



November 22<sup>nd</sup>, 2019  
Secretary General of the Commission  
CRTC  
Ottawa, Ontario  
K1A 0N2

## **Subject: Further comment regarding Consultation CRTC 2019-57**

1. CEA is pleased to see the lively debate viewable in intervenor responses to the questions posed by the Commission. Questions 212, 213, and 303 are of special note because they relate to Private Virtual Network Operator (PVNO) and Public Safety Broadband (PSBN). Other questions & responses directly and indirectly touch on CEA's position; that innovation in telecommunication regulation can help create the Smart Grid for the betterment of all Canadians. CEA would like to respond to some excellent points brought up by other intervenors as well as some inaccuracies that we believe have been represented to the Commission. CEA asks that this document be distributed to the following

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## **Comparing Responses to the Benefits of PVNO**

2. The Smart Grid, which is key to Canada's clean growth economy including electric vehicles and distributed renewable power, needs innovation in wireless communication because it has new telecommunication demands. To protect our customers Canadian electrical utilities (CEUs), want that wireless communication to be as resilient, secure and affordable as possible. That is why we are asking the Commission to allow critical infrastructure operators including CEUs and railways to access a new kind of wireless network, Private Virtual Networks, that achieves all those goals through regulatory and technological innovation.
3. Which is why we are particularly interested in responses to question 212. The response from Telus is a tough but generally fair (we disagree with a few points discussed later) document that identifies challenges with creating a PVNO. CEA thanks Telus, as well as Quebecor Media/Videotron, for honestly acknowledging the benefits of PVNO, question 212 F, to both a Mobile Network Operator (MNO) like themselves as well as a critical infrastructure operators such as an electrical utility or a railway company.
4. **If Telus and Videotron can publicly accept the benefits of PVNO CEA asks why do other MNO respondents including Bell, Rogers, Shaw, and SaskTel say that there will be no benefit to PVNO?** In general, CEA contests the strict content in MNO answers to question 212 as a less than full engagement with





both the spirit and the literal contents of CEA’s submissions where we identified numerous benefits to CEUs, MNOs, Public Safety and Canadians, Figure 1 below.

<b>Critical Infrastructures</b> 		<b>Public Safety</b> 	
↑ Reliability	↑ QoS	↑ Reliability	↑ QoS
↑ Security	↑ Safety	↑ Security	↑ Safety
↑ Coverage	↑ Shared RAN	↑ Coverage	↑ B14 optimal use
↑ Innovation	↑ Process efficiency	↑ Technology	↑ Process efficiency
↓ Costs	∅ Vendor lock-in	↓ Costs	∅ Vendor lock-in
<b>MNOs</b> 		<b>Society and Governments</b> 	
↑ Revenues	∅ New Competitor acts	↑ Coverage service	
↑ Traffic	↑ New services (SLA)	↑ Optimal use of public resource ( Frequency )	
↑ Innovation	↑ Coverage incentive	↑ Efficient use of public funds	
↑ Freq. ROI	↑ Reliability incentive	↑ Safer and Reliable services ( Utilities, Rail )	
	↑ Business efficiency		

Figure 1. Benefits of a PVNO are diverse and significant to Critical Infrastructure Operators such as CEUs and Rail, Public Safety including Police, Fire and Ambulance, Mobile Network Operators as well as the Canadian Public. An upward arrow denotes an increase, a downward arrow denotes a decrease while a struck through circle denotes a negation. E.g. for MNOs PVNO is not a competitor, while public safety sees an increase in Band 14 use, and critical infrastructure operators realize reduced costs.

5. For quick summary in our May 15<sup>th</sup> submission to the Commission CEA outlined the benefits of PVNO as the most economically efficient and socially acceptable<sup>1</sup> way to enable the Smart Grid through two distinct but related activities.
  - a. Where wireless coverage exists PVNO will significantly increase the reliability and security of commercial cellular networks to connect CEU Smart Grid field devices. This allows CEUs to avoid having to build new single purpose Field Area Networks (FANs).
  - b. In areas where commercial cellular networks are not present and new FANs are required the Mobile Network Code (MNC) granted as part of the PVNO gives CEUs the ability to use 3GPP equipment including, Long Term Evolution (LTE) and 5G, for wireless connections as well as to interoperate commercial and CEU FANs most efficiently.
6. CEUs have traditionally used their own purpose built FANs to reach field devices but as Smart Grid components including sensors and switches are increasingly moved into the residential, indoor and underground areas there is a massive need to improve connectivity. The challenge is that it is not economically efficient for CEUs to

<sup>1</sup> Socially acceptable because it best supports the clean economy.





increase their networks to reach ground level equipment because that would require building dedicated FANs comparable to existing MNO networks (the MNOs have similar coverage and device connectivity needs).

7. Thus, **if commercial cellular can be improved to the point where it is acceptably reliable and secure enough for critical infrastructure operators then commercial cellular should be used.** PVNO, which requires an MNC, is the way to improve the reliability and security of commercial cellular (both points have been discussed in length in previous submissions) to enable the Smart Grid. Examples of those field devices and Smart Grid applications include but are not limited to:
  - i. rooftop solar paired with batteries into grid connected virtual power plants,
  - ii. electric vehicle (EV) charging networks that respond in real time to customer needs,
  - iii. automatic reclosers to keep the public safe if lines go down in a storm,
  - iv. intelligent line fault indicators to help CEUs rapidly localize electrical faults to reduce or avoid outages, and
  - v. power quality improvements to better serve emerging high-tech industries.
8. For non-commercial cellular solutions, due to lack of coverage, LTE and the upcoming 5G technology are the best answers because they are backed by the 3GPP global standards. LTE is a known and well supported technology that is robust, very secure and highly affordable. It is for those reasons that LTE (and 5G soon) is the equipment that all of Canada's MNOs use for their commercial cellular services. But to use LTE and 5G an MNC is needed<sup>2</sup>.
9. Because of the points above PVNO is the most economically efficient solution to the telecommunication portion of Canada's clean growth economy. An agenda which is supported by the federal government and it was the ministry of Innovation, Science, and Economic Development (ISED) who instructed CEA to bring our PVNO request to the Commission and this consultation.
10. The Smart Grid is necessary both to meet customer demands for new and better services, as well as a way for CEUs to combat the increasing frequency and occurrence of power disruptions from climate change induced extreme weather, please see Figure 2 below. The Smart Grid improves the resiliency of power delivery by giving CEUs better data and finer control of the grid to make power restoration faster and safer, or to avoid disruptions to power delivery all together by taking proactive measures on areas that sensors identify are at risk of faulting.

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<sup>2</sup> <https://www.cablelabs.com/insights/a-comparative-introduction-to-4g-and-5g-authentication>



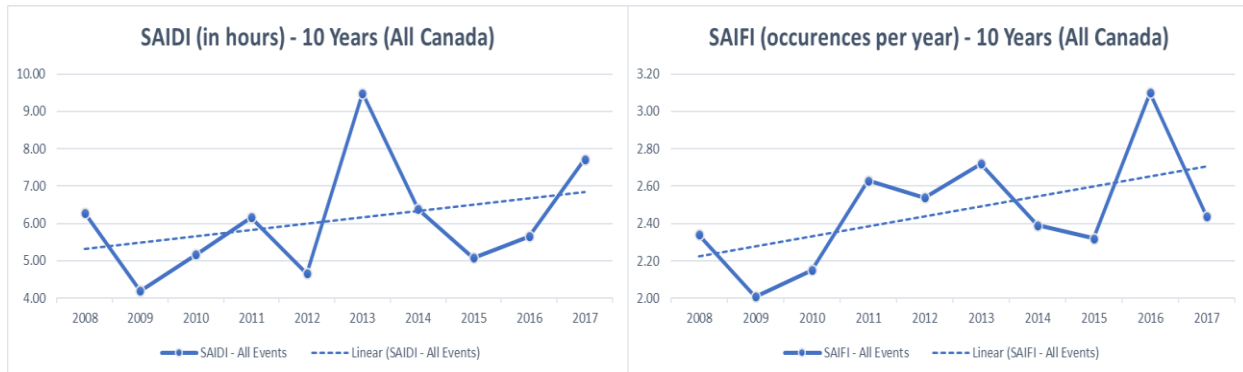


Figure 2. System Average Interruption Duration Index (SAIDI) & System Average Interruption Frequency Index (SAIFI) for all CEA members 2008 to 2017. Both datasets are trending upwards for increased durations of outages as well as increased frequency of outages.

11. **CEUs need innovative solutions to improve the grid because the alternative is decreasing service to customers, which is not acceptable to Canadians.** This is not a theoretical exercise either, it is happening today in the electricity industry. The foremost example is in California with power shut offs that will significantly affect their economy<sup>3</sup>. Not as news grabbing as California but the Canadian federal government has funded numerous Smart Grid projects<sup>4</sup> that seek to solve these emerging challenges.
12. The access to reliable electricity is the foundation of all advanced economies and without electricity our economy will grind to a halt. The increased ability to communicate in real time with field devices for the monitoring and control of the grid (the Smart Grid) granted by a PVNO is a necessary innovation to meet the growing reliability and resiliency challenges which threaten Canada's economy. The challenges of connecting and operating the Smart Grid are real, but solvable given regulatory innovation by the Commission. CEA is disappointed that most responses to the Commission did not engage with the myriad benefits CEA put forward.
13. CEA also reminds the Commission that small cell 5G networks are vulnerable to power outages due to their lack of battery backup and PVNO is a real solution to improve the reliability of the electrical grid which is a win-win scenario for MNOs, CEUs, and most importantly Canadians.

### Vendor Lock-In Exacerbates Poor Competition

14. It is small but important point about PVNO that it supports **evolution and growth in Canada's telecommunications industry through monitored regulated changes in market structure.** PVNO is not designed to be disruptive as it specifically values the investment and expertise of Canada MNOs and finds a way for critical infrastructure operators to address new opportunities/challenges and to escape lock-in.

<sup>3</sup> <https://www.theguardian.com/us-news/2019/oct/11/california-power-outages-cost-business-wildfires>

<sup>4</sup> <https://www.nrcan.gc.ca/science-data/funding-partnerships/funding-opportunities/current-investments/21146>



15. Lock-in is a challenge because it stifles competition which in turn inflates prices and can hold back innovation. CEUs want to be part of the solution to lock-in by creating new opportunities for telecommunication companies. PVNO does this by changing how contracts are awarded. This was a point raised in our May 15th submission and we ask the Commission to consider those points raised in paragraphs 54, 55 and 56 of that document. The points there relate to how PVNO will support new MNO entrants, rural/remote broadband initiatives as well as support new industries for Canada. All of this is done through contracts that can 'spread the wealth' of CEU business while also **offering greater surety for investment**. The idea for PVNO was born out of CEUs desire to achieve network diversity and to use all the infrastructure investment made by facilities-based operators. In this way PVNO is a cooperative (a.k.a. partnership) relationship between businesses and telecommunications service providers that supports market competition.

### **PVNO is Built on Partnerships**

16. Because PVNO is built on partnerships CEA reached out to major MNOs last year and CEA hosted a series of meetings between its members and representatives from Rogers, Bell and Telus. Regarding those meetings that Rogers, Bell, and Telus each reference in their submission to the Commission we would like to make one point of clarification, Shaw was invited but did not attend. Additionally, individual utilities routinely meet directly with their MNO service providers and PVNO has been discussed extensively with them.
17. CEA invited the major MNOs because CEA wants to work with Canada's telecommunications companies that already own and operate sophisticated wireless networks. PVNO is economically efficient because it uses wireless networks that are already available. And, CEA fully understands that it will be by working with Canada's MNOs, whose considerable infrastructure, investment and experience is valuable, that a final PVNO structure can be created.
18. That structure and partnership is important because CEA is realistic about what PVNO can and cannot do. PVNO by its inherent nature increases reliability and security but it alone cannot prioritize CEU critical communications such as SCADA (supervisory control and data acquisition) over commercial cellular networks. That prioritization comes from service agreements and is an example of where CEUs will work with MNOs collaboratively to build resilient networks that serve all of Canada. And, in their responses to the Commission the MNOs do note that data prioritization is currently possible and getting easier with technological advancements.

### **RAN Sharing Vs. RAN Diversity Responses**

19. In their responses to question 118 Rogers, Bell, Shaw, Telus, Cogeco, and Quebecor/Videotron each, in their own way, state how access to multiple independent RANs increases connection reliability. As such CEA does not consider the issue of whether access to multiple RANs can improve connection reliability a point of contention between any intervenor to this consultation.
20. The question is instead if the regulatory change requested by CEA and others, is necessary for new wireless enabled services for Canadians. CEA, and others, are of the position that regulatory changes are necessary because the necessary improvements to security and reliability as well as the interconnection of commercial wireless networks and CEUs FANs won't occur otherwise.



21. CEA would like the Commission to note that the interconnection of different networks described by Cogeco in their answer to question 109 regarding their Hybrid Mobile Network Operator (HMNO) and the Halton police department in their May 15th submission, as well as by both Shaw and Rogers in their responses to question 118 and 213 regarding PSBN are all technically the same as PVNO. All those respondents speak of interconnecting multiple networks to increase reliability. **The only difference between PVNO, HMNO and PSBN is the commercial arrangements**, the technology and expertise already exist.
22. A point where CEA is in general agreement with the MNOs is in regard to question 303, and 403, where the Commission asked whether RAN sharing was a potential way to increase the resiliency of public safety services. CEA generally agrees with the collective sentiment that single points of failure are suboptimal design choices. As such RAN sharing does not have the same benefits of RAN diversity. This does not mean that Mobile Virtual Network Operators (MVNOs) could not participate as PVNO service providers as many benefits of PVNO, namely ground level connectivity, security, and commercial cellular/FAN interconnection are not dependent on RAN diversity. But CEA does acknowledge that service diversity from multiple providers is different than RAN diversity from multiple networks and PVNO reliability increases with RAN diversity.

## Specific Disagreements to other Interveners

### E-Sims Are Not Necessary for PVNO Nor Do They Address Service Reliability Or Security

23. To iterate a portion of our May 15th submission eUICC programable SIMS do help alleviate vendor lock-in and for that they are good technology, but they do not increase security or reliability of networks. PVNO because it accomplishes all these goals is a fulsome, instead of piecemeal, solution and E-SIMS are not actually needed for PVNO as they are separate technologies/practises.
24. As such, CEA contests the position put forward by Telus implying that E-Sims are necessary for PVNO in their response to question 212 C. If a CEU has its SIM card manufactured with their own IMSI (International Mobile Subscriber Identity), which is derived from the MNC awarded to enable PVNO, then to connect that device over another visiting network does not require replacing or reprogramming that SIM card. That movement is instead done with the much simpler activity of dynamically registering the new IMSI on the new visiting network according to the PVNO's core steering instructions. All MNOs already have this capability as it is how roaming is accomplished according to 3GPP standards.
25. E-SIMS could be used for a PVNO but CEA questions why anyone would do so if simpler and more cost-effective solutions, for both the CEU and MNO are available. E-Sim profile management is a very complex operation<sup>5</sup> and changing the SIM profile over the air, to switch MNO, would also change the IP address which would significantly complicate CEU operations. Furthermore, the MNOs profile management implementations might result in a different type of vendor lock-in if agreements between different E-SIM providers and between MNOs

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<sup>5</sup> See page 20 of GSMA RSP Technical Specification – SGP.22 [https://www.gsma.com/newsroom/wp-content/uploads/SGP.22\\_v2.2.pdf](https://www.gsma.com/newsroom/wp-content/uploads/SGP.22_v2.2.pdf) for the diagram of what services are required for E-Sim subscription management.



are not in place. Also, E-SIM management may expose CEUs to international E-SIM management service providers and associated security risks.

### **Responsible MNC Use is Justified**

26. CEA asks the Commission to carefully consider arguments made by some respondents that MNCs will be exhausted by the requests made by CEA, and the Railway Association of Canada. For example, while Shaw is technically correct to say that only one third of Canadian municipalities could get their own MNC before exhausting Canada's existing supply that would be the most preposterous use of the resource and no serious organization would propose such a thing.
27. A reasonable example would instead be 1 MNC per province/territory, or even fewer if an effective MNC sharing service is available. Thirteen, or fewer, MNCs, each capable of supporting 1 billion devices, assigned to help people be safer is an efficient, effective and good use of a resource. Just as CEA's request for **a single 2-digit MNC (XX0 to XX9) to serve all of Canada's Smart Grid needs** is an efficient, effective and good use of Canada's MNC resource. As of writing this **943 of Canada's existing 1000 MNCs remain unassigned**. While finite, Canada is not at risk of depleting its MNC supply by the reasonable requests made by industry **to meet increasing environmental challenges and improve the lives of Canadians** given advancements in technology that make new services possible.

### **The Essentiality of PVNO**

28. All respondents to question 212 C note that they believe PVNO would be a retail offering, not wholesale. They defend their position with a narrow reading of the essentiality test. CEA contests their narrow reading of the essentiality test for two reasons.
29. The first reason is that no respondent to question 212 properly addressed the entirety of the essentiality test. The respondents do address the competition, input and duplicability components but they ignore, the policy considerations portion which can trump the other three components of the essentiality test<sup>6</sup> (emphasis added)

*“the Commission will apply the following policy considerations to inform, support, or reverse a decision to mandate the provision of a wholesale service”*

30. CEA's submissions to date have highlighted the public good (new Smart Grid services that including greenhouse gas reductions, increased safety and new economic growth opportunities), interconnection (PVNO is built on the principle of connecting commercial wireless networks and utility owned FANs) and innovation (PVNO is both regulatorily and technologically innovative) and other MNO respondents did not engage with those points.
31. The second reason CEA contests their reading of the essentiality test is their interpretation requires a competitive service which precludes any kind of non-competitive service from earning wholesale access. CEA's PVNO is

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<sup>6</sup> <https://crtc.gc.ca/eng/archive/2015/2015-326.htm>



not a reseller of services, it is not a competitive MVNO, it is not designed to do that and it does not want to because of the significant security reasons discussed in previous submissions to the Commission.

32. PVNO is designed to give CEUs direct relationships with multiple facilities-based operators to negotiate competitive agreements because retail offerings (as noted to the Commission in responses to question 212) have not been able to do that. Direct relationships with facilities based operators are preferable because intermediaries may pose a resiliency risk, security risk, and or unnecessarily increase operating costs.
33. While CEA does not support a restriction in services offered by MVNO Rogers in response to question 102 notes that MVNO should only be able to provide retail service to consumers, and not to business customers. This position includes that MVNO should not have access to the hosts LTE-M, NB-IoT, or 5G networks. Rogers states that this is because LTE-M, NB-IoT networks are only used to provide connectivity to M2M (machine to machine) and IoT (internet of things) devices, not consumers. This distinction highlights the difference between CEU needs, which include LTE-M, NB-IoT, and 5G, and commercial retail ones. Given the lack of retail offerings wholesale access through commercial agreements with comprehensive terms of service is essential for PVNO to deliver the myriad Smart Grid benefits to Canada.

### **Technical Detail in CEAs Submission**

34. The responses to the Commission by Bell and Shaw state that the CEA submissions have not been technical enough. Their critique is noted, CEA however rebuts that the plain language used in our submissions to date was a specific choice. CEA knows that as PVNO is an innovative proposal we would have to show both technical and non-technical audiences why PVNO will be good for Canada. If CEA could not articulate and effectively communicate the benefits of PVNO to all audiences, which we believe we have, then the discussion would have been academic at best and would not have been appropriate to have brought forward to the Commission.
35. Addressing what CEA believes is the underlying critique of our PVNO proposal, namely that CEUs are not qualified to operate advanced telecommunications networks we have a few points of rebuttal. The technical experts that comprise our Telecommunications Committee do have the expertise to propose realistic solutions to PVNO technical questions, and they have as evidenced in previous submissions to the Commission. CEA members also have extensive experience operating telecommunications networks from a variety of technology, medium, spectrums, devices, and applications which the Commission and the spectrum management office at ISED can confirm. The technical abilities of CEUs to manage and operate robust and reliable telecommunications assets is proven.
36. And CEA has members who are not just qualified to operate their telecommunications assets but are leaders. For example BC Hydro, has initiated a PSBN test bed designed to figure out exactly how to interoperate different equipment and different RANs which is a known challenge with PVNO as well making BC Hydro (an electrical utility) a leader in interoperability.







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## Conclusion

37. CEA thanks the Commission for the opportunity through this consultation to consider the view of its members on both why and how PVNO related regulatory changes will serve Canadians.

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## Acknowledgements

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