



## **Item 5.2: Real-Time Co-Optimization Implementation Update**

*Jayapal Parakkuth*

Senior Vice President and Chief Information Officer

Technology and Security Committee Meeting

ERCOT Public

June 23, 2025

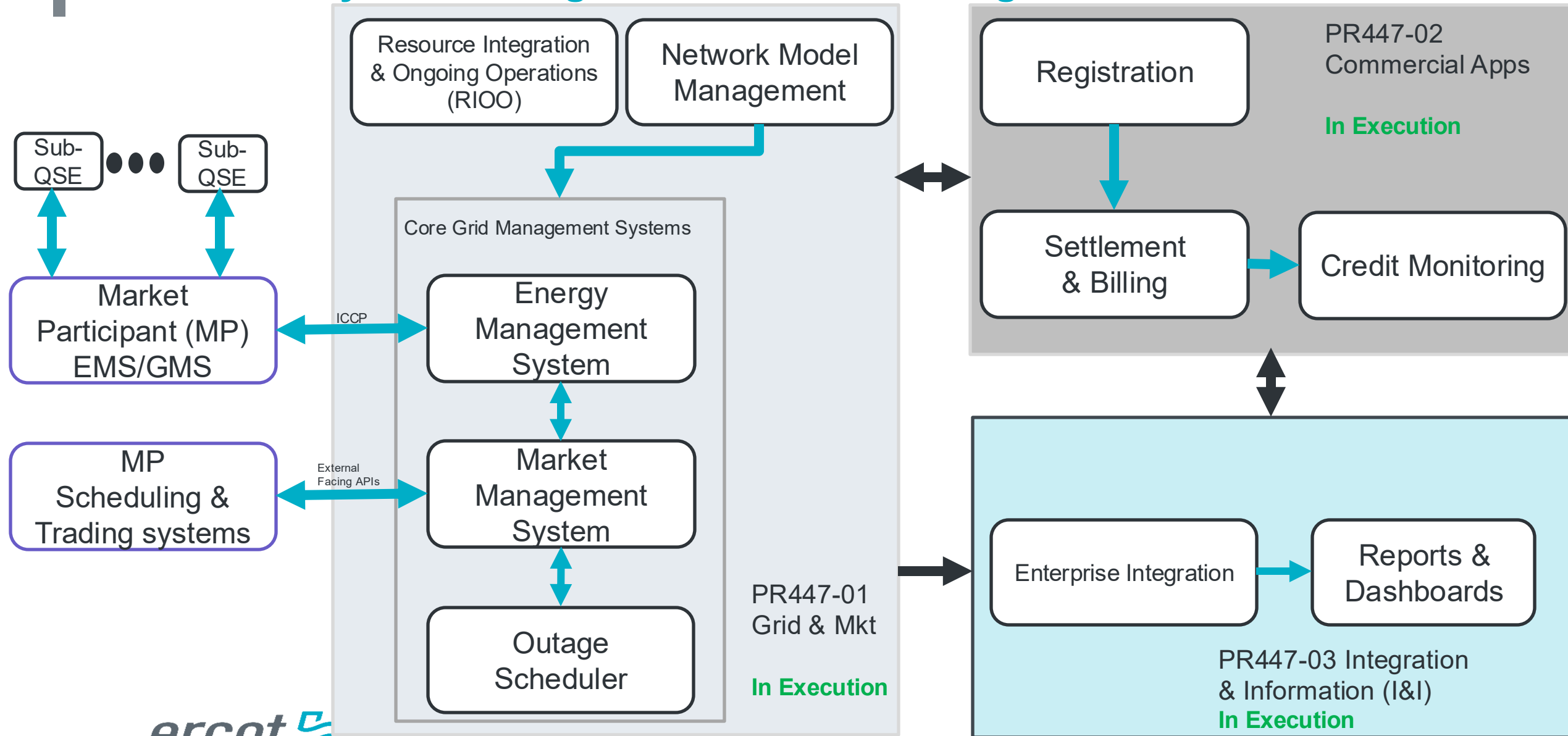
# Overview

- **Purpose**  
Periodic Update on RTC+B project status
- **Voting Items / Requests**  
No action is requested of the ERCOT Board; for discussion only

## Key Takeaways:

- We are continuing to make good progress on RTC+B:
  - Projects are in Execution Phase
  - RTC+B Market Trials system opened to MPs on May 5, 2025
- A planned go-live date of December 5, 2025, has been communicated to the stakeholders

# Overview of System Changes – RTC+B+SOC Program



# RTC+B+SOC Program Structure

Project	IA Budget	G2E Budget	Estimate at Completion (EAC)	Expenditure to Date	Trend	Description
PR447-00 Program Control	\$13.9M	\$5.4M	\$4,819,358	\$7,150,227	●	Includes Hardware, Software
PR447-01 Grid & Markets	\$24.8M	\$20.8M	\$18,769,536	\$10,831,969	●	MMS/EMS/OTS/NMMS/RIOO/PI/OS/Grid-Geo
PR447-02 Commercial Apps	\$5.8M	\$2.3M	\$2,146,349	\$1,454,179	●	S&B/CMM/Registration
PR447-03 Integration & Information (I&I)	\$5.3M	\$6.4M	\$6,222,664	\$3,471,444	●	Middleware, dashboards, reports, data warehouse
<b>Total</b>	<b>\$49.9M</b>	<b>\$34.9M</b>	<b>\$31,957,907</b>	<b>\$22,907,819</b>		

- Total budget may not foot due to rounding
- Expenditure to Date as of end of May 2025

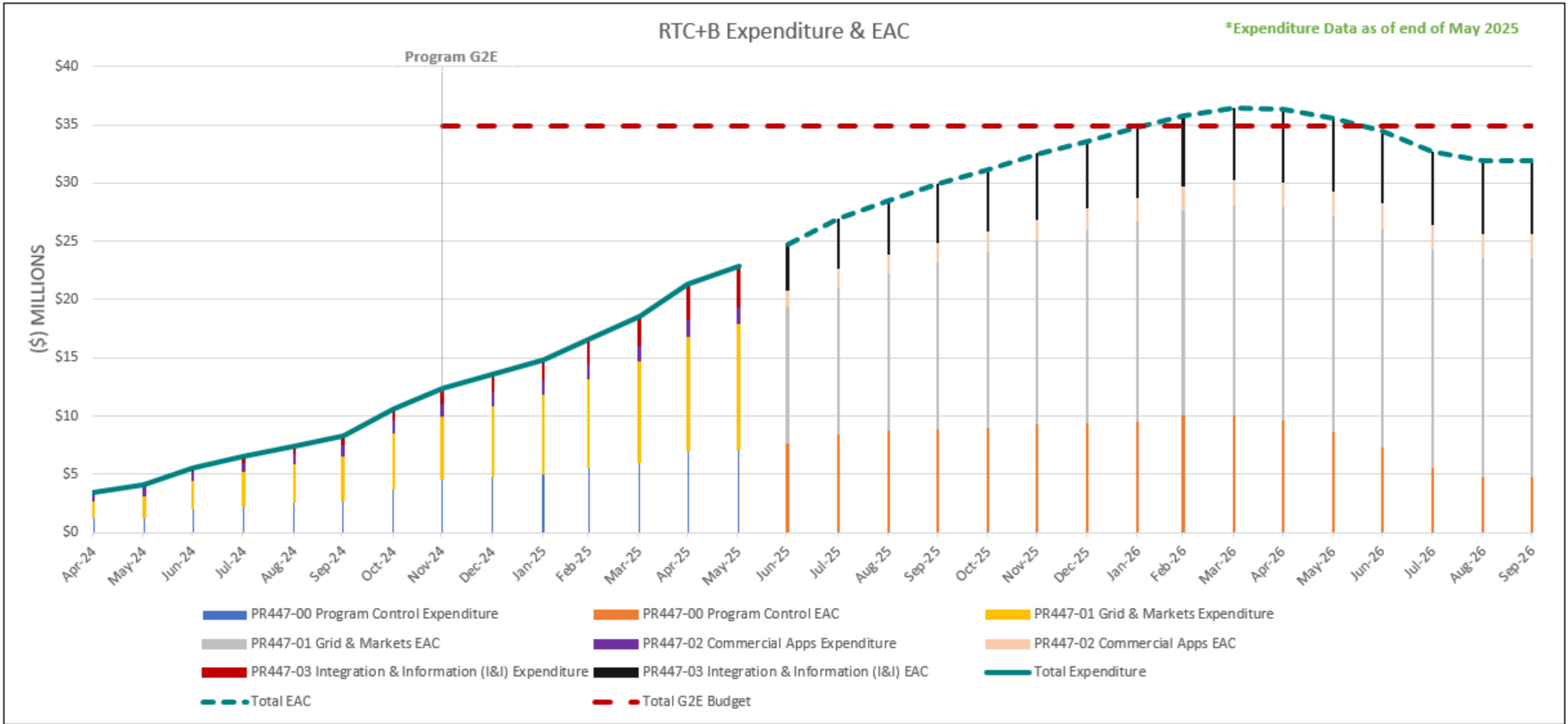
- Not Tracking to Plan
- At Risk
- Tracking to Plan

## Key Takeaways:

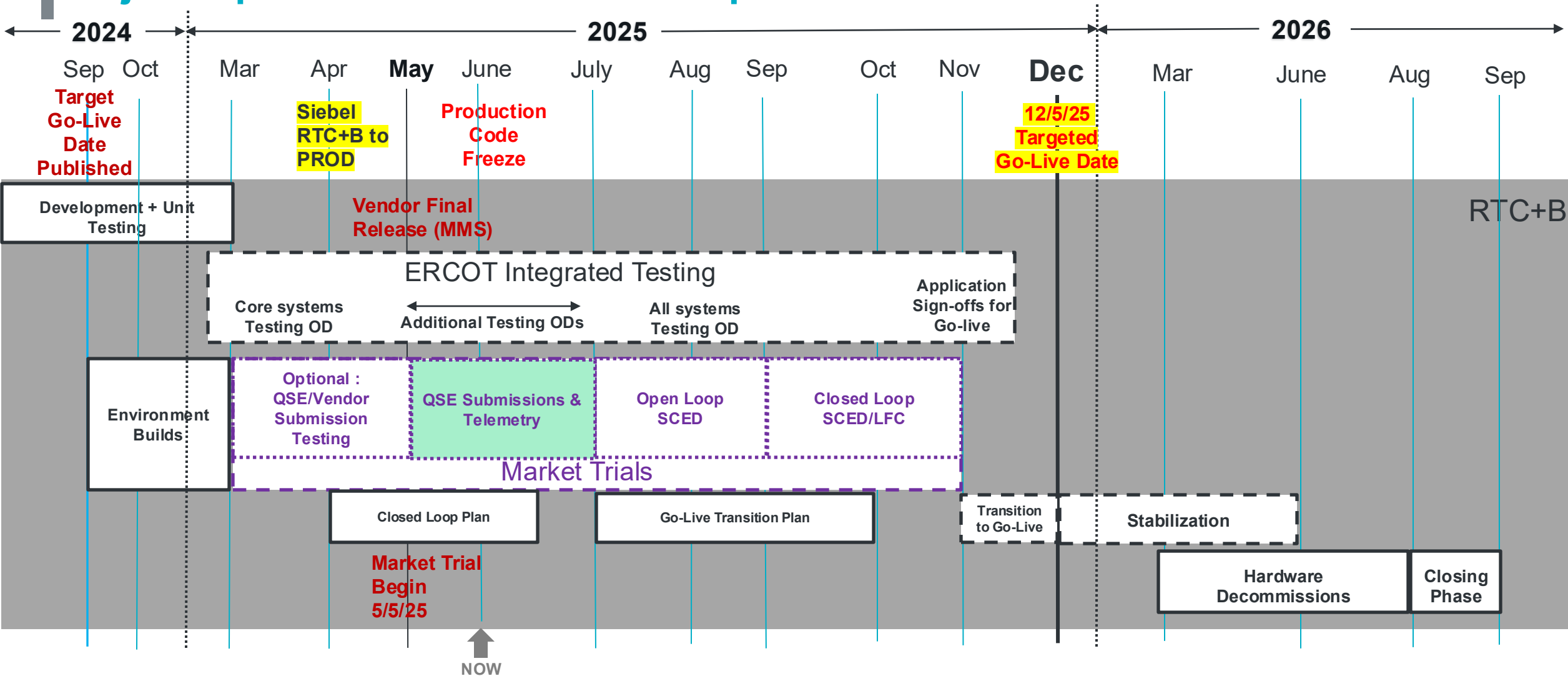
- Centralized Program Control structure with 3 project tracks are all on track
- MMS vendor integrated release delivered (May) – associated saving reflected in EAC.



# RTC+B Overall Expenditure & EAC



# Major Dependencies in our critical path



**Key Takeaways:** RTC+B Market Trials opened to MPs on May 5, 2025. QSE Submissions & Telemetry testing in-progress, weekly meetings and scorecards\* being published.

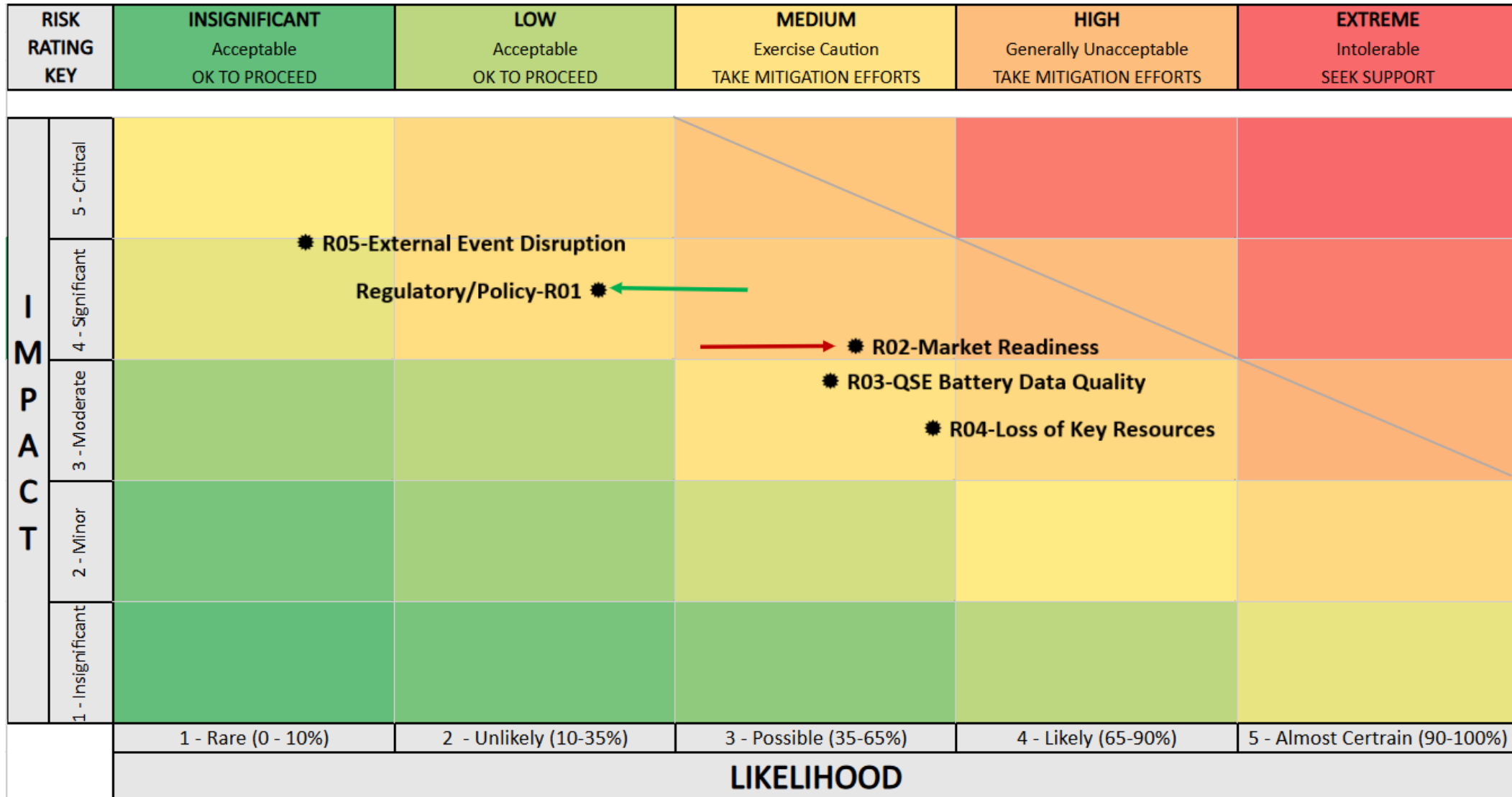


## Major Program Milestones for 2025

Task	Due by	Status
PR447-00 RTC+B ITEST Environment Readiness (Server Builds/Data refreshes)	Jan 31, 2025	Complete
PR447-01 MMS Vendor SCED Delivery	Feb 25, 2025	Complete
PR447-00 RTC+B Market Trials EMS/MMS Server Readiness	Feb 28, 2025	Complete
PR447-02 Commercial Applications ITEST Entry	Mar 03, 2025	Complete
PR447-00 Sandbox Deployment for QSEs/Vendors Market Submissions Testing	Mar 03, 2025	Complete
<b>PR447-00 First ITEST Operating Day (OD) Test for core systems (EMS/MMS/S&amp;B)</b>	<b>Apr 16, 2025</b>	Complete (met stretch goal Mar 28)
PR447-03 Sign-off Reports Needed for Open-Loop Market Trials	Apr 21, 2025	Complete
<b>PR447-00 Open Market Trials for QSE Testing</b>	<b>May 05, 2025</b>	Complete
PR447-01 MMS Vendor Final Release (all applications)	May 13, 2025	Complete
PR447-00 Begin Open-Loop RTC SCED	July 07, 2025	On-Track
PR447-03 Sign-off Reports Needed for Closed-Loop Market Trials	Aug 13, 2025	Upcoming
<b>PR447-00 First ITEST Operating Day (OD) Test for all Systems</b>	<b>Aug 27, 2025</b>	Upcoming
<b>PR447-00 Achieve Successful Closed-Loop Test</b>	<b>Oct 29, 2025</b>	Upcoming
PR447-00 ITEST Application Sign-off	Nov 21, 2025	Upcoming
<b>PR447-00 Go-live with RTC+B</b>	<b>Dec 05, 2025</b>	Upcoming



# RTC+B Program Risk Map



**Key Takeaway:** Identify, quantify, communicate & mitigate RTC+B risks in a timely manner



# RTC+B Program Risks

ID	Risk Title	Risk Description	Mitigation
R01	Regulatory/Policy	Potential of stakeholder legal or regulatory concerns to stop implementation (examples, stakeholder pressure or lawsuits around loss of revenue, AS Demand Curves, or battery state of charge issues)	All know issues being addressed by RTCBTF and report up through every TAC and ERCOT Board meeting in 2025.
R02	Market Readiness	Potential of one or many significant vendors or companies not having their systems ready for go-live.	Early releases of market interface documentation and live systems to IT/vendors, and ERCOT scorecards for each QSE to provide transparency on success rate provided to ERCOT Board.
R03	QSE Battery Data Quality	Market submission data quality of batteries related to Telemetry, COP, and Bid/Offer Curves	Implement additional Model Build Environment and ERCOT scorecards for each QSE to provide transparency on success rate provided to ERCOT Board.
R04	Loss of Key Resources	Retention of highly specialized SMEs. Impact of potential loss of key resources creates a knowledge loss and schedule disruption.	Executive awareness to build depth of defense in Execution schedule (particularly testing).
R05	External Event Disruption	Possibility for disruption due to External event out of ERCOT control.	Monitor out of our control items that may present risk: - Cyber Vulnerabilities, Tech health, Significant Weather Event

# NPRRs in the Implementation Pipeline..

NPRR#	Title	Approval Status/ Next Action	Software Impacts	ERCOT Plan
NPRR1268	RTC – Modification of Ancillary Service Demand Curves	PUCT approved in May 2025	Vendor, ERCOT Internal	<ul style="list-style-type: none"> <li>Design &amp; Development started with TAC Approval in March 2025</li> <li>Vendor delivery &amp; deployment to ERCOT test systems in June 2025, will require performance testing</li> </ul>
NPRR1269	RTC+B Three Parameters Policy Issues	PUCT approved in May 2025	Vendor, ERCOT Internal	<ul style="list-style-type: none"> <li>Design &amp; Development started with TAC Approval in March 2025</li> <li>Vendor delivery &amp; deployment to ERCOT test systems in June 2025.</li> </ul>
NPRR1270	Additional Revisions Required for Implementation of RTC	PUCT approved in May 2025	No impact	No software changes, parameter changes only
NPRR1282	Ancillary Service Duration under Real-Time Co-Optimization	Pending – targeted for June 2025 Board	No impact	No software changes, configuration changes only
NPRR1290	Gap Resolutions and Clarifications for the Implementation of RTC+B	Pending – targeted for September 2025 Board	Vendor TBD, ERCOT Internal	<ul style="list-style-type: none"> <li>Initial Assessment – 4 out of 10 items warrant software changes.</li> <li>System changes are in-flight.</li> </ul>

# Appendix

Links to educational material on the mechanics of RTC, Single Model and State of Charge:

- [RTC Updates to Reliability and Markets Committee - Overview of market design concepts & benefits](#)
- [RTCBTF - Refreshers on RTC Key Principles, Single Model and SOC](#)
- [RTCBTF](#)
- [RTC+B Training Videos](#)

**Links to associated key documents:**

- [RTC Key Principles](#)
- [NPRR1186 Interim SOC - Key Documents](#)
- [NPRR1204 SOC Considerations with RTC - Key Documents](#)

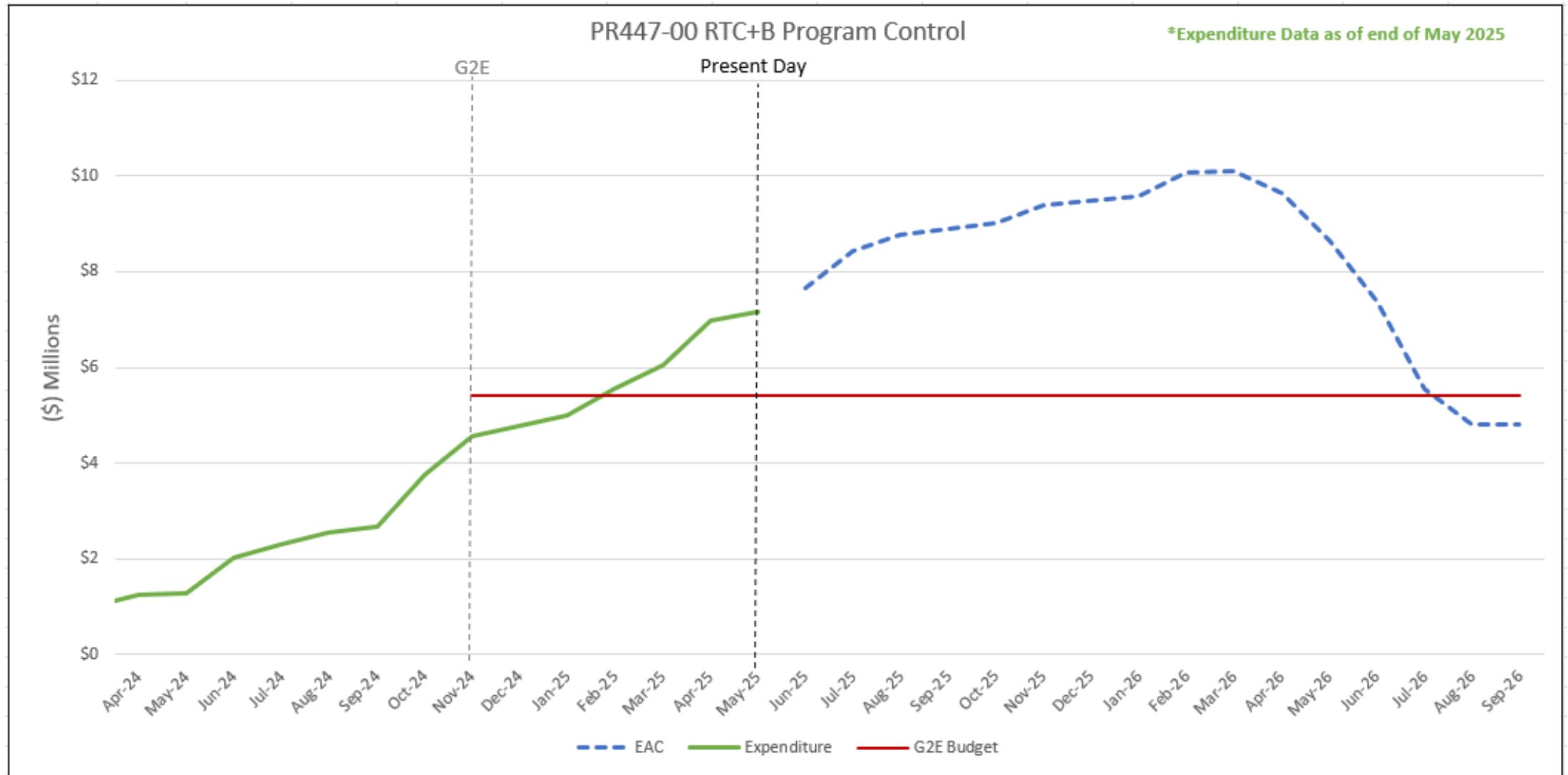
## Acronyms used in this slide deck

CIM	Common Information Modeling
CMM	Credit Monitoring & Management
DSA	Dynamic Stability Analysis
EMS	Energy Management System
GMS	Generation Management System
I&I	Integration and Information
ICCP	Inter control Center Protocol
LFC	Load Frequency Control
MMS	Market Management System
MP	Market Participant
NMMS	Network Model Maintenance System

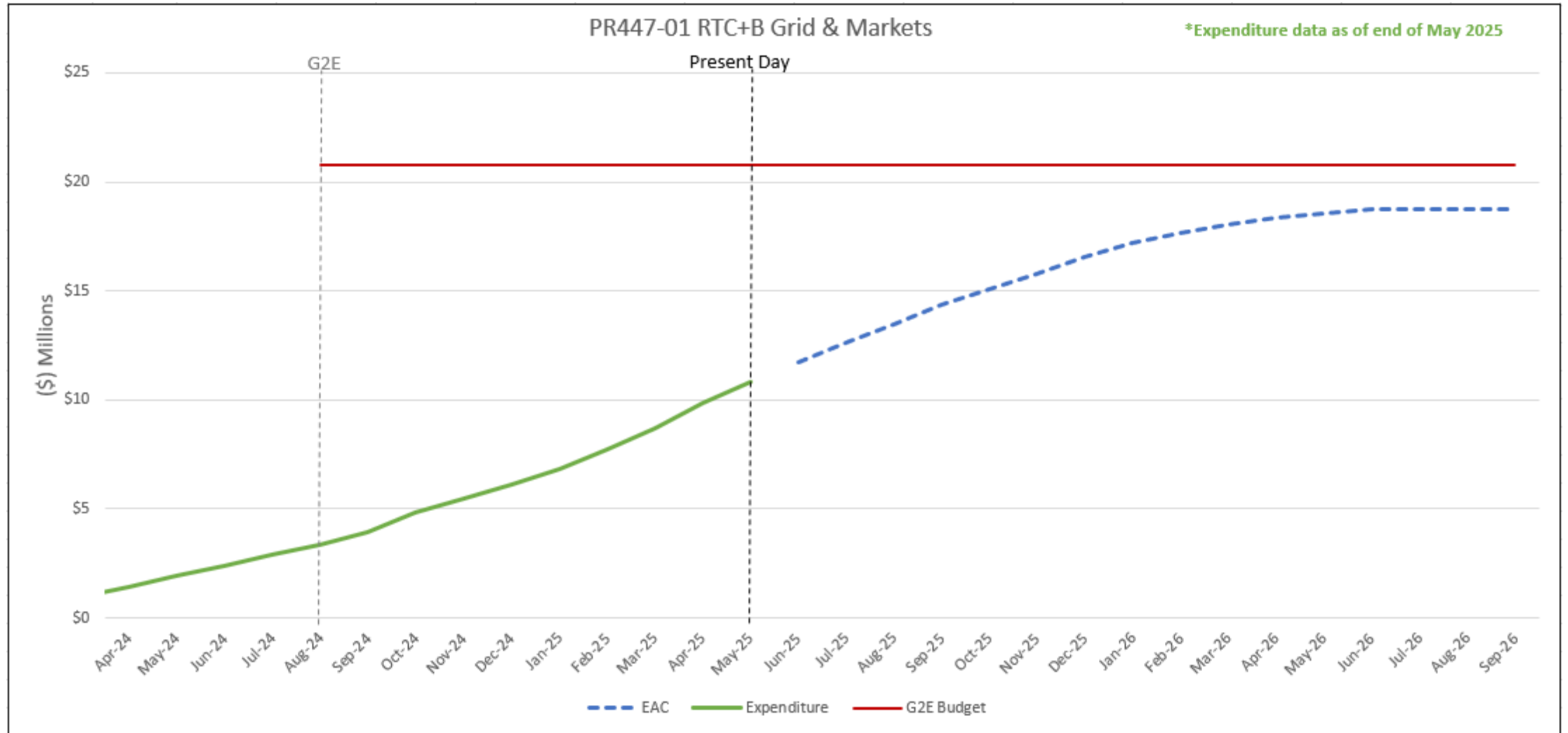
## Acronyms used in this slide deck

OS	Outage Scheduler
OTS	Operator Training Simulator
RIOO	Resource Integration and Ongoing Operations
RLC	Resource Limit Calculator
RTC	Real-Time Co-Optimization
RTCA	Real-Time Contingency Analysis
S&B	Settlements & Billing
SCADA	Supervisory Control and Data Acquisition
SE	State Estimator
SOC	State of Charge
VSA	Voltage Stability Analysis
G2E	Gate to Execution

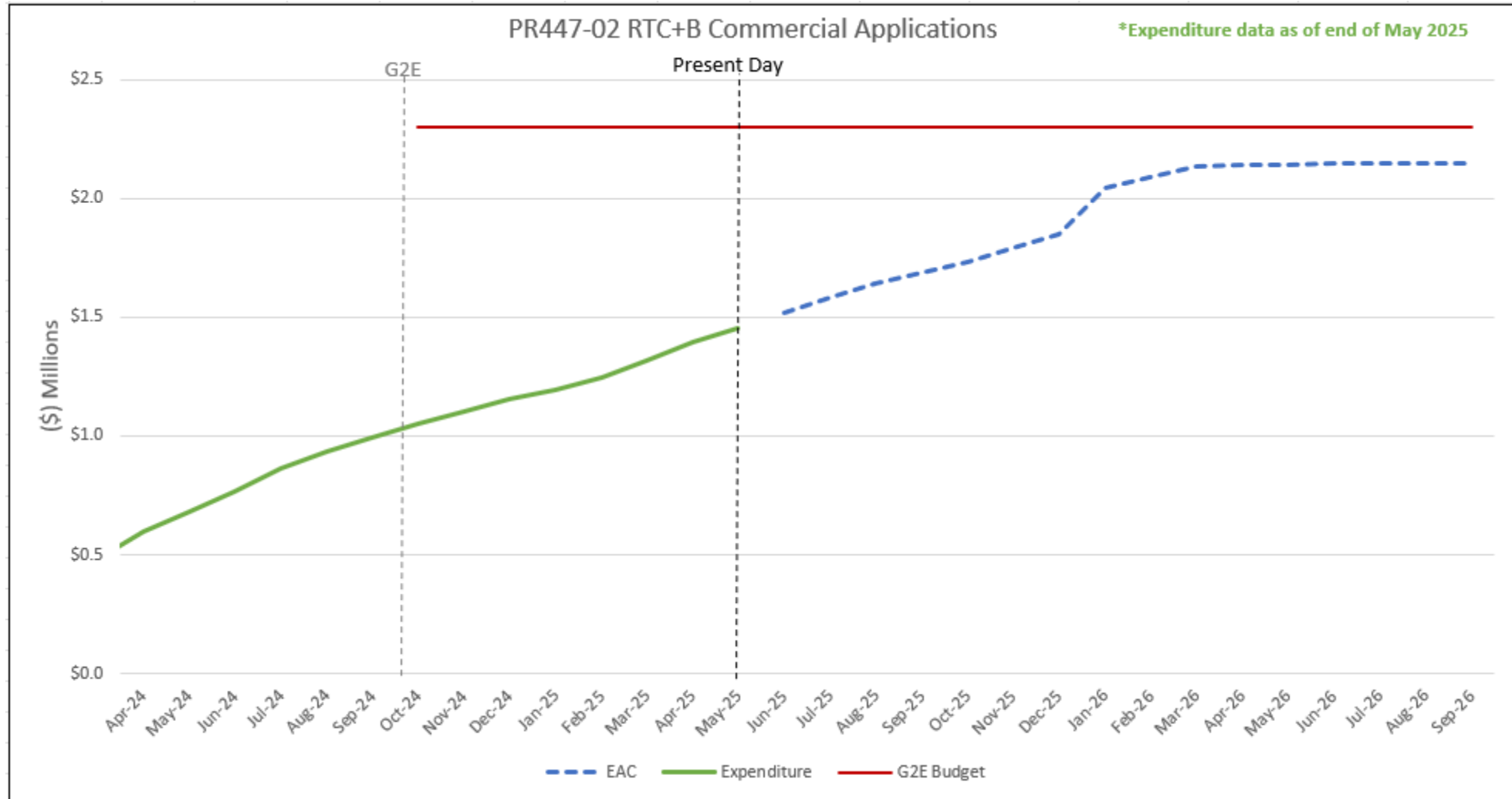
# RTC+B Program Control Expenditure & EAC



# RTC+B Grid & Markets Expenditure & EAC

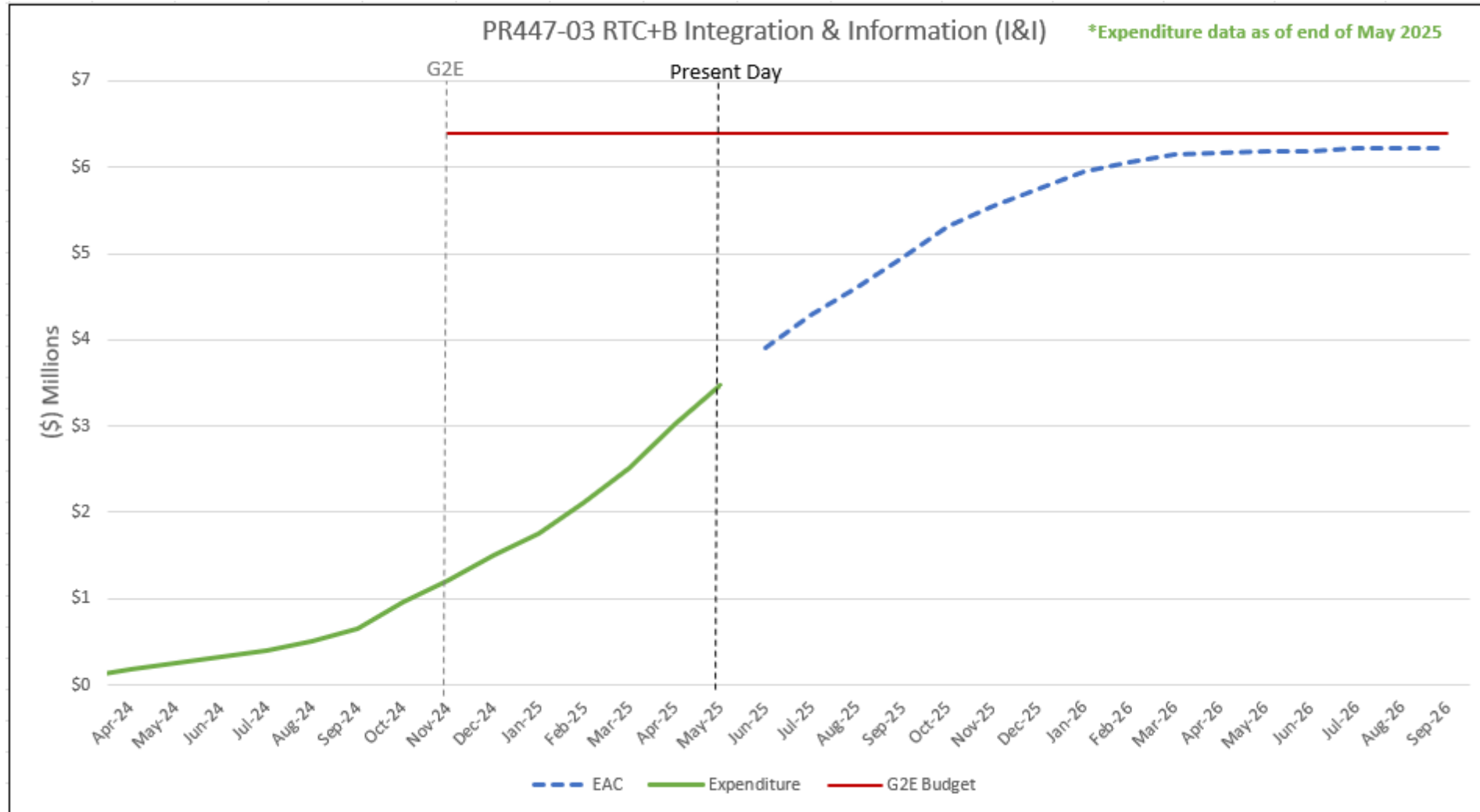


# RTC+B Commercial Applications Expenditure & EAC





# RTC+B Integration & Information (I&I) Expenditure & EAC



# Reasons for Underrun – G2E Budget from Charter

## Labor improvements (\$8.2M)

- Acceleration of schedule from a 6/2026 go-live to 12/2025

  - Designation of RTC as #1 priority project

  - Clarity of scope with RTC+B Task Force

  - Early delivery of FFRA, ECRS, EMS upgrade eliminated dependencies compared to Passport

  - Timely and quality releases from the vendor over time has lowered risks

- Confidence of delivery team with successful delivery of FFRA, ECRS, EMS upgrade

- Being able to retain the team that delivered FFRA/ECRS/EMS upgrade

## Hardware improvements (\$5.5M)

- Migration of hardware platform from expensive to cheaper servers

- Timing the project between Data Center refresh so that we can get full credit for decommissioned servers

## Software improvements (\$3.2M)

- Key License structure renegotiated to unlimited license model so that projects are spared

- Optimization of delivery environment

# RTC+B Program Risk Assessment

- Risks tracked at Program Level and at individual Project level:
  - Internal & External stakeholder forums (RTCBTF, TWG,...)
- Categories of Risk:
  - Budget, Communication, Legal/Regulatory, Organization/Staffing, Quality, Scheduling, Scope, Technological, Vendor.
- Evaluated weekly by Program Leadership:
  - Participants: PMs, Program Director, Tech Leads, Dept Directors
  - Activity:
    - Entry/acceptance of new risks, close-out of expired risks
    - Ownership & Due date assignment for each risk monitoring/mitigation
    - Review/Reassignment of Probability & Impact for each Active risk
    - Exposure = Probability x Impact
- Review of Vendor produced Monthly Risk Assessment report
- High/Medium Exposure risks reviewed Monthly with RTC+B Steering Committee (VPs)
- RTC+B risks reviewed periodically at Executive level in Risk Management Committee as well as ad hoc
- Consolidated into Risk Themes for T&S Committee Updates (Risk Map)

Sample Risk Entry Template

**Title \***

**Owner**

**Assigned To**

**Status**

**Category**

**Due Date**

**Probability \***  %  
Enter 25 (for 0-25%)  
Enter 50 (for 26-50%)  
Enter 75 (for 51-75%)  
Enter 100 (for 76-100%)

**Impact \***   
• 1 - Minimal/minor: no impact on business vision but may increase project costs and timescales  
• 2 - Moderate: may delay achievement of the vision or reduce project benefits  
• 3 - Severe: threatens the achievement of business vision or severely reduces project benefits  
• 4 - Critical: threatens the viability of the business or represents failure of the project

**Cost**   
The cost impact should the risk actually happen

**Description**

[Click for help about adding basic HTML formatting.](#)  
The likely causes and consequences of the risk

**Mitigation Plan**

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The plans to mitigate the risk

**Contingency Plan**

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The fallback plans should the risk occur

**Trigger Description**

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**Trigger** ☒ Date   
☐ Specify your own value:

The condition that triggers the contingency plan

**Date Opened**

**Date Closed**