



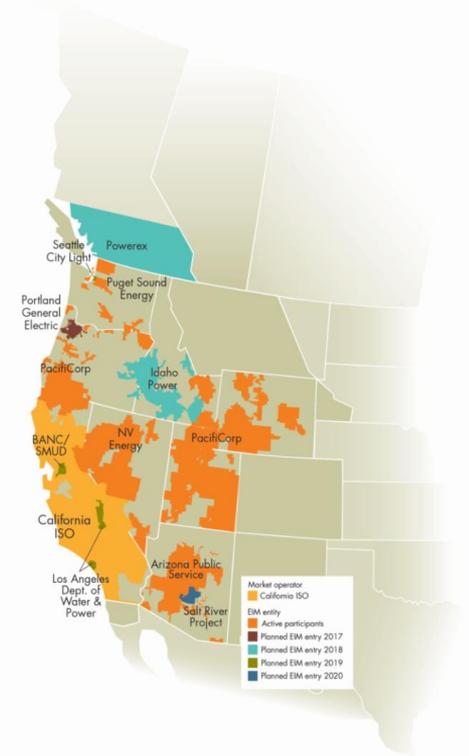
# Powerex EIM Participation Readiness

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March 8, 2018

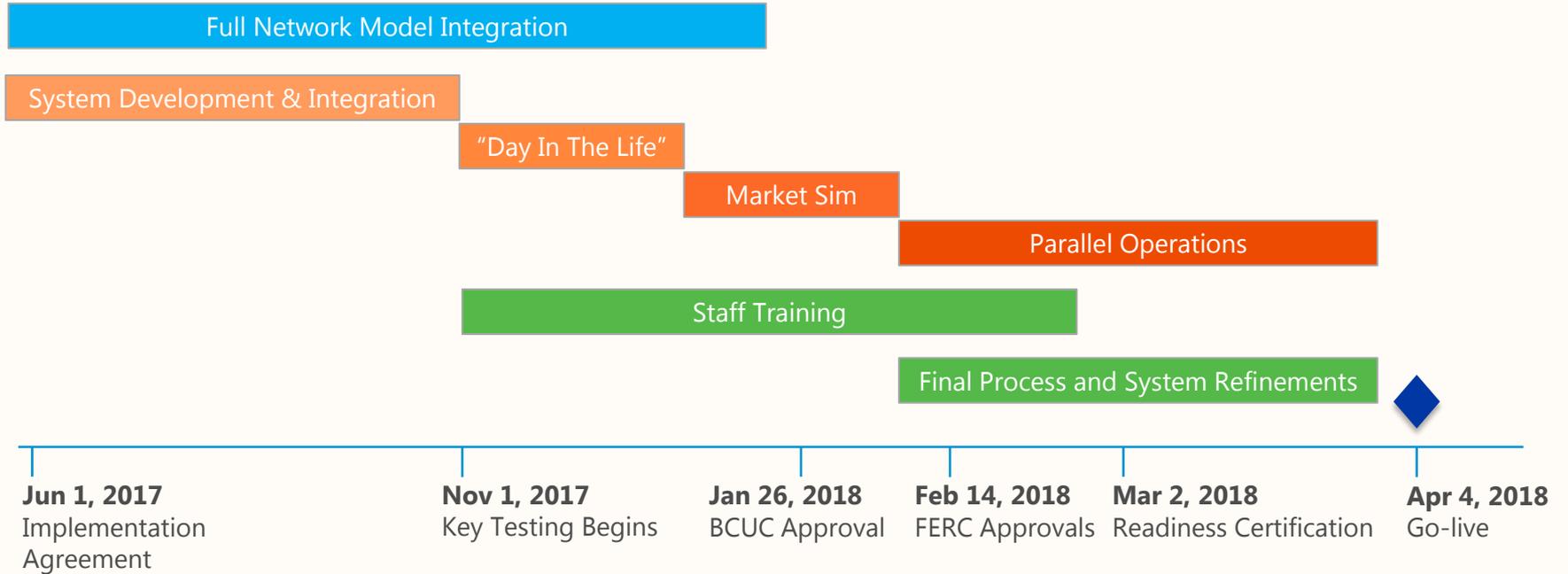
# Key Features of Powerex's EIM participation

- Powerex will participate under Canadian EIM Entity Agreement
- Supported by resources and load located in Canada
  - EIM area will not extend into Canada
  - Powerex will transact at BC-US Border using aggregated resources and load
- Transmission rights voluntarily made available to EIM
  - Set aside ahead of the hour
  - Anticipate 150 MW to and from Puget Sound Energy at BC-US Border
  - Anticipate 150 MW to and from CAISO at Malin
  - Will include dynamic transfer capability (subject to availability)
- Participation with aggregate resources
  - Aggregate Participating Resource (APR)
  - Aggregate Non-Participating Resources (e.g. VER, Load, small hydro, etc.)

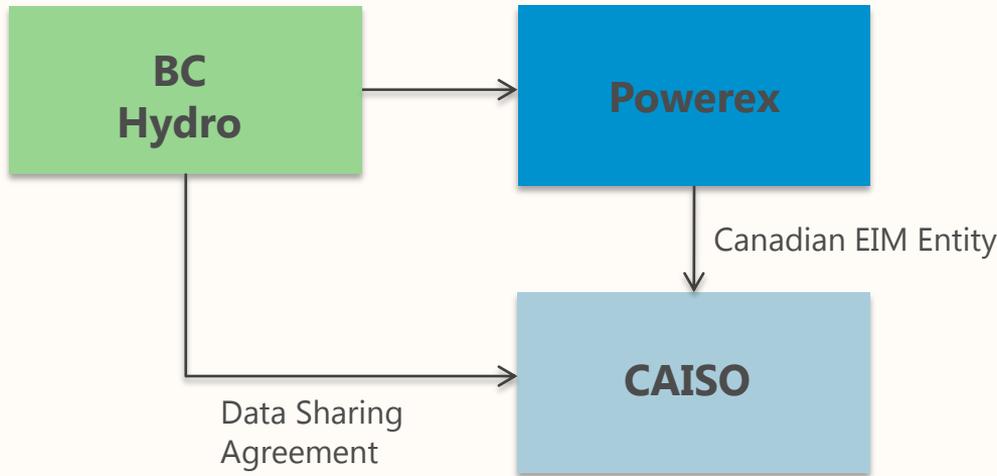


For further information see the presentation dated October 3, 2017  
<http://www.caiso.com/Documents/PowerexPresentation-PowerexEIMImplementationAgreementOverview.pdf>

# Key Implementation Milestones



# EIM Readiness Required Substantial Coordination



## Key Efforts

- ✓ Full Network Model
- ✓ Systems Integration
- ✓ Training
- ✓ Forecasting
- ✓ Balancing
- ✓ Testing
- ✓ Communication

## Coordination

- ✓ Joint efforts with Bonneville Power Administration and Puget Sound Energy on transmission

## Readiness Criteria

- ✓ 34 criteria complete
- ✓ Readiness Certification filed

# Powerex's EIM Implementation Was Highly Accelerated

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## **Key success factors:**

- Extensive experience in CAISO markets
  - Powerex has participated in CAISO's 5-minute markets since 2005
- Many existing processes and systems could be leveraged
  - Settlements systems, dynamic scheduling framework
- Extensive in-house IT development
  - Powerex has a large IT team
  - Most EIM tasks have been automated

***Despite successful progress towards Go-Live, EIM Parallel Operations has confirmed Powerex's concerns with existing CAISO options for Default Energy Bids***

# CAISO's Local Market Power Mitigation processes and DEB Options Are Not Workable for Powerex (1)

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## Powerex EIM Implementation Agreement Section 14, Principle (g):

"Any local market power mitigation framework to be applied will be consistent with the CAISO tariff, will mitigate potential market power concerns during constrained periods to the satisfaction of the DMM and FERC, and **will provide Powerex with sufficient flexibility to reflect the opportunity costs associated with the use of an external multi-facility hydro system with long term multi-year storage capability.**"

## Existing CAISO Default Energy Bid (DEB) tariff options are unworkable for Powerex:

1. Developed for CAISO BAA – a full ISO market
2. Do not reflect Powerex's marginal opportunity costs
3. Are used, under certain conditions, to effectively "over-ride" all of Powerex's purchase bids / offers

## Results in Powerex "forced sales" at uneconomic settlement prices

1. Economic harm to Powerex
2. Inefficient dispatch of Powerex's Participating Resource
3. Discourages Powerex's EIM participation

# CAISO's Local Market Power Mitigation processes and DEB Options Are Not Workable for Powerex (2)

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## Powerex Experience In Parallel Operations:

- Local Market Power Mitigation (LMPM) has been triggered frequently
  - EIM import path to BC often congests in MPM run
- During hours LMPM is triggered:
  - DEB may over-ride all of Powerex's bids and offers
  - LMPM applies for the entire hour
  - Often "flips" Powerex from net purchaser (and importer) to net seller (and exporter)
- Example:
  - Powerex purchase bid at \$20, sale offer at \$30;
  - Powerex becomes seller at \$10

## Near-term solutions available:

- Voluntarily provide transmission only on the path from CAISO to BC, in "higher risk" hours

## Longer-term solution:

- Develop a 4th Default Energy Bid Option
  - Strong support expressed from EIM Entities and other NW hydro utilities
  - CAISO stakeholder process to commence in Q2 2018
- Powerex believes eastern market approaches may be entirely workable, ***as they provide suppliers offer price flexibility, while still achieving competitive outcomes***

***powerex.***

*Supply. Flexibility. Commitment.*

Thank You

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