7 Action Plan

Action Plan Summary

This section of the IRP contains VEC's future actions and decision-making framework for its power supply portfolio, T&D improvements, and capital investments. VEC's action plan looks out to 2030. Our evolving world will need us to stay nimble, proactive and reactive. We plan to the best of our ability then respond and shift strategies and priorities appropriately.

7.1

We focus our action plan based on the five strategic plans themes we discussed in the introduction of this IRP:

Lead With People

Key challenges:

1. How does VEC sustain excellence in its safety program?
2. How does VEC sustain strong cybersecurity practices with limited resources?
7.2 3. As the grid continues to become more complex, how does VEC innovate without impacting rates?
4. As regulatory demands grow, how can VEC navigate evolving NERC/FERC requirements effectively?

Strategy	Action Plan
Focus Thought Partnership Projects on biggest challenges	• Focus innovation strategy and partnerships on increasing affordability and reliability • Expand strategic partnerships with rural cooperatives and participation with national organizations
Keep our staff and our members safe	• Continue collaborative, global improvements to VEC's safety program • Ensure compliance with standards
Prioritize cybersecurity efforts	• Dedicate resources to threat detection and management • Ensure adherence to internal goals and national compliance • Adhere to industry wide best practices and companywide training
Ensure compliance with expanding requirements	• Monitor NERC/FERC compliance demands as they rise for distribution operators. • Advocate with regulators for appropriate requirements, reducing where reasonable and feasible while expanding in other areas.

Table 77.8.1.A Summary of VEC action plan for Lead with People

7.3

Orchestrate Distributed Renewable Energy

Key challenges:

1. How does VEC affordably procure renewable resources to meet the Carbon-Free, Tier I, Tier II and Tier IV RES goals?
2. What is the least cost strategy to the increased power quality issues due to distributed generation?

Strategy	Action Plan
100% Carbon Free – 2026-2029	• Pursue extension of the current Howard Wind contract if reasonable prices can be obtained • Investigate converting the remaining 10 MW of Sheffield contract that is a discount to LMP to a fixed price that includes RECs • Investigate long-term PPA for On-Shore Wind project PPA beginning in 2027 • Investigate long-term PPA for existing hydro energy and RECs (anything longer than 10 years will require a CPG) • Monitor the spread between VT Tier I and MA Class I RECs and take advantage of REC arbitrage when appropriate • Investigate receiving RECs for energy deliveries from HQ to VEC to serve VEC's Block load when it is connected to HQ

	• Work with HQ to develop a bi-directional energy pilot through which VEC and HQ can serve each other energy at different times and use resources on both sides of the border to serve both utilities • Consider acquiring nuclear energy environmental attributes to meet a portion of the carbon-free shortfall • Evaluate and extend existing wind and hydro contracts, including securing more renewable energy and RECs, and consider new long-term PPAs starting in 2027. • Explore extensions and new agreements for wind and hydro PPAs, including converting Sheffield and Howard Wind contracts to secure more renewable energy and RECs. • Monitor REC markets for arbitrage opportunities and investigate acquiring RECs for energy from HQ to enhance carbon-free efforts.
Tier I and 100% renewable by 2030	• The above actions will positively impact Tier 1 and 100% renewable by 2030: ○ Monitoring REC markets and REC spreads for beneficial arbitrage ○ Consider extending Howard Wind PPA ○ Investigate converting 10MW of Sheffield to include REC's ○ Explore long-term PPAs for on-shore wind and existing hydro ○ Investigate receiving REC's for HQ block load deliveries ○ Work with HQ to develop bi-directional energy pilot • Participate in Request for Proposals for On-Shore Wind being issued by the Maine Public Utilities Commission for on-line date of mid-2030s • Participate in discussions to extend up to 20 MW PPA with Sheffield Wind if it repowers its facility • Investigating trading nuclear energy and environmental attributes for renewable energy and environmental attributes
Tier II	• Consider and analyze entering into Solar PPAs immediately to guard against the impact to solar costs as a result of legislation passed by the United States Congress. This will require the analysis of VEC being even more excess Tier II RECs in 2027-2029 to reduce the PPA cost of the entire term of a 25-year solar PPA versus delaying the entering a solar PPA until it is needed, but possibly at a significantly higher PPA rate • Consider banking excess Tier II RECs in 2027-2029 to reduce the amount of new Tier II resources in 2030+. The decision to Bank excess RECs would have to consider the trade-off between delaying the purchase of new resources and increasing the net cost to members prior to 2030 by not selling excess RECs • Consider using Market Purchases and either purchasing Tier II RECs from other VT utilities that are excess or paying the ACP rate in order to avoid overloading the Vermont distribution system with more generation than load in some hours of the summer • Analyze the impact of excess generation on the VEC system due to solar on VEC's settlement with ISO-NE as well as the stability of the VEC and VELCO systems • Investigate the potential for other Tier II resource technologies versus the cost of solar
Tier IV	• Many of the above actions also provide Tier IV resources including: ○ Investigating Howard Wind contract extension ○ Converting 10MW of Sheffield contract to include REC's and consider extending Sheffield 20 MW if it repowers ○ Exploring long-term on-shore wind PPA beginning in 2027 ○ Participate in on-shore wind RFP with Maine PUC ○ Investigate long-term PPA for existing hydro energy and REC's

Enable distributed Generation	• Enhance the interconnection process through continued data transparency and pursue more granular hosting capacity mapping tools. • Continue to explore non-wires alternatives for generation related power quality issues such as Volt/VAR controls.

Table 7.8.1.A Summary of VEC action plan for Orchestrated Distributed Renewable Energy

Engage Members

Key challenges:

7.4

1. Without cost-shifting, how do we consider energy burden and the disproportionate impact of energy costs of a large percentage of our members?
2. How does VEC ensure that electrification incentives are reaching those most in need as well as those who can afford electrification investments?
3. With over $95 million in required infrastructure investment needed to support electrification in the coming decades, how does VEC leverage DER management to reduce or defer investments?
4. What can be done to increase the likelihood that VEC is able to leverage DER resources to reduce the monthly RNS peak when the peak is increasingly hard to predict?

Strategy	Action Plan
Focus on energy equity	• Leverage federal and state grant opportunities to support income qualified members
Support beneficial electrification through incentives and programs	• Consider opportunities for programs or incentives to take into consideration income levels or areas with high energy burdens
Expand and optimize VEC Virtual Power Plant	• Expand assets under management through grant funding or additional DER devices such as heat pumps • Focus on peak forecasting challenges and develop new strategies to increase likelihood of hitting peaks
Reduce or defer infrastructure investment needed for electrification	• Complete “support your local grid” pilot • Continue to explore near real time power flow options to increase use case of grid aware DER management to primary line and substations • Partner with VELCO to reduce transmission impacts identified in the VELCO Long Range Plan

7.5

Table 7.8.1.A Summary of VEC action plan for Engage Members

Pursue Operations Reliability

Key challenges:

1. What technology and processes can be utilized to proactively prevent and detect outages?
2. As outages increase due to major events, how can VEC effectively prioritize investments to enhance resilience?
3. What resilience solutions are appropriate to VEC's investment capabilities?

4. With the rise in major events, how can VEC improve event readiness and response?

Strategy	Action Plan
Proactively prevent and detect outages	• Complete Asset Inspection Program and first cycle of Infrastructure Maintenance Cycle. • Maintain 10-year vegetation management cycle. • Complete AMI upgrade by 2030.
Advance event readiness and response	• Invest in technologies that improve communication, minimize contract crew dispatch time, and reduce administrative workload. • Implement an Enterprise Storm Management software application to assist driving maximum efficiency and minimal outage times • Continue to train (tabletop exercises) personnel on the Incident Command System to ensure efficiencies when managing outages
Prioritize resilience in investments	• Leverage technology to more accurately forecast future climate impacts • Enhance the T&D prioritization framework to optimize benefits and enhance the objectivity of capital investments.
Explore and implement resilience solutions	• Invest in strategic line relocations and undergrounding solutions • Use steel poles in areas most often impacted by major storms to ruggedize system • Utilize close-arm construction (Hendrix), covered wire, and other robust construction options • Continue to replace small wire and reconductor

Table 7.5.A Summary of VEC action plan for pursue operations reliability

7.6 Maintain Financial Strength

Key challenges:

1. How can VEC keep rates affordable despite rising external pressures such as transmission costs, interest rates and property taxes?
2. As rate design becomes increasingly crucial in preserving affordability, how can VEC better analyze current rate structures and identify potential to better align rates with costs as well as encourage cost-reducing behavior?
3. How can VEC best focus its efforts to maximize benefits amidst uncertain federal grant opportunities

Strategy	Action Plan
Keep rates affordable	• Consistently achieve financial goals to maintain stability and keep borrowing rates low • Obtain least-cost power supply contracts that provide long-term stability • Leverage load management tools to reduce exposure to increasing transmission expenses
Evolve rates with costs and encourage behavior that	• Complete cost of service study • Leverage cost of service study results to explore alternative rate structures

reduces costs	
Pursue grants	• Continue to pursue FEMA Hazard Mitigation funding • Focus federal and state grant efforts on infrastructure improvement to support reliability and electrification • Leverage research partnerships to understand the impacts of generation and electrification on the distribution grid

Table 7.8.1.A Summary of VEC action plan for maintain financial strength

Memorandum of Understanding (MOU)

7.7 VEC has provided a guide as to where items stipulated in a Memorandum of Understanding (MOU issued February 9, 2023, in Case No. 22-2764-PET) are in VEC's 2025 IRP filing. This guide is in the Appendix.

Capital Investment Overview

7.8 As part of the approval process of VEC's most recently filed IRP in 2022, VEC agreed to address several specific topics in the 2025 IRP as stipulated in a Memorandum of Understanding (MOU) Capital Investment Overview

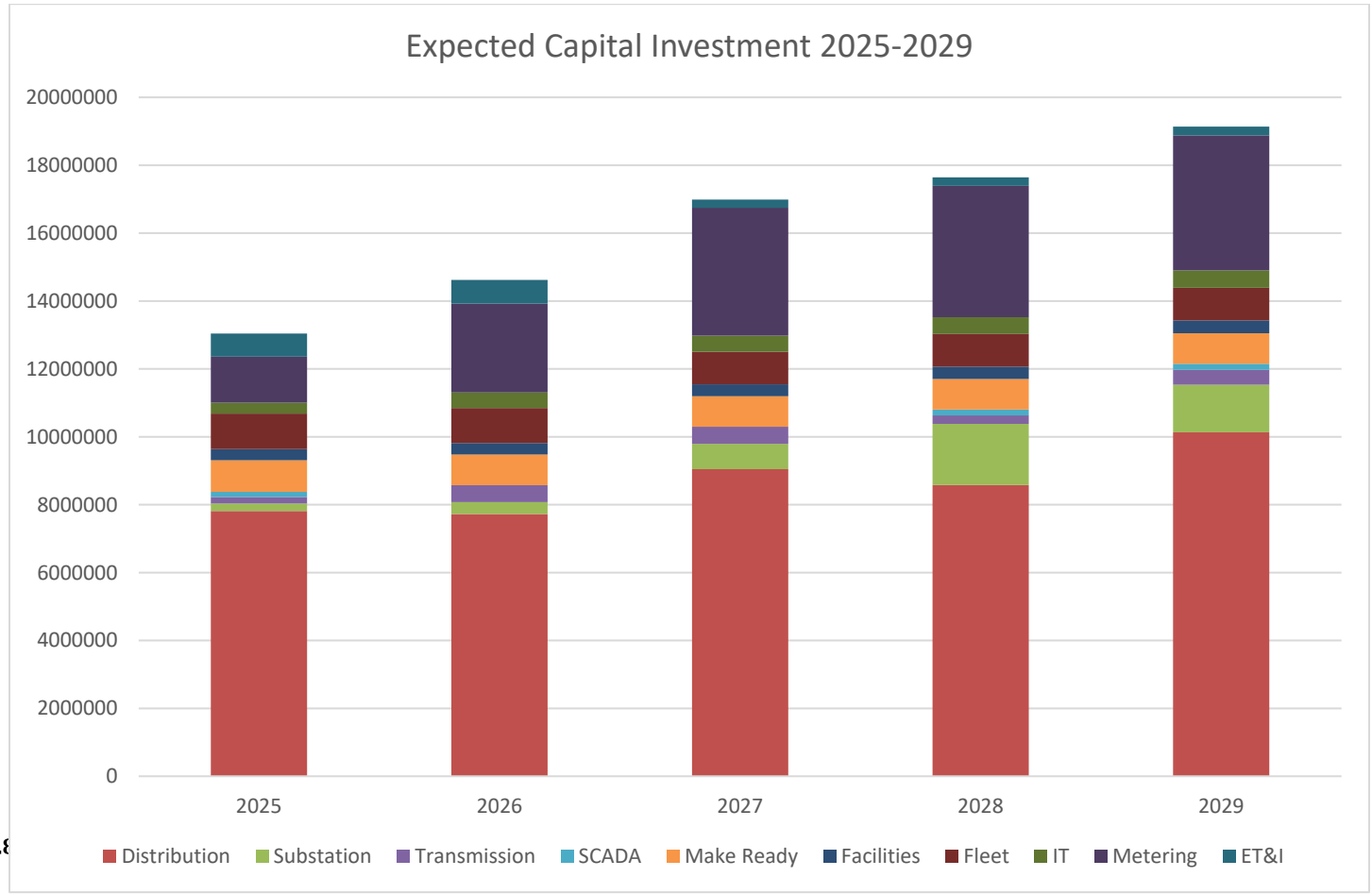
Prioritizing capital investment is critical to ensure VEC's membership receives the most reliable least-cost service. VEC's capital investment strategy primarily focuses on reliability and asset improvements. VEC places its capital projects into specific categories listed below:

- **Distribution** – This category includes both specific distribution projects (greater than $10,000) and annual overarching categories.
  - **Reconductoring** – Replacement or upgrade of wire size for both overhead and underground conductor.
  - **Line changes** – Movement of a line from off-road ROW to the road or from overhead to underground.
  - **Pole replacements** – Conditional or end of useful life replacements of pole assets.
  - **Transformers** – Includes distribution transformer exchanges due to outages or replacements due to condition.
  - **Ordinary replacements** – Anchor, recloser, pole top construction, regulator, or other major equipment replacements due to condition.
  - **Tier 3 CAP** – Customized opportunities to members with off-grid or underserved homes or businesses to replace fossil fuel usage with electricity.
  - **New service** – Line extensions for new service, temporary services, and retirement of lines.
  - **New construction** – New sectionalizing (reclosers, fused cutouts, sectionalizers), regulators, tie lines, adding phases, or reconductoring wire.
  - **Increase capacity** – Increasing distribution transformer capacity or voltage conversions.
  - **Other** – Security lights or LED upgrades.
- **Substation** – Substation equipment replacements and upgrades.
- **Transmission** – Transmission ordinary replacements and new construction.
- **SCADA**– Telecommunications, SCADA, Operations Technology (OT) cybersecurity.
- **Facilities** – New buildings, building enhancements, and security.
- **Fleet** – New vehicles or replacement of existing vehicles.

- **IT** – New software, software upgrades, hardware upgrades.
- **Metering** – New meter installations, meter replacements, industrial metering
- **ET&I** – Energy Transformation and Innovation. This includes items such as battery storage, heat pumps, new technology projects, etc.
- **Make Ready**- Replacement of poles due to make ready incentive or for existing NESC violations where VEC picks up the full cost.

Each VEC project estimated to be greater than $10,000 receives a specific line item within that fiscal year's budget (January to December). VEC also utilizes annual over-arching categories that contain miscellaneous replacements and construction. These "blankets" are too cumbersome to identify a specific line-item budget as they encompass hundreds of work orders.

The following graph displays VEC's projections until 2029.



7.8

Figure 7.8.A VEC Capital investment 2025-2029

T&D Capital Investment

VEC's Transmission and Distribution investment includes the Distribution, Substation, Transmission, and SCADA areas. Further details on all four components shown in the chart below (Distribution, Substation, Transmission, and SCADA) can be found in the following sections.

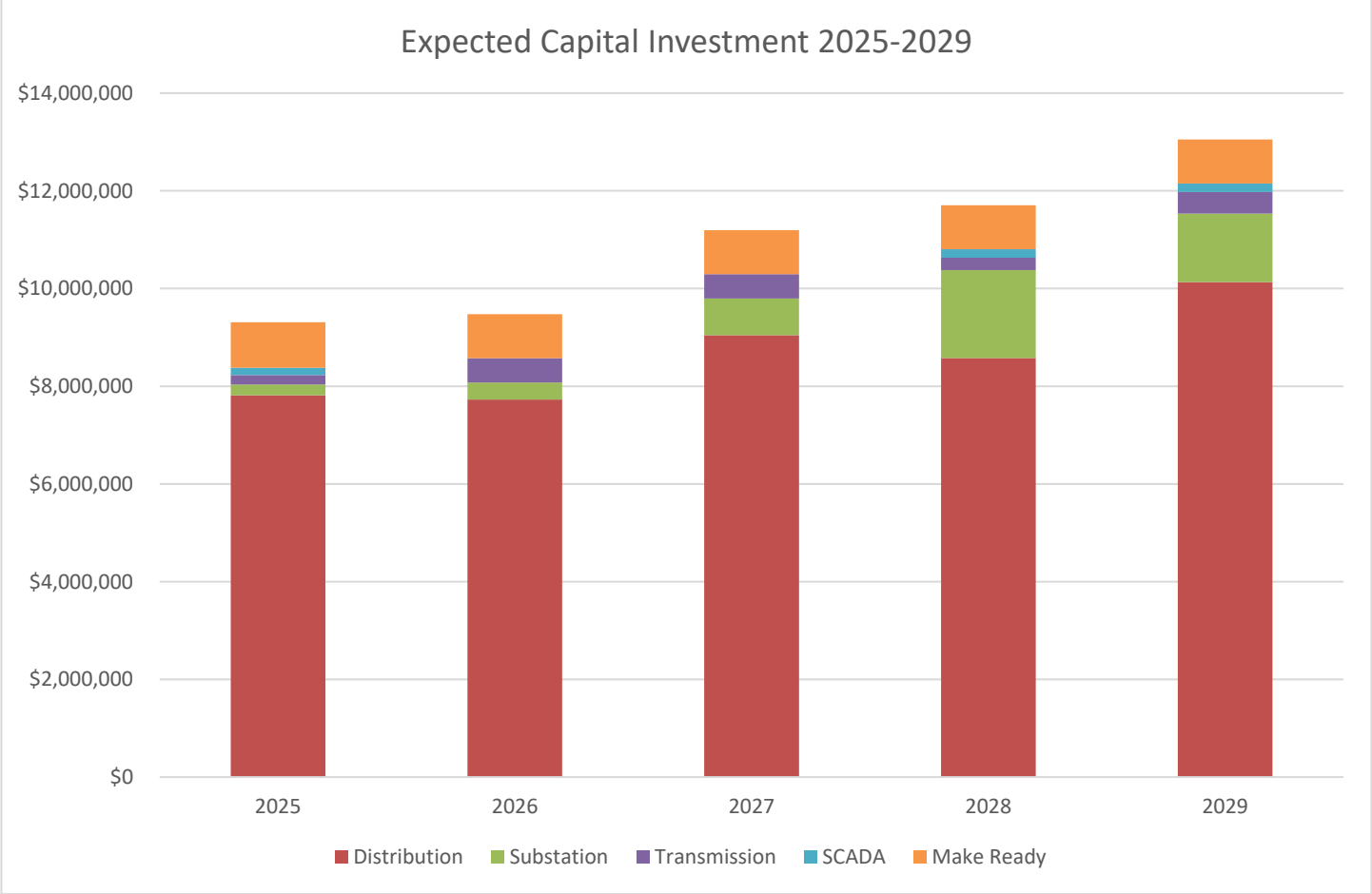


Figure 7.8.1.A Transmission & Distribution capital investment 2025-2029

Distribution Capital Investment

VEC's Distribution capital investment focuses on reconductoring, line relocations, undergrounding, and asset replacement. The budget includes non-discretionary components such as new services, line extensions, pole replacements, and capacity increases (43 percent or $3.1 million). Discretionary funds cover reconductoring, line changes, and new construction projects (57 percent or $4.1 million). Make Ready costs VEC approximately $900k annually, accounting for 6 percent of the capital budget.

Transmission Capital Investment

VEC uses 173 miles of transmission lines to deliver power from providers to substations or wholesale members. VEC's 46 kV lines connect to VELCO's 115 kV substations at Highgate, Jay, Newport, and Irasburg. The 34.5 kV lines operate as radial connections to GMP's 34.5 kV lines. Most capital funds will replace assets in poor condition. VEC will replace 17 deteriorating laminate poles with steel ones by 2025-2026, following VELCO's advice on early deterioration issues.

Substation Capital Investment

Sheldon Substation (Expected 2027-2028)

In late 2017, VEC received an application for a 20 MW solar project near its Sheldon 32 substation, requiring a substation upgrade. Although the solar project was withdrawn, VEC continued with the upgrade to address asset condition and safety concerns, providing reliability improvements and maintenance without outages.

The initial design included two 46 kV radial buses, a bus tie switch, five breakers, and two power transformers. VEC received a CPG in July 2021 and began site work, but post-COVID inflation caused costs to exceed budget estimates. As required, VEC halted construction when realizing costs would exceed the budget by over 20%.

Despite the setback, the Sheldon 32 substation upgrade is expected to proceed after completing the appropriate CPG process, estimated by 2027. The substation design may need significant modifications to meet current requirements and planning criteria. VEC aims to move forward while ensuring the design is thoroughly vetted.

Eden #2 Transformer Upgrade

The Eden substation contained three 833 kVA transformers, and at the time of the last IRP submission, it reached 75% of its nameplate capacity during peak periods. After some load growth, VEC observed instances during peak periods where the transformers were loaded to over 80% of their nameplate capacity, exceeding design criteria.

In 2024, VEC received a CPG to increase capacity at the Eden substation. The three single-phase transformers were upgraded from 833 kVA units to 1667 kVA units, which also necessitated the installation of spill (fluid) containment around the transformers. This upgrade effectively doubled the substation's capacity. As part of the transformer upgrade, real-time gas monitoring was installed on the transformers, and three new voltage regulators with increased capacity from 114 kVA to 167 kVA rated units were installed.

Additionally, infrastructure was added to the Eden substation to facilitate the quick installation of a mobile substation for future planned and unplanned maintenance and repair activities. VEC considers this infrastructure installation as a measure to enhance service reliability for its members.

VELCO SCAP Projects (2025-2029)

VELCO developed an evaluation protocol (Substation Condition Assessment Project or SCAP) used to conduct a condition assessment of its substations. The objective of the SCAP is to address stations within VELCO's system believed to require refurbishment. Typically, these stations are older, have not recently undergone significant capital upgrades and consist of facilities with planned replacements. VELCO first performs a comprehensive condition assessment of the facility, with the recognition that age alone does not warrant replacement, to develop the scope of work with the objective of refurbishing the station, extend the life of the assets, and improve reliability.

At several of these locations, VEC owns exclusive facilities (facilities that are necessary for the operation and control of our system only and not required by VELCO). VEC will bear 100 percent of the cost of any exclusive facilities replacements.

The SCAP identified four substations with associated projects that are located within VEC's service territory. VELCO has not yet completed work scopes for the projects, and estimates are based on total costs of other SCAP station projects. Once the project scopes are developed, a condition assessment report will be completed along with a scoping exercise. Presently, the locations and rough timelines for these projects are listed below:

- VELCO Newport T1 Transformer Replacement (2025)
- VELCO Tafts Corner – Breaker addition (2026)
- VELCO Newport – Replacement of 6 x 46kV breakers (2028)

- VELCO South Hero Substation Rebuild (2029)

SCADA Capital Investment

This section of VEC's capital budget includes any investment in telecommunications, SCADA, and Operations Technology (OT) cybersecurity. SCADA investment has since slowed with the largest recent investment being an upgrade to VEC's SCADA system. A high-level overview of VEC's proposed SCADA projects is provided below:

- **SCADA System Upgrade (2025-2026) -** VEC will be upgrading its SCADA system beginning in 2025. This replacement brings security enhancements, increased system capacity, enhanced features, and replaces out-of-support hardware.
- **Operations Technology Cybersecurity Improvements (2025-2026) -** The VEC information technology (IT) and Operational Technology (OT) networks are isolated from each other for cybersecurity purposes. VEC categorizes any cybersecurity upgrades associated with the SCADA system in this section. Upgrades to VEC's cybersecurity posture are expected to occur, at minimum, on a semi-annual basis to ensure VEC's operational systems remain secure. VEC plans to deploy enhanced threat feeds to its intrusion detection systems for improved detection and response to potential attacks. Additional security enhancements, such as removable media control and application whitelisting, are also on the roadmap.

Other Capital Investment

7.8.2 The T&D section of VEC's capital budget represents around 80 percent of total capital investment. The graph below shows the spending in the remaining categories of ET&I, Metering, Fleet, Make Ready and Facilities

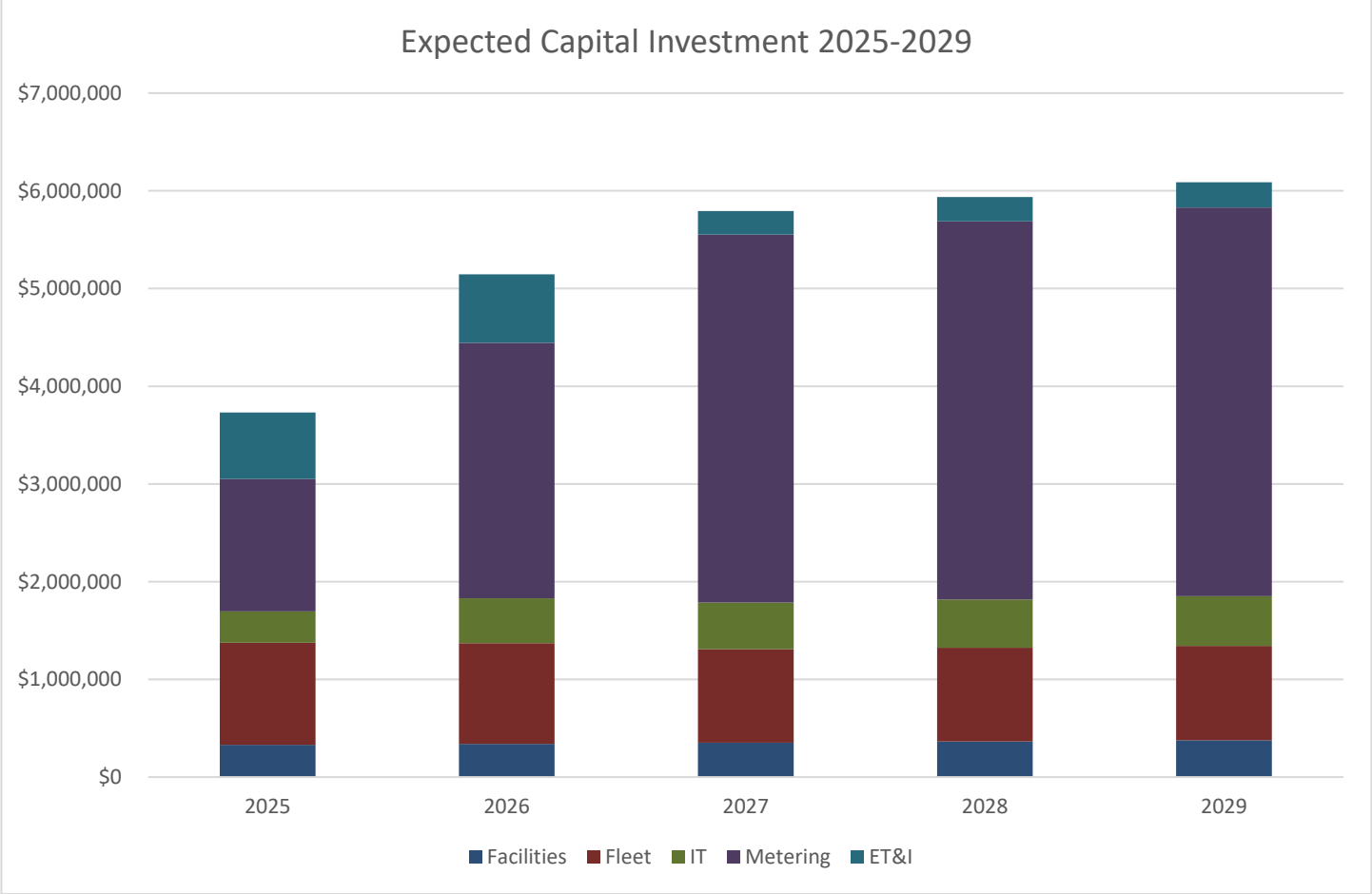


Figure 7.8.2.b Other capital investment 2025-2029

7.9 Vegetation Management and Engineering Studies

7.9.1 Vegetation Management Line Clearing

	Total Miles	Miles Needing Clearing	Clearing Cycle (Years)
Sub-transmission	~136	~156	5
Distribution	~2,438	~1,643	8

	2022 (Y-2)	2023 (Y-1)	2024 (Y)	2025 (Y+1)	2026 (Y+2)	2027 (Y+3)
Amount Budgeted	$4,313,663	$4,780,861	$5,215,051	$5,301,802	$5,460,856	$5,624,682
Amount Spent	$4,009,265	$4,091,929	$5,347,153			
Miles Cleared [3]	289 (12-year cycle)	248 (10-year cycle)	390 (8-year cycle)	344 [1] (8-year cycle)	335 [1] (8-year cycle)	322 [1] (8-year cycle)

Table 7.9.1.A Amount budgeted, spent, miles cleared as part of vegetation management cycle

The chart above shows the plan through 2027. The goal is to maintain a 10-year vegetation maintenance cycle

[1] "Miles Cleared" for 2023 and 2024 are planned/estimated and provide the basis for the amount budgeted.

[2] Includes an extra $309,000 for EAB mitigation in "off-years" since we shifted to a maintenance plan that gathers assets every other year instead of annually.

[3] Miles listed (either actual or planned) include both Transmission and Distribution.

Engineering Studies

VEC engages in several system wide reviews or studies of its power system. The following chart identifies VEC's existing and future engineering studies:

7.9.2

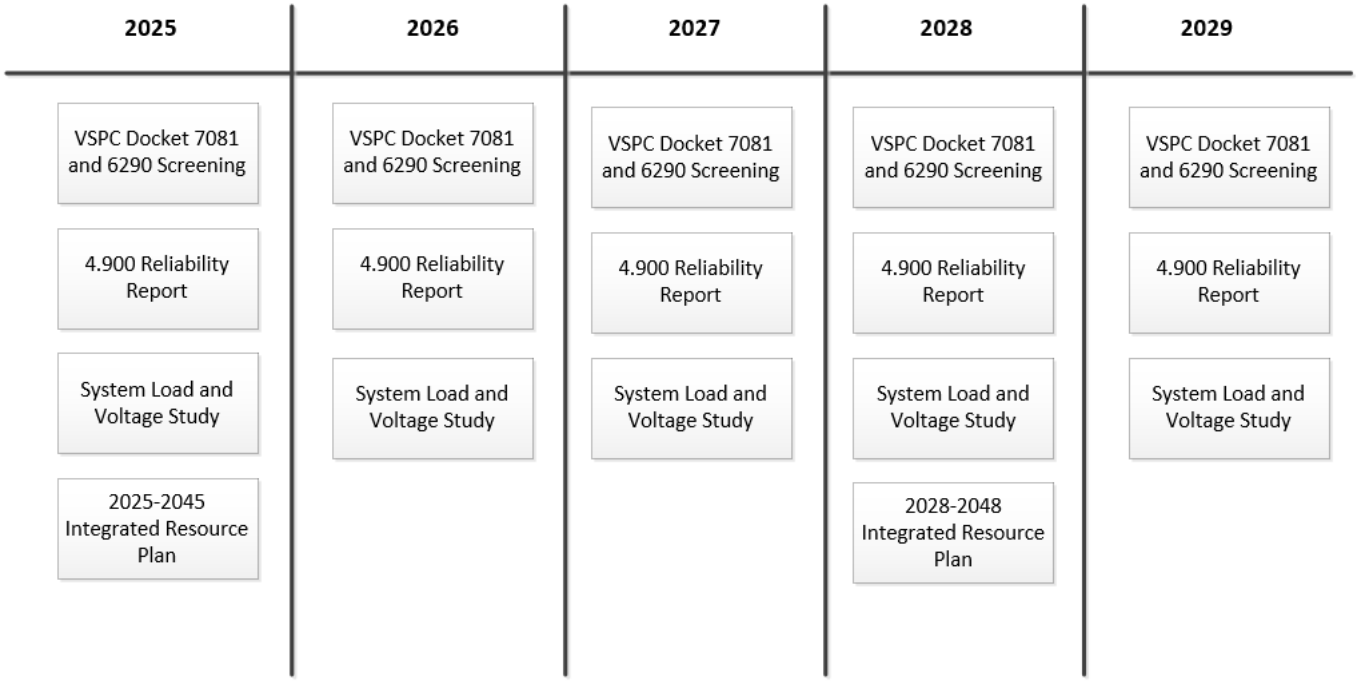


Figure 7.9.2.A 2018-2022 VEC engineering studies

Each of these studies were identified in the system planning section of Section 8 – Transmission and Distribution