Market Rule Amendment Submission

This form is used to request an amendment to, or clarification of, the *Market Rules*. Please complete the first four parts of this form and submit the completed form by email or fax to the following:

Email Address: Rule.Amendments@ieso.ca
Fax No.: (416) 506-2847 Attention: Market Rules Group
Subject: *Market Rule Amendment Submission*

All information submitted in this process will be used by the *IESO* solely in support of its obligations under the *Electricity Act, 1998*, the *Ontario Energy Board Act, 1998*, the *Market Rules* and associated policies, standards and procedures and its licence. All submitted information will be assigned the *confidentiality classification* of "public" upon receipt. You should be aware that the *IESO* will *publish* this *amendment submission* if the *Technical Panel* determines it warrants consideration and may invite public comment.

Terms and acronyms used in this Form that are italicized have the meanings ascribed thereto in Chapter 11 of the *Market Rules*.

PART 1 –SUBMITTER'S INFORMATION

Please enter contact information in full

Name: IESO Staff	
(if applicable) ***Market Participant* / *Metering Service Provider* No.[1]:** N/A	***Market Participant* Class: N/A**
Telephone: 416-506-2801	**Fax: 416 506-2847**
Email Address: rule.amendments@ieso.ca	

PART 2 – *MARKET RULE AMENDMENT SUBMISSION* INFORMATION

Subject: Technical Requirements
Title: Reactive Power Requirements for Induction Generators
Nature of request (please indicate with X): _X_Alteration__Deletion___Addition ___Clarification
Chapter: 4 Appendix: 4.2 Sections:
Sub-sections proposed for amending/clarifying : 1

[1] This number is a maximum of 12 characters and does not include any spaces or underscore.

PART 3 – DESCRIPTION OF THE ISSUE

Provide a brief description of the issue and reason for the proposed amendment. If possible, provide a qualitative and quantitative assessment of the impacts of the issue on you and the *IMO-administered markets.* Include the Chapter and Section number of the relevant market rules.

Under MR-00244, the IESO introduced changes to several aspects of the technical requirements for generation units. Among those changes was to specify requirements for provision of reactive power by induction generation units. The IMO Board approved these changes in October 2004. The approved changes came into effect on December 8, 2004. The resulting requirements for provision of reactive power by induction generation units are as follows:

"4. An induction *generation unit* that is injecting electricity at a nominal voltage of greater than 50 kV shall have the capability to supply reactive power at its terminal within the range 90% lagging (overexcited) to 95% leading (underexcited) power factor based on rated active power at rated voltage. Rated active power shall be the lesser of registered maximum continuous real power or 90% of the unit nameplate MVA.

5. An induction *generation unit* that is injecting electricity at a nominal voltage equal to or less than 50 kV shall, as a minimum, have the capability of operating at unity power factor. Additional reactive power capabilities for such an induction generation unit, up to the capabilities specified for a synchronous generation unit of the same apparent power, may be required if identified during the Connection Assessment and Approval process for that induction generation unit."

Following the publication of the approved amendment, a stakeholder identified a concern with the provision #4 above in its application to wind turbine generation units, namely:

"…fully appreciate the need to have the capability to supply reactive power, but I have a concern with one of the proposed changes related to the supply of reactive power by induction generators detailed in Appendix 4.2 – Ref 1, item 4.

Namely, that "An induction generation unit … shall have the capability to supply reactive power AT ITS TERMINAL within ….."

I am not aware of a single wind turbine generator (WTG) manufacturer that uses induction generators, which can presently meet this requirement.

If the intent is to have a facility that can deliver the required reactive power based on the accumulated capacity of the total wind farm then Ref 1 - item 4 should be re-phrased to require the supply of reactive power AT ITS CONNECTION POINT. This change of wording would allow for the installation of capacitor banks within the collection system, but not necessarily at the generation unit terminals."

IESO staff acknowledges the concern raised by the stakeholder and that the market rules should be changed. However, given the variety of induction generation unit technologies, configurations and potential locations, IESO staff believes it is more appropriate for the market rules to allow for the specification of individual reactive power requirements for each induction generation unit. Under this approach, the market rules could specify:

1. a minimum reactive power requirement that would be achievable by current technologies, and

2. allow for the IESO to require additional reactive power capability if such a requirement is

PART 3 – DESCRIPTION OF THE ISSUE

identified during the Connection Assessment and Approval process for a given induction generation unit.

This suggested approach is consistent with the existing requirement for induction generation units injecting at a nominal voltage of 50 kV or less. The suggested change would apply to induction generation units injecting at a nominal voltage of greater than 50 kV as well.

PART 4 – PROPOSAL (BY SUBMITTER)

Provide your proposed amendment. If possible, provide suggested wording of proposed amendment.

Amend Appendix 4.2 part 1 to require all induction generation units, regardless of the injection nominal voltage, to have, at a minimum, the capability to operate at unity power factor as measured at their respective connection point. The IESO would also have the authority to require additional reactive power capability, up to the capabilities required of a synchronous generation unit of the same apparent power, if such a requirement is identified during the Connection Assessment and Approval process.

PART 5 – FOR *IMO* USE ONLY

Technical Panel* Decision on Rule *Amendment Submission	
MR number: MR-00288-Q00	
Date submitted to *Technical Panel*: 9 Feb 05	
Accepted by *Technical Panel* as: X General Urgent Minor (please indicate with X)	**Date: 15 Feb 04**
Criteria for acceptance:	
Priority: High	
Criteria for assigning priority:	
Not accepted (please indicate with X)**:**	
Clarification/interpretation required (please indicate with X):	
***Technical Panel* minutes reference: IESOTP 158-1**	

PART 5 – FOR *IMO* USE ONLY

***Technical Panel* Comments:**

The Technical Panel noted the following three comments:

1. **The IESO should consider reactive power requirements for induction generation units connected to the IESO-controlled grid that are different than the requirements for induction generation units connected to a distribution system. The requirements for induction generation units connected to the IESO-controlled grid should be comparable to that for synchronous generation units so that all generation units on the IESO-controlled grid contribute to meeting grid reactive power requirements.**
2. **The market rule should provide, to the extent practical, certainty as to the reactive power requirement standard that a given induction generation unit installation will likely have to meet. Such certainty will benefit proponents and suppliers of induction generation equipment.**
3. **The standards and requirements of the market rules are to be applicable in most cases. The existing exemption process is intended and available to address those isolated circumstances where application of the market rules standards and requirements is not appropriate.**