



# Proposed Design Document

Enhanced Day-Ahead Commitment Process

Version 0.1 (Draft)

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Note: This version 0.1 of the Proposed Design Document is for viewing only. Stakeholder feedback on this proposal is being managed by web portal collaboration. For more background see: <http://www.ieso.ca/imoweb/news/newsItem.asp?newsItemID=4197>. Members of the Review team can be found at: [http://www.ieso.ca/imoweb/pubs/consult/se21/SE21\\_DAD\\_ReviewTeam.pdf](http://www.ieso.ca/imoweb/pubs/consult/se21/SE21_DAD_ReviewTeam.pdf). If you are interested in participating in the review please send an e mail to [stakeholder.engagement@ieso.ca](mailto:stakeholder.engagement@ieso.ca)

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# Summary

Changes in Ontario's electricity sector are on the horizon. Ontario's generation fleet is shifting away from coal through reduction and ultimate retirement in 2014 towards more natural gas, renewable and embedded generation. Growing focus on the environment, and the shift to greener solutions to meet Ontario's increasing electricity demand, has amplified the need to facilitate opportunities for demand response and utilization of Smart Meter technology.

In 2007, the IESO initiated a study to assess how our day-ahead planning mechanisms might be amended to support anticipated changes in Ontario's electricity sector. The assessment addressed both current and future challenges including how to most efficiently integrate and optimize Ontario's changing generation fleet (reduction and retirement of coal, more natural gas, renewable and embedded generation) and how to enable opportunities to better manage demand response and utilize smart meter technology. The merits of various possible day-ahead mechanisms were studied and assessed under Stakeholder Engagement Plan 21 (SE-21).

As the study progressed throughout 2007 into 2008, the IESO reduced the range of options for consideration in its analysis of potential improvements to day-ahead mechanisms to the following three options plus a baseline scenario:

- Baseline Scenario – Carrying on with the current wholesale market and Day-Ahead Commitment Process (DACP) design, along with the publication of the IESO day-ahead price forecast of real-time hourly Ontario energy price (HOEP) and a review of reliability cost guarantees
- Option 1: An enhanced day-ahead commitment process with a 24-hour optimized unit commitment process, three-part offers, refined cost guarantees, along with the continued publication of the IESO day-ahead price forecast of real-time HOEP
- Option 2: An enhanced day-ahead commitment process with a 24-hour optimized unit commitment process, three-part offers, refined cost guarantees and an Energy Forward Market (EFM)
- Option 3: An Unconstrained Day-Ahead Market (UDAM). Like Options 1 and 2, the UDAM would incorporate an enhanced DACP with a 24-hour optimized unit commitment process, three-part offers, and refined cost guarantees. Day-ahead financially-binding prices and schedules would be derived from the IESO unconstrained algorithm.

The IESO used cost benefit analysis (CBA) techniques and consideration of additional non-quantifiable impacts to assess the relative merits of the options. The cost-benefit analysis included IESO and stakeholder costs and benefits measured through overall market efficiency impacts. The additional non-quantifiable factors analysis discussed impacts on relevant aspects of market and physical operation. Net effects on consumer bills were also considered.

The overall objective of the various analyses was to help identify day-ahead mechanism improvements that would result in net benefits to the province as a whole relative to the current DACP.

The Day-Ahead Market Evolution Preliminary Assessment<sup>1</sup> published on May 5th, 2008 considered Option 2, an enhanced day-ahead commitment process with an EFM as the most prudent choice for implementation based on the cost-benefit analysis results. In the opinion of the IESO day-ahead team, Option 2 was robust enough to meet the needs of today and support the anticipated changes in Ontario's electricity sector without inhibiting future market evolution initiatives. But some stakeholder concerns over equal weighting of the Assessment's benefits to all options along with differing opinions on the evaluation of the non-quantifiable factors precluded general stakeholder agreement on proceeding with Option 2.

The IESO day-ahead team recommended and the IESO Board of Directors agreed to proceed with a stepped approach, starting with the design of the common elements in Options 1, 2 and 3. These common elements are:

- Optimization of commitment over the entire 24-hours of the next day,
- Use of multiple passes of the constrained algorithm to determine commitment and resource scheduling, and
- Use of offers for energy supported by submitted "fixed"<sup>2</sup> costs and technical data.

Also during this time, the IESO would complete and present designs of both day-ahead guarantees for generators and intertie transactions and exports exclusion. These designs would support the benefit analysis of Option 2 expressed in their Day-Ahead Market Evolution Preliminary Assessment. As well the IESO would provide opportunities for stakeholders to substantiate their concerns that the non-quantified factors assessed understated the benefits of Option 3, the UDAM and overstated Option 1 and 2 benefits. A change to the assessment of the non-quantified factor could change the cost-benefit analysis and provide the basis for implementation of UDAM<sup>3</sup>. Lastly the IESO would complete a review of energy forward market (EFM) design.

If by summer end 2008:

- an appropriate design of day-ahead guarantees for generators and intertie transactions is determined,
- a mechanism to include exports in the commitment process is devised, and
- no substantive analysis is provided by stakeholders to indicate how the Day-Ahead Market Evolution Preliminary Assessment benefits should change for UDAM relative to the enhanced day-ahead commitment process of Options 1 or 2 to offset UDAM's additional implementation costs,

the IESO will proceed with design completion and an implementation strategy of the enhanced day-ahead commitment process of Option 2 to be presented to the IESO Board of Directors for their approval. The directive from the Board noted above was to present only a review of EFM design and therefore, the EFM is not part of this proposed design.

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<sup>1</sup> [http://www.ieso.ca/IESOweb/pubs/consult/se21/se21-20080505\\_DAM\\_Assessment\\_Report.pdf](http://www.ieso.ca/IESOweb/pubs/consult/se21/se21-20080505_DAM_Assessment_Report.pdf)

<sup>2</sup> Typically includes unit start-up and minimum generation costs (commonly referred to as "fixed costs" although this may not meet the formal accounting definition of a fixed production cost).

<sup>3</sup> The *Day-Ahead Market Evolution Preliminary Assessment* indicates that in order for option 3 to be considered for implementation, it must provide in excess of \$4M/yr in benefits over options 1 or 2 for each of the 15 year analysis period .

# 1. Introduction

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## 1.1 Purpose

This proposal describes the design considered for the Day-Ahead Market Evolution (DAME) project. This proposed design serves as a reference document to facilitate design discussions with stakeholders and to support the eventual development of market rules, market manuals, business processes and procedures.

## 1.2 Scope

This document describes the IESO's enhanced day-ahead commitment process for the common elements of all options under consideration. The enhanced day-ahead design presented here proposes that the current day-ahead commitment process using the current pre-dispatch process and associated manual procedures, be replaced by a 24-hour optimized unit commitment process as the basis for resource commitment.

The IESO acknowledges that some references to the common elements, guarantees, and exports may change if an alternate option is pursued.

This document describes enhanced day-ahead commitment process in terms of:

- New business process design, and
- Impact on current business and technical processes.

Implementation of the enhanced day-ahead commitment process is largely integration of new components to the current day-ahead commitment, pre-dispatch and real-time dispatch processes to improve the efficiency of the current market. The proposed revisions would require modification to market rules, market manuals, procedures, IT systems, and business processes. Documentation required to support necessary changes will be prepared using the IESO's current processes for preparation of market rules, market manuals, procedures, IT systems, and business processes.

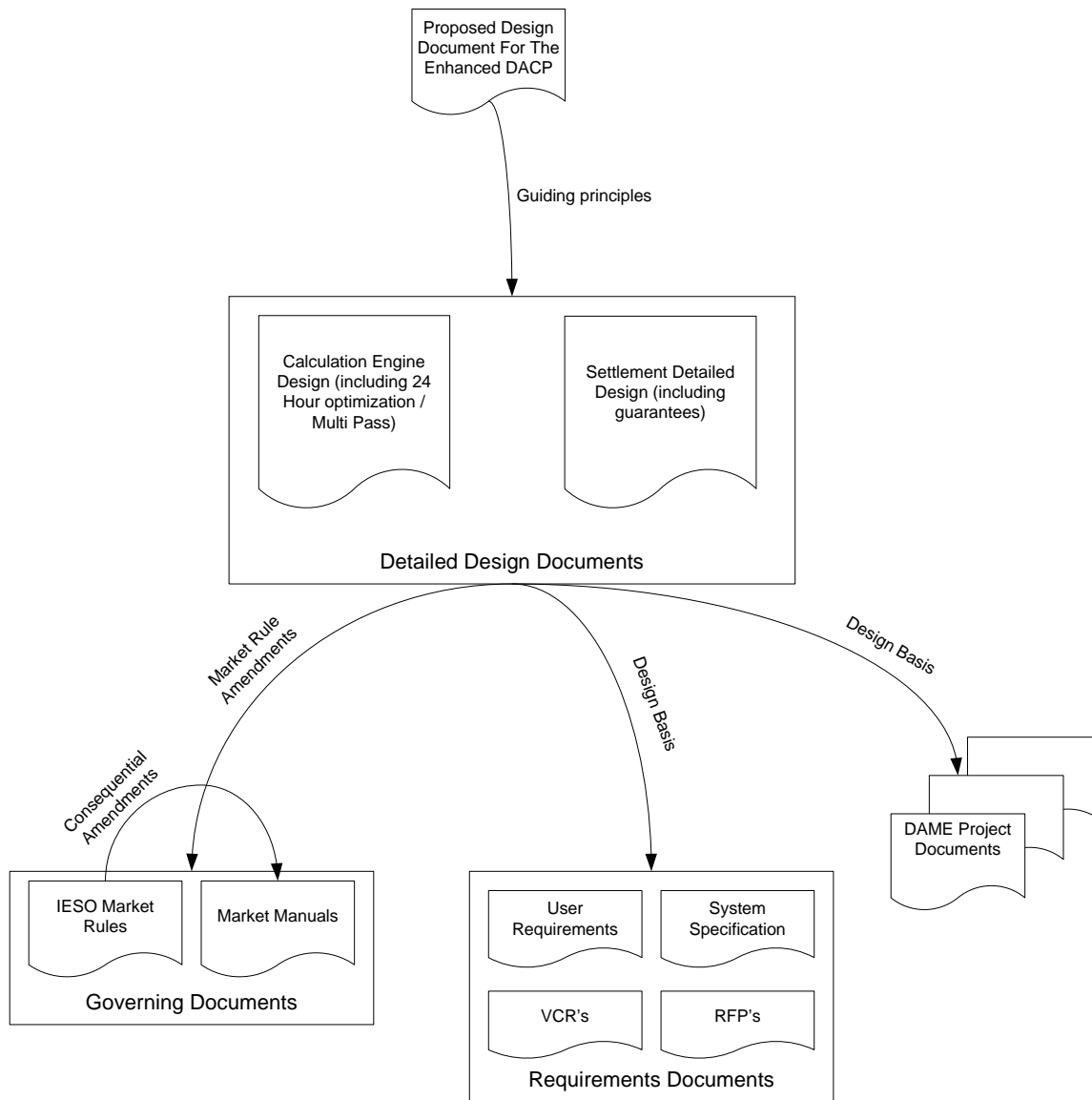
Various portions of this document make reference to current business practices, rules, procedures and processes. However, this document is not meant as a re-statement of the current design of the IESO process. Rather this document focuses on current process elements only to the extent that they might be used in the current or amended form in support of the enhanced day-ahead commitment process.

The starting point for this design is the maximum use of current IESO processes and market systems, thereby minimizing the impact on current operations of the market. This design will require some system changes to accommodate the proposed amendments to the pre-dispatch scheduling processes and the implementation of a new calculation engine to support a 24-hour optimized unit commitment. This design document reflects our current understanding of the business process changes and system impacts, and will evolve through detailed analysis and inputs from the stakeholder engagement process.

This design document is not expected to represent a complete or final statement of the design. Rather, it represents the best statement at this point in time of the expected design. As the design evolves through subsequent design activities, the design concepts identified in this document may change in response to

integration issues, implementation challenges or other concerns. Where these changes occur, an important part of the design and implementation process will be to engage stakeholders to discuss these changes. Other detailed design documents will be created to depict technical details for the enhanced day-ahead commitment process.

The following figure shows the relationship between this proposed design document and other detailed design documents, governing documents, requirements documents to be produced.



**Figure 1-1 – Documentation Flow for the Day-Ahead Market Evolution Project**

## **1.3 Who Should Use This Document**

This document will be used by the project stakeholders to better understand the changes that this design would introduce in the market and its impact on stakeholder's businesses and operations. It will also be used by the Day-Ahead Market Evolution (DAME) Project Team and pertinent IESO departments as a reference throughout the project lifecycle. This document will be used by the IESO Board for approval of capital budget for the DAME project. Portions of the content of this document may be used to support public discussions describing the detailed design.

## **1.4 Assumptions and Limitations**

### **Assumptions:**

While this document makes references to specific parameters that might be used in various processes, this document does not impart any assumptions as to what the value of those parameters might ultimately be. The setting of such parameters will be a matter of IESO policy to be determined at a later date under the amended authority of the market rules.

### **Limitations:**

This design of the initial implementation uses the current market participant interfaces to the greatest extent practicable. However, current limitations of system capabilities and implementation of necessary system changes may alter the ultimate design.

## **1.5 How This Document Is Organized**

This document is organized as follows:

- Section 2 of this document briefly describes the enhanced day-ahead commitment process in the context of current and modified business processes;
- Section 3 of this document provides a detailed description of the business processes required to support changes to the current day-ahead commitment process.
- Appendix A of this document provides detailed examples with outcomes from the guarantee design

## 2. Design and Business Processes Overview

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### 2.1 Design Overview

This design document describes the elements of the enhanced day-ahead commitment process. The inclusion of these elements in the current market design is expected to address both current and future challenges including how to most efficiently integrate and optimize Ontario's changing generation fleet (reduction and retirement of coal, more natural gas, renewable and embedded generation).

### 2.2 Enhanced Day-Ahead Commitment Elements

The current DACP will be modified to include the following elements.

#### 2.2.1 Three-Part Offers and 24 Hour Optimization

Under the current DACP, dispatchable generators can only submit single-part offers for incremental energy. Commitment decisions are made in the day-ahead commitment process on the basis of these single-part offers for energy, neglecting the start-up costs and minimum run costs of dispatchable generators. As well, the current DACP's generator commitments are based on the results of a day-ahead pre-dispatch run. Generators are scheduled to economically meet the forecast load on an hourly basis. Each hour of the dispatch day is considered sequentially. The lowest cost solution for each hour is determined, independent of the remaining hours of the dispatch day. This approach can lead to inefficient commitment, as generators that would otherwise not be economical with all its costs considered, would still be committed. Evidence of over-commitments by day-ahead commitment process has been quantified in the Day-Ahead Market Evolution Preliminary Assessment<sup>4</sup> document.

With the implementation of an enhanced day-ahead commitment process which includes a calculation engine with 24 hour optimization and the inclusion of all costs (offers plus commitment costs) along with technical data, a least-cost solution is produced over the entire day, rather than for 24 individual hours. By considering the total costs associated with dispatchable generator offers and simultaneous solving and considering the evaluation of technical data such as minimum run time over the 24 hours when determining day-ahead schedules and commitments, the IESO's algorithm would produce a more efficient solution than today. It would allow for better commitment decisions, weighing all commitment costs for making commitment decision. For example, it would permit the IESO to make a better decision as to whether it should commit resources with large start-up costs, since the advisability of incurring those costs to start a resource often depends on whether that resource is expected to run for several hours. It would assess whether it is economical to commit a resource with a long minimum run time, as committing such a resource may decrease costs in some hours while increasing them in other hours, and the benefits should be weighed against the costs when making the commitment decision. It would also

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<sup>4</sup> Presentation outlining the benefits can be found at: [http://www.ieso.ca/imoweb/pubs/consult/se21/se21-20080529-24-Hour\\_Optimization-Presentation.pdf](http://www.ieso.ca/imoweb/pubs/consult/se21/se21-20080529-24-Hour_Optimization-Presentation.pdf)

assess whether resources with significant minimum down times should be shut down, since doing so may lead to the need to incur unnecessary costs later, when those resources are no longer available as a result of having been shut down. It would permit the IESO to determine whether it should commit more costly but quicker-ramping resources or less costly but slower-ramping resources, imports or exports<sup>5</sup>. Finally, a 24-hour optimization can include constraints on the schedules for energy-limited resources that will ensure that they are scheduled to produce energy when it is most valuable. This enhanced day-ahead commitment process would co-optimize energy and operating-reserve over a 24-hour period.

## **2.2.2 Multiple Passes of Constrained Algorithm**

The enhanced day-ahead commitment process will be driven by a calculation “engine” composed of multiple “passes”, each with a distinct role towards the outcome of providing advisory schedules over a 24-hour period. It will use the incremental energy and fixed cost elements of offers and facility registered technical data to optimize unit commitment.

The multiple pass approach currently under consideration for the common elements uses three passes of the constrained algorithm. The first pass commits sufficient resources to meet the forecasted average demand for the hour. The second pass would then start with the commitments<sup>6</sup> from the first pass and commit any additional resources required to meet the forecasted peak demand in the hour. The third (final) pass would use all commitments from pass two to calculate hourly advisories based on forecasted average demand. The advisories from the third pass would be used by resources to plan for their next day’s operations (i.e. fuel planning purposes), and would form the basis for any guarantees.

## **2.2.3 Inclusion of Exports in Demand**

Although not directly part of the common elements, export inclusion is common to all options. Design of the 24-hour optimization, multiple passes of the constrained algorithm and discussion of changes to business process requires a position on export inclusion.

DACP is often a poor predictor of real-time operations as it does not consider export volumes, causing the day-ahead advisories that inform generators of their likely production levels for the next day to be unreliable predictors of real-time results.

Making available the most complete information set reflecting expectations of tomorrow should increase schedule advisory efficiency from the enhanced day-ahead commitment process. The most complete information would include bids for day-ahead exports. The scheduling of exports would allow additional resources to be committed in the most efficient manner to meet the expected market demand (consists of projected internal demand and exports).

## **2.3 Business Process Overview**

The business features of this model are largely achieved through modifications to current IESO business processes. This design utilizes a new 24 hour optimization calculation engine to achieve its resource commitment functionality. Other functionality required by this design is achieved by enhancements to current business processes. These enhancements include:

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<sup>5</sup> The design allows the inclusion of export bids.

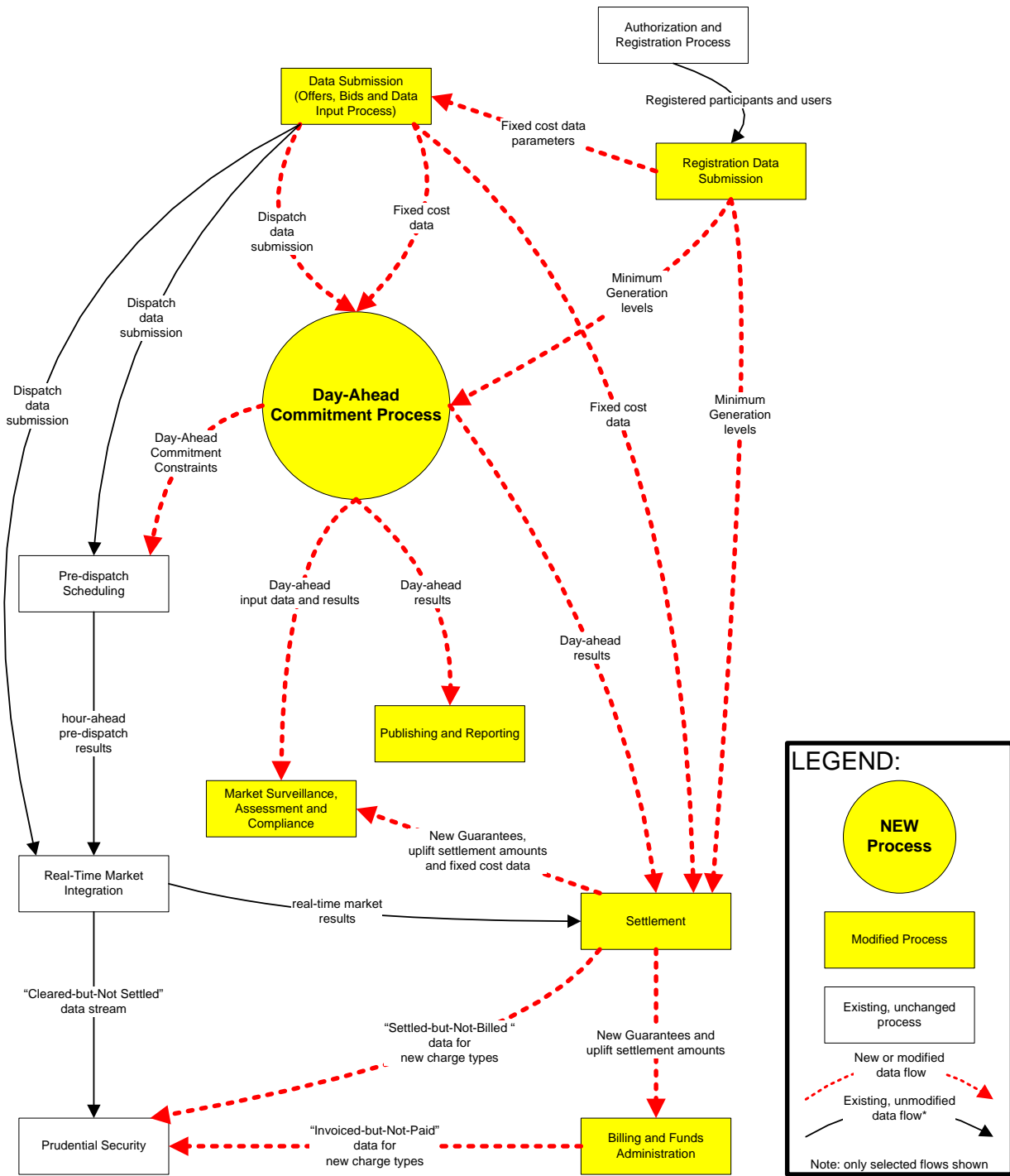
<sup>6</sup> Non-quick starts can not be below facilities minimum loading point.

- Facility Registration Process: Modifications to support:
  - registration of all dispatchable generation facilities for which the physical characteristics of the facility require a minimum loading point greater than zero megawatts and/or minimum run-time greater than one hour;
  - identification of resources subject to mandatory data submission;
  - registration of 'fixed'<sup>7</sup> cost data for different facilities that is required by the enhanced day-ahead commitment process;
  - registration of all technical data for different facilities that is required by the enhanced day-ahead commitment process; and
  - modification of the current 'fixed' cost and 'technical data for various facilities
- Offers, Bids and Data input Process: The format of bids and offers is largely unchanged in this design even with the inclusion of exports day-ahead. The current DACP has a number of specific windows to submit and/or change data dependent upon the time, type of resource and the reason for the change; this design may change these windows. Various facilities may be subject to data submission requirements for the enhanced day-ahead commitment process. This process will be reviewed during future initiatives like Market Transaction Interface (MTI) development as a replacement of Market Participant Interface (MPI).
- Publishing and Reporting: This process will need to support the new sets of results from the enhanced day-ahead commitment process. Specifically, market participants will need timely access to their private and public results from the updated day-ahead commitment process.
- Settlement Process: In addition to supporting all current real-time market settlement requirements, this process will use the enhanced day-ahead commitment results, real-time market results and registration data to derive any day-ahead guarantee payments for eligible resources. These payments will need to be recovered by some form of common cost allocation ("uplift") method. The settlement system, Commercial Reconciliation System (CRS) will be modified and functions will be added to support new day-ahead mechanism charge codes.
- Market Billing and Funds Administration Process: This process will need to support the invoicing and payment of any additional charge types related to the payment of and cost recovery of the reliability guarantees introduced into the settlement process.
- Prudential Security Process: The nature of this process is largely unchanged with respect to this design. However, calculation of actual net exposure to the marketplace will need to account for any new settlement amounts introduced as a result of the reliability guarantees.
- Market Surveillance, Assessment and Compliance: This process will have to monitor the enhanced day-ahead commitment process, to ensure that there is fair and competitive behaviour of imports, exports and internal resources to meet next-day requirements. In addition, this needs to be monitored to ensure that the associated reliability guarantees are not abused.

The context of these new and modified processes is illustrated in the high-level context diagram illustrated below, and are discussed in more detail within section 3 of this document.

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<sup>7</sup> Typically includes unit start-up and minimum generation costs.



**Figure 2-1 – Context and Inter-relationship of New and Modified Business Processes**

# 3. Detailed Business Process Design

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## 3.1 Process Overview

As described in Figure 2.1, and illustrated in the table below, this design is largely implemented through modification of various IESO business processes, applications, and technical interfaces. These changes will become clearer as the design evolves and processes become better defined.

Over the course of this section, the IESO shall examine each of the following process changes:

| Section | Process  | new/modified |
|---------|--|--------------|
| 3.2.1   | Dispatch Data Submission                       | modified     |
| 3.2.2   | Registration Data Submission                   | modified     |
| 3.3     | Enhanced Day Ahead Commitment                  | modified     |
| 3.4     | Publishing and Reporting                       | modified     |
| 3.5     | Settlement                                     | modified     |
| 3.6     | Billing and Funds Administration               | modified     |
| 3.7     | Real-Time Market Integration                   | modified     |
| 3.8     | Prudential Security                            |              |
| 3.9     | Market Surveillance, Assessment and Compliance | modified     |

## 3.2 Data Submission to Support Day-Ahead Commitment

The data submission process to support enhanced day-ahead commitment process will include submission of dispatch data before the start of the commitment process for all dispatchable resources that expect to bid or offer in real-time. Both the bid/offer window and the timing of the next day's pre-dispatch schedule will be changing in this design and are described in further detail below. Today's DACP rules for restrictions will be reviewed and revised. For example, restriction rules pertaining to submitting/resubmitting data while the DACP runs are executed will no longer be relevant in the enhanced day-ahead commitment process. Current market participant interfaces for dispatch data submission will be used. Fixed cost and technical data (generator and load parameters) will be submitted through the current facility registration process.

This process must:

- support the submission of dispatch data for internal resources, exports, and imports, into the commitment process;
- validate the submitted dispatch data;
- allow for data modification and updates, and continue to support all current pre-dispatch and real-time data submission requirements; and

- support the submission of generator fixed costs and technical data.

### 3.2.1 Dispatch Data Submission

The format of dispatch data required to support the enhanced day-ahead commitment process will be substantially the same as that used for real-time market dispatch data as defined in the Market Rules and Market Manuals. However, the addition of exports and an earlier bid/offer window will require modifications for dispatch data submission in both Market Rules and Market Manuals. As well the IESO is currently looking at how to address the inter-dependency of combustion and steam turbines in combined cycle facilities. The design of work<sup>8</sup> currently underway would change the separate modelling of each generating unit at a station and would result in both Market Rules and Market Manual changes. A subsequent version of this document will include details of the proposed design on this outstanding design detail.

- Generators (i.e., dispatchable, intermittent, self-scheduling or a transitional scheduling generator) and dispatchable loads intending to operate in real time including those that intend to operate in segregated mode of operation (SMO) must participate in the enhanced day-ahead commitment process by submitting initial dispatch data for next day's operation before the start of the commitment process if the resource expects to participate in real-time. For SMO units both dispatch data and an outage request that cover each of the hours during which the participant intends to operate in SMO is required as per today's reliability assessment requirements.
- Dispatchable generators with energy-limited resources (ELR), must also submit daily energy limit information with the initial dispatch data for each of these resources;
- Import offers with a valid NERC tag identifier<sup>9</sup> as per current rules will be submitted before the start of the commitment process for the purposes of qualifying for the guarantees if they exist; and
- Exports with a valid NERC tag identifier may bid voluntarily before the start of the commitment process for consideration in the day-ahead constrained schedule.

The table below summarizes the data submission requirements for each resource/transaction type and the associated format.

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<sup>8</sup> The IESO current design work is centered on a pseudo unit approach based on the New York modelling methodology to address the interdependency of combined cycle units.

<sup>9</sup> A valid NERC tag identifier consists of the registered codes for the Sink (Load) Control Area and Purchasing-Selling Entity, a tag code (unique seven character transaction identifier made up of upper alpha characters or the digits 0 through 9), and the registered code for the Source (Generation) Control Area

| Resource/<br>Transaction Type         | Submission<br>Requirement   | Dispatch Data                       | Details   |
|---------------------------------------|---|-------------------------------------|---|
| Dispatchable generation facilities    | Mandatory if the resource expects to run in real-time             | Energy and Operating Reserve Offers | Offers for all hours that the resource is not on outage<br><br>Daily energy limits for ELR's. voluntarily submitted                                       |
| Self-scheduling generation facilities | Mandatory   | Energy schedules                    | Expected generation for each hour of the dispatch day   |
| Intermittent generators               | Mandatory   | Energy forecasts                    | Forecast of the amount of energy expected to be injected  |
| Transitional scheduling generators    | Mandatory   | Energy schedules                    | Expected generation for each hour of the dispatch day   |
| Dispatchable load facilities          | Mandatory if the resource expects to be dispatchable in real-time | Bids                                | Same as real-time market bids<br><br>Bids need to distinguish between the dispatchable and non-dispatchable portion for the next day as per current rules |
| Imports                               | Voluntary   | Offers                              | Same as real-time market energy offers<br><br>Eligibility for DA-IOG (if they exist) for offers submitted before the start of the commitment process      |
| Exports                               | Voluntary   | Bids                                | Same as real-time energy market bids  |

### 3.2.2 Registration Data Submission

Dispatchable generators eligible for DA-PCG<sup>10</sup> will be submitting fixed costs (referring only to start-up and minimum run costs) and technical data (generator parameters) to the IESO through the current and modified Facility Registration Process. Self-scheduling, transitional scheduling and intermittent scheduling generators will not be eligible for DA-PCG.

The process to submit fixed cost and periodicity of modification is currently being reviewed. The IESO is aware that generation facilities' may need to change this information to reflect expected real-time costs more frequently than the current registration process permits<sup>11</sup>. It is the IESO's intent to discuss with stakeholders their specific needs and present an acceptable solution.

Furthermore, the mechanism of this submission will be reviewed when future initiatives like Market Transaction Interface (MTI) and Market Participant Enrolment are initiated. At that time the modification of the dispatch data submission process will be evaluated, to consider fixed cost as part of bids and offers.

<sup>10</sup> This document version has not considered dispatchable load eligibility for guarantees. If UDAM is pursued dispatchable load guarantees would be considered in subsequent versions.

<sup>11</sup> Currently information changes become effective within six business days of receipt of information change.

The introduction of these data elements would require at least the following modifications to the repository hosting the Facility Registration data.

- Modifications to the table structure to accommodate these data elements
- Creation/Modification of the data capture forms and methodology
- Mechanism to transfer this data to other processes will need to be created/modified

The 24 hour optimization engine will respect physical characteristics. Those characteristics defined as expedited operation data (EOD) in the current DACP market manual<sup>12</sup> will be used in the optimization calculation engine. There will be a need for participants to view this data in a manner similar to the review of other registered data. However, the enhanced day-ahead commitment process ability to respect physical characteristics does not remove participants' responsibility to offer in a manner that is consistent with the physical characteristics of units. The submission of the fixed cost and technical data that allows the IESO to make informed decisions on applying constraints for reliability which may impact the way units are scheduled will include the following information:

- **Start-up Cost** is the cost incurred to bring an off-line resource through all the unit specific start-up procedures, including synchronization and ramp up to minimum loading point.
- **Minimum Generation Cost** is the associated cost to maintain output at the minimum generation level.
- **Minimum Loading Point** is defined by the market rules as the minimum output of energy specified by the market participant that can be produced by a generation facility under stable conditions without ignition support.
- **Minimum Run-Time** is defined by the market rules as the time period specified by the market participant, for which a generation facility, having synchronized to the IESO-controlled grid, must run in accordance with the technical requirements of the facility.
- **Minimum Shut-Down Time** is defined by the market rules as the minimum time in hours between shutdown and start-up of a generation unit, as measured from the time of de-synchronisation from the IESO-controlled grid to the time of re-synchronisation on start-up.
- **Start-Up Time** is defined by the market rules as the time in hours required to bring a generation unit on line, as measured from the time of receiving a request to start the generation unit to the time of synchronisation.
- **Maximum number of starts per day** is the number of times that the unit can be started up within a day.

The first two bullets represent new data submission requirements. Missing from this list and part of the current DACP requirements is minimum generation block run-time<sup>13</sup>. Current IESO thinking is that

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<sup>12</sup> <http://www.ieso.ca/imoweb/pubs/dacp/MM9-dacp-manual.pdf> The Expedited Operational Data (EOD) refers to a dispatchable facility's start-up time, minimum shut-down time and maximum number of starts per day.

<sup>13</sup> **Minimum Generation Block Run-Time** is defined by the market rules as the time difference, specified by the market participant, between the minimum run-time and the minimum time required for a generation facility to ramp from synchronization to minimum loading point.

design of the 24 hour optimization calculation engine will not require this information. However, at a later date it may be necessary to revise this opinion and request minimum generation block run-time.

### 3.2.3 Wheeling Through Transactions

The current rules on financial binding status of imports committed day-ahead and IOG offset will continue to be applied for the enhanced day-ahead commitment process. New rules for financial binding status of exports committed day-ahead and IOG offset will need to be created and will be included in future revisions of this document as the design for exports is finalized.<sup>14</sup>

### 3.2.4 Bid/Offer Timeline

The timeline for the bid/offer data submission required for the commitment process is summarized below. These events are part of the larger timeframe for integration of the real-time market and the enhanced day-ahead process.

- (15:30 EST on Dispatch Day -1) – IESO issues Initial System Status Report (SSR) for Dispatch Day 1
- (5:30 EST on Dispatch Day 0) – IESO issues Pre-Market SSR for Dispatch Day 1
- (06:00 EST on Dispatch Day 0) – Bid/Offer window opens for Dispatch Day 1
- (09:00 EST on Dispatch Day 0) – Updated SSR for Dispatch Day 1
- (10:00 EST on Dispatch Day 0) – Bid/Offer window closes for Dispatch Day 1
- (10:00 EST - 15:00 EST on Dispatch Day – 0) – Day-ahead Calculation Engine runs, and Day-Ahead Commitment & Advisory Schedules published no later than 15:00 EST, for Dispatch Day 1
- (16:30 EST – 17:00 EST on Dispatch Day -0) – Pre-dispatch data published for hour ending HE 18 – HE 24 for Dispatch Day 0 and all hours for Dispatch Day 1

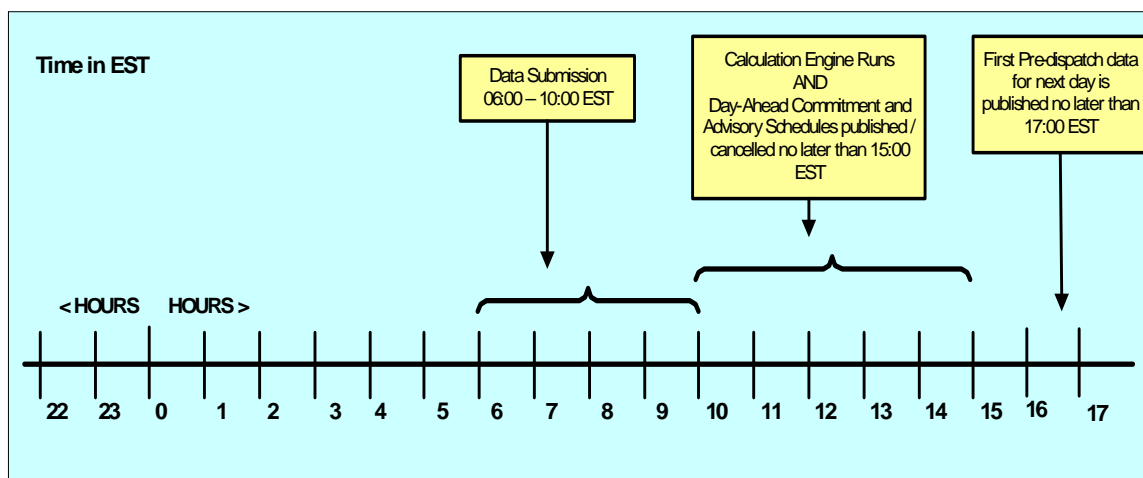


Fig 3.1: Timelines showing Dispatch Data Submission

<sup>14</sup> The IESO is continuing to work with the Guarantee/Export Technical Support Group on finalizing the design of export. Therefore, it would be premature to include details at this time.

Day-ahead advisory schedules are the product of all unit commitments resulting from the optimization process.

Changes from the current process include:

- a shorter bid window (closes 1 hour earlier);
- publication of pre-dispatch schedules will not include enhanced day-ahead commitment results for the next day schedules until the pre-dispatch run published in 17:00 for HE 18; and
- no opportunity for ELRs during the enhanced day-ahead commitment process to adjust offers.

The opportunity to change ELR offers is available in the current DACP because the pre-dispatch algorithm does not optimize energy of an ELR over the entire day. Therefore, it is possible that ELRs may be scheduled in a sub-optimal way. The enhanced day-ahead commitment process 24-hour optimization should remove the potential for sub-optimal schedules. Current DACP rules pertaining to situation that allow special handling of ELR offer changes specifically those pertaining to failure to submit, new availability post bid window close, and error (as outline in DACP market manual) are currently under consideration. Once the enhanced day-ahead commitment process has begun calculating and changes can be only considered by the subsequent pre-dispatch runs.

### **3.2.5 Validation of Dispatch Data Submission**

All dispatch data received in advance of the commitment process will be checked for correct data format. This is consistent with the current dispatch data validation process.

### **3.2.6 Data Modification and Updates**

Upon the closure of the day-ahead dispatch data submission window, the commitment process will begin.

For generation resources, submission of updates on outages and de-ratings will be as required in accordance with the current Market Rules.

The offers and bids, and modifications to offers and bids, submitted after the start of the commitment process will not be considered by the calculation engine. Modifications made to the dispatch data after the enhanced day-ahead commitment process has begun calculating will only be considered by subsequent runs of pre-dispatch after the enhanced day-ahead commitment process results have been passed to pre-dispatch.

## **3.3 Enhanced Day-Ahead Commitment Process**

The enhanced day-ahead commitment process selects resources to provide and consume energy for the next day.

For the purposes of describing this commitment process, day-ahead commitment of resources refers to the selection of:

- Any non-quick start dispatchable generator that receives a schedule to at least its minimum loading point<sup>15</sup> for at least its minimum run-time, from the commitment process;
- Any import that receives a schedule from the commitment process; and
- Any export that receives a schedule from the commitment process.

The commitment process provides an initial indication of how internal generation resources, imports, exports and dispatchable loads may be dispatched or constrained in their operation by the IESO.

The commitment process based on IESO forecast of the Ontario peak and average demand for non-dispatchable load is executed on a daily basis and consists of the following components:

- Day-ahead scheduling for IESO resource commitment;
- Passing of constraints for committed generators to pre-dispatch scheduling process.

### 3.3.1 Day-Ahead Commitment Process Details

The calculation engine is the core component of the enhanced day-ahead commitment process common elements. The engine receives many different inputs from market participants and the IESO, and determines day ahead advisory schedules for energy and operating reserve. Market rule specification of the enhanced day-ahead commitment process calculation engine comparable in scope and level of detail to the current specification of the real-time and pre-dispatch algorithms, is necessary to establish and maintain transparency and stakeholder confidence regarding the determination of the enhanced day-ahead commitment process advisory schedules.

The key features of the enhanced day-ahead commitment process calculation engine are:

1. Simultaneous co-optimization of energy and operating reserve over the full 24 hours of the next dispatch day.
2. Schedules based on maximizing the gain from trade. This is the same optimization objective as the real-time dispatch algorithm. The enhanced day-ahead commitment process calculation engine uses the bids and offers from market participants as the measure of the value of buying and selling electricity and operating reserve.
3. A security assessment functionality and a scheduling functionality. The security assessment functionality determines the loss factors, loss adjustments and transmission limits (including pre and post-contingency limits) as conditions to be met by the scheduling functionality in determining the scheduling of bids and offers. As an option, loss factors may be fixed (and input) rather than being dynamically calculated.
4. A sequence of three passes in order to determine the advisory schedules.

The commitment process starts after the completion of the bid/offer submission process, daily at 10:00 EST. The day-ahead commitments and the advisory schedules will be published no later than 15:00 EST. IESO expects that other than the few days per year to accommodate network model builds and technical

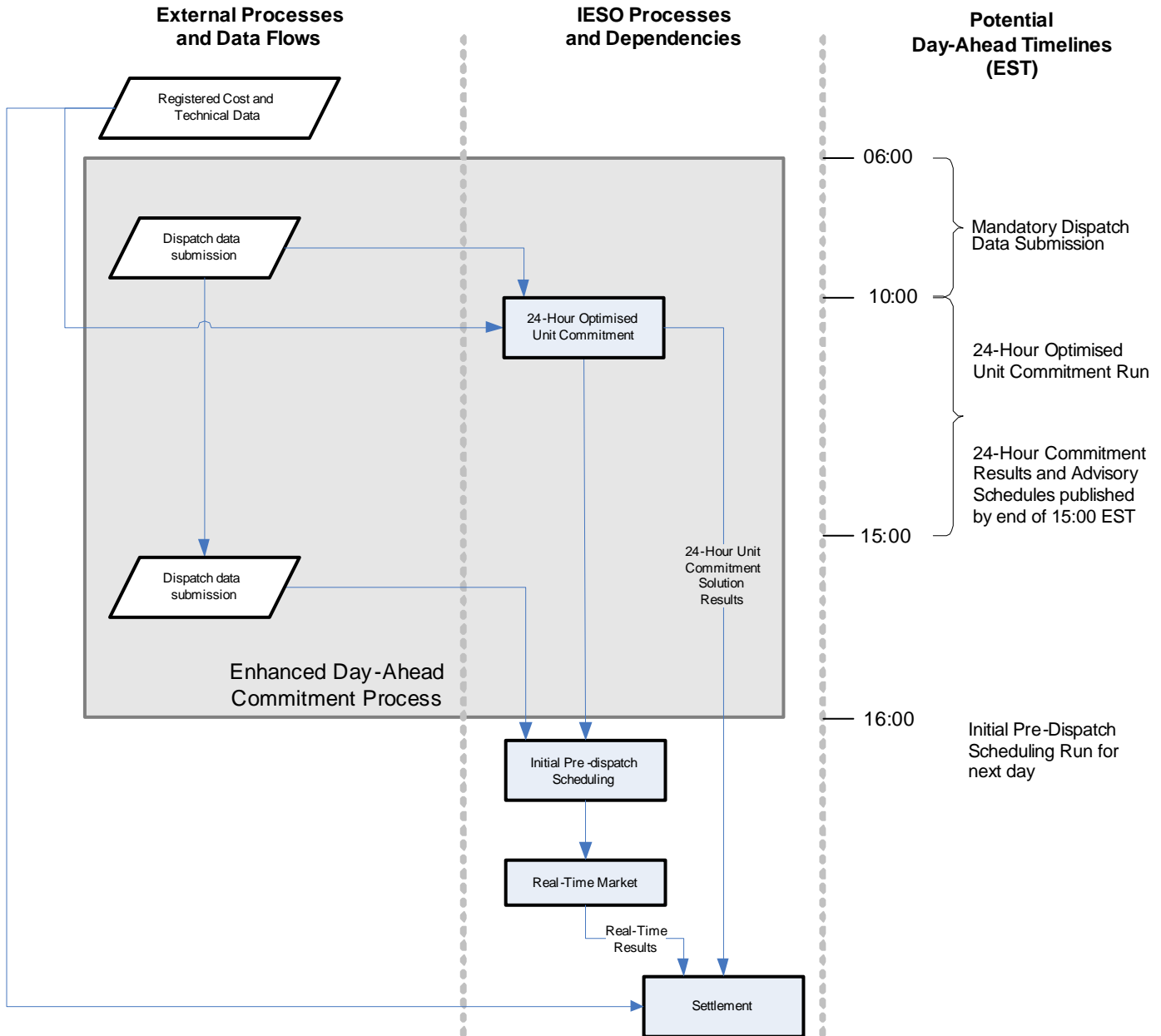
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<sup>15</sup> The commitment process will not schedule for an amount less than its minimum unless its part of its ramp up period.

upgrades (software releases) publication of enhanced day-ahead commitment advisory schedules to be well in advance of 15:00 EST.

The initial pre-dispatch process for the next day will start at 16:07, and pre-dispatch results will be published for HE 18 of the current day (day 0) and all hours of next dispatch day (day 1).

The day-ahead timelines for the execution of the 24-hour Optimization Engine is shown in the figure below.



**Figure 3-2 – Summarised Process Overview: Enhanced day-ahead commitment process using new 24 Hour Optimization Calculation Engine**

The calculation engine will comprise of three constrained passes, each with a distinct role in creating day-ahead unit commitments and advisories. The multi-pass calculation engine will determine the optimal unit commitments and resource schedules over a 24-hour period for energy and operating reserve.

The constrained runs ensure that there are sufficient resources available in real-time to meet not just the average forecast demand in the hour, but the peak forecast demand. It may be necessary to start additional non-quick start units, quick start units, reduce dispatchable loads or to schedule additional imports beyond what is required to meet average demand to ensure that the IESO can reliably meet peak.

The first pass using dispatch data submissions, fixed costs and technical data will establish a set of resources to meet the average forecast demand.<sup>16</sup>

Since it is necessary to ensure that there are adequate resources available to meet the highest demand during the hour, a second reliability pass using peak forecast demand will be run. After blocking on imports, exports and the non-quick start units at their minimums from the first pass, a second constrained algorithm pass using the peak forecast demand will be run. In this pass the algorithm will endeavour to solve using online resources. But if additional resources are required, the algorithm will solve using dispatchable generation with registered minimum run times of less than one hour over longer minimum run time dispatchable generation and imports when scheduling additional resources to meet peak forecast demand<sup>17</sup>. This is done to avoid over-commitment of less flexible resources for peak forecast demands within a dispatch hour that can be met by more flexible dispatchable generation resources.

A third pass will be required to establish advisory schedules to meet average forecast demand from the resources selected from pass two. If no additional commitments or imports are scheduled in pass 2, then the results of this pass will be identical to Pass 1.

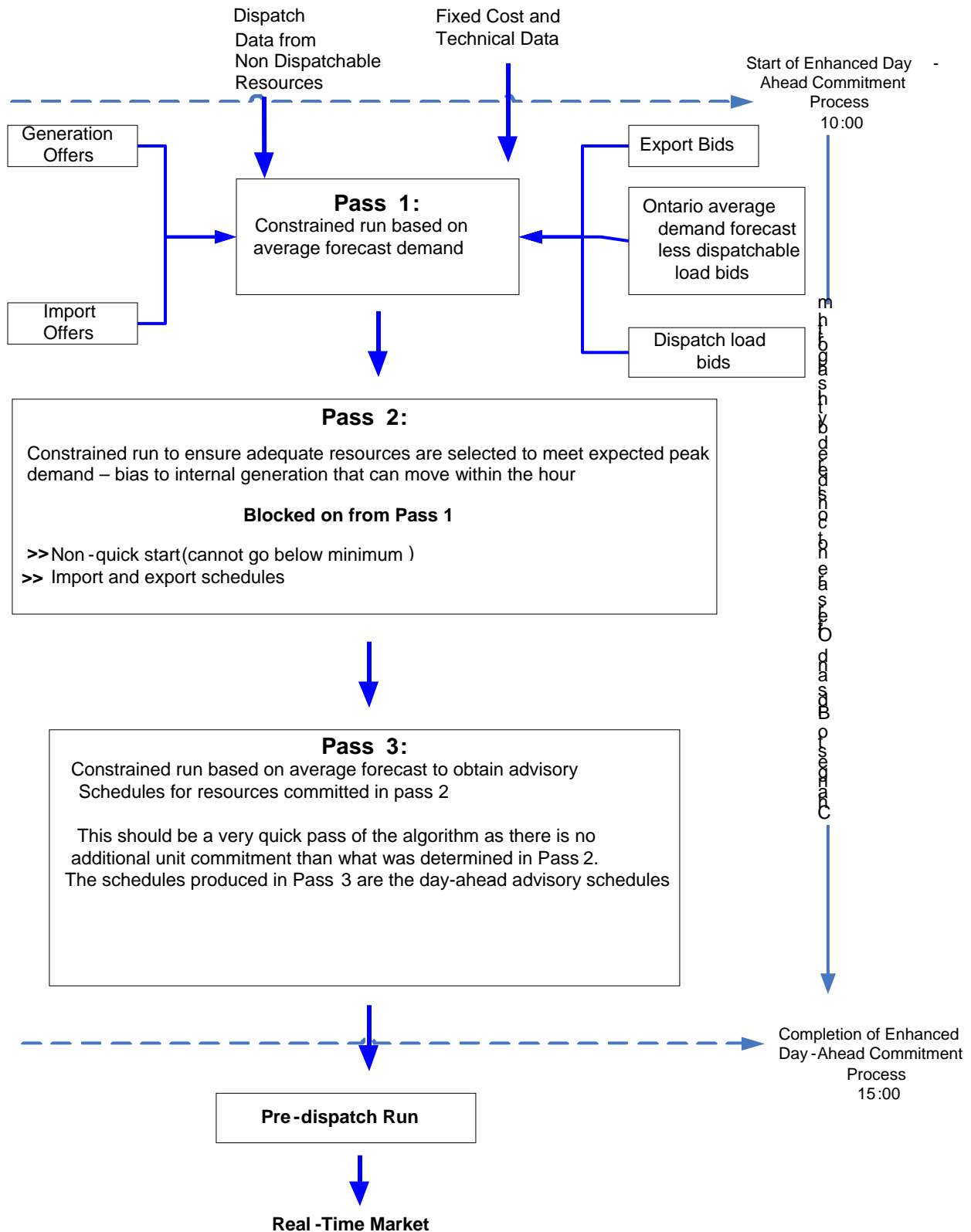
No later than 15:00 EST all the enhanced day-ahead commitment process results providing advisory schedules are published for use by participants. The 17:00 EST published pre-dispatch for HE 18:00 contains all the constraints and schedules for the next day. All subsequent pre-dispatch runs are executed as they are today. The need for a fourth pass for prices and financially binding schedules is dependent on upcoming Board of Directors decisions and will be reflected in subsequent versions of this document.

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<sup>16</sup> There would be initialization parameters to indicate/estimate the duration of operations or shutdown for the end of day 0 into the beginning of dispatch day 1.

<sup>17</sup> The function to bias the outcome to a particular set of dispatchable generation is currently under consideration.

The three passes are depicted in the figure below and in Table 3.1:

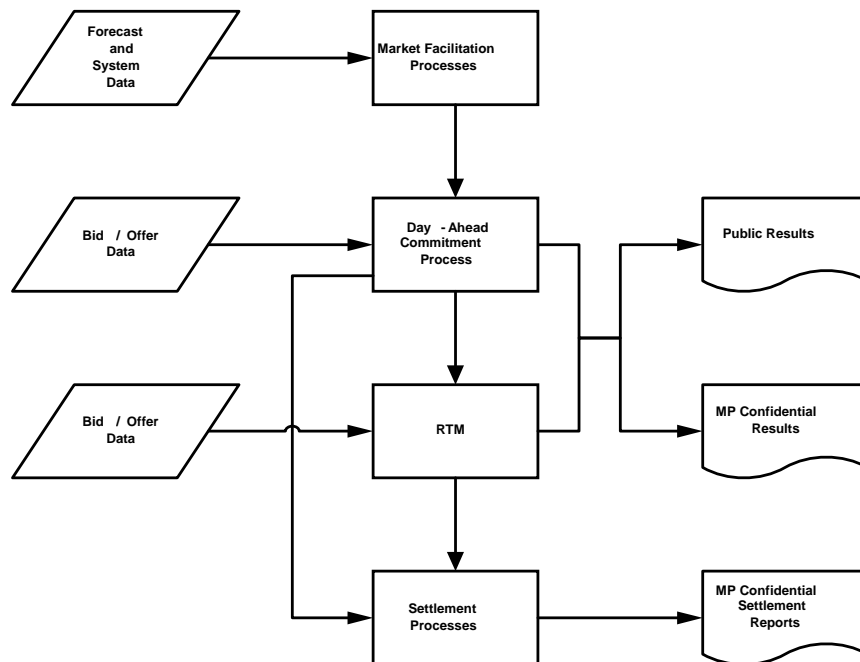


Any changes to the offers and bids after 10:00 EST will be done in accordance with the Market Rules. In addition any outages or de-ratings for generation resources during this time must be reported. The IESO will amend DACP Market Rules that specifically address IESO obligations, permissions and authorities in the event that a software or process failure occurs during the enhanced day-ahead commitment process.

## 3.4 Publishing and Reporting

### 3.4.1 Overview

Reporting refers to the general creation of documents related to the operation of IESO-administered markets. Publishing refers to the specific preparation of public documents made available on the IESO web site. Many of the reports currently generated for the real-time market and their associated processes can be leveraged for the enhanced day-ahead commitment process. Specifically, many of the reports produced by the IESO's Market Forecasts and Integration Department (MF&I) can be used by the enhanced commitment process with no or minimal changes. Some settlement reports will require modification to accommodate settlement changes from the enhanced day-ahead commitment process. Some new settlement reports may be required to support the commitment process and these will be identified in future versions of this proposed design document. Other reports produced for the RTM require no change. Figure 3.2 shows the publishing and reporting processes.



**Figure 3.4: Publishing and Reporting Processes**

## **3.4.2 Near-Term Security and Adequacy Assessment Reports**

Prior to closure of the enhanced day-ahead commitment process bid/offer window at 10:00 EST, reports detailing the operating state of the IESO controlled grid (ICG) are published to aid market participants in making market and operational decisions. The content of the System Status Reports (SSRs) will remain the same as current SSRs. The SSRs and outage reports can provide such information to market participants in advance of the enhanced day-ahead commitment process. The SSRs will continue to be prepared by the IESO's Market Forecasts and Integration Department (MF&I). The content of these reports will remain the same as for the RTM.

### **Outage Reports**

It is anticipated that the current outage reports published for RTM will not change.

### **Pre-Dispatch Reports**

The pre-dispatch report that will be published during hour ending 17:00 will contain pre-dispatch information for hours ending 18 to 24 of the current day (day 0) and hours ending 1 to 24 of the next day (day 1). As the day progresses into the next day, the pre-dispatch reports are updated on an hourly basis for the remainder of period.

### **Publishing and Reporting of Commitment Process Results**

Upon the completion of the commitment process, committed resources will get notification of their commitments.

- Commitment Process Participant-Facing Reports – Confidential; and
- Constrained hourly schedules for each resource committed for energy and operating reserve;

### **Transmission Rights Reports**

No change

### **Settlement Reports**

All settlement reports are confidential. The structure of some settlement reports used in the RTM will not change while the structure of others will be modified. There may also be new settlement reports. The IESO plan is to actively stakeholder reporting requirements to help identify any new/modified reports.

## **3.5 Settlement Process**

### **3.5.1 Introduction**

This section provides an overview to the functional requirements that would enable the IESO Settlement Process to support the direction outlined in this paper. These requirements include both new and modified settlement amounts and the necessary input data in order to support those calculations. For the most part, all downstream processes including settlement statement production, and disagreement processing would be supported within the current real-time market settlement framework.

The main modifications to the settlement process discussed in this section include:

- Settlement Data Requirements
- New, Modified and Unchanged Relevant Settlement Amounts (Charge Types)
- Financial Balancing
- Supporting Processes

Each of these items is more fully described in the sub-sections that follow.

### 3.5.2 Settlement Data Requirements

Input data requirements for the Settlement Process will be required for the additions/modification to the current enhanced day-ahead commitment process for guarantees, offsets and day-ahead failure charges. These additional/modified input data series would be extracted from the following upstream processes:

- The Commitment Process;
- The Offers, Bids and Data Input Process; and
- The Facility Registration Process
- Additions/modifications are described in the sections that follow.

### 3.5.3 New, Modified and Unchanged Relevant Settlement Amounts (Charge Types)

Settlement charges including many new settlement charges introduced to market participants in June 2006 for DACP will be affected by the implementation of the enhanced day-ahead commitment process. While many of those charge types will remain, there will be a need to modify some of them and add new ones. Below is a list of charge types market participants can expect as new, modified or unchanged as a result of implementing the enhanced day-ahead commitment process.

| Settlement Name  | Code | Settlement Timeframe | Description  | Status  |
|--|------|----------------------|--|---|
| Real-time Intertie Offer Guarantee and Intertie Offer Guarantee Offset | 130  | Hourly               | Compensation for cumulative, hourly financial losses as implied by the market schedule for Imports of energy at an intertie metering point. This amount is reduced by the IOG Offset when the import is part of an implied "wheeling through" transaction. | Modified to reflect changes in offset calculation and DA-IOG adjustment from urgent rule amendment MR-00323 |
| Real-time Generation Cost Guarantee Payment                            | 133  | Hourly               | Combined Guaranteed Costs payment, assessed in accordance with the applicable market manual.   | Under Review  |
| Real-time Import Failure Charge  | 135  | Hourly               | Applies to a scheduled real-time import that is scheduled in the hour-ahead pre-dispatch but fails to flow in real-time, and does not have a 'bona-fide or legitimate' reason for the failure.   | Unchanged   |
| Real-time Export Failure Charge  | 136  | Hourly               | Applies to a scheduled real-time import that is scheduled in the hour-ahead pre-dispatch but fails to flow in real-time, and does not have a 'bona-fide or legitimate' reason for the failure.   | Unchanged   |

| Settlement Name                                      | Code | Settlement Timeframe | Description  | Status  |
|--|------|----------------------|--|---|
| Net Energy Market Settlement Uplift                  | 150  | Hourly               | Balances charge types 1130 and 1137 (also includes charge types 100,101,103, 104 and 130)  | Unchanged   |
| Local Market Power Rebate                            | 170  | Monthly              | Distributes proceeds from IOG_OFFSET process   | Unchanged   |
| Generation Cost Guarantee Recovery Debit             | 183  | Monthly              | Recovers cost of the real-time and day-ahead generation cost guarantees  | Modified to reflect changes from DAGCG to DAPCG and changes to SGOL program |
| Intertie Failure Charge Rebate                       | 186  | Hourly               | Based on pro-rata share of AQEW/SQEW for money collected from intertie transactions that fail in real-time for reasons within the market participant's control<br><br>The total rebate amount will be the sum of day-ahead import failure charges; real-time import failure charges and export failure charges<br><br>Both a day-ahead import failure charge and a real-time import failure charge can be calculated on the same transaction, in this case only the greater of the two will apply<br><br>Rebate may or may not appear on a preliminary settlement statement depending on any intertie failure charges are calculated on the corresponding trade date<br><br>Effective July 1, all intertie transaction failure charges and associated rebates will be calculated daily and presented as a detail record on settlement statements | Modified to include day-ahead export failure charge                         |
| Day-Ahead Intertie Offer Guarantee Settlement Credit | 1130 | Hourly               | Calculated for import transactions scheduled in the pre-dispatch of record and is a credit to marketers conducting day-ahead import transactions.  | Modified to reflect changes in day-ahead calculations                       |
| Day-Ahead Generation Cost Guarantee (DAGCG) Payment  | 1133 | Hourly               | A credit allowing generators to recover 'day-ahead combined guaranteed costs' incurred to achieve synchronization, ramp output to minimum loading point and then to run for no less than the minimum generation block run-time<br><br>Appears on settlement statements when the settlement amount for a generator start committed day-ahead exceeds \$0  | Deleted and replaced by DAPCG   |
| Day-Ahead Production Cost Guarantee (DAPCG) Payment  |      | Daily                | A credit allowing generators to recover 'as offered' incurred to achieve synchronization, ramp output to advisory schedule and then to run for no less than the minimum generation run-time<br><br>Appears on settlement statements when the settlement amount for a generator start committed day-ahead exceeds \$0   | NEW   |
| Day-Ahead Import Failure Charge                      | 1135 | Hourly               | Applies to a scheduled day-ahead import that does not flow in real-time and does not have a 'bona-fide or legitimate' reason for the failure   | Unchanged   |

| Settlement Name                         | Code | Settlement Timeframe | Description  | Status                      |
|---|------|----------------------|--|-----------------------------|
| Day-ahead Export Failure Charge         |      | Hourly               | Applies to a scheduled day-ahead export that does not flow in real-time and does not have a 'bona-fide or legitimate' reason for the failure   | NEW                         |
| Intertie Offer Guarantee Reversal       | 1137 | Hourly               | Reverses the smaller of charge type 130, 'Real-time Intertie Offer Guarantee', and charge type 1130 when they appear to the same import transaction.   | Modified                    |
| Day-Ahead Fuel Cost Compensation Credit | 1138 | Hourly               | A credit to generators to specifically recover certain fuel costs incurred by generators when de-committed by the IESO to maintain reliability<br><br>The value on a settlement statement represents the costs submitted on <a href="#">Form 1654</a> , 'Fuel Cost Compensation'.                                    | Under Review                |
| Intertie Failure Charge Reversal        | 1139 | Hourly               | Reverses the smaller of charge types 1135 and 135 when they apply to the same import transaction   | Modified to include exports |
| Day-Ahead Fuel Cost Compensation Debit  | 1188 | Monthly              | Recovers certain fuel costs incurred by generators as part of the DACP<br>May only occur occasionally, as generators can only make claims under certain circumstances<br><br>Will not appear until the July 31, 2006 preliminary settlement statement at the earliest, depending on valid claims made by generators. | Under Review                |

### 3.5.4 Day-Ahead Guarantees

Today's day-ahead guarantees ensure market participants with committed resources and import transactions recover eligible costs if real-time revenues are insufficient. Committed dispatchable generators and imports to Ontario are expected to perform in the real-time market in a manner consistent with their day-ahead advisory schedules. Any new guarantees which would replace the current guarantee would be created under this same philosophy.

Obligations associated with commitment are subject to the following market principles:

- Day-ahead guarantees should not inhibit legitimate response to prevailing real-time market conditions.
- Day-ahead guarantees should not interfere with current compliance principles regarding failure of intertie transactions, or compliance with real-time market dispatch instructions.

These day-ahead guarantee options are in turn subject to settlement cost recovery. Subsequent version of this document would describe guarantees under the section heading listed below.

### **3.5.5 Day-Ahead Production Cost Guarantee (DA-PCG)**

#### **Overview**

Any design of a Day-Ahead Production Cost Guarantee (DA-PCG) would present to eligible dispatchable generation facilities<sup>18</sup> guaranteed cost recovery when day-ahead and/or real-time revenue is insufficient to cover as-offered costs to produce schedules as committed by the IESO in the day-ahead and that was actually dispatched to produce in the real-time market. The details of DA-PCGs are dependent on upcoming Board of Directors decisions and will be reflected in subsequent versions of this document.

### **3.5.6 Day-Ahead Intertie Offer Guarantee (DA-IOG)**

#### **Overview**

Import offers into the enhanced day-ahead commitment process are voluntary. Participating in the day-ahead process does not preclude real-time import offers which may be in addition to or may replace day-ahead import transactions.

Like the DACP, the enhanced day-ahead commitment process will commit an import in the selection of resources when it is the most economical resource to serve the day-ahead forecasted load. In real-time, if the day-ahead forecast was correct, that import should remain economic into real-time pre-dispatch and be appropriately selected to serve forecast real-time load. The details/deletion of DA-IOGs is dependent on upcoming Board of Directors decisions and will be reflected in subsequent versions of this document.

### **3.5.7 Modifications to IOG Offset Mechanism**

The IOG Offset mechanism as described in the current IESO market rules for Real-time Intertie Offer Guarantee and Intertie Offer Guarantee Offset must be revised to recognize the addition of exports and to recognize the different constructs of the payments to importer under the different options. The details are dependent on upcoming Board of Directors decisions and will be reflected in subsequent versions of this document.

### **3.5.8 Modifications Real-time Generation Cost Guarantee Payment (RT-GCG) and Spare Generation On Line (SGOL) Impacts**

There may be a need to provide real-time commitment to non-quick start dispatchable generation that did not receive a day ahead advisory schedule. However, any real-time commitment program must not undermine the efficiencies gained from the enhanced day-ahead commitment process. With that focus in mind, the IESO will examine the current SGOL and corresponding RT-GCG for the appropriate integration with the enhanced day-ahead commitment process which may result in real-time program and guarantee modifications.

### **3.5.9 Adding Day-ahead Export Failure Charge**

The current IESO thinking is that the day-ahead export failure charge will be closely related to the current real-time and day-ahead intertie transaction failure charges. Using the day-ahead and real-time import

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<sup>18</sup> Eligible facilities deemed through facility registration will automatically receive DA-PCG.

failure rules as a guide, if there is a real-time export failure charge and a day-ahead export charge applied to the same failed export transaction, the participant will be charged the larger of these two settlement amounts. This is accomplished by applying both charges, and then applying a third charge to reverse the lesser charge. The Intertie Failure Charge Reversal charge (charge type 1139) reverses the smaller of the Real-time Export Failure charge (charge type 136) and Day-ahead Export Failure Charge (charge type number to be defined ) when they are both applied to the same import transaction. This would mean an update to the Intertie Failure Charge Reversal.

### **3.5.10 Financial Neutrality**

The general principles of financial neutrality for the Settlement process are set out in Chapter 9, Section 6.16 of the Market Rules. The IESO will ensure principles hold true after the implementation of any new settlement amounts presented in this proposed design document.

### **3.5.11 Supporting Settlement Cycle Processes:**

Under the proposed design, the Settlement Process will be supported within the current real-time market settlement cycle. This include the settlement cycle issuance of preliminary and final settlement statements, the current Notice of Disagreement Process and the eligibility of monthly rebate on all uplift payments incurred while qualifying for generation station service.

## **3.6 Market Billing and Funds Administration**

### **3.6.1 Introduction**

All of the new and modified settlement amounts required for this design will be supported within the current market billing and funds administration framework. This framework includes:

- invoicing on a regular schedule determined by the Settlement Schedule and Payments Calendar (SSPC);
- issuance of “Statements of Activity”;
- payment processing;
- provision of information to the Prudential Security Process; and
- application of the Goods and Services Tax (GST).

All of the new and modified settlement amounts described in the Settlements Section are intended to be supported by the current, monthly invoicing and payments cycle.

### **3.6.2 Timelines**

All of the new and modified settlement amounts described in the Settlements Section are intended to be supported by the current, monthly invoicing and payments cycle.

### **3.6.3 Statement of Activity**

It is intended that any new charge types created as a result of this design would also be reflected in this Statement of Activity. The "Statement of Activity" will be produced and sent to the market participants as currently scheduled, the first business day of each calendar month for the previous calendar month.

### **3.6.4 Payments processing**

The enhanced day-ahead commitment process will not change payment processes. Payments due from the market participant to the IESO are reflected in debit invoices and are due within 2 business days of receipt of the invoice (the "market participant payment date"). Payments due to the market participant from the IESO are reflected in credit invoices and are cleared within 2 business days of the market participant payment date (the "IESO payment date"). The IESO may also produce manual invoices when required for finance charges on late payments, compliance penalties, and interest on cash prudential deposits.

### **3.6.5 Provision of Information to the Prudential Security Process**

The invoiced-but-not paid (INP) component of the prudential risk calculation currently used by the IESO extracts from the invoicing input stream. As new charge types to be introduced under this design are to be integrated into the same monthly Market Billing and Funds Administrations stream, the overall calculation of INP will continue to follow the same timeframe observed under the current IESO Prudential process.

### **3.6.6 GST Treatment**

This design does not change the current GST treatment currently followed under IESO market rules for market participants, importers, exporters or the IESO consideration as the principal to all transactions of either purchasing or selling to market participants. New charge will be presented to the CRA to establish GST treatment.

### **3.6.7 GST Treatment for Guarantees and Related Uplifts:**

There will be no change from current GST treatment for guarantees and uplifts. Both of the guarantees contemplated under this design have parity with current, real-time market settlement amounts which guarantee the same types of financial payments.

## **3.7 Real-Time Market Integration**

### **3.7.1 Overview**

With the introduction of an enhanced day-ahead commitment process the majority of activities associated with pre-dispatch and real-time market operations remain unchanged, including:

- IESO preparation and publication of security and adequacy assessment (SAA) reports and system status reports (SSR);

- IESO preparation of inputs to scheduling tools (e.g. equipment outages, operating security limits, intertie scheduling limits, load forecasts, etc.):
- The acquisition and implementation of ancillary service provider agreements such as regulation, voltage control and reactive support as well as reliability must run contracts;
- The use of constrained and unconstrained IESO-controlled grid models by the dispatch algorithm;
- Issuance of pre-dispatch and real-time dispatch reports (contents and timing of participant-facing private reports and public reports);
- The optimization objective and outputs of the dispatch algorithm;
- Issuance of and compliance with dispatch instructions; and
- IESO will coordinate interchange scheduling with neighbouring Control Areas following completion of the commitment process.

However, some new processes are required with the introduction of the enhanced day-ahead commitment process, namely:

- New commitment reports may be required; and
- Rules for the revisions of dispatch data originally submitted for the commitment process may change to reflect IESO commitments.

The following sections describe those pre-dispatch and real-time processes that are new or will change as a result of the commitment process.

### **3.7.2 Observing Day-Ahead Commitments in Real-Time**

Like today, dispatchable generation resources that are committed by the IESO in the commitment process will have constraints applied by the IESO that will be observed in the pre-dispatch and real-time scheduling processes. For each committed generation resource, the IESO will apply a minimum constraint in the Contract Management tool, for its declared minimum loading point for a period of hours equal to its minimum run-time. The constraints will be observed by the pre-dispatch and real-time constrained dispatch algorithms such that the resource will be scheduled and dispatched to a quantity no lower than its minimum generation level. These commitments will be transferred and managed in the IESO's Unit Commitment Manager. A committed unit will not be dispatched below its minimum generation level until such time as IESO control room operations staff confirm the de-commitment time. There will be changes to the current practices of observing day-ahead commitment under the enhanced day-ahead commitment process.

### **3.7.3 De-commitment and Withdrawal**

As in DACP, the enhanced day-ahead commitment process 24-hour optimization calculation engine will identify the resources required for the dispatch day. Changes to this set of committed resources may impact system reliability and will have settlement implications. At this time, there are no expected changes to the current IESO rules and procedures that enable processing of these events appropriately.

### **3.7.4 Market Participant Withdrawal of Supply Offers**

There will be no changes to the practices of withdrawal of supply offers as a result of implementation of the enhanced day-ahead commitment process.

Under DACP, dispatchable generation and imports committed to supply energy or operating reserve cannot reduce the quantity of their RTM offers below day-ahead committed quantities without IESO approval. Quantity reductions to offers associated with committed resources will be considered a request to withdraw the offer.

Currently a request to withdraw a supply offer must occur no later than two hours before the start of the action required to meet their day-ahead committed schedule. For a dispatchable generator, the request must occur two hours prior to the expected synchronization time, or if already in service, two hours before the intended withdrawal time. For intertie transactions, the request must occur two hours prior to the start of the intertie transaction.

### **3.7.5 IESO De-commitment of Resources**

The communication of all de-commitment requests initiated by the IESO will remain unchanged from the current practices. The IESO will only de-commit dispatchable generation resources or imports due to reliability concerns, not for economics.

### **3.7.6 Day-Ahead Guarantee Impact**

The exceptions rule of payment of guarantees not based on real-time market performance if the real-time market schedule reduction is due to an IESO de-commitment decision or the inability of a non-quick start generation facility to connect to the IESO-controlled grid as a result of events or circumstances directly related to the IESO-controlled grid that are beyond the control of the generation facility remains unchanged.

### **3.7.7 IESO Data Inputs**

### **3.7.8 Day-ahead Intertie Transactions**

Where one leg of an offer to import and a bid to export submitted and identified as a wheeling through transaction is not successfully scheduled in whole or in part in the enhanced day-ahead commitment process, the corresponding leg will be reduced to the lowest scheduled quantity.

As is currently expected in the DACP, there is an expectation that market participants will offer or bid in the real-time market in a manner to have their transactions scheduled in an amount equal to their enhanced day-ahead commitment process committed and scheduled quantity. There will be no change to pre-dispatch scheduling process which determines the economic schedules for interchange and feeds these quantities into the Transaction Checkout process in real-time.

## **3.8 Prudential Security Process**

Securing the financial risks to the IESO-administered markets under this design can be accommodated within the current, real-time market prudential security construct. New and revised settlement amounts proposed under this design do have potential to increase a market participant's liability exposure but accommodation can be achieved through the configuration of any proposed new settlement amounts (see also, "Settlement Process") into current prudential systems and procedures. On an ongoing basis, all new and modified charge types would be considered within the IESO's monitoring market participant actual exposure

### **3.8.1 Default Levy**

This design does not propose any changes to the current market participant default levy.

## **3.9 Surveillance, Assessment and Compliance**

Like DACP, the enhanced day-ahead commitment process is built upon the premise of the submission of reasonable data by market participants. It is also expected that this data will remain reasonable, or only be revised as would be appropriate for changes to real-time availability/deliverability and real-time market forces. The IESO's Market Assessment Unit within MACD will continue as they do now to monitor data submission behaviours and anomalies that result from market participant conduct with respect to the reasonableness of offers from dispatchable generators, bids from dispatchable loads, energy schedules from self-scheduled generators, and energy forecasts from intermittent generators and transitional-scheduled generators. As well they will continue monitor abuses of market power and gaming as well as flaws in the market rules, procedures or in the overall market design will exercise oversight of the enhanced day-ahead commitment process. In particular, employ oversight as it pertains to monitoring for instances of local market power.

On a daily basis, data is gathered from all Market systems and centrally stored in the Surveillance Data Repository (SDR) for long term access. This data is used by MACD for market analyses as it pertains to surveillance, assessment and compliance. Some examples of new data that will need to be stored in the SDR are: day-ahead committed exports quantities, start-up costs, minimum-generation costs, and minimum-run times as submitted by those resources receiving DA-PCG as input in the enhanced day-ahead commitment process results.