



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@theIMO.com

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 *IMO* 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 *IMO* 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: IMO Staff	
(if applicable) <i>Market Participant / Metering Service Provider No.</i> ¹ :	<i>Market Participant Class:</i>
Telephone: 416 506-2801	Fax: 416 506-2847
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PART 2 – MARKET RULE AMENDMENT SUBMISSION INFORMATION

Subject: Day-Ahead Market (DAM)
Title: DAM - Market Operations
Nature of request (please indicate with X): ___Alteration___Deletion__X__Addition ___Clarification
Chapter: 12 (new) Appendix: Sections:
Sub-sections proposed for amending/clarifying :

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.

Background:

In consultation with market participants and other stakeholders, the IMO developed a high-level design for a day-ahead market. The IMO-Board has endorsed proceeding with the development of a day-ahead market and has directed the IMO to proceed with the development of the detailed design and market rule amendments for the day-ahead market consistent with the high-level design strawman¹. This market rule amendment submission on the subject of market operations is one of many anticipated rule amendment submissions for the day-ahead market.

Day-ahead Market Description:

The Day-ahead Market (DAM) is a market-based auction of offers to sell energy and operating reserve and bids to buy energy that will clear in the day ahead of the real-time dispatch day. Day-ahead Market clearing and settlement will use a uniform price, together with the payment of CMSC (Congestion Management Settlement Credit).

The proposed Day-ahead Market has the following characteristics:

- **Market function:**
 - to allow participants to buy and sell energy and sell operating reserve ahead of real-time, improving operational certainty, and
 - to allow participants to lock-in prices day ahead, improving price certainty and reducing exposure to real time price volatility.
- **Unit commitment** – a least-cost commitment of generation, imports and price-responsive loads based on a security-constrained model of the IMO-controlled grid to assure that sufficient resources are on-line to meet forecast demand for the next day, making it easier to achieve reliability through market mechanisms.
- **Demand response** – to enable greater participation from loads that can respond to price without requiring them to be 5-minute dispatchable, making it easier to achieve reliability through market mechanisms.
- **Import and export day-ahead schedules** – to provide financial commitment for day ahead inter-tie transactions, reducing inter-tie failures in real time and making it easier to achieve reliability through market mechanisms.
- **Virtual buying and selling** – to enable financial arbitrage of potential differences in day ahead and real time prices, driving day ahead and real time price convergence.
- **Stable forward price index** – to provide a day ahead price that is less volatile than the real-time market, supporting development of forwards and futures markets.

The day-ahead market, which optimises resource selection over the day, will yield a more economic utilisation of resources than the present myopic real-time market mechanism, which optimises every 5 minutes. This will improve market efficiency. The unit commitment aspects of the DAM will improve reliability.

A major feature of this market, the Multi-Pass Calculation Engine is described below.

Multi-Pass Calculation Engine

¹ http://www.theimo.com/imoweb/pubs/consult/mep/DAM_WG_Strawman-4_0.pdf.

PART 3 – DESCRIPTION OF THE ISSUE

The day-ahead market will be driven by a calculation “engine” composed of five “passes,” each with a distinct role in the creation of financially binding day-ahead market schedules and prices, as well as anticipated (but non-binding) schedules and prices for the real-time market. Using multi-part bids and offers the multi-pass calculation engine will simultaneously optimise for energy and operating reserves over a 24-hour period with an hourly resolution.

Pass 1: An initial security-constrained pass will calculate a least-cost commitment based only on the load bid into the day-ahead market and operating reserve requirements. Pass 1 commits resources to satisfy bid loads. Prices and schedules from this pass serve as input to pass 2.

Pass 2: Given the commitment results of the first pass, a second security-constrained pass will calculate a least cost commitment for total next day forecast requirements, which covers load that did not bid into the day-ahead market. That is, the pass commits the additional resources necessary to satisfy next day forecast loads. Since they did not bid into the day-ahead market, the commitment costs associated with this additional load will be for fixed costs only. Together, these two passes will define the generators, imports, and price-responsive loads committed the day-ahead that are needed to meet the bid-in day-ahead loads and remaining forecast next day load requirements.

Importantly, passes 1 and 2 will be security-constrained commitment passes; thus ensuring that sufficient resources will be committed to resolve expected congestion. By moving much of the task of managing congestion into the day-ahead market, the IMO can significantly simplify and reduce real-time interventions to manage congestion.

Ontario resources and imports that are committed day ahead and have submitted fixed costs will be eligible for a PCG (production cost guarantee). The production cost guarantee will compensate resources (generators, imports, price-responsive loads) to hold them whole to their fixed costs should revenues earned in the Day-ahead Market be less than the revenues necessary to cover the fixed cost bids and offers. The production cost guarantee will provide an incentive for resources to perform in the real-time market in a manner consistent with their commitment in the Day-ahead Market, thereby enhancing reliability.

Pass 3: Using the commitment results from passes one and two, a third security constrained pass will then define the least cost set of financially binding constrained schedules and non-binding nodal prices of supply offered to meet the bid-in loads participating in the day-ahead market. This pass determines the constrained schedules that, together with the unconstrained uniform prices determined in pass 5, are used in the calculation of DAM CMSC payments. The nodal prices of this third pass will be published for informational purposes only.

Pass 4: A fourth security-constrained pass using the commitment results from passes one and two and forecast load will produce the lowest cost set of resources to meet the forecast load and corresponding operating reserves. This advisory dispatch will be used by the IMO for its security analysis of the Day-ahead Market output.

Pass 5: Finally, a fifth market clearing pass of the day-ahead market calculation based on an unconstrained dispatch will determine uniform prices and binding unconstrained schedules that together with pass 3 results will be used for settlement and calculation of CMSC for bid-in loads and offers of supply.

The above is intended as a brief high level introduction to the multiple passes of the calculation engine. A detailed description of the DAM market operations, including the various optimisations and objective functions of each pass and the determination of schedules, prices and the specification of the DAM algorithm is contained in the DAM Calculation Engine detailed design document².

² http://www.theimo.com/imoweb/consult/mep_dam.asp

PART 4 – PROPOSAL (BY SUBMITTER)

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

This market rule amendment (MR-00264) will address the scheduling and pricing aspects of the DAM. It will provide market rules on the subjects of DAM dispatch algorithm optimisation objective, unit commitment, scheduling and pricing similar in content and detail to the current Chapter 7 sections 4, 6 and 8 market rules for the real-time market. The DAM market rules would be in a new chapter 12 of the market rules. They are anticipated to be comparable in detail and structure to the existing rules for the real-time market.

The scope of the market operations market rules for the DAM include:

- the calculation engine: its purpose, its optimisation objective (to maximise the gain from trade), its basic inputs (e.g. valid DAM bids and offers, modelling of constraints, MMCP etc) and its basic outputs (e.g. the constrained schedules of pass 3, the advisory schedule of pass 4, the unconstrained uniform prices from pass 5).
- the purpose and determination of the financially binding day-ahead constrained schedule and unconstrained (i.e. market) schedule, the determination of day-ahead market prices, including inputs, outputs and how the IMO determines the schedules and prices
- the required timelines for determination of the DAM schedules and prices.

PART 5 – FOR IMO USE ONLY

Technical Panel Decision on Rule Amendment Submission	
MR number: MR-00264-Q00	
Date submitted to Technical Panel: August 18, 2004	
Accepted by Technical Panel as: <input type="checkbox"/> General <input type="checkbox"/> Urgent <input type="checkbox"/> Minor (please indicate with X)	Date: N/A
Criteria for acceptance: N/A	
Priority: N/A	
Criteria for assigning priority: N/A	
Not accepted (please indicate with X):	
Clarification/interpretation required (please indicate with X):	
Technical Panel minutes reference: IMOTP-148-1	
Technical Panel Comments:	