

Title: POD Costs to smaller loads

Preamble: The AESO recognizes that a different cost function is applicable to smaller transmission customers. The transmission system has standardized on a minimum of 138 kV. Smaller transmission customers rarely require this size of line, but must build a 138 kV line for their interconnections.

Reference: S4, page 14

Request:

- (a) Please estimate the cost savings applicable to the system of standardizing to 138 kV.
 - (i) Spare parts
 - (ii) Bulk purchasing
 - (iii) Maintenance
 - (iv) Losses
 - (v) Stranded assets
 - (vi) Reliability
 - (vii) Engineering and design
- (b) Given that smaller POD's do not require 138kV lines, does the AESO agree that these customers are penalized for this standardization?
- (c) Given the objective of clear cost/ causation, please indicate if the AESO has study work underway to estimate the additional costs paid by smaller transmission customers
- (d) Is the AESO attempting to determine the appropriate reduction in average transmission rates that should accrue to smaller loads?
- (e) In general, would the AESO agree that less loaded systems (ie: small transmission loads on 138kV systems) and transformers (and other equipment) last longer and require less maintenance, than fully loaded equipment?

Response:

The AESO strives to manage the AIES in a safe, reliable, and economic manner. As part of this mandate the AESO plans the system using standard nominal system voltages as defined in industry standard ANSI C84.1. The voltage classes that have been utilized on the AIES to date include; 500 kV, 230 kV, 138 kV, 69 kV, and 25 kV, where the latter is used for distribution. At certain locations some of these voltage classes (such as the 230 kV and 138 kV) have been operated at the higher end of the voltage range to achieve greater capacity and reduce system losses.

Existing 69 kV facilities will be gradually phased out and replaced with 138 kV facilities as 69 kV upgrades have consistently lost out in terms of being viable as transmission reinforcement given

the size of individual loads and the overall load density materializing in Alberta. The principal cost savings attributable to implementing a 138 kV minimum voltage arises from not having to rebuild 69 kV lines to accommodate additional load in the future. Cost reductions attributable to less expensive 69 kV facilities are more than outweighed by additional costs incurred when the 69 kV facilities need to be upgraded to 138 kV to meet increasing load density on the transmission system.

For new system projects a minimum voltage of 138 kV will generally be applied. However, for interconnection of customer facilities consideration will be given to a 69 kV interconnection if 69 kV facilities exist in the area with adequate capacity. As the transmission system will gradually move away from 69 kV facilities the new facilities may be designed and built for 138 kV but be energized at 69 kV to avoid future rebuild costs.

- (a) By applying 138 kV as a minimum voltage on the AIES for new transmission facilities, additional future capacity may be available. The cost for this capacity will be largely dependant upon the specific details of each project. However, given that a 138 kV and a 69 kV facility both need to meet the same interconnection requirements, the only significant cost premium would be for the higher voltage equipment. (Equipment typically accounts for 30-40% of a project's total cost.) The cost for labour, project management, right of way, and project overheads would generally remain the same. The significant cost savings would be in not having to rebuild a 69 kV line to accommodate additional load in the future, as discussed above.

Comments on the requested aspects of interconnecting a new project at 138 kV instead of 69 kV are provided below. Specific estimates of savings attributable to each aspect are not available, and cannot be provided without additional research in each area.

- (i) Spare Parts – At present there are still 69 kV facilities on the AIES so adequate spare parts are currently maintained. No cost savings are anticipated.
- (ii) Bulk Purchasing – Some savings are attributable to bulk purchasing of 138 kV equipment. As 69 kV equipment is not as commonly ordered it is unlikely that it would be purchased in bulk.
- (iii) Maintenance – As the bulk of maintenance costs are labour related, no substantial cost savings are anticipated.
- (iv) Losses – As line losses are determined by I^2R , doubling the voltage will reduce losses by approximately a factor of 4 (that is, one-quarter the losses).
- (v) Stranded Assets – There are no immediate plans to replace all existing 69 kV facilities. If load grows to exceed the existing 69 kV system capacity, upgrading to 138 kV will be considered. Also, when existing 69 kV facilities reach the end of their useful life consideration will be given to upgrade to 138 kV to avoid additional future rebuild costs.
- (vi) Reliability – Statistically, 138 kV facilities are more reliable than 69 kV facilities, attributable in part to different lightning protection methodologies. (Shield wire is typically applied on 138 kV lines while pole mounted lightning rods are used on 69 kV lines.) Higher reliability would also be experienced for lines designed for 138 kV but energized at 69 kV.
- (vii) Engineering and Design – Generally the TFOs have up-to-date 138 kV design templates as new 138 kV facilities are regularly added. As 69 kV is not as common, there may be additional costs to bring their design templates up-to-date for a specific 69 kV project.

- (b) No, the AESO does not consider that smaller PODs are penalized through the transition to a 138 kV minimum voltage. System access service through a connection to the transmission system provides access to exchange electric energy and ancillary services, and is not differentiated by the actual physical system facilities associated with a specific interconnection. Furthermore, paragraph 30(3)(a) of the *Electric Utilities Act* requires that the AESO's rates "shall not be different...as a result of the location of those systems or persons on the transmission system." As the voltage at which a customer interconnects is frequently a result of the system voltage in the location, varying rates in respect of voltage level would effectively vary rates based on location.

The AESO also considers that material costs are incurred in respect of service to smaller customers. Some of those costs are discussed in the response to Information Request TCE.AESO-029 (b).

In respect of the specific question of costs attributable to services interconnected at 69 kV, the AESO notes the following considerations.

- (i) As discussed in part (a) above, the gradual move away from 69 kV facilities primarily avoids future rebuild costs. Savings from this approach accrue to all customers.
- (ii) During the development of an interconnection proposal, consideration is given to connecting smaller loads at all voltages available in the area, including 138 kV, 69 kV, and 25 kV via the distribution system. After consultation with the customer, a Need Identification Document is filed with the EUB which best suits the project. Ample opportunities to explore alternatives to a 138 kV interconnection are available.
- (iii) The purpose of standardizing on 138 kV for system projects is to ensure there is appropriate capacity available on the AIES to serve current and future customers' needs. A new customer benefits from this arrangement when connecting to or increasing load on a 138 kV line that has available capacity, compared to a 69 kV line that could require upgrading to accommodate additional load.

Finally, the AESO notes that the proposed POD charge was based on a cost function developed, in part, using costs for smaller substations interconnected over the past 20 years, as described in the response to Information Request PPGA.AESO-003 (d). The AESO considers that incorporating projects over that length of time reasonable reflects the range of voltages at which such projects would connect and would therefore result in an appropriate attribution of costs to smaller customers.

- (c) No, the AESO has no such studies underway. The AESO considers the evidence provided in its Application regarding costs attributable to smaller PODs to be appropriate for the design of its DTS rate.
- (d) No. As discussed in part (b) above, the AESO considers that customers are charged through average rates for system access service and not for the actual physical system facilities associated with their specific interconnections. The proposed rate appropriately charges smaller customers for the system access service they receive.

In addition, as discussed in parts (a) and (b) above, the AESO has not identified appreciable reductions in costs attributable to lower voltage services.

- (e) In theory, yes, but to a limited extent in practice. Actual planned maintenance might be the same, but the equipment life expectancy would be longer if the equipment was more lightly loaded over its life. However, many other factors play a significant role in determining when equipment is replaced, including requirements for additional capacity, accidental and environmental damage, and system reconfigurations.

Title: PSC Credit

Preamble: The AESO used the existing 2006 PSC in designing the 2007 PSC credit.

Reference: S4 PAGE 51

Request:

Can the AESO please describe the METHODOLOGY (steps) used to derive the 2006 PSC credit?

Response:

The methodology used to calculate the 2006 Primary Service Credit was described on page 40 of section 4 of the AESO's 2006 GTA filed on January 31, 2005. The calculation of the PSC level was provided in more detail in the response to Information Request COSC.AESO-004 in the proceeding for that application.

Page 40 of section 4 of the 2006 GTA, as well as the response to COSC.AESO-004, are provided in Attachment PPGA.AESO-014. The section of EUB Decision 2005-096 approving the current level of the Primary Service Credit is quoted in the response to Information Request DUC.AESO-011 (a).