

Market Renewal - Energy Workstream Session for LDCs

September 18, 2018

Disclaimer

This presentation and the information contained herein is provided for information and discussion purposes only. This presentation does not constitute, nor should it be construed to constitute, legal advice or a guarantee, representation or warranty on behalf of the IESO. In the event of any conflict or inconsistency between the information contained in this presentation and the Market Rules, the Market Manuals, any IESO contract or any applicable legislation or regulation, the provisions of the Market Rules, Market Manuals, contract, legislation or regulation, as applicable, govern.

Agenda

- Introduction to Market Renewal
- Overview of the Market Renewal energy initiatives, highlighting areas of interest for LDCs
- Next steps

Introduction to Market Renewal

Market Renewal Overview

- Ambitious set of initiatives that amounts to a fundamental redesign of Ontario's electricity markets and **prepares us for future change**
- Current design has served Ontario well but demands of a modern **grid evolving rapidly**
- **Reforms are required** to allow the IESO to continue to manage the grid reliably & cost effectively
- Efficiency savings of **\$2.2-\$5.2 billion** over a 10 year period

Renewing Ontario's Electricity Market

Address Inefficiencies of Current Design

- Unique two schedule system
- Reliance on out of market payments
- Price distortions and out of market actions

Solutions well tested in other markets but will need to be designed to meet Ontario needs

Reduce Costs and Risks

- Reduce reliance on real-time market
- More efficiently schedule and optimize resources
- Flexible to changing long-term outlook

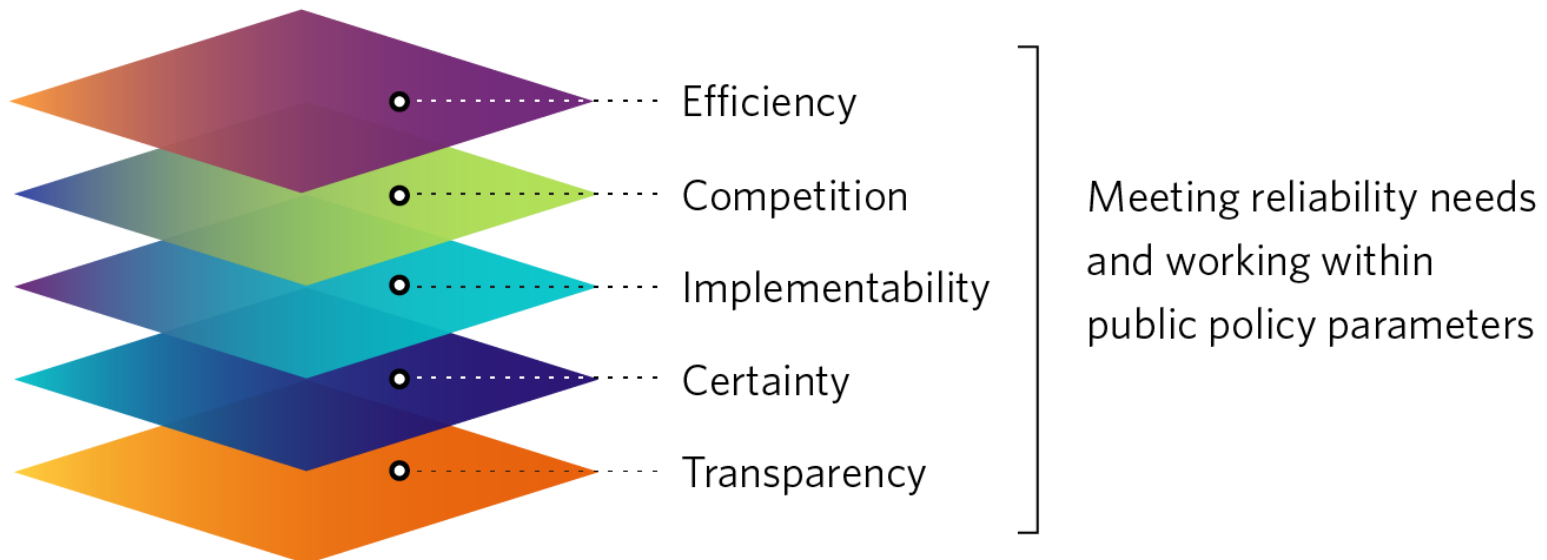
Enable a More Dynamic Future

- New technologies and business models
- Increased role and participation of individual consumers in the market

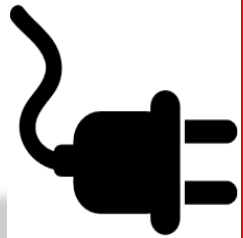
Options being defined

Mission and Guiding Principles

A more efficient, stable marketplace with competitive and transparent mechanisms that meet system and participant needs at lowest cost.



Scope of the Market Renewal Program



ENERGY
work stream

- Single Schedule Market
- Day-Ahead Market
- Real Time Unit Commitment



CAPACITY
work stream

- Incremental Capacity Auction



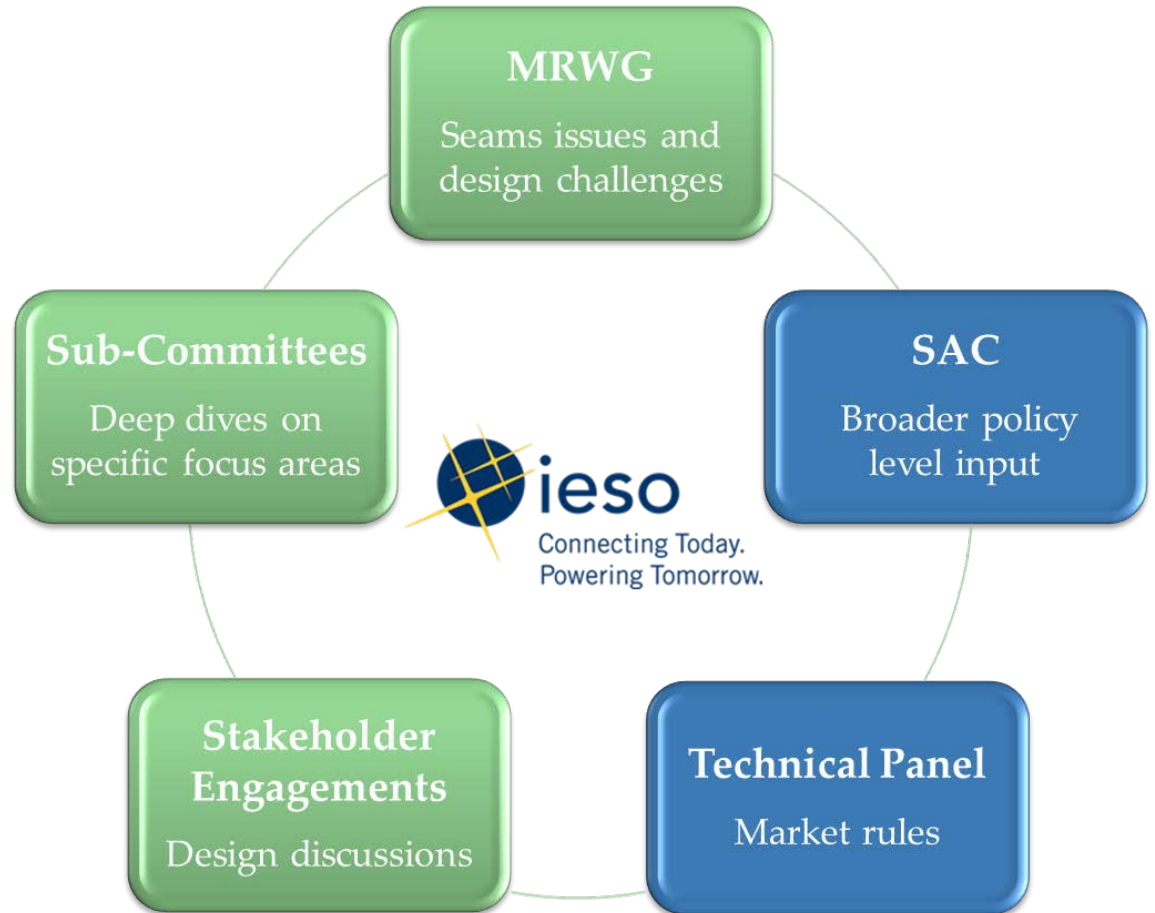
Near-term
Projects

**Market
Renewal**

Future
Projects

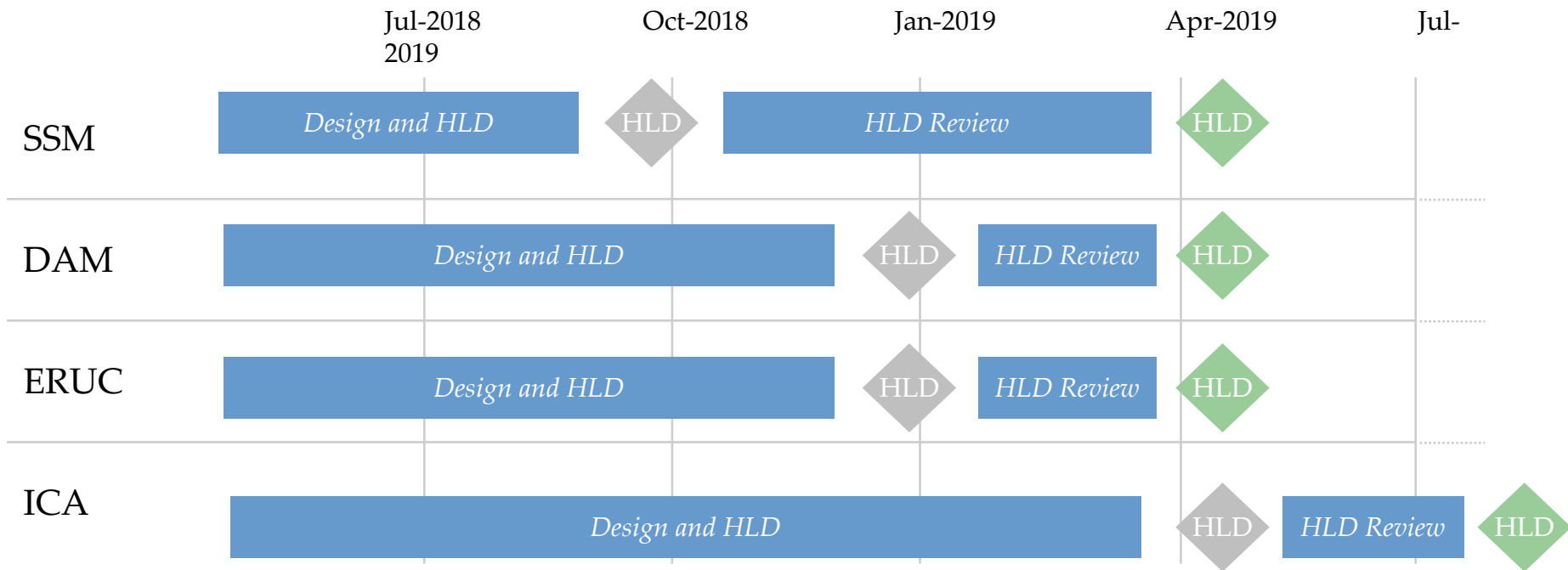
Engagement Framework

Framework will evolve as we transition into Detailed Design. The focus will continue to be getting the right input from the right stakeholders.



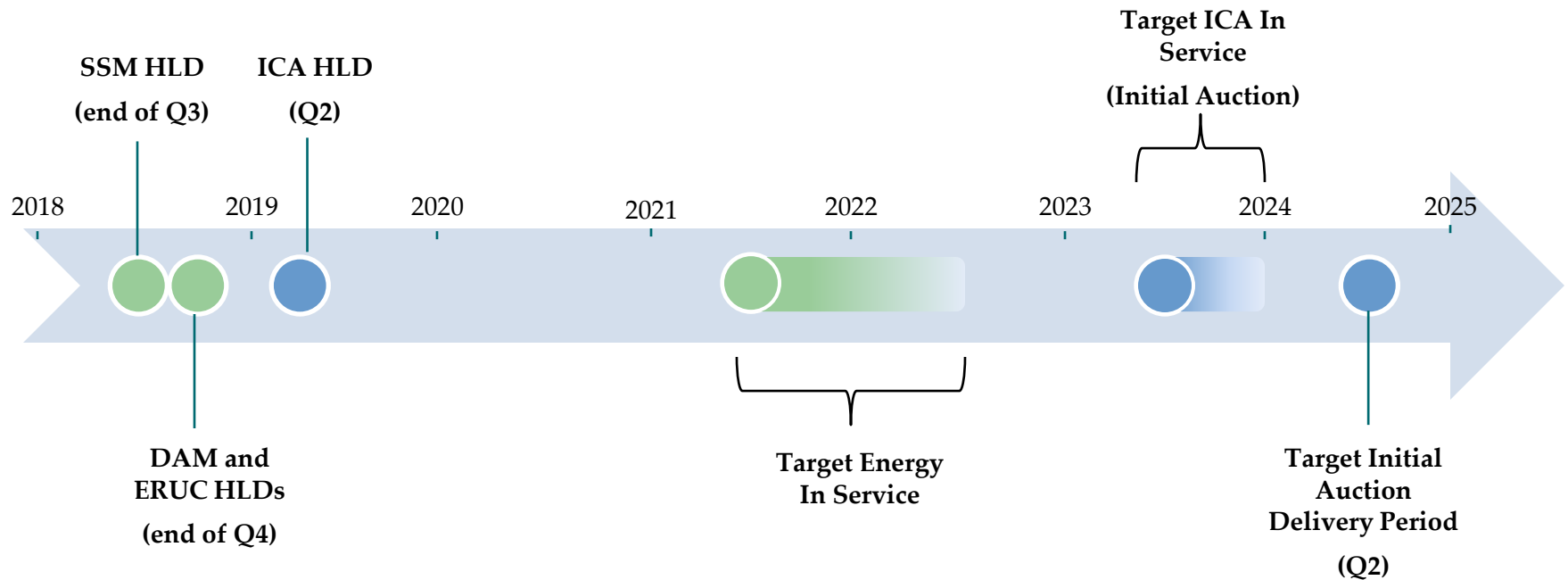
High Level Design Timelines

- HLDs will be published for an 8 week period
 - First round of SSM feedback will be due in November 2018
- Detailed work on settlements will commence in early 2019, an ideal time for LDCs to become more involved



 = DRAFT HLD published
  = HLD final

Market Renewal Indicative Timeline

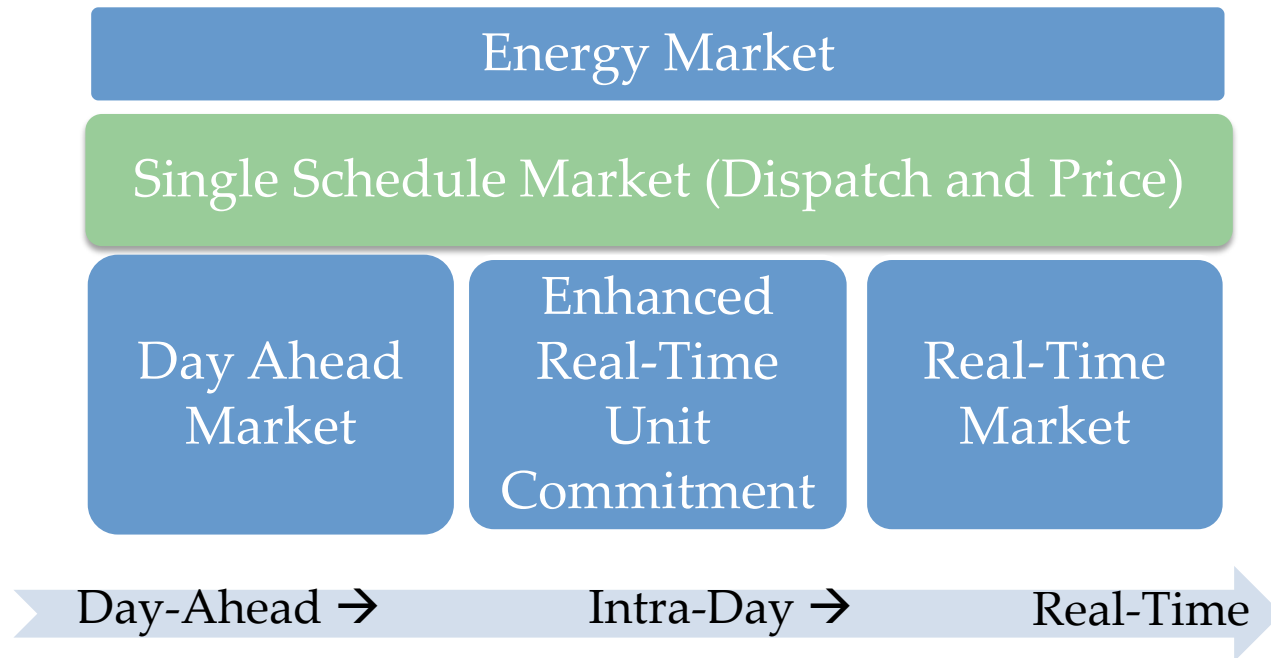


This graphic is for illustrative purposes only and dates are subject to change

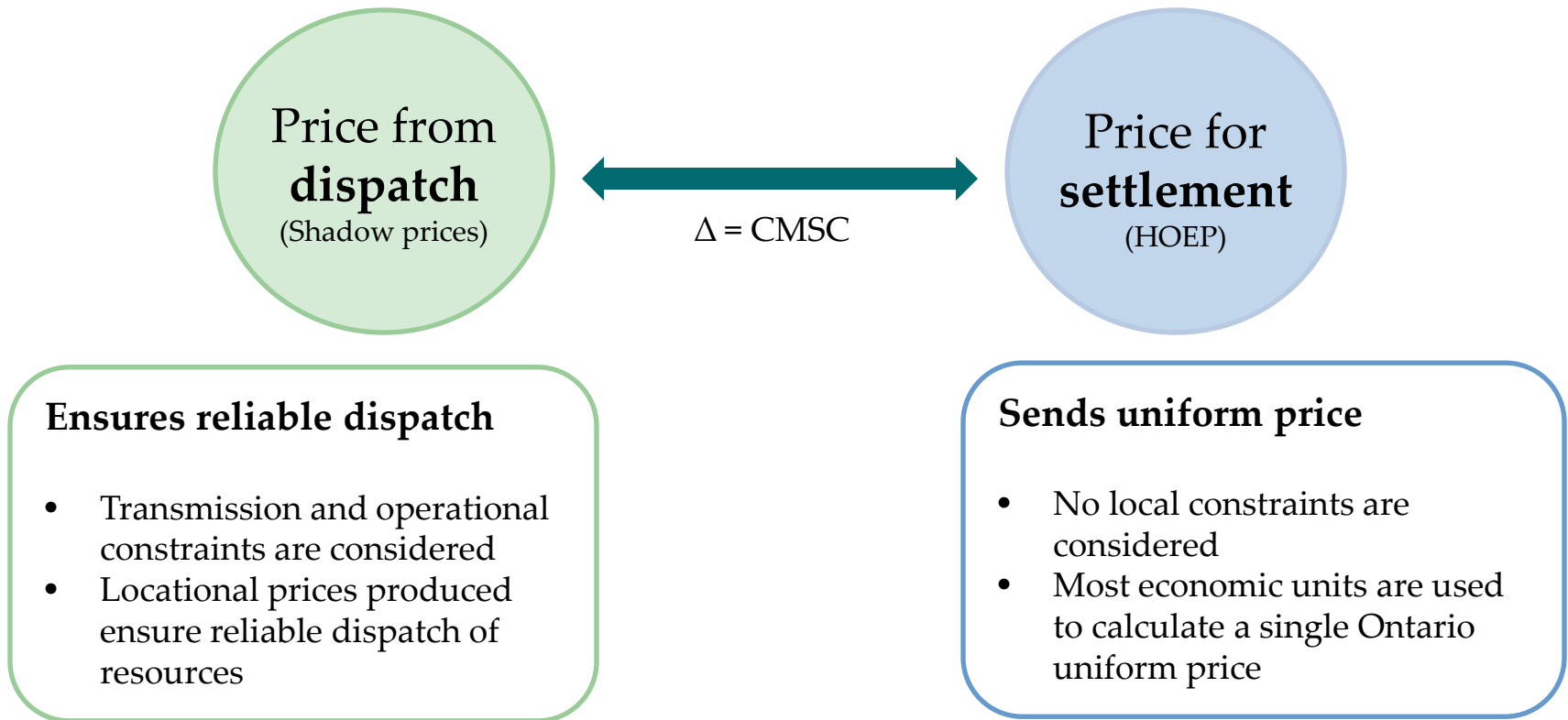
Overview of the Energy initiatives

Single Schedule Market - The Big Picture

- This initiative will replace Ontario's two schedule system with a single schedule market (SSM) that better aligns price with dispatch
- Improving the energy price signal in Ontario is a foundational change that is required to address existing challenges and prepare for the market of the future

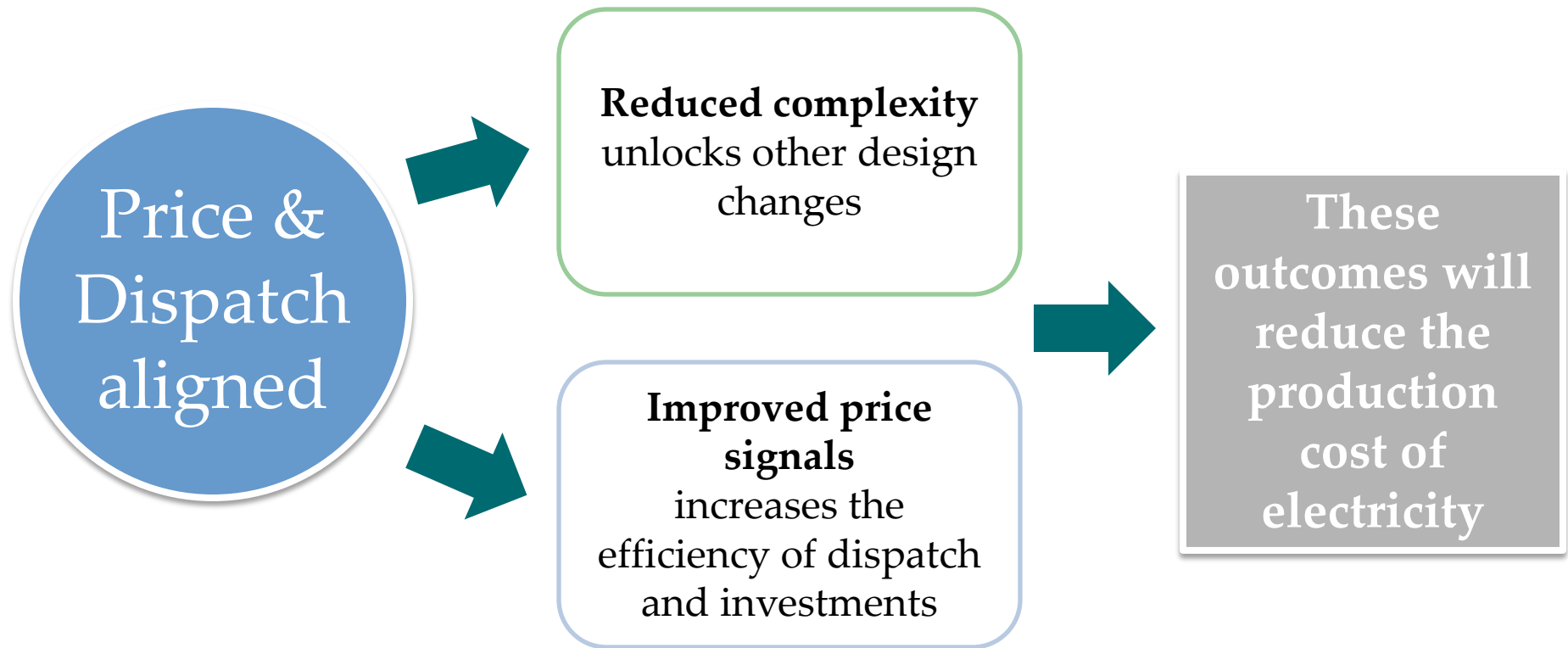


The Current Two Schedule System



- ✘ Distorts price signals
- ✘ Incentivizes inefficient consumption / operation / trading and gaming
- ✘ Requires out of market payments

Single Schedule Market



Enabled by Single Schedule Market

Uniform Price to Locational Pricing

- Electricity consumers in Ontario currently pay a uniform price for energy
 - E.g., Market Clearing Price for dispatchable loads and Hourly Ontario Energy Price (HOEP) for LDCs
- The uniform price carries several limitations:
 - Is **not reflective of the incremental value of energy** at a given location
 - Is **not consistent with the offer prices and dispatch** of generation resources
 - **Adds complexity** associated with out of market payments to align short-term incentives with dispatch
 - **Lack of transparency** in cost of out of market payments
- Market Renewal will see the introduction of locational pricing which will more accurately reflect locational constraints
 - LDC settled loads will not be directly affected by Market Renewal

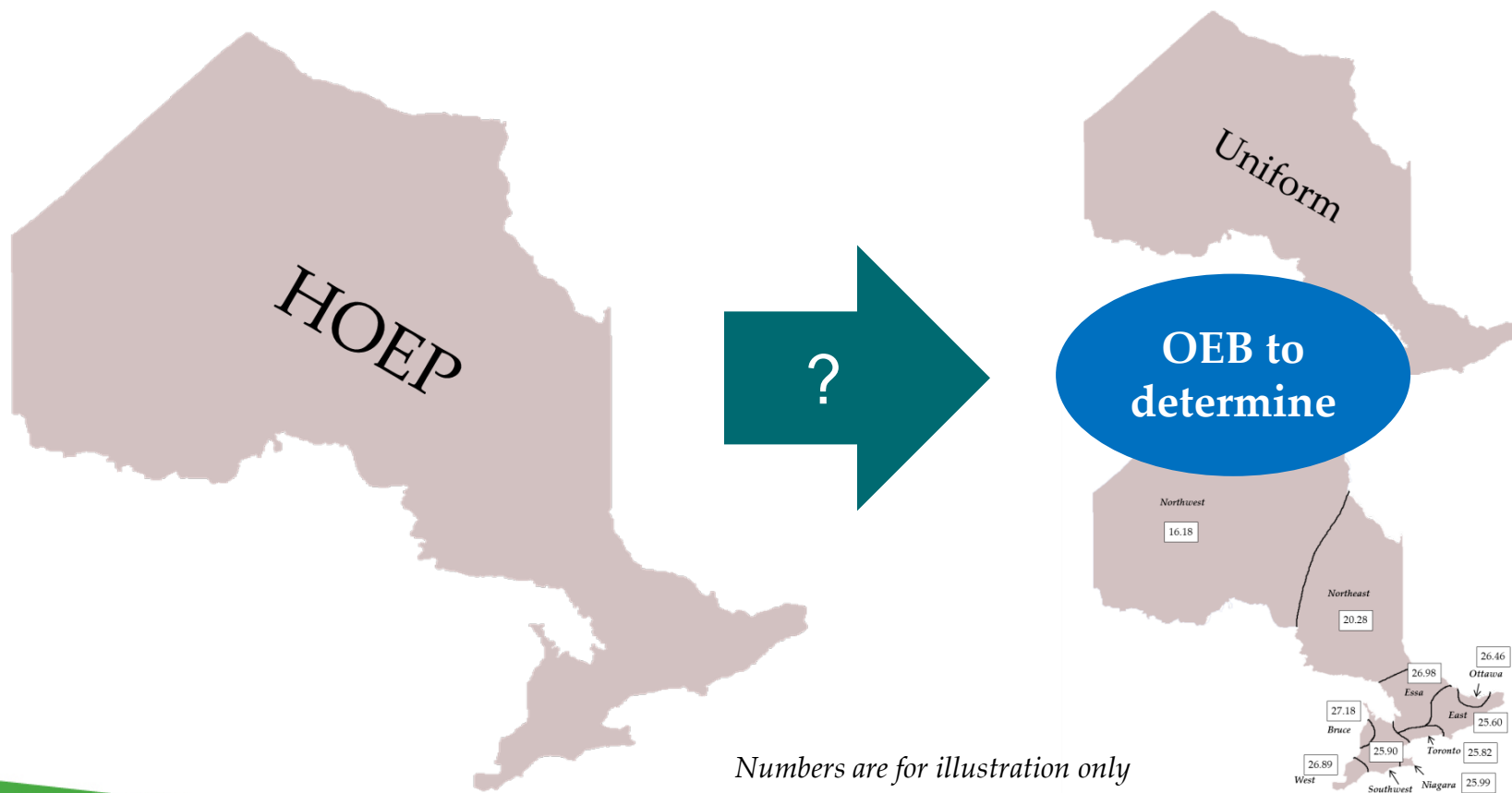
Change for LDCs

LDCs will move from the HOEP to being settled on a zonal basis



Change to Dx-Connected LDC Customers?

Settlement for RPP consumers and LDC-settled large loads is up to the OEB to determine



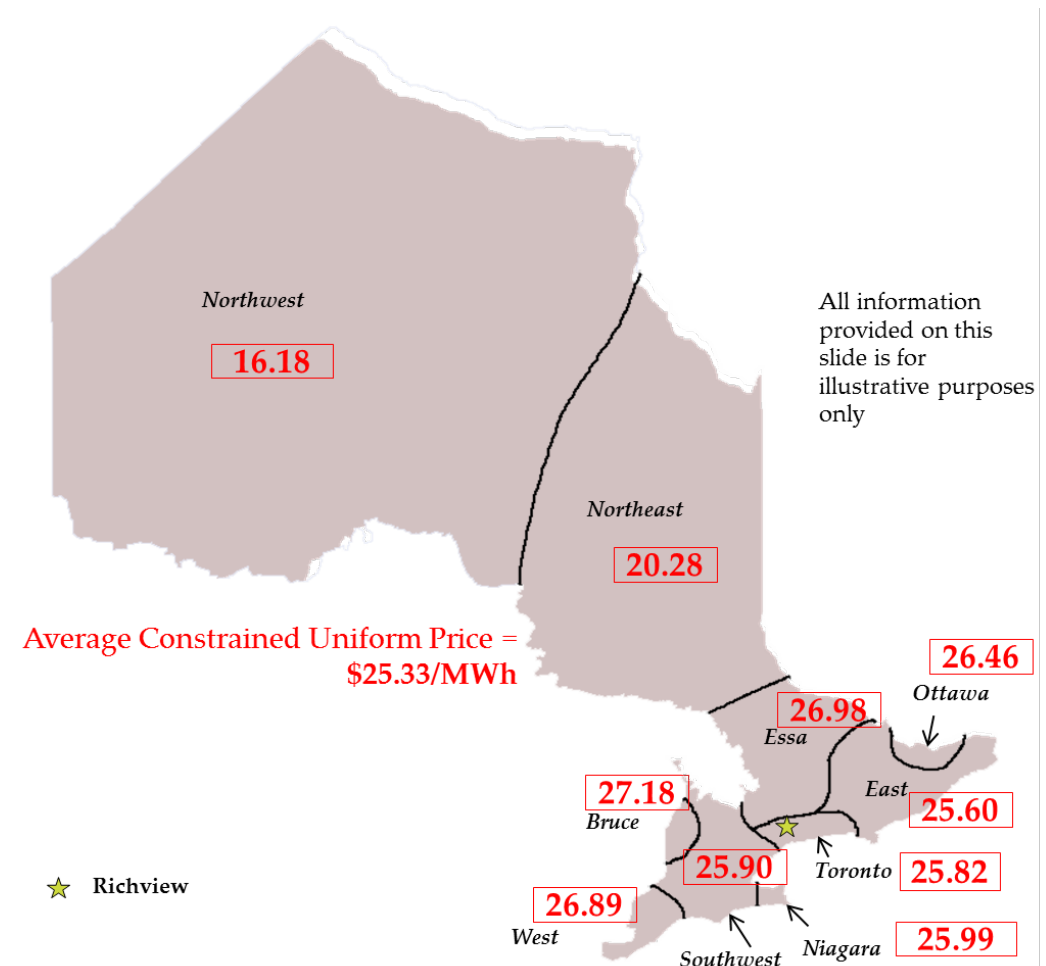
Load Pricing Summary

The SSM will introduce locational pricing for IESO settled loads which will reduce the overall cost of managing the grid and decrease costs for all consumers

- IESO settlement for LDCs will be based on zonal prices
- The IESO looks forward to continued discussions with LDCs in 2019 to further define this process
- As with today, the cost of energy to LDCs will continue to be passed through to their customers
- Settlement for LDC customers will be determined by the OEB
- The IESO has had initial conversations with the OEB on this topic and continued work will be required post HLD

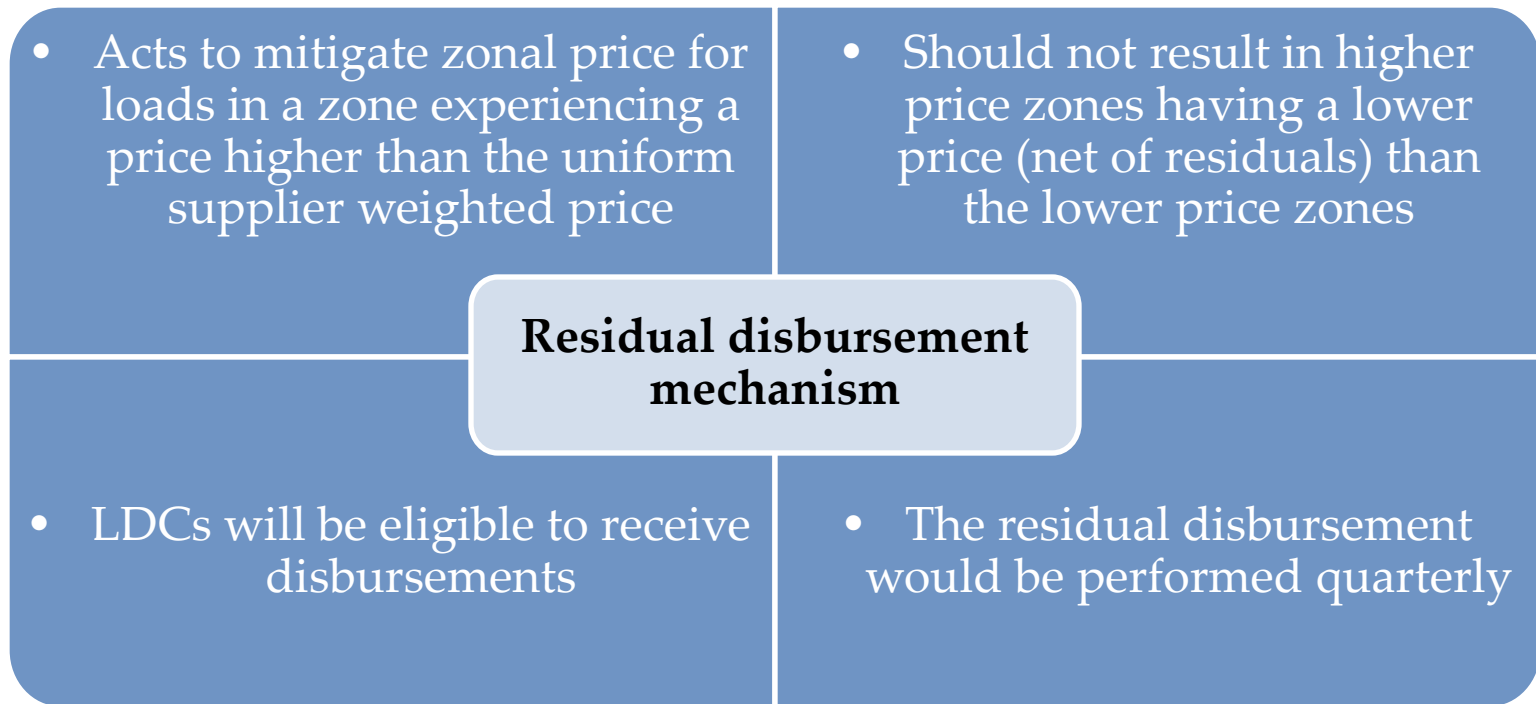
Zonal Pricing – general observations (2014-16)

- Analysis shows average annual Northern Ontario prices are less than those in Southern Ontario, and the Constrained Uniform Price
- Average zonal prices are similar across Southern Ontario
- The average Constrained Uniform Price is very similar to, but on average lower than, the zonal prices in Southern Ontario



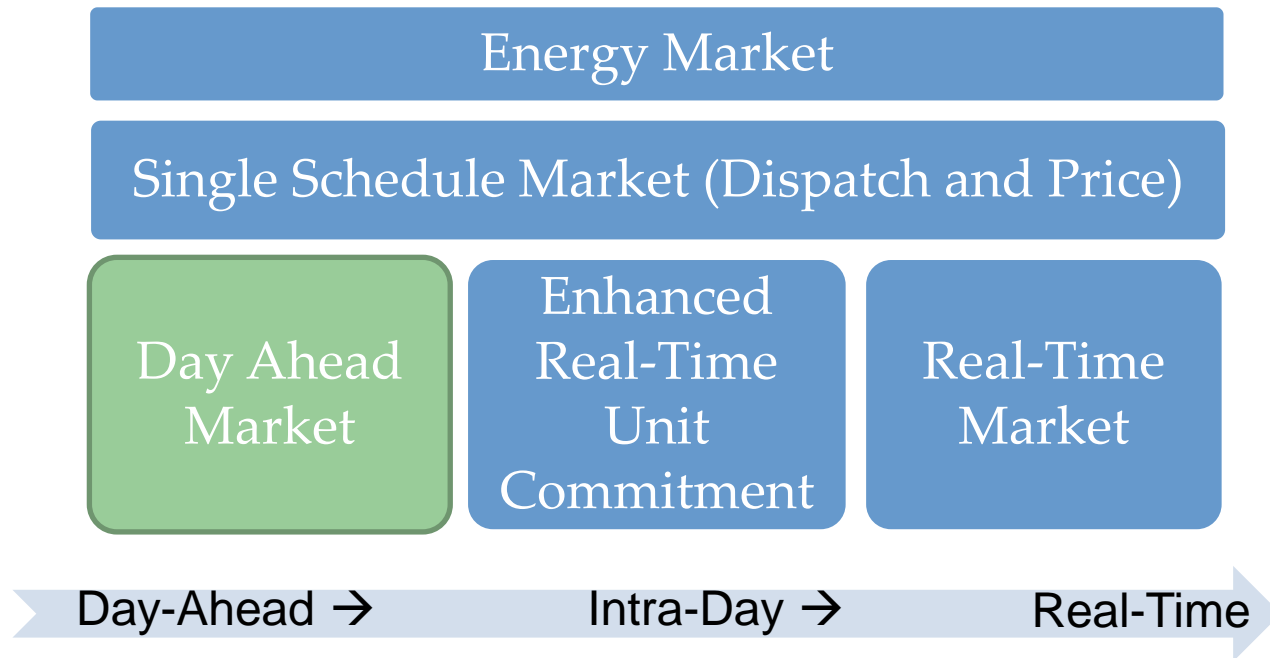
Residuals

- An excess amount, known as a “residual”, will occur when transmission congestion and losses cause the marginal price needed to meet demand to be different from the average price paid to suppliers



Day-Ahead Market: The Big Picture

- A day-ahead energy market allows participants to buy or sell wholesale electricity a day in advance
- It is enabled by the single schedule market design and will operate prior to pre-dispatch and real-time



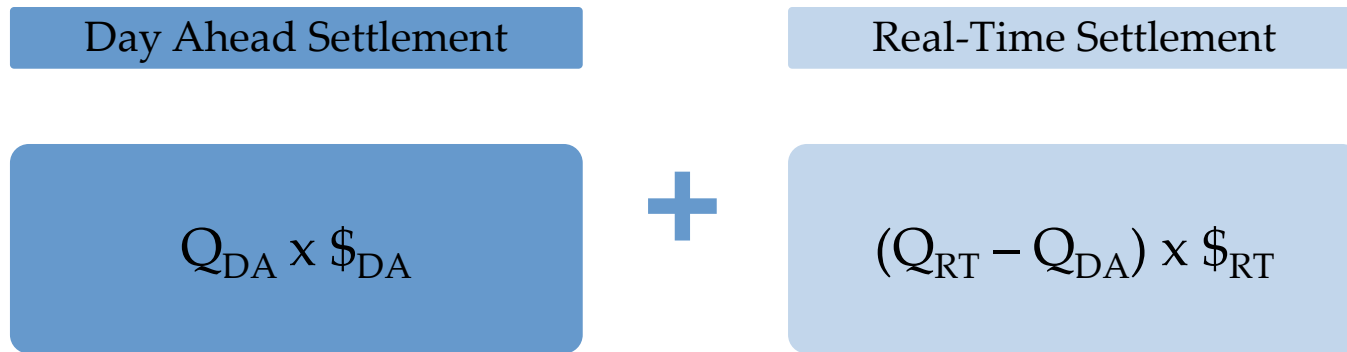
Why a Day Ahead Market?

Current Day-Ahead Commitment Process (DACP)	Day-Ahead Market (DAM)
<ul style="list-style-type: none">• Participants submit day-ahead bids and offers primarily to declare availability in real-time.	<ul style="list-style-type: none">• Participants submit day-ahead bids and offers to compete with other for a day-ahead price.
<ul style="list-style-type: none">• Day-ahead bids and offers may be less efficient because they are not competing for a price	<ul style="list-style-type: none">• Day-ahead bids and offers are more efficient because they are competitive
<ul style="list-style-type: none">• Exports can participate but are not incentivized to do so	<ul style="list-style-type: none">• Exports are incentivized to participate for a day-ahead price
<ul style="list-style-type: none">• Resources are scheduled to meet Ontario demand, providing a rough approximation of tomorrow's operation	<ul style="list-style-type: none">• Resources are scheduled to meet total Market demand, providing a better approximation of tomorrow's operation

A day-ahead price signal incentivizes greater and more efficient participation from all resources

How it Works

- DAM produces hourly schedules and prices that are financially binding, introducing a 'two-settlement' system



- Real-time settlement only used for balancing, where deviations from day-ahead schedules are settled at real-time prices

LDCs will not be exposed to the two settlement approach; a modified settlement approach will be used

Modified Settlement for LDCs

- A modified settlement process is required for LDCs and all other non-dispatchable loads because the IESO will continue to forecast demand on their behalf

Modified Settlement for LDCs

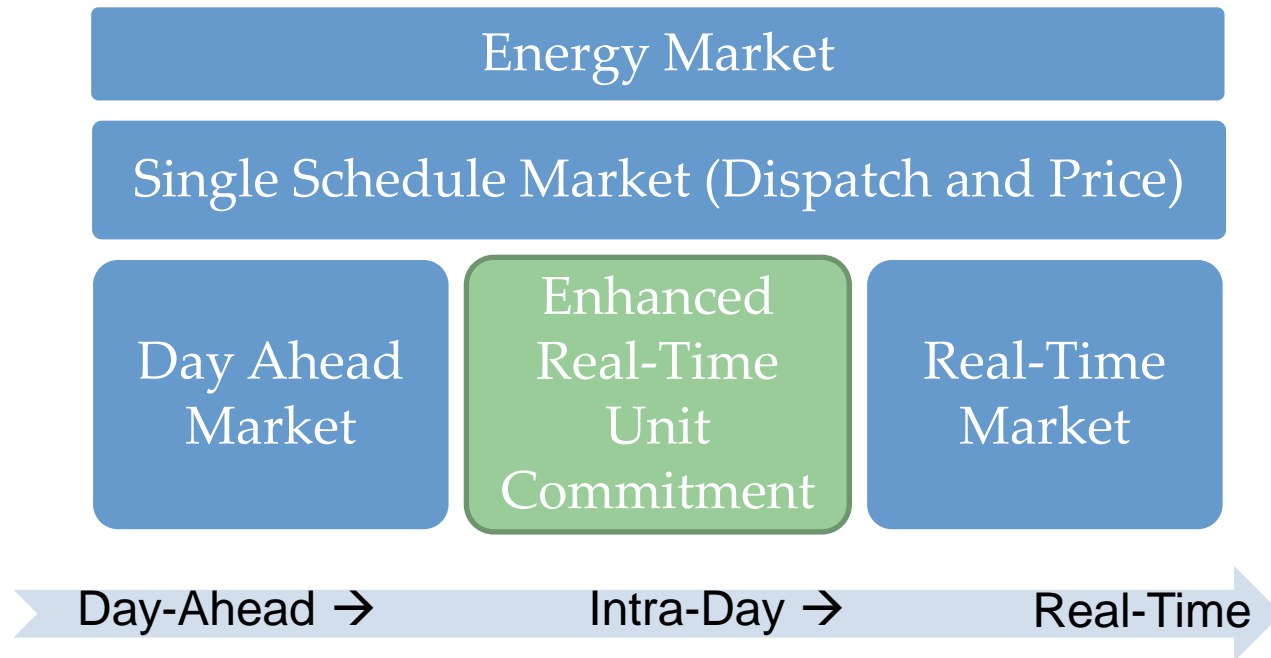
$$(Q_{RT} \times \$_{DA}) + (Q_{RT} \times \$_{ForecastDeviation})$$

$\$_{ForecastDeviation}$ = cost or benefit of IESO forecast deviations on a per MW-consumed basis

- Modified settlement allows the balancing cost (or benefit) of IESO forecast deviations to be distributed fairly amongst all non-dispatchable loads (including LDCs)

ERUC: The Big Picture

- Enhanced real-time unit commitment will operate in the pre-dispatch timeframe, after day-ahead / before real-time



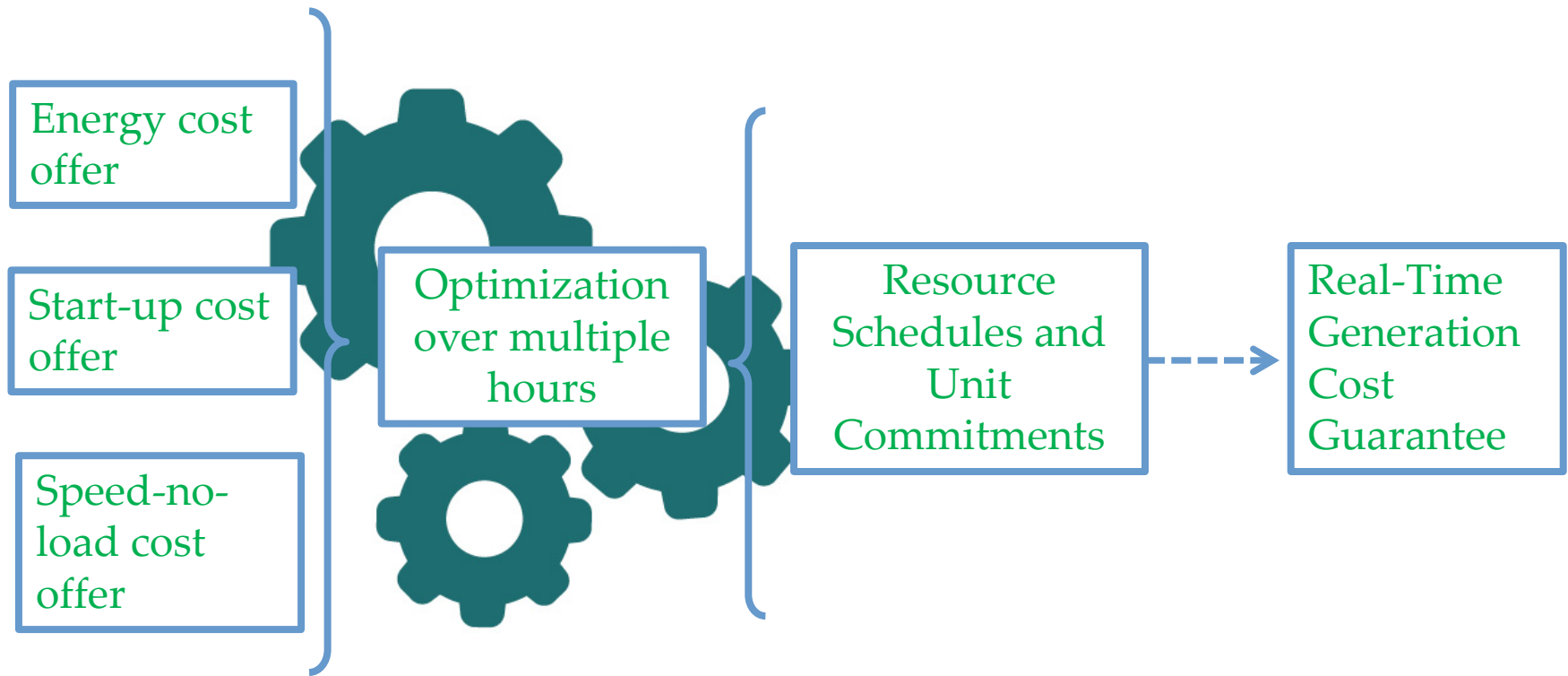
ERUC - How it Works

- Security constrained unit commitment, **jointly optimizing energy and operating reserves** in the pre-dispatch timeframe

- Optimization will evaluate the overall efficiency of the **commitment across the whole run**

- Consider all resource bids and offers to **determine the optimal mix** of resources to meet net load

Enhanced Real-Time Unit Commitment Process



Next Steps...

- **HLD Draft Review**

- Stakeholders will be given 8 weeks to review the HLDs
- IESO will conduct an education and awareness session to assist stakeholders with their understanding of the documents
- Technical Q&A sessions will be held to assist stakeholders with their review of what is in the HLDs
- Details will be posted on the IESO Market Renewal website

- **Detailed Design**

- Work on the detailed design will begin in early 2019
- Engagement approach will be more targeted to specific focus areas (e.g. settlements, operations, etc.). **This is when LDC input will be particularly helpful**
- IESO will continue to engage with LDCs to ensure their input is appropriately incorporated in the final design