Argument by Donald Scarlett – 23 September 2016
FortisBC Net Metering Update Application

Introduction

Wikipedia: "Net Metering is an enabling policy designed to foster private investment in renewable energy."

I will be asking the Commission to make a decision that will remind FortisBC that Net Metering —like Demand-Side Management—is a vehicle for socially and environmentally beneficial energy management; not a vehicle for maximizing utility profit.

I will argue that the letter and the spirit of BC Government directives, and provisions of the BC Utilities Act, must take precedence over the wishes of a regulated electric utility. It is to be expected that private corporations will avoid giving up the opportunity to profit from sales if they can—they are beholden to their shareholders, after all. However, the profit motive does not generally protect the environment or serve the interest of the public, or ensure all British Columbians are treated fairly, or help the Province achieve energy self-sufficiency. These values are within the purview of the Commission and I will ask that the Commission exercise its powers in the public interest to deny parts of this Application by FortisBC (henceforth, "FBC").

For simplicity I will use the feminine pronoun throughout this document to refer to persons of either gender.

BC Government directives

The BC Government's 2007 Energy Plan provides a basic directive for the Commission and for British Columbia utilities. The Energy Plan includes:

> Policy Action #2: Ensure a coordinated approach to conservation and efficiency is actively pursued in British Columbia.
> Policy Action #10: Ensure self-sufficiency to meet electricity needs.
> Policy Action #21: Ensure clean or renewable electricity generation continues to account for at least 90 percent of total generation. [The Clean Energy Act now sets the percentage at 93 percent.]
> Policy Action #25: Ensure the procurement of electricity appropriately recognizes the value of aggregated intermittent resources.

The Commission appropriately noted that Policy Action #2 was relevant to its Amendment to BC Hydro's Rate Schedule 1289 Decision, dated July 25, 2014, because Net Metering (henceforth, "NM") contributes to both energy conservation and efficiency. In the past, energy conservation had been interpreted primarily as a policy to reduce electricity consumers' use of energy. From the viewpoint of the electricity utility, however, a NM customer's electricity generation is indistinguishable from energy conservation by that customer because less energy has to be transmitted long distances from large, centralized power plants to serve her load. NM generation in BC is not only clean and renewable, but creates less environmental impact than large-scale utility generation projects such as FBC's own hydro dams (see page 2). Some of the electricity purchased annually by FBC originates from thermal generators (see page 3), which makes it even less desirable. The physical effect of NM can be regarded as being socially and environmentally equivalent to any demand-side management program. BC Hydro has used the slogan, "Power Smart works like a dam." One can justifiably coin another slogan: "Net Metering works like Power Smart."

I contend that NM generation is environmentally more benign than FBC's large-scale hydroelectric utility generation, whether owned by the Company or purchased from BC Hydro or purchased from Independent Power Producers.

In the response to Resolution IR1 Q#8 FBC stated:
"For 2015, the overall percentage of power from sustainable/clean sources was between 92% and 100%. Power from FBC-owned generation and the Brilliant plants contributed to 77% of the total generation and is from sustainable/clean generation. FBC purchased a further 15% from BC Hydro and IPPs, which is also assumed to be 100% sustainable/clean. The remaining 8% was purchased from the market."

In the response to Scarlett IR1 Q#2 FBC states:
"At this time the sole market supplier is Powerex under current agreements."

Powerex specializes in electricity trade across the BC borders. Whether its imports originate in Alberta or from the US, a significant portion generally originates from CO_2-producing thermal sources.

From Scarlett IR2 Q#13:
"However, large dams and IPP projects involve huge amounts of concrete (which has a heavy CO_2 footprint), involve tree removal and substation construction, their reservoirs fluctuate, causing harm to spawning beds and riparian wildlife and kill fish via entrainment in turbines, nitrogen poisoning and habitat impact by reduced stream water flow. Please explain why FBC suggests power from large power dams and IPPs is equivalent in terms of cleanliness and sustainability to NM generation via solar, wind and micro-hydro."

FBC's Response:
"FBC declines to respond to this question as it is not with the limited scope of the current round of information requests as defined by Commission Order G-126-16.
The resources FBC discussed in the original response are accepted as clean within BC."

FBC in its response to Shadrack IR1 Q#21a stated:
"In the FBC service area, there are no particular benefits that accrue to the broader customer base from net metering installations given the significant clean power supply resources the Company already utilizes."

Whether or not Scarlett IR2 Q#13 was within the scope of IR#2, it gave FBC the opportunity to explain ***why*** the Company considers its generation sources to be "clean." It is understood nowadays that large hydro generation and storage facilities ***do*** entail serious environmental impacts. To paraphrase Canada's Prime Minister, "it's 2016." In my question #13 I didn't even mention CO_2 and methane (both associated with global warming) production in storage reservoirs or note that an important objective of the recent upgrade of FBC's Waneta Dam was to ***reduce*** serious fish mortality caused by excessive nitrogen dissolution during spilling. FBC's responses to Scarlett IR2 Q#13 and Shadrack IR1 Q#21a suggest that the Company is either surprisingly ignorant of these impacts or prefers not to acknowledge them.

As a designer and builder of micro-hydro power plants with considerable experience in that field (ref: my resume, which is appended to this Argument), I can state with certainty that not one of the negative environmental impacts I referred to in my Q#13 or the paragraph above will be associated with a micro-hydro generation plant sized below the 50kW threshold of FBC's RS95. The requirements of the Water Stewardship Branch of the BC Ministry of Environment for residential and small commercial water licenses are strict with regard to fish impacts; fish habitat must be preserved in fish bearing streams. Even aquatic invertebrate populations must be identified and protected, as they provide food for downstream

fish populations. Micro-hydro projects have no reservoirs, their intake structures are small and are required to be screened to prevent fish entrainment, penstocks are small and soil and debris cannot be allowed to find their way into the watercourse during construction, powerhouses are typically the size of a garden shed and tailrace water must be stilled to prevent erosion.

My electrical contracting business operates primarily in the BC Hydro service area north of Kaslo and has installed many of the NM solar power arrays which are prevalent there. Although fabrication of photovoltaic cells is associated with toxic chemicals, the environmental and physical impact over the lifetime of these installations is negligible. I have no experience with wind turbines, but to date their contribution to FBC's NM program is insignificant.

I also contend that NM generation is socially beneficial, in that it allows the public to become engaged with production of clean and renewable energy and to invest in its development. This benefit is recognized explicitly by the 2007 Energy Plan, pp 9-10 & 26, which states:

> "Net Metering allows customers to lower their environmental impact and take responsibility for their own power production. It helps to move the province towards electricity self-sufficiency and expands clean electricity generation, making BC's electricity supply more environmentally sustainable."
>
> "Government's goal is to encourage a diverse mix of resources that represent a variety of technologies"
>
> "To close [the] electricity gap ... will require an innovative electricity industry and the real commitment of all British Columbians to conservation and energy efficiency."

NM brings into the electricity market "a diverse mix of resources that represent a variety of technologies" and it also is described accurately as a form of "energy efficiency" because it supplies clean and renewable energy with no investment, management or maintenance required of the utility.

FBC should recognize the particular importance of Policy Actions #10 and #21 to the Company, since FBC has to purchase about half the electrical energy required to serve its own customers; moreover, NM energy is renewable and cleaner (as I have argued) than all of the energy FBC generates itself or purchases from other utilities. As FBC assembles the energy resources required to serve its customers throughout the year, FBC presumably dispatches its own generation first resource because it is cheap—the dams have been fully amortized and only operation, repairs and upgrades must be supported. As an energy source NM costs FBC essentially nothing (as I will argue starting on page 5), so logic and BC Government directives would suggest NM energy—being cleaner and cheaper than its own resources—should be its first choice, and encouraged accordingly.

Finally, Policy Action #25 directs the Commission and electrical utilities to recognize the value of large numbers of intermittent energy sources; distributed generation (henceforth "DG") is a key characteristic of NM. A sufficiently large number of independent energy sources become statistically equivalent to a single reliable source while at the same time reducing line losses because of their widespread distribution. The aggregate value of these energy sources to the utility and to the Province will grow when they comprise a variety of sizes, generation types and locations—and are large in number. FBC unfortunately chooses not to acknowledge the value of aggregated small energy sources.

> FBC response to Resolution IR1 Q#3:
> "Customer rates are not set such that individual customers can be singled out for either their location, characteristics or proximity to other customers. Rather, rates are set on an aggregate basis taking into consideration total consumption and power-purchase expenses that are allocated to the various customer classes on a ratio that is determined during a periodic cost of service and rate design review.

Similarly, while it is possible that the presence of DG may have a beneficial localized impact on system losses, the level of losses impacts rates only as an aggregate input into the rate design exercise. Therefore, there can be no consideration given to this for individual customers or a subset of a customer class. A reduction in losses would be recognized for all customers connected to the distribution system when system wide distribution losses were confirmed through a study and reflected in a cost of service process."

FBC ignores Policy Action #25 and denies the value of DG simply because the Company chooses not to go to the trouble of calculating it. Moreover, this FBC Application acts to prevent DG from reaching its energy efficiency potential by discouraging enrollment in RS95 (by enforcing arbitrary conditions to participation and reducing its value to the investing customer).

An excerpt from Commission Order G-57-12 states:

"The Clean Energy Act (*CEA*) received Royal Assent on June 3, 2010. It advances 16 specific energy objectives to help achieve British Columbia's energy vision, including new measures to promote electricity efficiency and conservation. One of these efficiency and conservation objectives is to "foster the development in British Columbia of innovative technologies that support ... the use of clean and renewable resources." Another objective is to "ensure the authority's rates remain among the most competitive rates charged by public utilities in North America." In the Panel's view, this supports a focus on economic efficiency criteria in the design of the Net Metering rate and a reduction of any unnecessary economic barriers to the program."

This Commission Order concerns BC Hydro, rather than FBC; however, provisions of the Clean Energy Act apply to all electricity utilities in BC. FBC's application to reduce the amount the Company has reimbursed NM producers over the past several years for net excess generation (henceforth, "NEG") will create a new economic barrier to customers proposing to enter the NM program in the future.

In its response to BCUC IR1 Q#3.2.1, FBC stated:
"The NM Program itself remains an offering driven by customer initiative and largely undertaken by those customers for reasons other than economics."

FBC shows little understanding of why NM customers are motivated to join the program. The Company has not given evidence that it ever asked them; certainly I was never asked. It appears that FBC used outdated data to establish that solar photovoltaic generation has an exceptionally long payback, when prices of solar panels and controllers have plummeted over the past few years. Nor did the Company take into account the increased value of a house with an installed solar array—especially if the installation could provide backup power during outages (which are very frequent in rural areas). Micro-hydro generation typically has a much shorter payback period than solar photovoltaic. Economics certainly does drive NM; moreover, economic efficiency is the major driver of the size of any NM installation. This point will be developed further later in this Argument.

From BCUC IR1 Q#9.3.2:
"Does FBC consider that the energy generated from a distribution connected DG customer with DG should generally be considered long-term or short-term in nature? Please explain."

Response:
"The Company only includes sources of supply in the long term planning process where there is a long term commitment that the power will be available. Therefore, excess energy from net metering customers is considered short-term in nature as there is no long-term commitment."

This is another example of FBC arbitrarily discounting the value of NM NEG. The primary reason NM customers don't make a long term commitment is that FBC has not to date given them the opportunity to do so. Nevertheless, if the Company reimburses NM customers fairly for NEG, the economic incentive to commit will prevail—and the statistical characteristic of DG will further establish the reliability of the energy resource to the utility.

These examples give evidence that FBC's vision of its NM program is blinkered and highly restrictive. Besides ignoring the directives of the 2007 Energy Plan and the 2010 Clean Energy Act, FBC appears to regard NM as a burden that it feels the need to marginalize as much as it can persuade the Commission to allow. In the 1990s as an electricity consumer advocate (representing the Kootenay-Okanagan Electric Consumers Association) I attended Commission-sponsored "alternative dispute resolution" sessions that substituted for annual rate hearings. Whenever NM was mentioned around the table I recollect the Company (then called Utilicorp or Aquila or Energy One) vigorously opposed its adoption. Evidently little has changed since then, except that BC Hydro's initiation of NM must have increased the pressure on FBC sufficiently to cause it to adopt its RS95 in 2009.

What does NM actually cost FBC?

In the Exibit B-1 Net Metering Program Update Application section, "Changes to the Treatment of NEG" starting on page 9 Line 33, FBC states:

> "FBC does not believe that other customers (non-participants in the program) should support the Company purchasing power on their behalf at rates far above what is available from other sources."

This misconception needs to be corrected. When a NM customer's power plant or solar array produces more energy than she is using at that particular time, the additional energy flows to her neighbours' houses. This will typically be true of solar photovoltaic surplus in the middle of the day or micro-hydro surplus in the middle of the night; however, even very small NM generators will do this from time to time because the customer's own consumption will at times be close to zero. If a NM customer's generation is large enough, it will send excess energy to her neighbours on a seasonal basis, since during the summer months her own daily average consumption will typically be lower than during the winter. The energy that flows to neighbours' houses is used by the neighbours, measured by the neighbours' electric meters and billed to the neighbours by the utility company—at retail rates. Note that the utility's infrastructure, which enables NM energy to flow into the customer's neighbourhood, is paid for through the Basic Charge, so the utility is not giving away any value for free.

FBC proposes in this Application to reimburse the NM customer at retail rates for this energy, whether it flows to the neighbours daily or seasonally, either by accumulating dollar credits on each bill (as at present) or—if approved by the Commission—by banking her excess kilowatt-hours and applying them to bills (typically in winter) when her consumption is higher. FBC implicitly recognizes that the value of excess NM generation is the retail price that the Company charges the customer's neighbours for energy that the Company neither generated nor transmitted to her neighbourhood. No doubt FBC realizes it would be poor for customer relations to pay a NM customer a price lower than retail for daily or seasonal surplus generation during times when her consumption was low—because she would rightly object if her daily or seasonal excess energy generation were arbitrarily devalued and sold back to her at a profit to the utility.

FBC coined the term, "NEG," to refer to energy generated by the customer that has not been absorbed by her consumption by the time of the annual reconciliation. The Company in this Application proposes to arbitrarily devalue this customer-produced energy that until now it has been willing to pay retail rates for (via billing) up to the annual reconciliation date. The customer's NEG continues to flow to

her neighbours but FBC seeks permission from the Commission to make a 350% windfall profit selling it to them.

To return to FBC's statement from Exhibit B-1 quoted above, the Company is ***not*** purchasing power on behalf of its customers; it is reimbursing a NM customer for energy she has already sent to her neighbours, energy for which FBC has already billed and collected payment at retail rates from those neighbours. There is no difference between reimbursement at retail rates by FBC for a NM customer's daily and seasonal surplus generation, and reimbursement for NEG, except that the Company is presently asking the Commission to allow it to make a windfall profit from its resale of NEG.

FBC claims in this Application that denial of this unearned profit to the Company would negatively impact its customers sufficiently to justify the Company's discriminatory and unjust treatment of a handful of NEG producers. FBC is claiming its customers will suffer if it loses its chance to profit from $34,402 in sales of energy (in the most recent accounting period, ref: BCUC IR1 Q#2.1) that it did not produce. Moreover, to prevent this loss of unearned profit it seeks permission to short-change a few NM participants out of approximately $24,500 worth of energy (the difference between the retail value of the NEG and the amount FBC proposes to pay for it). It is worth remembering that FBC's loss of profit is negligible—less than .02%—by comparison to its total annual sales that amount to about $184,326,000 (Shadrack IR1 Q#20a). It's safe to say that the Company's customers will not experience a noticeable impact via their electricity bills. In fact, FBC agrees that the impact on its customers is negligible in its response to Shadrack IR1 Q#11a:

> "If the intent of the question is to query as to whether the ad-hoc purchases or customer generation has had a noticeable impact on the overall power supply portfolio or costs of FBC to date, the answer is no."

FBC copied the wording in BC Hydro's RS1289 stating that the intent of the NM program was to allow customers to displace their own consumption, up to a 50kW limit on generation. Economic reality, human nature, BC Government policy and the Commission evidently persuaded BC Hydro not only to ignore the restriction for customers to displace only their own consumption, but also to later increase the generation limit to 100kW. FBC when faced with the same realities has reacted via this Application by attempting to turn back the clock—and under the guise of protecting its customers' interests, seriously and unfairly impacting the handful of NM customers who produce NEG.

Losing sales due to energy conservation initiatives is a reality for electrical utilities all over the world, but the social and environmental value of energy conservation (up to a certain cost per kilowatt saved) is universally considered to trump the utility's profit motive. As FBC acknowledged in its response to Scarlett IR2 Q#15, FBC is compensated for its expenditures for demand-side management programs on what I understand is the same basis as its capital construction—but not for loss of sales. That arrangement is evidently acceptable to the Company because it has not applied to change it after decades have passed. There is also no reason why FBC should seek to be compensated for lost sales due to NEG, since NM costs FBC essentially nothing (Shadrack IR1 Q#22a.iii) and as I have detailed earlier, NM is essentially equivalent to demand-side management (henceforth, "DSM") socially and environmentally.

It is noteworthy that NM is also compatible with DSM; there is no conflict between them because a motivated customer can undertake both at once. However it should be recognized that a NM customer would be strongly motivated ***not*** to participate in DSM if FBC is permitted to discount NEG by more than 2/3, as the Company requests in this Application. Depending on the size of her generator, her effort to reduce electricity consumption could create NEG, which would result in a reduced benefit from her energy savings. The per customer benefit to the utility grid from NM will generally be greater than for DSM because NM can reduce a customer's load by 100% (or more if there is NEG).

The required investment by the utility is zero. From the utility's point of view, if a NM customer produces NEG, it is the same as if additional customers in the same neighbourhood have joined the NM program without the paperwork and staff time required to process the application and manage the billing. If FBC were genuinely interested in the success of its NM program as mandated by the BC Clean Energy Act and the 2007 Energy Plan and wished it to grow enough to positively influence the Company's resource mix, it would welcome NEG.

FBC is inconsistent in complaining that non-participants in NM will be negatively impacted by valuing NEG at retail rates when the Company doesn't mind that non-participants in DSM programs ***are*** negatively impacted. FBC's responses to Scarlett IR1 Q#8-10 show that the Company's Conservation and Energy Management Programs cost about 28 cents per saved kWh/year in 2015. Utilities provide a subsidy to DSM participants and recover that expense through regulated rates. DSM reduces the power bills only for participants, so non-participating customers end up subsidizing the DSM participants. Recognizing the social and economic value of DSM, regulators across North America consider this arrangement to be fair and reasonable.

> In its response to Shadrack IR1 Q#22, FBC states:
> "the Company does not have information of the cost to administer that NM program as it is not tracked separately and is not significant at the current participation levels. Employees that have NM related responsibilities complete the tasks within their normal work schedule."

NM, in contrast to DSM, involves a negligible expense by the utility and NM customers pay 100% of the construction cost of their energy source and its maintenance, as well as property taxes, permit fees (and water rental as applicable). Because the utility does not pay for NEG, but merely loses sales, it is not eligible to seek rate relief—so non-participating customers are left whole.

> In response to BCUC IR1 Q#9.4, FBC states:
> "The full physical loss benefit is realized only if the energy delivered to the grid is consumed locally. If it must be transported through the system for an extended distance, then a smaller loss benefit would be realized. However, as the Company is proposing no market based price adjustment, it would be inappropriate to recognize a loss related price adjustment."

This statement by FBC demonstrates disregard for the physics of DG electrical energy, presumably to justify the Company's unwillingness to acknowledge the value of DG and NEG. NEG will travel only far enough to be absorbed by the closest loads; not for an extended distance. NM customers tend to be located in less densely populated (rural) areas because the space required by for solar and wind generation is limited in urban areas, and water sources capable of being harnessed privately for micro-hydro are available only in rural areas. Rural areas also generally experience greater transmission line losses than the rest of the utility distribution system because they tend to be further from centralized generation and substations; thus the DG benefit (reduced transmission losses) of NM to the utility per generated kilowatt is greater than the benefit of DSM (which may be more evenly distributed geographically) per kilowatt saved. Moreover, the fact that natural gas is generally not available in rural areas means that customers' average annual electrical consumption is higher, especially in winter. DSM and NM are consequently particularly valuable to customers living in rural areas, and can to some degree counter the disadvantages of living outside densely populated areas.

> In response to BCUC IR1 Q#4.1, FBC stated:
> "Providing customers with the opportunity to offset their own consumption with clean, renewable energy directly supports government policy actions related to promoting the use of clean, renewable resources contained in the 2007 BC Energy Plan and the Clean Energy Act."

FBC implies here that it is in full support of the directives of the 2007 BC Energy Plan and the Clean Energy Act, while at the same time proposing to discourage growth of the NM program to its full potential by devaluing NEG by more than 2/3. The BC Government Plan and Act do not make the artificial distinction that NEG in some way is different from displacement of a customer's own consumption.

Fair Treatment of NM customers

As demonstrated earlier in this Argument, FBC seeks in this Application to preserve the Company's profit from electricity sales, and to increase that profit by undervaluing and reselling NM customers' NEG. No credible case has been made that negative impacts have been or will be felt by FBC customers due to retail payments for NEG. Much of the Company's case for decreasing the reimbursement for NEG by more than 2/3 has been based on the supposedly deliberate violation of the terms of FBC's NM agreement by NM participants. However, information available to NM participants and the Company's behaviour during the four years that NEG has been reimbursed belies that claim.

Because FBC spent nothing on advertising or promotion of its Net Metering (NM) program (ref: Shadrack IR1 Q#22a.iii.), the most publicly accessible information about the program is on the Company's website. That website states,

> "FortisBC has defined net metering as the metering and billing practice that allows for the flow of electricity both to and from a customer through a bidirectional meter. Residential and commercial customers can offset part or all of their own electrical requirements up to 50kW through generating their own clean energy and selling it back to FortisBC. FortisBC will credit customers for net energy they produce at their existing retail rate."

Anyone reading this will notice that "net energy" can mean only energy that is in excess of the customer's consumption (NEG: FBC acknowledged this in response to Scarlett IR2 Q#4), so this is an invitation to build clean generation up to 50kW and sell its output in excess of own consumption to FBC at the existing retail rate. "Offset part or all of their own electrical requirements" does not suggest a limit; it reads like a benefit of NM. In view of FBC's "concern" that people are "misunderstanding" the intent of the program, it is puzzling that the Company has left that wording on its website to the present day. Aside from muddying the waters, this is a case of corporate irresponsibility. People can be misled into planning or building expensive generation on their properties under false pretences.

As an electrical contractor and a designer and builder of renewable energy projects (ref: my resume, which is appended to this Argument), I had already been aware of BC Hydro's NM program and had, in fact, built a micro-hydro project that was producing significant NEG in the BC Hydro service area prior to engaging with the FBC NM program. I was aware that BC Hydro had not restricted NM generation at that time except by the original 50kW cap, despite having wording in RS1289 (largely copied by FBC in RS95) that spoke of the intent of the program being to offset own consumption. Actions speak louder than ambiguous words. Moreover, it was not unreasonable to suppose that FBC would wish its NM program to be generally consistent with BC Hydro's, if only to help make the treatment of BC residents fair and uniform across the Province.

Surely, if FBC felt that the issue of reimbursing NM customers for NEG at retail rates was a problem, it should have at least spoken to those customers who were already supplying NEG. The Company, however, has provided no evidence that it ever did so, and my own experience as FBC's largest supplier of NEG is that I was never contacted by the Company over the four years I have been reimbursed for NEG. This was confirmed in the response to Scarlett IR2 Q#1.

Earlier in this Argument I noted that although FBC's NM program (including NEG) does not have negative impacts on non-participants, the Company's DSM program does. But I will note here that all FBC customers will also suffer a negative impact from the Company's Application and this Hearing. In Scarlett IR2 Q#17-18 I asked how much FBC had already spent and expected to spend on this Application and participating in this hearing. The Company's response of $75,000 did not include internal staff time (and likely legal advice) that has obviously been expended, so the total is certain to be significantly higher. It is my understanding that FBC's and the Commission's costs to initiate, participate in and conduct this hearing will ultimately be paid by FBC's customers. I now point out that those customers will suffer much more from the Company's decision to proceed with this Application than they would have, even if FBC had had justification for reducing its reimbursement for NEG (by about $24,500; see page 6). I believe it would be appropriate for the Commission to keep this in mind when the Company applies for relief through rates for this hearing. No electric utility should be rewarded for wasting the Commission's time and ratepayers' money.

I argued on page 6 that FBC through its Application proposes to unfairly impose a financial impact on NM customers who produce NEG. Those customers entered into an agreement with the Company that caused them to make a large investment. Some Intervenors view changing the terms of the agreement (terms that were confirmed by FBC's reimbursements over the past four years) as breaking a contract; certainly it is unfair and creates a hardship for NEG producers. It's reasonable to ask how other electrical utilities under regulation by the Commission have handled a similar situation.

BC Hydro's Electric Plus program is a suitable example. My understanding of this program is that it offered a very favourable electricity rate for space and water heating to customers who had a backup heat source and were willing to install a special meter on their home that would allow the utility to disconnect the electric heat at times when the grid was heavily loaded. As it turned out, few or none of the Electric Plus customers ever had their heating disconnected, so those customers enjoyed a windfall saving on their electricity bills. BC Hydro proposed a 10 year phase-out of the E-Plus rates in its 2007 Rate Design Application; however, the Commission refused in its 2007 BC Hydro Rate Design Phase 1 Decision dated October 26, 2007.

Although the Electric Plus program was closed to new applicants and is still slowly winding down due to natural attrition (home ownership changes, etc.), it is noteworthy that the Commission regarded a sudden change in a utility agreement that had required a substantial investment by the applying customers to be too unfair to approve. This FBC Application would have a similar effect on NM customers who had invested heavily enough in their electricity generation to be producing NEG. I have argued that FBC's NM program is socially and environmentally beneficial, as well as furthering BC Government directives and as such should be encouraged to grow, including with NEG up to an appropriate kilowatt limit. Should the Commission decide otherwise, I respectfully request that the example of Electric Plus be followed with regard to NM customers who already have invested in power plants capable of producing NEG.

California provides another example of regulatory fairness in the case of electric utility customers who have invested significantly to participate in a NM program. The California Public Utilities Commission (CPUC) has ruled unanimously that existing rooftop solar arrays can keep selling electricity to the grid at current rates for 20 years. When Governor Jerry Brown Assembly Bill 327 into law he wrote:

> "As the CPUC considers rules regarding grandfathering of net meter customers, I expect the Commission to ensure that customers who took service under net metering prior to reaching the statutory net metering cap on or before July 1, 2017, are protected under those rules for the expected life of their systems."

Recruiting and appropriately and fairly treating investors willing to invest substantially in a program initiated by an electricity utility requires a degree of responsibility not evident in FBC's Application. The Commission has the power to enforce this responsibility and I will be grateful if that is a result of this Hearing.

Another aspect of power generation projects of the type recruited by a utility's NM program is economic efficiency, which is directly related to the generating capacity of the installation. This issue was cogently developed in Commission Order G-57-12 (pages 43-44), dealing with BC Hydro's NM generation limit:

> Implementing new generation capacity is an expensive endeavour, either for BC Hydro when it is building dams and powerhouses, or for a residential consumer installing DG equipment. To this end, the Panel notes that in its Final Submission, BC Hydro stated that the key barrier to participation in RS 1289 remains the cost of technology. However, in the case of the DG equipment typical in the Net Metering program, none of the capital costs are borne by BC Hydro or its ratepayers. As can be seen in Zdenek Los' case, by allowing for a larger capacity limit, the Net Metering program could possibly be made more attractive and more accessible to potential customers, which would benefit BC Hydro and its ratepayers. ***It is the Panel's view that the capacity of a Net Metering installation should be driven by considerations of economically available clean energy and not by the theoretical maximum capacity a homeowner may require.*** [my emphasis] Further, given the emphasis placed on electrical self-sufficiency and clean electricity generation by BC energy policy and legislation, the Panel is of the opinion that encouraging participation by lowering barriers should be of primary importance."

As a designer and builder of numerous micro-hydro power plants and through my electrical contracting business an assembler of numerous solar photovoltaic power installations (ref: my resume, which is appended to this Argument), I can attest to the accuracy of this excerpt. When building a micro-hydro power plant, the cost per kilowatt of capacity at a given site is always lower with increased size. Fore example, a pipe large enough to develop twice as much power typically costs only 30 to 50% more to buy and costs very little more to install. Moreover, it is environmentally and socially better to maximize the beneficial use of a stream (up to its environmentally acceptable generating capacity), rather than building undersized projects on a larger number of streams. Solar photovoltaic generation also benefits from economies of scale due to savings on design, permits and labour.

FBC's arbitrary requirement that NM be limited in size to own consumption constitutes a barrier to investors who would be willing to construct generation but understandably want it to be as economically efficient as possible. BC Government directives and past Commission decisions regard such requirements as regressive and barriers to beneficial initiatives such as DG, NM and energy efficiency.

Although I am aware that increasing FBC's 50kW generation limit to 100kW to match BC Hydro's present limit is not within the scope of this Hearing, I strongly suspect that FBC is not sufficiently interested in the beneficial potential of NM to propose such an increase to its program. Without impetus from the utility, I suspect the initiative may have to come from the Commission at a future rate hearing or rate design proceeding. There may be relatively few suitable sites for NM power plants larger than 50kW in the FBC service area, but there also is social value in the fairness of treating utility customers consistently throughout the Province of BC.

Banking of NEG

After five years of participation in FBC's NM program, I can comment knowledgeably on FBC's billing methodology for NM and NEG. There have been some problems in my case; I hope other NM customers have had an easier time. I have felt it necessary to recalculate every bill I have received from FBC since I entered the NM program because a few rather significant mistakes have been made in the calculation of my credit balance (to date, always in favour of the Company). On February 9, 2013 I asked for an error of $64.83 to be corrected. On September 26, 2015 I complained about an error of $1025.76 and by the time it was corrected it had grown to more than $1800.00. My meter readings were estimated

for four months, again in favour of the Company by up to 4535kWh. Reimbursement for NEG occurred on March 3 in 2013 but slipped to May 30 in 2016; in the past two years it has taken a telephone enquiry to expedite the reimbursement. I suspect all of these irregularities are due at least in part to the difficulty in calculating NM accounts with a two-tier rate schedule with rate increase adjustments annually. It must be a daunting task for FBC employees to perform these calculations.

FBC's proposal to bank NEG kWh credits and pay for them on a set date in March of the following year is reasonable. It would make sense to simplify calculation of the amount to be reimbursed for NEG kWh. In the interest of logic, efficiency, fairness, consistency between NEG and non-NEG NM customers, recognition of the value of clean, renewable energy production, adherence in good faith to the Company's agreement with NM customers and following BC Government directives, I submit that the calculation for each class of customers (residential, commercial, etc.) should be as closely as possible based on the retail rate for that class.

The tier 1 and tier 2 rates for the previous year should be separately prorated (to account for rate increases that seem to occur at various times in the year). Then the first 9600 kWh of NEG should be paid for at the averaged tier 1 rate and the remainder paid for at the averaged tier 2 rate (9600 is a year's worth of tier 1 kWh). This method closely approximates the value of NEG presently calculated for NM customers and rate inflation would be accounted for. This is preferable to a flat rate because no matter how it is calculated, a flat rate will inevitably create winners and losers among the producers of NEG. Also, a problem with BC Hydro's flat rate for NEG is that is appears to lag behind the inflation of the utility's electricity rates. Inflation protection for FBC is even more important because the Company's rates generally increase faster than BC Hydro's. When I first became involved in BC electricity policy in 1986, WKP rates were about 60% as high as BCH rates.

Conclusions:

1. NM is at least as valuable from a social, environmental and energy efficiency standpoint as DSM, and both are valuable enough to society and the Province's goal of self-sufficiency to justify loss of electric utility sales.
2. NM with or without NEG has no negative impact on FBC's customers, while the Company's decision to precipitate this hearing has little justification and will burden customers with a significant cost.
3. Barriers to NM such as arbitrary imposition of rules such as limitation to own consumption and reimbursement below retail should be removed, in keeping with BC Government directives.
4. FBC does not purchase energy from NM customers with NEG; it needs to reimburse those customers for income the Company has received when neighbours of the NM customers pay FBC for energy it did not provide.
5. FBC's proposal to treat NEG as purchased energy, devalue it and resell it at up to a 250% profit is unjustified and unfair to customers who have invested in its production.
6. FBC has not credibly established that it has treated its NM customers responsibly and with due diligence to make them aware of the Company's concerns or even understand their motivation to participate in the program.
7. Banking of NEG energy should be simplified but managed to match the status quo (reimbursement at retail rates) as closely as possible.
8. The 50kW limit should be increased to 100kW to be consistent with the rest of the Province.

I sincerely thank the Commission for ensuring this Hearing process would be fair to all parties. FBC originally sought a hasty hearing with little opportunity for interested parties to seek answers or prepare Argument. Both rounds of IRs were useful and informative; evidence was obtained that the Commission reasonably requires to make an appropriate decision.

Donald Scarlett, P. Eng.

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RESUME

Personal

Born 1 February 1948 at Brantford, Ontario. Attended school in Germany and United States. Active in hiking, kayaking, alpine ski touring, flying and amateur astronomy. Holds a private pilot licence and ultralight pilot permit.

Academic Attainment

1969: B. Sc., Mechanical Engineering (Design), Massachusetts Institute of Technology, Cambridge, Massachusetts.

Experience gained as a research assistant at M.I.T. included X-ray diffraction, electron microscopy, materials testing and computer programming. Credited for substantial contribution in a published report entitled "Metal-Matrix Composites" (1967); prize winner in the 1968 Luis De Flores Design Competition.

Professional Experience

Forty-three years' experience in business management, project supervision, design of electrical systems, computer programming and energy policy analysis.

1973 - Present: President of an electrical contracting firm (Scarlett's Electric Ltd.) which performs work for government agencies, industrial and commercial businesses as well as residential customers. Responsible for all aspects of operation and management and holder of a British Columbia journeyman's license for electrical contracting. Extensive experience with electrical instrumentation, controls and equipment, electrical and building codes, and design of electrical systems. Since 1990 the business has specialized in design, consulting and project management for small hydroelectric projects and more recently, construction of photovoltaic arrays. The small hydroelectric projects completed or under construction to date, with services provided, are listed below in chronological order:

- Silver Mountain Ranch, Gold Hill (6.5 kW) – design, permits & construction (turnkey)
- Norns Creek Hydro, Pass Creek (400 kW) – consulting
- Woodbury Creek Hydro, Ainsworth (225 kW) – consulting
- Seaton Creek Hydro, Three Forks (250 kW) – consulting
- Weaver Hydro, Kaslo (150 W) – design, construction management (turnkey)
- Bernard Creek Hydro, Riondel (28-49 kW) – design, permits & construction (turnkey)
- Arnold Hydro, Riondel (3.5 kW) – consulting
- Whitewater Creek Hydro, Retallack (60 kW) – design, permits & construction (turnkey)
- Bauer Hydro, Shutty Bench (2.5 kW) – consulting
- Little John Creek Hydro, Meadow Creek (75 kW) – design, permits & construction (turnkey)
- Rudolph Hydro, Shutty Bench (2.5 kW) – design, construction management (turnkey)
- Murphy Creek Hydro, Riondel (50 kW) – design, permits & construction (turnkey)

- Bird Creek Hydro, Blewett (8 kW) – design & construction (turnkey)
- Weaver Hydro, Retallack (3.5 kW) – design, permits & construction (turnkey)
- Sweeney Hydro, Argenta (2.5 kW) – design & construction (turnkey)
- Fletcher Creek Hydro, Kaslo (21 kW) – design, permits & construction (turnkey)
- Finkle Creek Hydro, Ferguson (150 kW) – design, permits & construction management
- Mulvey Creek Hydro, Slocan (20 kW) – design, permits & construction management
- Procter Creek Hydro, Procter (24 kW) – design, construction management
- Septet Creek Hydro (Bugaboo) (150+ kW) – preliminary survey
- Salisbury Creek Hydro (20 kW) – design, construction management
- Birkbeck Creek Hydro (6 kW) – preliminary survey
- Siwash Creek Hydro (496 kW) – drawing & calculation check
- Redfish Creek Hydro (9 kW) – design, construction management
- Norman Wells Creek Hydro (150 kW) – preliminary survey
- Bobbie Burns Creek Hydro (100 kW) – preliminary survey
- Eagle Creek Hydro (120 kW) – preliminary survey
- McFayden Creek Hydro (5 kW) – survey, permits, construction management
- Murray Creek Hydro (3.5 kW) – design, construction management
- South Griffith Creek Hydro (45 kW) – survey, design, construction management
- McFarlane Creek Hydro (17 kW) – survey, design, permits, construction management
- Clute Creek Hydro (6 kW) - survey, design, permits, construction management (turnkey)
- Sandy Creek Hydro (12 kW) – intake & controls redesign & construction
- Memphis Creek Hydro (8 kW) – intake design & construction management
- College Creek Hydro (1.2 kW) – intake & controls redesign, turbine replacement
- Kaslo Mountain Hydro (250 W) – design, construction management (turnkey)
- South VanTuyl Creek Hydro (3 kW) – intake design, permits & contruction management
- Hazel Creek Hydro (48 kW) – survey, preliminary design, permits
- McGuigan Creek Hydro (43 kW) – survey, preliminary design, permits

In addition, feasibility studies for the Villages of New Denver, Silverton and Slocan have been performed in partnership with another hydroelectric specialist and a local engineering firm. Surveys and flow measurements have also been conducted for two potential projects in the several megawatt size range. Professional testimony was presented on behalf of two small hydroelectric projects at Environmental Appeal Board hearings.

1986 - 2007: Spokesperson and lead intervenor on behalf of the non-profit Kootenay-Okanagan Electric Consumers Association, in south-central British Columbia, until 2004. Frequent intervenor at B.C. Utilities Commission hearings, speaker and workshop panelist at B.C. Hydro Energy Forums, member of the B.C. Hydro Conservation Potential Review Collaborative (1991-1994) member of the B.C. Hydro Integrated Energy Plan Consultative Committee (1995) and member of the external review panel for the B.C. Hydro 2007 Conservation Potential Review.

1981 - 1998: Owner of a personal computer consulting business (Sirius Computer Systems) which produced specialized applications software for small businesses, utilizing Computer-Aided Design and Drafting (CADD), leased computer equipment and provided guidance and training for small businesses acquiring or using personal computer hardware and software.

1980 - 1983: Senior Mechanical Engineer with a consulting engineering firm (Canuck Engineering Ltd.) in Calgary, Alberta, specializing in the petroleum and gas industries.

Responsible for design, specification, procurement and construction supervision of electrical and electronic systems for the pipeline portion of the Alberta Energy Company Ltd. Cold Lake Bitumen Pipeline System. Also responsible for research and modeling calculations for product properties, hydraulics and heat transfer for the Cold Lake Bitumen Pipeline System during the design phase for original construction and later expansion.

1971 - 1972: Employed by Canadian Dynamics Ltd. in Vancouver, British Columbia, designing and producing electronic devices for remote sensing, data acquisition and communication. Responsible for design and project management for mechanical and electrical systems, as well as installation and commissioning of custom-designed equipment and instrumentation.

1969 - 1971: Employed by Synax Biomedical Corporation in Somerville, Massachusetts, which created one of the earliest specialized microcomputers for commercial and research markets. Responsible for design, prototyping and production of mechanical components for all products of the firm.

Professional Associations

Association of Professional Engineers and Geoscientists of British Columbia