2027 Long Range Transmission Plan (LRP) Study Scope Introduction

April 29, 2026
Vermont System Planning Committee
Presented By: Marc Allen

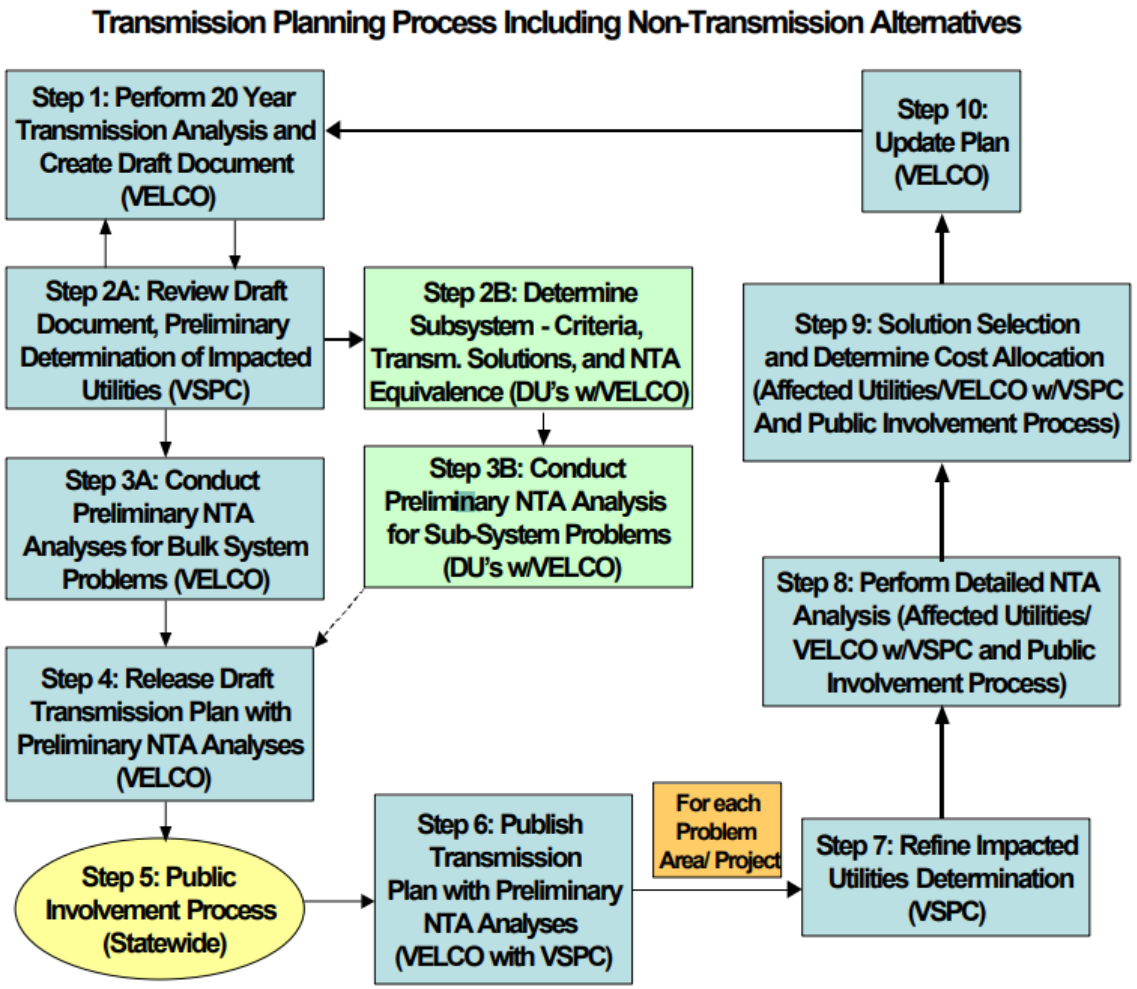
Outline

- 2027 LRP Planning Process
  - Background info
  - Milestones
- 2027 LRP Study Scope Introduction
  - Case Setup & Loads
  - Analysis Scenarios
  - Resource Mix
  - Contingency Requirements
- Next Steps

Background

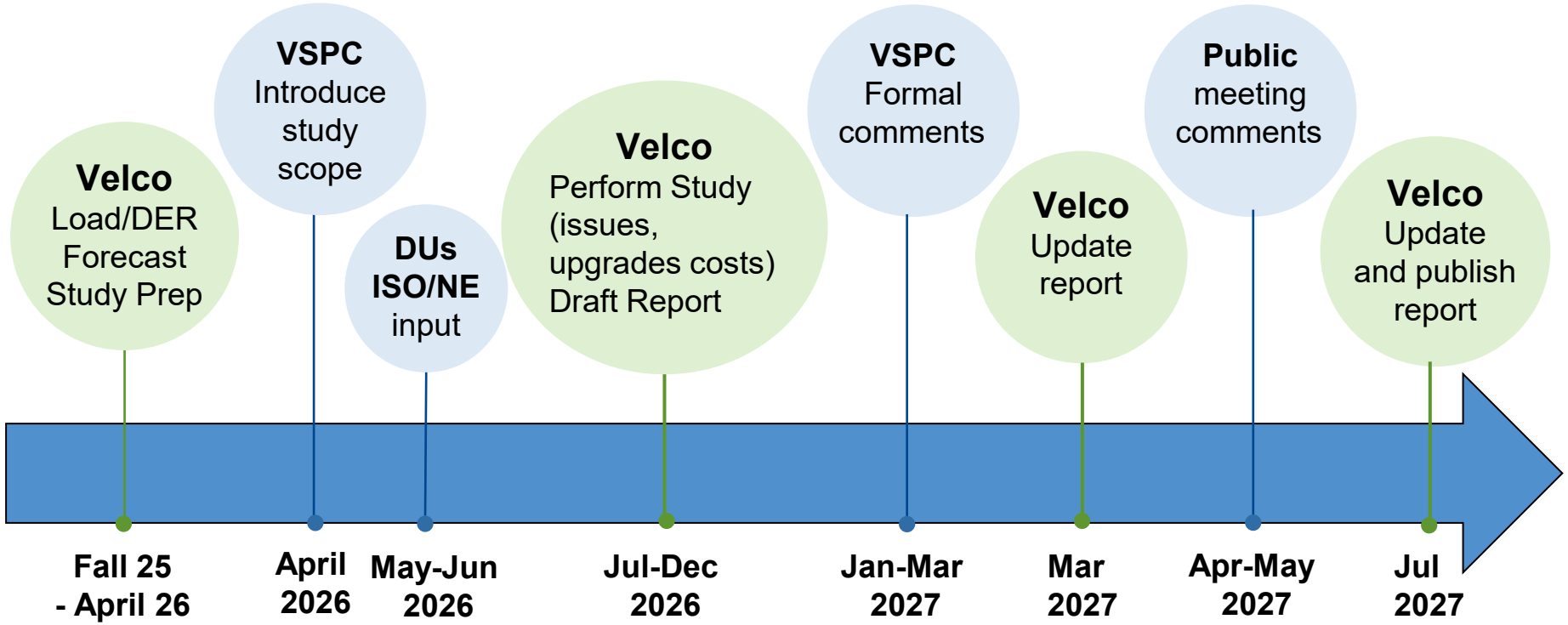
- 2005 Vermont General Assembly Act 61
  - VELCO to prepare a long-range electric transmission plan
    - Range > 10 years
    - Update every 3 years.
    - > 2 Public meetings
    - Coordinate with DUs
- 2006 PUC's Docket 7081 MOU
  - VSPC established
  - Planning process created
- 2007 Docket 7081
  - Study range: 20 years

Background

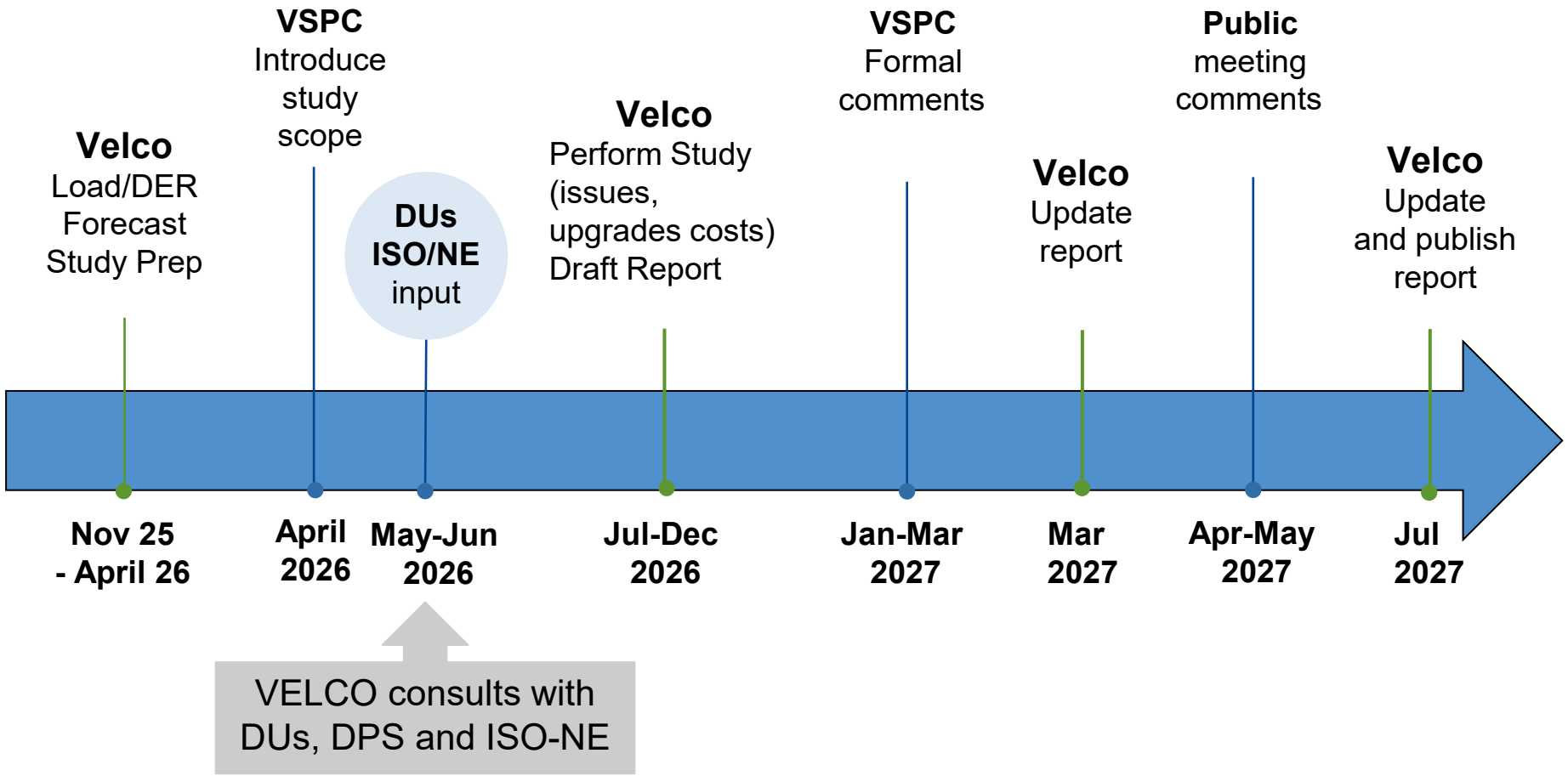


https://puc.vermont.gov/sites/psbnew/files/orders/2007/7081mouwithattachments.pdf

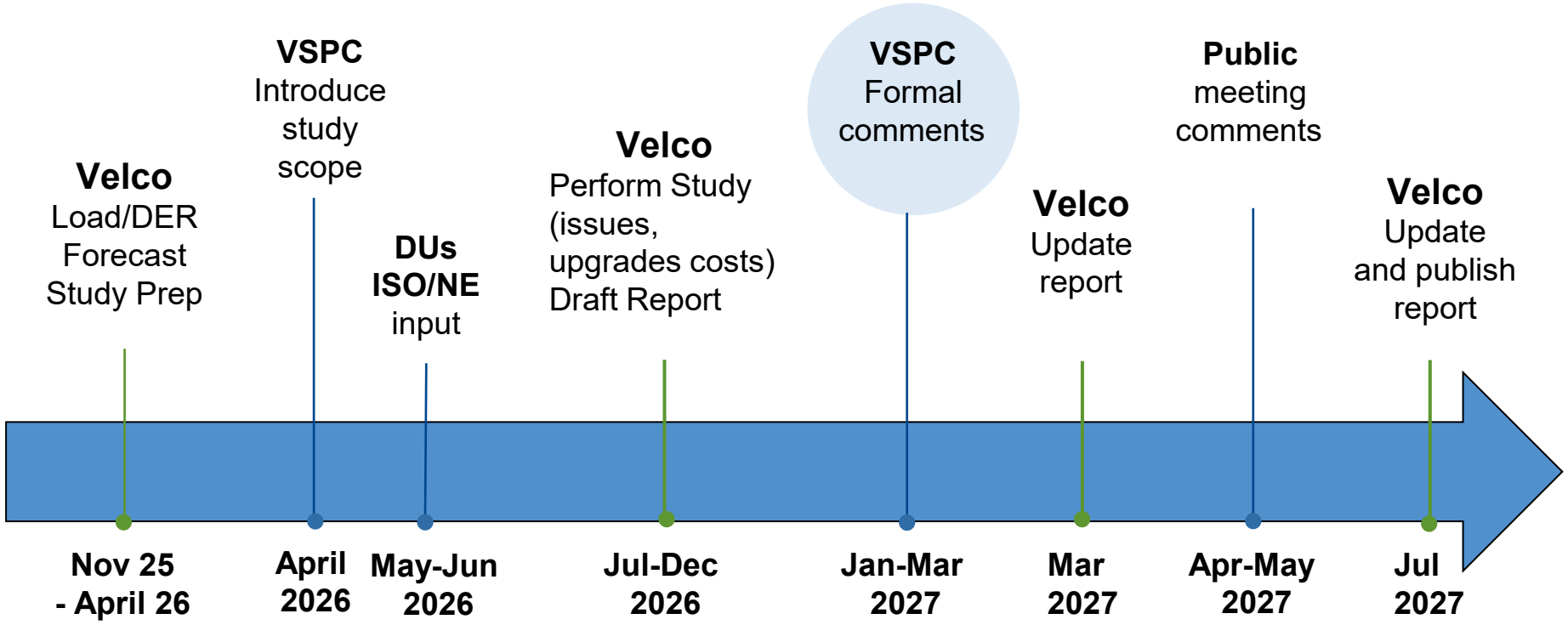
LRP Milestones



LRP Milestones

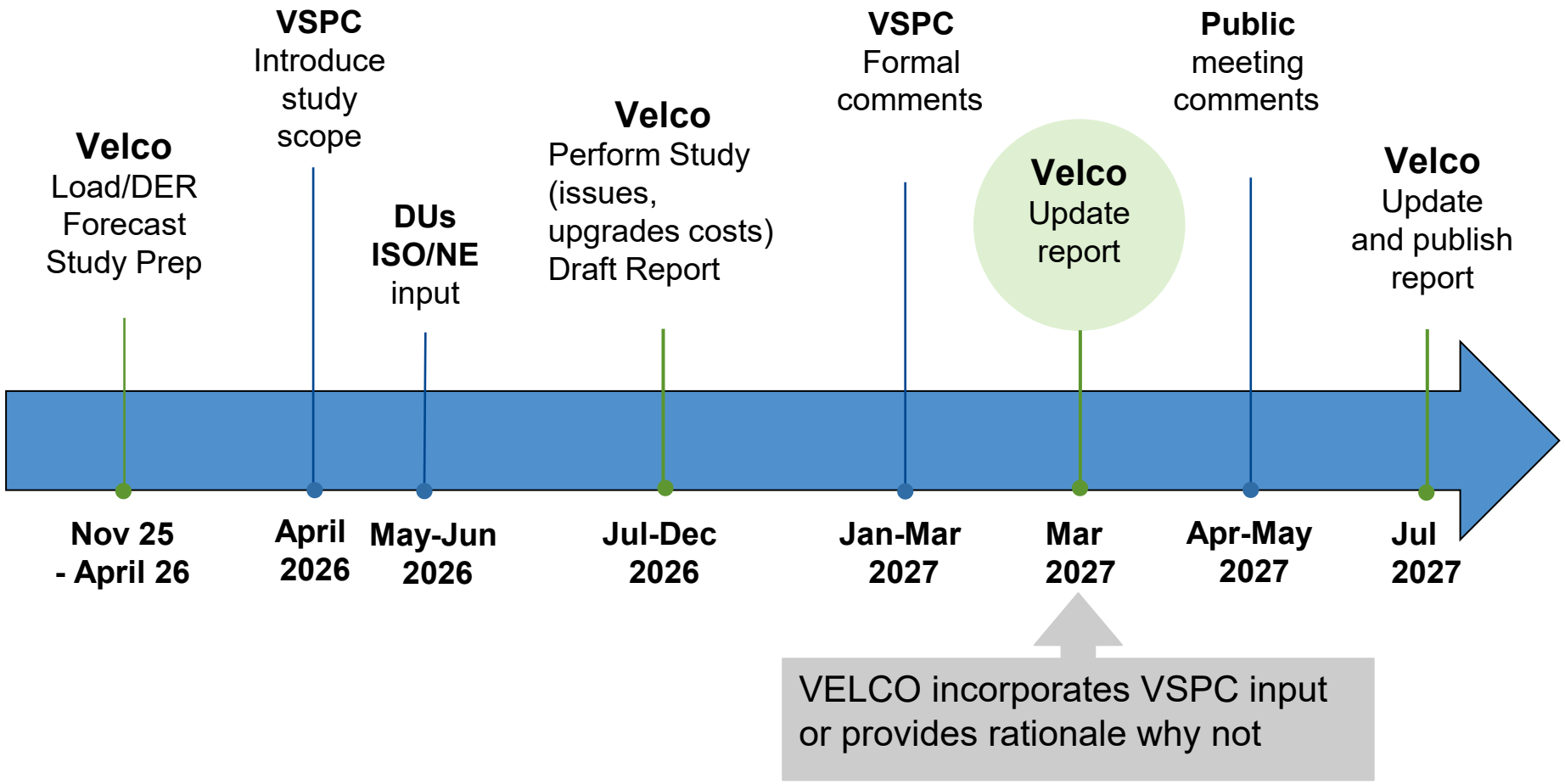


LRP Milestones



- >= 60 day report review period
- Input on content
- Review of system level determinations and NTA screenings
- Formal memo of response to VELCO

LRP Milestones



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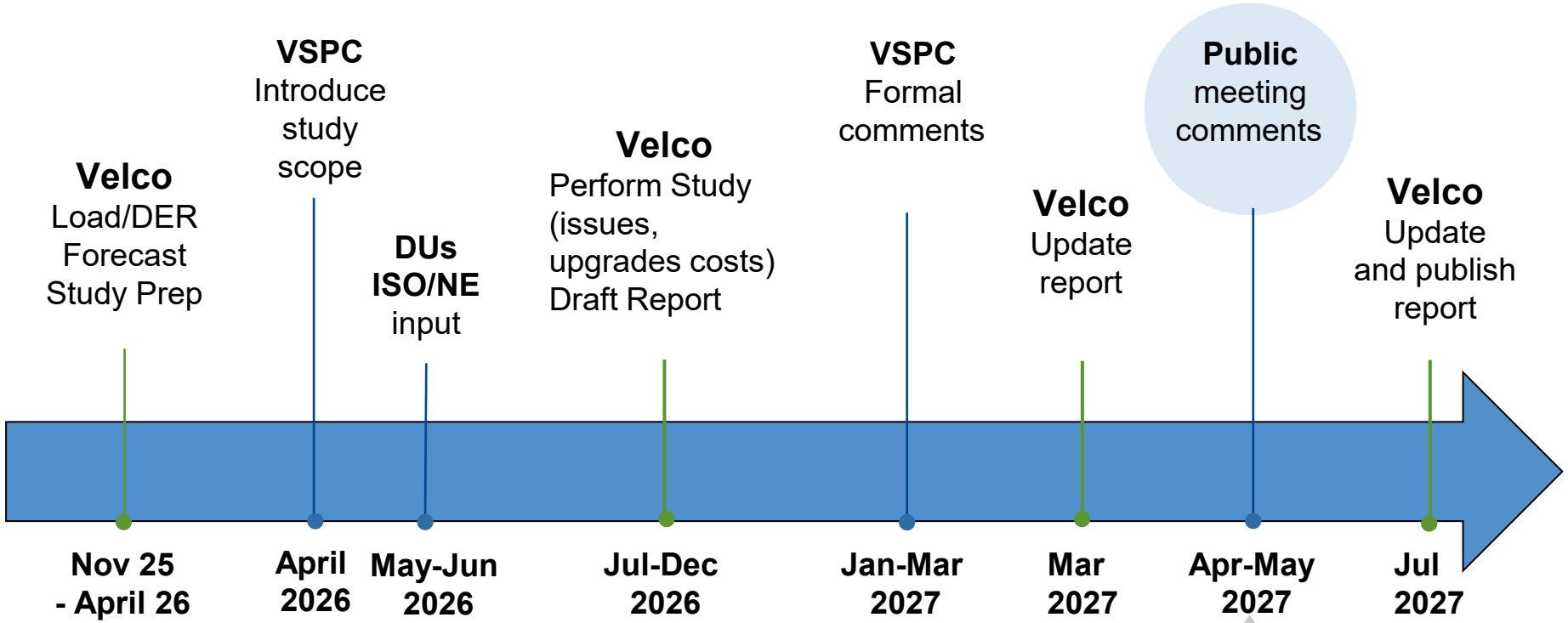
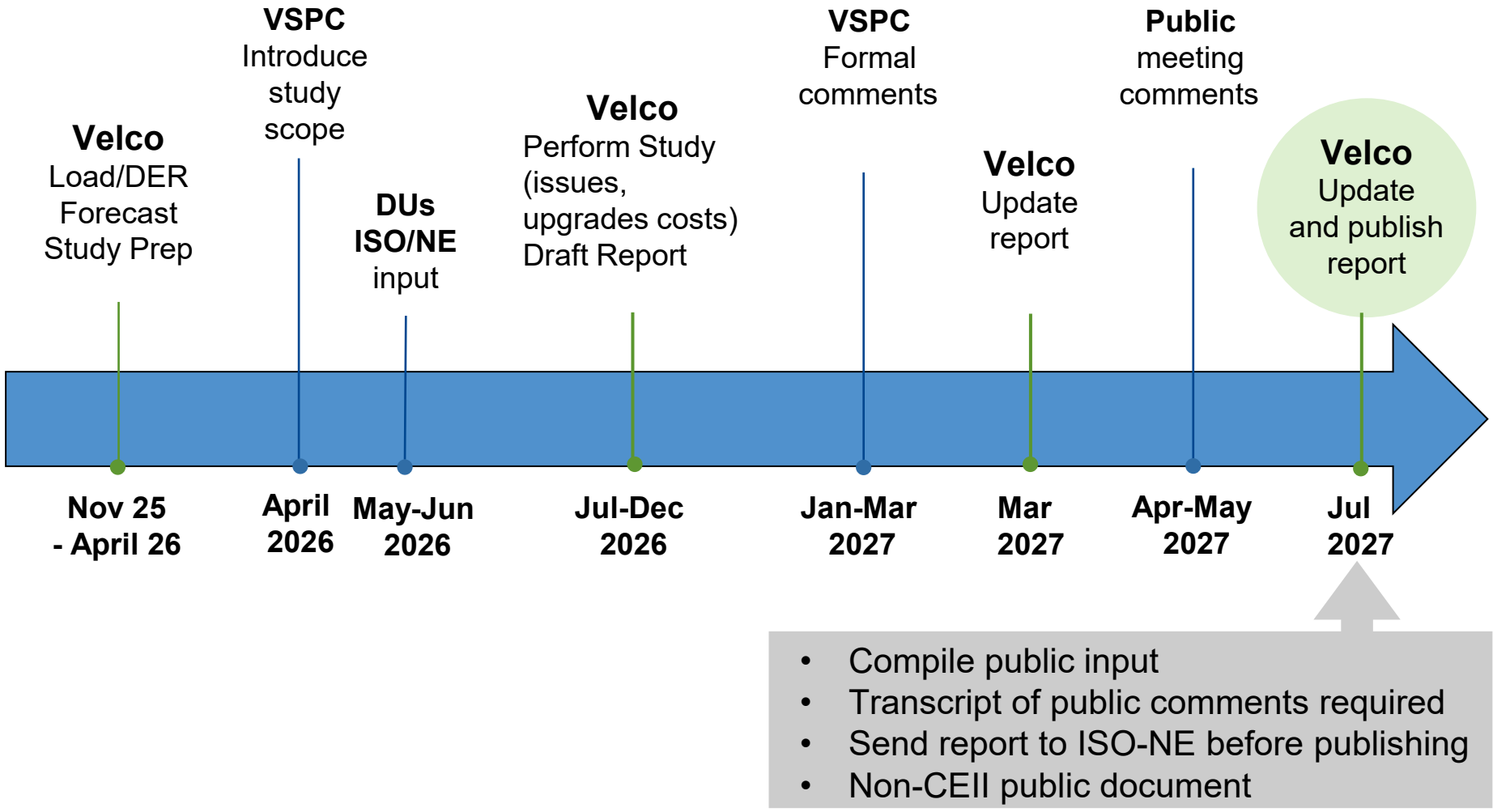


- At least 2 geographically diverse public meeting
- Public hearing in Montpelier
- Presentation to various parties as invited

LRP Milestones



2027 LRP
Study Scope Introduction

Case Setup

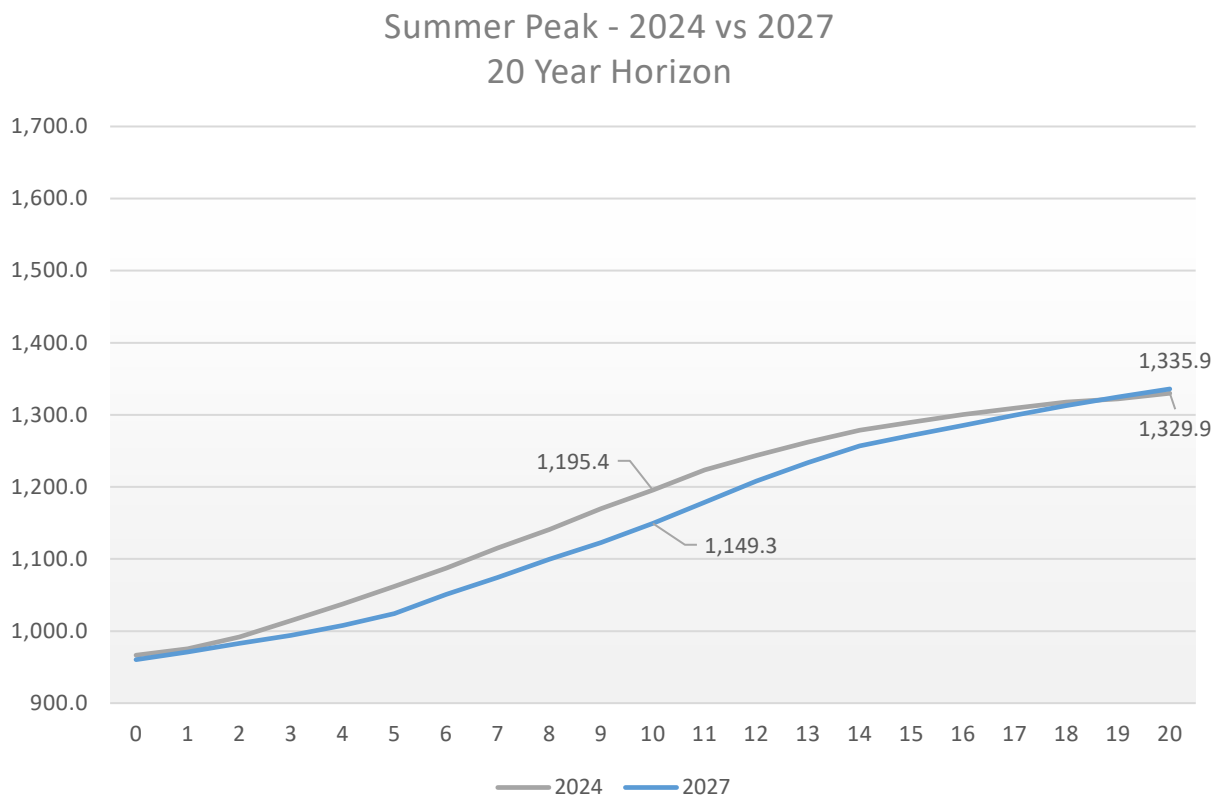
- Study Years
  - 2036 and 2046
    - Summer Peak
    - Winter Peak
    - Daytime Minimum Load – High DER

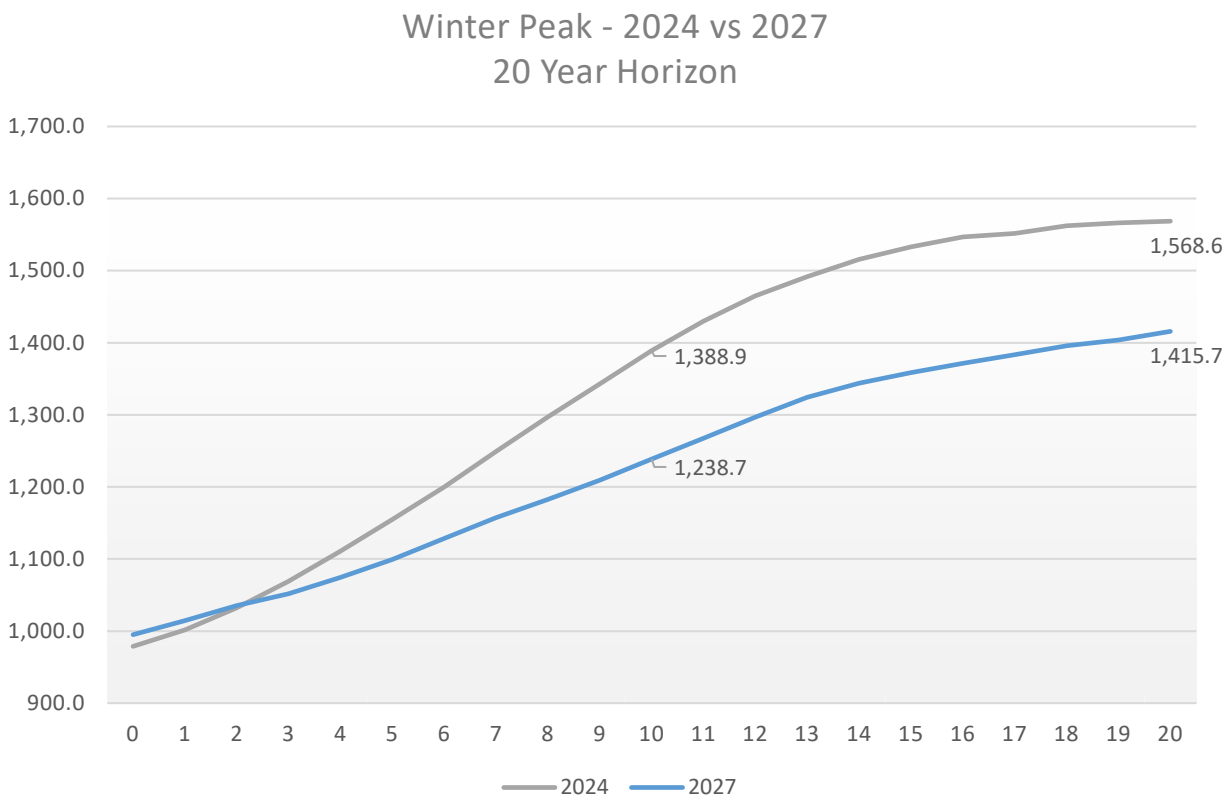
- System Topology
  - ISO-NE identified upgrades included
  - Projects with a Vermont section 248 approval included*

- Interregional System Transfers
  - NY-NE: 0 MW –> PV20 0 MW
  - North-South: Reasonably Stressed
  - West-East: Reasonably Stressed

*Will not include Coolidge TDI project due to lack of progression

Case Setup – Peak Loads





DER Assumptions

- DER modeling (DTM – High DER scenario)
  - 600 – 1300MW, 100 MW increments (20% PUC Renewable Energy Standard, Tier II)
- Remove Solar PV Optimization analysis
  - Discuss the results we have identified from previous iterations of the plan
- Energy Storage
  - Not modeled in base scenarios (reserved for frequency/duration analysis)

Analysis Scenarios

- Reliability analysis utilizing projected load growth for the following scenarios:
  - Peak Loads – Summer, Winter
  - Daytime Minimum Load – High DER
    - Hold Gross load at this scenario constant - ~600 MW VT load
    - Incremental solar PV penetration utilizing today's distribution of DER
      - 600MW – 1300 MW

- Highgate Converter Contribution
  - 0 MW and 225 MW

Scenarios Matrix	Summer Peak	Winter Peak	Daytime Minimum Load
Load Forecast Scenario	Medium	Medium	600 MW Gross Load
Highgate (MW)	0 / 225	0 / 225	0 / 225
PV20 Imports (MW)	0	0	70

- Frequency/Duration Analysis on Constraints

Resource Mix

Resource	Summer Peak	Winter Peak	Daytime Min
Sandbar PST (MW) Blissville PST (MW)	0 0	0 0	70 0
Highgate HVDC (MW)	0 / 225	0 / 225	0 / 225
Wind	5%	25%	65%
Hydro	10%	50%	90%
Solar	0%	0%	100%*
BESS**	0%	0%	0%
Thermal Gens	***	***	***

* Incremental 600 MW – 1300 MW
** Not modeled (reserved for frequency/duration analysis)
*** Use ISO-NE Generation Outage Assumptions – Specific Units TBD. Incorporate Feedback on utility resource plans as needed

Contingency Requirements

- NERC - planning standard TPL-001-5.1
  - Category P0 (No outages – (N-0))
  - Category P1 (Outage of one element such as line, trsf, gen (N-1))
  - Categories P2 to P7 (Outage of two or more elements (N-1))
  - Categories P3/P6 (Two consecutive contingencies (N-1-1))
- ISO-NE - Planning Procedure No.3
- NPCC - Directory 1
- DU line outage (N-1) – Not required for regional planning
  - Entire line, breaker to breaker
  - Line end open
  - Radial lines
  - Pick up radial line, close N.O. switch

NERC = North American Electric Reliability Council
ISO-NE = Independent System Operator of the New England electric system
90/10 = 90% chance that the actual load will be at or lower than the forecast, 10% chance that it will exceed the forecast

Contingency Definitions

General Category	NERC TPL-001 Category*	Event Descriptions
N-0	NERC P0	All Lines in – No event
N-1	NERC P1 NERC P2 NERC P7	Gen, Line, XFMR, Shunt, Single Pole of a DC Line No Fault Sectioning, Bus Fault, Breaker Failure Lines sharing Common Structure**, Bipolar DC line
N-1-1	NERC P3, P6	Loss of a P1 element followed by another P1 element

*Applies to BES facilities
** Excludes circuits that share a common structure for 1 mile or less.

Next Steps

- Follow-up email request to distribution utilities

All feedback should be submitted to:

planning@velco.com