

Q:

- a) How much are the system losses?
- b) What potential projects could be undertaken to reduce system losses?
- c) What is the potential for updating transformers to reduce lines losses?

A:

On Nov 14, 2006 transmission line losses ranged from a low of about 6% for 24 MW of power (1.46 MW in losses) flowing from the Aishihik plant to Takhini substation (Whitehorse) on a medium length line with fairly high loading, to a high of approximately 25% for 3.25 MW of power (0.8 MW of losses) flowing from Takhini substation to Faro on a long line with very light loading. Hence there is very little opportunity to reduce system peaks to make any material difference in the reserve capacity requirements.

To reduce these losses the three basic strategies are to:

- a) Operate at a higher system voltage,
- b) Reduce conductor losses by using larger conductors,
- c) Use low loss transformers.

All three of these parameters are considered during the design of a transmission system to arrive at the lowest cost of ownership over the life of the project. For existing facilities it is usually impractical to upgrade purely for a gain in efficiency. (Re-conductoring a line would cost millions and involve extensive line outages). In general these types of upgrades would be done for the purposes of gaining additional transmission capacity in heavily loaded areas, and the improvements in efficiency are a secondary benefit.

In the Yukon the potential for significant efficiency improvements by using low loss transformers on the transmission system is relatively low. This is because the largest part of the losses is in the lines themselves. In rough terms the transformer losses are less than 10% of the total transmission losses.

Other activities that can and are considered are efficiency improvements during equipment upgrades. Two examples are that distribution transformer losses are considered during annual purchases, and as part of the evaluation of the recent Aishihik generator rewind the lowest loss winding was selected (for both efficiency and other technical reasons).

YUKON UTILITIES BOARD		
EXHIBIT		B-21
DAY	ENTERED BY	DATE
	YEC	Nov 15/06