

Philosophy

The IMO will only take manual action to maintain the reliability of the power system and will minimize the disruption to the market, while remaining consistent with the market design fundamentals.

Principles

- P1** - The IMO will only intervene to alter PD generated transaction schedules for a given dispatch hour if:
- in the IMO's opinion, as a result of changing conditions, the RT schedules will not have sufficient resources available to maintain the reliable operation of the IMO controlled grid; or
 - consistent with interconnection agreements and industry policy, requested to do so by another control area or reliability coordinator.
- P2** - IMO manual changes shall be consistent with the changes that would have occurred if the hour-ahead pre-dispatch sequences recognized the reliability concern.
- P3** - To the extent practicable, the IMO shall limit manual intervention to an amount equal to the difference between the change in conditions and the RT capability of available internal resources to address that change.
- P4** - The IMO shall, to the extent practicable, use the economic merit order of intertie transactions as the basis for determining which transactions to manually adjust.
- P5** - IMO manual intervention shall impact the same RT/PD schedule (constrained or unconstrained) that would have had insufficient resources as a result of the changing conditions, as noted in **P1**.
- P6** - The MP whose transaction is affected by the IMO manual intervention shall be eligible for the same market compensation and be subject to the same risks as if the transaction was scheduled in the hour-ahead PD.*

**Compensation includes Energy/OR MCP, CMSC and IOG, while the risks include negative CMSC.*

Base Case #1 & #2 – Worksheet

Applicability – The treatment applies for all three timelines (before PD, After final PD but before RT, and in RT).

Base Case Example & Description	IMO Action	Current IMO Treatment; Market and MP Implications (CS, MS, MCP, CMSC, IOG etc)	Discussion: Consistent with Principles? Rationale for Divergence?
<p>1 – External Curtailment <i>(Security/Adequacy)</i></p> <p>At times the IMO is requested to modify transactions due to circumstances beyond the Ontario borders. These changes can be due to transmission limitations or adequacy problems in the other jurisdiction but from the Ontario perspective the impact is the same.</p> <p>2 – Failed Transaction</p> <p>A participant’s failure to navigate, or successfully schedule, an amount equal to the IMO’s PD request in the adjacent market.</p> <p>NOTE – These two cases result in the same IMO action and treatment and are therefore grouped together for simplicity.</p>	Dispatch off requested import	<ul style="list-style-type: none"> • IMO decreases import transaction quantity by amount requested; assigns TLRe/OTH to transaction. (TLRe for TLR’s – OTH for all other reasons) • MS & CS have revised quantity. • CS qty = MS qty; no CMSC. • RT MCP reflects the action. 	<p>Base case 1 & 2 represent a condition where an MP has offered/bid into the market a quantity that the external agency will not permit to flow. Coding of these changes result in the IMO systems treating the transaction as if it had never been offered/bid.</p> <p>P1: Yes. IMO requested by external party to reduce the transaction.</p> <p>P2: Yes. If external problem were known before hour-ahead PD run, the offers/bids would have been removed as if the transaction, or curtailed portion at least, did not exist.</p> <p>P3: N/A –Selection based on external request.</p> <p>P4: N/A –Selection based on external request.</p> <p>P5: Yes. If the dispatch data was revised both the MS and CS would reflect the change.</p> <p>P6: Yes. If not offered/bid there is no compensation.</p>
	Dispatch off requested export	<ul style="list-style-type: none"> • IMO decreases export transaction quantity by amount requested; assigns TLRe/OTH to transaction. (TLRe for TLR’s – OTH for all other reasons) • MS & CS have revised quantity. • CS qty = MS qty; no CMSC. • RT MCP reflects the action 	

Base Case #3 – Worksheet

Applicability – The treatment applies in the “before final PD” timeframe.

3 – NY- IMO Scheduling Protocol	IMO Action	Current IMO Treatment; Market and MP Implications (CS, MS, MCP, CMSC, IOG etc)	Discussion: Consistent with Principles? Rationale for Divergence?
<p>To ensure coordinated operations and increase the success rate of interchange scheduling the IMO develops scheduling protocols with its neighbors. In the case of the NY-IMO protocol, restrictions are placed on transactions in advance of the final PD. The IMO uses primary and secondary codes to identify the treatment within the tools. The protocol requires the IMO to predetermine the maximum MW's to be considered by NY. The IMO uses the TLRi code 90-minutes prior to the start of the dispatch hour.</p>	<p>Restrict imports and exports</p>	<ul style="list-style-type: none"> • IMO reviews with NY the transactions scheduled in the IMO 2-hour ahead PD. • NY evaluates the transactions in the NY BME (Balancing Market Evaluation) but uses the IMO value as a max cap. • IMO uses the TLRi/MAX code to ensure that the PDCS does not contain more than the amount identified to the NYISO. • The TLRi code does not restrict the PDMS to the max provided to NYISO. • Assuming the max is accepted and scheduled by the NYISO and the IMO's 1-hour ahead PD schedules the max again the RT MS and CS will use the final PD MS and CS values. • If NYISO has something less than the max/final PD amount see Base case #2 - failed transaction for treatment. • If the IMO's 1-hour ahead PD has a lesser value then that value is used in the RT CS and MS, unless failed by NY. MS is not restricted in PD. • CS is restricted to a max of the 2-hour ahead PD value. • CMSC is permitted for any differences. • RT MCP is not affected as the MS is not restricted. • Transaction eligible for IOG (import). 	<p>Base case 3 – By using the TLRi code the IMO allows the MS to be unaffected while the CS reflects the quantities being reviewed by NYISO.</p> <p>P1: Yes. IMO requested by external party to coordinate transaction scheduling to improve success rates. Note that this was a mutual request.</p> <p>P2: Yes. By not restricting the MS, and fixing the CS the IMO replicates the treatment that would have occurred had the MP known the NY Scheduled value.</p> <p>P3: Yes. Selection based on PD outcome.</p> <p>P4: Yes. Selection based on PD outcome.</p> <p>P5: N/A.</p> <p>P6: Yes. The transaction remains eligible for same compensation and exposed to same risks as if it was evaluated in PD CS and PD MS.</p>

Base Case #4 – Worksheet

Applicability – The treatment applies for only two of the identified timelines (After final PD but before RT, and in RT).

4 – Internal Transmission Constraint	IMO Action	Current IMO Treatment; Market and MP Implications (CS, MS, MCP, CMSC, IOG etc)	Discussion: Consistent with Principles? Rationale for Divergence?
<p>Internal security problem occurs after the hour-ahead PD timeframe and there are insufficient real-time internal resources to solve the problem; or conditions change in real-time and there are insufficient internal resources to solve the problem. e.g. internal transmission constraint, local area OR constraint</p>	Constrain on import (prior to RT)	<ul style="list-style-type: none"> • IMO selects and increases import transaction quantity; assigns TLR_i to transaction. • CS has revised quantity. • MS quantity not affected. MCP determined based on MS quantity i.e. MCP does not reflect action. • CS qty ≠ MS qty. Transaction eligible for CMSC. • Transaction eligible for IOG as an off set to potential (-) CMSC. 	<ul style="list-style-type: none"> • P1: Yes, IMO assesses that RT resources are not sufficient to maintain reliable operation. • P2: Yes. Had PD sequences included security problem and the fact that internal resources could not solve problem, PD CS would take same action. • P3: Yes, to the extent practicable the IMO will select just enough. • P4: Yes, to the extent practicable the IMO will select in economic merit order. • P5: Yes. Security constraints are not included in MS which is unconstrained, so only CS should be affected by IMO action. • P6: Yes. Transaction eligible for same compensation and exposed to same risks as if it was scheduled in PD CS and not in PD MS. Due to manual nature of intervention, the resulting transaction quantities may not be the same as if scheduled by the PD sequences.
	Constrain off import (prior to or during RT)	<ul style="list-style-type: none"> • IMO selects and decreases import transaction quantity; assign TLR_i to transaction • CS has revised quantity. • MS quantity not affected. MCP determined based on MS quantity i.e. MCP does not reflect action. • CS qty ≠ MS qty. Transaction eligible for CMSC. • Transaction eligible for IOG as an off set to potential (-) CMSC. 	
	Constrain on export (prior to RT)	<ul style="list-style-type: none"> • IMO selects and increases export transaction quantity; assigns TLR_i to transaction. • CS has revised quantity. • MS quantity not affected. MCP determined based on MS quantity i.e. MCP does not reflect action. • CS qty ≠ MS qty. Transaction eligible for CMSC. 	
	Constrain off export (prior to or during RT)	<ul style="list-style-type: none"> • IMO selects and decreases export transaction quantity; assigns TLR_i to transaction. • CS has revised quantity. • MS quantity not affected. MCP determined based on MS quantity i.e. MCP does not reflect action. • CS qty ≠ MS qty. Transaction eligible for CMSC. 	

Base Case #5 – Worksheet

Applicability – The treatment applies for only one of the identified timelines (After final PD but before RT).

5 – Internal Adequacy	IMO Action	Current IMO Treatment; Market and MP Implications (CS, MS, MCP, CMSC, IOG etc)	Discussion: Consistent with Principles? Rationale for Divergence?
<p>Base case 5 deals specifically with circumstances after PD but prior to RT.</p> <p>Internal adequacy shortfall identified after hour-ahead PD and real-time resources cannot solve the problem. For example, this can be the result of generation contingencies after the PD or failed transactions during check-out.</p>	Select additional imports	<ul style="list-style-type: none"> • IMO selects and increases import transaction quantity; assigns OTH to transaction. • CS and MS have revised quantity. • MCP will reflect action • CS qty = MS qty; no CMSC • Transaction eligible for IOG based on modified MS. 	<ul style="list-style-type: none"> • P1: Yes, IMO assesses that remaining RT resources are not sufficient to maintain reliable operation. • P2: Yes. If PD sequences had seen adequacy shortfall (contingency or transaction failure) and insufficient RT resources, it would have taken same action. • P3: Yes, to the extent practicable the IMO selects just enough to solve the problem. • P4: Yes, to the extent practicable the IMO selects transactions in economic merit order. • P5: Yes. Adequacy shortfall likely¹ to occur in both CS and MS. Both schedules should reflect IMO action. • P6: Yes. Transaction eligible for same compensation and exposed to same risks as if it was scheduled in PD CS and PD MS. Due to manual nature of intervention, the resulting transaction quantities may not be the same as if scheduled by the PD sequences.
	Reduce exports	<ul style="list-style-type: none"> • IMO selects and decreases export transaction quantity; assigns OTH to transaction. • CS and MS have revised quantity. • MCP will reflect action • CS qty = MS qty; no CMSC 	

¹ Currently it is impossible to see the exact correlation between a CS and MS shortage therefore the IMO takes actions with the assumption that both schedules are equally resourced. It is acknowledged that circumstances can arise where either the MS or the CS are under-generated.

Base Case #6 – Worksheet

Applicability – The treatment applies for one of the three identified timelines (After final PD but prior to RT).

6 – Internal Transmission Constraint leads to Adequacy Concern	IMO Action	Current IMO Treatment; Market and MP Implications (CS, MS, MCP, CMSC, IOG etc)	Discussion: Consistent with Principles? Rationale for Divergence?
<p>Base case 6 deals with an initial security problem that becomes an adequacy concern due to the actions taken to resolve the security problem.</p> <p>For example, a studied contingency requires the reduction of a nuclear facility. IMO constrains down the nuclear unit and adjust imports and exports to compensate (BC#4). After some time the nuclear facility submits a derating or is forced O/S. At this time the IMO becomes deficient, similar to BC#5, and must reflect the fact that the nuclear unit cannot offer the same quantity it did prior to the event.</p>	Select additional imports	<ul style="list-style-type: none"> • IMO selects and increases import transaction quantity; assigns OTH to transaction • CS and MS have revised quantity. • MCP will reflect action • CS qty = MS qty; no CMSC • Transaction eligible for IOG 	<p>Provided we are considering the period after the derating the following is true. The following is not true for the period leading up to the unit limitation.</p> <ul style="list-style-type: none"> • P1: Yes, IMO assesses that remaining RT resources are not sufficient to maintain reliable operation. • P2: Yes. If PD sequences had seen adequacy shortfall (contingency or transaction failure) and insufficient RT resources, it would have taken same action. • P3: Yes, to the extent practicable the IMO selects just enough to solve the problem. • P4: Yes, to the extent practicable the IMO selects transactions in economic merit order. • P5: Yes. Adequacy shortfall likely to occur in both CS and MS. Both schedules should reflect IMO action. • P6: Yes. Transaction eligible for same compensation and exposed to same risks as if it was scheduled in PD CS and PD MS. Due to manual nature of intervention, the resulting transaction quantities may not be the same as if scheduled by the PD sequences. <p>The market’s current treatment needs to be reviewed and changes may result. The practical application of a process under these high stress situations needs to be factored into the outcome/revised process.</p>
	Reduce exports	<ul style="list-style-type: none"> • IMO selects and decreases export transaction quantity; assigns OTH to transaction. • CS and MS have revised quantity. • MCP will reflect action • CS qty = MS qty; no CMSC 	

Base Case #7 – Worksheet

Applicability – The treatment applies for two of the identified timelines (After final PD but before RT, and in RT).

7 – Recall of an Export (not offered as OR)	IMO Action	Current IMO Treatment; Market and MP Implications (CS, MS, MCP, CMSC, IOG etc)	Discussion: Consistent with Principles? Rationale for Divergence?
<p>Base case 7 deals specifically with the curtailment of an export whether or not it has been offered as OR.</p> <p>Internal adequacy shortfall identified within (or for) a given dispatch hour and real-time resources cannot solve the problem. As examples, this can be the result of failed transactions, contingencies, unexpected load increases or transaction recall during an hour.</p>	<p>Reduce the export transaction.</p>	<ul style="list-style-type: none"> • The IMO will coordinate the “recallability” with the external entities. • IMO recalls (reduces the schedule for) the export, assigns OTH to transaction • CS and MS has revised qty; • RT MCP would reflect action • Transaction not eligible for CMSC 	<ul style="list-style-type: none"> • P1: Yes, IMO assesses that remaining RT resources are not sufficient to maintain reliable operation. • P2: Yes. If PD sequences had seen adequacy shortfall (contingency or transaction failure) and insufficient RT resources, it would have taken same action. • P3: Yes, to the extent practicable the IMO selects just enough to solve the problem.. • P4: Yes, to the extent practicable the IMO selects transactions in economic merit order. • P5: Yes. Adequacy shortfall likely² to occur in both CS and MS. Both schedules should reflect IMO action. • P6: Yes. Transaction eligible for same compensation and exposed to same risks as if it was scheduled in PD CS and PD MS. Due to manual nature of intervention, the resulting transaction quantities may not be the same as if scheduled by the PD sequences. <p>Note that the priority export treatment and use of Control Action Operating Reserve will permit the scheduling of exports during circumstances where the original algorithm would have otherwise not scheduled the export in the first place.</p>

² Currently it is impossible to see the exact correlation between a CS and MS shortage therefore the IMO takes actions with the assumption that both schedules are equally resourced. It is acknowledged that circumstances can arise where either the MS or the CS are under-generated.

Base Case #8 – Worksheet

Applicability – The treatment applies only in RT.

8 – OR Activation	IMO Action	Current IMO Treatment; Market and MP Implications (CS, MS, MCP, CMSC, IOG, etc)	Discussion: Consistent with Principles? Rationale for Divergence?
Activation of OR provided by import (assume no MS for energy)	Activate import energy. (increase import schedule)	<ul style="list-style-type: none"> • IMO activates import energy, assigns ORA to the transaction. • CS has revised qty. • MS qty not affected; MCP does not reflect action. • Transaction eligible for CMSC for energy provided upon activation. • Transaction not eligible for IOG (MS energy qty is not changed). • IMO reduces OR requirement and then transitions back to full complement post recovery. 	<ul style="list-style-type: none"> • P1: No. The IMO manually intervenes to activate offered OR provider’s energy. This action is not taken based on the internal resources ability to provide. • P2: No. If PD sequences had seen contingency the PD may select the intertie resources as MS resources. • P3: No. See P1. • P4: Yes. OR Activation is based on least cost energy prices. • P5: No. The normal PD process would allow the activated OR providers to be dispatched in the MS as well as the CS. • P6: No. If PD recognized the change the compensation would be based on MS and CS considerations. Current practice has compensation on CS impacts only.
Activation of OR provided by export that offered OR and was selected for OR	Activate export energy. (reduce export schedule)	<ul style="list-style-type: none"> • IMO activates export energy, assigns ORA to the transaction. • CS has revised qty. • MS qty not affected; MCP does not reflect action. • Transaction eligible for CMSC for energy (potentially (-) CMSC). • IMO reduces OR requirement and then transitions back to full complement post recovery. 	<p>Further consideration also indicates that the current treatment of OR activation from intertie resources is inconsistent with the RT equivalent for internal dispatchable resources. * See description below.</p> <p>Modifications to the existing processes should be considered because the activation of OR is inconsistent with several of the defined principles.</p>

* OR activation for internal resources results in limited CMSC followed by a “recalculation” of the MCP and ultimately the MS for the applicable resources. As an example a 100 MW dispatchable load bid at \$50 in a \$40 market will have a 100 MW MS for energy and we will assume it had an offer of 100MW of OR that was also accepted. If a contingency occurred the IMO would dispatch off the load resulting in a CS of 0 MW. Assuming the expost MS remains at 100MW (due to the simultaneous OR requirement reduction) there will be a 100 MW CMSC payment for energy of \$10/MW. However, Once the IMO begins to increase the OR requirement, the load may see a MS quantity that is reduced to 0 MW due to the loss of more economical resources. As this happens the load goes from receiving CMSC to being dispatched off in the MS and getting no CMSC.

The process for generators is similar. However, as the IMO increases the OR requirement the price will rise and the MS for the generator is likely to increase proportionally, thus converting compensation from CMSC to energy. It is important to consider that the IMO is paying for the resources to be on standby for energy dispatch. For internal resources this means eligible for MCP considerations. With respect to imports and exports it would appear to be inconsistent and perhaps inappropriate that the market pays for resources to be eligible for energy dispatch but at the very time and for the very reason they are called upon they are not permitted to be dispatched in the energy MS. Therefore it may be appropriate to modify the current process from ORA to an OTH equivalent.

Base Case #9 – Worksheet

Applicability – The treatment applies for two of the three identified timelines (After PD but prior to RT, and in RT).

9 – Interconnection Contingency (partial or complete)	IMO Action	Current IMO Treatment; Market and MP Implications (CS, MS, MCP, CMSC, IOG etc)	Discussion: Consistent with Principles? Rationale for Divergence?
<p>The IMO controlled grid is interconnected with 5 different jurisdictions. Some of these jurisdictions are connected by single elements and some are comprised of several elements. Single interconnections are susceptible to complete failures while multiple line interconnections are susceptible to deratings or partial failures.</p>	<p>Reduce import/export</p>	<ul style="list-style-type: none"> • IMO selects and decreases import transaction quantity; assign TLRi to transaction. • CS has revised quantity. • MS quantity not affected. MCP determined based on MS quantity i.e. MCP does not reflect action. • CS qty ≠ MS qty. Transaction eligible for CMSC. • Transaction eligible for IOG. • The intertie limitation will be reflected in the pricing and scheduling processes for future hours. 	<ul style="list-style-type: none"> • P1: Yes, changes are at the mutual request of both the IMO and counter-party jurisdiction. Additionally, internal resources will not be able to solve the problem. • P2: No, if PD recognized the derating or failure the MS quantities would reflect the limitation as the interties are priced based on congestion pricing principles. • P3: Yes, to the extent practicable the IMO selects just enough to solve the problem. • P4: Yes, to the extent practicable the IMO selects transactions in economic merit order. • P5: No, If the PD recognized the limitation the MS quantities would reflect the new limited values and the MS would be lower. • P6: No, If the PD process recognized the problem the intertie prices would reflect the congestion or outage and instead of CMSC would create where appropriate FTR payments. Note that complete intertie outages do not result in FTR payments. <p>Although not consistent with all of the described principles the treatment provides a compromise that balances the intent of the market design and MP compensation. The current treatment, which for intertie contingencies and deratings pays CMSC until the PD sequence recognizes the limitation, is recommended to remain.</p>

Base Case #10 – Worksheet

Applicability – The treatment applies in one of the three identified timelines (After final PD but prior to RT).

10 – Predicted Adequacy for Future Hours	IMO Action	Current IMO Treatment; Market and MP Implications (CS, MS, MCP, CMSC, IOG etc)	Discussion: Consistent with Principles? Rationale for Divergence?
<p>If in the IMO’s opinion there is an adequacy concern in a future hour the IMO may take action including the constraining on/off of imports/exports. For example, the IMO constrains off scheduled hydraulic facilities with limited energy and adjust imports/exports early in the day so that the hydraulic energy will be available later in the day.</p>	<p>Constrain on import</p>	<ul style="list-style-type: none"> • The IMO constrains off energy limited hydraulic resources, selects and constrains on the import transaction and assigns TLRi to the transaction. • CS has revised import quantities. • MS import and water qty unchanged • MCP not affected • Water and import eligible for CMSC 	<ul style="list-style-type: none"> • P1: Yes, The IMO only takes this action if it is expected that the internal resources are required in the future hour to maintain reliability. • P2: Yes, if PD recognized the shortage in future hours then the hydraulic facilities would be preserved for the at risk hour. The energy would be replaced with other non-limited resources such as imports/exports. This however requires accompanying dispatch data revision on behalf of the hydraulic operator. • P3: Yes, to the extent practicable the IMO selects just enough to solve the problem. • P4: Yes, to the extent practicable the IMO selects transactions in economic merit order. • P5: Yes, In this case the hydraulic resources would remain in the MS and the TLRi code ensures that the intertie resources only affect the CS. • P6: Yes, CMSC and IOG are paid.
	<p>Constrain off export</p>	<ul style="list-style-type: none"> • The IMO constrains off energy limited hydraulic resources, selects and constrains off the export transaction and assigns TLRi to transaction • CS has revised import quantities. • MS export and water qty unchanged • MCP not affected • Water and export eligible for CMSC 	