



TMR Estimates 2008 - 2011



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Introduction

This document provides an estimate of the AIES TMR need for the next 4 years, 2008 to 2011. The following sections describe the TMR requirements on a regional basis. The estimates were created based on recent operations planning studies as described below. Planned transmission and generation system additions were considered using the best available project information regarding in-service dates. Future TMR estimates, such as those provided for future AESO GTAs and Budget Review Processes (BRP) will be adjusted as system conditions change and project in-service dates are updated.

Assessing TMR Needs

The Alberta Electric System Operator (AESO) has a duty to ensure reliable operation of the Alberta Interconnected Electric System (AIES) and to promote the fair, efficient and openly competitive exchange of electric energy. A significant part of meeting these duties involves conducting operations planning studies that have these objectives;

- Evaluate current transmission configuration to consider recent performance and availability of key facilities.
- Integrate planned transmission and generator additions based on most recent project in-service dates.
- Assess demand changes including elements of long and shorter term load forecasts.
- Review generator operating history and assess future generator operation to establish reasonable generation scenarios.
- Assess the 'most-likely' operation of new generators, usually based on fuel type or project specific information.
- Assess other relevant operational factors including maintenance outage plans, and impacts to operating tools.
- Test the performance of the studied area against a set of contingencies. The contingency selection criteria vary from region to region.

As a result of the above mentioned analysis the following actions are taken by the AESO:

- Establish reliable system operating limits for the studied conditions.
- Establish any requirement for ancillary services to ensure reliable system performance, often expressed as a TMR need whether to mitigate for transient or voltage stability, thermal overloads or voltage deviation.
- Propose operating policies and procedures.

It is important to note that operations planning studies do not cover every possible operating condition that may occur. To do so would be impractical. It follows that when short term planned outage conditions and contingencies occur that have not been studied, actions must be taken to return the system to a reliable and studied state. In

this case, generators may be directed in real-time to provide Transmission Must Run (TMR) or other ancillary services as contemplated in the AESO tariff and ISO rules.

In some areas of the AIES, contracted TMR service may be the only means available to maintain system performance, either under steady state conditions or following foreseen contingencies. An assessment of whether to contract through a competitive procurement process or through direct negotiations is dependent on the frequency, duration and volume of the TMR service required.

Regional TMR Estimates

The following sections provide an estimate of the regional need for TMR up to and including 2011. TMR, when required is a regional need and is presented accordingly in this document.

North West Region

The **Grande Prairie area** requires TMR on a daily basis. The Northwest Alberta Transmission Development Need Identification Document (NID), approved by the EUB, includes several transmission reinforcement projects for the area. Based on the current project timelines, these upgrades will eliminate the need for TMR by year 2010 for all studied conditions.

Certain system conditions not contemplated in the area study could result in real time conscription of TMR. Some of the system conditions not considered include weather related multiple transmission contingencies and unexpected changes to generator operation including TMR-contracted generators.

The AESO has contracted sufficient gas fired TMR in the Grande Prairie area to account for daily system operations. There are several base load generators that provide support for the Grande Prairie area. The most severe contingencies are the loss of the Milner generator or the 240 kV line between Little Smokey and Wesley Creek. Unpredictable events such as poor generator performance and some transmission line derates over the past couple of years have resulted in some conscription of TMR. Although the AESO feels the current contracted amount of TMR is sufficient to manage the daily operation and most contingencies that may occur in the area, TMR requirements may increase in the future if the current transmission projects being constructed are delayed or higher load growth for the period occurs.

The following table provides the likely TMR requirements for the Grande Prairie area for the forecast period.

Contracted TMR: NW Area		
Year	Max TMR (MW)	TMR (MWh)
2008	140	172,625
2009	140	190,950
2010*		0
2011		0

* anticipated in-service date for transmission reinforcement

The **Rainbow Area** requires TMR at all times. The approved Northwest Alberta Transmission Development NID also calls for several transmission reinforcements for the area. Based on the current project timelines, these upgrades will eliminate the need for TMR by year 2011 for all studied conditions.

As noted above certain system conditions such as weather related multiple transmission contingencies along with multiple and/or unexpected generator outages may increase the need for TMR in the area during the 2008 and 2009 period.

The AESO is currently securing sufficient amounts of TMR in the Rainbow area. All generators in the area are gas fired and approximately equal in size. The most severe contingency is the loss of one generator. As generators are generally much less reliable than transmission facilities, a standby TMR generator has been contracted for to be run in situations when there is an outage to an area generator. Although the AESO feels the current amount of TMR being secured is sufficient to manage the daily operation requirement and most contingencies that may occur in the area, other considerations may increase the amount of TMR required. For instance, a recent lack of generator outage coordination resulted in conscription of additional TMR for several days. Additional TMR may also be required if the current transmission projects being constructed are delayed or higher than forecast load growth occurs.

The following table provides the likely TMR requirements for the Rainbow area for the forecast period.

Anticipated Contracted TMR: Rainbow Area		
Year	Max TMR MW	Total TMR MWh
2008	150	951,930
2009	160	956,410
2010	160	965,340
2011*		0

* anticipated in-service date of transmission reinforcement

South Region

The **Calgary** area requires TMR during certain transmission contingencies. For instance, outages on the 240 kV lines in the area, or outages at any reactive support facilities, most notably the Langdon SVC, require TMR. The generation mix in southern Alberta is diverse and includes base load coal, base load industrial co-generation, seasonal hydro, run of river hydro, peaking hydro, wind, and combined cycle gas. In addition, the interties to BC and Saskatchewan, as well as the market participation of the City of Medicine Hat generation affect the Calgary area operation. The most severe contingencies are the loss of double circuit north–south 240 kV lines. The recent Calgary area capacitor additions combined with the current LBCSO contract is expected to provide sufficient TMR up to 2009. For 2010 and 2011 the Edmonton – Calgary 500 kV Transmission Development is expected to be in service eliminating the need for any additional TMR requirements beyond the current LBCSO contract.

Currently, in accordance with the AESO’s Congestion Management Principles Paper, if the SOK-240 cut plane exceeds limits, generation upstream of the cut plane will be reduced and south supply will become in-merit and replace the constrained upstream generation. Thus, beyond the set of studied conditions, the energy market operation provides the primary mitigation for TMR need beyond what is currently contracted for the Calgary area.

The following table provides the TMR estimate for the Calgary area.

Contracted TMR: Calgary area		
Year	Max TMR MW	TOTAL TMR MWh
2008	125	7500
2009	125	7500
2010*	125	7500
2011*	125	7500

* **Note:** As discussed above, the southern Alberta generation mix is very diverse, estimating generating patterns and considering impacts of the interties makes assessing TMR needs for the area particularly challenging. In general, an assessment of normal and contingency conditions will be conducted considering generation development, units in merit, and import energy. If it is determined that system performance is unacceptable in 2010 and subsequent years due to delays in the Edmonton Calgary 500 kV transmission project, additional TMR and/or load shedding services may be procured.

The studies for the **South areas**, i.e. areas not included in the Calgary planning area, have determined that no long-term contracted TMR is required. Contingencies not accounted for in the original area study may result in a short

term need for TMR to mitigate the impact of the next contingency, which may be secured through short-term contracts or conscription.

Central Region

The **Joffre area** does not require TMR. Although there may be concerns in the area when all area generators are off line, the chances of such an occurrence are remote. It is expected the construction of new transmission facilities will further reduce the need for TMR in the area. In cases where contingencies not contemplated in the area study in fact occur, Joffre generation may need to be directed to provide service.

The **Brazeau area** requires voltage support during transmission outages that coincide with unexpected multiple generator outages. During these periods, Brazeau generators have been requested to come on line for area voltage support.

Edmonton and Fort Saskatchewan Regions

The AESO contracted the Rossdale plant for TMR to mitigate the effects of transmission line outages supplying the central core of Edmonton. TO date, the Rossdale plant has not been used for TMR. TMR will not be needed when the third line into the central core of Edmonton is in service. The current in-service date is the end of 2008 and the Rossdale contract is set to expire at that time.

The planned capacitor bank additions in the Edmonton region and the Heartland transmission development, which is required for the significant load growth in the Heartland area, will defer any need for TMR in the Edmonton and Fort Saskatchewan areas.

Fort McMurray Region

The Fort McMurray region does not require TMR at this time. Currently the Fort McMurray area generation flows out of the region. However there is the potential for the area to become dependent on power flowing in to the region (if sufficient generation is not on-line) which could result in a need for TMR, but this is not expected to happen during the forecast period.