

**Ottawa River Power Corporation
Application for electricity distribution rates effective May 1, 2019**

Vulnerable Energy Consumers Coalition (VECC) Interrogatories

Incremental Funding for a New Substation

VECC-1

a) Please complete the following table:

	2015 CAPEX	2016 CAPEX	2017 CAPEX	2018 CAPEX	2019 CAPEX	2020 CAPEX
Plan/Board Approved	\$776,484	\$1,194,640 <i>6months at 2010 capex and 6months at 2016 capex Rates implemented July 1, 2016</i>	\$1,245,950	\$1,245,950	\$1,245,950	\$1,245,950
Actual	\$780,068	\$1,083,956	\$1,131,176			
In-Service Additions (Actual)	\$959,680	\$1,180,886	\$1,394,709			

b) Please explain any CAPEX variances greater than 10%.

There are no variances greater than 10%

VECC-2

a) Please provide Ottawa River’s capital investment project/program listing for the years 2015 to 2019 in a format consistent with Appendix 2-AA and provide the excel spreadsheet.

Ottawa River’s capital investment programs are located at Appendix 1

b) Please identify the capital projects/programs in 2019 that are discretionary.

System Renewal projects could potentially be considered discretionary. The budget in 2019 has been lowered to \$310K compared to \$400k in 2018, \$611K in 2017 and \$496 in 2016.

c) Please identify the capital projects/programs in 2019 that are new.

- *The largest new capital projects in 2019 is the substation build in Almonte.*
- *In 2019 the voltage conversion on Substation 1 and 3 circuits will continue to decommission both Substation 3 and Substation 1. Rather than rebuild these two 5 KV stations in Pembroke, it was decided to change circuits to 12,470 Volts to be fed from other stations.*
- *New bucket truck in Almonte to replace a 1994*

The evidence in ORPC's 2015 Cost of Service (COS) application states "ORPC's distribution system in Almonte was designed and constructed since the 1900's and the distribution system contains a 2400 Volt feeder system. It is also important to note that ORPC also owns and operates three individual transformer stations in Almonte that are located throughout the town. Two substations will require upgrading in the next 10 years and the addition of a new substation is planned for future growth beyond 2020. From a replacement cost perspective, the new transformer station may represent approximately 5% of ORPC's entire asset."

- a) Please provide any demand and growth projections and substation capacity analysis and any other analysis performed by Ottawa River at the time of the last COS application that Ottawa River relied on to determine that two substations will require upgrading in the next 10 years and the addition of a new substation is planned for future growth beyond 2020.

The DSP was completed by the former President. The age of the MS-2 and MS-3 stations was identified in the 2017 condition assessment and Ottawa River Power has had these stations on their radar beforehand. We certainly don't replace stations solely based on their age, but maintenance and reliability issues will increase as these assets age. Planning data for short and long term development is obtained from the local municipality.

- b) Please explain what has specifically changed in the analysis, demand and growth projections and substation capacity analysis since the time of the last COS application to support an ICM for a new MS-4 substation in Almonte in 2019, earlier than originally thought.

The July 4, 2018 instantaneous feeder loading shows a demand of 9459 kVA. This is simply a snapshot in time. This may not in fact be the peak load for Almonte.

In any case, there are two concerns that we have with Almonte. First, this is a high growth area. Load is quickly being added to the Almonte 4 kV system at a rate substantially higher than previous years. Second, should there be a failure of one of the two 5000 kVA transformers at either MS-1 or MS-2, there is not enough capacity to supply the town. In all likelihood, prolonged outages and perhaps rolling blackouts would result. This is unacceptable.

ORPC has mentioned that maintenance activities are currently limited to shoulder season loads, which is inconvenient. If one of these 5000 kVA transformers failed for any reason,

Ottawa River Power now knows that the actual loading is very high – almost as much as the total station capacity. There is very little remaining capacity available for new load growth. More importantly, there is a large short fall in capacity for a major equipment failure at any Almonte MS.

- c) Please identify the two substations requiring upgrading in the next 10 years, the forecast timing of these upgrades and the work required.

The two substations requiring upgrading in the next 10 years are Substation 2 and Substation 3. Substation 2 built in 1975 requires mechanical protective relays to be changed, porcelain insulators to be changed and the Scada system to be connected to it. Substation 3 is older still, built in 1965. The switchgear is obsolete, it too has mechanical protective relays and porcelain insulators that require changing.

Both of these stations have transformers and metalclad switchgear >40 years. Cables have been replaced at MS-2. Relaying equipment is outdated. Spare parts for switchgear, circuit breakers, relays are no longer available. Potential safety concerns for arc flash hazard are in both of these switchgear buildings.

VECC-4

Ref: Section 22 Incremental Capital Module Rate Rider Request P19

The evidence states “In 2017 a Substation Condition Assessment Study was commissioned by Ottawa River Power (Appendix D). With a new president appointed, this was a necessity to continue with the Distribution Plan as filed with its 2015 Cost of Service Application. The Assessment completed in 2017 found many substation deficiencies. Nine of its current substations are over forty years old. While the distribution system plan indicated that a substation could be built after 2020 in Almonte, this is proven to not be the case.

- a) When was the new President appointed?
The new President took over in April 2016 and was officially appointed in June 2017.
- b) Please explain further how the appointment of a new President impacts continuation of the Distribution Plan filed with the 2015 COS application.
With this appointment came a review of the distribution system as a whole and the plan specifically. It was determined through this process that Almonte was going to need a substation sooner than expected. This was determined by Ottawa River Power’s own substation technician and two outside 3rd parties. None of these experts had any input into the 2015 DSP.
- c) Please provide a listing of all substation condition assessment reports undertaken since 2010.
Ottawa River Power hired Barkley Technologies Inc. in early 2016 to do a substation planning report.
- d) Please provide a copy of the most recent substation condition assessment report(s) prior to the Costello substation Condition Assessment Report dated September 2017 (Appendix D).
A copy of this document can be found at Appendix 2.
- e) Please provide a schedule that compares the key differences in the 2017 substation deficiencies compared to the previous assessment.
The key difference in the 2017 assessment compared to the 2016 draft assessment is capacity and aging infrastructure.

Ref: Section 22 Incremental Capital Module Rate Rider Request P16

a) Please provide the customer numbers for each of the years 2013 to 2017.

Total Customers	2013	2014	2015	2016	2017	With Almonte	Without Almonte
Residential	9193	9294	9399	9505	9589	4%	1.6%
GS<50	1332	1316	1306	1297	1290	-3.1%	-4.2%
GS>50	145	146	149	150	150	3.4%	4.0%
Street Lighting	2,787	2,796	2835	2826	2827	1.4%	0.9%
Sentinel Lighting	205	202	206	235	231	13%	
Unmetered Scattered Load	68	68	68	68	85	25%	
Total	15,743	15,836	15,978	16,097	16,189	2.83%	

Ottawa River Power submits the following table of just the Almonte customers. Looking at total customers does not demonstrate the growth occurring in Almonte where capacity is the issue.

Almonte Customers	2013	2014	2015	2016	2017	% Increase
Residential	2384	2460	2520	2606	2673	12.12%
GS<50	287	289	288	289	288	0
GS>50	22	22	22	22	22	0
Street Lighting	652	683	671	671	672	3.1%
Sentinel Lighting	14	15	15	15	16	14.2%
Unmetered Scattered Load	10	10	10	10	10	0
Total	5382	5493	5541	5629	5698	5.8%

b) Please provide the customer numbers forecast for each of the years 2019 to 2030.

Ottawa River has provided its best estimate on customer numbers from 2019 to 2013 use the annual growth and then the mean growth. Unmetered scattered load was smoothed to reflect current numbers with no anticipated growth while sentinel light were estimated from 2015 onwards to make up for a recount on lights.

	Residential	GS<50	GS>50	Street Lighting	Sentinel Lighting	Unmetered Scattered Load
2019	9932	1280	149	2845	234	85
2020	10061	1272	150	2854	233	85
2021	10191	1263	151	2864	233	85
2022	10323	1255	152	2874	232	85
2023	10457	1247	153	2884	232	85
2024	10593	1239	154	2894	231	85
2025	10730	1231	155	2904	231	85
2026	10870	1223	156	2914	230	85
2027	11011	1215	157	2923	230	85
2028	11153	1199	158	2933	229	85
2029	11298	1191	159	2945	229	85
2030	11445	1183	160	2964	228	85

c) Please provide customer consumption for each of the years 2013 to 2017.

You can see from the table below that there is an overall decreasing trend in consumption. This equates to a 5.6% decrease in consumption. While customer numbers are increasing, conservation is the primary cause of decreased use.

Total	2013	2014	2015	2016	2017
Residential	80,138,214	79,483,998	77,615,395	76,635,115	76,119,517
GS<50	31,708,039	31,649,726	30,536,533	29,415,061	28,872,533
GS>50	73,596,923	75,512,849	68,528,024	75,048,053	70,829,349
Street Lighting	2,424,249	2,439,792	2,204,458	1,307,703	1,297,582
Sentinel Lighting	270,899	245,570	240,165	217,806	203,681
Unmetered Scattered Load	453,471	454,406	476,219	594,265	611,519
	188,593,808	189,788,355	179,602,809	183,220,019	177,936,198

Almonte	2013	2014	2015	2016	2017
Residential	20,077,226	21,117,177	22,274,900	20,923,990	20,637,977
GS<50	5,645,491	5,687,568	5,734,017	5,549,208	5,313,888
GS>50	10,075,673	10,090,725	10,400,514	10,628,233	10,933,745
Street Lighting	387,806	387,030	382,009	420,405	417,811
Sentinel Lighting	10,016	9,570	8,949	8,705	9,137
Unmetered Scattered Load	118,515	121,100	121,100	121,100	121,100
	36,316,740	37,415,184	38,923,504	37,653,657	37,435,675

Looking at Almonte consumption by itself there is close to a 3.1% increase in consumption which is contrary to what is happening in Ottawa River Power as a total. Increased customer growth is a primary contributor as well as some industries that are continuing to grow and expand.

d) Please provide customer consumption forecast for each of the years 2019 to 2030.

Ottawa River Power provides the following table of consumption forecast. This was not a formal load forecast but the use of rough estimates. While the first few years may prove to be accurate, with growth, conservation and new technology the later numbers could change substantially.

	Residential	GS<50	GS>50	Street Lighting	Sentinel Lighting	Unmetered Scattered Load	
2019	75,146,735	28201198	70153872	1297582	189665	658984	175650055
2020	74186350	27551334	69484837	1290000	176613	710134	173401288
2021	73238307	26913583	68822183	1290000	164459	765253	171195806
2022	72302346	26290593	68165848	1290000	153142	824651	169028602
2023	71378346	25682025	67515772	1290000	142603	888660	166899429
2024	70466154	25087543	66871896	1290000	132790	957636	164808043
2025	69565620	24506823	66234161	1290000	123652	1031967	162754248
2026	68676595	23939545	65602507	1290000	115143	1112067	160737883
2027	67798931	23385398	64976877	1290000	107219	1198384	158758836
2028	66932483	22844079	64357214	1290000	99841	1291401	156817046
2029	66077107	22315289	63135559	1290000	92970	1391638	154304592
2030	65232664	21798740	62533455	1290000	86573	1499655	152443117

VECC-6

Ref: Section 22 Incremental Capital Module Rate Rider Request P18

- a) Did Costello provide a cost estimate for the project? If yes, please provide.
Costello did a high level review of the estimate produced by Ottawa River Power.
- b) Please discuss Ottawa River’s approval process for the project and the status of the approvals.
The Board of Directors approved the build of Substation 4 at the June 22, 2018 meeting.
- c) Please provide the latest in-service date for the project.
The expected date of in-service will be sometime in June 2019.
- d) Please provide details on the costs incurred to date for the project by year.
The costs incurred to date are:
 - Land - \$88,721
 - Geotechnical Investigation - \$6,600
 - Project Management/Engineering - \$39,337

- e) Please discuss Ottawa River's plan regarding a true-up of costs related to the construction of the substation.

Ottawa River will complete a true-up of costs in its next cost of service in 2021.

- f) Please discuss alternatives to the project and the cost of each alternative.

A spare transformer could be purchased and kept on hand in Almonte to be used as an emergency replacement in the event of the failure of one of the existing station transformers. The three existing substations are not the same as each other. MS-1 and MS-2 stations have one three phase 5000 KVA transformers. MS-3 station has one smaller 3000 kVA transformer. The electrical connections are also different on the three station transformers. It would be difficult to have a spare transformer that would easily be installed at any of the substations. The replacement of a failed transformer with an identical unit is time-consuming, in the order of at least 3 days work. To replace a transformer with a unit that is physically quite different, it could take much more time. This would result in a lengthy unplanned outage and rolling blackouts. This alternative is not feasible in our opinion.

Ottawa River Power also considered cooling fans. MS-2 has provisions for fans, but MS-3 does not. Please note that there are two concerns with capacity – there are presently three substations, and it is good practice to have capacity to tolerate any single failure without prolonged outages. In this case, ORPC requires to supply the existing 12,764 kVA of load with only two out of three transformers. If one of the existing 5000 kVA unit fails, or any critical device inside that station (switchgear, cables, batteries), there would only be 5000 + 3000 kVA of remaining capacity. Currently this is not enough capacity for meeting 2018 requirements, let alone new load being added in Almonte. Only one of the three stations could have fan cooling added, for an increase of 1650 kVA. The MS-2 transformer could be equipped with fans. It is already 43 years old, and this could very well be the unit that fails.

- g) Please provide the approved business case for the project.

While Ottawa River Power did not prepare a formal business case for this project, it was approved by the Board of Directors. Ottawa River Power has always been fiscally responsible and continues to do so. No project of this size and amount would be undertaken if not completely necessary. Unless a station is built in Almonte there is the potential for large numbers of customers being without power for lengthy periods of time.

- h) Please indicate the party that will undertake the Engineering and Design, Civic Construction and Electrical work.

Costello and Associates will do the Engineering and Design. Civil Construction and Electrical work will be tendered out in the early 2019.

VECC-7

Ref: Section 22 Incremental Capital Module Rate Rider Request P21

The evidence indicates "The complete load in Almonte during peak times is more than what two stations are able to handle. If one station was to go "down", ORPC would be faced with trying to rent a mobile station. ORPC would not be able to shift a fully dropped load to the other two stations.

- a) Please identify the stations and provide the analysis to show the load in Almonte during peak times is more than what the two stations are able to handle.

The winter peak loading for the Almonte stations was approximately 12,764 kVA. There are two concerns that we have with Almonte. First, this is a high growth area. Load is quickly being added to the Almonte 4 kV system at a rate substantially higher than previous years. Secondly, there is 13,000 kVA of transformer capacity installed for a load of 12,764 kVA. There is very little capacity remaining for new load growth. More importantly, there is no contingency allowed for the failure of any major component (transformer, switchgear, damage to single poles outside substations). Any major failure of this sort would result in a prolonged loss of the station, and prolonged customer outages. Worst case, with the loss of a single 5000 kVA transformer at MS-1 or MS-2, there would be only 8000 kVA of available capacity. This would result in the prolonged loss of about 45% of Almonte's 4 kV load at a minimum.

- b) Please provide the cost to rent a mobile station.

The cost to rent a mobile station is estimated to be quite large. It has been said that they are approximately \$35,000 per week. While several LDC's have mobile substation, there is no assurance that one would be available when needed. The time to procure, deliver, and install would require 2-3 days minimum, during which customers would be without power. The stations have to be modified to accept a mobile, and without knowing the details of the mobile sub, this could not necessarily be done in advance. This would add more work to the emergency installation, possibly adding days more time to the outage. There are also potential environmental concerns with the use of a mobile sub in close proximity to the Mississippi River.

A mobile station is for emergency purposes and is not the right approach or a permanent solution.

VECC-8

Ref: Section 22 Incremental Capital Module Rate Rider Request P22

Please discuss when Ottawa River expects each existing station to reach capacity?

The July 4, 2018 instantaneous feeder loading shows a demand of 9459 kVA. This is simply a snapshot in time.

The aggregate station load is now 12,764 kVA. The issue is not necessarily the individual loading on any station, but what would happen if one of the three stations failed. ORPC could NOT supply enough capacity in this case.

Please note that there are two concerns with capacity – there are presently three substations, and it is good practise to have capacity to tolerate any single failure without prolonged outages. In this case, ORPC requires to supply the existing ~12,764 kVA of load with only two out of three transformers. If one of the existing 5000 kVA unit fails, or any critical device inside that station (switchgear, cables, batteries), there would only be 5000 + 3000 kVA of remaining capacity.

Currently this is not enough capacity for meeting 2018 requirements, let alone new load being added in Almonte.

At present Ottawa River Power expects MS-2 to reach capacity in 2019, while MS-3 could reach this in 2020.

VECC-9

Ref: Section 22 Incremental Capital Module Rate Rider Request P23

The evidence indicates Ottawa River Power purchased a lot on Industrial Drive in Almonte for the construction of the new Substation 4. This location was chosen to relieve the pressure on Substation 2. It will also serve future growth in the North. ORPC is currently working with Costello Utility Consultants who will do the electrical engineering and project management. The transformer is going out to tender by the end of September with the intention of the station being in full service by June 2019.

a) When was the lot purchased? When did the sale close?

The land was purchased in June 2018. The sale closed June 23, 2018.

b) Please provide a Map that shows where MS-4 will be located in relation to the other Stations.

Please see Appendix 3

c) Please discuss options looked at to build MS-4 on land owned by Ottawa River.

Ottawa River does not own any other land than at Substation 2 which has no room for an additional station, and Substation 3 which is not located where the growth in Almonte is occurring.

d) Please provide the date the transformer went out to tender.

The tender for the transformer was sent out on Friday September 28, 2018.

e) When and how was Costello retained to do the electrical engineering and project management?

Ottawa River Power has been using the service of Costello and Associates since 2015 with a more permanent relationship in 2017 and 2018. They have been doing the engineering on design drawings since that time. In 2015 Ottawa River Power completed a competitive process for a design for a rebuild of Substation 2 in Pembroke. This was awarded to Costello then. It made sense to Ottawa River Power to use this design and save funds on the engineering in 2018/2019.

Costello is re-using design work already developed for ORPC, resulting in a lower engineering cost for MS-4. They are also repeating aspects of designs completed for a number of recent similar stations constructed for other Ontario LDC's.

VECC-10

Ref: Appendix D

a) Please provide the Terms of Reference for the Study.

As mentioned in the initial application, Costello and Associates did a distribution system overview for the new President in 2017. The utility had just gone through some large human resources transitions, with employees retiring and with that a loss of history and knowledge. The report was shared with the new Operations Manager and Substation Technician who agreed a more detailed report was required.

b) Was an RFP issued for the Substation Condition Assessment Study?

Costello and Associates were introduced to the new President by Hydro Ottawa. They came highly recommended to work with utilities of our size. Stephen Costello, owner, worked in a utility setting for 15 years at the executive level and has extensive knowledge and experience in substations. No RFP was issued for the assessment.

VECC-11

Ref: Appendix D Section 4. Recommendations

Please provide Ottawa River's response to each of the Recommendations in the Report.

- Ottawa River Power has documented the maintenance program. All stations undergo an annual maintenance schedule and on a four year cycle more intense maintenance is performed. In 2017 Almonte MS-2 underwent its four year program and in 2018 Sub-3 in Almonte underwent its four year maintenance.
- Ottawa River Power has forecasted the replacement of the stations in Almonte and Pembroke. It will continue to perform assessments in the future
- Ottawa River Power has reduced the number of reclose attempts.
- Ottawa River Power is budgeting for station replacement and has undertaken voltage conversion in Pembroke in order to decommission Substation 3 and Substation 4.

VECC-12

Ref: General

a) Please provide the timing for Ottawa River's next rebasing application.

Ottawa River Power will be rebasing in 2021.

b) Please explain why the proposed construction of a new municipal substation in Almonte cannot be part of Ottawa River's next COS application.

The current substations in Almonte are close to peak capacity during peak load times in the summer and winter. More importantly, we are very concerned that any failure at one of the three existing stations would result in a prolonged interruption to our customers.

c) Please advise of the actions Ottawa River will take in the event that the Board does not approve the ICM applied for.

Ottawa River Power will build the substation as it is needed. An application has been sent to Infrastructure Ontario to provide the necessary means to do this. Not building the substation could result in rolling blackouts to Almonte.

d) Please confirm base rates do not include amounts related to this project.
Ottawa River Power confirms that current base rates do include amounts for this projects.

e) Please provide Ottawa River’s SAIDI and SAIFI results for the years 2013 to 2017 excluding Major Event Days and Loss of Supply.

	2013	2014	2015	2016	2017
SAIDI	0.33	1.24	3.95	1.55	0.95
SAIFI	0.23	0.79	2.56	0.84	0.62

f) Please provide the number of customer interruptions, the number of customer interruption minutes and # of customers impacted in Almonte related to MS-#1, 2 and 3 for each of the years 2008 to 2018.

Date	# Customers	Duration	Customer Hrs	
July 18, 2009	850	0.50	425	MS 1
July 17, 2010	815	0.42	342.3	MS 2
Nov 22, 2014	1829	3.0	5487.	MS 1