had different supply chain business requirements. PassPort and BC Hydro's existing business processes have limitations when viewed in the context of BC Hydro's current business requirements. The Supply Chain Applications Project ("SCA Project") positions BC Hydro to meet current and future business needs, reduce risk, and benefit customers.<sup>3</sup> The preferred project option, an SAP-based system that will integrate with BC Hydro's overall SAP platform, delivers the greatest benefits with the least risk. The Commission should find that the SCA Project is in the public interest.

3. BC Hydro set out the specific approvals it is seeking in section 1.3 of the Application. In accordance with the proposed two-phase regulatory process accepted by the Commission in Order G-32-17, BC Hydro is requesting acceptance of the Definition Phase capital expenditures of the SCA Project as reflected in the draft order in Attachment A of the

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<sup>1</sup> Exhibit B-1, Application, p. 1-1.

<sup>2</sup> A list of supply chain business processes is provided in Exhibit B-1, Application, Attachment E.

<sup>3</sup> Exhibit B-1, Application, p. 1-1.

Application.<sup>4</sup> BC Hydro will seek acceptance of the Implementation Phase capital expenditures in the second phase of the regulatory process.<sup>5</sup>

## **B. SUBMISSION OVERVIEW AND KEY POINTS**

4. This Final Submission is organized around the following key points:

- Part Two: The Phase Two process should proceed expeditiously with minimal regulatory process to reduce the risk of costly delays in SCA Project implementation.
- Part Three: The governing public interest consideration in accepting the proposed expenditure schedule for the SCA Project should be the fact that BC Hydro's customers benefit from the project.
- Part Four: The scope of the SCA Project is well defined, and the robust cost estimate meets the requirements for estimating accuracy in the Commission's CPCN Guidelines.
- Part Five: The SCA Project is required to address capability gaps in the existing supply chain management system. It will deliver financial benefits, and will reduce or eliminate safety, financial, reputational and reliability risks related to BC Hydro's supply chain.
- Part Six: The SAP alternative is superior to the PassPort alternative. SAP will fully meet the identified capability gaps, is the lower risk alternative, and delivers greater benefits to customers.
- Part Seven: BC Hydro has identified and mitigated SCA Project risks.

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<sup>4</sup> Exhibit B-1, Application, Attachment A (Phase One).

<sup>5</sup> Exhibit B-1, Application, Attachment B (Phase Two).

## **PART TWO: TWO-PHASE PROCESS FACILITATES EARLY STAKEHOLDER INVOLVEMENT AND MITIGATES PROJECT RISK**

5. BC Hydro proposed a two-phase regulatory process for the SCA Project to facilitate Commission review at the two critical decision points in the project lifecycle.<sup>6</sup> In the absence of material changes to the cost, benefits, scope and schedule assumptions, the Commission should issue a phase two order accepting the Implementation Phase capital expenditures as being in the public interest with minimal regulatory process.

### **A. PROJECT CHARACTERISTICS SUIT A TWO-PHASED PROCESS**

6. In phase one, BC Hydro is seeking acceptance of the Definition Phase capital expenditures for the SCA Project. In phase two, BC Hydro is seeking acceptance of the Implementation Phase capital expenditures. The two-phase process is not the customary regulatory process employed by the Commission. It was proposed considering the specific attributes of the SCA Project, including the large percentage of project expenditures in the Definition Phase and the need for an expeditious transition between the Definition and Implementation Phases.<sup>7</sup> In Order G-32-17, the Panel agreed that BC Hydro's two-phase process is appropriate. The Commission's Reasons for Decision noted that there was common agreement among the parties that some type of two-phase review is the best option. The Commission invited parties to provide any additional comments on future process as part of their Final Submissions.<sup>8</sup>

7. The phase two process, described on pages 1-18 to 1-19 of the Application, will be initiated when BC Hydro submits a verification report (the "Phase Two Verification Report"). The Phase Two Verification Report will include updated cost, benefit, scope, and schedule information based on the completed Definition Phase work. It will also include an initial set of baselines and metrics to measure benefits of the SCA Project.<sup>9</sup> The Phase Two Verification

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<sup>6</sup> Exhibit B-1, Application, pp. 1-17 to 1-19.

<sup>7</sup> Exhibit B-1, Application, pp. 1-3 and 1-8.

<sup>8</sup> Exhibit A-5, Order G-32-17, Appendix A, p. 3.

<sup>9</sup> Exhibit B-6, BCUC IR 2.51.4.

Report will identify whether there has been any material change in the cost, benefit, scope, and schedule information for the SCA Project. A reasonable definition of a material change is provided in the Application.<sup>10</sup>

**B. AN EXPEDITIOUS PHASE TWO PROCESS IS APPROPRIATE AND IMPORTANT**

8. An expeditious phase two process is appropriate in light of the evidentiary record, and important for mitigating project risk.

9. BC Hydro presented sufficient information in its Application for review and approval of all project expenditures. The phase one regulatory process has been rigorous and robust. BC Hydro anticipates that the Commission's decision to accept the Definition Phase capital expenditure will rest on a determination that, in principle, the SCA Project is in the public interest based on the project justification, including the cost, benefits, scope, and schedule assumptions provided in the Application.

10. Therefore, if the Phase Two Verification Report does not identify any material changes in the initial assumptions,<sup>11</sup> the Commission should be confident, based on the record and decision in phase one and the Phase Two Verification Report, that it can accept the Implementation Phase capital expenditures as being in the public interest without further process. To the extent that regulatory process is considered necessary, due to a material change to the SCA Project or otherwise, it should be tailored and focused to minimize delay.

11. An expeditious phase two process is essential from the perspective of minimizing risk of a costly project delay. The SCA Project, unlike typical large generation, transmission or distribution projects, has a unique human resource element, namely that the people who will perform Definition Phase activities are largely the same people who will implement the project. It is important for BC Hydro to move from Definition to Implementation Phase activities without unnecessary disruption to the project or the project team.<sup>12</sup> A delay to Implementation Phase

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<sup>10</sup> Exhibit B-1, Application, pp. 1-18 to 1-19.

<sup>11</sup> Exhibit B-1, Application, pp. 1-18 to 1-19.

<sup>12</sup> Exhibit B-1, Application, p. 1-8.

activities would require BC Hydro and the System Integrator to cease work on the SCA Project. This outcome could be expected to impact the cost and/or quality of the project. The cost implication of a delay is currently estimated at approximately \$3.6 million for a four-month delay in moving from Definition Phase to Implementation Phase.<sup>13</sup>

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<sup>13</sup> Exhibit B-1, Application, p. 1-19. As discussed on page 2-18 of the Application, BC Hydro included a \$3.6 million project reserve for delay to a regulatory process between the Definition and Implementation Phases, but this does not include a schedule contingency. See Exhibit B-3, BCUC IR 1.13.4 for a further discussion of the impact of a delay for regulatory process between the Definition and Implementation Phases.

**PART THREE: CUSTOMER BENEFITS, REDUCED RISK, KEY TO PUBLIC INTEREST DETERMINATION**

12. BC Hydro filed the Application pursuant to paragraph 44.2(1)(b) of the *Utilities Commission Act* (the “UCA”), which states that a public utility may file an expenditure schedule of capital expenditures that the public utility anticipates making. The UCA establishes a public interest test for acceptance of an expenditure schedule under section 44.2, setting out a number of factors that the Commission must consider in determining the public interest. Attachment C to the Application discussed the applicable legal framework in further detail. The governing public interest consideration in accepting the proposed expenditure schedule for the SCA Project should be the fact that BC Hydro’s customers will benefit from the SCA Project.

13. Subsection 44.2(5.1) of the UCA lists a number of matters that the Commission must consider when considering whether to accept an expenditure schedule filed by BC Hydro. It states:

44.2(5.1) In considering whether to accept an expenditure schedule filed by the authority [BC Hydro], the commission, in addition to considering the interests of persons in British Columbia who receive or may receive service from the authority, must consider

(a) British Columbia’s energy objectives,

(b) an applicable integrated resource plan approved under section 4 of the *Clean Energy Act*,

(c) the extent to which the schedule is consistent with the requirements under section 19 of the *Clean Energy Act*, and

(d) if the schedule includes expenditures on demand-side measures, the extent to which the demand-side measures are cost-effective within the meaning prescribed by regulation, if any.

14. As an IT project, the SCA Project has no environmental impacts. It does not trigger any obligation to consult with First Nations. The 2013 Integrated Resource Plan, referenced in paragraph (b), does not address IT investments. The Application is neutral in

terms of reducing electricity demand, which is referenced in section 44.2(5.1)(c). The Application is unrelated to demand-side management.<sup>14</sup>

15. The public interest factors identified in section 44.2 of the UCA that are relevant to the SCA Project are: (i) the interests of persons in British Columbia who receive or may receive service from BC Hydro; and (ii) the government's energy objective of ensuring that BC Hydro's rates remain among the most competitive of rates charged by public utilities in North America. As discussed below in this Final Submission, the capital expenditures will improve efficiency and reduce BC Hydro's costs and risks of acquiring and deploying third-party services and materials. The SCA Project thus advances the interests of customers (i.e., "persons in British Columbia who receive or may receive service" from BC Hydro) and helps to maintain BC Hydro's current position of having among the most competitive rates in North America.<sup>15</sup>

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<sup>14</sup> Exhibit B-1, Application, Attachment C.

<sup>15</sup> Exhibit B-1, Application, Attachment C. The SCA Project will also result in 77 person-years of employment in British Columbia, which supports British Columbia's energy objective in section 2(k) of the *Clean Energy Act*, to "to encourage economic development and the creation and retention of jobs". See Exhibit B-3, BCUC IR 1.30.12 for further discussion.

## PART FOUR: PROJECT SCOPE AND COST

### A. INTRODUCTION

16. In this Part, BC Hydro addresses the scope and cost of the SCA Project. BC Hydro highlights the following points:

- First, the SCA Project will close the identified capability gaps in BC Hydro's current supply chain technology and processes, allowing BC Hydro to meet current business requirements more efficiently and with less risk.
- Second, the SCA Project cost estimate meets the Commission's requirements for estimating accuracy, with significant components already subject to firm pricing and appropriate contingencies included.

### B. SCA PROJECT WILL IMPROVE BC HYDRO'S SUPPLY CHAIN BUSINESS PROCESSES

17. The SCA Project will replace BC Hydro's core PassPort supply chain IT system with an SAP supply chain IT system, and will improve BC Hydro's supply chain business processes to meet current business requirements.

18. There are three core areas for which supply chain functionality is being implemented in SAP:

- **Materials Management** – inventory management, forecasting and demand planning, material requirements planning, and warehouse operations for all materials;
- **Purchasing** – purchasing processes, contract administration and invoice processing for all materials and services; and
- **Integration** – integration of SAP supply chain modules with other previously implemented SAP modules (Project System, Finance & Controlling, Quality Management) and other systems, including PassPort (work management), Oracle

Primavera Unifier (Construction Contract Management), and Supply Chain Workspace (sourcing, category, and contract management).<sup>16</sup>

19. The SCA Project scope is discussed in Chapter 4 of the Application and detailed information on the project scope is provided in the Conceptual Design Report included as Attachment H of the Application.<sup>17</sup>

20. BC Hydro's implementation of the new IT system and processes as described in the Conceptual Design Report will address 150 of the 153 Supply Chain Business Requirements.<sup>18</sup> In doing so, BC Hydro will close the identified capability gaps that exist in BC Hydro's current supply chain technology and processes, resulting in reductions in cost, effort and risk.<sup>19</sup> BC Hydro addresses the project benefits in Part Five of this Final Submission.

### **C. THE SCA PROJECT COST ESTIMATE IS ROBUST**

21. The SCA Project cost estimate meets the Commission's requirements for estimating certainty. BC Hydro is justified in its confidence that it can complete the SCA Project without exceeding the upper end of the cost estimate range.<sup>20</sup>

#### **(a) Mid-Range Cost Estimate**

22. BC Hydro has estimated the total cost of the SCA Project as being between \$60.5 million and \$79.3 million, with a mid-range cost estimate of \$65.9 million.<sup>21</sup> The mid-range cost estimate of the SCA Project has an accuracy range of +15 per cent/-10 per cent, and is

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<sup>16</sup> Exhibit B-1, Application, pp. 1-5 and 1-6.

<sup>17</sup> Exhibit B-1, Application, p. 4-13 and Attachment H.

<sup>18</sup> Exhibit B-1, Application, p. 4-13; Exhibit B-4, BCOAPO 1.25.1. The 150 of 153 business requirements noted on page 4-13 of the Application are the same as the 322 requirements described in Attachment H and Attachment K. The reason they are counted as 153 in the Application, while as 322 in the other Attachments, is that the 322 value is based on the number of times an individual unique requirement appears across BC Hydro's 5 unique supply chains, while the 153 value is a count of the unique requirements.

<sup>19</sup> Exhibit B-1, Application, p. 1-4.

<sup>20</sup> Exhibit B-1, Application, p. 3-5; Exhibit B-6, BCUC IR 2.43.1.

<sup>21</sup> The expected capital cost portion of the SCA Project is \$59.2 million, with a project capital cost range of between \$54.3 million and \$71.8 million (Exhibit B-1, Application, p. 1-6).

analogous to a P50 cost estimate.<sup>22</sup> A breakdown of the Mid-Range cost estimate is provided in the following table:<sup>23</sup>

<b>SAP Project - Mid-range cost</b>				
<b>Cost (000's)</b>				
	<b>Life to date</b>	<b>Future estimate (inflated)</b>	<b>Total</b>	<b>%</b>
<b>Early Design Work (Transformation WIP)</b>				
IOMA	\$ -	\$ -	\$ -	0%
Capital <sup>1</sup>	\$ 7,310	\$ -	\$ 7,310	100%
Interest during construction	\$ -	\$ -	\$ -	0%
<i>Sub-total</i>	\$ 7,310	\$ -	\$ 7,310	100%
<b>Identification</b>				
IOMA	\$ 1,236	\$ -	\$ 1,236	100%
Capital	\$ -	\$ -	\$ -	0%
Interest during construction	\$ -	\$ -	\$ -	0%
<i>Sub-total</i>	\$ 1,236	\$ -	\$ 1,236	100%
<b>Early Definition</b>				
IOMA	\$ 115	\$ 252	\$ 367	8%
Capital	\$ 3,012	\$ 968	\$ 3,980	84%
Interest during construction	\$ 83	\$ 296	\$ 379	8%
<i>Sub-total</i>	\$ 3,210	\$ 1,516	\$ 4,726	100%
<b>Mobilization &amp; Design</b>				
IOMA	\$ -	\$ 783	\$ 783	7%
Capital	\$ -	\$ 9,379	\$ 9,379	89%
Interest during construction	\$ -	\$ 414	\$ 414	4%
<i>Sub-total</i>	\$ -	\$ 10,576	\$ 10,576	100%
<b>Implementation (pre go-live)</b>				
IOMA	\$ -	\$ 2,178	\$ 2,178	8%
Capital	\$ -	\$ 22,944	\$ 22,944	84%
Interest during construction	\$ -	\$ 2,211	\$ 2,211	8%
<i>Sub-total</i>	\$ -	\$ 27,333	\$ 27,333	100%
<b>Implementation (post go-live)</b>				
IOMA	\$ -	\$ 1,240	\$ 1,240	20%
Capital	\$ -	\$ 4,924	\$ 4,924	80%
Interest during construction	\$ -	\$ -	\$ -	0%
<i>Sub-total</i>	\$ -	\$ 6,164	\$ 6,164	100%
<i>Total before contingency</i>	\$ 11,756	\$ 45,589	\$ 57,345	
<i>Contingency - 20% of future estimates</i>	\$ -	\$ 8,534	\$ 8,534	
<b>Total after contingency</b>	\$ 11,756	\$ 54,123	\$ 65,879	
<sup>1</sup> Transformation blueprint value				
<sup>2</sup> Source: Attachment F, Tab C2				

<sup>22</sup> Exhibit B-1, Application, pp. 2-15 to 2-16. The upper end of the accuracy range is analogous to a P90 cost estimate. See Exhibit B-1, Application, p. 3-5 and Exhibit B-6, BCUC IR 2.43.1.

<sup>23</sup> Exhibit B-3, BCUC IR 1.16.1.

23. BC Hydro included its detailed estimate of Definition and Implementation Phase costs in Attachment F, workbook tab C1 – Direct Cost Detail.

**(b) BC Hydro’s Estimate is Robust**

24. Section 2.4 of the Application describes how BC Hydro developed the estimated cost range for the SCA Project. The cost estimate is robust, and BC Hydro “has high confidence that it can complete the Supply Chain Applications Project without exceeding the upper accuracy range”.<sup>24</sup> The following evidence justifies BC Hydro’s confidence in the estimates:

- The Identification Phase and Early Definition Stage costs up to the end of November 2016 are the actual recorded costs.<sup>25</sup>
- The remaining Definition and Implementation Phase forecast costs have been developed using a bottom-up approach based on pricing and proposal information submitted to BC Hydro from the System Integrator and Quality Assurance Advisor.<sup>26</sup>
- A significant portion of the direct costs are subject to fixed price contracts with the Systems Integrator and Quality Assurance Advisor.<sup>27</sup>
- BC Hydro has used the System Integrator’s proposed cost in the project cost estimate, without incorporating any potential cost savings from the gain sharing provision in the Master Services Agreement with the Systems Integrator. Under this provision, BC Hydro and the System Integrator will share any cost savings that occur if the notional calculated fees for the System Integrator’s work regarding a fixed-price statement of work are less than the fixed price for the

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<sup>24</sup> Exhibit B-6, BCUC IR 2.43.1.

<sup>25</sup> Exhibit B-1, Application, p. 2-14.

<sup>26</sup> Exhibit B-1, Application, p. 2-14.

<sup>27</sup> Exhibit B-3, BCUC IR 1.4.3. BC Hydro’s response to BCOAPO IR 1.4.1 (Confidential) provides a breakdown of the mid-range cost estimate categorized by spend area such as System Integrator, QA Consultant, Other Consultants, Hardware, Software, BC Hydro Labour, Contingency, Reserve.

statement of work. If any cost savings due to the gain sharing provision occurs, this would reduce the project cost.<sup>28</sup>

- BC Hydro calculated Interest during Construction based on the committed in-service date, rather than the earlier target date. BC Hydro's approach was conservative, since it leads to higher interest costs being reflected in the SCA Project estimate. The mid-range cost estimate would be reduced by \$770,000 in interest costs if the target in-service date was used rather than the committed in-service date.<sup>29</sup>
- The SCA Project estimate includes a 20 per cent contingency, calculated on the costs still to be incurred. It represents costs that BC Hydro expects to expend, but that are not detailed in the base estimate of the direct project costs. The 20 per cent contingency is consistent with the cost contingency used on other BC Hydro projects.<sup>30</sup>
- The upper bound of the cost estimate incorporates a project reserve, with incremental interest during construction. The project reserve includes an incremental contingency of 15 per cent to mitigate unknown risks and an additional reserve amount to mitigate cost impacts associated with known risks.<sup>31</sup>

25. BC Hydro will provide an updated cost estimate in the Phase Two Verification Report.<sup>32</sup>

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<sup>28</sup> Exhibit B-3, BCUC IR 1.30.9; Exhibit B-6, BCUC IR 2.41.2.

<sup>29</sup> Exhibit B-3, BCUC IR 1.13.4.

<sup>30</sup> Exhibit B-3, BCUC IR 1.13.7.

<sup>31</sup> Exhibit B-1, Application, pp. 2-17 to 2-18.

<sup>32</sup> Exhibit B-1, Application, p. 1-18.

**(c) The Cost Estimate Appropriately Excludes the Cost of SAP Platform Upgrades**

26. It was appropriate for BC Hydro to exclude the cost of an SAP platform upgrade to S/4 HANA from the SCA Project estimate for four reasons:

- First, an SAP platform upgrade is not necessary to meet the SCA Project objectives.<sup>33</sup>
- Second, BC Hydro will have to upgrade its SAP Platform in the future, independent of the decision to use SAP for Supply Chain. BC Hydro's SAP platform supports multiple business process areas including Customer Care, Finance, Human Resources, Project and Portfolio Management, Incident Management, and partial implementations of Supply Chain and Work Management functionality. As with any software system, periodic SAP Platform upgrades are necessary to maintain the health and operability of the overall platform.<sup>34</sup>
- Third, SAP platform upgrades cannot be performed for individual business modules. As such, BC Hydro's practice since it began operating SAP in 2003 has been to treat upgrades as separate initiatives, each justified by its own business case.<sup>35</sup>
- Fourth, it is premature to quantify the costs of a migration to S/4 HANA, given the newness of the SAP S/4 HANA product and the lack of reference sites. There are few examples of SAP S/4 HANA having been implemented by major utilities. BC Hydro does not consider it prudent to become an early adopter of this platform.<sup>36</sup>

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<sup>33</sup> Exhibit B-6, BCUC IR 2.42.2.

<sup>34</sup> Exhibit B-6, BCUC IR 2.42.2.

<sup>35</sup> Exhibit B-6, BCUC IR 2.42.2.

<sup>36</sup> Exhibit B-3, BCUC IR 1.7.2; Exhibit B-6, BCUC IR 2.42.1.

27. BC Hydro will assess the details of an upgrade when the SAP S/4 HANA product and market are more mature.<sup>37</sup>

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<sup>37</sup> Exhibit B-6, BCUC IR 2.42.1.

## **PART FIVE: THERE IS A COMPELLING RATIONALE FOR THE SCA PROJECT**

### **A. INTRODUCTION**

28. BC Hydro has provided a compelling rationale for the SCA Project. In this Part of the Final Submission, BC Hydro elaborates on the following points, which support a finding that the SCA Project is in the public interest.

- First, the SCA Project will close the capability gaps in the current supply chain system and business processes.
- Second, the SCA Project will provide net financial benefits, which ultimately flow to BC Hydro's customers.
- Third, the SCA Project will reduce or eliminate safety, financial, reputational and reliability risks in the supply chain.
- Fourth, the SCA Project is required before BC Hydro can achieve the full benefits from additional investments in work management and asset management business processes and IT systems.<sup>38</sup>

### **B. SCA PROJECT WILL CLOSE THE CAPABILITY GAPS IN THE CURRENT SUPPLY CHAIN**

29. BC Hydro assessed its supply chain business requirements, and identified 13 capability gaps in the current IT system and business processes. The SCA Project will close those gaps.

30. The PassPort supply chain IT system and associated business practices were implemented in 2003, and designed primarily to support materials and inventory management. They do not adequately support the acquisition of non-inventoried materials or services. Currently, about 90 per cent of BC Hydro's total third-party expenditures is related to purchases

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<sup>38</sup> Exhibit B-1, Application, pp. 2-7 to 2-8.

that are not maintained (or maintainable) as inventory, and between 60 per cent and 80 per cent of BC Hydro's total third-party expenditures is for services rather than materials.<sup>39</sup>

31. BC Hydro's third-party service and material needs have also increased since 2003. BC Hydro's annual capital expenditures increased from approximately \$600 million in fiscal 2003 to approximately \$2.3 billion in fiscal 2016, and operating costs increased from approximately \$580 million in fiscal 2003 to over \$950 million in fiscal 2015.<sup>40</sup> Approximately 85 per cent of BC Hydro's capital spending and approximately 55 per cent of BC Hydro's operating costs are third-party services and materials that must be procured using BC Hydro's supply chain.<sup>41</sup>

32. BC Hydro undertook a formal process to identify its supply chain needs across the organization. The outcome of this process was the Supply Chain Business Model, which identified 153 supply chain-specific business requirements.<sup>42</sup> The implementation of the Supply Chain Business Model will require changes in technology, and changes in processes, roles, and responsibilities.<sup>43</sup>

33. BC Hydro experts performed a gap assessment of its current supply chain IT system and business processes.<sup>44</sup> BC Hydro identified 13 capability gaps in the current supply chain IT system and associated business practices.<sup>45</sup> The 13 capability gaps are specific to technology limitations that prevent BC Hydro from fully implementing the Supply Chain Business Model.<sup>46</sup> The successful implementation of the Supply Chain Business Model contemplates the closing of all of the capability gaps.<sup>47</sup>

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<sup>39</sup> Exhibit B-1, Application, p. 2-7.

<sup>40</sup> Exhibit B-1, Application, pp. 1-4 and 1-5.

<sup>41</sup> Exhibit B-4, BCOAPO IR 1.1.1 and 1.1.2.1.

<sup>42</sup> Exhibit B-1, Application, p. 4-6.

<sup>43</sup> Exhibit B-4, BCOAPO IR 1.18.1 and CEC IR 1.53.1.

<sup>44</sup> Exhibit B-3, BCUC IR 1.11.1.

<sup>45</sup> Exhibit B-1, Application, pp. 2-8 to 2-12.

<sup>46</sup> Exhibit B-3, BCUC IR 1.3.1.

<sup>47</sup> Exhibit B-4, CEC IR 1.42.1.

34. The SCA Project will close the 13 capability gaps. The table below summarizes the 13 capability gaps identified by BC Hydro’s assessment team, which will be addressed by the SCA Project. ABB does not contest BC Hydro’s assessment that these capability gaps exist based on how BC Hydro’s PassPort system is configured and operated currently. ABB’s evidence is premised on the functionality of Asset Suite 9, the latest ABB upgrade that has yet to secure a significant market presence.<sup>48</sup>

	Capability Gap	Explanation
1	Inability to Manage Service-Related Spend	<p>Services represent between 60 and 80 per cent of BC Hydro’s \$2.5 billion supply chain procurement spend. The services procured include construction services, equipment installation services, and maintenance services. The current supply chain systems do not allow BC Hydro to easily track and view the different types of services for which BC Hydro regularly contracts and their associated costs.<sup>49</sup></p> <p>This system limitation has also prevented BC Hydro from developing an accessible and current listing of the various types of services and their respective costs (referred to as a “services catalogue”) that would allow for process automation. Developing a services catalogue as part of the SCA Project will: improve BC Hydro’s negotiating position <i>vis-a-vis</i> vendors; provide historical pricing and contract terms for services; and allow BC Hydro to develop a self-service application for the requisition of common services.<sup>50</sup></p>
2	Limitations in BC Hydro’s Ability to Manage Contracts	<p>BC Hydro’s contract management and administration function aims to maximize financial performance and minimize risk in contractual arrangements. Effective contract management and administration<sup>51</sup> requires accessing contract terms, contract conditions, and contract performance data. The current systems place a high burden on users by requiring them to work in multiple systems, and impede access to contract terms. These limitations could prevent a contract manager from taking advantage of contract terms (e.g., volume discounts) due to a lack of visibility of these terms in the system.<sup>52</sup></p>

<sup>48</sup> Exhibit B-5, BCUC-ABB IR 2.0.

<sup>49</sup> Exhibit B-1, Application, p. 2-8.

<sup>50</sup> Exhibit B-1, Application, p. 2-8 to 2-9.

<sup>51</sup> Contract administration refers to the administrative transactional processes that must be performed to initiate and maintain each contract, including administration of invoices, changes, and closeouts. See Exhibit B-1, Attachment H, p. 47.

<sup>52</sup> Exhibit B-1, Application, p. 2-9.

		<p>The SCA Project will make more real-time operational contract information available to users and will allow for both services and materials to be requisitioned in one process.<sup>53</sup> Real-time operational contract information relates to having operational data for a contract codified and readily available in the system throughout the contract lifecycle. This includes information relating to spend, units consumed (for both services and materials), volume discounts, variable contract terms and conditions, and extension options. In BC Hydro’s current PassPort supply chain system, much of this data is stored as free text, limiting its value in processing, reporting, and analysis.<sup>54</sup> The new SAP supply chain system will have a data model that will improve BC Hydro’s ability to forecast contract expiry and manage contract extension processes, with reduced manual effort.<sup>55</sup></p>
3	Limitation on Inventory Management	<p>BC Hydro must assess most of its inventory requirements manually, since there is no system in place that automates inventory requirements processes. BC Hydro’s lack of an inventory management system can cause BC Hydro to carry more inventory than necessary, incur rush orders, and issue multiple orders for similar materials. It also constrains BC Hydro’s ability to manage the entire scope of third-party materials and services acquisition. This has resulted in higher ‘spot buy’ activity whereby BC Hydro purchases materials more frequently, in smaller quantities, and at a higher cost versus negotiating bulk purchase contracts at a lower cost.<sup>56</sup> The new supply chain IT system will allow for automated tracking of inventory requirements and will allow BC Hydro to optimize inventory levels.<sup>57</sup></p>
4	Limitation on Managing Supplier Performance	<p>BC Hydro’s existing processes for tracking performance metrics against actual supplier performance are manual, inconsistent, inefficient and subject to error. The review of supplier performance is also generally performed on a case-by-case basis. Information about common suppliers is not available across the organization, which results in a risk that BC Hydro may continue to use suppliers with poor performance. A system that tracks and consolidates information about supplier performance, which will be an outcome of the SCA Project, will allow BC Hydro to avoid poor performing suppliers.<sup>58</sup></p>
5	Limitation on Managing Supply	<p>BC Hydro is unable to plan materials and services on infrastructure projects directly in the IT system. There is also no way to automatically update the supply chain when changes to schedule or scope</p>

<sup>53</sup> Exhibit B-1, Application, p. 3-9.

<sup>54</sup> Exhibit B-6, BCUC IR 2.48.3.1.

<sup>55</sup> Exhibit B-4, CEC IR 1.13.3.

<sup>56</sup> Exhibit B-1, Application, p. 2-9.

<sup>57</sup> Exhibit B-1, Application, p. 2-5.

<sup>58</sup> Exhibit B-1, Application, p. 2-10.

	Chain for Capital Projects	<p>occur; the updates must be inputted manually and across various systems. The manual processes require BC Hydro to expend greater effort than necessary on capital project management.<sup>59</sup></p> <p>The SCA Project will allow for direct integration between the SAP supply chain module and the SAP Project Systems module.<sup>60</sup> The SCA Project will provide better ability to manage supply chain for capital projects through planning and visibility of material and services requirements directly in the IT system and automatic updating to the supply chain when changes to project schedule or scope occur. The SCA Project is also expected to improve BC Hydro's ability to manage service-related spend, manage and administer contracts, and manage individual supplier performance, all of which will enable better contracting on large capital projects.<sup>61</sup></p>
6	Lack of Order, Delivery and Payment Tracking	<p>BC Hydro's supply chain does not have a consolidated system that tracks requests, receipt of materials, delivery of services, and payment details in one application. The information is entered and managed in multiple applications. When process exceptions occur, users must manually trace transactions through multiple systems to determine the cause and resolve the issue.<sup>62</sup> The deployment of SAP for supply chain will allow for the order, delivery, and payment processes to occur in one system.<sup>63</sup></p>
7	Inability to Support Sales and Return of Unused Materials	<p>There is no system capability or mechanism to track when unused materials have been returned to warehouses from job sites. At present, the returns process requires significant manual effort. Due to the lack of visibility of surplus materials, BC Hydro risks replenishing stock when the same material is sitting unused in the field or in a warehouse. The SCA Project will improve visibility of surplus materials, which will reduce the risk of holding unnecessary inventory.<sup>64</sup></p>
8	Inability to Pre-package Materials for Field Crews	<p>The current supply chain does not enable BC Hydro to pre-assemble materials for specific jobs or recurring jobs that require the same set of materials. This results in increased effort at remote storage sites to prepare materials for crews on a case-by-case basis.<sup>65</sup> The SCA Project will provide the functionality to permit pre-packaging of job materials for crews.<sup>66</sup></p>
9	Lack of Wireless Access to Inventory	<p>Mobile access to inventory information is not available to storekeepers as they move through the warehouse. Greater effort is required to manage inventory. Inventory information collected manually is also not as accurate or current as it could be, resulting in more inventory being held than</p>

<sup>59</sup> Exhibit B-1, Application, p. 2-10.

<sup>60</sup> Exhibit B-1, Application, p. 3-10.

<sup>61</sup> Exhibit B-3, BCUC IR 1.4.2.

<sup>62</sup> Exhibit B-1, Application, p. 2-10.

<sup>63</sup> Exhibit B-1, Application, p. 3-10.

<sup>64</sup> Exhibit B-1, Application, pp. 2-10 to 2-11.

<sup>65</sup> Exhibit B-1, Application, p. 2-11.

<sup>66</sup> Exhibit B-1, Application, p. 3-11.

	Information	is optimal. <sup>67</sup> The SCA Project will enable wireless access to inventory information, which will assist in optimizing inventory levels through more accurate inventory data. <sup>68</sup>
10	No Self-serve Option for Routine Service Requests	There is currently no self-service application that allows users to select from a drop-down menu the specific service they require and submit the service request automatically. There is greater effort required for service requests because each request must be made to a buyer accompanied by a written description of the specific services needed. <sup>69</sup> In the new supply chain there will be a self-service IT application for low-value and low-risk services that will allow users to select from a drop-down menu the specific service they require and submit the request for services automatically. This will be faster and more efficient than the current system. <sup>70</sup>
11	Inability to Pay Suppliers Without an Invoice	The supply chain system does not allow BC Hydro to automatically pay suppliers without an invoice in certain circumstances where there are adequate controls to ensure receipt of goods or services. Instead, all goods received must be accompanied by an invoice that must be manually matched (or checked against) the underlying contract with the supplier. The SCA Project will enable BC Hydro to pay suppliers without an invoice, which will save invoice processing costs <sup>71</sup> and is expected to permit the company to negotiate lower per unit pricing on certain types of goods and services. <sup>72</sup>
12	Inability to Streamline Controls and Approvals Process	The current approvals process is inflexible and does not provide for streamlining approval processes where appropriate. There is limited ability within the current system to streamline the approvals processes while maintaining required controls. <sup>73</sup> Closing this capability gap requires work to be managed, including approval, in a single system. The SCA Project will largely allow the financial control and approval of work to occur in SAP. <sup>74</sup>
13	Inability to Integrate Work Management Systems	BC Hydro manages its work management processes using a number of IT systems, including Spatial Asset Management System, System for Transmission Asset Recording & Reporting, PowerOn, ServiceLink, SAP, and PassPort. Work orders created in each of these systems are interfaced to BC Hydro's SAP-based finance system. This interface allows work orders to be used as charge codes for purchasing materials and services or for charging employee time. No similar interface exists with PassPort. As a result, work orders created in any system other than PassPort do not directly link to the PassPort supply chain system and must be manually re-created in PassPort to allow for materials

<sup>67</sup> Exhibit B-1, Application, p. 2-11.

<sup>68</sup> Exhibit B-1, Application, pp. 2-5 and 3-11.

<sup>69</sup> Exhibit B-1, Application, p. 2-11.

<sup>70</sup> Exhibit B-1, Application, p. 2-5.

<sup>71</sup> Exhibit B-7, CEC IR 2.83.1, 2.83.2, and 2.83.3.

<sup>72</sup> Exhibit B-1, Application, p. 2-11.

<sup>73</sup> Exhibit B-1, Application, pp. 2-11 to 2-12.

<sup>74</sup> Exhibit B-1, Application, p. 3-12.

		and services to be planned. Additional manual effort is required to update changing work schedules in PassPort in order to coordinate material and service deliveries. <sup>75</sup> While future effort will be required to put all work order related information in SAP, the SCA Project will provide benefits such as the ability to plan the materials and services to the work order in SAP. <sup>76</sup>
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**C. PROJECT PROVIDES NET FINANCIAL BENEFITS**

35. BC Hydro has devoted a significant amount of time to understanding the range of potential benefits associated with improving existing processes and creating new processes to drive value. In examining the SCA Project, BC Hydro determined that it will provide significant net financial benefits, which will ultimately benefit BC's Hydro customers. Most aspects of the analysis went unchallenged in information requests. For any issues that were canvassed in the information requests, BC Hydro has provided compelling responses.

**(a) The Detailed and Conservative Analysis Demonstrates Significant Benefits**

36. BC Hydro developed the benefits analysis from the "bottom up", identifying 64 specific benefits that it believes are achievable and that will result in reduced costs, effort, and risk for BC Hydro. This analysis is detailed in Attachment F of the Application, and updated in the attachment to BC Hydro's response to BCUC IR 2.39.1.

37. The benefits calculation reflects the expectation that the benefits of the SCA Project will ramp up over a two- to four-year time horizon. Cost and monetized effort benefits will begin to be recognized one year after the project goes into service. The effort benefits will increase over a two-year period. Cost benefits will increase over a four-year period.<sup>77</sup>

38. BC Hydro took a conservative approach to assessing the benefits of the SCA Project. Although BC Hydro will seek to achieve 100 per cent of the estimated benefits, BC Hydro selected 50 per cent as the potential for monetized benefits to be achieved. The upper ceiling of 60 per cent and lower floor of 30 per cent were similarly selected to be

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<sup>75</sup> Exhibit B-1, Application, p. 2-12.

<sup>76</sup> Exhibit B-1, Application, p. 3-12 and Attachment H, p. 27.

<sup>77</sup> Exhibit B-3, BCUC IR 1.4.3.

conservative.<sup>78</sup> In response to BCUC IR 2.33.4, BC Hydro stated that “given the bottom-up development of the forecasted benefits, BC Hydro believes there is a high likelihood of realizing 50 per cent or more of the benefits.”

***Financial Benefits Are Significant Despite Conservative Assumptions***

39. BC Hydro’s proposed investment in a new supply chain is expected to yield annual recurring monetized expected benefits of \$26 million.<sup>79</sup> The expected financial benefits are significant despite BC Hydro’s conservative assumptions outlined above.

40. Over the course of the proceeding, BC Hydro made four corrections to the calculation of the estimated annual benefits. The four corrections had no impact on the cost estimate, and only marginally reduced the estimated annual benefits as shown in the table below.<sup>80</sup>

**Annual Potential Benefits**

	<b>Mid</b>	<b>Low</b>	<b>High</b>
<b>SAP (Dec 21, 2016 Application)</b>	27,460	16,595	33,186
<b>SAP (Updated)</b>	26,172	15,704	31,403

41. As discussed in the next section, the Net Present Value (“NPV”) of both discounted cash flows and incremental revenue requirements impact remain overwhelmingly positive. The mid-range cost and benefit estimates correspond to a NPV of \$68 million on a discounted cash flow basis and \$53 million on an incremental revenue requirements basis.<sup>81</sup>

***Financial Benefits Relate to Cost and Effort Reduction***

42. The monetized benefits of the SCA Project are derived from either cost reduction or effort reduction savings.<sup>82</sup> Cost reduction savings are based on total addressable spend that flows through the supply chain. Effort reduction savings are based on the number of

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<sup>78</sup> Exhibit B-4, CEC IR 1.33.1.

<sup>79</sup> Exhibit B-1, Application, p. 1-6, as updated in Exhibit B-6, BCUC IR 2.39.1.

<sup>80</sup> Exhibit B-6, BCUC IR 2.39.1.

<sup>81</sup> Exhibit B-1, Application, p. 1-6, as updated in Exhibit B-6, BCUC IR 2.39.1.

<sup>82</sup> Exhibit B-1, Application, p. 2-27.

transactions that are processed annually by the supply chain. The benefit amounts are then allocated between capital and operating based on historical spend and effort information. Based on this historical information, BC Hydro has assumed that 76 per cent of cost reduction benefits will be attributable to capital activities and 24 per cent will be attributable to operating activities. With respect to effort reduction benefits, BC Hydro has assumed that 40 per cent will be attributable to capital activities and 60 per cent will be attributable to operating activities.<sup>83</sup>

43. BC Hydro will include forecast savings to revenue requirements attributable to the SCA Project starting in its next revenue requirements application, as fiscal 2021 will be the first year the SCA Project is expected to provide ratepayer benefits.<sup>84</sup> BC Hydro expects that some FTEs will be reduced and some FTEs will be diverted to other activities based on operational requirements. The effort reduction will be spread across multiple employees and multiple departments. Any decisions about eliminating positions will need to consider all of BC Hydro's operational requirements at that time, and will be reflected in future iterations of BC Hydro's Workforce Plan.<sup>85</sup>

**(b) Specific Issues Regarding Benefits Raised in Information Requests**

44. Most aspects of BC Hydro's analysis went unchallenged in the information requests. For issues that were raised in the information requests, BC Hydro provided compelling responses. These issues are briefly addressed below.

***Benefit 7: Reduction of Effort in Operations Managing Completion of Work***

45. Benefit 7 described on Tab F1 in Attachment F is the reduction of effort in operations managing completion of work. In determining this potential benefit, BC Hydro estimated that, for the approximately 4,000 people working in PassPort performing supply

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<sup>83</sup> Exhibit B-3, BCUC IR 1.4.3.

<sup>84</sup> Exhibit B-1, Application, p. 1-6.

<sup>85</sup> Exhibit B-3, BCUC IR 1.30.13; Exhibit B-7, CEC IR 2.76.1.

chain functions and managing contracts for downstream activities, about 30 per cent of their time is inefficient.<sup>86</sup>

46. The inefficient time is attributable to the shortcomings of the current supply chain, which necessitates manual processes (i.e., the use of spreadsheets and other systems to track, approve, and report work).<sup>87</sup> BC Hydro believes that the SAP supply chain system can eliminate 100 per cent of the inefficient time.<sup>88</sup>

***Benefit 14: Reduction of Cost of Capital through an Increase in Inventory Turns***

47. Benefit 14 described on Tab F1 in Attachment F is the potential reduction of cost of capital through an increase in inventory turns. Holding less overall inventory to support a given volume of work results in lower carrying costs while the material sits in inventory. In turn, this frees up BC Hydro's working capital (i.e., cash or borrowings that would have otherwise been used to purchase higher levels of inventory can be used for other purposes).<sup>89</sup>

48. The current inventory turn metric for active stock materials is 1.6 on \$200 million annual spend (\$125 million active stock on hand), with \$5.6 million per year in associated carrying costs. Benchmarking information indicates that members of BC Hydro's peer group have, on average, been able to attain an inventory turn ratio of 2.79, which is a reasonable and achievable target.<sup>90</sup> Increasing the inventory turn metric to 2.79 would result in a savings of \$2.4 million a year in lower carrying costs.<sup>91</sup> As with all other monetized benefits, BC Hydro has applied a 30 per cent, 50 per cent and 60 per cent factor to estimate the low, medium and high benefit scenarios.

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<sup>86</sup> Exhibit B-1, Appendix F, Tab F1.

<sup>87</sup> Exhibit B-4, CEC IR 1.11.2; Exhibit B-1, Appendix F, Tab F1, Cell E9.

<sup>88</sup> Exhibit B-6, BCUC IR 2.34.1.

<sup>89</sup> Exhibit B-6, BCUC IR 2.35.3. In Exhibit B-6, BCUC IR 2.35.4, BC Hydro updated Tab F1 of Attachment F to reflect the correct calculation logic.

<sup>90</sup> Exhibit B-6, BCUC IR 2.35.2.

<sup>91</sup> Exhibit B-6, BCUC IR 2.35.3.

49. The calculation of this benefit excludes spares inventory that is kept in reserve to address situations of critical failure. Increasing the inventory turn ratio above the current 1.6 on active inventory would not result in reduced spares inventory. BC Hydro will continue to ensure system reliability at higher inventory turns for active inventory by maintaining existing levels of critical spares inventory.<sup>92</sup>

***Benefit 23: Evaluated Receipt Settlement***

50. The Evaluated Receipt Settlement benefit (benefit ID 23) described on Tab F1 in Attachment F is related to the reduction of effort to process invoices and resolve discrepancies associated with vendor-supplied invoices. Where Evaluated Receipt Settlement can be used to replace vendor generated invoices, it eliminates the risk that the vendor invoice is incorrect, and therefore reduces the effort required to resolve invoice errors.<sup>93</sup> BC Hydro estimated the potential mid-range benefit at \$59,000 annually.<sup>94</sup>

51. BC Hydro processes 144,000 invoices per year.<sup>95</sup> If BC Hydro has an agreement with vendors to use Evaluated Receipt Settlement, the system will use the receipt of materials or acceptance of services as the basis to generate, post and pay an invoice based on the conditions of the purchase.<sup>96</sup> Evaluated Receipt Settlement will reduce the number of invoices received at Accounts Payable, ensure payment is made at the contracted rate, eliminate need for suppliers to send a separate invoice, and eliminate invoice variances.<sup>97</sup>

52. Eliminating the need for suppliers to issue a separate invoice is also a benefit to suppliers. BC Hydro has not included in its calculations the benefit of potential price discounts that suppliers might provide for the use of Evaluated Receipt Settlement.<sup>98</sup>

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<sup>92</sup> Exhibit B-6, BCUC IR 2.35.2.

<sup>93</sup> Exhibit B-1, Attachment F, Tab F1.

<sup>94</sup> Exhibit B-1, Attachment F, Tab F1.

<sup>95</sup> Exhibit B-1, Attachment F, Tab F1.

<sup>96</sup> Exhibit B-7, CEC IR 2.83.1.

<sup>97</sup> Exhibit B-4, CEC IR 1.18.1 and CEC IR 1.18.4.

<sup>98</sup> Exhibit B-7, CEC IR 2.83.3.

***Benefit 60: Reduction of the Cost of Materials Created by Reducing Premiums Paid for Spot Buy Activity***

53. Benefit 60 described on Tab F1 in Attachment F is the potential reduction of the cost of materials created by reducing premiums paid for spot buy activity. BC Hydro spends approximately \$200 million a year on stock materials. It is estimated that approximately 30 per cent of materials requests results in an expedited purchase, and this creates a 15 per cent increase in costs. BC Hydro estimated a potential mid-range benefit of reducing premiums paid for spot buy activities at \$4.5 million annually.<sup>99</sup>

54. The opportunity to reduce spot buy activity may be characterized, partly, as improved category management. Limited visibility of demand in the system can result in reactive spot buy activity, as opposed to a more planned, strategic approach. Category management may improve the process by establishing key contracts in advance. On its own, however, category management would not necessarily reduce spot buy activity or expedited purchases. Accurate master data, lead times, and need dates are required to release an order at the appropriate time, and therefore reduce expediting and costs for rush deliveries. Even without category management, increased visibility of demand would improve the ability of planners to execute manual spot buy activities, and avoid potential expediting and rush delivery charges.<sup>100</sup>

**(c) Project Yields Positive Net Present Value**

55. BC Hydro calculated the NPV of the SCA Project, taking into account upfront capital costs, future benefits, and ongoing capital and operating costs to measure the total value added to the organization. In general terms, the NPV is calculated as: PV Future Benefits – PV Capital Costs – PV Future Operating Costs. A NPV greater than zero means the project creates economic value.<sup>101</sup>

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<sup>99</sup> Exhibit B-1, Attachment F, Tab F1.

<sup>100</sup> Exhibit B-6, BCUC IR 2.36.1.

<sup>101</sup> Exhibit B-7, Landale IR 2.3.1.

56. The updated NPV analysis tables in BC Hydro’s response to BCUC IR 2.39.1 demonstrate that the SCA Project is beneficial.<sup>102</sup> The results of the revised analysis are:

**NPV of discounted cash flows (millions)**

	<b>Mid</b>	<b>Low</b>	<b>High</b>
<b>SAP (Dec 21, 2016 Application)</b>	74.4	6.4	111.6
<b>SAP (Updated)</b>	68.3	2.2	103.2

**NPV of incremental revenue requirements impact (millions)**

	<b>Mid</b>	<b>Low</b>	<b>High</b>
<b>SAP (Dec 21, 2016 Application)</b>	59.0	(4.0)	94.0
<b>SAP (Updated)</b>	53.5	(7.8)	86.2

57. In response to an information request from Mr. Landale, BC Hydro provided benefit-cost ratios. These numbers were calculated by dividing the present value of the forecast benefit by the present value of the forecast capital and operating costs. A ratio of less than 1.0 indicates that the project destroys value, while a ratio greater than 1.0 indicates that a project creates value. Higher values indicate that the value creation is more robust, and is thus more likely to survive adverse cost, schedule, or market variation. The cost-benefit ratios for the SCA Project are robust:<sup>103</sup>

<b>SAP</b>	<b>Low Benefit</b>	<b>Mid Benefit</b>	<b>High Benefit</b>
<b>Low Cost</b>	<b>1.64</b>	<b>2.74</b>	<b>3.29</b>
<b>Mid Cost</b>	<b>1.34</b>	<b>2.23</b>	<b>2.68</b>
<b>High Cost</b>	<b>1.03</b>	<b>1.72</b>	<b>2.06</b>

58. The above cost-benefit ratios and NPV analysis demonstrate that the SCA Project is expected to create economic value.

<sup>102</sup> Exhibit B-7, Landale IR 2.3.1.

<sup>103</sup> Exhibit B-7, Landale IR 2.3.1.

**(d) Benefits will Apply to Innovative Procurement Approaches**

59. A portion of the \$2.5 billion of materials and services that flow through BC Hydro's supply chain may be contracted through innovative procurement approaches such as Design Build or Public Private Partnership.<sup>104</sup> The SCA Project will benefit all projects regardless of the procurement approach by improving visibility of requirements and contract data in the system, and improving supplier performance management capabilities.<sup>105</sup> While the number of individual contract packages for a project is lower under an innovative procurement approach, the analysis, sourcing, and contracting process may be just as onerous as under traditional procurement approaches.<sup>106</sup>

60. BC Hydro explained in detail that the benefits of the SCA Project would apply to a large project contracted under a competitive innovative procurement approach:<sup>107</sup>

- For Benefit 5, BC Hydro explained that the calculation was based on addressable spend multiplied by estimated average cost savings of 0.5 per cent. BC Hydro purposefully selected a low percentage rate, recognizing that some portion of the addressable spend or that certain categories of services and materials may not achieve cost savings, while others could achieve a significantly higher cost savings rate. For large projects contracted under an innovative procurement approach, there may be less potential for negotiated cost savings on individual services and materials. However, these projects will still benefit from BC Hydro having better data regarding historical purchase volumes and prices, which would be useful information while estimating project costs, analyzing proposals received from proponents and negotiating the overall contract.
- For Benefit 7, the calculation logic is based on the estimated number of hours spent by employees across BC Hydro to manage contracts and completion of work, and the portion that is considered inefficient. This is an effort-based benefit. As with any

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<sup>104</sup> Exhibit B-3, BCUC IR 1.4.2.2; Exhibit B-6, BCUC IR 2.37.1.

<sup>105</sup> Exhibit B-3, BCUC IR 1.4.2.2.

<sup>106</sup> Exhibit B-3, BCUC IR 1.4.2.2.

<sup>107</sup> Exhibit B-6, BCUC IR 2.37.2.

construction project, a large portion of contracts under an innovative procurement approach relate to services. As such, these contracts benefit from a system and processes that reduce or eliminate the need for manual effort and working in different systems to manage the completion of work under a contract. While the number of contracts that BC Hydro would process under an innovatively procured project would generally be lower than under a traditionally procured project, these contracts tend to be larger and more complex. Therefore, the total effort necessary to manage the contracts does not correlate with the number of contracts.

- For Benefit 26, the calculation logic is based on the number of service-related invoices that BC Hydro processes annually and the reduction in effort to approve these invoices if there was an automated three-way match in the system. In calculating the benefit, BC Hydro assumed that 70 per cent of invoices have average complexity and 30 per cent are more complex, requiring additional effort to approve. BC Hydro did not further categorize the complex invoices into more granular levels of complexity, as the potential increase in accuracy of the estimate would not have warranted the manual effort to do so. The benefit is applicable to all service-related invoices, regardless of the procurement approach. The number of invoices for a given project under innovative procurement would likely be lower than the number of invoices for the same project under traditional contracting. However, the innovative procurement invoices are also likely to be more complex and require more effort to process. BC Hydro does not have a breakdown of invoice volumes by procurement approach, but is confident that, of the 144,000 invoices processed across BC Hydro annually, only a very small portion relates to projects contracted under an innovative procurement approach.
- For Benefit 60, the calculation logic is based on reducing spot buy and expediting costs for stock materials by increasing visibility of material demand in the system. The benefit calculation is based on BC Hydro's actual spend on stock materials. Consequently, it reflects the actual usage of stock materials across all BC Hydro operations and projects, including those contracted under an innovative procurement approach. Due to the

nature and scope of large capital projects, the majority of their costs are not related to stock materials, irrespective of the underlying procurement approach. Therefore, this benefit is not expected to be impacted by any increase or decrease in innovative procurement.

**(e) BC Hydro Will Track and Report Benefits**

61. BC Hydro will identify measures and metrics that will be used for tracking the realization of financial benefits from the SCA Project. BC Hydro will use direct measures wherever feasible. Where direct measures are not feasible, BC Hydro will seek to develop indirect metrics and measures that are effective and accurate.<sup>108</sup>

62. BC Hydro will develop an initial set of metrics and measures in the Design and Implementation Planning Stage, based on the impact assessment performed at that time. BC Hydro will file the initial set of baselines and metrics and measures in the Phase Two verification report.<sup>109</sup>

63. During the Implementation Phase, BC Hydro will provide updates on the benefits realization monitoring plan as part of the semi-annual project progress reports. This will include updates on planned baselines, metrics, and measures for tracking the realization of benefits.<sup>110</sup>

64. The Project's final completion report will provide an update on the status and plans for the realization of benefits. As benefits will be realized over a ten-year period, beginning a year after onboarding and increasing over two to four years, progress on realized benefits will be reflected in future Revenue Requirement Applications.<sup>111</sup>

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<sup>108</sup> Exhibit B-6, BCUC IR 2.51.2.

<sup>109</sup> Exhibit B-6, BCUC IR 2.51.4.

<sup>110</sup> Exhibit B-6, BCUC IR 2.51.3.

<sup>111</sup> Exhibit B-6, BCUC IR 2.51.3.

**D. SCA PROJECT WILL REDUCE RISK IN THE SUPPLY CHAIN**

65. The SCA Project reduces the overall risk in the supply chain by reducing the likelihood of risks materializing.<sup>112</sup> The SCA Project's ability to mitigate risks is an important part of the project's justification despite the challenges in quantifying the consequences of the risks and risk reduction benefits.<sup>113</sup>

66. Table 2-9 in the Application summarizes the key risk reduction benefits of the SCA Project. In response to an information request, BC Hydro reproduced the table with additional examples and a qualitative estimate of the likelihood and consequences of these risks materializing, both before and after the SCA Project. BC Hydro provided the information with the caveat that it had applied significant judgment, and that there is a broad range of potential likelihood and consequence combinations.<sup>114</sup> The revised table is reproduced below for reference.

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<sup>112</sup> Exhibit B-1, Application, p. 2-25; Exhibit B-3, BCUC IR 1.2.1; Exhibit B-7, CEC IR 2.78.1.

<sup>113</sup> Exhibit B-1, Application, p. 2-28; Exhibit B-3, BCUC IR 1.2.1.

<sup>114</sup> Exhibit B-3, BCUC IR 1.2.1.

Risk Category & Description from Table 2-9	Likelihood & Impact <sup>115</sup>		Qualitative Discussion
	Today	After SCA	
<p><b>Safety</b></p> <p>The current system does not maintain adequate information regarding what services vendors are qualified to perform for BC Hydro. As such there is a risk that vendors perform work that they are not fully qualified to do which could result in a safety incident.</p>	<p>Moderate likelihood, low to high impact</p>	<p>Low likelihood, low to high impact</p>	<p>This risk broadly considers various qualifications for vendors, which could include safety certifications, technical qualifications, and past-performance.</p> <p>For example, a vendor could be contracted to perform a certain type of work which does not require safety certifications or specific technical qualifications, and then because they are already on contract, they could be assigned additional work which does require safety certifications or specific technical qualifications. While this would be of low to moderate likelihood, potential consequences could range from a near miss (low) to fatality (high).</p> <p>A vendor may have performed poorly in the past, and that feedback may not be known by those initiating and managing subsequent contracts. For example, a contractor consistently does not demonstrate an understanding of the hazards for a work zone and consequently does not establish proper procedures for proceeding safely with their work. This would be of low to moderate likelihood, but could have low to high consequence for the contractor's team and for BC Hydro team members.</p>

<sup>115</sup> The evaluation of likelihood is assessed as follows: Low likelihood represents potentially a single annual occurrence; moderate likelihood represents potentially multiple annual occurrences; and high likelihood represents regular, frequently repeated occurrences.

Consequence severity, or impact, is assessed as follows: Low represents a minor impact of limited financial consequence, limited complaints by shareholder or a minor impact on reliability. Moderate represents impact ranges from financial impacts that are substantial, customer groups impacted or significant (but mitigatable) reliability impacts. High represents financial impacts that are high, reputational impacts that are broad and involve loss of trust and reliability issues that required a reduction in BC Hydro's supply.

Risk Category & Description from Table 2-9	Likelihood & Impact <sup>115</sup>		Qualitative Discussion
	Today	After SCA	
<p><b>Financial</b></p> <p>Risks in the supply chain process can lead to situations where BC Hydro pays too much for goods and services or pays for goods not actually received.</p>	<p>Low to moderate likelihood, low to moderate impact</p>	<p>Low likelihood, low to moderate impact (impacts could also reduce)</p>	<p>Examples of Financial risks are as follows:</p> <p>BC Hydro has in some cases negotiated contracts with volume based discounts. The system does not track these volumes and automatically apply the discount. Therefore, there is a risk that the discounts will not be applied and BC Hydro will pay more than it should for the goods or services.</p> <p>Lack of visibility of work or project-related supply chain demand (i.e. work is not planned in the system such that it is visible to supply chain) results in a risk that requests for materials or services are made with only a short lead time. Consequences of requesting materials or services with short lead times could include higher pricing for services or for rush manufacture or delivery of materials, an inability to take advantage of natural market fluctuations that affect certain commodities. Another consequence is that supply chain may carry higher inventory than is actually necessary to support the work or projects underway. Ultimately, work may need to be deferred if the required materials or services are not available in time.</p> <p>When materials and services are purchased together on the same Contract Order, there are no automated controls linking the receipt of the goods or services to the Contract Order. Instead invoice approval relies on a manual process where the approver is accountable for guaranteeing acceptance of the work. This process can be labour intensive and prone to error, and there is a low to moderate risk of invoices being approved for payment without the materials or services having been received, or at higher prices than the underlying Contract Order.</p>
<p><b>Reputational</b></p> <p>Not being able to accurately report on how much BC Hydro spends on specific categories of goods or services and where it is spent is a reputational risk for BC Hydro.</p>	<p>Moderate likelihood, low to moderate impact</p>	<p>Low likelihood, low to moderate impact</p>	<p>The risks in this area have consequences that include complaints by other companies, or customer groups that are critical of BC Hydro, both of which could lead to adverse publicity and loss of confidence in BC Hydro. For example:</p> <p>There is a moderate risk that BC Hydro is unable to provide accurate financial reporting on services. The consequence of this is that we are unable to disclose the value spent on specific services, potentially leading to a perception of poor management and lack of reliability in our financial reporting in general.</p> <p>There is a low - moderate risk that BC Hydro conducts a procurement event without accurate knowledge of past spending, which could impact the procurement process as well as the subsequent contract. If a contract is put in place that does not accurately reflect BC Hydro's requirement, this could impact the organization's reputation with the vendor as well as the other vendors that competed for the work.</p>

Risk Category & Description from Table 2-9	Likelihood & Impact <sup>115</sup>		Qualitative Discussion
	Today	After SCA	
<p><b>Reliability</b> When materials and or services of low quality are introduced into the system it can impact reliability. The current supply chain system cannot automatically trigger a quality inspection for all materials that should be inspected. Reliance on manual tracking of quality inspection requirements increases the risk that poor quality items are accepted by BC Hydro and introduced into the system.</p>	<p>Moderate likelihood, low to moderate impact</p>	<p>Low to moderate likelihood, low to moderate impact</p>	<p>Moderate risks associated with material quality today can be lowered by linking material acceptance to quality inspections as part of the SCA Project. Two examples to support this include:</p> <ol style="list-style-type: none"> <li>1. Today there is no ability to systematically associate single or multiple material quality inspections of equipment with partial acceptance and payment, as is commonly experienced in supply and install contracts. There is low to moderate risk of paying for achievement of milestones related to manufacture, delivery or installation without verifying quality.</li> <li>2. Similarly, the inspection process for routine material supply contracts is highly manual, and there are low to moderate risks that materials are accepted without there having been sufficient quality checks completed. The consequences in this case are typically low.</li> </ol>

67. The qualitative risk assessment provided by BC Hydro is consistent with the Capital Investment Analysis Guide and demonstrates that the risk reduction benefits of the SCA Project are significant.<sup>116</sup>

**E. PROJECT POSITIONS BC HYDRO TO ACHIEVE FULL BENEFITS FROM INVESTMENT IN WORK MANAGEMENT AND ASSET MANAGEMENT**

68. The SCA Project is a precondition to achieving the full benefits from BC Hydro’s additional investments in work management and asset management business processes and IT systems.<sup>117</sup> BC Hydro explained the relationship between supply chain and work and asset management in the Application, as follows:

There is a close relationship amongst the supply chain, work management, and asset management processes and systems. Work management refers to the business processes and systems required to implement capital and maintenance work programs. Asset management refers to the business processes through

<sup>116</sup> Exhibit B-6, BCUC IR 2.33.7.

<sup>117</sup> Exhibit B-1, Application, pp. 2-7 to 2-8; Exhibit B-3, BCUC IR 1.6.5.

which physical assets and their associated performance, risks, and expenditures are managed. BC Hydro has invested, and expects to continue to invest, in work management and asset management processes and IT systems to realize productivity improvement benefits. However, the supply chain improvements contemplated by the Supply Chain Applications Project are required before BC Hydro can achieve the full benefits from additional investments in work management and asset management business processes and IT systems.<sup>118</sup>

69. BC Hydro expects to make more specific plans regarding when to proceed with investments in work and asset management IT systems over the next two years. These plans will be followed by specific decisions and approvals to proceed with individual projects.<sup>119</sup> BC Hydro expects this investment will include the implementation of the work and asset management IT systems that will result in the retirement of the PassPort system.<sup>120</sup> An estimate of the potential cost savings from the retirement of the PassPort system is included in the NPV analyses for the SCA Project.<sup>121</sup>

#### **F. CONCLUSION AND REQUESTED FINDINGS**

70. The Commission should find that BC Hydro has provided a compelling rationale for undertaking the SCA Project. The SCA Project will address the identified capability gaps in BC Hydro's existing supply chain system, allowing BC Hydro to meet the supply chain business requirements identified in the Supply Chain Business Model. The SCA Project will provide net financial benefits and will reduce risk related to BC Hydro's supply chain. It will also enable BC Hydro to achieve the full benefits from additional investments in work management and asset management business processes and IT systems.

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<sup>118</sup> Exhibit B-1, Application, pp. 2-7 to 2-8. Also see Exhibit B-3, BCUC IR 1.6.1.

<sup>119</sup> Exhibit B-3, BCUC IR 1.6.3.

<sup>120</sup> Exhibit B-3, BCUC IR 1.6.3.1.

<sup>121</sup> Exhibit B-1, Attachment F; Exhibit B-3, BCUC IR 1.12.4 and BCUC IR 1.24.5.

## **PART SIX: SAP IS THE SUPERIOR ALTERNATIVE FOR BC HYDRO**

### **A. INTRODUCTION**

71. Chapter 3 of the Application sets out BC Hydro's assessment of alternative IT platforms for the SCA Project. BC Hydro explained how it identified the two viable alternatives (SAP and PassPort), its assessment criteria, and the application of those criteria to the two alternatives. The evidence demonstrates that SAP is the superior alternative for BC Hydro's SCA Project. The following points, each of which is addressed in this Part of the Final Submission, support BC Hydro's selection of SAP:

- First, SAP and PassPort are viable alternatives for addressing the identified capability gaps. The use of an alternate IT system, or a major upgrade to ABB's Asset Suite 9 or SAP S/4 HANA, are not realistic alternatives.
- Second, SAP better addresses the identified capability gaps, is aligned with BC Hydro's Common Platform Strategy, has a lower risk profile, and is superior under NPV analyses.
- Third, third-party assessments of SAP and PassPort support BC Hydro's selection of SAP.

### **B. SAP AND PASSPORT ARE THE VIABLE ALTERNATIVES**

72. BC Hydro identified SAP (ECC6/EhP8) and PassPort (Asset Suite 8) as the two viable alternatives for the SCA Project. A third alternative IT system would be very unlikely to fill the capability gaps better than PassPort or SAP. A major upgrade to either ABB's Asset Suite 9 or SAP S/4 HANA is not a realistic alternative.

#### **(a) Viability of SAP and PassPort Confirmed**

73. SAP and PassPort are viable technology platform alternatives. The viability of SAP is confirmed by the Conceptual Design Report for the SCA Project, which is Attachment H

to the Application. The viability of PassPort is confirmed by its current use as the supply chain application at BC Hydro.

**(b) Other Alternatives Would Be Unlikely to Address Capability Gaps Better**

74. A third alternative IT system would be very unlikely to fill the capability gaps better than PassPort or SAP for the following reasons:

- SAP can fully address the capability gaps. No other alternative (including PassPort) would provide incremental functional benefits over SAP.<sup>122</sup>
- SAP is a “best of breed” supply chain solution.<sup>123</sup> There are third-party studies on the record that reinforce this. SAP is ranked first, with 21 per cent market share, for supply chain management applications. SAP is also number one among procurement software vendors, with 22 per cent market share.<sup>124</sup> Gartner regards SAP as one of only two “leaders” in Energy and Utilities Enterprise Asset Management Software, having regard to both “completeness of vision” and “ability to execute”.<sup>125</sup> SAP also shares top spot with Oracle at 9 per cent of market share for utility software vendors.<sup>126</sup> These studies are addressed further below.
- BC Hydro already owns the necessary PassPort and SAP licenses and hardware for a new supply chain. Incremental software licenses and hardware costs, including ongoing maintenance, would add unnecessary cost to the project and ongoing maintenance costs.<sup>127</sup>

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<sup>122</sup> Exhibit B-1, Application, p. 3-3.

<sup>123</sup> Exhibit B-3, BCUC IR 1.8.3 and BCUC IR 1.1.4.

<sup>124</sup> Exhibit B-3, BCUC IR 1.1.4.

<sup>125</sup> Exhibit B-3, BCUC IR 1.8.3.1. See also BCUC IR 1.8.2.

<sup>126</sup> Exhibit B-3, BCUC IR 1.1.4.

<sup>127</sup> Exhibit B-1, Application, pp. 3-2 and 3-3.

- Implementing a third alternative would require new personnel with the system skills necessary to train existing personnel in the use of a new system. Hiring new personnel would drive up incremental operating costs. It would be more difficult for BC Hydro to share support resources across platforms.<sup>128</sup>
- Adopting a third alternative would necessitate developing at least one additional set of interfaces to allow users of the new IT system to access the existing SAP and PassPort systems. Adding interfaces increases the complexity of, and adds costs to, BC Hydro's IT environment.<sup>129</sup>
- BC Hydro personnel have experience with PassPort and SAP. Any third alternative would entail more risk to both the SCA Project and its sustainment.<sup>130</sup>

75. BC Hydro did not undertake any further analysis of potential alternatives in addition to SAP and PassPort, given that a full analysis of an IT system other than PassPort and SAP would require considerable expense<sup>131</sup> and an alternative technology platform was unlikely to provide any material advantage over SAP or PassPort.

**(c) Major Upgrade to Asset Suite 9 is not a Feasible SCA Project Alternative**

76. BC Hydro assessed PassPort's capabilities based on Asset Suite 8, which is the current system in place at BC Hydro. ABB, in its evidence, suggested that BC Hydro should upgrade to ABB's Asset Suite 9.<sup>132</sup> ABB based its critique of BC Hydro's analysis largely on the functionality of Asset Suite 9.<sup>133</sup> An upgrade to Asset Suite 9 is not a feasible SCA Project alternative.

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<sup>128</sup> Exhibit B-1, Application, p. 3-3.

<sup>129</sup> Exhibit B-1, Application, p. 3-3.

<sup>130</sup> Exhibit B-1, Application, p. 3-3.

<sup>131</sup> Exhibit B-3, BCUC IR 1.8.3.

<sup>132</sup> Exhibit C3-3; Exhibit C3-5, BCUC-ABB IR 1.3.1.

<sup>133</sup> Exhibit C3-5, BCUC-ABB IR 1.3.

77. BC Hydro, in its Rebuttal Evidence, identified four reasons why ABB Asset Suite 9 is not a feasible alternative for the SCA Project:

First, the scope of a major upgrade to Asset Suite 9 is significantly greater than the scope of the Supply Chain Applications Project. BC Hydro currently uses Asset Suite 8 for work management, asset management and supply chain. If BC Hydro were to implement a major upgrade to Asset Suite 9, BC Hydro would need to upgrade its work management and asset management functions and business processes, in addition to its supply chain. Such an upgrade would be a large transformation initiative spanning work management, asset management, and supply chain. It would be inaccurate to categorize such a project as a straightforward technical upgrade. Further, BC Hydro has significant customizations built on Passport and custom applications built to work with Passport. It is not known how Asset Suite 9 would work with these customizations. A major upgrade to Asset Suite 9 would be a different, and larger, project than the Supply Chain Applications Project.

Second, the scope of a major upgrade to Asset Suite 9 would greatly increase risk due to the extent of business change that will be required. As noted above, if BC Hydro were to implement a major upgrade to Asset Suite 9, BC Hydro would have to upgrade all of its work management and asset management functions and business processes, in addition to its supply chain. The scope of the change management required for such a project would be much greater, as it would impact a larger user base, including all contractors and employees using Asset Suite for asset management (e.g. processing work orders), who would not be impacted by the Supply Chain Applications Project. An Asset Suite 9 upgrade would also require: changes to the end user interface and the backend technical codebase (i.e. COBOL to Java); and re-validation of all existing integration points, customizations, and existing business processes.

As discussed in Chapter 4 of the Application, BC Hydro made the strategic decision in 2013 to proceed with its Transformation Blueprint IT Projects (including work management, asset management and supply chain, amongst others) in a measured way to reduce risks. This decision has reduced the risk of the Supply Chain Applications Project. In BC Hydro's assessment, it would not be prudent to upgrade its work management, asset management and supply chain functions in a single project.

Third, Asset Suite (either version 8 or 9) does not meet BC Hydro's supply chain business requirements as well as SAP. Asset Suite is primarily an Enterprise Asset Management product. Enterprise Asset Management products focus on the maintenance of plant assets. Asset Suite focuses on asset and work management

functionality, and has supply chain functionality primarily focused on the maintenance of plant assets. While Asset Suite is a leading Enterprise Asset Management product for power generation utilities, it is not a leading product for transmission and distribution or a leading supply chain product. As indicated in response to BC Hydro IR 1.1, [REDACTED].

In contrast, SAP offers a comprehensive common platform product, which includes asset management, but also modules such as finance, customer care, project management, and human resources. SAP's supply chain module is more fulsome than Asset Suite with regard to how it manages services and integrates with project management. Given the size of BC Hydro's capital portfolio, the need to improve the management of services and the integration with project management is a primary business driver for the Supply Chain Applications Project. As BC Hydro already uses SAP for customer care, finance, human resources, and project and portfolio management, the use of SAP for supply chain reduces manual efforts and complexity related to using two different platforms and removes the need for interfaces between two platforms. Further, a large portion of BC Hydro's current users of Asset Suite are also users of SAP, and only use Asset Suite for supply chain, not asset management. Using SAP for supply chain will simplify the experience for these users as they would only have to use one platform. Using SAP for supply chain will also position BC Hydro to be able to phase-out Asset Suite in the future and eliminate the operating costs associated with maintaining two platforms.

Fourth, given the significant scope and change management issues associated with an upgrade to Asset Suite 9, BC Hydro is not willing to bear the risk of being an early adopter of Asset Suite 9. See BC Hydro's response to BCUC IR 1.7.2 and 2.42.1.<sup>134</sup>

78. BC Hydro submits that these reasons are compelling. These reasons undermine much of ABB's critique of BC Hydro's analysis, as ABB had based its critique on Asset Suite 9. ABB states that it "is absolutely committed to the successful closure of the gaps identified in the application, presuming that BCH is interested in an Asset Suite 9 upgrade".<sup>135</sup> BC Hydro is clear that it will not invest in a major upgrade to Asset Suite 9 at this time.<sup>136</sup>

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<sup>134</sup> Exhibit B-11, Rebuttal Evidence, pp. 2 to 5. As stated in BC Hydro's response to BCUC IR 1.7.2 and 2.42.1, given the recent introduction of Asset Suite 9, there are few examples of it having been implemented by major utilities. ABB's responses to information requests confirm this (Exhibit C3-5-1, FEI-ABB IR 3.4; BCUC-ABB IR 1.1 and 3.3).

<sup>135</sup> Exhibit C3-5, Landale-ABB IR 2.5.

<sup>136</sup> Exhibit B-11, Rebuttal Evidence, p. 2.

**(d) Major Upgrade to SAP S/4 HANA is Not Required at this Time**

79. As in the case of PassPort, BC Hydro assessed SAP capabilities based on the current version that BC Hydro runs. In the case of SAP, the current version is ECC6/EhP8. An upgrade to SAP S/4 HANA is not required for the SCA Project, and it is too early to consider adoption of the new platform.<sup>137</sup> BC Hydro cited some of the same reasons that applied to ABB's Asset Suite 9: the 13 capability gaps can be closed with software that BC Hydro already owns and operates, without the need for a major system upgrade, and BC Hydro does not consider it prudent to become an early adopter of the new platform.<sup>138</sup> BC Hydro expects to upgrade its SAP platform in the future, irrespective of whether the SCA Project proceeds.<sup>139</sup>

**C. SAP IS SUPERIOR TO PASSPORT FOR MEETING BC HYDRO'S REQUIREMENTS**

80. BC Hydro compared the SAP and PassPort alternatives using appropriate financial and non-financial criteria: ability to support the Supply Chain Business Model; alignment with the Common Platform Strategy; risk; project cost; and monetized benefits. The results of BC Hydro's alternatives assessment, as updated in BCUC IR 2.39.1 and BCOAPO 2.28.1, are summarized in the table below.<sup>140</sup>

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<sup>137</sup> Exhibit B-3, BCUC IR 1.7.2.

<sup>138</sup> Exhibit B-3, BCUC IR 1.7.2. Please also refer to BC Hydro's response to ABB IRs 1.4.0 and 1.6.0.

<sup>139</sup> Exhibit B-6, BCUC IR 2.42.1.

<sup>140</sup> Exhibit B-1, Application, pp. 3-6 and 3-7; Exhibit B-6, BCUC IR 2.39.1; Exhibit B-7-2, BCOAPO 2.28.1.

Criteria	Measure	Alternative 1 - (SAP)	Alternative 2 – (PassPort)
Ability to support the implementation of the SC Business Model	Degree to which capability gaps are closed by the alternative, with all capability gaps weighted equally. Scored out of 52	50	37 <sup>141</sup>
Alignment with BC Hydro Common Platform Strategy	Binary (Yes / No)	Yes	No
Risk	Risk assessment rating relative to baseline	Baseline	Higher Business and Delivery Risk
Project cost	Cash flow (\$ millions)	60 to 79	37 to 115
Monetized benefits <sup>142</sup>	Cash flow savings at stabilization (\$ million/year). <sup>143</sup>	16 to 31	11 to 22
	NPV of discounted cash flows (\$ millions)	2 to 103	(47) to 69
	NPV of revenue requirements impact (\$ millions)	(7.8) to 86	(42.5) to 63

81. The alternatives analysis demonstrates that the SAP alternative (also referred to as Alternative 1) is the preferred alternative for undertaking the SCA Project for the following reasons:

- SAP closes the capability gaps to a significantly greater degree, whereas PassPort leaves material capability gaps;
- SAP is aligned with the Common Platform Strategy, whereas the PassPort alternative is inconsistent with the Strategy;
- SAP has lower business and technology risk;
- The cost of the two alternatives are reasonably comparable;
- SAP is expected to deliver greater financial benefits to the organization;
- SAP has a higher NPV of discounted cash flows and revenue requirements; and
- SAP is a higher-rated supply chain system.

<sup>141</sup> This value was revised upwards from 36 to 37 for the reasons set out in Exhibit B-7-2, BCOAPO IR 2.28.1.

<sup>142</sup> Results are as updated in Exhibit B-6, BCUC IR 2.39.1.

<sup>143</sup> Figures shown are in F2016 dollars.

The evidence supporting these findings is discussed below.

**(a) SAP is Best Positioned to Meet Identified Capability Gaps**

82. BC Hydro assessed the extent to which SAP and PassPort-based solutions are able to address the 13 capability gaps. The SAP alternative addresses the capability gaps better than PassPort. There were eight instances where SAP scored better than PassPort. There were no instances where PassPort scored better than SAP.

***Gap Assessment Process Undertaken by Internal and External Experts***

83. BC Hydro was well positioned to assess the current capabilities of the PassPort supply chain, and the ability of PassPort and SAP to fill capability gaps, given BC Hydro's current experience with operating both PassPort and SAP.<sup>144</sup> BC Hydro's gap assessment was undertaken by a team of experts with first-hand knowledge and experience in operating and enhancing SAP and PassPort. BC Hydro summarized the expertise of the evaluation team as follows:

The three evaluators that developed the relative effort factors each have between ten and 20 years of experience managing and implementing SAP or Passport at BC Hydro and other companies. Their experience includes working with the product versions of SAP and Passport that were considered in the evaluation.

Two additional evaluators were involved in the assessment of the capability gaps of PassPort and SAP, including the analysis attached to BC Hydro's response to CEC IR 1.49.2. These evaluators each have more than 15 years of experience working with Passport and SAP, and combined, have implemented or sustained Passport or SAP at more than 20 businesses around the world.<sup>145</sup>

84. BC Hydro did not consult with ABB or SAP in determining how well SAP or PassPort would close each of the capability gaps. BC Hydro had sufficient in-house knowledge to perform the assessment of the current version of the software. Performing the analysis

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<sup>144</sup> Exhibit B-3, BCUC IR 1.1.4; Exhibit B-4, CEC IR 1.49.2.

<sup>145</sup> Exhibit B-3, BCUC IR 1.11.1.

independently of the system vendors avoided any bias or conflict of interest from SAP or ABB.<sup>146</sup> As discussed below, the results of BC Hydro’s assessment is aligned with the perspective of third party assessments of the supply chain capabilities of SAP and Passport.

**Assessment Methodology**

85. BC Hydro assessed the ability of each alternative to address the identified capability gaps according to two dimensions. First, BC Hydro assessed the ability of either SAP or PassPort to close each capability gap and assigned a score between 0 and 4, as set out below.<sup>147</sup> The score took into account BC Hydro’s assessment of whether the applications could be reasonably customized to close the capability gap (e.g., BC Hydro assigned a score of 4 in circumstances where reasonable customization results in fully closing the capability gap).<sup>148</sup>

**Table 3-4 Capability Gap Scoring Criteria**

Criteria	Score
Does not address the capability gap	0
Addresses a small fraction of the capability gap	1
Addresses some of the capability gap	2
Addresses most but not all of the capability gap	3
Fully addresses all of the capability gap	4

86. Second, BC Hydro assessed each capability gap with reference to how dependent it was on being integrated with other business processes and IT systems. BC Hydro adjusted the capability score downwards where integration dependency was considered high, such that the integration that could be reasonably developed would not wholly close the capability gap.<sup>149</sup> There were three instances where BC Hydro reduced the score based on an assessment

<sup>146</sup> Exhibit B-3, BCUC IR 1.9.2 and 1.9.3.

<sup>147</sup> Exhibit B-1, Application, p. 3-8. BC Hydro explained in its response to BCUC IR 1.10.4 (Exhibit B-3) that using a more granular gap analysis scale (e.g., 1 to 10) would imply a level of precision that does not exist in the analysis and could be misleading.

<sup>148</sup> Exhibit B-3, BCUC IR 1.7.1.

<sup>149</sup> Exhibit B-3, BCUC IR 1.7.1; Exhibit B-7, BCOAPO IR 2.27.2.

that integration could not reasonably be built (Capability Gaps 1, 5 and 6). The overall score for PassPort was reduced by a total of four points (from 40 to 36).<sup>150</sup>

**Gap Assessment Results Favour SAP**

87. The following table summarizes BC Hydro’s assessment of how well the SAP and PassPort alternatives will close the 13 capability gaps.<sup>151</sup>

Capability Gap	Alternative 1 (SAP)	Alternative 2 (PassPort)
1 - Inability to manage service-related spend	4	2
2 - Limited contract management	4	3
3 – Limited ability to manage inventory levels	4	4 <sup>152</sup>
4 - Limited ability to manage individual supplier performance	4	4 <sup>153</sup>
5 – Difficulty managing the supply chain for capital projects	4	0
6 - Lack of order, delivery and payment tracking	4	3
7 - Inability to support sales and returns of unused materials	4	3
8 - Inability to support pre-packaging of materials for field crews	4	4 <sup>154</sup>
9 - Lack of wireless access to inventory information	4	4 <sup>155</sup>
10 - No self-serve option for routine service requests	4	3
11 - Inability to pay suppliers without an invoice	4	2
12 - Inability to streamline controls and approvals process	3	2
13 - Inability to integrate the work management systems	3	3
<b>Total Score (out of 52)</b>	<b>50</b>	<b>36</b>

88. The following is a description of the rationale for the score given to each alternative where SAP scored more favourably.

	SAP	PassPort
1 - Inability to manage service-related spend	4	2

<sup>150</sup> Exhibit B-7, BCOAPO IR 2.27.1 and 2.27.2.

<sup>151</sup> The table is based on the information in Table 3-5 in the Application (p. 3-8), but the score for capability gap 11 was revised upwards from 1 to 2 to reflect the adjustment discussed in BC Hydro’s response to BCOAPO IR 2.28.1 (Exhibit B-7-2).

<sup>152</sup> Exhibit B-1, Application, p. 3-9.

<sup>153</sup> Exhibit B-1, Application, pp. 3-9 to 3-10.

<sup>154</sup> Exhibit B-1, Application, p. 3-11.

<sup>155</sup> Exhibit B-1, Application, p. 3-11.

89. BC Hydro assessed PassPort a 3 out of 4 for three reasons: (i) PassPort's lack of a services catalogue, (ii) PassPort's separate processes for procuring materials and services, and (iii) PassPort's inability to define variable services as manageable units of work. The PassPort score was then reduced from 3 to 2 (out of 4) due to the high dependence on integration in fully meeting the requirements of this capability, and inability to reasonably build the integration.<sup>156</sup>

90. There is a clear difference in functionality between SAP and PassPort that justified a lower score for PassPort on this capability gap. The three reasons for rating PassPort a 3 out of 4 before the integration adjustment are explained below:

- PassPort does not contain a catalogue of services (although it does contain one for materials). The absence of a defined services catalogue limits BC Hydro's ability to define, manage, and report on specific services over time. In contrast, SAP has the ability to catalogue both materials and services. This functionality is necessary for effective category management, as described in Attachment K – Supply Chain Business Model.<sup>157</sup> Specifically:
  - SAP's services catalogue enables users to plan work by selecting standard pre-defined services from a list, and to have the cost of the work calculated automatically based on the units of work required and the existing negotiated rates. In PassPort, users must describe in text the service for which they need to create a contract and an estimate of the value of the service.<sup>158</sup>
  - SAP's defined services catalogue also allows for SAP to track the amount, quality, rate, and total cost of defined services over time, providing the data to enable future negotiation of preferred rates for services. BC

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<sup>156</sup> Exhibit B-6-2, BCUC IR 2.47.1.2.

<sup>157</sup> Exhibit B-6-2, BCUC IR 2.47.2.

<sup>158</sup> Exhibit B-6-2, BCUC IR 2.47.1.1.

Hydro is currently unable to use the unstructured data captured in PassPort in the same way, without extensive manual analysis.<sup>159</sup>

- PassPort has separate modules for the management of inventory (materials) and contracts (services). Separate processes, documents, and data are necessary for procuring and managing materials and services. The initiation of requests for material is through a materials request (MR) document, while initiation of a request for services is through a contract request (CR) document. These documents require separate processes and are stored in separate tables within the PassPort database. Given that a significant portion of the items BC Hydro procures include a combination of materials and services, this is another significant limitation. It results in users adding materials to contract requests as textual line items, bypassing the use of PassPort's materials catalogue, limiting its value. SAP has no such limitation. SAP allows for the procurement of materials, services, or a combination of the two, through a single process and set of documents.<sup>160</sup>
- BC Hydro's ability to manage service-related expenditures depends on its ability to define the scope of work for service contracts as manageable work units. PassPort could be configured to allow non-variable services to be defined as manageable work units, but not variable services. A variable service is a service that is planned, procured, managed and invoiced in terms of a measure of units of work (e.g. service planned and invoiced on an hourly basis). The amount of work performed and invoiced for a variable service in any given period is likely to vary. A non-variable service is planned as a single defined activity or set of milestones that is assigned an overall dollar value, rather than a unit based rate, e.g. janitorial services at a fixed price per month.<sup>161</sup> SAP allows for all services to

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<sup>159</sup> Exhibit B-6-2, BCUC IR 2.47.1.1.

<sup>160</sup> Exhibit B-6-2, BCUC IR 2.47.2.

<sup>161</sup> Exhibit B-6-2, BCUC IR 2.47.1.1.

be defined as manageable work units, including those that are variable.<sup>162</sup> As a result:

- SAP is able to contract unit-based work for any type of unit. PassPort can only define unit-based work of labour (hourly) based work, and only achieve the process functionality BC Hydro requires if PassPort's time and labour module is used. BC Hydro currently uses SAP's time and labour system because of the internal integration between it and SAP's human resources module, which BC Hydro also uses.<sup>163</sup>
- SAP has the capability to automatically post financial accruals and adjust commitment amounts to be paid based on varying units of work (e.g., the plan may call for 100 units of work to be performed in a given period, but only 90 are invoiced). PassPort requires manual processing to initially plan a milestone payment via the payment authorization process for the dollar value of 100 units of work, which must be manually updated based on the dollar value of actual 90 units of work completed.<sup>164</sup>

91. For the above reasons, BC Hydro reasonably scored PassPort lower than SAP, as a 3 of 4.

92. BC Hydro confirmed that the information provided by ABB regarding Asset Suite Contract Management application and Compose tool in its intervener evidence did not change its assessment. BC Hydro noted that it "has utilized PassPort's contract management module since its initial implementation of PassPort in 2003 and is well aware of its capabilities."<sup>165</sup> BC Hydro also explained that it is aware of the capabilities of the Compose tool, noting that the Compose tool is not a specific tool for contract management, but is a general tool that can be used to tailor the PassPort application overall. BC Hydro explained: "While the compose tool

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<sup>162</sup> Exhibit B-1, Application, p. 3-8 to 3-9; Exhibit B-4, CEC IR 1.49.2, Attachment 1.

<sup>163</sup> Exhibit B-6-2, BCUC IR 2.47.1.1.

<sup>164</sup> Exhibit B-6-2, BCUC IR 2.47.1.1.

<sup>165</sup> Exhibit B-6-2, BCUC IR 2.47.2.

can be used to develop automated workflow and simplify screens for end users, it cannot overcome the limitations noted above as they are fundamental to the structure of the PassPort data model and cannot simply be corrected by adding, updating, or renaming fields.”<sup>166</sup> BC Hydro also explained that, while “BC Hydro uses such tools at times to automate workflows and simplify user interactions with its systems, it generally avoids adding, updating, and renaming fields as this is a customization of the core product, and such customizations are generally costly to implement and maintain.”<sup>167</sup>

93. Capability gap 1 was one of three instances where BC Hydro reduced the score, given its assessment that the level of integration that could reasonably be built would not close the capability gap. In this instance, BC Hydro reduced the score from 3 to 2. The dependence on integration was rated as “high”.<sup>168</sup> BC Hydro explained that fully closing this capability gap requires integration with (i) SAP’s project management module (where most of the need for materials and services are generated), and (ii) SAP’s finance module for the automation of commitments and monthly accruals.<sup>169</sup>

94. ABB stated on pages 3 and 4 of its Evidence that Asset Suite has multiple avenues for integrating to other business information systems, including SAP Project Systems, and that numerous utility installations can testify to this functionality.<sup>170</sup> BC Hydro’s response to BCUC IR 2.49.1 discussed the barriers to full integration and BC Hydro’s experience developing and maintaining such interfaces with PassPort. The discussion in that response applies equally to all three instances where the PassPort scores were reduced for reasons of feasibility of closing the gap:

While BC Hydro agrees in theory with ABBs assertion that “Asset Suite has multiple avenues for integrating to other business information systems including SAP Project Systems”, in practice there are significant barriers for achieving workable integration.

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<sup>166</sup> Exhibit B-6-2, BCUC IR 2.47.2.

<sup>167</sup> Exhibit B-6-2, BCUC IR 2.47.2.

<sup>168</sup> Exhibit B-7, BCOAPO IR 2.27.2.

<sup>169</sup> Exhibit B-7-2, BCOAPO IR 2.27.3.

<sup>170</sup> Exhibit C3-3.

BC Hydro has extensive experience integrating PassPort and non-PassPort systems, and has developed and maintains 30 interfaces between PassPort and other systems, including 20 with SAP. In the past, BC Hydro has had limited success interfacing PassPort's purchasing and contract management functions and SAP's Project Systems module (please refer to BC Hydro's response to CEC IR 1.50.1 for discussion on this experience). Given BC Hydro's experience and level of understanding of its project management processes, BC Hydro is confident that effective integration between SAP Project Systems and PassPort cannot reasonably be built.

When discussing the ability to integrate business information systems, there are two aspects that must be considered:

1. the technical interfacing methods available (i.e., the technical method of how the systems are able to transfer data from one to the other), and
2. the business functionality perspective (i.e., how well the data structures and associated functionality of the systems align in order to support end-to-end business processes).

It is with regard to item 1 that BC Hydro agrees with ABBs statement; however, it is due to item 2 that BC Hydro has had limited success interfacing PassPort with SAP Project Systems.

BC Hydro has utilized two methods for technically integrating Asset Suite (Passport) and SAP: direct integration and web services middleware software.

Both technical methods have been used by BC Hydro when building interfaces between Asset Suite and SAP.

While it is possible to technically interface business information systems, the effectiveness of those interfaces in enabling a business process has to do with the design of the individual applications, including how their data is defined and structured. Applications define all of the pieces of data they manage in a "data dictionary" and organize that data in a "data model" that defines the data structure and data relationships. As a result, while it may be technically possible to move data from one system to another, that data may have different definitions and be used in very different ways within each application, limiting the ability for a business process to operate efficiently across the applications.

BC Hydro recognizes that this challenge is in part due to the integrated nature of SAP. As noted in the Gartner report provided in response to BCUC IR 1.1.3 "SAP

EAM is not designed for integration with enterprise applications from other major ERP vendors.” This comment is not just true for SAP EAM (the topic of this report is EAM systems) but is true for SAP in general. For example, it is not possible to plan a material of [sic] service within SAP’s Project Systems module without it automatically triggering SAP’s internal supply chain processes. This functionality cannot be turned off without significant and complex customization to SAP’s core program code. As a result, there is no reasonable method that enables materials and services planned in SAP’s Project Systems module (as is called for in the process) to be interfaced to PassPort supply chain.<sup>171</sup>

95. BC Hydro’s responses to CEC IRs 1.50.1 and 1.54.2 further discuss BC Hydro’s experience integrating processes between PassPort and SAP. In response to CEC IR 1.50.1, BC Hydro explained how it attempted to integrate PassPort based contracts with SAP-based projects. The interface took approximately one year and cost between \$200,000 and \$400,000, but did not deliver on the expected business value.<sup>172</sup> In response to CEC IR 1.54.2, BC Hydro explains that an interface between PassPort and a new third-party software solution was estimated to cost more than \$1 million, and still would not eliminate the need for users to work in both systems.<sup>173</sup>

96. BC Hydro explained as follows:

There is a fundamental mismatch between the lifecycles of some data in SAP and Passport, which causes interface issues. For example, work orders are currently interfaced between Passport and SAP. A Passport work order’s statuses (e.g., approved, ready, closed, etc.) are sequential whereas the equivalent work order in SAP goes through a different series of statuses, some of which are not sequential and some of which do not exist in Passport. The result is that the technical interface between the systems must attempt to compensate for cases where statuses get out of sync. In practice, not all mismatches can be resolved by the technical interfaces and errors are logged, which in turn must be prioritized and resolved by IT support staff on a daily basis.<sup>174</sup>

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<sup>171</sup> Exhibit B-6, BCUC IR 2.49.1.

<sup>172</sup> Exhibit B-4, CEC IR 1.50.1.

<sup>173</sup> Exhibit B-4, CEC IR 1.54.2.

<sup>174</sup> Exhibit B-4, CEC IR 1.54.2.

97. The Commission should give weight to BC Hydro’s extensive experience attempting to integrate PassPort with other applications. It was appropriate to reduce PassPort’s score from 3 to 2.

2 - Limited contract management	SAP	PassPort
	4	3

98. SAP has an advantage over PassPort in the way that users can access key contract information and requisition materials and services. In SAP, more real-time operational contract information is available to users. SAP users can requisition both services and materials in one process, which is not possible with PassPort. These advantages allow better contract management in SAP.<sup>175</sup> For these reasons, SAP scored 4 and PassPort scored 3.<sup>176</sup>

99. ABB stated on pages 3 and 4 of its Evidence that, as part of Purchased Materials, users can enable the viewing of real-time operational contract information of both materials and services.<sup>177</sup> BC Hydro answered ABB’s statement in the response to BCUC IR 2.48.4:

Yes, BC Hydro did consider ABB’s proposed solution to close capability gap 2, however, the proposed solution would not fully close the capability gap and therefore BC Hydro has not changed its assessment.

BC Hydro scored PassPort 3 out of 4 regarding its ability to close capability gap 2 for two reasons:

1. PassPort has separate processes and data objects for managing the procurement of materials and the procurement of services. This creates complexity when procuring a combination of materials and services from a single vendor. ABB’s proposed method to work around this shortcoming does not overcome the fundamental complexity of processing contracts and material purchases separately and then having to manually link them to enable viewing by users. The solution proposed by ABB would not fully close the capability gap.

2. PassPort does not have a catalogue of services and as a result contains less structured data about the services to be procured and managed than SAP. While ABB’s proposed solution would “enable the viewing of real-time contract

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<sup>175</sup> Exhibit B-1, Application, p. 3-9.

<sup>176</sup> Exhibit B-1, Application, p. 3-9.

<sup>177</sup> Exhibit C3-3.

information of both materials and service”, the absence of a defined services catalogue in PassPort results in data often being stored as “free text”. Data stored as “free text” is similar to an unrestricted comments field in an online survey; while it can be viewed, it does not utilize established rules and data relationships. This limits its usefulness in automated processing and data queries. In contrast, because SAP has a defined services catalogue, more of the required data is stored in structured fields increasing ease of access and use in processing. The absence of a service catalogue in PassPort is not overcome by ABB’s proposed solution.<sup>178</sup>

100. BC Hydro therefore reasonably rated PassPort a 3 out of 4.

	SAP	PassPort
5 – Difficulty managing the supply chain for capital projects	4	0

101. Capability gap 5 accounts for the most significant difference between the two alternatives. The evidence supports BC Hydro’s assessment.

102. Closing the capability gap is highly dependent on an integrated solution because it requires data and functions that span project management and supply chain systems.<sup>179</sup> SAP rates well (4 of 4) on this item because (i) SAP is a fully integrated enterprise solution, and (ii) BC Hydro has already implemented its capital project management processes in SAP’s Projects Systems (PS) module.<sup>180</sup>

103. BC Hydro assigned PassPort a score of 2 for its ability to close the capability gap, but reduced the score to 0 due to the complexity of integrating PassPort with BC Hydro’s existing project management systems.<sup>181</sup> BC Hydro’s assessment regarding the complexity of integration was based on first-hand experience. BC Hydro had previously investigated during two previous SAP module projects - Finance and Project and Portfolio Management - the possibility of building additional integration between PassPort and SAP Project Systems

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<sup>178</sup> Exhibit B-6-2, BCUC IR 2.48.2.

<sup>179</sup> Exhibit B-3, BCUC IR 1.7.1.

<sup>180</sup> Exhibit B-1, Application, p. 3-10.

<sup>181</sup> Exhibit B-3, BCUC IR 1.7.1.

modules. BC Hydro determined in both instances that additional integration was not feasible.<sup>182</sup>

104. ABB disputes BC Hydro's assessment regarding capability gap 5, suggesting that its PassPort product warrants a score of 4.<sup>183</sup> BC Hydro's assessment should be preferred to ABB's position. The evidence provided by ABB includes a lengthy discussion of Asset Suite's design engineering (compatible unit estimating) functionality, but does not describe any project management capabilities. ABB's evidence suggests that customers do not use Asset Suite for project management, but develop interfaces to other project management systems (such as SAP's Project Systems).<sup>184</sup> This integration, however, cannot reasonably be built to fully close the capability gap.<sup>185</sup>

105. BC Hydro's assessment was based on its first-hand experience of being unable to effectively integrate Passport and SAP Project Systems. ABB provided no analysis in support of its assessment despite being asked a direct question about it.<sup>186</sup> Specifically, in BCUC-ABB IR 6.2 the Commission asked ABB to provide details of utilities that have integrated Passport with SAP Project Systems. ABB's response to this question only indicates that its clients run "certain SAP modules" and have experience with "related integration". ABB did not identify any utilities that have effectively integrated Passport with SAP Project Systems.<sup>187</sup>

106. The lack of integration is a critical shortcoming for a PassPort solution. It is very important for BC Hydro to be able to more effectively manage major capital projects, particularly considering the magnitude of BC Hydro's capital plan over the next 10 years.<sup>188</sup>

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<sup>182</sup> Exhibit B-1, Application, p. 3-10.

<sup>183</sup> Exhibit C3-3.

<sup>184</sup> Exhibit B-7-2, BCOAPO IR 2.28.2. For instance, ABB states in its evidence that the data in Asset Suite "could be pulled into an in-application report or BI platform, such as SAP Business Objects or Microsoft PowerBI, and then shared across the organization, as required"; ABB also states, "Asset Suite has multiple avenues for integrating to other business information systems (such as SAP Project Systems)..." (Exhibit C3-3, p. 4).

<sup>185</sup> Exhibit B-7-2, BCOAPO IR 2.28.2; Exhibit B-6, BCUC IR 1.7.1.

<sup>186</sup> Exhibit C3-5, BCUC-ABB IR 6.2.

<sup>187</sup> Exhibit B-6, BCUC IR 2.49.1.

<sup>188</sup> Exhibit B-1, Application, p. 3-10.

	SAP	PassPort
6 – Lack of order, delivery, and payment tracking	4	3

107. This capability requires that the end-to-end process from order, to delivery, to payment be under a single system. Currently, the order and delivery processes are managed in PassPort, and the payment processes are managed in SAP. SAP merited a score of 4 because the deployment of SAP for supply chain would allow for the order, delivery, and payment processes to occur under one system.<sup>189</sup>

108. BC Hydro assigned PassPort a score of 3 because not all of the payment information can be interfaced back to PassPort.<sup>190</sup> That is, the PassPort score was reduced from 4 to 3 because the dependence on integration was rated as “medium” and the integration that can reasonably be built would not fully close this capability gap.

109. In response to ABB’s position that PassPort should not be given a lower score,<sup>191</sup> BC Hydro explained that:

...the setup described by ABB with regard to closing of capability gap 6 is similar to how BC Hydro currently operates with PassPort interfaced to SAP’s finance module to complete the processing and posting of financial entries in SAP. BC Hydro agrees that the current gap could be partially closed with a PassPort-based solution, and that the current interfaces could likely be enhanced. However, the gap cannot be fully closed due to the need to split the payables process across two applications (as is done today), which requires users to access multiple systems.<sup>192</sup>

110. BC Hydro further explained that, even with the integration proposed by ABB in place, there are limitations within the process. The fact that it spans two IT systems (SAP and PassPort) means that users cannot access all of the information they may need in order to investigate a payment or invoice without logging into and searching both applications. This

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<sup>189</sup> Exhibit B-1, Application, p. 3-10.

<sup>190</sup> Exhibit B-1, Application, p. 3-10.

<sup>191</sup> Exhibit C3-3, p. 7.

<sup>192</sup> Exhibit B-7-2, BCOAPO IR 2.28.2.

limitation is removed with an SAP-based solution, which is why SAP received a higher score of 4.<sup>193</sup>

	SAP	PassPort
7 – Inability to support sales and returns of unused materials	4	3

111. The SAP alternative will fully support the return of unused materials from the field. BC Hydro assumed for the purposes of its analysis that returns processing in PassPort could be improved. However, PassPort does not have a sales and distribution module, which is required to support the sales and returns of unused materials. For this reason, PassPort merited a score of 3.<sup>194</sup>

112. ABB’s evidence and responses to information requests did not change BC Hydro’s assessment of PassPort.<sup>195</sup> BC Hydro explained that it

...is aware of Asset Suite’s capabilities in this area, and agrees that a PassPort-based solution could meet a number of BC Hydro’s requirements. Asset Suite’s capabilities are focused on the return of inventoried materials and do not address BC Hydro’s requirements to return unused non-stock materials (i.e., non-catalogued materials not carried in inventory). The majority of unused material for which a returns process is required are non-catalogued materials purchased for capital infrastructure projects but not consumed as part of the project.<sup>196</sup>

	SAP	PassPort
10 – No self-serve option for routine service requests	4	3

113. Automation of routine procurement is dependent on a services catalogue and an easy user interface for navigation and workflow. PassPort has more limited services catalogue capability than SAP, justifying the differential in scoring.<sup>197</sup> BC Hydro explained that SAP provides more options for how unitized services can be configured including the Service Master concept. In PassPort, the majority of services utilized by BC Hydro could not be catalogued to a

<sup>193</sup> Exhibit B-7, BCOAPO IR 2.27.2.

<sup>194</sup> Exhibit B-1, Application, p. 3-11.

<sup>195</sup> Exhibit B-7-2, BCOAPO IR 2.28.2; Exhibit B-11, Rebuttal Evidence, p. 8.

<sup>196</sup> Exhibit B-7-2, BCOAPO IR 2.28.2.

<sup>197</sup> Exhibit B-1, Application, p. 3-11.

sufficient degree of detail, thereby limiting PassPort effectiveness as a self-service procurement tool. BC Hydro processes a large volume of services related to contract orders annually. The ability to automate a significant portion of contract orders is a key requirement.<sup>198</sup>

114. ABB stated that it is unclear why Asset Suite (PassPort) is perceived as having a more limited services catalogue, or why this could not be automated.<sup>199</sup> BC Hydro explained:

The basic difference between SAP and PassPort with regard to a services catalogue capability is that SAP has a services catalogue while PassPort does not. As a result, it is not possible for a user in PassPort to access a list of catalogued services and select them for inclusion in planning a piece of work (i.e., a work order or a project) enabling the automation of subsequent procurement activities. PassPort does provide the ability to establish “background” and “model” contracts, the details of which can be copied into a new contract thereby mimicking some of the capabilities of a service catalogue. The approach is limited compared to the SAP structure which is based on having a defined and approved catalogue of available services that end users can select from.

Absence of a service catalogue limits the amount of structured data as discussed in BC Hydro’s response to BCUC IR 2.48.4, which limits the ability to automate routine procurement. Given the importance of having a services catalogue for automating procurement, PassPort was scored a 3 with respect to closing capability gap 10.<sup>200</sup>

115. CEC-ABB IR 4 asked ABB to discuss why its services catalogue is not more limited than SAP’s catalogue. ABB’s response to the question does not describe a services catalogue. Asset Suite does not have a services catalogue.<sup>201</sup> BC Hydro reasonably assigned PassPort a lower score than SAP.

	SAP	PassPort
11 – Inability to pay suppliers without an invoice	4	2

<sup>198</sup> Exhibit B-3, BCUC IR 1.9.7.

<sup>199</sup> Exhibit C3-3, p. 9.

<sup>200</sup> Exhibit B-6-2, BCUC IR 2.50.1.

<sup>201</sup> Exhibit B-11, Rebuttal Evidence, p. 8.

116. The functionality to pay a supplier without an invoice is called Evaluated Receipt Settlement. SAP has full Evaluated Receipt Settlement functionality.<sup>202</sup> Taking into consideration ABB’s intervener evidence, BC Hydro concluded that PassPort provides capability to pay for materials without an invoice. However, it does not provide this ability for contract services.<sup>203</sup> PassPort therefore scored 2 out of 4.

	SAP	PassPort
12 – Inability to streamline controls and approvals processes	3	2

117. Closing this capability gap requires work to be managed, including approval, in a single system. SAP warranted a score of 3 because it will largely allow the financial control and approval of work to occur in SAP. SAP will not fully close this capability gap because certain work (Distribution Design Work and Generation & Transmission Stations) will remain in PassPort unless and until Work Management and Asset Management are undertaken in SAP.

118. PassPort merited a score of 2. Much of the work will never be managed in PassPort. There is also no Human Resources module in PassPort to support the use of organizational roles to determine approval authority.<sup>204</sup>

119. ABB’s Evidence provided a description of how controls and approvals are managed within Asset Suite.<sup>205</sup> BC Hydro responded that it “agrees that controls and approvals could be improved with a PassPort-based solution. However, ABB’s evidence does not address BC Hydro’s reasoning for why PassPort was rated lower than SAP in this area. As described in the Application, fully closing this capability gap would require work to be managed and approved in a single system.”<sup>206</sup>

120. In response to CEC-ABB IR 6, ABB asserted that it would rate as a 4 for capability gap 12. While ABB described in this IR response some of PassPort’s functionality and some of

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<sup>202</sup> Exhibit B-1, Application, pp. 3-11 to 3-12.

<sup>203</sup> The score for capability gap 11 was revised upwards from 1 to 2 to reflect the adjustment discussed in BC Hydro’s response to BCOAPO IR 2.28.1.

<sup>204</sup> Exhibit B-1, Application, p. 3-12.

<sup>205</sup> Exhibit C3-3, p. 13.

<sup>206</sup> Exhibit B-7-2, BCOAPO IR 2.28.2.

its limitations, ABB did not address BC Hydro's stated business requirements. As BC Hydro's projects and portfolio management, finance and human resources systems are SAP-based, BC Hydro can never fully close capability gap 12 with PassPort.<sup>207</sup>

**(b) SAP is the Only Alternative Aligned with BC Hydro's Common Platform Strategy**

121. SAP is the only alternative that is consistent with BC Hydro's Common Platform Strategy.<sup>208</sup>

***SAP is BC Hydro's Common Platform***

122. In 2008, BC Hydro made a decision to shift to an enterprise-wide SAP IT platform. BC Hydro refers to this as its Common Platform Strategy. The rationale for choosing an enterprise IT platform as a technology standard was that, over time, it will allow all core business processes to be consolidated onto a single platform (SAP). The benefits of the Common Platform Strategy are:

- A reduction in overall complexity of BC Hydro's IT environment;
- More streamlined business processes;
- A single source of information and thus consistency of analysis and reporting;  
and
- Reduction in the cost of future business and technology changes.<sup>209</sup>

123. Since the Common Platform Strategy was adopted, BC Hydro has implemented SAP for Finance, Human Resources, Project and Portfolio Management as well as other enhancements and partial implementation projects.<sup>210</sup> BC Hydro expects to continue investing in the SAP platform after the SCA Project is completed. Consistent with the Transformation

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<sup>207</sup> Exhibit B-11, Rebuttal Evidence, p. 8.

<sup>208</sup> Exhibit B-1, Application, p. 3-13.

<sup>209</sup> Exhibit B-1, Application, p. 3-13.

<sup>210</sup> Exhibit B-1, Application, p. 3-13.

Blueprint described in section 4.2.7 of the Application, future projects supporting work and asset management will likely be on an SAP platform.

***The Challenge of Integrating PassPort in an SAP Environment***

124. PassPort and SAP are designed to operate as integrated systems performing multiple business functions, not as standalone systems integrated with other systems. Selection of PassPort as the preferred alternative for supply chain would complicate BC Hydro's IT systems, potentially impacting its ability to successfully execute future projects.<sup>211</sup>

125. The Common Platform Strategy was considered in assigning the capability gap scores discussed above, in the sense that BC Hydro took into account the degree of integration to other SAP components required to fully close a given capability gap. PassPort's score was reduced where complex integration between PassPort and the non-supply chain components of SAP would be required. The total PassPort score was only reduced for this reason by 4 points out of a possible score of 52. That is, PassPort would have scored 40 points (rather than 36) out of a possible 52 if BC Hydro had not included a consideration of the integration benefits of a common platform in its assessment.<sup>212</sup>

126. Implementing the SAP supply chain will position BC Hydro to phase-out all use of PassPort, thus reducing complexity and costs of operating and maintaining two systems.<sup>213</sup>

**(c) SAP is the Lower Risk Alternative**

127. The SAP alternative is lower risk than PassPort, primarily because adopting the PassPort alternative would introduce additional business and project delivery risk.

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<sup>211</sup> Exhibit B-1, Application, p. 3-13.

<sup>212</sup> Exhibit B-4, BCOAPO IR 1.17.1.

<sup>213</sup> Exhibit B-1, Application, pp. 2-7 to 2-8; Exhibit B-3, BCUC IR 1.24.5.

***PassPort Would Introduce Greater Business Risk***

128. Most risks in this category (as summarized in Table 4-3 of the Application) are the same for both alternatives. However, an additional business risk exists with PassPort that does not arise with SAP. BC Hydro's supply chain system has been on a PassPort platform since 2003. Once an IT system has been in use for a significant amount of time, as with PassPort, user behaviour becomes entrenched. Changing processes and changing behaviour in PassPort may therefore be difficult and challenging.<sup>214</sup>

129. ABB claims that BC Hydro's assumptions around business risk are incorrect. ABB, however, does not address BC Hydro's rationale for concluding that PassPort would introduce greater business risk. BC Hydro agrees with ABB that change management will equally be a part of either an SAP transition or a PassPort transition.<sup>215</sup> BC Hydro's view is that it may be more difficult to change user behaviour in Passport. As explained in response to CEC IR 1.53.1, the SCA Project will not just implement new technology, but will also implement new business processes and roles in support of the Supply Chain Business Model. As a result, if BC Hydro implemented a PassPort based solution, people using PassPort would have to undergo behaviour changes to adapt to the new processes, roles, and responsibilities.<sup>216</sup> PassPort has been in place at BC Hydro since 2003, and there are over 4,000 users of the PassPort platform in a calendar year.<sup>217</sup> The potential for entrenched behaviour is therefore a risk with PassPort that does not exist to the same degree with SAP for supply chain.

***PassPort Would Introduce Greater Project Delivery Risk***

130. Overall project delivery risk is higher for the PassPort alternative for three reasons. First, PassPort has a higher likelihood of an unsuccessful system integrator RFP, given the relative lack of PassPort resources in the market. Due to the specialized nature of the PassPort system and its smaller market presence, external systems integrators have limited

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<sup>214</sup> Exhibit B-1, Application, p. 3-14.

<sup>215</sup> Exhibit C3-3, p. 14.

<sup>216</sup> Exhibit B-4, CEC IR 1.53.1.

<sup>217</sup> Exhibit B-4, CEC IR 1.53.2.

PassPort capabilities in comparison to SAP. BC Hydro's perspective is supported by Gartner research, which cautions: "there are limited service provider options, mainly ABB itself (i.e., the PassPort vendor) and references report resource constraints".<sup>218</sup> Second, the PassPort alternative has a higher risk of poor quality as BC Hydro's internal PassPort team capacity is more limited than its internal SAP capacity.<sup>219</sup> Third, SAP benefits from prior work that mitigates the delivery risk of the project, which has not been completed for PassPort.<sup>220</sup>

131. In its evidence, ABB stated that it "works with a number of Systems Integrators, including Deloitte, PricewaterhouseCoopers, Accenture, and potentially others, as well as other niche partners (e.g., Trinoor, whom BC Hydro engages today)."<sup>221</sup> BC Hydro recognizes that ABB works with a number of Systems Integrators, but in BC Hydro's experience the number of overall resources in the marketplace with PassPort-related skillsets is limited in comparison to resources with SAP-related skillsets. As an example, when BC Hydro conducted the RFP for the SCA Project, which requires skills in both SAP (the target platform) and PassPort (the legacy platform), each of the three Systems Integrator finalists proposed their own resources for SAP-related roles, but none proposed their own resources for PassPort-related roles. Instead, the Systems Integrators each partnered with Passport speciality firms (e.g., ABB) to put together viable proposals.<sup>222</sup>

132. ABB acknowledges Gartner's caution that "there are limited service provider options, mainly ABB itself, and references report resource constraints." ABB states that it "has endeavoured to strengthen its partner network and EAM practice".<sup>223</sup> When asked to elaborate on what ABB has done to strengthen its partner network, and whether it still has "resource constraints", ABB's response is equivocal, and does not demonstrate that it has overcome the resource constraints noted by Gartner.

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<sup>218</sup> Exhibit B-3, BCUC IR 1.9.9.

<sup>219</sup> Exhibit B-3, BCUC IR 1.9.9.

<sup>220</sup> Exhibit B-1, Application, pp. 3-14 to 3-15.

<sup>221</sup> Exhibit C3-3, p. 14.

<sup>222</sup> Exhibit B-7, BCOAPO IR 2.30.1.

<sup>223</sup> Exhibit C3-3, p. 16.

**(d) The Cost of the Alternatives is Not Determinative**

133. BC Hydro's approach to developing a cost estimate for PassPort for the purposes of the alternatives analysis was reasonable. The relative cost of the two alternatives is not determinative one way or the other.

***BC Hydro Took a Reasonable Approach in Developing the PassPort Cost Estimate***

134. The SCA Project conceptual design was developed on the basis of implementing SAP and not on the basis of implementing a PassPort solution. In the absence of having a PassPort-specific conceptual design, BC Hydro used the detailed SAP Definition Phase cost estimate as a base from which it developed a cost range for the PassPort alternative for this evaluation.<sup>224</sup>

135. For each cost component, BC Hydro estimated the level of effort (as a percentage) reasonable for a PassPort-based solution relative to the SAP based solution.<sup>225</sup> Overall, the level of effort to complete the implementation of Passport is estimated to be lower given that the existing supply chain system is PassPort-based. BC Hydro then multiplied the level of effort percentage by the SAP project cost estimate for each project activity and summed each cost to calculate a base cost for PassPort.<sup>226</sup> BC Hydro then applied a contingency of 20 per cent on the cost estimate and added IDC to calculate a mid-range cost estimate. As no conceptual design exists for the PassPort alternative, and consistent with BC Hydro standards, an uncertainty range of +100% / -35%<sup>227</sup> was applied to calculate the upper and lower bounds

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<sup>224</sup> As described in section 2.4 of the Application, the detailed cost estimate is included on workbook tab C1 – Direct Cost Detail of Attachment F.

<sup>225</sup> Exhibit B-1, Application, p. 3-15; Exhibit B-3, BCUC IR 1.11.1.

<sup>226</sup> A component was also added to the PassPort estimate to account for the work required to complete the equivalent of the early design work developed as part of the Supply Chain Transformation Blueprint. This component was calculated by taking the ratio of the design costs for PassPort and SAP multiplied by the value of the early design work used for the SAP alternative. See Exhibit B-1, Application, p. 3-15, footnote 26.

<sup>227</sup> This range applies to an AACE Class 5 estimate which is an appropriate classification for the PassPort estimate as no design work has been completed for this alternative. See Exhibit B-1, Application, p. 3-16, footnote 27.

for the estimate. The calculation of the Alternative 2 (PassPort) cost estimate is included in tabs D1 and D2 of Attachment F.<sup>228</sup>

136. Table 3-6 of the Application, reproduced below, provides the components of the Alternative 2 (PassPort) cost estimate range:<sup>229</sup>

**Table 3-6 Alternative 2 (PassPort) Cost Estimate**

<b>Phase / Activity</b>	<b>Capital Costs</b>	<b>Operating Costs</b>	<b>Total</b>
Identification		1.2	1.2
Definition	17.3	1.9	19.2
Implementation	22.9	2.5	25.4
Contingency (20% x Definition & Implementation)	8.0	0.9	8.9
Total Cost (ex IDC)	48.2	6.5	54.7
Interest During Construction (IDC)	2.5		2.5
<b>Total Expected Cost</b>	<b>50.7</b>	<b>6.5</b>	<b>57.2</b>
<b>Total Upper Bound Estimate (+100%)</b>	<b>101.6</b>	<b>13.2</b>	<b>114.8</b>
<b>Total Lower Bound Estimate (-35%)</b>	<b>33.0</b>	<b>4.3</b>	<b>37.3</b>

137. Table 3-7 of the Application, reproduced below, summarizes the estimated project costs for the two alternatives.<sup>230</sup>

**Table 1-7 Comparison of Project Costs for Alternatives**

<b>Alternative</b>	<b>Total Estimated Project Cost Range (\$ million)</b>
1 – SAP	60.5 - 79.3
2 – PassPort	37.3 - 114.8

138. Based on the methodology for developing a cost estimate for Alternative 2 (PassPort) described above, the fact that BC Hydro has not developed a conceptual design for PassPort, and that there has not been a competitive bid process to provide any cost certainty, the cost range for PassPort is much larger to account for the uncertainty. For this reason, it is

<sup>228</sup> Exhibit B-1, Application, p. 3-16.

<sup>229</sup> Exhibit B-1, Application, p. 3-16.

<sup>230</sup> Exhibit B-1, Application, p. 3-16.

difficult to draw a specific conclusion as to which alternative is preferable based on project cost alone.<sup>231</sup>

139. The approach used by BC Hydro for the PassPort Alternative is valid:

- The implementation of a PassPort-based solution and an SAP-based solution are fundamentally similar. Both involve the design of new supply chain business processes and technology, the configuration of a packaged IT solution, the testing of that solution, the cleaning and migration of required data, and the preparation and delivery of organizational change management and training activities. Therefore, the base estimate used for the SAP implementation in terms of timing, activities required, and resources needed, was appropriate as a starting point for developing the PassPort estimate.<sup>232</sup>
- To model the design costs of the PassPort alternative, BC Hydro required a method to estimate the effort to complete an equivalent amount of the early design work that was completed for SAP. For reasons of estimating consistency and conservatism, it was reasonable to estimate that the early design work for PassPort would cost \$6.2 million (i.e., 85 per cent of the \$7.3 million for the SAP early design work). The 85 per cent factor reflects the ratio of the direct costs required to complete the SAP design and those required to perform similar work in PassPort. While the cost to complete the early design work for PassPort may be the same as for SAP, BC Hydro used the more conservative approach by applying the 85 per cent. There was no practical ability to go to market and receive meaningful competitive pricing for the early design work.<sup>233</sup>
- The range used for the PassPort Alternative is consistent with BC Hydro's estimation guidelines for alternatives analysis performed during the Conceptual

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<sup>231</sup> Exhibit B-1, Application, pp. 3-16 to 3-17.

<sup>232</sup> Exhibit B-3, BCUC IR 1.11.2.

<sup>233</sup> Exhibit B-3, BCUC IR 1.11.3.

Design stage.<sup>234</sup> Selection of a preferred alternative is typically done at a +100/ - 35 per cent level of accuracy.<sup>235</sup>

- The reason the SAP Alternative had a tighter estimate range than the guidelines would require at this stage is because BC Hydro completed early project design work under the Transformation Initiative and completed the System Integration procurement. Because these costs are known, the SAP Alternative has a narrow estimate range.<sup>236</sup>

140. Further, the cost and time to complete a Class 3 or Class 4 cost estimate for the PassPort Alternative is prohibitive:<sup>237</sup>

Developing a Class 3 or Class 4 cost estimate for the PassPort Alternative is not necessary for the alternatives analysis, would cause delay, and increase the cost of the project.

In order to develop a Class 4 cost estimate for the PassPort alternative, BC Hydro would need to develop a conceptual design report similar to the one developed for the SAP-based solution to be used as the basis for such an estimate. Completing this work for the SAP-based solution cost \$1.2 million and took four months.

While completing this work for a PassPort-based solution would likely incur a similar cost, it would require at least an additional two to three months as BC Hydro would need to go to market to hire resources to complete the work. At the time BC Hydro started the development of the SAP-based conceptual design, there was a team of SAP knowledgeable resources available due to the recent completion of the Supply Chain Solutions projects.

In order to develop a Class 3 cost estimate for the PassPort alternative, BC Hydro would need to complete the work required for a Class 4 estimate and in addition would need to complete design work equivalent to the early design work completed for the SAP-based alternative and would need to complete a procurement exercise in order to receive firm implementation pricing from the

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<sup>234</sup> Exhibit B-4, BCOAPO IR 1.19.1.

<sup>235</sup> Exhibit B-3, BCUC IR 1.9.1.

<sup>236</sup> Exhibit B-4, BCOAPO IR 1.19.1.

<sup>237</sup> Exhibit B-6, BCUC IR 2.46.1.

market. BC Hydro estimates that this would require roughly 12 months to complete at a cost of approximately \$8 million.

141. In its responses to information requests, ABB is critical of the cost estimates developed by BC Hydro in 2015 in Attachment P of the Application, and suggests that an upgrade to Asset Suite 9 could be done for less.<sup>238</sup> ABB responses are incomplete and unreliable, and cannot be used to assess the costs of the SCA Project. First, ABB only comments on ABB's own costs to implement Asset Suite 9. ABB does not estimate BC Hydro's or a System Integrator's costs, which are a significant component of the costs of the SCA Project. ABB also offers no details on the upgrades conducted for any of its clients or what its clients' costs were. As a result, ABB provides no comparable cost information. Second, the costs of an upgrade are driven to a large extent by BC Hydro's own business requirements, which BC Hydro is in the best position to assess.<sup>239</sup> ABB's responses to information requests indicate that it does not understand BC Hydro's business requirements. ABB's responses understate the need to interface with other systems and demonstrate that ABB does not understand the scope of the SCA Project or the complexity of BC Hydro's IT environment.<sup>240</sup> BC Hydro's past experience implementing PassPort in 2003, which cost approximately \$50 million, is consistent with BC Hydro's estimate for the PassPort alternative.<sup>241</sup> BC Hydro submits that ABB's comments on the costs of implementing an upgrade to Asset Suite should be given little to no weight.

142. In summary, BC Hydro's cost estimate for the PassPort alternative is based on a valid method, and within a reasonable estimating range for an alternatives analysis. The significant cost and time to prepare a Class 3 or Class 4 cost estimate for the PassPort alternative are therefore not necessary.

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<sup>238</sup> Exhibit C3-5-1, BCUC-ABB IR 2.2 and 2.3. BC Hydro notes that the cost estimates in Attachment P are no longer valid, and have been replaced by the alternative assessment included in Chapter 3 of the Application (Exhibit B-6, BCUC IR 2.46.2).

<sup>239</sup> Exhibit B-11, Rebuttal Evidence, pp. 5 to 7.

<sup>240</sup> Exhibit B-11, Rebuttal Evidence, pp. 7, 9, and 10.

<sup>241</sup> Exhibit B-11, Rebuttal Evidence, p. 6.

**(e) SAP is the Superior Alternative Under the Benefits Analysis**

143. The benefits analysis of alternatives is based on the benefits analysis in section 2.5 of the Application for Alternative 1 (SAP). For the purposes of this analysis, BC Hydro multiplied the monetized benefit of addressing each capability gap under Alternative 1 (SAP) by the ratio of the PassPort/SAP score. For example, the low and high monetized benefit estimates associated with addressing the first listed capability gap (Inability to manage service-related spend) under Alternative 1 (SAP) is \$7.2 to \$14.4 million. The ratio of the PassPort/SAP score with respect to each alternative's ability to close this capability gap is 2/4, or 0.5. Multiplying the monetized benefit range by the ratio yields a benefit of \$3.6 to \$7.2 million. The Alternative 2 (PassPort) benefit amounts for the 13 capability gaps were then totaled. The results are shown in Table 3-8 of the Application, reproduced below:<sup>242</sup>

**Table 3-8 Annual Recurring Benefits Range at Stabilization (F2017 Dollars)**

<b>Alternative</b>	<b>Annual Benefits Range (\$ million)</b>
1 – SAP	16.6 to 33.2
2 – PassPort	11.8 to 23.7

144. The recurring monetized benefits range at stabilization for Alternative 1 (SAP) is higher by between \$5 and \$9 million per year.<sup>243</sup>

145. BC Hydro has discussed above why its scoring of the relative ability of PassPort and SAP to close capability gaps is appropriate. It was reasonable to use the scoring for the purpose of determining monetized benefits. BC Hydro elaborated:

BC Hydro believes the assumption that they [the realization of monetized benefits and the score provided in the capability gap analysis] are linearly proportional is reasonable and appropriate for the level of analysis performed. There is clearly a relationship between the closing of a capability gap and the delivery of the associated benefits. Fully closing a capability gap should enable full delivery of the benefit, and conversely, a capability gap that cannot be closed at all would provide none of the associated benefit. While the actual relationship

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<sup>242</sup> Exhibit B-1, Application, p. 3-17.

<sup>243</sup> Exhibit B-1, Application, p. 3-17.

may not be entirely linear, BC Hydro does not have any data to enable a more detailed understanding of the potential relationship between the two.<sup>244</sup>

146. The method used for this analysis likely overstates the monetized benefits associated with the PassPort alternative, since BC Hydro’s analysis assumes that addressing a proportion of a capability gap will result in a comparable proportion of benefits of the SAP alternative. As many of the problems to be addressed by the closing of the capability gaps are interrelated, some of the PassPort benefits calculated through this method may not be realizable.<sup>245</sup>

**(f) SAP Has Greater Net Present Value (DCF and Revenue Requirements)**

147. NPV analyses for Alternative 2 (PassPort) were developed using the same logic and general inputs as the NPV analyses undertaken for Alternative 1 (SAP). The NPV range was determined using the same high cost / low benefit and low cost / high benefit scenario approach that was used for the SAP NPV analyses.<sup>246</sup> For the NPV of Alternative 2 (PassPort), incremental anticipated operating costs of between \$0.5 - \$0.75 million (operating) and \$0.15 - \$0.25 million (capital) per year were included.<sup>247</sup>

148. The NPV figures for the two alternatives in Table 3-9, updated in the response to BCUC IR 2.39.1, are as follows (rounded):<sup>248</sup>

**Table 3-9 (Updated) NPV Ranges for Alternatives 1 and 2**

Scenarios	NPV (\$ millions)	
	DCF	Revenue Requirement
Alternative 1 (SAP)	2 to 103	(8) to 86
Alternative 2 (PassPort)	(47) to 69	(43) to 63

<sup>244</sup> Exhibit B-3, BCUC IR 1.10.2.

<sup>245</sup> Exhibit B-1, Application, pp. 3-17 to 3-18.

<sup>246</sup> Exhibit B-1, Application, p. 3-18.

<sup>247</sup> Exhibit B-1, Application, p. 3-18. Also see Exhibit B-3, BCUC IR 1.12 series.

<sup>248</sup> Exhibit B-6, BCUC IR 2.39.1.

149. The NPV range for Alternative 1 (SAP) is higher than Alternative 2 (PassPort) for both the NPV of discounted cash flows as well as the NPV of revenue requirement impacts.<sup>249</sup>

150. To further compare the two alternatives, BC Hydro plotted the range of NPV results for the potential cost and benefit scenarios.<sup>250</sup> BC Hydro assesses the probability of the NPV of Alternative 2 (PassPort) being higher than Alternative 1 (SAP) as low. In the comparison of the NPV values in Tables 3-2 and 3-3 of the Application, the NPV of the PassPort alternative never exceeds the NPV of the SAP alternative for a given like-for-like scenario.<sup>251</sup> This analysis demonstrates that Alternative 1 (SAP) is superior to Alternative 2 (PassPort) based on the NPV assessment criteria.

151. In addition, the benefit-cost ratios, provided in response to an information request from Mr. Landale, provide a different way of comparing the economic benefits of the two alternatives:<sup>252</sup>

<b>SAP</b>	<b>Low Benefit</b>	<b>Mid Benefit</b>	<b>High Benefit</b>
<b>Low Cost</b>	1.64	2.74	3.29
<b>Mid Cost</b>	1.34	2.23	2.68
<b>High Cost</b>	1.03	1.72	2.06

<b>PassPort</b>	<b>Low Benefit</b>	<b>Mid Benefit</b>	<b>High Benefit</b>
<b>Low Cost</b>	1.50	2.50	3.00
<b>Mid Cost</b>	1.00	1.66	2.00
<b>High Cost</b>	0.52	0.87	1.04

152. The above cost-benefit ratios and NPV analyses demonstrate that Alternative 1 (SAP) is superior to Alternative 2 (PassPort).

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<sup>249</sup> Exhibit B-1, Application, p. 3-18.

<sup>250</sup> Exhibit B-1, Application, p. 3-18.

<sup>251</sup> Exhibit B-3, BCUC IR 1.9.5.

<sup>252</sup> Exhibit B-7, Landale IR 2.3.1.

**(g) SAP Has Surpassed PassPort in the Market as a Supply Chain System**

153. From the 1990s to 2008 BC Hydro's IT strategy for enterprise applications was to select and implement "best of breed" solutions. BC Hydro's perspective in the late 1990s was that PassPort was a "best of breed" solution for utility work management and supply chain solutions.<sup>253</sup> SAP has surpassed PassPort in this area, and is now a "best of breed" supply chain solution.<sup>254</sup> BC Hydro stated: "For BC Hydro, this means that "best of breed" functionality is available within SAP, and that this functionality can be leveraged while at the same time retaining the benefits of and maintaining full alignment with its Common Platform IT strategy."<sup>255</sup>

154. The third-party studies on the record reinforce BC Hydro's perspective on SAP's functionality and position in the market:

- In Appsruntheworld.com's "Top 10 Utility Software Vendors and Market Forecast 2015-2020," SAP shares top spot with Oracle at 9 per cent market share for utility software vendors, and SAP leads in terms of year-over-year growth of 23 per cent.<sup>256</sup>
- In Appsruntheworld.com's "Top 10 SCM Software Vendors and Market Forecast 2015-2020," SAP is rated as number 1, with 21 per cent market share, for supply chain management applications.<sup>257</sup>
- In Appsruntheworld.com's "Top 10 Procurement Software Vendors and Market Forecast 2015-2020," SAP is rated as number 1, with 22 per cent market share, for procurement software vendors.<sup>258</sup>

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<sup>253</sup> Exhibit B-3, BCUC IR 1.8.2.

<sup>254</sup> Exhibit B-3, BCUC IR 1.8.3 and BCUC IR 1.1.4.

<sup>255</sup> Exhibit B-3, BCUC IR 1.8.2.

<sup>256</sup> Exhibit B-3, BCUC IR 1.1.4.

<sup>257</sup> Exhibit B-3, BCUC IR 1.1.4.

<sup>258</sup> Exhibit B-3, BCUC IR 1.1.4.

- The Forrester Report “Vendor Landscape: ePurchasing Suites, 2016 to 2017” addresses the ePurchasing market overall. The report draws the general conclusion that “Enterprise or suite vendors offer most functions looked for by organizations, however, organizations may want to supplement with best of breed solutions for specific needs.” ABB's products are not mentioned in the list of either enterprise or best of breed solutions for supply chain, despite the fact that Forrester identifies some 60 leading companies and products. The report notes that SAP Ariba “has the broadest and deepest suite. Both Ariba and SAP have been in the ePurchasing game since the late 1990s, and it shows in their market presence and product.”<sup>259</sup>
- Gartner’s report entitled “Magic Quadrant for Energy and Utilities Enterprise Asset Management Software, September 2015” categorizes only the SAP and IBM products as “Leaders” out of approximately 12 Energy and Utilities Enterprise Asset Management software products in the marketplace.<sup>260</sup> The report shows ABB Asset Suite (formerly known as PassPort) as being in the “Niche Players” quadrant. SAP is superior to PassPort on both the “completeness of vision” and “ability to execute” scales.<sup>261</sup>
- The ARC Advisory Group’s Enterprise Asset Management Global Market Research Study referenced by ABB is focused on asset management, rather than supply chain IT systems. ABB noted that it is shown as having a greater market share than SAP in Enterprise Asset Management in the category of Electric Power Generation.<sup>262</sup> However, SAP is a leading supplier in the category of Electric Power Transmission and Distribution, whereas ABB is not.<sup>263</sup> Further, SAP has a greater market share than ABB for the category of companies with

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<sup>259</sup> Exhibit B-3, BCUC IR 1.1.3, Attachment 1.

<sup>260</sup> Exhibit B-3, BCUC IR 1.1.3, Attachment 2.

<sup>261</sup> Exhibit B-3, BCUC IR 1.8.3.1. See also BCUC IR 1.8.2.

<sup>262</sup> Exhibit C3-3, p. 16.

<sup>263</sup> Exhibit B-11, Rebuttal Evidence, pp. 12 to 13. See Confidential Exhibit B-11-1 for results.

revenue greater than \$1 billion, which applies to BC Hydro.<sup>264</sup> The ARC Study confirms that Asset Suite is an asset management product focused on power generation, including nuclear. In contrast, BC Hydro is a vertically integrated utility, with generation, transmission, distribution, and retail functions. The majority of BC Hydro's overall active inventory is used for transmission- and distribution-related work, and the supply chain requirements for transmission and distribution are different than for generation.<sup>265</sup>

155. The market information underscores BC Hydro's position that SAP is the better alternative for BC Hydro.

#### **D. CONCLUSION AND REQUESTED FINDING**

156. The alternatives analysis demonstrates that Alternative 1 (SAP) is the preferred alternative for undertaking the SCA Project as it closes the capability gaps to a greater degree, is aligned with the Common Platform Strategy, is lower risk, and is expected to deliver greater financial benefits. BC Hydro's perspective on the strengths of SAP vs. Passport is supported by independent third-party research.

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<sup>264</sup> Exhibit B-11, Rebuttal Evidence, pp. 14 to 15. See Confidential Exhibit B-11-1 for results.

<sup>265</sup> Exhibit B-11, Rebuttal Evidence, p. 13.

## **PART SEVEN: PROJECT RISKS ARE MITIGATED**

### **A. INTRODUCTION**

157. In this Part, BC Hydro makes the following points:

- First, BC Hydro has both the technical capacity and relevant experience to implement the SCA Project;
- Second, BC Hydro has put in place a qualified, experienced team to deliver the SCA Project, including a System Integrator and Quality Assurance Advisor;
- Third, BC Hydro has completed several steps to mitigate project risks in advance of the implementation of the project;
- Fourth, BC Hydro has identified key business, technology, project delivery, and readiness risks that may arise during the course of the SCA Project, and has taken steps to address those risks; and
- Fifth, BC Hydro's Quality Assurance Advisor has endorsed BC's Hydro actions.

### **B. BC HYDRO HAS BOTH TECHNICAL CAPACITY AND RELEVANT EXPERIENCE**

158. BC Hydro has significant experience in implementing SAP technology projects:

- BC Hydro first installed SAP's Utilities Customer Care module in 2003.<sup>266</sup>
- In 2008, BC Hydro shifted to an enterprise-wide SAP IT platform. Since that time, BC Hydro has implemented three major SAP projects: the Financial Systems Replacement Project, the Human Resources Project, and Project and Portfolio Management. Each project implemented a complete SAP module.<sup>267</sup>

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<sup>266</sup> Exhibit B-1, Application, p. 1-10.

<sup>267</sup> Exhibit B-1, Application, pp. 1-10 to 1-11.

- BC Hydro has also implemented other smaller SAP projects involving preparatory design work, enhancements, and partial system implementations, including two supply chain-specific SAP projects described in section 4.2.8 of the Application.<sup>268</sup>

## **C. BC HYDRO HAS THE CORRECT TEAM IN PLACE TO DELIVER THE PROJECT**

### **(a) Project Team**

159. The SCA Project team is composed of full-time BC Hydro employees and consultants who have extensive experience in the design, development, and implementation of IT projects, both at BC Hydro and at other large utilities. The SCA Project team structure and key roles are identified in Figure 1-1 of the Application.<sup>269</sup>

### **(b) BC Hydro Has Appointed a Qualified System Integrator**

160. The System Integrator is responsible for providing advisory and implementation services to help BC Hydro develop process and solution designs, and implement the designed solution for the SCA Project. BC Hydro has completed a multi-step public procurement process to select an external partner to provide system integration services for the SCA Project. This process was designed to afford BC Hydro increased cost certainty, to provide an assessment of the value of the design artifacts developed as part of the Transformation Blueprint, and to establish a contract that enables BC Hydro to share project risks with the System Integrator.<sup>270</sup>

161. BC Hydro has received firm pricing from its preferred proponent and has validated its view on the resources required, the amount of the design completed to date, and the amount of time required to finish the preliminary design and to implement the SCA

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<sup>268</sup> Exhibit B-1, Application, p. 1-11.

<sup>269</sup> Exhibit B-1, Application, p. 1-11.

<sup>270</sup> Exhibit B-1, Application, p. 4-18.

Project.<sup>271</sup> BC Hydro provided additional details regarding the roles and responsibilities of the System Integrator in response to information requests.<sup>272</sup>

**(c) BC Hydro Has Appointed a Quality Assurance Advisor**

162. BC Hydro has engaged a Quality Assurance Advisor for the SCA Project, who will provide independent oversight and ongoing assessments of the governance structure, process and staffing, and project status. The primary objective of the Quality Assurance Advisor is to help BC Hydro identify, manage, and mitigate risks associated with the SCA Project.<sup>273</sup>

163. Specifically, the Quality Assurance Advisor is an independent third-party consultant whose role will entail the following responsibilities:

- Providing an initial assessment of the governance structure, processes, and staffing, including contracting arrangements with the System Integrator established by BC Hydro;
- Providing ongoing assessments of the effectiveness of the governance structure, processes, and staffing; and
- Providing ongoing assessments of the project status, including key issues and risks.<sup>274</sup>

164. The Quality Assurance Advisor will have access to Project personnel, records, and meetings. As reflected in Figure 1-1 in the Application, the Quality Assurance Advisor reports directly to the Project Sponsor.<sup>275</sup> The Quality Assurance Advisor will also report on a monthly basis to the SCA Project Steering Committee, on a quarterly basis to BC Hydro's Executive Team, and on an ad hoc basis to both the SCA Project Steering Committee and the

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<sup>271</sup> Exhibit B-1, Application, p. 1-7.

<sup>272</sup> Exhibit B-4, BCOAPO IR 1.7.1 and BCOAPO IR 1.7.2.

<sup>273</sup> Exhibit B-1, Application, p. 1-15.

<sup>274</sup> Exhibit B-1, Application, p. 1-15.

<sup>275</sup> Exhibit B-1, Application, p. 1-15.

Executive Team in regard to key milestone readiness reports. Further details on the quality assurance reports are provided in section 1.2.4 of the Application, and anticipated deliverables of the Quality Assurance Advisor are listed in response to BCOAPO IR 1.5.1.<sup>276</sup>

#### **D. BC HYDRO COMPLETED PRE-PROJECT RISK MITIGATION**

165. Prior to the SCA Project, BC Hydro undertook several actions to reduce the overall project risk. These actions have had positive implications on the risks described in section 4.8.2 in the Application.

- **Ensuring that Integration with other BC Hydro Systems is Adequately Considered:** The supply chain component of the Transformation Blueprint considers how various IT systems will interact with the supply chain (SAP) IT system. The Transformation Blueprint has therefore advanced BC Hydro's understanding of the project design requirements and how the supply chain interacts with the other systems.<sup>277</sup>
- **Managing the Extent and Speed of Change introduced at BC Hydro:** BC Hydro's decision in 2013 not to implement the Transformation Blueprint IT Projects as a single program reduced the risk of implementing a new supply chain IT system. By dividing the Transformation Initiative into its component parts, implementation of the SCA Project will be more manageable.<sup>278</sup> In addition, BC Hydro has already made organizational changes in anticipation of the implementation of the SCA Project. These changes include the creation of the Supply Chain Business Unit and the implementation of process improvements, particularly in areas like category management. This reflects a conscious strategy to reduce the amount of change impacting BC Hydro's operations, and to limit the amount of organizational and process change occurring concurrently with

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<sup>276</sup> Exhibit B-4, BCOAPO IR 1.5.1.

<sup>277</sup> Exhibit B-1, Application, pp. 4-29 to 4-30.

<sup>278</sup> Exhibit B-1, Application, p. 4-30.

the implementation of new IT systems.<sup>279</sup> BC Hydro still considers replacing all remaining PassPort functionality through a single combined supply chain, work management, and asset management project would expose BC Hydro to an unacceptable level of risk.<sup>280</sup>

- **Supply Chain Business Model and Business Requirements:** The early development of the Supply Chain Business Model and Supply Chain Business Requirements have clarified what BC Hydro's supply chain requirements.<sup>281</sup>
- **Implementation of Supply Chain Functionality in SAP:** The Supply Chain Solutions – SAP project included some of purchasing and inventory management processes specifically with regard to smart meters. The SCA Project will, among other things, expand the use of SAP to cover all materials that BC Hydro needs to purchase, issue, and store. The Supply Chain Solutions – SAP project demonstrated that BC Hydro can meet its requirements for purchasing and inventory management with minimal customization of the SAP platform, and that BC Hydro can successfully create the necessary interfaces with PassPort.<sup>282</sup>

#### **E. BC HYDRO HAS IDENTIFIED THE KEY RISKS AND IS ADDRESSING THEM**

166. BC Hydro has prudently assessed the risks of the SCA Project and developed mitigation plans for each risk.

167. Section 4.8.2 of the Application identifies key business, technology, project delivery, and readiness risks at the early definition stage of the SCA Project. These categories of risk encompass the following:

- **Business risk:** Risks related to the realization of benefits that are dependent on the adoption of change within the business;

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<sup>279</sup> Exhibit B-1, Application, p. 4-30.

<sup>280</sup> Exhibit B-3, BCUC IR 1.6.8.

<sup>281</sup> Exhibit B-1, Application, p. 4-30.

<sup>282</sup> Exhibit B-1, Application, pp. 4-30 to 4-31.

- Technology risk: Risks related to the maturity of the technology;
- Project Delivery risk: Risks related to the delivery of the Project; and
- Readiness risk: Risks related to the ability of the organization to execute the Project.

168. Section 4.8.2 of the Application lists the mitigation activities that BC Hydro has developed or is planning to address each identified risk. BC Hydro also has a Risk Management Plan in place for the SCA Project, which describes how risks will be managed.<sup>283</sup>

169. As explained in section 4.4.4 of the Application, the System Integrator will have primary responsibility for day-to-day coordination and execution of activities on the SCA Project, including identifying and monitoring risks and developing risk mitigation plans. This model provides the best opportunity to reduce project risk, by leveraging the experience, methodology and teamwork of a System Integrator while allowing BC Hydro to ensure the SCA Project is executed to BC Hydro standards.<sup>284</sup> The System Integrator shares in project risk by providing a fixed price bid for the SCA Project.<sup>285</sup> The Master Services Agreement also has a number of risk-allocation provisions which provide an incentive for the System Integrator to manage project risk appropriately.<sup>286</sup>

170. BC Hydro expects that project risks will be reduced through the course of the Definition Phase as its mitigation plans are advanced. BC Hydro will advise the Commission on changes associated with these risks in the Phase Two Verification Report.<sup>287</sup>

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<sup>283</sup> Exhibit B-3, BCUC IR 1.30.7, Attachment 2.

<sup>284</sup> Exhibit B-3, BCUC IR 1.30.7.

<sup>285</sup> Exhibit B-3, BCUC IR 1.30.6.

<sup>286</sup> Exhibit B-3, BCUC IR 1.30.9.

<sup>287</sup> Exhibit B-1, Application, p. 4-38.

**F. QUALITY ASSURANCE ADVISOR ENDORSED BC HYDRO'S ACTIONS**

171. KPMG's Supply Chain Applications Project: Interim Project Readiness Assessment and System Integrator Procurement and Selection Process Assessment are included as Attachment N to the Application. These documents contain KPMG's full assessment. A summary of KPMG's assessment, observations, and recommendations is provided below.

172. In its Interim Project Readiness Assessment, KPMG's overall interim Project readiness assessment is as follows (page 12):<sup>288</sup>

Based on this Interim Project Readiness Assessment Report, KPMG's assessment is that the overall SCA Project readiness activities completed by BC Hydro have been strong with much thought and diligence employed in the assessment of the need for change, planning and readiness for the next phase of this project. The Program status is well aligned to KPMG's expectations at this stage of the project.

173. KPMG summarized its observations as follows:<sup>289</sup>

- Strong leadership commitment and involvement for an extended period of time: Business and IT Steering Committee members interviewed to date have clearly articulated the need for a unified platform in order to effectively run business processes and bring standardization to BC Hydro.
- Clear articulation of the case for change: Business stakeholders are ready to support the Project and to enable the capture of business benefits as outlined.
- Effective tailoring and deployment of a robust BC Hydro Information Technology Delivery Standard Practices (ITDSP) methodology for delivering projects of this scale with the appropriate control and approvals.

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<sup>288</sup> Exhibit B-1, Application, p. 4-21.

<sup>289</sup> Exhibit B-1, Application, pp. 4-21 to 4-22.

- Evidence of a rigorous financial model with quantifiable benefits expected to be driven by the technology implementation, along with inclusion of the required contingency and risk reserves.
- A robust SI procurement and selection process with an appropriate level of control and input from key decision makers. BC Hydro has incorporated contractual measures to mitigate and share risk and reward scenarios.

174. KPMG also noted a number of risks to the SCA Project (e.g., further delay to Project mobilization) and made a number of recommendations. KPMG's recommendations covered a range of topics, including Project accountability and responsibility, Project governance structure and capability, Project plan and deliverables, resourcing, and change management planning.<sup>290</sup>

175. BC Hydro prepared an action plan for addressing all of KPMG's recommendations in its KPMG Interim Project Readiness Assessment Management Plan, which is included as Attachment O to the Application. Many of these actions were already included in BC Hydro's Project plan for execution closer to mobilization of the Project or during the Mobilization stage.<sup>291</sup>

## **G. CONCLUSION AND REQUESTED FINDINGS**

176. The Commission should find that BC Hydro has the technical capability and relevant experience and the correct team in place to undertake the SCA Project. BC Hydro has successfully reduced the risk of the SCA Project by, amongst other actions, managing the extent and speed of change introduced. BC Hydro has prudently identified the risks of the SCA Project and put in place mitigation activities to address each risk. The Quality Assurance Advisor's conclusions on BC Hydro's actions to date confirm that BC Hydro is proceeding prudently with the SCA Project to date, and is ready to proceed with the remaining Definition Phase activities.

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<sup>290</sup> Exhibit B-1, Application, p. 4-22.

<sup>291</sup> Exhibit B-1, Application, p. 4-22.

**PART EIGHT: CONCLUSION AND ORDER SOUGHT**

177. The evidence demonstrates that the SCA Project is in the public interest. The SCA Project positions BC Hydro to meet current and future business needs, reduce risk, and benefit customers. The preferred project option, an SAP-based system that will integrate with BC Hydro’s overall SAP platform, delivers the greatest benefits with the least risk. BC Hydro requests that the Commission accept the Definition Phase capital expenditures as being in the public interest.<sup>292</sup> If the Commission accepts the capital expenditures as in the public interest, BC Hydro will commence Definition Phase activities on the SCA Project and will file its Phase Two Verification Report seeking acceptance of Implementation Phase capital expenditures in due course.

ALL OF WHICH IS RESPECTFULLY SUBMITTED.

Dated:	<u>June 23, 2017</u>	<u><b><i>[original signed by Chris Bystrom]</i></b></u> Christopher Bystrom Counsel for BC Hydro
Dated:	<u>June 23, 2017</u>	<u><b><i>[original signed by Matthew Ghikas]</i></b></u> Matthew Ghikas Counsel for BC Hydro

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<sup>292</sup> Exhibit B-1, Application, Attachments A and B. BC Hydro has set out the specific approvals it is seeking in section 1.3 of the Application, and they are reflected in the draft Orders.