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December 22, 2017

British Columbia Utilities Commission
Suite 410, 900 Howe Street
Vancouver, B.C.
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Attention: Mr. Patrick Wruck, Commission Secretary and Manager, Regulatory Support

Dear Mr. Wruck:

Re: FortisBC Inc. (FBC)

Project No. 1598934

Application for Approval of 2018 Demand-Side Management (DSM) Expenditures (the Application)

Response to the British Columbia Utilities Commission (BCUC or the Commission) Information Request (IR) No. 1

On November 15, 2017, FBC filed the Application referenced above. In accordance with Commission Order G-176-17 setting out the Regulatory Timetable for the review of the Application, FBC respectfully submits the attached response to BCUC IR No. 1.

If further information is required, please contact Sarah Wagner at (250) 469-6081.

Sincerely,

FORTISBC INC.

Original signed:

Diane Roy

Attachments

1.0 Reference: INTRODUCTION

Exhibit B-1, p. 1

Utilities Commission Act, section 44.2(5)

Exhibit A-2, p. 1

The FortisBC Inc. (FBC) Application for Acceptance of 2018 Demand-Side Management (DSM) Expenditures (Application) on page 1 states:

Pursuant to section 44.2 of the Utilities Commission Act (UCA or the Act), FBC seeks British Columbia Utilities Commission (BCUC or the Commission) acceptance of its DSM expenditure schedule for the year 2018, as set out herein (2018 DSM Plan). The 2018 DSM Plan anticipates expenditures on DSM of $7.9 million in total. The following application provides details to support FBC's 2018 DSM Plan and its funding request, including proposed funding for each program area and cost effectiveness results.

Section 44.2(5) of the Utilities Commission Act (UCA) states:

In considering whether to accept an expenditure schedule filed by a public utility other than the authority, the commission must consider

(a) the applicable of British Columbia's energy objectives,

(b) the most recent long-term resource plan filed by the public utility under section 44.1, if any,

(c) the extent to which the schedule is consistent with the applicable requirements under sections 6 and 19 of the Clean Energy Act,

(d) if the schedule includes expenditures on demand-side measures, whether the demand-side measures are cost-effective within the meaning prescribed by regulation, if any, and

(e) the interests of persons in British Columbia who receive or may receive service from the public utility.

In Order G-176-17, recital D, the Panel states:

The Panel considers that the Application does not provide the requisite information or level of detail to warrant an expedited decision …

1.1 Please provide supporting information and commentary to the Application which is commensurate with the level of detail provided in the FBC Application for

Acceptance of DSM Expenditures for 2017 and the accompanying 2017 DSM Plan.

Response:

Please refer to Attachment 1.1.

FORTIS BC™

FORTISBC INC.

Application for Acceptance of Demand Side Management Expenditures for 2018

Attachment 1.1
Supporting Information and Commentary

December 22, 2017

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1. INTRODUCTION

1.1 *BCUC IR 1.1.1*

On November 15, 2017, FortisBC Inc. (FBC or the Company) filed with the British Columbia Utilities Commission (BCUC or the Commission) an Application for Acceptance of Demand Side Management (DSM) Expenditures for 2018 (2018 DSM Application or the Application). The Application outlined FBC's request, pursuant to section 44.2(1)(a) of the *Utilities Commission Act* (UCA or the Act), for Commission acceptance of FBC's DSM expenditure schedule totalling $7.6 million for the year 2018.

On December 6, 2017, the Commission issued Order G-176-17, establishing a regulatory timetable for the Application. On the same date, the Commission delivered its Information Request (IR) No. 1 to FBC, consisting of the following request:

"Please provide supporting information and commentary to the Application which is commensurate with the level of detail provided in the FBC Application for Acceptance of the DSM Expenditures for 2017 and the accompanying 2017 DSM Plan."

This filing is FBC's response to BCUC IR 1.1.1 and provides the requested supporting information and commentary regarding the 2018 DSM Application. The funding request outlined in the Application and in this IR response is supported by a detailed 2018 DSM Plan, found in Appendix A. The 2018 DSM Plan provides details on each of FBC's program areas and individual DSM programs, including cost-effectiveness test results.

1.2 *REGULATORY CONTEXT*

The 2018 DSM Plan represents a continuation of previously approved DSM plans and is based on the high level spending and savings targets presented in FBC's 2016 Long Term Electric Resource Plan (2016 LTERP) and Long Term Demand Side Management Plan (LT DSM), which are currently under Commission review. A review of this regulatory context is provided below.

On August 8, 2016, FBC filed an application for acceptance of DSM expenditures for 2017 (2017 DSM Plan) of $7.6 million. The 2017 DSM Plan was a continuation of the expenditures and cost-effective programs previously accepted by the Commission in FBC's application regarding its 2015-2016 DSM Expenditure Schedule (2015-2016 DSM Plan). The Commission accepted the 2017 DSM Plan pursuant to Order G-9-17, dated January 25, 2017.

On November 30, 2016, FBC filed its 2016 LTERP and LT DSM Plan. The LT DSM Plan included an assessment of the appropriate level of cost-effective DSM resource acquisition to match the Company's resource needs over the LTERP's 20-year planning horizon. The savings targets presented for the first three years of the LT DSM Plan (2018-2020) were largely an extension of the previously approved 2015-2016 DSM Plan and 2017 DSM Plan.

The High DSM scenario FBC selected for its LT DSM Plan contemplated DSM expenditures for 2018 of $7.9 million and annual DSM savings of 26.4 GWh[1]. These reflect increases of approximately $0.3 million and 0.7 GWh as compared to FBC's accepted DSM budget for 2017 of $7.6 million and savings target of 25.7 GWh.

The LT DSM Plan calls for a ramp up in DSM spending and savings, beginning in 2021 to optimize short term utilization of Tranche 1 Energy from FBC's Power Purchase Agreement (PPA) with British Columbia Hydro and Power Authority (BC Hydro).[2] On this basis, the LT DSM Plan targets savings that would offset an average of 77 percent of FBC's forecast load growth annually over the LTERP's planning horizon.

Of the five Interveners that filed final written submissions in the LTERP process, none challenged or commented negatively on FBC's proposed ramp up approach to DSM. Each of the British Columbia Old Age Pensioners' Organization, et al. (BCOAPO), BC Sustainable Energy Association and Sierra Club BC (BCSEA), and the Commercial Energy Consumers Association of British Columbia (CEC) expressed support for the High DSM scenario in their respective written submissions.

The regulatory review process for the 2016 LTERP and LT DSM Plan is still ongoing. Interveners filed their Final Submissions on November 10, 2017 and FBC's Reply Argument was filed on November 24, 2017. Based on this timing, FBC expects the Commission's decision on the LTERP and LT DSM will be made, at the earliest, late in 2017 or more likely in 2018. By way of example, when the FortisBC Energy Utilities (FEU) 2014 Long Term Resource Plan was under review, it was approximately 2.5 months between the completion of final written argument and the Commission's decision being rendered.

1.3 *COMMISSION ORDER SOUGHT*

When the 2016 LTERP and LT DSM Plan were filed, FBC anticipated filing its next DSM expenditure schedule in mid-2017[3] following a Commission decision on the 2016 LTERP and LT DSM Plan. Due to the ongoing regulatory review of the 2016 LTERP and LT DSM Plan, on November 15, 2017 FBC filed an application seeking acceptance of a DSM budget for 2018 in advance of a Commission decision on the 2016 LTERP and LT DSM Plan, in order to continue offering its existing DSM programs in 2018 without any market disruption.

FBC seeks Commission acceptance of the 2018 DSM expenditure budget contemplated in the LT DSM Plan of $7.9 million. The 2018 DSM Plan will be a continuation of the expenditures and cost-effective programs previously accepted in the 2017 DSM Plan, with small modifications in order to comply with changes to applicable legislation as discussed further below. FBC expects

[1] 2016 LTERP and LT DSM Plan, Volume 2, Section 3.3, Table 3-2: Pro-forma DSM Savings Targets, pg. 16.
[2] 2016 LTERP and LT DSM Plan, Volume 2, Section 3, pg. 11.
[3] 2016 LTERP and LT DSM Plan, Volume 2, Section 2.1, pg. 6.

to file a multi-year DSM expenditure plan for 2019 onwards in 2018 that addresses any directives from the Commission's decision on the 2016 LTERP and LT DSM Plan.

As outlined in the Application and more fully explained in this IR response, the proposed 2018 DSM Plan expenditures are cost-effective, fulfil the adequacy requirements of the DSM Regulation[4], and are in the public interest.

[4] Demand-Side Measures Regulation 326/2008, as amended by B.C. Reg. 141/2014.

2. BACKGROUND

2.1 *LEGAL FRAMEWORK*

FBC filed the 2018 DSM Application pursuant to section 44.2(1)(a) of the UCA, which provides that a utility may file an "expenditure schedule" containing "a statement of the expenditures on demand-side measures the public utility has made or anticipates making during the period addressed by the schedule." All proposed activity in FBC's 2018 DSM Plan qualifies as "demand-side measures", as defined in the *Clean Energy Act* (CEA)[5]. Under section 44.2(2) of the UCA, the Commission must accept a schedule of DSM expenditures before those expenditures are included in a utility's rates.

Pursuant to section 44.2(3) and (4) of the UCA, the Commission must accept all (or a part of) the DSM expenditure schedule if it considers that making the expenditures in the schedule (or a part of it) would be in the public interest. In considering whether an expenditure schedule put forward by a public utility, other than the British Columbia Hydro and Power Authority (BC Hydro), is in the public interest, the Commission must consider the following criteria according to section 44.2(5):

- the applicable of British Columbia's energy objectives;
- the most recent long-term resource plan filed by the public utility under section 44.1 of the UCA, if any;
- if the schedule includes expenditures on demand-side measures, whether the demand-side measures are cost-effective within the meaning prescribed by regulation, if any; and
- the interests of persons in British Columbia who receive or may receive service from the public utility.[6]

Section 2.2, below, addresses how FBC's proposed 2018 DSM Plan supports the applicable energy objectives. Consistency with the Company's most recently filed long-term resource plan (the 2016 LTERP) is addressed in Section 2.3. Consideration of adequacy, as defined in the DSM Regulation, is discussed in Section 2.4. The Commission's comments in its decision regarding the 2017 DSM Plan Directives are addressed in Section 2.5 and consideration of the 2018 expenditure schedule's cost-effectiveness is addressed in Section 3.1. The discussion in the 2018 DSM Application and these supporting materials confirms that FBC's proposal furthers the interests of persons in British Columbia who receive or may receive service from FBC.

[5] *Clean Energy Act*, S.B.C. 2010, c. 22, s. 1(1) (Definitions)
[6] Section 44.2(5) also includes "(c) the extent to which the schedule is consistent with the applicable requirements under sections 6 and 19 of the [CEA]"; however, neither of those provisions is applicable to FBC in respect of the Application.

2.2 CONSISTENCY WITH BRITISH COLUMBIA ENERGY OBJECTIVES

British Columbia's energy objectives are set out in section 2 of the CEA. A summary of how FBC's proposed 2018 DSM Plan supports the applicable of these energy objectives is provided in the table below.

Table 2-1: BC's Energy Objectives Met by FBC DSM Activity

Energy Objective	FBC 2018 DSM Plan
(b) to take demand-side measures and to conserve energy…	FBC's DSM proposals are designed to implement cost-effective (as defined by the DSM Regulation) demand-side measures. See Section 3.
(d) to use and foster the development in British Columbia of innovative technologies that support energy conservation and efficiency and the use of clean or renewable resources;	FBC supports pilot projects for new DSM technologies, and the 2018 DSM Plan includes provision for Innovative Technology projects. See Appendix A, Section A5.
(h) to encourage the switching from one kind of energy source or use to another that decreases greenhouse gas emissions in British Columbia;	The BC Conservation Potential Review (CPR) report on fuel switching potential is not yet finalized. If or when FBC elects to pursue such measures it will file an application pursuant to s. 18 of the CEA and s. 4 of the Greenhouse Gas Reduction (Clean Energy) Regulation[7].
(i) to encourage communities to reduce greenhouse gas emissions and use energy efficiently;	Local government & institutional strategic energy planning, and Community Education & Outreach, are enabled through supporting initiatives. Provision for, and further development of, the BC Step Code will be included within Program areas. See Sections 2.4.4 and 2.4.5 and Appendix A, section A5.5.

2.3 CONSISTENCY WITH LONG TERM RESOURCE PLAN

Under section 44.2 of the UCA, in determining whether to accept an expenditure schedule filed by a utility, the Commission must consider the utility's most recent long-term resource plan filed under section 44.1 of the Act. For FBC, the current 2016 LTERP was filed on November 30, 2016 and currently awaits a decision from the BCUC. The DSM measures included in the 2018 DSM Plan are consistent with the measures assessed and the benefit/cost methodology used in the 2016 LTERP. More specifically, the measures included within programs in the 2018 DSM Plan pass the Total Resource Cost (TRC) test[8] and address the key end-uses of the principal customer rate classes - consistent with the 2016 LTERP (and approved for the 2017 DSM Plan).

[7] Greenhouse Gas Reduction (Clean Energy) Regulation, B.C. Reg. 102/2012, as amended

[8] The TRC test is the ratio of the benefits of a DSM measure divided by the DSM measure's cost, including the utility's program costs. The TRC is further described in Section 5.1.2.

The 2016 LTERP indicated that FBC's long run marginal cost (LRMC) of acquiring electricity from BC "clean or renewable" resources is $100.45/MWh (nominally $100/MWh).[9] In the 2018 DSM Plan, the Company uses $100/MWh as the LRMC, and continues to use the approved DCE factor of $79.85 per kW-yr.[10] Based on the LRMC of $100 per MWh, the 2018 DSM Plan achieves a TRC Benefit/Cost ratio of 1.6 at the portfolio level.

2.4 *ADEQUACY PURSUANT TO THE DSM REGULATION*

Section 44.1(8)(c) of the UCA provides that, in considering whether to accept a utility's long term resource plan, the Commission must consider whether the plan "shows that the public utility intends to pursue adequate, cost-effective demand-side measures". In practice, the on-going adequacy of a long term resource plan is achieved through the DSM measures funded through a utility's expenditure schedules under section 44.2(a) of the UCA. A public utility's DSM plan is "adequate" for these purposes, if it includes measures that satisfy the requirements set out in section 3 of the DSM Regulation.

The adequacy requirements in section 3 of the DSM Regulation were amended on March 24, 2017 pursuant to B.C. Reg. 117/2017 (the March 2017 Amendment), which added new requirements (e) and (f). The full section 3 requirements subsequent to the March 2017 Amendment are as follows:

a) a demand-side measure intended specifically to either (i) assist residents of low-income households to reduce their energy consumption, or (ii) reduce energy consumption in housing owned or operated by a local government, specified societies and associations, or a governing body of a first nation, if the benefits of the reduction primarily accrue to low-income households occupying the housing, the prescribed housing providers or the first nation governing body if the households in its housing are primarily low-income;

b) a demand-side measure intended specifically to improve the energy efficiency of rental accommodations;

c) an education program for students enrolled in schools in the public utility's service area;

d) an education program for students enrolled in post-secondary institutions in the public utility's service area;

e) one or more demand-side measures to provide resources as set out in paragraph (e) of the definition of "specified demand-side measure", representing no less than

   (i) an average of 1% of the public utility's plan portfolio's expenditures per year over the portfolio's period of expenditures, or

[9] 2016 LTERP and LT DSM Plan, Volume 1, Section 9.3.1, pg. 119
[10] Accepted by the Commission in Order and Decision No. G-19-17 regarding FBC's 2017 DSM Expenditure Application.

(ii) an average of $2 million per year over the portfolio's period of expenditures;

f) one or more demand-side measures intended to result in the adoption by local governments and first nations of a step code or more stringent requirements within a step code.

The Company addresses each of these adequacy provisions below. Further details on each program are provided in the 2018 DSM Plan at Appendix A.

2.4.1 Income Qualified program

FBC's low income program is designed to meet the needs of qualified low income customers within the Company's service area and is provided at no cost to eligible participants. It is offered in collaboration with FEI and BC Hydro to ensure consistency and delivery of best practices. The eligibility criteria for low income DSM programs are established in section 1 of the DSM Regulation.

The Low Income Program portfolio includes Energy Saving Kits (ESKs) (both mail-out and bulk distribution), and the collaborative BC Hydro and FortisBC Energy Conservation Assistance Program (ECAP) for single-family and housing society operated multi-unit residential buildings (MURB). Qualifying housing society buildings can also access the Commercial MURB rebate programs with a 40 percent incentive increase (to address affordability issues) for common area improvements.

2.4.2 Rental Accommodations

In 2016, FBC, in collaboration with FEI, launched a direct-install program with measures such as low flow fixtures and ENERGY STAR lighting products for rental MURB suites in its service territory. The program also provides no cost whole-building energy assessments to identify additional measures (common area lighting, central space heating and hot water boilers) that could be undertaken by the building owners, and provides two years of technical support and access to the FBC Commercial rebate programs. The 2018 DSM Plan continues this offer to MURBs in this target segment.

2.4.3 Education Programs

FBC, in collaboration with FEI, has developed a curriculum-connected online resource for BC elementary and secondary school teachers called Energy Leaders. Teachers can now download lesson plans to assist them with the energy related sections of the curriculum. Program design for grades 10-12 will begin in 2018 and be piloted in school year 2018-19.

FBC also provides financial and in-kind support for post-secondary initiatives for curriculum-based classroom instruction and broader campus-wide behaviour change programs.

2.4.4 Codes and Standards

The new paragraph 1(e) of the definition of "specified demand-side measure" referenced in the amended section 3(e) of the DSM Regulation is as follows:

> (e) financial or other resources provided
>
> (i) to a standards-making body to support the development of standards respecting energy conservation or the efficient use of energy, or
>
> (ii) to a government or regulatory body to support the development of or compliance with a specified standard or a measure respecting energy conservation or the efficient use of energy in the Province.

In addition, a new paragraph was added under section 4(1.1) of the DSM Regulation, the Cost-effectiveness test, as follows:

> (d) the benefit of the demand-side measure is what is would have been had no step code been adopted in the Province.

A new definition of the term "step code", used in the amended sections 3(f) and 4.1(d), was also added to section 1 of the DSM Regulation as follows:

> "step code", in relation to a building to which Part 3 or 9 of the British Columbia Building Code (the Code) applies, means energy efficiency requirements in a regulation made under section 3 of the *Building Act* that are more stringent than the requirements in
>
> (a) Sentence 10.2.1.1.(1) of the Code, for buildings to which Part 3 of the Code applies, or
>
> (b) Subsections 9.36.2 to 9.36.4 of the Code, for building to which Part 9 of the Code applies …

FBC's proposed 2018 DSM expenditure budget addresses section 3(e) of the DSM Regulation by including funding of $80,000 for Codes and Standards (C&S) under Supporting Initiatives. This funding represents 1 percent of the proposed 2018 DSM expenditure budget of $7.9 million. This C&S budget will be allocated to supporting energy efficiency products or installation standards produced by the Canadian Standards Association (CSA), advancing product or building codes, as well as FBC resources used to advance C&S generally.

2.4.5 Step Codes for Local Government and First Nations

FBC's Supporting Initiatives for its DSM programming includes funding for Community Energy Planning (CEP) assistance that local governments, including First Nations, can access to assist in adopting the progressive provincial Step Code for new construction using FBC's New Home

Program under its Residential DSM programs. This is the continuation of an existing FBC DSM measure.

With the addition of the funding to C&S, noted in section 2.4.4 above, and the continuation of the CEP as part of Supporting Initiatives, FBC's DSM programs in the 2018 DSM Plan are in compliance with the existing and new adequacy requirements under the DSM Regulation.

Furthermore, FBC's New Home program offering uses the BC Building Code as the baseline to calculate the benefit/cost ratio in compliance with section 4(1.1)(d) of the amended DSM Regulation.

2.5 *BCUC DIRECTIVES*

The Commission decision to accept FBC's 2017 DSM Plan, Order and Decision No. G-19-17, did not include any specific directives for FBC to address in its next DSM expenditure plan, but did raise concerns over extending existing DSM programs that fell short in performance in 2015.[11] FBC notes that, based on 2017 DSM performance results to date and ongoing DSM activity levels, FBC anticipates achieving its 2017 DSM Plan savings and expenditure targets. Further details regarding FBC's 2017 DSM performance are included in Appendix A. FBC also notes that the 2017 DSM Plan was developed and filed before the initial phase of the BC CPR had been completed, whereas the current 2018 DSM Plan and associated funding level is based on the CPR results as well as FBC's evaluation of its long term resource needs more generally, as reflected in the 2016 LTERP and LTD DSM Plan.

[11] BCUC Order G-9-17, Appendix A, Page 10 of 10

3. SUMMARY OF DSM PLAN AND FUNDING REQUEST

The 2018 DSM Plan (Appendix A) provides program details and projected cost-effectiveness test results by program, sector and at the portfolio level. The following provides summary information.

The DSM Plan covers FBC's funding request for 2018 for major customer sectors and program areas: Residential (including Low Income and Rental), Commercial (including Irrigation and Street Lighting), Industrial, Supporting Initiatives, and Portfolio (formerly Planning & Evaluation).

A single year funding approval is being requested to span the period until the Commission has issued its decision regarding FBC's 2016 LTERP.

The proposed 2018 DSM Plan is a modest increase of the level of expenditures and cost-effective programs comparable to the previously accepted 2017 DSM Plan by Order G-9-17. The funding level for the 2018 DSM Plan is also consistent with the level of expenditures contemplated in FBC's LT DSM Plan. A further ramp up in DSM spending and savings is planned to start in 2021. The programs in the 2018 DSM Plan are continuations and/or augmentations where appropriate, of programs that FBC is currently implementing, and has reported on in its prior DSM Annual Reports.

FBC requests acceptance of DSM expenditures of up to $7.9 million in 2018.

3.1 *FUNDING REQUEST BY PROGRAM AREA*

Table 3-1, below, is a summary table of the proposed 2018 DSM Plan's energy savings and expenditures by program area (sector), non-program areas and portfolio level totals. The table also presents TRC Benefit/Cost ratios by program area and at the portfolio level.

Table 3-1: 2017 Approved and 2018 DSM Plan Expenditures & Savings

	Program Area	2017 Approved		2018 Plan			2018/17 Difference	
		Savings	Cost	Savings	Cost	TRC[12]	Cost	% Diff
		MWh	($000s)	MWh	($000s)	B/C Ratio	($000s)	
1	**Sector**							
2	Residential	10,493	2,718	7,132	2,486	1.4	-231.6	-9%
3	Commercial	13,666	3,131	19,165	3,473	2.0	341.6	11%
4	Industrial	1,556	309	1,188	496	2.8	187.2	61%
5	**Program subtotal**	**25,715**	**6,158**	**27,486**	**6,456**	**1.8**	**297.2**	**5%**
6	Supporting Initiatives		674		742		67.9	10%
7	Portfolio		777		743		-34.2	-4%
8	**Total**		**7,610**		**7,940**	**1.6**	**330.8**	**4%**

Program expenditures are proposed to increase overall by 5 percent, or $0.3 million, and Program area plan costs have shifted in response to market conditions. Residential funding has declined by 9 percent or $0.2 million, offset by an 11 percent increase ($0.3 million) in Commercial funding, to reflect the levels of activity in these sectors in 2017. The significant increase in the Industrial sector shown in Table 3-1, above, reflects a higher incentive rate and a re-allocation of staff resources to that program. Supporting Initiatives includes an increase in C&S funding to comply with the March 2017 Amendment to the DSM Regulation.

FBC's planned DSM expenditures for 2018 are provided in more detail by program area/sector in the 2018 DSM Plan (Appendix A).

3.2 *DSM PROGRAMS*

The DSM programs listed in the 2018 DSM Plan are largely continuations, or enhancements, of existing programs included in the 2017 DSM Plan for which expenditures have previously been accepted by the Commission.

Further details for each program can be found in the 2018 DSM Plan (Appendix A).

3.3 *DSM GUIDING PRINCIPLES*

The 2016 LT DSM Plan was developed using the following guiding principles[13]:

1. The DSM Plan will be customer-focused by offering a range of measure choices within programs that address the key end-uses of the principal customer rate classes;

[12] Total Resource Cost (TRC) based on net savings and costs, adjusted by program NTGR (net to gross ratio).
[13] 2016 LTERP and LT DSM Plan, Volume 2, Section 2.1, pg. 6.

2. The DSM Plan will be cost-effective by including only those measures, with the exception of adequacy measures, that have a TRC Benefit Cost ratio greater than unity on a portfolio basis; and
3. The DSM Plan will be compliant with the applicable sections of the UCA, the CEA, and the DSM Regulation.

FBC continues to be guided by these principles in designing and carrying out the 2018 DSM Plan.

4. COST EFFECTIVENESS APPROACH

4.1 *COST-EFFECTIVENESS UNDER THE DEMAND-SIDE MEASURES REGULATION*

FBC's proposed DSM portfolio for 2018 is cost-effective according to the methodology set out in section 4 of the DSM Regulation. As shown in the 2018 DSM Plan, evidenced by Table 3-1 above, the DSM Plan on a portfolio basis passes the Total Resource Cost (TRC) test as it has a benefit to cost ratio greater than unity (1.0), namely 1.6.

The following discussion explains aspects of the TRC cost-effectiveness test(s) under the provincial DSM Regulation and shows that the 2018 DSM Plan also meets those requirements. The current approach to determining the cost-effectiveness of FBC's DSM programs is comprehensive, benefits customers and should be carried forward through the 2018 test period.

The relevant parameters set out in the DSM Regulation are summarized below. Other considerations for determining the cost-effectiveness of the Company's DSM Plan are discussed in Section 4.

4.1.1 Portfolio-Level Analysis

Section 4(1) of the DSM Regulation provides that the Commission, in determining the cost-effectiveness of a demand-side measure proposed in an expenditure portfolio or a plan portfolio, may assess the costs and benefits of (a) a demand-side measure individually, (b) with other demand-side measures in the portfolio or (c) the portfolio as a whole.

The Commission has historically considered the cost-effectiveness of FBC's DSM plans at the portfolio level. In its Decision on FBC's 2012-13 Revenue Requirements Application the Commission stated:

> Regarding the cost effectiveness of the DSM programs, the Commission has previously assessed FortisBC's DSM programming at a portfolio level and will continue to do so in this case.[14]

In its Decision concerning FBC's 2015-2016 DSM Expenditure Schedule, the Commission confirmed this approach:

> In undertaking this review, the Commission Panel approached it on a holistic basis, considering the entire DSM portfolio.
>
> […]
>
> [The portfolio approach] provides FBC with the flexibility to undertake programs that are expected to provide a net BC benefit but where energy savings are hard

[14] Order G-110-12, page 136

to measure or low in the short term, provided there are other programs in its portfolio that provide offsetting benefits and/or savings. [15]

FBC proposes that the same portfolio level approach to cost effectiveness should be applied in the Commission's review of the 2018 DSM Plan.

FBC will continue to report on individual DSM program cost-effectiveness results in its Annual Reports, and individual program cost-effectiveness projections are also provided in the 2018 DSM Plan (Appendix A).

4.1.2 Total Resource Cost (TRC) Test

The governing TRC test is generally expressed as a ratio of the benefits of a DSM measure divided by the measure's cost, including the utility's program costs. The benefits are the "avoided costs", calculated as the present value over the effective measure life of:

i. the measure's energy savings, valued at the LRMC; and

ii. the measure's demand savings, valued at the DCE.

The measures' energy and demand savings are grossed-up by the avoided transmission and distribution energy losses ("line losses") before the benefits are calculated.

In its 2018 DSM Plan, the Company has used the LRMC of $100 per MWh developed for its 2016 LTERP for the purposes of cost effectiveness testing. As noted, a decision from the Commission regarding the 2016 LTERP is currently pending.

The DCE value of $79.85[16] per kW-yr, accepted in the Commission's decision regarding FBC's 2017 DSM Plan Decision, is again used for this Application. Likewise, the Company again used a 6 percent DR in the current filing.

Section 4 of the DSM Regulation requires that DSM cost effectiveness be evaluated using the governing TRC test and, as necessary, the modified TRC (mTRC) test for up to 10 percent of the expenditure portfolio (see Section 4.1.4). Where the evaluation occurs at the portfolio level, the total costs of the portfolio are compared to the total value of the benefits of the programs contained in the portfolio.

The DSM Regulation also includes special treatment for specified measures (section 4(4)) and low income programs (section 4(2)). Specifically, section 4(4) of the DSM Regulation states that the cost-effectiveness of a *specified* demand-side measure must be determined by the cost effectiveness of the portfolio as a whole. Under section 1 of the DSM Regulation, specified demand-side measures include: education programs; energy efficiency training; community

[15] Order G-186-14, page 4

[16] FBC Application for Acceptance of Demand Side Management Expenditures for 2017, Appendix C, Deferred Capital Expenditure Study, July 2016. Table 4 (p. 23).

engagement programs; technology innovation programs; and resources supporting the development of energy conservation or efficiency standards. FBC has included specified demand-side measures within its Supporting Initiatives program area, including increasing its Codes and Standards support to comply with the March 2017 Amendment to the DSM Regulation.

For a DSM measure(s) intended specifically to assist residents of low-income households to reduce their energy consumption (which would include the activities within FBC's Income Qualified Program), the Commission must, per section 4(2) of the DSM Regulation use, in addition to any other analysis the Commission considers appropriate, the TRC test and consider the benefit of the DSM to be 140 percent of its nominal value. FBC has applied this approach in the cost-effectiveness analysis of the Low Income programs presented in the 2018 DSM Plan.

4.1.3 Avoided Cost Sensitivity

As stated in the previous section, the 2018 DSM Plan uses the LRMC of $100 per MWh from the 2016 LTERP to determine the avoided energy cost benefits of DSM program measures. This LRMC value is considered "firm" energy, i.e. inclusive of generation capacity benefits. The Company also includes a DCE value of $79.85 per kW per year to represent the incremental capacity savings of deferred infrastructure. The estimated Benefit/Cost ratios, using the two figures, are shown at the sector and portfolio levels in Table 3-1 above.

By comparison, based on a regulatory filing in 2016,[17] BC Hydro's LRMC is approximately $106/MWh, including energy and capacity, which approximates the $100/MWh value for firm energy that FBC is utilizing. As a result, no sensitivity runs were undertaken.

4.1.4 Modified Total Resource Cost (mTRC) Test

Under section 4(1.1)(c) of the DSM Regulation, the mTRC rules allow for a 15 percent increase for non-energy benefits (NEB) to support measures that fail the core TRC test. Section 4(1.5) limits this use of NEBs to a maximum of 10 percent of the total expenditures in an electricity DSM expenditure portfolio.

4.1.4.1 Inclusion of Non-Energy Benefits (NEBs)

Section 4(1.1)(c) of the DSM Regulation requires the Commission to allow the inclusion of NEBs, the amount of which may be determined either by the Commission based on evidence from the utility or by using a deemed 15 percent increase to the benefits side of the mTRC calculation. FBC uses the latter approach in its mTRC calculations.

Two measures in the 2018 DSM Plan require the mTRC test in order to be considered cost effective under the DSM Regulation. These are the Residential Heat Pump and Customer

[17] BC Hydro. 2015 Rate Design Application. Evidentiary Update on Load Resource Balance and Long Run Marginal Cost. Conclusion Section. February 18, 2016.

Engagement Tool, which total $0.3 million, or 4.2 percent of the expenditure portfolio, and therefore are within the specified budgetary limit.

4.2 *ELEMENTS OF THE STANDARD COST BENEFIT TESTS*

While the TRC and mTRC continue to be the governing tests that FBC used to determine the cost-effectiveness of its 2018 DSM Plan on a portfolio basis, the Company has also historically reported and considered a range of other industry standard cost-effectiveness tests, including the Ratepayer Impact Measure (RIM)[18], the Utility Cost Test (UCT)[19] and the Participant Cost Test (PCT)[20] applied at the program, program area (or sector) and portfolio levels. These are from the California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects (California Manual), and will be applied consistently in the 2018 DSM Plan.

FBC's DSM expenditure portfolio, as set out in the 2018 DSM Plan, meets the cost-effectiveness test under the DSM Regulation. FBC notes that the key input assumption, namely the LRMC, contained in the 2018 DSM Plan is consistent with the value used in the 2016 LTERP. The standard test results are shown in Table A6-1 of the 2018 DSM Plan (Appendix A).

[18] The Ratepayer Impact Measure (RIM) test measures what happens to customer bills or rates due to lost utility revenues and recovery of costs caused by the program (incentives + administration) less avoided costs (e.g. power purchase reductions).

[19] Referred to as Program Administrator Cost Test in the California Manual. The Program Administrator Cost Test measures the net costs of a demand side management program as a resource option based on the costs incurred by the program administrator (including incentive costs) less avoided costs e.g. power purchase reductions.

[20] The Participants Test is the measure of the quantifiable benefits (Utility incentive, reduction in utility bills) and costs (principally the Measure cost) to the customer due to participation in a program.

5. EVALUATION, MEASUREMENT AND VERIFICATION

Evaluation, Measurement and Verification (EM&V) are important aspects of managing a DSM portfolio. The Company employs Measurement & Verification (M&V) protocols on individual DSM projects, using IPMV[21] best practices, to ensure energy savings estimates are sound. Furthermore, the Company conducts Monitoring & Evaluation (M&E) activities on all programs, with comprehensive impact, process and/or market reviews[22] at appropriate times in program life cycles. The evaluation results inform program design, and summaries of M&E reports are shared with stakeholders and the Commission through the DSM Annual Reports.

5.1 *MONITORING AND EVALUATION PLAN EXTENSION*

Section A6.1 of the 2018 DSM Plan (Appendix A) proposes the M&E expenditures to ensure an adequate M&E review is in place for the test period.

Overall planning & evaluation (P&E) expenditures include costs for EM&V activities. The total proposed expenditure for EM&V activities to be conducted for 2018, is approximately $350 thousand, or 4.4 percent of the DSM expenditure portfolio.

5.2 *NET-TO-GROSS RATIO: SPILL-OVER AND FREE RIDERS*

Historically, FBC calculated the net-to-gross (NTG) ratio by adjusting the benefits downward for the presumed presence of free riders[23]. Additionally, FBC has included known spill-over[24] effects in the NTG ratio, which is a recognized approach used by other utilities including BC Hydro. Spill-over is the conceptual opposite of free riders, thus including both effects presents a more complete and balanced view of program impacts.

FBC will continue to evaluate and quantify free-rider and spill-over effects on a program-by-program basis. Where adequate estimates are developed or acquired based on the results of an evaluation, free rider and spill-over effects will be accounted for in the NTG ratio, as appropriate.

Table 5-1 below lists the free-ridership and spill-over rates currently used by FBC.

[21] International Performance Measurement and Verification Protocol® (IPMVP) http://evo-world.org/en/

[22] Types of evaluation activities include: Process evaluations, where surveys and interviews are used to assess customer satisfaction and program success; Impact evaluations, including NTG assessment, to measure the achieved energy savings attributable to the program; and Market reviews to gauge Market Transformation progress.

[23] Individuals who participate in an incentive program who would have the measure even in the absence of an incentive.

[24] Spillover effects involve non-participants who acquired an energy conservation measure (ECM), and who did not receive an incentive, but were influenced by the operation of the utility's DSM program

Table 5-1: FBC Program Free-Rider and Spill-Over Rates

Program Area	Free-rider	Spill-over	Source of Justification
Residential			
Home Improvement Program	20%		LiveSmart, BC Hydro, Apr 2012
Heat Pumps - rebates	44%	20%	Research Into Action, 2017
Heat Pumps - loans	15%	20%	Research Into Action, 2017
Heat Pump Water Heaters	0%		
Lighting	36%	77%	Evergreen Economics, 2014
Appliances	57%	39%	Evergreen Economics, 2014
New Home Program	20%		per BC Hydro (Cooper and Habart, 2014)
Rental (in-suite)	0%		Dunsky Consulting, 2016
Commercial			
Commercial Lighting	31%	9%	Evergreen Economics, 2013
Sm Business Direct Install	31%		Evergreen Economics, 2013
Building & Process Improvement	30%		Sampson Research, 2012
Custom Lighting	34%		Evergreen Economics, 2013
Building Improvement New	25%		Sampson Research, 2011
Industrial			
Industrial Efficiency	12%		Sampson Research, 2013
Low Income Housing			
Energy Savings Kit	0%		as per BC Hydro
Energy Conservation Assistance Program	0%		as per BC Hydro

6. CONCLUSION

This 2018 DSM Plan includes a range of DSM measures and programs and uses the LRMC of $100/MWh, all of which are consistent with the 2016 LTERP (as-filed) and the previously accepted 2017 DSM Plan. The cost-effectiveness of the 2018 DSM Plan is also based on the DCE of $79.85/kW-yr and DR of 6% as accepted in the Commission's 2017 DSM Plan decision.

The Company believes that its 2018 DSM Plan, as filed, is in the interests of its customers and is compliant with the relevant provisions of the governing legislation and is cost-effective under the tests stipulated under the legislation. FBC thereby requests that the Commission accept the 2018 DSM expenditures of $7.9 million as filed to support and implement the 2018 DSM Plan.

APPENDIX A

2018 Demand-Side Management (DSM) Plan

December 22, 2017

FortisBC Inc.

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APPENDIX A: DEMAND-SIDE MANAGEMENT

A1 INTRODUCTION

Demand-Side Management (DSM) programs have been offered to FortisBC Inc. (FBC or the Company) customers since 1989 and are available to eligible customers served by FBC and its wholesale customers of Grand Forks, Nelson Hydro, Penticton, and Summerland.

On November 30, 2016, FBC filed its 2016 Long Term Electric Resource Plan (2016 LTERP) and Long Term Demand Side Management Plan (LT DSM Plan) with the British Columbia Utilities Commission (BCUC or the Commission). The savings target presented for the first three years of the LT DSM Plan (2018-2020) were largely an extension of the previously approved 2015-2016 DSM Plan and the 2017 DSM Plan.

The regulatory review process for the 2016 LTERP and LT DSM Plan is still ongoing. FBC is now seeking acceptance of a DSM budget for 2018 in advance of a Commission decision on the 2016 LTERP and LT DSM Plan, in order to continue offering its existing DSM programs in 2018 without any market disruption.

FBC is requesting Commission acceptance of the 2018 DSM expenditure budget of $7.9 million contemplated in the LT DSM Plan. All figures in the 2018 DSM Plan are nominal (before tax effect). The 2018 DSM Plan will be a continuation of the expenditures and cost-effective programs previously accepted for the 2017 DSM Plan, with small modifications in order to comply with changes to applicable legislation as discussed further below.

FBC expects to file a multi-year DSM expenditure plan for 2019 onwards in 2018 that addresses any directives from the Commission's decision on the 2016 LTERP and LT DSM Plan.

A1.1 *SUMMARY OF 2018 DSM PLAN*

The 2018 DSM plan portfolio includes programs for the Residential, Commercial, and Industrial customer classes, Low Income (included in Residential program area) and Irrigation and Street Lighting classes (included in Commercial program area). There are also non-program expenditures for supporting initiatives, and portfolio activities.

The 2018 DSM Plan was developed in compliance with the provincial DSM Regulation, as discussed in the 2018 DSM Application. It includes programs that are mandated to meet the adequacy provisions of the DSM Regulation, namely measures for rental and low income customers, and education (elementary, secondary, and post-secondary schools). Support for BC Energy Step Code, to advance the energy efficiency performance of new residential and non-residential building stock is included in the 2018 DSM Plan. Provision for Codes and Standards (C&S) support is also included under supporting initiatives.

The DSM programs described herein, and in the Application, are high-level overviews and/or descriptions of the available offers. The detailed Terms & Conditions for each program take precedence over and govern the actual measure incentives available, and process required, for qualifying customers.

Table A-1, below, is a summary table of the proposed 2018 DSM Plan energy savings and expenditures by program area (sector), non-program areas and portfolio level totals. The table also presents Total Resource Cost (TRC) Benefit/Cost ratios by program area and at the portfolio level.

The 2018 DSM Plan is largely a continuation of the suite of programs and expenditures that FBC provided customers in 2017 and addresses recent amendments to the DSM Regulation made in March 2017.

Program expenditures are proposed to increase by 5 percent overall, or $0.3 million, and Program area plan costs have shifted in response to market conditions. Residential funding has been decreased by 9 percent or $0.2 million, offset by an 11 percent increase ($0.3 million) in Commercial funding, to reflect the anticipated 2018 DSM activities in these sectors. The significant increase in the Industrial sector shown in Table A1-1 below, reflects a higher incentive rate and a re-allocation of staff resources to that program. Supporting Initiatives includes an increase in C&S funding to comply with the March 2017 Amendment to the DSM Regulation.

Table A1-1: 2017 Approved and 2018 DSM Plan Expenditures & Savings

		2017 Approved		2018 Plan			2018/17 Difference	
		Savings MWh	Cost ($000s)	Savings MWh	Cost ($000s)	TRC[1] B/C Ratio	Cost ($000s)	% Diff
1	**Sector**							
2	Residential	10,493	2,718	7,132	2,486	1.4	-231.6	-9%
3	Commercial	13,666	3,131	19,165	3,473	2.0	341.6	11%
4	Industrial	1,556	309	1,188	496	2.8	187.2	61%
5	**Subtotal**	**25,715**	**6,158**	**27,486**	**6,456**	**1.8**	**297.2**	**5%**
6	Supporting Initiatives		674		742		67.9	10%
7	Portfolio		777		743		-34.2	-4%
8	**Total**		**7,610**		**7,940**	**1.6**	**330.8**	**4%**

A1.2 *THE LRMC AND COST EFFECTIVENESS RESULTS*

The 2017 DSM Plan used the Long Run Marginal Cost (LRMC) of $112 per MWh for clean or renewable BC resources as set out in FBC's 2012 Long Term Resource Plan (2012 LTRP) and an updated Deferred Capital Expenditure (DCE) factor value of $79.85 per kW-yr. The Commission accepted FBC's 2017 DSM Plan based on those assumptions pursuant to Order G-9-17.

The proposed 2018 DSM Plan uses the updated LRMC value of $100 per MWh filed as part of the Company's 2016 LTERP[2] and continues to use the approved DCE factor of $79.85 per kW-yr. Based on the 2016 LTERP LRMC value of $100 per MWh, the 2018 DSM Plan achieves a TRC Benefit/Cost ratio of 1.6 at the portfolio level.

Alternative Benefit/Cost ratios – including the utility cost test (UCT), ratepayer impact measure test (RIM), and participant cost test (PCT) – by program, sector and portfolio level are shown for information purposes in the Summary Table A6-1, below.

A1.3 *2017 DSM PLAN RESULTS*

Based on its 2017 results as at the end of September, FBC believes that it can achieve its proposed 2018 DSM Plan, including the 5 percent increase in program expenditures. Table A1-2 shows the actual results up to September 2017 compared to the targets in the 2017 DSM Plan.

[1] Total Resource Cost (TRC) based on net savings and costs, adjusted by program NTGR (net to gross ratio).
[2] 2016 LTERP and LT DSM Plan, Volume 1, Section 9.3.1, pg. 119.

Table A1-2: September 2017 Results Compared to 2017 DSM Plan

Program Area	2017 Approved Spend ($000s)	2017 Actual Spend YTD ($000s)	Actual Spend YTD as a % of Approved ($000s)	2017 Approved Savings MWh	2017 Actual Savings YTD MWh	Actual Savings YTD as a % of Approved MWh
Residential	2,718	1,253	46%	10,493	7,997	76%
Commercial	3,131	2,992	96%	13,666	12,160	89%
Industrial	309	65	21%	1,556	0	0%
Subtotal	**6,158**	**4,310**	**70%**	**25,715**	**20,157**	**78%**
Supporting Initiatives	674	257	38%			
Portfolio	777	756	97%			
Total	**7,610**	**5,323**	**70%**			

Interim results from September 2017 show that FBC has achieved 70% of the expenditures and 78% of the savings planned for 2017. Program expenditures in the residential and industrial sectors as of September align with historical trends where expenditures are highest in the last quarter of the year. Energy savings in the industrial sector as of September are also following past trends. Due to the longer timeframe for industrial project implementation, savings realization is generally late in the year. FBC anticipates that it will meet its 2017 goals and therefore, considers the proposed 5 percent increase in program expenditures in 2018 is achievable.

The following sections provide further detail on each of the program areas contained in FBC's 2018 DSM Plan.

A2 RESIDENTIAL PROGRAM AREA

The 2018 DSM Plan focuses on the opportunities in Residential energy retrofits, addressing major end-uses (space heating, hot water, appliances and lighting) as well as beginning to support the BC Energy Step Code. The following Table A2-1 outlines the list of Residential programs, plan costs and energy savings, and the Benefit/Cost ratio on a Total Resource Cost (TRC) basis. Overall the 2018 Residential program area spend is anticipated to drop $232 thousand, compared to 2017 Approved, mostly due to the anticipated drop in Income Qualified participation, see explanation in that section below.

A description of each incentive program and the primary delivery mechanisms follows.

Table A2-1: Residential Program Expenditures & Savings

	Program	2017 Approved		2018 Plan		
		Savings, system MWh	Cost ($000s)	Savings, system MWh	Cost ($000s)	TRC, net B/C ratio
1	**Home Renovation**					
2	Home Renovation	364	206	1,203	300	1.1
3	Heat Pumps	781	253	395	167	0.9
4	Lighting	2,735	153	3,337	202	1.8
5	Appliances	126	71	215	159	2.1
6	Water Heating	17	28	38	25	1.8
7	**New Home**					
8	New Home	126	52	169	76	1.3
9	**Income Qualified & Rentals**					
10	Low Income	3,247	1,265	1,229	731	2.0
11	Rentals	0	0	306	53	3.4
12	**Customer Engagement Tools**	3,097	200	240	165	0.7
13	**Non-program specific expenses**		491		610	
14	**Total**	**10,493**	**2,718**	**7,132**	**2,486**	**1.4**

A2.1 *HOME RENOVATION*

The main components of the Home Renovation program are building envelope improvements (insulation and air sealing). Program delivery will be primarily through continuation of the Home Renovation Rebate (HRR) partnership with FortisBC Energy Inc. (FEI) and BC Hydro. The program encourages customers to focus on the appropriate measure sequence up to obtaining a “whole home” EnerGuide rating. Heating/cooling systems (for example, heat pumps) are promoted where applicable but tabulated under a separate plan line item. ENERGY STAR® appliances and lighting are marketed separately, as described below.

To improve participation, First Nations that undertake energy-efficiency improvements to multiple on-reserve homes will be able to apply for HRR rebates via a "bulk" application process.

The BC Home Energy Coach hotline, funded by the Ministry of Energy, Mines and Petroleum Resources, is a tool FBC is promoting through marketing and outreach channels. This centralized hotline and website offers free advice on how to save energy during all stages of a home improvement project, including information on available rebates.

A2.2 *HEAT PUMPS*

With its temperate winters and hot summers, the FBC service area is an ideal climate for air source heat pumps (ASHP). Further, the 2012 Residential End Use Survey (REUS) data shows that 38 percent of FBC customers have electric heat, indicating a large potential market for the program. The program will continue with incentives for owners to upgrade electric heating systems to either central split (forced-air) or ductless mini-split (for customers with electric baseboard heating) air source heat pumps.

The incentive value for a forced air central ASHP was doubled in the 2017 DSM Plan (and continues in 2018) and both central and ductless ASHP configurations are eligible for the HRR bonus offer to attract more comprehensive retrofits. In spite of FBC's increased rebate values, participation numbers continued to decline throughout 2017. An insight report was conducted in summer 2017 that identified customers' knowledge (or lack thereof) and interest in heat pump technology. It also uncovered barriers for adoption, such as the preference to switch to a lower cost fuel i.e. natural gas and customer aversion to Tier 2 of the Residential Conservation Rate.

In response to declining participation, the 2018 budget was reduced to ensure participation numbers could be met in the interim while tools to increase the number of customers participating in the program are developed. In 2018, a communications campaign targeting customers with electricity as their primary heating source will leverage perceived strengths of heat pump technology. This is intended to set the stage for increased participation in subsequent years.

As an alternative to direct financial incentives, FBC will also continue to offer heat pump loans for qualifying customers at a below market interest[3] rate.

Heat pump incentives and tune-up rebates have been maintained for 2018. FBC is also partnering with the BC Ministry of Energy and Mines and BC Hydro to perform a study on ASHP installation practices in the province in an effort to improve their performance.

[3] Current ASHP loan offer: 1.9% p.a. over 10-years O.A.C.

A2.3 *RESIDENTIAL LIGHTING*

Approximately 14 percent of all residential electrical use within the FBC service area is attributed to lighting. To help build market transformation and improve customer participation in lighting incentive programs, FBC will continue its collaboration with BC Hydro and retailers to provide "instant rebates" at the point of sale (POS) for limited time periods over the course of the year. Rebates will be provided for qualified ENERGY STAR LED[4] lamps, controls and hard-wired luminaires.

A2.4 *NEW HOME*

FBC, in partnership with FEI, will support local governments in their adoption of the BC Energy Step Codes as part of an ongoing initiative for market transformation to high performance homes. To stimulate further uptake of energy-efficient construction the new home program will align with the performance-based approach of the BC Step Code.

FBC will provide incentives to encourage a higher level of whole home energy efficiency via a performance path, e.g. BC Step 3 is equivalent to ENERGY STAR for New Homes (ESNH), to exceed the baseline requirements of the BC building code. At the time of writing, stakeholder consultation regarding Step Code incentives is being initiated, and therefore the proposed New Home program will evolve over the course of 2018.

A2.5 *WATER HEATING*

Approximately 50 percent of FBC customers' water heaters are heated with electricity. To encourage efficient water heating, FBC will continue to offer rebates for the installation of heat pump water heaters (HPWH) for customers with electrically heated hot water.

To build capacity, FBC provided product samples to qualifying trade allies to increase experience and familiarity with HPWH technology. In addition, to improve HPWH product availability, FBC will continue discussions with manufacturers and distributors. To build awareness for customers, the heat pump communications campaign highlighted in Section A2.2 will also include messaging that includes HPWHs. The technology barriers are similar and both can be addressed in communications and outreach. In 2018, FBC will conclude its field study, in collaboration with BC Hydro and NRCan, on the suitability of ducted integrated HPWH and non-integrated[5] HPWH in the BC climate.

Low flow showerheads will be distributed via Energy Saving Kits and other channels.

[4] Light emitting diode (LED)
[5] Non-integrated means the compressor unit is located outside the home, instead of on top of the tank as with integrated HPWH models

A2.6 *APPLIANCES*

FBC will continue to provide rebate offers for top tier ENERGY STAR clothes washers and dryers, and refrigerators and collaborate on these offers with FEI where appliances result in gas-fired water heating savings. In response to recent innovations in dryer technology, the rebate structure was divided into three tiers with higher incentives for the most efficient models on the market, such as heat-pump dryers.

A2.7 *INCOME QUALIFIED PROGRAM*

FBC will continue to provide low income households with Energy Saving Kits (ESKs) and distribute them directly to qualified customers, primarily through low-income service providers, like food banks, and via direct mail to low-income households not associated with social housing.

The Energy Conservation Assistance Program (ECAP), offered in partnership with FEI, provides a basic level of service to all qualifying participants. The base service includes direct installation of basic measures (ENERGY STAR lighting and low-flow products, i.e. showerheads), limited draft-proofing installation, occupant energy coaching, and an energy assessment. The assessment will identify those homes qualified for extended energy conservation measures like insulation of ceilings and basements, additional draft-proofing and/or ENERGY STAR refrigerators, for qualified single- and multi-family dwellings.

When first launched, the ECAP initially had strong participation from some early adopters. Now that the program has matured, FBC is finding that more outreach is required in order to engage customers that can benefit from this program. While outreach has been and will continue to be strengthened throughout FBC's service region, the budget allocated to ECAP in 2018 is reflective of the lower participation rates seen in 2017. However, FBC's intention is to service every eligible participant that is engaged in the program, thus the decrease in budget should not be viewed as a scaling back of program resourcing in any way.

An ECAP pilot for First Nation housing will enable the direct installation of a limited number of heat pumps for the most vulnerable households.

A "top-up" rebate for multi-unit residential buildings (MURBs) will be continued for common area lighting, HVAC and basic building envelope improvements.

A2.8 *RENTAL ACCOMMODATION*

In collaboration with FEI, the Rental Apartment Program (RAP) will continue to be offered. This program includes the direct installation of ESK-type in-suite measures for rental suites in MURBs. The program also provides no cost whole-building energy audits to identify additional measures (common area lighting, central space heating and hot water boilers) that could be

undertaken by the building owners and provides two years of technical support and access to FBC's Commercial rebate programs (as discussed in further detail in Section A3 below).

A2.9 *CUSTOMER ENGAGEMENT TOOLS*

FBC's messaging to residential customers encourages the adoption of energy-efficient behaviours (for example, the use of clotheslines) and will continue using a variety of communication channels, both on-line and print (e.g. bill inserts). Activities may include the distribution of product samples at community events.

In addition to providing customers with access to the Customer Information Portal (CIP) to view near real-time energy usage of their residential and small commercial (single phase) AMI meters, FBC will explore and promote mobile/web apps to enable customers to better manage their energy usage.

In collaboration with FEI, FBC plans to select a service provider to implement a residential customer engagement tool (CET) in 2018. The funding envelope will include a digital platform that will engage customers by providing basic energy literacy information, behaviour change tools, access to rebates, conservation tips and offers, home energy reports, an online calculator, community challenges and other tools currently under consideration.

A3 COMMERCIAL PROGRAM AREA

Program offers for the Commercial sector, including the Irrigation and Street Lighting rate class customers, will be focused on the economic opportunities in Lighting and Building Process Improvements (non-lighting processes, such as Heating, Ventilation, Air Conditioning (HVAC), refrigeration, pumps and fans, etc.)

Customers are reached through two key program offers: the Custom Business Efficiency Program (CBEP) and Commercial Product Rebates (CPR).

The following Table A3-1 outlines the list of Commercial programs, plan costs and savings, and the Benefit/Cost ratio on a Total Resource Cost basis. A description of each program and the primary delivery mechanisms follows.

Table A3-1: Commercial Program Expenditures & Savings

	Program	2017 Approved		2018 Plan		
		Savings, system MWh	Cost ($000s)	Savings, system MWh	Cost ($000s)	TRC, net B/C ratio
1	Lighting	10,592	1,976	13,620	1,750	2.3
2	Building Improvement	2,931	362	5,290	988	2.0
3	Irrigation	144	25	255	32	1.7
4	Non-program specific expenses		769		703	
5	**Total**	**13,666**	**3,131**	**19,165**	**3,473**	**2.0**

A3.1 *COMMERCIAL LIGHTING PROGRAM – NEW AND RETROFIT*

Program assistance and financial incentives to install high efficiency lighting and lighting controls will continue to be offered for existing and new commercial customers. Program assistance will include a free walkthrough energy assessment of the customer's premises and a co-funded detailed assessment, as requested.

MURB programs are managed in the Commercial sector to reflect best practices. Common area measure savings and costs are attributed to the Commercial sector, however the costs and savings from in-suite measures will continue to be attributed to the Residential sector.

Lighting incentives for retrofit and new construction projects may be accessed through several channels including:

- point-of-sale retrofit product rebates at authorized distributors;
- prescriptive CPR rebates through the DSM online portal; and

- custom rebates for larger, more complex, new construction or retrofits through the Custom Business Efficiency offer.

The transformation of street lighting to LED type luminaries continues in FBC's service area, with the conversion of street lights in the City of Kelowna slated for 2018.

A3.2 *BUILDING IMPROVEMENT – NEW AND RETROFIT*

Program assistance and financial incentives will continue to be offered for existing and new commercial customers, including MURB owners/operators, to install in-suite energy efficiency measures. Program assistance will include a free walkthrough energy assessment of the customers' whole building premises. FBC will also subsidize the cost of a more detailed assessment, as requested.

FBC will offer incentives to support energy efficiency for various end-uses, including, but not limited to: heating, ventilation, air conditioning measures, pumps, motors, commercial kitchen equipment, compressed air, and refrigeration technologies. As with Lighting, energy efficiency retrofit rebates will be available through point-of-sale rebates at authorized distributors, and prescriptive CPR rebates through the on-line portal.

Additionally, custom rebates for larger, more complex retrofits will be channelled through the Custom Business Efficiency program offer.

FBC will also offer new construction rebates to encourage efficient construction practices for new commercial buildings and MURBs. Incentives will be offered to offset the incremental cost of energy efficiency construction compared to standard "baseline" construction as adopted by the provincial building code. In 2018, FBC will be developing a revised new construction program, in partnership with FEI, to better align its program offerings with the provincial Energy Step Code for Part 3 (and Part 9) commercial buildings.

A3.3 *KEY ACCOUNTS*

Formerly known as "Partners in Efficiency", FBC's Technical Advisors act as key account representatives to sizeable institutional, commercial and industrial customers. In addition to the incentives offered in the form of rebates and energy assessments, FBC representatives work closely with qualifying customers to help determine the economics for energy efficiency upgrades to new and existing facilities and street lighting.

FBC also co-sponsors in-house energy specialists for the City of Kelowna and the University of British Columbia Okanagan to help build institutional capacity to complete energy efficiency retrofit projects within their organizations.

A3.4 *IRRIGATION*

Program assistance and financial incentives will continue to be offered for irrigation customers to install energy efficiency measures to promote energy efficient irrigation. Free walk-through energy assessment will be available to irrigation customers.

Product rebate incentives on energy-efficient irrigation system components (variable-speed drives, high-efficiency pumps and low pressure irrigation systems, etc.) will be offered through the DSM online rebate portal. A custom option approach will also be offered for comprehensive system retrofits for qualified customers through the Custom Business Efficiency offer.

A4 INDUSTRIAL PROGRAM AREA

The following tables outline the proposed Industrial program, plan costs and savings, and the Benefit/Cost ratio on a TRC basis. A description of the Industrial Efficiency program and the primary delivery mechanisms follows.

Table A4-1: Industrial Efficiency Expenditures & Savings

	Program	2017 Approved		2018 Plan		
		Savings, system MWh	Cost ($000s)	Savings, system MWh	Cost ($000s)	TRC, net B/C ratio
1	Industrial	1,556	242	1,188	305	2.3
2	Non-program specific expenses		67		191	
3	**Total**	**1,556**	**309**	**1,188**	**496**	**2.1**

A4.1 *INDUSTRIAL EFFICIENCY*

FBC will continue to offer program assistance and financial incentives for industrial customers to achieve increased efficiency in their processes, buildings and/or systems. Program assistance includes co-funded facility-wide energy efficiency assessments and detailed, system-specific feasibility studies to qualifying industrial customers.

The 2018 Industrial budget increase is partly to fund such energy efficiency assessments; additionally, staff resourcing has been increased and the Industrial incentive rate has been increased up to a nominal $0.25 per kWh saved for qualifying projects. Due to the time lag between identifying potential projects, and the customers' capital funding cycle, the energy savings won't materialize in 2018 but are anticipated in subsequent plan years.

FBC will offer custom rebates through the Custom Business Efficiency program offer to support energy efficiency for various industrial end-uses, including, but not limited to: industrial process optimization, lighting, heating, ventilation and air conditioning, pumps, fans, compressed air, hydraulics and other motor systems. Prescriptive product rebates (for example, variable-speed air compressors and lighting products) will also be offered through the DSM online rebate portal.

A5 SUPPORTING INITIATIVES

Supporting Initiatives are important for the success of the 2018 DSM Plan because they provide program support, educate (customers and students), build trade ally capacity and promote market transformations, which are necessary to enable the potential savings that have been identified. The supporting initiatives, which complement the incentive-based programs listed previously, are characterized as portfolio level spending as they do not result in direct DSM savings.

Table A5-1 lists the components and Approved/Plan expenditures for 2017-18 with a consistent level of effort anticipated.

Table A5-1: Supporting Initiative Expenditures

	Program	2017 Approved	2018 Plan
1	Conservation Education and Outreach	200	200
2	Community Energy Planning	75	75
3	Trade Allies	100	100
4	Education Programs	150	150
5	Codes and Standards	25	80
6	Non-program specific expenses	124	137
7	**Total**	**674**	**742**

A5.1 *CONSERVATION EDUCATION AND OUTREACH*

This component of FBC's Supporting Initiatives seeks to increase public awareness of energy efficiency and conservation matters and programs, and to educate customers in regards to the availability of DSM programs. To promote the Company's incentive programs, collateral such as brochures, posters, point-of-sale materials, business case reports and promotional items are utilized. Collateral and promotional items will be distributed to residential customers at trade shows, community events and through local government and other stakeholders' communication channels. They will also be provided to trade allies (electrical contractors, appliance retailers, heat pump contractors) for distribution to customers. The point-of-sale materials highlighting energy efficiency and conservation will be provided to wholesale distributors and retail partners that sell energy efficiency equipment.

Targeted information campaigns with specific messaging about programs and energy efficiency may be purchased for trade magazines, newsletters and other industry focused information pieces. Mass market advertising (on-line, radio and print) will also be used to promote general conservation messaging and awareness for rebate programs.

A5.2 *COMMUNITY ENERGY PLANNING*

This element of Supporting Initiatives provides financial assistance to local governments, including First Nations, and institutional customers to facilitate energy efficiency planning activities like the development of community energy efficient strategic plans, energy efficient design practices and organizational policies like adopting advanced energy efficiency standards for the entities' own building stock. The planning must be targeted at reducing electricity usage and demand.

A5.3 *TRADE ALLIES*

FBC relies heavily on trade allies, such as contractors and distributors that provide the qualifying products and capacity to install energy efficiency measures. Through its Trade Ally Network (TAN), FBC provides sponsorships for training and support for a number of initiatives for the building trades and electrical trade organizations,[6] as well as support for energy management planning training like Natural Resources Canada's "Spot the Savings" workshops. Committed to growing the energy efficiency knowledge amongst the trades, FBC will continue to provide support for these programs in 2018.

A5.4 *EDUCATION PROGRAMS*

FBC, in collaboration with FEI, has developed a curriculum-connected online resource for BC elementary and secondary school teachers called Energy Leaders. Teachers can now download lesson plans to assist them with the energy related sections of the curriculum for kindergarten to grade 9 classes. (Program design for grades 10-12 will begin in 2018 and be piloted in school year 2018-19.)

In addition, FBC will provide funding for the assembly style presentation Energy Champions currently partnering with BC Lions.

FBC also provides financial and in-kind support for post-secondary initiatives for curriculum-based classroom instruction and broader campus-wide behaviour change programs.

A5.5 *CODES AND STANDARDS*

In compliance with section 3(1)(e) of the DSM Regulation (March 2017 amendment) FBC has increased its 2018 Codes and Standards budget to $80,000 or 1 percent of its proposed portfolio expenditures. A number of international and national organizations such as the Consortium for Energy Efficiency, the Canadian Standards Association, and Natural Resources Canada work to set new efficiency standards for consumer electronics, appliances, and lighting

[6] TECA (Thermal Environmental Comfort Association), SICA (Southern Interior Construction Association), CHBC (Canadian Home builders Association), BCEA (BC Electrical Association), etc.

products amongst other equipment and technologies. Similarly, local, provincial and federal governments are setting policy and regulations to increase as-built energy efficiency performance or raise awareness (e.g. EnerGuide building ratings). FBC supports codes and standards policy development and research, through in-kind and financial co-funding arrangements.

A6 PORTFOLIO EXPENDITURES

Formerly known as Planning and Evaluation activities, portfolio expenditures are required to properly plan and implement the proposed DSM program expenditures and ensure the energy savings targets are met. This expenditure includes provisions for planning and evaluation staff, who perform DSM project due diligence, including savings verification, and oversee program evaluation studies.

Updating FBC's DSM Plan at regular intervals ensures that new and emerging commercially available DSM measures are taken into account, avoided cost assumptions are updated and the appropriate program course corrections are made.

The following Table A6-1 shows the major planning and evaluation cost elements for the 2017 DSM Plan, with 2017 approved portfolio expenditures for comparison.

Table A6-1: Portfolio Expenditures

	Program	2017 Approved	2018 Plan
		($000s)	
1	Office expenses	55	53
2	Monitoring and evaluation	186	150
3	Portfolio projects	96	100
4	Portfolio level expenses	440	440
5	**Total**	**777**	**743**

Monitoring and evaluation is discussed in the following section. Portfolio projects now include consultant fees and funding for innovative technologies, which will include the completion of the HPWH field study.

A6.1 *MONITORING AND EVALUATION*

Monitoring & Evaluation (M&E) studies are necessary to ensure that FBC's DSM program expenditures will yield the target energy savings expected and that the programs are operating effectively.

M&E of energy efficiency programs provides internal and external accountability by reducing uncertainty in the estimates of energy and demand savings, and by determining the cost effectiveness of these programs using the governing TRC benefit/cost test after adjusting for savings realization, free-rider and spill-over effects.

Table A6-2, below, provides a listing of the M&E study types for the 2018 DSM Plan and proposed expenditures, including EM&V staff labour[7]. The proposed budget ($0.35 million) aligns with the Company's EM&V Framework and industry general practice[8] for budget spending on M&E activities, representing 4.3 percent of the Company's total 2018 DSM portfolio expenditure.

Table A6-2: 2018 Monitoring & Evaluation Plan Expenditures

DSM Program Evaluation and Research Plan for 2018				
Evaluation Name	**Program Area**	**Type of Evaluation**	**Evaluation Partnership**	**Plan ($000s)**
New Home Step Code Program	Residential	Process	None	20
MURB New Construction	Commercial	Process evaluation and file review	None	25
Commercial Prescriptive/Direct Install Lighting	Commercial	Process and impact evaluation	None	75
Low Income ECAP Overall Evaluation Project	Residential/Commercial	Process and impact evaluation	FEI	7.7
Low Income ECAP Ongoing Feedback Survey	Residential	Customer satisfaction	FEI	1.5
Community Outreach - Energy Specialist Overall Program Evaluation	Residential and Commercial	Stakeholder satisfaction	FEI	2.3
Community Outreach - Energy Leaders	Residential	Teacher and student satisfaction	FEI	2.5
Residential Heat Pumps	Residential	Audit site visits	BC Hydro	5
Allowance for unplanned EM&V				11
Sub-Total				**150**
EM&V Staff Labour				200
Total				**350**

[7] Note: the $200 EM&V staff labour allowance shown in Table A5-2 is embedded in the $440 figure for Portfolio level activities in Table A5-1.
[8] California Evaluation Framework. June 2004. TecMarket Works.

A7 INTEGRATION WITH FEI'S CONSERVATION AND ENERGY MANAGEMENT (C&EM) PROGRAM

The C&EM[9] department is well on the way towards full integration of the design, marketing and processing of customer-facing components of FBC and FEI program offers, especially in the shared service territory.[10] The intent is to provide customers with "one-stop" information and program access via the website, other marketing collateral and face-to-face interactions.

Additionally, FBC will continue to collaborate with BC Hydro, the BC Ministry of Energy and Mines, Ministry of Indigenous Rights and Restitution and NRCan whenever appropriate to design and promote programs that support market transformation.

[9] C&EM was formerly known as PowerSense, in the FBC service area, and Energy Efficiency and Conservation (EEC) in the FEI service area.

[10] The shared service territory is where the service territory of FEI (the gas utility) and the service territory of FBC (the electric utility) overlap.

A8 APPENDIX A

The following table provides the governing (TRC, mTRC) Benefit/Cost ratios for the 2018 DSM Plan, at the Program, Sector and Portfolio levels; as well as the auxiliary B/C ratios under the California Standard Practice manual.

Table A8-1: 2018 DSM Plan Benefit/Cost Tests

Sector	Program	Benefit/Cost Ratios, 2018				
		TRC	mTRC	UCT	PCT	RIM
Residential		1.4	1.7	3.8	1.9	0.9
Commercial		2.0	2.2	4.4	4.5	0.7
Industrial		2.1	2.3	3.0	6.0	0.8
Subtotal		1.8	2.0	4.1	3.4	0.8
Total		**1.6**	**1.8**	**3.3**	**3.4**	**0.7**
Residential	Home Improvement	1.1	1.2	5.0	1.5	0.8
	Heat Pumps	0.9	1.0	1.7	2.3	0.5
	New Home	1.3	1.5	3.9	2.2	0.7
	Lighting	1.8	2.1	21.2	1.4	1.3
	Appliances	2.1	2.2	4.5	1.2	1.9
	Water Heating	1.8	2.0	2.2	8.3	0.8
	Low Income	2.0	2.5	2.3	14.7	0.8
	Rentals	3.4	3.9	5.9	7.5	0.9
	Behavioural	0.7	0.8	4.3	0.9	0.8
Total		**1.6**	**1.9**	**5.3**	**1.9**	**1.0**
Commercial	Lighting	2.3	2.6	6.3	4.6	0.7
	Building Improvement	2.0	2.3	4.7	4.4	0.7
	Irrigation	1.7	1.9	4.2	4.0	0.6
Total		**2.2**	**2.5**	**5.7**	**4.5**	**0.7**
Industrial	**Industrial**	**2.3**	**2.6**	**3.7**	**6.0**	**0.8**
Total		**2.3**	**2.6**	**3.7**	**6.0**	**0.8**