Market Renewal Program: Introduction to Day Ahead Market

September 20, 2017

Market Renewal Working Group

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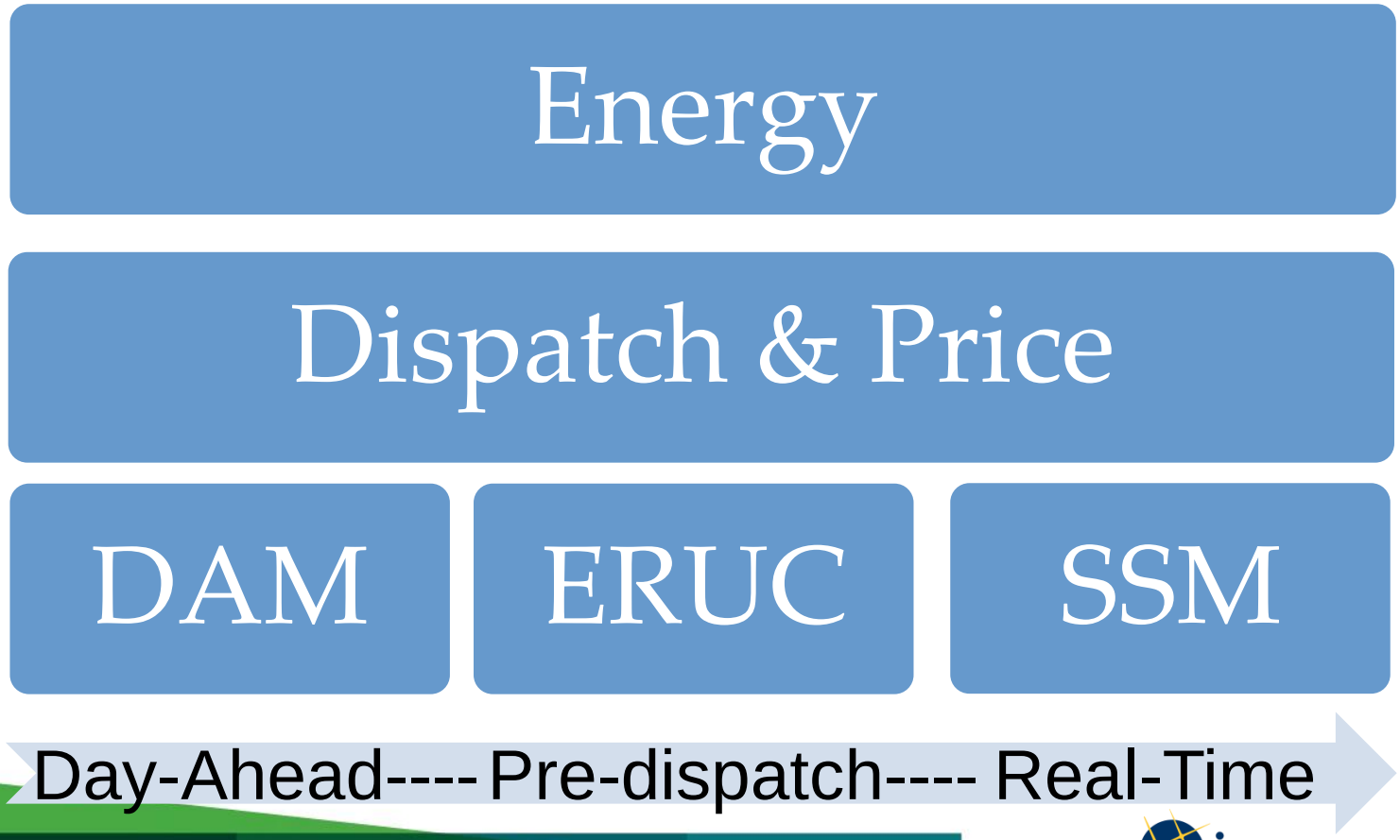
Agenda

- The need for a Day Ahead Market (DAM)
- Mechanics of a DAM and the two-settlement system
- Key design elements required to transition to a DAM

The Big Picture

Day-ahead market is enabled by the single schedule market design and will operate prior to pre-dispatch and real-time



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Why a Day Ahead Market?

- Improves operational certainty for system operators as real-time approaches
- Improves production certainty for dispatchable resources
- Establishes a hedge against price volatility in the real-time market caused by changes in supply and demand

How has day ahead scheduling evolved?

2004	• Day Ahead Market design proposed with uniform pricing
2006	• Day Ahead Commitment Process (DACP) introduced to address reliability issues • Committed internal generation and imports day ahead
2008	• Stakeholder Engagement: Day Ahead Market Evolution • Elected to enhance the existing DACP
2011	• Enhanced DACP introduced; 24 hour optimization using incremental energy, start up and speed no load costs • More effective scheduling of combined cycle gas
2017	• Case for Market Renewal and a Day Ahead Market

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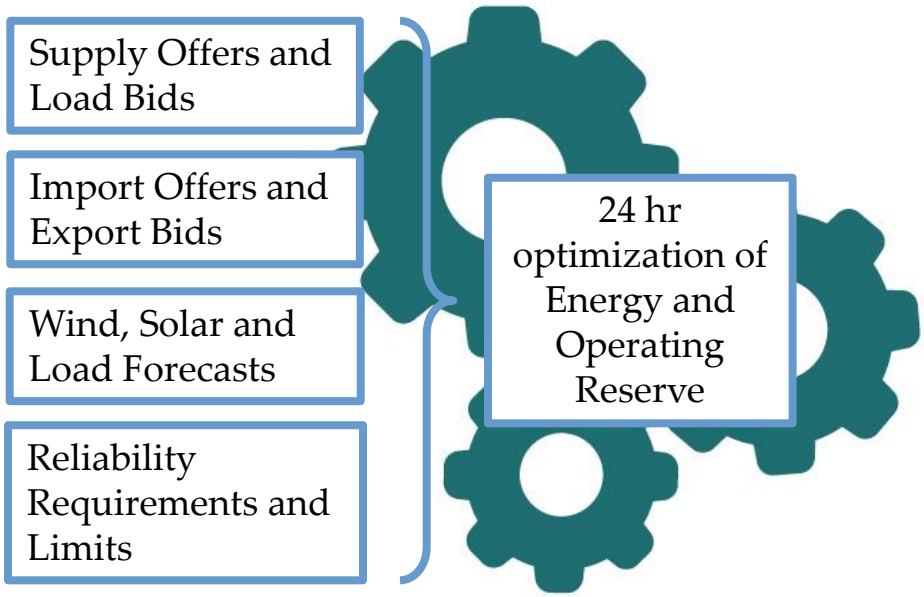
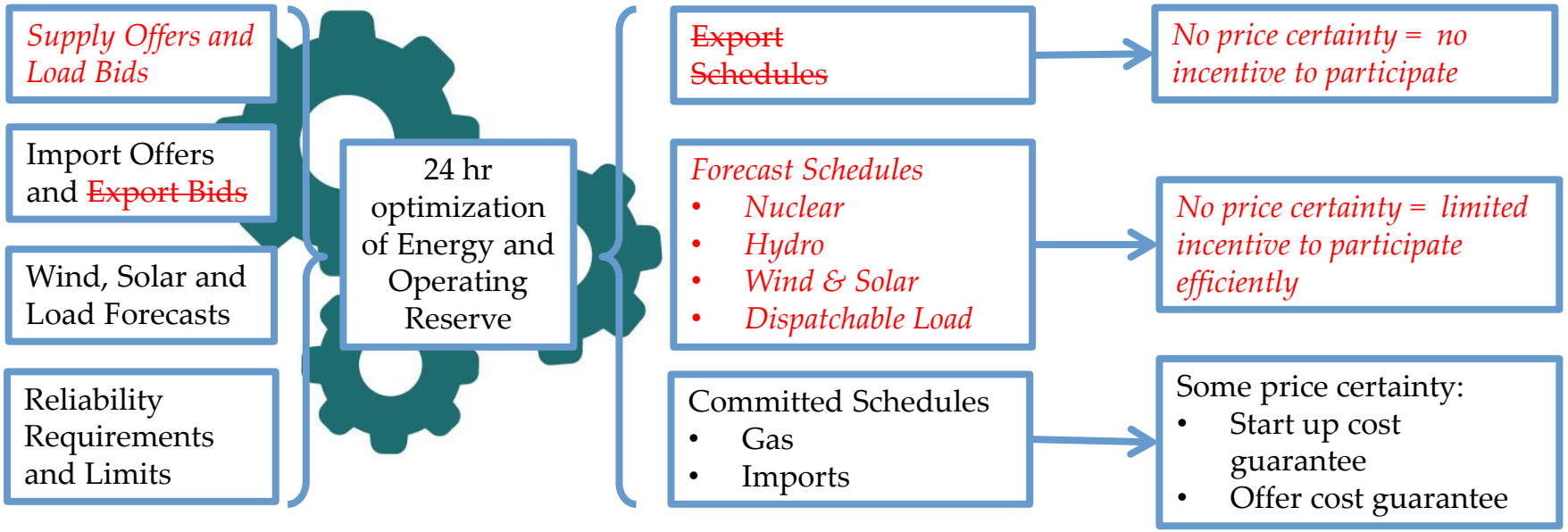
Current Day Ahead Scheduling Process (DACP)



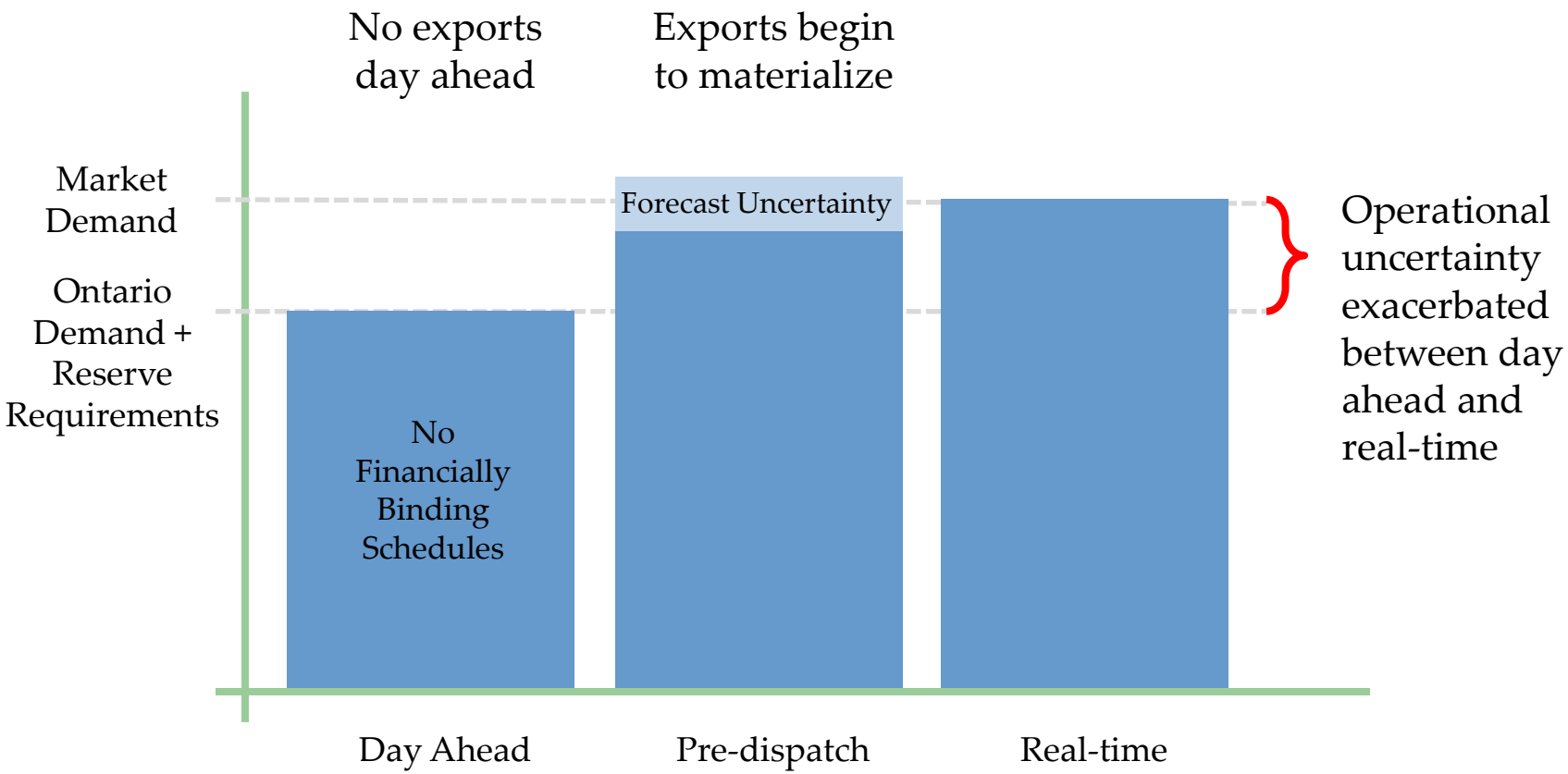
- Capable of minimizing total cost of production to meet market demand
- Considers start up costs and minimum run times for non-quick start facilities
- Provides cost guarantees for non-quick start resources and imports

Current DACP: What's missing



- Limited operational certainty without financial certainty:
  - Lack of participation (exports)
  - Less efficient participation (other resources)

Current DACP: Limitations

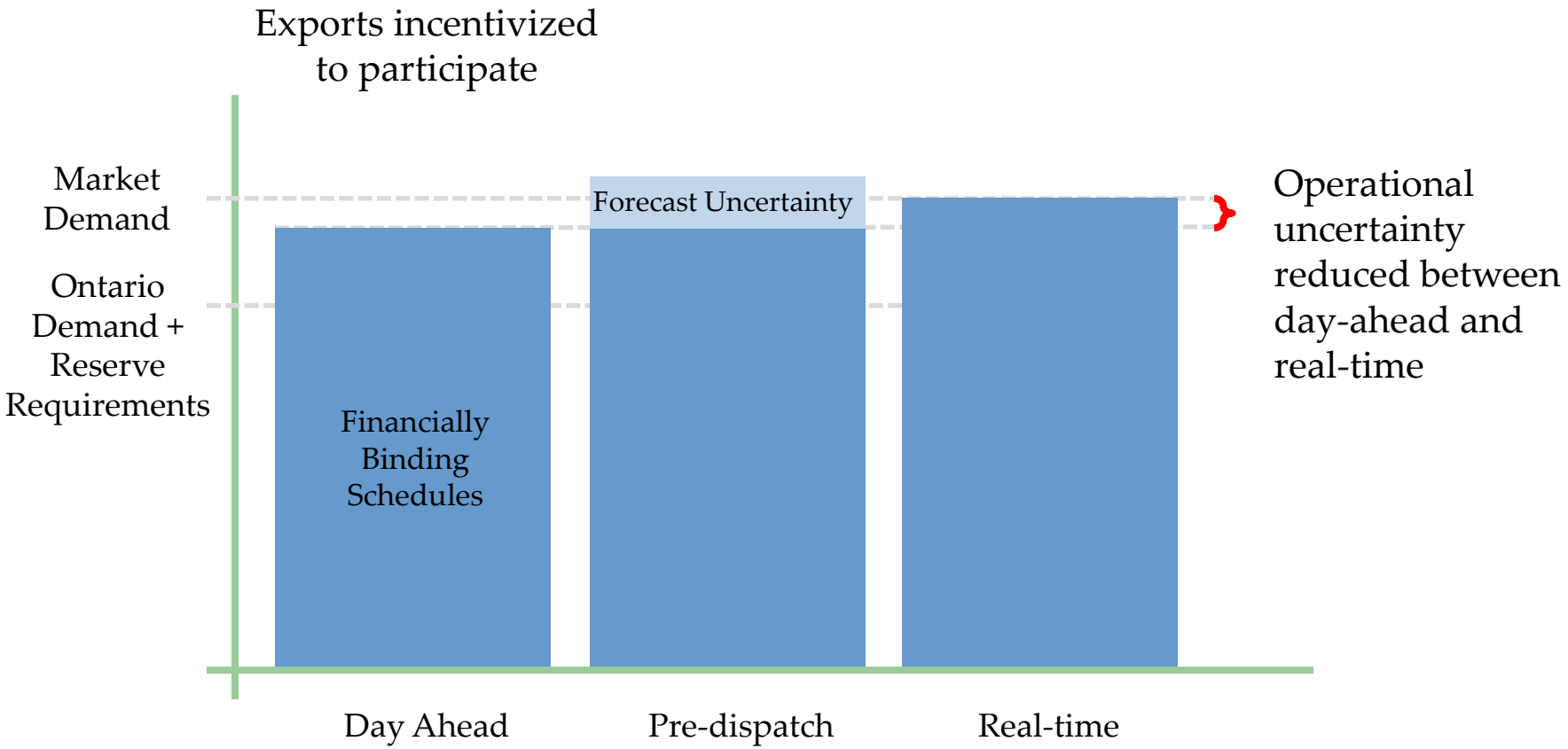


DAM Two Settlement: Incentivized Participation

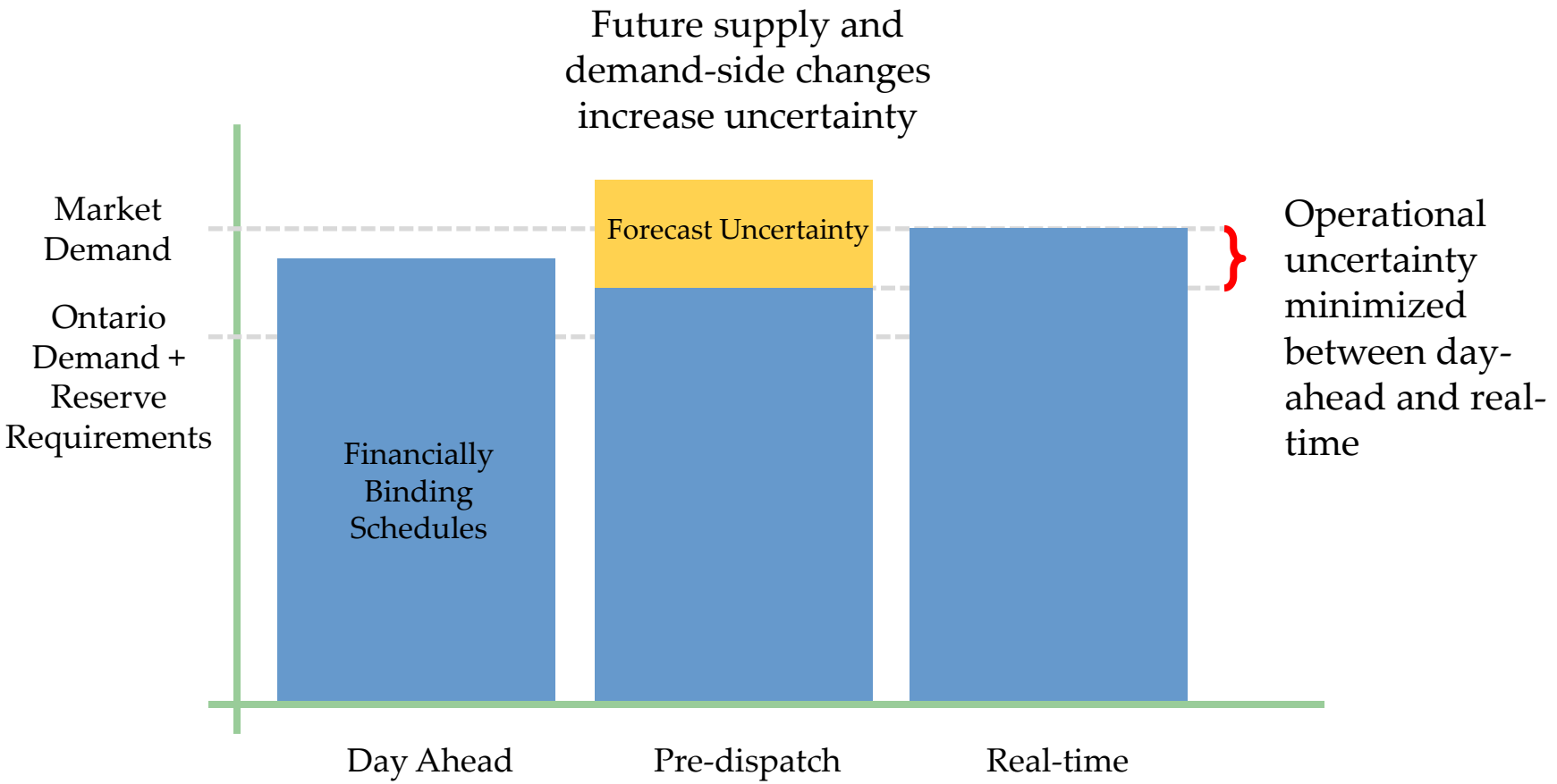
Day Ahead		Real-Time (Balancing)
$Q_{DA} \times \$_{DA}$	+	$(Q_{RT} - Q_{DA}) \times \$_{RT}$

Deviations from day-ahead obligations must be bought or sold back at real-time prices.

Financially Binding Day Ahead Market



Better Prepared for the Future



Proposed Design Elements

Module	Module Name	No.	Design Element Name
A	Participation and Input Data	1	Must Offer Requirements
		2	Load Participation
		3	Supply Participation: Variable Generation
		4	Reliability Input Parameters
		5	Virtual Transactions
B	Execution, Timing and Real-Time Integration	6	Functional Passes
		7	Offer Resubmission for Energy Limited Resources
		8	Submission and Posting Deadlines
		9	Initiation of Operational Commitments
		10	Reporting Obligations
C	Price Formation	11	Load Pricing
		12	Price Setting Eligibility
D	Market Power Mitigation	13	Process, Timing and Reference Levels
E	Settlements	14	Two Settlement for Loads
		15	Two Settlement for Supply
		16	Make Whole Payments
		17	Uplift Recovery
		18	Financial Transmission Rights
		19	Market System Failure

Module A: Participation and Input Data

No.	Design Element Name	Description
1	Must Offer Requirements	What must offer rules will apply to the various types of supply and load resources.
2	Load Participation	Bidding obligations and methodologies for demand response and non-dispatchable load to participate in the DAM.
3	Supply Participation: Variable Generation	Offer obligations and methodologies for variable generation to participate in DAM.
4	Reliability Input Parameters	What ancillary service and reliability requirements are needed to run a DAM.
5	Virtual Transactions	Should purely financial offers and bids be included in the DAM design.

Module B: Execution, Timing and Real-Time Integration

No.	Design Element Name	Description
6	Functional Passes	What functions are required to produce financially binding schedules and prices to satisfy demand and reliability requirements subject to market power mitigation.
7	Offer Resubmission for Energy Limited Resources	How to facilitate optimal scheduling of energy limited resources.
8	Submission and Posting Deadlines	What are the optimal submission and posting deadlines for a DAM.
9	Initiation of Operational Commitments	How DAM results will be used to operationally signal a non-quick resource to start in real-time.
10	Reporting Obligations	What types of public and private information should be published to market participants before, during and after DAM.

Module C: Price Formation

No.	Design Element Name	Description
11	Load Pricing	How to address day-ahead pricing issues related to non-dispatchable load bids.
12	Price Setting Eligibility	Which resources and parameters will be eligible to set DAM prices when compared to Real-Time.

Module D: Market Power Mitigation

No.	Design Element Name	Description
13	Process, Timing and Reference Levels	To recap how the market power mitigation elements developed in SSM and ERUC apply to DAM.

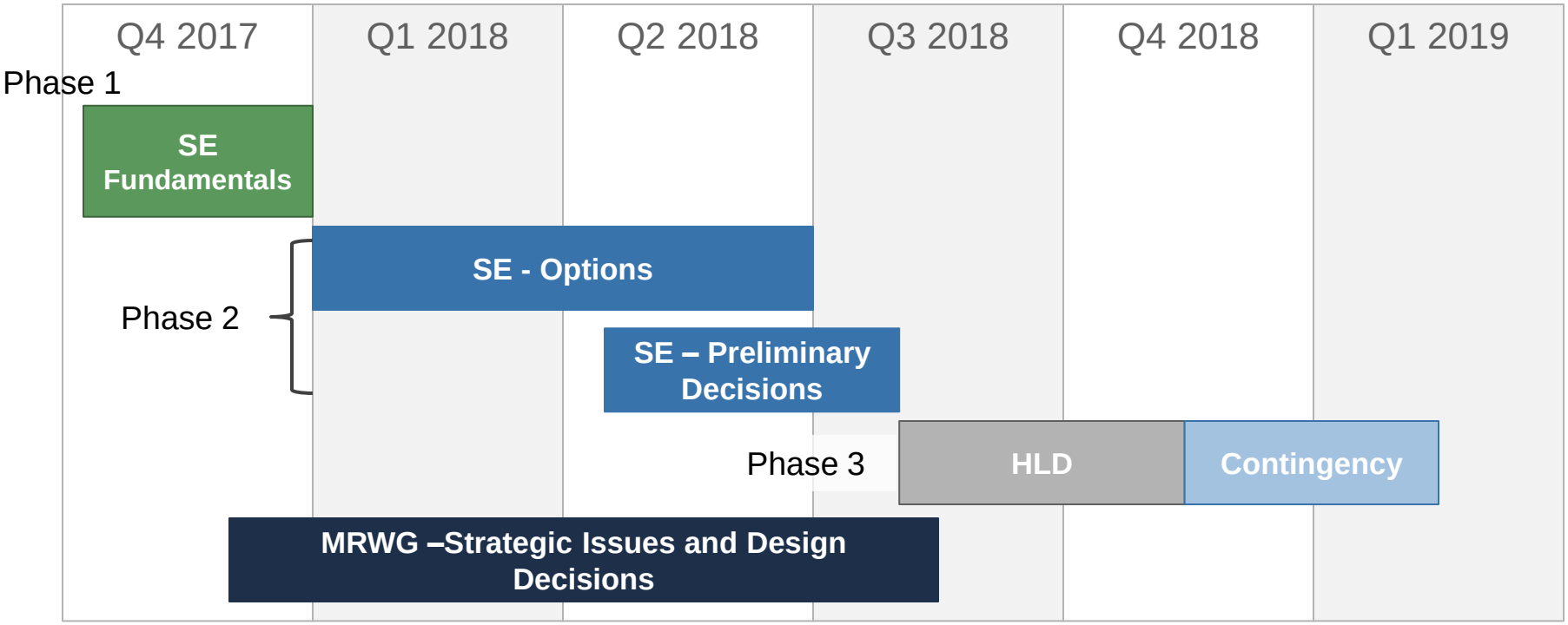
Module E: Settlements

No.	Design Element Name	Description
14	Two Settlement for Load	How loads will be exposed to two-settlement for energy and operating reserve.
15	Two Settlement for Supply	How supply will be exposed to two-settlement for energy and operating reserve.
16	Make Whole Payments	What make whole payments are specific to DAM, who will be eligible to receive them and under what conditions.
17	Uplift Recovery	What types of uplift will apply in DAM and how will they be recovered.
18	Financial Transmission Rights	How will existing external FTRs and internal FTRs (if introduced under SSM) be settled.
19	Market System Failure	What principles will govern how the day-ahead and real-time markets should be settled when either is interrupted.

DAM vs. DACP

Process	Rules for Participation	Inputs	Execution & Real-Time Integration	Real-Time Market Execution	Settlement
Typical DAM	Market Participant Load Bidding and Supply Offer Obligations Must offer for capacity resources	Physical bids and offers; Virtual bids and offers; Forecasts; Reliability Requirements	Submission & Posting Deadlines One run for: Market Power Mitigation, Scheduling, Pricing and Commitment	Dispatch and Pricing; Actual Performance	Separate Day-Ahead and Real-Time Settlements; Separate Day-Ahead and Real-Time Make Whole + Uplift
DACP Differences	IESO bids for most load and offers some supply Must offer for all resources	No Virtual bids and offers	Two Runs & Resubmission Window No Mitigation or Pricing;	No difference	Single Real-Time Settlement and Day Ahead Make Whole

DAM Project Timelines



DAM High Level Design Schedule

- Three phases of High Level Design to continue through approximately Q4 2018

- Near-term schedule (Phase 1):

Date	Forum	Topic
Wednesday, October 11	DAM	Introduction to DAM
Monday, October 30	DAM	Fundamentals 1: Modules A & B
Monday, November 27	DAM	Fundamentals 2: Modules C, D & E