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December 18, 2018

**VIA ELECTRONIC MAIL**

British Columbia Utilities Commission  
 6<sup>th</sup> Floor, 900 Howe Street  
 Vancouver, B.C. V6Z 2N3

**Attention: Patrick Wruck, Commission Secretary  
 and Manager, Regulatory Support**

Dear Sirs/Mesdames:

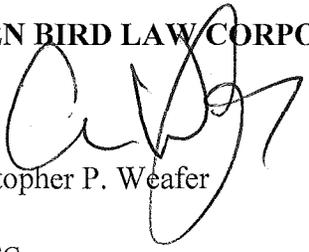
**Re: British Columbia Hydro and Power Authority ("BC Hydro") Supply Chain  
 Applications Project Phase Two ~ Project No. 1598975**

We are counsel to the Commercial Energy Consumers Association of British Columbia (the "CEC"). Attached please find the CEC's first set of Information Requests with respect to the above-noted matter.

If you have any questions regarding the foregoing, please do not hesitate to contact the undersigned.

Yours truly,

**OWEN BIRD LAW CORPORATION**

  
 Christopher P. Weafer

CPW/jj  
 cc: CEC  
 cc: BC Hydro  
 cc: Registered Interveners

**COMMERCIAL ENERGY CONSUMERS ASSOCIATION  
OF BRITISH COLUMBIA (“CEC”)**

**INTERVENER INFORMATION REQUEST NO. 1**

**British Columbia Hydro and Power Authority (BC Hydro) Supply Chain  
Applications Project Phase Two  
Project No. 1598975**

**December 18, 2018**

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**1. Reference: Exhibit B-1, page 1-3**

BC Hydro monetized the cost and effort reduction benefits in a base case resulting in a net present value of discounted cash flows of \$68.3 million with a range of \$2.2 million to \$103.2 million between the low and high scenarios. Anticipated benefits from reducing or eliminating risks were not monetized because there is insufficient information available to calculate the economic benefit, although BC Hydro believes there will be reduced or avoided costs resulting from the risk reductions;

- **Project Risks:** The Commission was satisfied that BC Hydro's approach to project risk management was appropriate. BC Hydro developed a risk register outlining the likelihood of occurrence and consequences of each risk, and mitigation plans. BC Hydro also has a Risk Management Plan in place to manage these risks, and expects that project risks will be reduced through the course of the Definition Phase as its mitigation plans are advanced; and

1.1 Does BC Hydro regularly examine and assess its ability to effectively reduce risks?

1.1.1 If yes, please provide the metrics that BC Hydro normally utilizes to evaluate risk reductions.

1.1.2 If no, please explain why not and what information would be useful in BC Hydro's view to evaluate its ability to reduce risks.

2. Reference: Exhibit B-1, page 1-3 to 1-4, and 1-5 and page 1-6 and page 2-1

- **Project costs:** With respect to total project costs, BC Hydro estimated a mid-range cost estimate of \$65.9 million with upper- and lower-bound cost

estimates ranging from \$60.5 million to \$79.3 million. In the Phase One proceeding, acceptance of capital expenditures ranging from \$22.5 million to \$29.7 million to complete work to the end of the Definition Phase was requested. The Commission found that the proposed lower-bound and mid-range cost estimates, in total and up to the end of the Definition Phase, were supported by their respective cost breakdowns and were reasonably robust.

Based on the updated information, the forecast project completion date for the SCA Project is March 2021 at a cost in the range of \$71.3 million to \$79.3 million and with a base case scenario net present value of discounted cash flows of \$41.8 million and a base case scenario net present value of revenue requirements of \$25.1 million.

- The Expected Cost estimate is \$71.3 million, which is analogous to a P50 estimate. The Expected Cost estimate is comparable to the Mid-range Cost estimate of \$65.9 million in the Phase One Application. BC Hydro explains this variance in the referenced sections.

Sections 2.2.1 and 2.3.1; Appendix F

The SCA Project's Expected Cost of \$71.3 million has a cost estimating accuracy range of +15 per cent /- 10 per cent. The Expected Cost reflects BC Hydro's bottom-up estimate of the cost to deliver the SCA Project. When compared with the type of cost estimate BC Hydro would normally develop for an infrastructure project,

- 2.1. As the \$71.3 is comparable to the mid-range estimate, with an estimating accuracy of + 15% would BC Hydro consider \$82 million ( $\$71.3 \times 1.15$ ) to be an upper bound estimate and \$64.17 ( $\$71.3 \times .9$ ) to be a lower bound estimate? Please explain why or why not and provide quantification of any other upper or lower bound estimate.
- 2.2. Please discuss the difference between a P50 estimate and P90 estimate.

2.3. Did BC Hydro use a P90 or other in the Phase 1 filing? Please identify and explain why.

**3. Reference: Exhibit B-1, page 1-8 and Appendix E page 5 of 12**

In its Phase One Decision, the Commission found that “there may be a requirement for a more comprehensive review at the end of the Definition Phase” and that “further process will be determined once the Commission receives the Verification Report.” BC Hydro wishes to accommodate the need for whatever review of the Verification Report that the Commission determines is required. BC Hydro, however, must also consider the consequences of the loss of resource continuity due to a delay between the Definition and Implementation Phases.

Given that the Verification Report demonstrates that the SCA Project still has a strong project justification and positive NPV based on updated costs and benefits, BC Hydro has concluded that it is prudent to commence Implementation Phase activities in advance of a Commission Decision. On September 27, 2018, BC Hydro’s Board of Directors authorized the SCA Project to proceed with Implementation Phase activities up to the incremental increased value of \$15 million in advance of a Commission Decision. The Board Briefing Memo and Certified Resolution are included as Appendix E.

Proceeding with Implementation Phase activities will allow the project to continue with less risk, and will allow approximately six months for the regulatory process

without impact to the cost and schedule of the SCA Project. While this will entail increased cost recovery risk, BC Hydro is confident in the business case for the SCA Project and that the ultimate determination in this proceeding will be acceptance of the expenditures for the SCA Project.

The project is proposing to begin Implementation Phase activities in early October, prior to receiving the Commission’s decision on the Phase Two Application. This is to avoid the significant risk of the project losing key resources and continuity were it to incur a lengthy delay at this point in the project. It is expected that the regulatory process will take three to six months to complete, which will place between \$7.5 million and \$15 million at risk. We do not need BCUC approval to proceed, but rather approval for recovery of funds spent. On September 24, 2018, BC Hydro met with BCUC staff and outlined our implementation strategy.

3.1. Please provide a discussion of the Commission’s decision options in reviewing this application.

- 3.2. Please provide BC Hydro's views as to whether or not BC Hydro's decision to proceed with the Implementation Phase prior to the Commission's decision on whether to approve the Project could have any impact on the Commission's decision-making?
- 3.3. Please provide a discussion of the risks to BC Hydro if the Commission were to deny the project after BC Hydro has already begun the Implementation Phase.
- 3.4. Please provide a discussion of the risks to BC Hydro's Board of Directors if the Commission were to deny the project after BC Hydro has already begun the Implementation Phase.
- 3.5. Please provide a discussion of the risks to ratepayers if the Commission were to deny the project after BC Hydro has already begun the Implementation Phase.
- 3.6. Please provide a discussion of the risks to taxpayers if the Commission were to deny the project after BC Hydro has already begun the Implementation Phase.
- 3.7. What is the expected period of time that BC Hydro gains by proceeding with the Implementation Phase in advance of the Commission's determination?
- 3.8. Please provide a discussion of the 'incremental increased value of \$15 million,' explaining what it is and how it was arrived at.
- 3.9. Please provide a discussion of the \$7.5 million to \$15 million which was identified as being 'at risk'.
  - 3.9.1. Please provide an assessment of the 'risk', describing the types of 'resources' that could be lost and the impact of losing those resources.
  - 3.9.2. Please provide a probability for the 'risk'.
  - 3.9.3. Please discuss who would be expected to experience the negative impacts from the 'risk'.
  - 3.9.4. Please provide a discussion of the steps BC Hydro took to mitigate the risk, other than commencing the project ahead of receiving Commission approval.
- 3.10. Please confirm, or otherwise explain, that BC Hydro is always at risk of losing important resources in implementing its projects.

**4. Reference: Exhibit B-1, page 1-8 and page 1-9 and Appendix E page 5 of 12**

**Proceeding with Implementation Phase activities will allow the project to continue with less risk, and will allow approximately six months for the regulatory process**

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without impact to the cost and schedule of the SCA Project. While this will entail increased cost recovery risk, BC Hydro is confident in the business case for the SCA Project and that the ultimate determination in this proceeding will be acceptance of the expenditures for the SCA Project.

The project is proposing to begin Implementation Phase activities in early October, prior to receiving the Commission's decision on the Phase Two Application. This is to avoid the significant risk of the project losing key resources and continuity were it to incur a lengthy delay at this point in the project. It is expected that the regulatory process will take three to six months to complete, which will place between \$7.5 million and \$15 million at risk. We do not need BCUC approval to proceed, but rather approval for recovery of funds spent. On September 24, 2018, BC Hydro met with BCUC staff and outlined our implementation strategy.

- 4.1. Please relate the value of the \$millions 'at risk' to the 3 – 6 month time frame for a Commission process. i.e. If the Commission process took 3 months, was the risk at \$7.5 million whereas at 6 month the risk was \$15 million? Please elaborate and provide justifications for BC Hydro's figures.
- 4.2. What steps would be required for BC Hydro to request an expedited process from the Commission? Please explain and provide the expected costs of requesting an expedited process.
- 4.3. Did BC Hydro request an expedited process from the Commission? Please explain.
  - 4.3.1. If yes, please elaborate on the result of that request.
  - 4.3.2. If no, please explain why not.
- 4.4. Please confirm that the 'risk' of losing \$7.5 million to \$15 million would have represented a reasonable justification for requesting an expedited process.
  - 4.4.1. If not, please explain why not.
- 4.5. If the Commission were to have processed the application within 1 month, what would the value of the 'risk' have been? Please provide a justification for the figure.
- 4.6. Would BC Hydro agree that proceeding without Commission approval adds a measure of complexity to the regulatory filing and application that would otherwise not have been necessary? Please explain.
- 4.7. Please confirm that BC Hydro essentially considers the Commission decision to be straightforward and uncomplicated.
  - 4.7.1. If not confirmed, please explain why not and discuss the complexities and/or issues that could arise that make it less than straightforward.

5. Reference: Exhibit B-1, page 2-4 and page 2-7

2.2.1 Definition Phase: Expected Cost Estimate

In the Phase One Application, BC Hydro's Mid-range Cost to the end of the Definition Phase was a total of \$26.1 million. This included actual costs of \$11.7 million for activities completed prior to filing the Application,<sup>4</sup> \$11.4 million for direct future project costs, \$2.3 million for contingency, and \$0.8 million for interest during construction.

As of the end of August 2018, the Expected Cost to the end of the Definition Phase is now \$25.4 million (row J). BC Hydro's actual recorded cost (including interest during construction) is \$24.0 million and BC Hydro estimates the future project cost for the remaining Definition Phase activities at \$1.4 million. The difference between the Definition Phase Expected Cost and the Definition Phase Mid-range cost in the Phase One Application is a positive variance of \$0.7 million, comprised of a positive capital cost variance of \$0.9 million and a negative operating cost variance of \$0.2 million.

Table 2-2 Definition Phase: Verification Report Cost Estimate (including Actual Cost) versus Phase One Cost Estimate (\$ million)

Ref	Components	Capital Costs		Operating Costs		Total Costs		
		Phase One Cost Estimate (A)	Verification Report Cost Estimate (B)	Phase One Cost Estimate (C)	Verification Report Cost Estimate (D)	Phase One Cost Estimate (E)	Verification Report Cost Estimate (F)	Variance (F-E)
A	Supply Chain Transformation Blueprint (Early Design Costs)	7.3	7.3	-	-	7.3	7.3	0.0
B	Identification	-	-	1.2	1.2	1.2	1.2	0.0
C	Definition (Early Definition as of November 2016)	3.0	3.0	0.1	0.1	3.1	3.1	0.0
D	Definition (Early Definition post November 2016)	1.0	0.7	0.3	0.0	1.2	0.7	-0.6
E	Definition (Mobilization, Design & Implementation Planning)	9.4	9.7	0.8	1.4	10.2	11.0	0.9
F	Total Life-to-Date Cost as of August 31, 2018 (A + B + C + D + E)	20.7	20.6	2.4	2.7	23.1	23.4	0.3
G	Direct Future Costs to End of Definition	-	1.3	-	0.1	0.0	1.4	1.4
H	Contingency (% * Direct Future Costs to End of Definition)	2.1	0.0	0.2	0.0	2.3	0.0	-2.3
I	Interest During Construction	0.8	0.7	-	-	0.8	0.7	-0.1
J	Total Expected (Mid-range) Cost Estimate to end of Definition (F + G + H + J)	23.5	22.6	2.6	2.8	26.1	25.4	-0.7
K	Project Reserve - incremental contingency	1.9	0.0	0.2	0.0	2.0	0.0	-2.0
L	Project Reserve - reserve for known risks	4.2	0.0	-	0.0	4.2	0.0	-4.2
M	Incremental Interest During Construction on Project Reserve	0.1	0.0	-	0.0	0.1	0.0	-0.1
N	Total Project Reserve (K + L + M)	6.1	0.0	0.2	0.0	6.3	0.0	-6.3
O	Total Authorized Cost Estimate to end of Definition (J + N)	29.7	22.6	2.8	2.8	32.4	25.4	-7.0

Notes:

1. Minor differences attributable to rounding.
2. Contingency in Phase One Application was 20 per cent of Direct Future Costs of \$10.3 million.
3. Direct costs are inclusive of inflation. Contracts with third parties are inclusive of inflation. Internal labour cost estimates are built using BC Hydro's standard labour rates, which are also inclusive of inflation.
4. As BC Hydro resources charge their time directly to Information Technology projects, capitalized overheads are not allocated to BC Hydro's Information Technology projects.

- 5.1. The CEC notes that the negative variance in costs is almost completely a result of savings in contingency and project reserve. Does BC Hydro normally end up using Contingency and/or Project Reserve funds in the Definition Phase of a Project, or is this something that is normally not needed? Please explain and provide some quantification of the frequency and level to which BC Hydro typically uses its Contingency/Project Reserve.
- 5.2. How does BC Hydro evaluate the validity of its cost estimating over the long term? Please explain.
  - 5.2.1. Please provide the results of any assessment BC Hydro conducts in validating its cost estimating over the last five years.

**6. Reference: Exhibit B-1, page 2-5 and 2-6 and Exhibit B-1, pages 2-9**

**2.2.2 Definition Phase: Authorized Cost Estimate**

The Authorized Cost is the Expected Cost plus project reserve. A project reserve of \$6.3 million was assigned to the Definition Phase in the Phase One Application. As discussed in section [2.2.1](#), the updated Definition Phase Expected Cost for the SCA Project is below the Mid-range cost. Therefore, the SCA Project will not be

- 1 accessing the Definition Phase project reserve. BC Hydro has also not reserved any
- 2 funds to mitigate unknown or known risks for the balance of the Definition Phase.

The forecast direct cost for the Implementation Phase is \$37.9 million (\$31.5 million capital cost and \$6.4 million operating cost). This is \$6.6 million higher than the forecast direct cost of \$31.3 million (\$27.9 million capital cost and \$3.4 million operating cost) for the Implementation Phase included in the Phase One Application. As detailed in [Table 2-3](#) below, the \$6.6 million variance is due to an increase in the contract between BC Hydro and the System Integrator and in BC Hydro's internal costs, due to changes in the SCA Project's schedule and a need for additional resources dedicated to the SCA Project.

**Table 2-3 Future Direct Cost Variance Breakdown (\$ million)**

<b>Variance Explanation</b>	<b>Cost Variance (\$ million)</b>
Change in System Integrator Contract	3.4
Change in BC Hydro's Internal Cost	3.2

- 6.1. When BC Hydro does not use contingencies in the Definition Phase of a Project, does BC Hydro normally reduce its upper, mid or low cost estimates by the unused Project Reserve/contingency funds from the Definition Phase or do these normally carry over into later phases? Please explain.

7. Reference: Exhibit B-1, pages 2-9 and 2-10

**Table 2-3 Future Direct Cost Variance Breakdown (\$ million)**

Variance Explanation	Cost Variance (\$ million)
Change in System Integrator Contract	3.4
Change in BC Hydro's Internal Cost	3.2

The underlying driver for the increase in the Implementation Phase direct costs is an overall increase in the complexity and understanding of the solution, which has led to an increase in the project schedule and estimated resource levels that will be required to complete it. See section 4.3.3 and section 6.3 for a discussion of the Design and Implementation Planning stage activities and the changes to the project schedule, respectively.

Based on the updated design work, the System Integrator has agreed to a fixed price for the remaining scope of work for the Implementation Phase of the SCA Project. The scope of work includes what System Integrator previously divided into the following three work packages: 3) Realization - Build and Testing

(Implementation); 4) Final Preparation - User Acceptance Testing and Training (Implementation) and 5) Stabilization - Post go-live (Implementation). The fixed price contract with the System Integrator is reflected in the updated direct cost estimate.

In summary, the updated forecast direct cost better reflects the required additional resources and extended project schedule to meet the solution design, and is supported by the fixed price contract with the System Integrator.

- 7.1. Please confirm or otherwise explain that PwC is the System Integrator and also the primary developer of the Verification Report information.
- 7.2. Please provide details of the changes to the System Integrator Contract.
- 7.3. Please provide the original value of the System Integrator Contract.
- 7.4. Please provide the original value for BC Hydro's Internal cost.
- 7.5. Please detail the 'increase in the complexity and understanding of the solution' that has led to an increase in the project schedule and required resources.

7.6. Would increases such as those to the System Integrator Contract and consequent increases have counted as part of the Project Reserve/contingencies under the Phase 1 application, or would these have been considered something different? Please explain.

8. **Reference: Exhibit B-1, page 2-12**

### **2.3.2 Total SCA Project: Authorized Cost Estimate**

The Authorized Cost of \$79.3 million is the sum of the Expected Cost of \$71.3 million and a revised project reserve of \$8.0 million ([Table 2-7](#), row AJ). The Authorized Cost is the same as the Upper Bound Cost in the Phase One Application.

The project reserve provides for the potential cost risks to the SCA Project beyond that included in determining the Expected Cost. The project reserve has two components: 1) an additional reserve amount to mitigate cost impacts associated with two discrete known risks totaling \$1.3 million ([Table 2-7](#), row AG) and 2) an incremental contingency of \$6.5 million ([Table 2-7](#), row AH) to mitigate unknown risks. There is also incremental IDC on the project reserve of \$0.2 million ([Table 2-7](#), row AI). The project reserve is controlled by the Board of Directors, and not the project manager or project director. The SCA Project cannot access the project reserve without first obtaining approval from the Steering Committee, the President, and the Board of Directors. To secure the release of the project reserve, a formal expenditure authorization request revision is required. Furthermore, the portion of project reserve relating to known risks will only be accessible if those risks materialize.

8.1. What process will be followed if the project costs ultimately exceed the ‘Authorized Cost’?

8.1.1. Under what circumstances would the Commission be advised of the potential for a cost-overrun, and what options are open to the Commission in such an event?

9. Reference: Exhibit B-1, page 2-15

1 Table 2-7 Total SCA Project: Verification Report Cost Estimate (including Actual Cost)  
2 versus Phase One Cost Estimate (\$ million)

Ref	Components	Capital Costs		Operating Costs		Total Costs		
		Phase One Cost Estimate (A)	Verification Report Cost Estimate (B)	Phase One Cost Estimate (C)	Verification Report Cost Estimate (D)	Phase One Cost Estimate (E)	Verification Report Cost Estimate (F)	Variance (F-E)
R	Supply Chain Transformation Blueprint (Early Design Costs) (A from Table 2-2)	7.3	7.3	-	-	7.3	7.3	0.0
S	Identification (B from Table 2-2)	-	-	1.2	1.2	1.2	1.2	0.0
T	Definition (Early Definition as of November 2016) (C from Table 2-2)	3.0	3.0	0.1	0.1	3.1	3.1	0.0
U	Definition (Early Definition post November 2016) (D from Table 2-2)	1.0	0.7	0.3	0.0	1.2	0.7	-0.6
V	Definition (Mobilization, Design & Implementation Planning) (E from Table 2-2)	9.4	9.7	0.8	1.4	10.2	11.0	0.9
W	Total Life-to-Date Cost as of August 31, 2018 (R + S + T + U + V)	20.7	20.6	2.4	2.7	23.1	23.4	0.3
X	Direct Future Costs to End of Definition (G from Table 2-2)	-	1.3	-	0.1	-	1.4	1.4
Y	Contingency (% * Direct Future Costs to End of Definition) (H from Table 2-2)	2.1	0.0	0.2	0.0	2.3	0.0	-2.3
Z	Interest During Construction (Definition Phase) (I from Table 2-2)	0.8	0.7	-	-	0.8	0.7	-0.1
AA	Total Definition Phase Expected (Mid-range) Cost Estimate (W + X + Y + Z)	23.5	22.6	2.6	2.8	26.1	25.4	-0.7
AB	Implementation (Costs to Go Live)	22.9	25.9	2.2	4.9	25.1	30.7	5.6
AC	Implementation (Stabilization & Completion)	4.9	5.6	1.2	1.6	6.1	7.2	1.1
AD	Contingency (% * Direct Future Costs)	5.6	4.7	0.7	1.0	6.3	5.7	-0.6
AE	Interest During Construction	2.2	2.3	-	-	2.2	2.3	0.1
AF	Total Expected (Mid-range) Cost Estimate (AA + AB + AC + AD + AE)	59.2	61.1	6.7	10.2	65.9	71.3	5.4
AG	Project Reserve - Reserve For Known Risks (from P in Table 2-5)	5.2	1.3	0.0	0.0	5.2	1.3	-3.9
AH	Project Reserve - Incremental Contingency (from Q in Table 2-1)	6.9	5.4	0.8	1.1	7.7	6.5	-1.2
AI	Incremental Interest During Construction on project reserve	5.2	1.3	0.0	0.0	5.2	1.3	-3.9
AJ	Total Project Reserve (AG + AH + AI)	12.6	6.9	0.8	1.1	13.4	8.0	-5.4
AK	Total Authorized Cost Estimate (AF + AJ)	71.8	68.0	7.5	11.3	79.3	79.3	0.1

Supply Chain Applications Project  
Phase Two Verification Report

1 Notes:

- 2 1. Minor differences attributable to rounding.  
3 2. Contingency in Phase One Application was 20 per cent of Direct Future Costs of \$42.7 million. Contingency in the Verification Report is 15 per cent of  
4 Direct Future Costs of \$37.9 million.  
5 3. Direct costs are inclusive of inflation. Contracts with third parties are inclusive of inflation. Internal labour cost estimates are built using BC Hydro's  
6 standard labour rates, which are also inclusive of inflation.  
7 4. As BC Hydro resources charge their time directly to Information Technology projects, capitalized overheads are not allocated to BC Hydro's Information  
8 Technology projects.

- 9.1. Please provide the rationale for reducing the contingency from 20% of Direct Future Costs to 15% of Direct Future Costs.
- 9.2. What percentage of Direct Future Costs or equivalent does BC Hydro normally assign for contingency, and how does this change over the course of a project?

10. Reference: Exhibit B-1, page 2-17

1 **2.4 Other SCA Project Costs**

2 In addition to the costs described above, the SCA Project is anticipated to incur  
3 incremental annual operating and capital costs of between \$2.3 million and  
4 \$3.4 million<sup>9</sup> to provide ongoing business support and sustainment. This amount  
5 includes costs not reflected in the Phase One Application, such as ongoing Supply  
6 Chain business unit support and sustainment costs, including headcount reduction  
7 costs. The Phase One Application had ongoing IT-only support and sustainment  
8 costs of between \$1.8 million to \$2.9 million.

9 As these costs are ongoing costs following the project being placed in service, they  
0 are not included in [Table 2-2](#) or [Table 2-6](#). However, consistent with the Phase One  
1 Application, these costs have been incorporated into the net present value of  
2 discounted cash flow and revenue requirements described in section 3.4 and  
3 provided in Appendices F and J.

4 The SCA Project will result in the impairment of the remaining PassPort supply chain  
5 IT asset. The net book value of the three supply chain-related PassPort IT assets as  
6 of August 2018 is approximately \$0.7 million. In accordance with International  
7 Financial Reporting Standards<sup>10</sup>, BC Hydro will accelerate depreciation<sup>11</sup> of the  
8 remaining supply chain PassPort IT system costs in the Implementation Phase and  
9 will fully depreciate the asset by the in-service date of the project.

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<sup>9</sup> Figures are in nominal dollars.

<sup>10</sup> International Accounting Standard 36, Paragraph 58 states the asset shall be adjusted in future periods to allocate the asset's revised carrying amount, less its residual value (if any), on a systematic basis over its remaining useful life."

<sup>11</sup> Under current depreciation rates, the net book value of the Passport supply chain-related IT assets will be \$0.3 million by the committed in-service date (March 2020). Therefore, BC Hydro will accelerate the depreciation rate such that at the committed in-service date the assets will be fully depreciated. The accelerated depreciation of the remaining Passport supply chain-related IT assets has not been included in the revenue requirement impact analysis as it is not a material amount.

- 10.1. Is the \$2.3 million to \$3.3 million in incremental annual operating costs in excess of the \$1.8 million to \$2.9 million in anticipated IT support, or is the Phase 1 identified IT operating support included in the incremental costs of \$2.3-\$3.3 million? Please explain.
- 10.2. Is the FRS standard for accelerated depreciation of IT assets under these circumstances mandatory or is there flexibility? Please explain.
- 10.3. If there is flexibility, please explain why BC Hydro opted for accelerated depreciation.

**11. Reference: Exhibit B-1, page 3-1 and Appendix G, page 5 of 10**

BC Hydro and PricewaterhouseCoopers (PwC) have worked together over the Definition Phase to validate and refine the analysis of the discrete benefits flowing from the SCA Project and the expected quantifiable benefits that will result. The updated analysis incorporates a distinction between benefits that can be quantified and benefits that can be monetized (i.e., expected incremental reductions in BC Hydro’s revenue requirements, all else being equal). Based on PwC’s advice, the analysis recognizes that benefits that save a small increment of time of many individuals across the organization are unlikely to be monetized, even though they can be quantified in dollar terms and represent a value to the organization.

Based on the Definition Phase work, the annual recurring quantifiable benefits of the SCA Project at stabilization are expected to be \$34.8 million, with \$23.0 million of this amount monetized. This compares to BC Hydro’s mid-range estimate in the Phase One Application of \$26.2 million in annual benefits that can be quantified and realized.

*Annual value of benefits (Phase 1 Filing)*

	<i>Phase 1 Filing (Low Case)</i>	<i>Phase 1 Filing (Mid Case)</i>	<i>Phase 1 Filing (High Case)</i>
<i>Cost</i>	\$6.9 M	\$11.4 M	\$13.7 M
<i>Effort</i>	\$8.8 M	\$14.7 M	\$17.7 M
<i>Risk</i>	\$0.0 M	\$0.0 M	\$0.0 M
<i>Total</i>	<b>\$15.7 M</b>	<b>\$26.2 M</b>	<b>\$31.4 M</b>

*Figure 2: Summary of Low/Mid/High Case Projections from Phase 1 Filing*

*Annual value of benefits (Phase 2 Filing)*

<i>Phase 2 Filing</i>	
<b>Expected Monetized Benefit</b>	\$23.0 M
<b>Non-Monetized Benefit</b>	\$11.8 M
<b>Risk (Non-Quantified)</b>	\$0.0 M
<b>Expected Quantified Benefit Total</b>	<b>\$34.8 M</b>

*Figure 3: Summary of benefit estimates for Phase 2 Filing*

- 11.1. Why did BC Hydro not recognize that benefits that ‘save a small increment of time of many individuals’ is unlikely to be monetized in its Phase 1 report?
- 11.2. Please confirm or otherwise explain that the Phase 1 report with \$26.2 million of annual benefits quantified and realized assumed that all the benefits were able to be ‘monetized’.

12. Reference: Exhibit B-2, page 3-7

**Table 3-2 Changes to Identified Benefits**

<b>Benefit ID</b>	<b>Benefit Name</b>	<b>Change</b>	<b>Category (Cost/ Effort/ Risk)</b>
92	Reduced spend due to systematic communication of change in the demand	New	Cost
102	Improved visibility of excess project material	New	Cost
103	Improved reel return management	New	Cost
104	Reduction in inventory obsolescence write-offs	New	Cost
60	Reduction of expedited purchasing on non-stock material	Removed	Cost
66	Reduced cost to compile spend reports	Removed	Effort
93	Inventory process effort reduction	New	Effort
94	Reduction of efforts to process manual POs	New	Effort
96	Reduction of effort to process manual change requests	New	Effort
97	Reduced effort for scheduler via improved material visibility	New	Effort
100	Reduced effort with system blocks on closing charge codes with open orders	New	Effort
105	Reduction in project forecasting effort	New	Effort
13	Reduced effort by streamlining demand management on long-lead time items	Removed	Effort
15	Effort reduction through automated inventory level management	Removed	Effort
23	Reduced effort via evaluated receipt settlement (ERS)	Removed	Effort
35	Reduced effort via centralized kitting	Removed	Effort
44	Reduced effort to execute material return from projects	Removed	Effort
56	Eliminate maintenance of duplicate work orders in PassPort	Removed	Effort
98	Reduced risk of receiving and paying for non-compliant material	New	Risk

12.1. Please provide a column indicating the value of each New and Removed Benefit.

13. Reference: Exhibit B-1, page 3-7 and 3-8

**3.2.3 Expected Quantified Benefits**

PwC worked with BC Hydro to validate and refine the quantification of the benefits. The quantified benefits in the Verification Report equals a maximum potential benefit forecast of \$64.4 million annually, assuming a 100 per cent realization rate. This has resulted in an increase in the benefits forecast of \$12 million annually from the

maximum potential benefit forecast in the Phase One Application of \$52.4 million annually.

In the Phase One Application, for its base (mid-range) case, BC Hydro assumed that 50 per cent of the identified quantifiable benefits will be realized (\$26.2 million annually). For the Verification Report, for each quantified discrete benefit, a realization ratio from 50 per cent to 100 per cent was assigned based on the design work and increased confidence in the ability to achieve the benefits. Overall, the effective weighted realization ratio is now approximately 54 per cent for the Phase Two base case. The overall increase in the value of the quantified benefits and the change in the effective weighted realization ratio have resulted in expected quantified benefits (**Expected Benefits**) of \$34.8 million.

- 13.1. Please provide details of the process by which the ‘realization ratios’ were developed and by whom these were done.

**14. Reference: Exhibit B-1, page 3-8 and 3-10 and Appendix G page 5 of 10**

The following assumptions were also used in the analysis:

- (i) Based on a more refined analysis, BC Hydro has estimated that an average of 65 per cent of cost reduction benefits will be attributable to capital activities, with the remaining average of 35 per cent being attributable to operating and financing activities. In the Phase One Application 76 per cent of cost benefits were attributed to capital activities and 24 per cent to operating activities, based on an analysis of historical spend information. Benefits relating to financing activities were not included in this capital/operating allocation.

Based on the projected allocation of effort reduction impacts to specific parts of the organization as a result of the Design work done to date, an average of 65 per cent of effort reduction benefits are attributable to capital activities and 35 per cent to operating activities. In the Phase One Application, the allocation of effort reduction benefits was assumed to be 40 per cent capital and 60 per cent operating, based on the portion of BC Hydro's total labour costs incurred for capital versus operating activities;

**Table 3-3 Phase Two Annual Expected Benefits versus Phase One Annual Mid Benefits Scenario at Full Ramp Up (\$ million)<sup>1</sup>**

Capability Gap	Phase One Mid Scenario Benefits (A)	Verification Report Expected Benefits (B)	Variance (B - A)
1 - Inability to manage service related spend	12.04	10.85	-1.18
2 - Poor contract management	5.98	16.29	10.30
3 - Limited ability to manage inventory levels	6.04	3.55	-2.49
4 - Poor management of individual supplier performance	0.20	0.00	-0.20
5 - Limited ability to manage supply chain for capital projects	0.00	1.12	1.12
6 - Lack of order, delivery and payment tracking	0.10	0.09	-0.01
7 - Inability to support return of unused materials	0.07	0.82	0.75
8 - Inability to pre-assemble materials for field crews	0.39	0.00	-0.39
9 - Lack of mobile access to inventory information	0.00	0.00	0.00
10 - No self-serve option for routine service requests	0.62	1.33	0.72
11 - Inability to pay suppliers without an invoice	0.06	0.00	-0.06
12 - Inability to streamline controls and approvals process	0.02	0.29	0.27
13 - Inability to integrate with work management systems	0.68	0.43	-0.24
<b>Total</b>	<b>26.17</b>	<b>34.77</b>	<b>8.59</b>

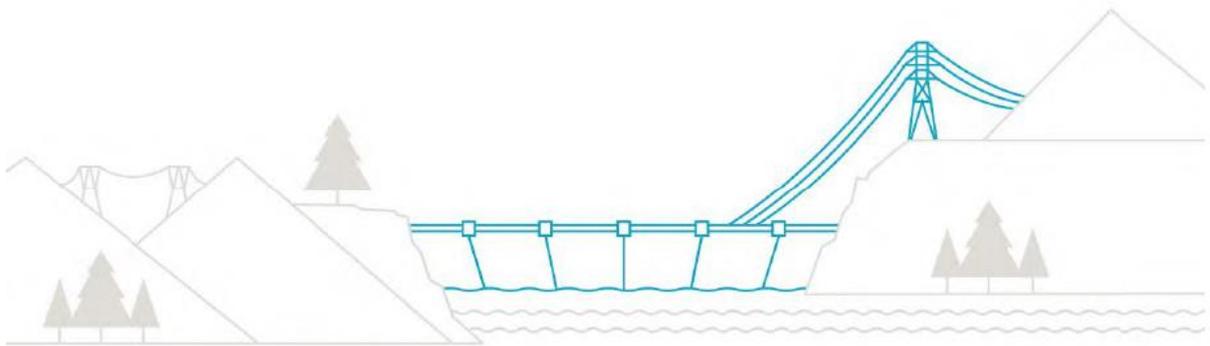
- 14.1. Please provide a column in Table 3-3 with the total cost reduction benefits broken down by capital activities, operating and financing activities from both the Phase 1 application and the Verification Report, so that the information is available for each capability gap.

15. Reference: Exhibit B-1, Appendix H, page 1 of 87

# SCA Benefits

## Updated Analysis post Design Phase

October 3, 2018



This report should be read in its entirety and should not be separated. This report was a joint effort between PwC and BC Hydro and the final deliverable represents the outcome of this joint effort. Given PwC's role as System Implementor (SI) for the BC Hydro SCA Project this report represents a refined benefits case based on the work completed jointly by PwC and BC Hydro through the recently completed Design Phase of the SCA Project.



Appendix H

- 15.1. Does BC Hydro agree that PwC has a vested interest in the outcome of the Verification Report and the approval for BC Hydro to proceed with the project? Please explain why or why not.
- 15.2. If yes, why did BC Hydro not employ an independent firm to conduct the Verification Report? Please explain.

16. Reference: Exhibit B-1, page 3-16

**Table 3-5 Summary of Key Risk Reduction Benefits**

Risk Category	Risk Description		Updated Likelihood & Impact	
	Phase One	Phase Two Risk Update	Today	After SCA
<b>Safety</b>	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.	No incremental safety risk benefits were identified and the risk profile was validated based on design. SAP functionality such as source lists, outline agreements and service masters (line item level tracking), and more real-time visibility of operational contract information will help reduce the risk of non-preferred / non-qualified contractors performing the work.	Moderate likelihood, low to high impact	Low likelihood, low to high impact
<b>Financial</b>	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.	SAP functionality includes service masters and outline agreements, which allows for the creation of standardized service contracts, and the creation of Purchase Orders for Services will enable more active contract management, thereby reducing the risk of paying suppliers at incorrect rates. One incremental benefit identified was the reduced risk of receiving and paying for non-compliant material.	Low to moderate likelihood, low to moderate impact	Low likelihood, low to moderate impact (impacts could also reduce)
<b>Reputational</b>	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.	No incremental reputational risk benefits were identified, risk profile was validated based on design. SAP reporting functionality will enhance the level of detail and quality of costs - enriching the spend data for more accurate reporting, thereby reducing reputational risk.	Moderate likelihood, low to moderate impact	Low likelihood, low to moderate impact

- 16.1. What additional information is required to ensure that BC Hydro only contracts with qualified suppliers?
- 16.2. Why can BC Hydro not simply require vendors to document their qualifications with their bids?

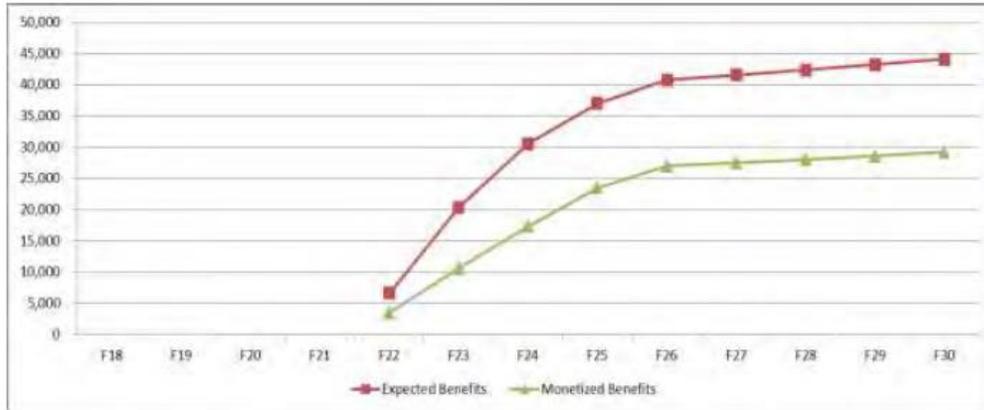
- 16.3. How often has BC Hydro contracted with non-qualified suppliers in the past five years? Please provide the frequency and the value of the contracts.
- 16.4. Please provide the process by which the Verification Report was able to verify and/or update the change in likelihood and impact for the Safety risk.
- 16.5. How does BC Hydro currently track whether or not it ‘overpays’ for goods and services or pays for goods and services that are not received? Please provide BC Hydro’s five year history.
- 16.6. Please provide the process by which the Verification Report was able to verify and/or update the change in likelihood and impact for the financial risk.
- 16.7. How often does BC Hydro currently pay for non-compliant material? Please provide BC Hydro’s history of receiving and paying for non-compliant material over the last five years including the value and frequency of such events.
- 16.8. Please provide examples of the specific goods and services for which BC Hydro is not able to report on the spending.
- 16.9. Please provide the process by which the Verification Report was able to verify and/or update the change in likelihood and impact for the Reputational risk.
- 16.10. Please discuss why being able to report on the spending for such goods and services is necessary for the future, when it has not been required in the past.
- 16.11. Please elaborate on why the reliance on manual tracking of quality inspection items increases the risk that poor-quality items are accepted by BC Hydro.
  - 16.11.1. Please provide evidence that this is the case.
- 16.12. Please provide the process by which the Verification Report was able to verify and/or update the change in likelihood and impact for the Reliability risk.

**17. Reference: Exhibit B-1, page 3-18 and 3-19 and 3-21**

**3.4 Net Present Value**

Based on the updated benefits analysis described in sections [3.2.3](#) and [3.2.4](#), once benefits stabilize, the SCA Project will result in \$20.4 million per year (fiscal 2018 dollars) of cost reduction savings (for materials and services) and \$14.4 million of expected effort reduction savings (of this amount there is \$2.6 million of monetized effort reduction savings) per year (fiscal 2018 dollars) as explained in section [3.2.4](#). All benefits are estimated to stabilize by fiscal 2026 and have been forecast to increase by inflation.

**Figure 3-1 Ramp Up of Expected and Monetized Benefits Cash Flow (\$ '000)**



Similar to what was done in the Phase One application, BC Hydro has performed two sets of NPV analyses: 1) NPV of discounted cash flows, and 2) NPV of the revenue requirements. The NPV of discounted cash flows measures the profitability or the value added of a potential investment. The calculated NPV of discounted cash flows excludes the sunk costs as described in the Phase One Application<sup>16</sup> and Interest during Construction, which is consistent with prior applications for major capital projects. The NPV of the revenue requirements measures the net value that will flow to ratepayers. The NPV of revenue requirements analysis is discussed further in section [3.4.2](#).

<sup>16</sup> Sunk costs are defined for modeling purposes as project costs incurred up to November 30, 2016.

**Table 3-6 NPV of Discounted Cash Flows: Sensitivity and Breakeven Analysis**

Scenarios	NPV of Discounted Cash Flows (\$ million)	Benefit Percentage Required to Breakeven (%)
Expected Costs / Monetized Benefits	41.8	60
Authorized Costs / Monetized Benefits	31.9	69
Expected Costs / Expected Benefits	102.5	38
Authorized Costs / Expected Benefits	92.6	44

- 17.1. Please provide the sunk costs.
- 17.2. Please provide the NPV values and Figure 3-1 including all the sunk costs.
- 17.3. Please provide Table 3-6 including sunk costs.

**18. Exhibit B-1, page 3-20 and 3-21**

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<sup>17</sup> The nominal discount rate used for the NPV analysis in the Phase One Application was 7 per cent as this was BC Hydro's weighted average cost of capital at the time. The current discount rate is based on the weighted average cost of capital provided under BC Hydro Business Planning Common Rates of 6.0 per cent nominal. The inputs and calculation of the discount rate is as follows:

- BC Hydro's target debt-equity ratio: 60:40
  - Cost of Debt: 4.01 per cent (forecast incremental cost of debt based on information provided by the Ministry of Finance)
  - Return on Equity: 8.75 per cent (benchmark return on equity determined by Commission Order No. G-129-16)
  - WACC = (% of debt x cost of debt) + (% of equity x return on equity) = (60% x 4.01%) + (40% x 8.75%) = 5.906% = 6% rounded to the nearest 25 basis points.
- 

**Base Case – Expected Cost / Monetized Benefits Scenario:** The NPV of discounted cash flows for the Base Case scenario is positive at \$41.8 million. The equivalent mid scenario NPV of discounted cash flows in the Phase One proceeding was \$68.3 million<sup>18</sup>. The NPV of discounted cash flows in the Base Case scenario is lower than the Phase One Application Mid-range scenario NPV of discounted cash flows by \$26.5 million due primarily to the determination that approximately only 18 per cent of the financial value of the expected effort reduction benefits can be reasonably monetized as discussed in section [3.2.4](#). This is a departure from the approach taken in the Phase One Application, where BC Hydro assumed it could monetize all the Mid-range effort reduction benefits. The \$5.4 million increase in the Expected Cost also has a negative impact on the NPV of discounted cash flows. All else being equal, the change in the nominal discount rate from 7 per cent to 6 per cent had a positive impact of \$7.2 million on the Base Case NPV of discounted cash flows.

- 18.1. Does BC Hydro expect that its discount rate could change over the period of the project?
- 18.1.1. If yes, what changes does BC Hydro anticipate for its discount rate over the next 5 and 10 years? Please explain.

**19. Reference: Exhibit B-1, page 3-22**

**Authorized Cost / Monetized Benefits Scenario:** BC Hydro calculated a scenario where the SCA Project draws on the full amount of the project reserve and realizes the Monetized Benefits. In this Authorized Cost / Monetized Benefits scenario, the NPV of discounted cash flows based on monetized benefits is \$31.9 million.

- 19.1. Please conduct a sensitivity analysis in which the Monetized Benefits are reduced by 15%, 20%, 25% and 50%.

20. Reference: Exhibit B-1, Appendix G Cover and Exhibit B-1, page 3-9, and Appendix H Cover page 1 of 87

## Appendix G

### PwC Conclusion & Summary on SCA Benefits Analysis Post Design Phase

For each quantified benefit, the calculation logic and realization ratio was reviewed, validated, and refined. In addition to the information in Appendix F, included in the Benefits Report is a detailed benefits analysis for each identified benefit including the realization ratio, the Expected Benefit, the SCA Project Design considerations, and how the benefit was calculated.

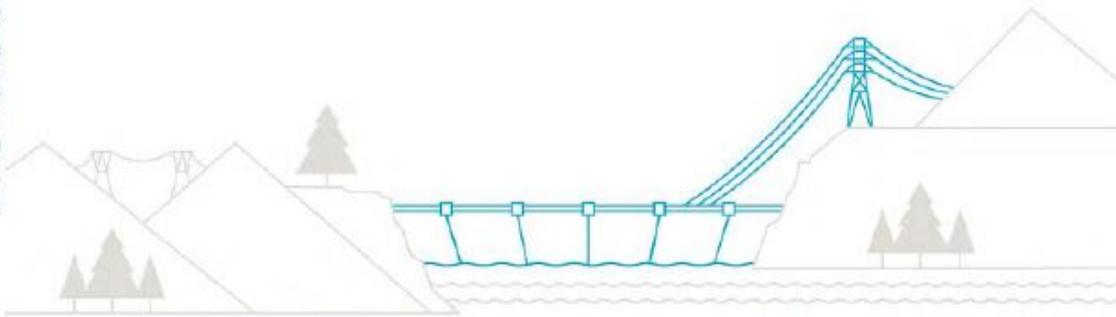
# SCA Benefits

## Updated Analysis post Design Phase

October 3, 2018

Supply Chain Applications Project  
Phase Two Verification Report

Page 1 of 87



This report should be read in its entirety and should not be separated. This report was a joint effort between PwC and BC Hydro and the final deliverable represents the outcome of this joint effort. Given PwC's role as System Implementor (SI) for the BC Hydro SCA Project this report represents a refined benefits case based on the work completed jointly by PwC and BC Hydro through the recently completed Design Phase of the SCA Project.



Appendix H

- 20.1. Do Appendix G and H together with Appendix F, represent the complete report provided by PwC?

20.2. If no, please provide the complete report provided by PwC.

**21. Reference: Please confirm that Appendix H is the Benefits Report referenced on page 3-9 of the Application.**

21.1. If not confirmed, please provide the report or identify where it is included in the application.

**22. Reference: Exhibit B-1, Appendix G, page 9 of 10**

### ***Benefits dependencies***

The realization of benefits will be dependent on the adoption of tools available to BC Hydro, the level of change management that goes into project implementation and governance and benefits tracking. The following dependencies are overarching to all benefits identified in the review.

- **Master data management:** This includes a commitment to master data governance and stewardship such as the timely entering of information into the system to enable benefits associated with contract management and negotiations. The creation of new material masters in a timely manner for all materials, which will flow through the BC Hydro distribution network or require quality inspection. The development of new service masters to eliminate or minimize the need for free text services. The SCA project will require an increased awareness of the dependant master data requirements and potential process design efforts supported by appropriate training and change management efforts.
- **Governance and benefits tracking:** Active supply chain governance with clear lines of accountability need to be established to deliver the benefits, including ongoing benefits tracking and key performance indicator reporting. As part of the governance and reporting, it is necessary to make sure the baseline metrics (in the "IT Benefits Tracking" form) are well understood and the tracking and measuring mechanisms are agreed upon early and then managed (and governed) through a sustainment team or organization.
- **Supplier engagement:** BC Hydro must be willing to execute on savings opportunities and make decisions to engage suppliers to hold them to contractual commitments, service levels and obligations to reduce and recover contract leakage benefits.
- **Demand management:** Improved demand management capabilities to align supply strategies to materials requirements to reduce excess materials. Commitment to accuracy of material needs dates coming out of work orders and projects.
- **Change management:** There will be a need to change behaviors and practices for effective use of the new system, such as the discipline to capture more transactions for various supply chain activities. Dedicated change management support and training will be necessary to help achieve the realization of the benefits.

### **Conclusion**

The SCA project is expected to continue to show a net positive return for BC Hydro and its ratepayers. The PwC analysis is based on experience with many like projects in the Utility sector and indicates an Expected Quantified Benefit of **\$34.8 million** per year including an Expected Monetized Benefit of **\$23.0 million** in cost and effort benefits. Additionally there are significant non-quantified benefits, including the ability to close the capability gaps in BC Hydro's Supply Chain function, reduce the current risk profile as outlined earlier in the summary and re-deploy effort and operational resources to help actively manage costs and improve service.

Considering the premise of monetization (the likely realization of a financial reduction) when deploying supply chain transformations across many disparate areas, and with much of the effort benefits yielded in smaller time increments shared between thousands of employees, we are supportive of BC Hydro's project strategy of focusing on monetizing the cost benefits and select few (most achievable) effort benefits. This approach is conservative, yielding a highly achievable Expected Monetized Benefit of \$23.0 million (\$20.4 million of cost and \$2.6 million of effort benefits).

- 22.1. Please provide a quantitative assessment of the value of master data management activities needed.
  - 22.1.1. Please discuss BC Hydro's current practices with regard to data management activities and how these will change under the Supply Chain project.
- 22.2. Please provide a quantitative assessment of the value of governance and benefits tracking activities needed.
- 22.3. Please discuss BC Hydro's current practices with regard to governance and benefits tracking activities and how these will change under the Supply Chain project.
- 22.4. Please provide a quantitative assessment of the value of supplier engagement activities needed.
- 22.5. Please discuss BC Hydro's current practices with regard to supplier engagement activities and how these will change under the Supply Chain project.
- 22.6. Please provide a quantitative assessment of the value of the demand management activities needed.
- 22.7. Please discuss BC Hydro's current practices with regard to demand management activities and how these will change under the Supply Chain project.
- 22.8. Please provide a quantitative assessment of the value of the change management activities needed.
- 22.9. Please discuss BC Hydro's current practices with regard to change management activities and how these will change under the Supply Chain project.

23. Reference: Exhibit B-1, Appendix H, page 4 of 87

## Objectives

BC Hydro has recently completed design stage for the Supply Chain Applications (SCA) project. With this higher level of design detail available, the benefits BC Hydro is expecting from the SCA implementation can be further refined and updated to reflect the current level of confidence. This is an interim update to the benefits analysis to support BC Hydro in providing an update to the British Columbia Utilities Commission (BCUC).

### Objectives of this Report

#### Validate quantified and non-quantified benefits and update based on Design

- Increase the level of accuracy of quantified benefits included in the 2016 BCUC filing (through stakeholder workshops and applicable industry benchmarking)
- Identify new benefits from SCA based on design completed and quantify where appropriate

#### Refine the assessment of attainability of the benefits

- Compare forecasted benefits from SCA to available benchmarks of industry peers, where applicable, who have previously undertaken similar implementations to increase the level of confidence in estimates for key benefits

#### Provide documentation for future benefits tracking and analysis

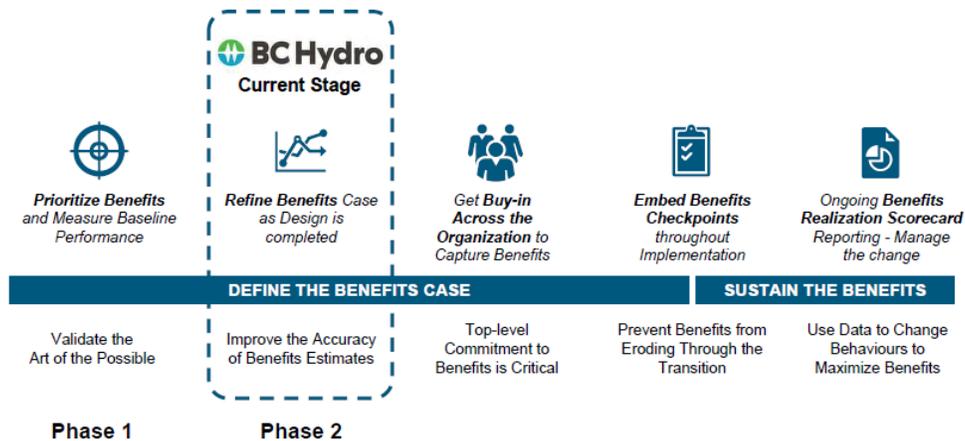
- Develop the required benefits documentation to support the 2018 BCUC filing
- Complete BC Hydro's IT Benefits Tracking form for the SCA benefits to support BC Hydro's benefits realization management program

- 23.1. Please provide the PwC Building Trust and Transparency - A Holistic Approach to Third Party Contracts 2016 or identify where it is included in the application.
- 23.2. Please identify the industry peers and the project implementations included in the report.
- 23.3. Please discuss the ways in which BC Hydro differs from the industry peers in the report.
- 23.4. Please discuss the ways in which the BC Hydro project differs from the industry peer projects in the report.
- 23.5. Please provide a discussion of how PwC modified its expectations from the 'benchmark range' to account for the unique aspects of BC Hydro and its current project.

**24. Exhibit B-1, page 3-18 and Appendix H, page 5 of 87**

The benefits tracking sheet is used to capture changes in tracked benefits, metrics and measures over time. Each benefit tracking sheet includes the baselines, the target benefits, and the metrics and/or measures used to assess the benefit. BC Hydro will prepare a tracking sheet for every effort reduction benefit with an annual Expected Benefit above \$500,000 at stabilization, and for every cost reduction benefit. At this materiality limit, BC Hydro will be tracking the twelve benefits that comprise approximately 96 per cent of the total Expected Benefits and 99 percent of the total Monetized Benefits. BC Hydro includes as Appendix I the benefits tracking sheets.

The updated Phase 2 SCA Benefits Case captures the design work completed to date through to the end of the C2 Design phase. It refines the benefits based on the more detailed data available.



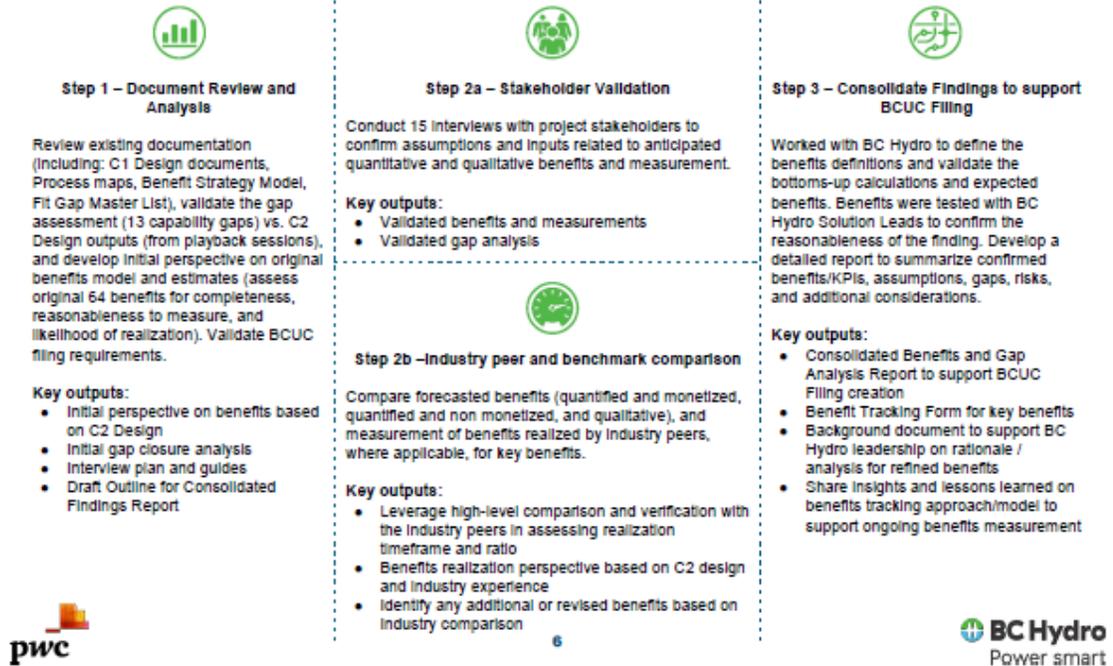
- 24.1. Please confirm or otherwise explain that the ‘baseline metrics’ against which BC Hydro will evaluate the project represent a ‘Business As Usual’ approach, rather than any kind of post-internal efforts that could be taken in the absence of the project.
- 24.2. The above illustration shows the Measurement of Baseline Performance occurring prior to Refining the Benefits case, refining the benefits and getting buy in across the organization and top-level commitment to achieving benefits. Please explain how the Benefits measurement ensures that the benefits are attributable only to the capital expenditures associated with the Supply Chain project, and not to the other activities which could be generated as a result of the corporate buy in and top-level commitment.
- 24.3. Please provide the complete set of baseline metrics or identify where these are included in the application.

**25. Reference: Exhibit B-1, page 3-4 and 3-5 and Appendix H, page 6**

- **Step 1: Document Review and Analysis** - Reviewed existing documentation and validated capability gap assessments against design stage outputs to assess benefits for completeness, reasonableness to measure, and likelihood of realization;
  
- **Step 2a: Stakeholder Validation** - Conducted interviews with SCA Project stakeholders to confirm assumptions and inputs for forecasted quantitative and qualitative benefits and measurement;
  
- **Step 2b: Industry Peer and Benchmark Comparison** – Compared forecasted benefits to the measurement of benefits realized by industry peers for key benefits to assess realization timeframe and ratio and identify any changes to the benefits that might be necessary; and
  
- **Step 3: Tested benefits with BC Hydro stakeholders** to confirm reasonableness of findings and developed a detailed report to summarize confirmed benefits, key performance indicators, assumptions, gaps, risks, and any other additional considerations.

## Approach to Refine Benefits Analysis

The following steps were performed to refine the benefits analysis and complete this report.



- 25.1. Please provide a description of C1 and C2 Design documents.
- 25.2. Please explain the process by which PwC validated the gap assessment vs C2 Design outputs.
- 25.3. Please describe the process used for assessing the original 64 benefits for “completeness, reasonableness to measure and likelihood of realization”.
- 25.4. Please identify the positions of the 15 stakeholders who were interviewed.
- 25.5. Please provide a discussion of how the interviews were conducted.
- 25.6. Please provide a discussion of the types of evidence PwC collected to validate stakeholder claims developed during the interviews.
- 25.7. Please explain the meaning of ‘Leverage’ as an output in high level comparison and verification.
- 25.8. Please provide the full Consolidated Benefits and Gap Analysis Report or identify where it is included in this application.

**26. Reference: Exhibit B-1, page 3-11 and Appendix H page 20 of 87**

- **Capability Gap No. 2 – Poor Contract Management:** The Expected Benefits for capability gap No. 2 increased by \$10.3 million annually. This increase is as a result of a change in the underlying approach to Benefit ID No. 5 – “Reduced Cost Due to Active Contract & Supplier Management.” Benefit ID No. 5 quantifies BC Hydro’s increased ability to better manage contracts and suppliers to ensure anticipated contract benefits are fully realized, do not erode, and are increased over time. In the Phase One Application, BC Hydro had forecasted the value of this benefit as a reduction of 0.5 per cent of overall spend based on its improved ability to negotiate commercial terms with better data and visibility to demand. PwC advised taking a broader focus to quantify the benefits from active contract and supplier management not only to negotiate better terms, but also to mitigate value leakage. The benchmarked range for savings from the elimination of cost leakage from contract non-compliance was determined to be between 0.5 per cent and 3 per cent in a PwC study<sup>14</sup>. BC Hydro and PwC determined that a reduction of 1.5 per cent, which is just below the mid-point, is achievable and reasonable.

<sup>14</sup> PwC – Building Trust and Transparency – A Holistic Approach to Third Party Contracts – 2016.

# ID #5 - Reduced Cost Due to Active Contract & Supplier Management

Cost

SUMMARY

Better ability to manage contracts, suppliers and spend on an ongoing basis to ensure anticipated contract benefits are fully realized, do not erode and are increased over time. Supplier-related costs will be reduced due to active contract and supplier management enabled by SCA capabilities which provide more visibility, management and control over spend, contract terms and supplier performance; and by refocusing additional resources on these activities that are freed up through effort savings created by other benefit areas. Examples of SCA capabilities include: conformance to contract terms through outline agreements with 'locked pricing', management of milestone payments, better visibility of contract spend to ensure compliance to appropriate contracts, more efficient and reliable access to the signed contracts and amendments, matching of service and material acceptance with invoice information to ensure payment only of work and materials delivered, ERS that allows to pay without invoice while still supporting early payment discounts, ability to track discounts and rebates, ability to monitor and measure contract fulfillment and supplier performance, reports that provide data-based knowledge for decisions and actions.

<b>Expected Quantified Benefit</b>	<b>100% Benefit at</b>	<b>Realization Ratio</b>
<b>\$16.1 M</b>	<b>Year 5</b>	<b>50%</b>

DETAILS

	Phase 1 Filing	Phase 2 Filing	Change	
Expected Quantified Benefit (\$)	\$5.8 M	\$16.1 M	+\$10.3 M	
				Phase 1 Filing <span style="background-color: #0056b3; color: white; padding: 2px 5px;">\$5.8 M</span>
				Phase 2 Filing <span style="background-color: #0056b3; color: white; padding: 2px 5px;">\$16.1 M</span>

**Benefit Details**  
 BC Hydro's current systems have limited functionality to capture contract details for Business Groups across the company to enable active contract and supplier management. As a result, efforts are currently expended on manually gathering information. Reduced manual efforts from gathering information through the use of spreadsheets will be redirected to actively manage contracts and suppliers. With SCA functionality, it is expected these efforts to be repurposed to actively managing contracts and suppliers and therefore mitigate current value leakage due to missed discount terms, non-compliance to contracted rates and terms, overage charge due to rework or unjustified change orders.

**Rationale for Change**  
 The Phase 1 approach focused on BC Hydro's improved ability to negotiate commercial terms with better data and visibility to demand (savings of 0.5% of overall spend). This revised approach takes a broader focus to quantify the benefits from active contract and supplier management to not only negotiate better terms but also to mitigate value leakage.

**SCA Design Considerations**  
 Use of outline agreements to capture contracts as well as use of material and service masters to capture itemized services will enable BC Hydro to track progress on work and contract compliance. Use of these SCA elements will enable electronic tracking of contracted terms to mitigate leakage through non-compliance. There will also be a number of operational reports such as Contract Expiration, Measure of Non-Compliance with Contract Terms, Measure of Missed Discount Terms, Measure Number of Change Order that Exceeds Contract Price and Spend by Outline Agreement along with a Supplier Relationship Management dashboard that will provide timely and quality information for more active management.

**How To Calculate Benefit**  
 Using a baseline of \$2.14 billion in addressable spend (managed through procurement process), a reduction of 1.5% is achievable via supplier spend reduction through active contract and supplier management.

The savings estimate percentage applied represents the mid-point of the benchmarked range for a PwC study on contract management and contract value leakage (non-compliance).

<b>Savings from elimination of cost leakage from contract non-compliance</b>	<b>0.5-3%</b>
PwC - Building Trust and Transparency - A Holistic Approach to Third Party Contracts - 2016	

**Benefit Details**  
 BC Hydro's current systems have limited functionality to capture contract details for Business Groups across the company to enable active contract and supplier management. As a result, efforts are currently expended on manually gathering information. Reduced manual efforts from gathering information through the use of spreadsheets will be redirected to actively manage contracts and suppliers. With SCA functionality, it is expected these efforts to be repurposed to actively managing contracts and suppliers and therefore mitigate current value leakage due to missed discount terms, non-compliance to contracted rates and terms, overage charge due to rework or unjustified change orders.

**Rationale for Change**  
 The Phase 1 approach focused on BC Hydro's improved ability to negotiate commercial terms with better data and visibility to demand (savings of 0.5% of overall spend). This revised approach takes a broader focus to quantify the benefits from active contract and supplier management to not only negotiate better terms but also to mitigate value leakage.

**SCA Design Considerations**  
 Use of outline agreements to capture contracts as well as use of material and service masters to capture itemized services will enable BC Hydro to track progress on work and contract compliance. Use of these SCA elements will enable electronic tracking of contracted terms to mitigate leakage through non-compliance. There will also be a number of operational reports such as Contract Expiration, Measure of Non-Compliance with Contract Terms, Measure of Missed Discount Terms, Measure Number of Change Order that Exceeds Contract Price and Spend by Outline Agreement along with a Supplier Relationship Management dashboard that will provide timely and quality information for more active management.

- 26.1. Please elaborate with specific examples and quantification where possible on the 'broader focus' that was advised to be included by PwC.
- 26.2. Please confirm that BC Hydro staff are currently tracking progress on work and contract compliance.
- 26.3. How does BC Hydro currently evaluate its progress on work and contract compliance? Please explain, and provide how often this assessment is undertaken by BC Hydro.

**27. Reference: Exhibit B-1, Appendix H page 20 of 87 and Appendix F, page F2.**

**How To Calculate Benefit**  
Using a baseline of \$2.14 billion in addressable spend (managed through procurement process), a reduction of 1.5% is achievable via supplier spend reduction through active contract and supplier management.  
The savings estimate percentage applied represents the mid-point of the benchmarked range for a PwC study on contract management and contract value leakage (non-compliance).

Savings from elimination of cost leakage from contract non-compliance	0.5-3%
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PwC - Building Trust and Transparency - A Holistic Approach to Third Party Contracts - 2016

- 27.1. Please confirm that the full dataset supporting the benefits attributed to ‘Reduced Cost Due to Active Contract and Supplier Management’ is included in Appendix F, page F2, or identify the other sources of information.
- 27.2. F2 references page numbers in multiple locations. Please identify the page references.
- 27.3. Please provide further details of the \$32,145,000 Phase 2 total effort (F2, Row 8, Column N or identify where this can be found in the application).
- 27.4. Does BC Hydro currently establish percentage or other objectives for procurement savings? Please explain.
  - 27.4.1. If yes, please provide BC Hydro’s objectives and results for the last five years.
  - 27.4.2. If not, please explain why not.

**28. Reference: Exhibit B-1, page 4-5 and 4-6**

*SCA Project Team Formation and Training*

The core project team is comprised of roughly 65 individuals from BC Hydro and the Systems Integrator. During the Mobilization Stage, the core project team was on-boarded and received training on the project plans and procedures, including

design methodology and approach, BC Hydro's supply chain process model, SAP's functionality and capabilities, and BC Hydro's existing processes and information technology systems.

*Develop Plan for the Design and Implementation Planning Stage*

During the Mobilization Stage, BC Hydro and the System Integrator worked together to develop a series of documents that outline how the project will be governed; the procedures it will utilize; the project organization, roles and responsibilities; and the detailed work plans of the activities to be performed.

- 28.1. Please provide the number of individuals in the core project team from BC Hydro and the number of individuals from the System Integrator.

**29. Reference: Exhibit B-1, page 2-9 and page 2-10 and page 4-2**

**Table 2-3 Future Direct Cost Variance Breakdown  
(\$ million)**

Variance Explanation	Cost Variance (\$ million)
Change in System Integrator Contract	3.4
Change in BC Hydro's Internal Cost	3.2

The underlying driver for the increase in the Implementation Phase direct costs is an overall increase in the complexity and understanding of the solution, which has led to an increase in the project schedule and estimated resource levels that will be required to complete it. See section 4.3.3 and section 6.3 for a discussion of the Design and Implementation Planning stage activities and the changes to the project schedule, respectively.

Based on the updated design work, the System Integrator has agreed to a fixed price for the remaining scope of work for the Implementation Phase of the SCA Project. The scope of work includes what System Integrator previously divided into the following three work packages: 3) Realization - Build and Testing

(Implementation); 4) Final Preparation - User Acceptance Testing and Training (Implementation) and 5) Stabilization - Post go-live (Implementation). The fixed price contract with the System Integrator is reflected in the updated direct cost estimate.

In summary, the updated forecast direct cost better reflects the required additional resources and extended project schedule to meet the solution design, and is supported by the fixed price contract with the System Integrator

#### **4.2 Scope of the Supply Chain Applications Project**

The functional and technical components of SAP that are in scope for the SCA Project are materially the same as discussed in section 4.3 of the Phase One Application. The key scope elements include the installation of the following SAP-based systems: materials management; purchasing; and integration. In section 4.3 of the Phase One Application, BC Hydro also stated that the objectives of the SCA Project were to close the capability gaps in the existing supply chain IT system; meet the Supply Chain Business Requirements; and deliver the benefits.

The sections below include a discussion of any changes to the functional and technical components of SAP that are in scope and a re-assessment of the SCA Project's ability to meet the stated objectives.

- 29.1. Please provide the cost of the original system integrator contract.
  - 29.2. Please rationalize the increase in the system integrator contract with the statement that the scope of the project has not changed materially.
- 30. Reference: Exhibit B-1, page 5-3 and page 5-7**

The only newly identified risk is the potential for low data quality and/or data not being ready according to the Project Schedule. The main type of data relevant to this risk is information on BC Hydro's contracts. If this risk materializes, it would not impact project costs, but could result in increased operating cost pressures as BC Hydro works to increase the data quality and availability; any impact to the project schedule due to this risk would be addressed through the project schedule contingency.

In [Table 5-1](#) below, for each identified risk, the applicable risk category, and the status of the risk (active, inactive, new, updated) is provided. Risks with a status that includes the words "Updated" or "Inactive" were previously included in the Phase One Application. The newly identified risk is highlighted for easy identification.

6	Project Delivery	Active, Updated	Requirement to undertake a protracted regulatory process in order to proceed with implementation phase work	Comprehensive Application; propose a schedule that facilitates a decision by April 2018.	In progress	Potential impact will vary depending on date and wording of British Columbia Utilities Commission decision.	Board of Directors resolution passed enabling the project to proceed with Implementation Phase activities for up to six months while the regulatory approval process continues in parallel. Some residual risk remains that delay may be required if regulatory process extends beyond six months.	Monitoring	Low probability: High impact
				Incremental funding included in Project Reserve as described in section 2.4.2, Table 2-4	Completed				

- 30.1. Please define Low, Medium and High Probability, with quantification.
- 30.2. Please define Low, Medium and High Impact, with quantification.
- 30.3. Please provide a quantification for the ‘High Impact’ noted for the regulatory risk.
- 31. Reference: Exhibit B-1, page 5-3, page 5-13 and Appendix H, page 20 of 87

The only newly identified risk is the potential for low data quality and/or data not being ready according to the Project Schedule. The main type of data relevant to this risk is information on BC Hydro's contracts. If this risk materializes, it would not impact project costs, but could result in increased operating cost pressures as BC Hydro works to increase the data quality and availability; any impact to the project schedule due to this risk would be addressed through the project schedule contingency.

15	Project Delivery	New	Low data quality and or data not being ready according to Project Schedule			Continue detailed assessment and planning of data conversion requirements in early Realization	In Progress	Medium Probability, medium impact
						Alignment of the data conversion tasks with business transition and resource plans	Planned	

### ID #5 - Reduced Cost Due to Active Contract & Supplier Management Cost

Supply Chain Applications Project	SUMMARY		Better ability to manage contracts, suppliers and spend on an ongoing basis to ensure anticipated contract benefits are fully realized, do not erode and are increased over time. Supplier-related costs will be reduced due to active contract and supplier management enabled by SCA capabilities which provide more visibility, management and control over spend, contract terms and supplier performance, and by relocating additional resources on these activities that are freed up through effort savings created by other benefit areas. Examples of SCA capabilities include: conformance to contract terms through outline agreements with 'locked pricing', management of milestone payments, better visibility of contract spend to ensure compliance to appropriate contracts, more efficient and reliable access to the signed contracts and amendments, matching of service and material acceptance with invoice information to ensure payment only of work and materials delivered, ERS that allows to pay without invoice while still supporting early payment discounts, ability to track discounts and rebates, ability to monitor and measure contract fulfillment and supplier performance, reports that provide data-based knowledge for decisions and actions.	
	<b>Expected Quantified Benefit</b>	<b>100% Benefit at</b>	<b>Realization Ratio</b>	
	<b>\$16.1 M</b>	<b>Year 5</b>	<b>50%</b>	

	Phase 1 Filing	Phase 2 Filing	Change	Phase 1 Filing	\$5.8 M
<b>Expected Quantified Benefit (\$)</b>	\$5.8 M	\$16.1 M	+\$10.3 M	Phase 2 Filing	\$16.1 M

**Benefit Details**  
BC Hydro's current systems have limited functionality to capture contract details for Business Groups across the company to enable active contract and supplier management. As a result, efforts are currently expended on manually gathering information. Reduced manual efforts from gathering information through the use of spreadsheets will be redirected to actively manage contracts and suppliers with SCA functionality. It is expected these efforts to be repositioned to actively managing contracts and suppliers and therefore mitigate current value leakage due to missed discount terms, non-compliance to contracted rates and terms, overage charge due to rework or unjustified change orders.

**Rationale for Change**  
The Phase 1 approach focused on BC Hydro's improved ability to negotiate commercial terms with better data and visibility to demand (savings of 0.2% of overall spend). This revised approach takes a broader focus to quantify the benefits from active contract and supplier management to not only negotiate better terms but also to mitigate value leakage.

**SCA Design Considerations**  
Use of outline agreements to capture contracts as well as use of material and service masters to capture itemized services will enable BC Hydro to track progress on work and contract compliance. Use of these SCA elements will enable electronic tracking of contracted terms to mitigate leakage through non-compliance. There will also be a number of operational reports such as Contract Expiration, Measure of Non-Compliance with Contract Terms, Measure of Missed Discount Terms, Measure Number of Change Order that Exceeds Contract Price and Spend by Outline Agreement along with a Supplier Relationship Management dashboard that will provide timely and quality information for more active management.

**How To Calculate Benefit**  
Using a baseline of \$2.14 billion in addressable spend (managed through procurement process), a reduction of 1.5% is achievable via supplier spend reduction through active contract and supplier management.

The savings estimate percentage applied represents the mid-point of the benchmarked range for a PaC study on contract management and contract value leakage (non-compliance).

<b>Savings from elimination of cost leakage from contract non-compliance</b>	<b>0.5-0%</b>
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PaC - Building Trust and Transparency - A Holistic Approach to Third Party Contracts - 2018

**32. Reference: Please provide a full discussion as to the extent to which the risk related to ‘information of BC Hydro’s contracts’ relates to the ‘Reduced Cost Due to Active Contract and Supplier Management’ benefit ID#5.**

- 32.1. Please define ‘low quality data’ and provide examples.
- 32.2. If the data related to BC Hydro’s contracts is of low quality, how will BC Hydro ensure that the project benefits are maintained? Please discuss.
- 32.3. Please provide a discussion of why the new Risk was provided with a “medium” probability rating.
- 32.4. Please provide a discussion of why the new Risk was provided with a “medium’ impact rating and provide quantification of the potential impact.