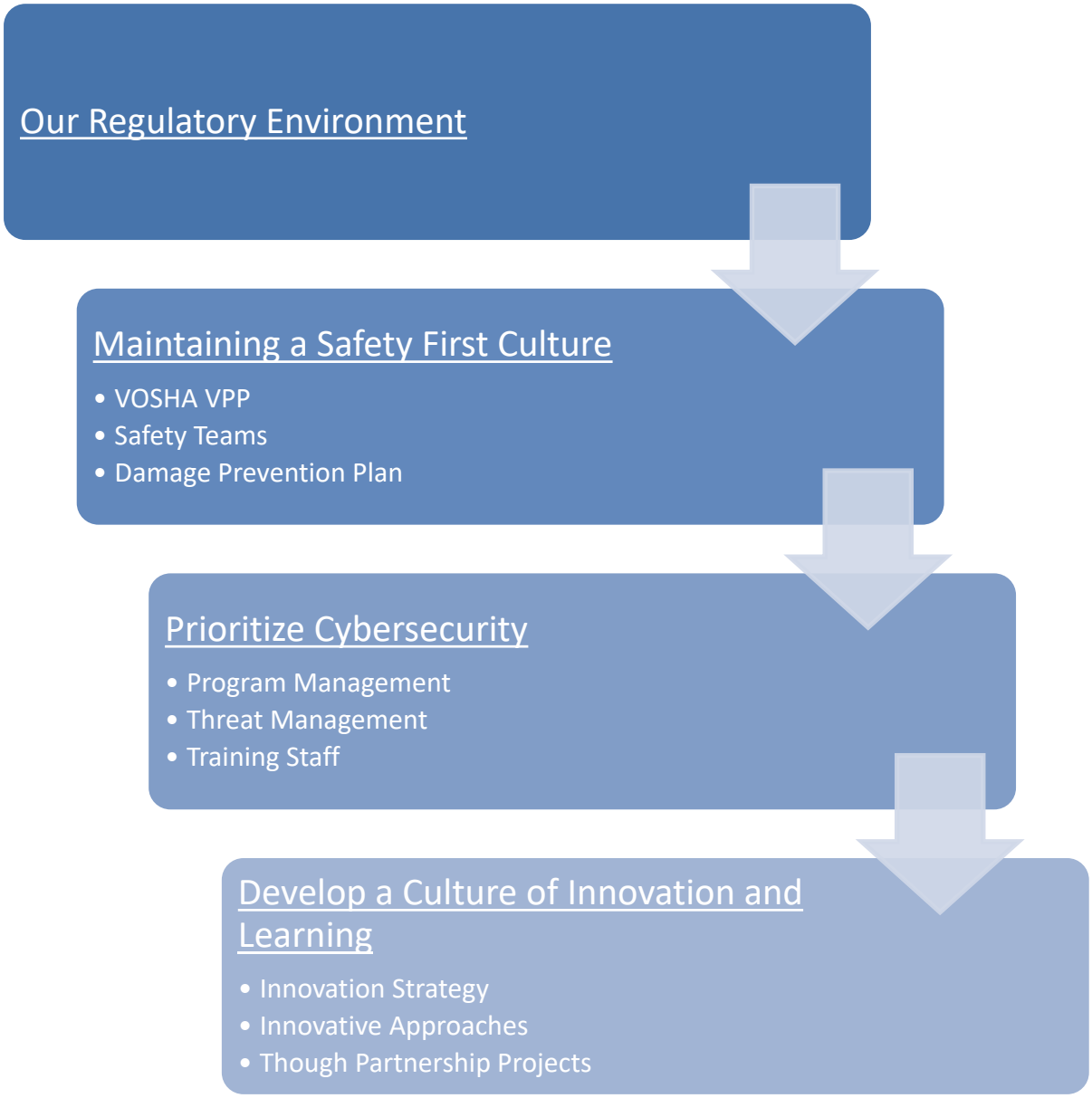
2 Lead With People

2.1 Introduction

Our employees are our greatest asset. Our objective is to lead with a people-centric approach to sustain a resilient organization that adapts effectively to evolving challenges. By maintaining a safety-first culture, fostering innovation, and prioritizing cybersecurity, we aim to create a safer, more productive, and member-focused work environment.

2.1.1 General Overview



2.2 Our Regulatory Environment

2.2.1 Vermont Department of Public Service (PSD) IRP Guidance

Appendix B: Guidance for Integrated Resource Plans and 202(f) Determination Requests identifies the baseline requirements that a utility IRP shall include. In addition, IRP's and other utility actions should be consistent with the Comprehensive Energy Plan.

2.2.2 Vermont Comprehensive Energy Plan (CEP)

The CEP is required by 30 V.S.A. § 202b and the Vermont Electric Energy Plan is required by 30 V.S.A. § 202. The PSD coordinates closely with other state agencies and the Climate Council created through the Global Warming Solutions Act (Act 153 of 2020) to ensure that the CEP advances policy objectives across multiple areas.

The 2022 CEP lays out Vermont's high-level goal to meet 25% of energy needs statewide from renewable sources by 2025, 45% by 2035, and 90% by 2050. These goals were followed by legislative changes in 2024 that updated the RES requirements.

2.2.3 Global Warming Solutions Act (GWSA)

In 2020, the Vermont Legislature passed the Global Warming Solutions Act (Act 153 as Enacted), which created legally binding emission reduction targets. The GWSA calls for meeting 100% of the electricity sector needs from carbon-free resources by 2032, with at least 75% from renewable energy.

2.2.4 Service Quality and Reliability Performance (SQRP)

VEC, like other Vermont utilities, operates under the guidelines of a Service Quality and Reliability Plan (SQRP), which defines standards by which VEC's member service, safety, and reliability performance is measured. This plan requires the utility to monitor and report the results of its performance in these areas annually to the Public Utility Commission. VEC's SQRP includes several "service guarantees" – specific credits or financial benefits that go to the affected individual retail customers if the utility fails to meet one of its service commitments.

VEC believes the service guarantees are excellent tools for helping us prioritize our work to be as responsive to members as possible.

Below is how VEC describes our service quality guarantees to our members:

"Committed to our members" means that we back our service to you with the following service guarantees:

Our Service Quality Guarantees	
Guarantee #1:	We guarantee that your bill will be rendered within seven days of your scheduled billing cycle or you will receive a $5 credit toward your account.
Guarantee #2:	We guarantee that the bill presented to you will be accurate. If you receive a bill with a mistake in it, VEC will correct the mistake and you will receive a $5 credit toward your account.
Guarantee #3:	We guarantee that line crews will be on time for scheduled appointments. If our crew has an appointment with you and does not show up within a two-hour window of the appointment, you will receive a $5 credit toward your account.

Guarantee #4:	We guarantee that your meter work will be completed within four business days of the promised delivery date on the service order. If we do not meet this date, you will receive a $5 credit toward your account.
Guarantee #5:	We guarantee that any line work will be completed within five business days of the promised delivery date, providing you have met your requirements. If we do not complete the work within this time frame, you will receive a $5 credit toward your account.

Figure 2.3.4.A VEC SQRP Guarantees

2.2.5 Renewable Energy Standard Requirements (RES)

In June of 2015, Public Act No. 56 established a Renewable Energy Standard (RES) with specific requirements focused on increasing investment in renewable energy resources and decreasing carbon emissions across the state and region. Many of these provisions were updated by the legislature in 2024. VEC has been successful in meeting its RES requirements to date. This IRP shows that VEC's current committed resources will exceed its projected Tier II obligation through approximately 2030, even after considering load growth from Tier III programs and therefore meets the goals of supporting the development of in-state renewable generation. After 2030 the opportunities to meet Tier II in-state renewable requirements become more challenging and costly particularly given the projected growth in load, the recent loss of solar incentives, the high penetration levels of solar, and the cost and permitting hurdles of other types of renewable energy. Another ongoing RES-related Power Supply challenge will be managing longer term Renewable Energy Credit (REC) procurement and retirement decisions given the relative uncertainty in retail sales impacts from new net metering installations, the pace of electrification in the heating and transportation sectors, and the changing regulatory environment in other states.

The current RES requirements are listed here : https://puc.vermont.gov/electric/renewable-energy-standard

2.2.6 National and Regional Requirements

VEC is required to follow guidelines and standards set forth by several national and regional organizations.

The Federal Energy Regulatory Commission (FERC)

FERC, is an independent agency that regulates the interstate transmission of natural gas, oil, and electricity. FERC also regulates natural gas and hydropower projects.

North American Electric Reliability Corporation (NERC)

FERC designated NERC to establish and enforce reliability standards for the bulk power System (BPS). NERC has divided the North American Electric Utilities electrically into 4 large power grids:

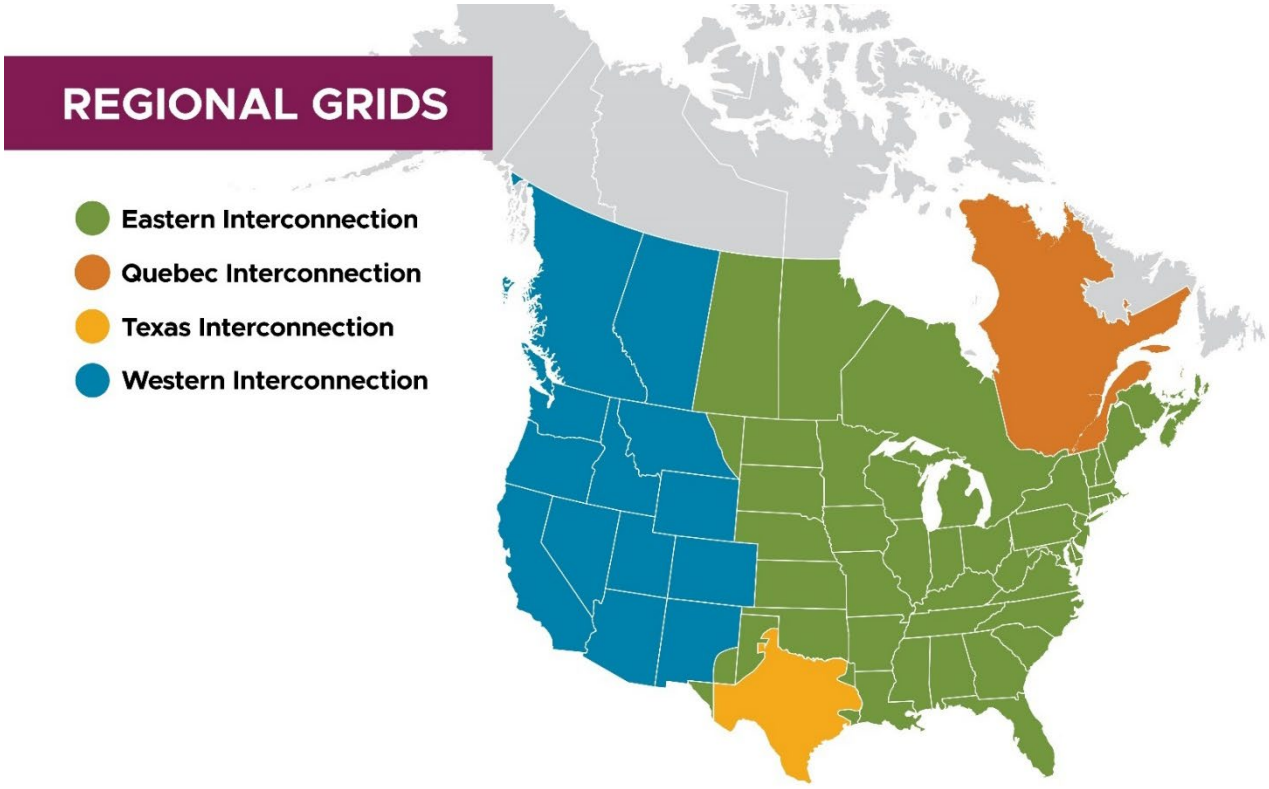


Figure 2.3.6.A Regional grids - (Image by Stephanie King | Pacific Northwest National Laboratory)

NERC also groups North American Electric Utilities geographically into six regions for enforcement of reliability standards.

As an entity under NERC, VEC is registered as a Distribution Provider (DP). Distribution Providers with applicable facilities are subject to 33 separate reliability standards. Because of the amount of load VEC serves (<100MW) and the type of facilities VEC owns, only 16 of the NERC standards are applicable.

Northeast Power Coordinating Council (NPCC)

NPCC is one of seven Regional Entities which, together with the North American Electric Reliability Corporation (NERC), make up the Electric Reliability Organization Enterprise. As a part of the ERO Enterprise, NPCC is committed to the collective vision of a highly reliable and secure North American bulk power system and shares the joint mission of assuring the effective and efficient reduction of risks to the reliability and security of the grid for New York, New England, and Quebec. NPCC also performs the auditing and enforcement of the 93 currently active NERC and Regional Reliability standards. The applicability of these standards is dependent on the type of Entity an electric utility is (e.g., – ISO, Transmission Owner/Operator, Distribution Provider, Load Serving Entity, Generation Owner/Operator, etc.) Applicability of each standard is dependent on the type of entity, amount of load served, and the facilities each entity owns. As an example, a distribution provider that does not provide electric service to a nuclear facility will not be subject to compliance for the reliability standards associated with nuclear facilities.

Independent System Operator – New England (ISONE)

An Independent system operator (ISO) is an independent, federally regulated entity established to coordinate regional transmission in a non-discriminatory manner and ensure the safety and reliability of the electric system. ISONE is the independent, non-profit Regional Transmission Organization, headquartered in Holyoke Massachusetts, serving Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. ISONE is subject to NERC reliability Standards as a transmission operator (TO) and transmission planner (TP).

2.2.7 How are Regulatory Requirements Increasing for VEC

Regional Regulatory Requirements

Regulatory oversight from ISO New England (ISO-NE) and the Northeast Power Coordinating Council (NPCC) is increasing for distribution electric utilities, focusing on grid reliability, emergency preparedness, and distributed energy resources. ISO-NE, as New England's regional transmission organization, is more involved in planning and operational coordination to ensure system reliability amid rising electrification and decarbonization pressures. Updates like Emergency Operating Procedure EOP-011-4 require utilities to develop load-shedding programs for supply deficiencies, emphasizing risk mitigation and system resilience due to extreme weather and distributed generation.

NPCC's role in auditing and enforcing NERC and regional reliability standards is expanding. Distribution providers face more complex compliance obligations based on their operations, such as load served and facility types. Utilities must meet various cybersecurity, communications, and emergency response protocols, even if exempt from nuclear-related NERC standards.

ISO-NE has increased data requirements from distribution utilities to address challenges like behind-the-meter (BTM) generation and power factor management. Under Planning Procedure No. 12, utilities must submit detailed information on distributed energy resources (DERs), including BTM photovoltaic systems and battery storage, to improve forecasting and system modeling. This data enters ISO-NE's Dynamic Data Management System (DDMS) for maintaining grid reliability and accurate load forecasting. Utilities must distinguish between FERC and state jurisdictional facilities for proper interconnection processes.

Utilities like VEC are enhancing their planning and data exchange with VELCO for real-time management of transmission and distribution grids, requiring more dedicated resources and potentially raising membership rates.

Environmental ANR

Vermont's environmental regulations are becoming increasingly complex for electric utilities, particularly with wetland permitting and Act 250 compliance. Utilities like VEC must navigate numerous permitting requirements before starting construction projects. For instance, any line extension needs all relevant state and local permits, including those under Act 250, which applies to projects disturbing over 10 acres or one acre in towns without permanent zoning. Routine distribution line work can trigger Act 250. Wetland permitting now requires adherence to Section 6.22 of the Vermont Wetland Rules, consulting with agencies or third-party environmental consultants.

Recent legislative activity aims to modernize and expand these regulations. Despite utilities advocating for streamlined processes, regulators have largely maintained or increased oversight. The Department of Environmental Conservation (DEC) now evaluates whether relocating lines to roadside rights-of-way justifies permit exemptions. Overall, Vermont's environmental policy is increasingly integrating climate adaptation, water quality, and land use planning into utility permitting, requiring greater coordination, documentation, and foresight from utilities.

Environmental regulations are increasingly impacting VEC's resources and costs for obtaining permits for routine work listed below:

1. Water Quality Certification and Section 401 Compliance: Projects needing federal permits, like Section 404 or FERC licenses, must secure a Section 401 Water Quality Certification from Vermont ANR. This ensures compliance with Vermont Water Quality Standards. Some projects may get conditional approval via self-verification or pre-construction notification, while others need individual review, adding time and complexity.

2. Vegetation Management and Land Use Compatibility:
   VEC's rights-of-way often traverse actively managed forests, agricultural lands, and sugar bushes, making vegetation management a sensitive regulatory issue. The 2025 Vegetation Management Plan emphasizes alignment with Vermont's rural land use patterns and underscores the necessity for careful coordination with landowners and regulators to prevent conflicts with conservation objectives. This includes adherence to state-level habitat protection regulations and collaboration with local conservation commissions.

2.3 Maintaining a Safety-First Culture

VEC takes the safety of our members, employees, and community-at-large seriously. We share recommendations with our members on various safety topics, including how to use a generator safely and how to be safe during an outage, and we produce regular safety videos which are all available on our website https://vermontelectric.coop/electric-system/safety. We regularly share safety-themed messages with our members through our social media venues as well as the quarterly "Coop Life" newsletter.

2.3.1 VOSHA VPP

Vermont's Occupational Safety and Health Administration (VOSHA) awarded VEC the Green Mountain Voluntary Protection Program (VPP) STAR designation in 2017, and we have proudly maintained that status ever since. VEC

remains the only power distribution utility in New England with this high-level recognition, joining just five other non-utility organizations across Vermont.

Preparation for VOSHA's on-site review took more than five years and addressed 28 safety and health elements. The review included intensive inspections of VEC's four district facilities, 14 formal interviews, and over 25 informal interviews. VEC demonstrated a strong history of management commitment to safety, robust employee involvement, and effective systems for worksite analysis, hazard prevention and control, and safety training.

In 2024, VEC submitted a 66-page narrative self-evaluation to VOSHA, highlighting our continued commitment to safety excellence. The report emphasized our collaborative safety culture, union engagement with IBEW Local 300, and our operational footprint across 74 towns. It also confirmed that VEC's injury rates remain well below industry averages, supporting our eligibility for continued STAR status

Our relationship with VOSHA continues to drive continuous improvement across all aspects of our safety program—internally through training and wellness initiatives, and externally through contractor safety and community engagement. This commitment ensures that safety remains a core value embedded in every part of our operations.

2.3.2 Safety Teams

VEC has several safety teams focused on various aspects of the company's safety culture.

- **The Safety Committee** is made up of VEC field and office personnel and is focused on updating the VEC safety manual to bring it up to date with current standards and practices.
- **The Health and Wellness Team** creates programs and activities that foster a culture of wellness within VEC -- with a continuing emphasis on health and wellness while working remotely.
- **The Incident Analysis Team** conducts 4-step investigations for injury or near miss events that warranted an investigation.
- **The Safe Worksite Analysis Team (SWAT)** has conducted facility inspections for over nine years, and focuses on organization and cleanliness of our four district offices.
- **The Communications Team** focuses on issuing our employee safety-themed calendar, summer safety quiz, and our annual Safety Pledge that all VEC employees sign.
- **Joint Apprentice Training Committee (JATC)** reviews apprenticeship steps, requirements, expectations, and documentation. Last year the JATC also established a 34.5 kV gloving/hot work apprenticeship program for First Class Line Workers.
- **The First Aid Team** receives biennial certifications in first aid, CPR and AED. If needed they respond to any injury events within VEC district offices.

2.3.3 Apprenticeship Programs

Joint Apprenticeship Training Committee (JATC)

The JATC provides guidance and recommends changes as to the apprenticeship program and the training and skills needed to advance through each step of VEC's training programs. The intent is to develop a safe, well-trained and skilled electrical worker workforce. The committee expanded its focus beyond line workers to include apprentices in other departments, i.e. metering and substation departments.

VEC lineworkers obtain training and apprenticeship through the Vermont Registered Apprenticeship Program. The program is administered by Vermont Department of Labor's Workforce Development Division. It is an occupational training program designed to provide individuals with hands-on experience and on-the-job training.

Switching and Tagging

VEC maintains a Switching and Tagging procedure that clearly sets criteria for qualifications allowing VEC employees and contractors working for VEC to perform switching and tagging functions on VEC's distribution and transmission primary equipment. VEC maintains a list of qualified individuals that is maintained by the Manager of System Operations. Competency-based switching and tagging training is provided to all personnel listed on the Switching and Tagging Qualification List and others who are expected to become a switch person, biennially. Following the training, all previously qualified personnel must successfully pass a competency exam to sufficiently demonstrate their continued qualifications.

Following each VEC switching and tagging biennial training, all Switching and Tagging and Clearance personnel must successfully pass a written competency exam. Failure to attend this biennial training will revoke all switching and tagging duties, resulting in the removal from the Switching and Tagging Qualification List

VELCO switching and tagging Training will be provided biennially, on off years from the VEC training. All VEC personnel identified as meeting the qualifications of Switching and Tagging, Clearance Holder, and VELCO Switching and Tagging must attend the training classes, as appropriate. VEC field personnel that currently do not hold a VELCO Switching and Tagging certification will be encouraged to become VELCO qualified if their job duties require them to perform switching and tagging duties in VELCO facilities

2.3.4 Promoting a Zero Injuries Philosophy

For 2024 we will concentrate on an overarching goal of "Promoting a ZERO injuries philosophy across the organization." The associated implementation strategies to achieve this goal includes ideas such as:

- Conduct a comprehensive incident event analysis to determine new trends for the follow-on action of developing new injury prevention strategies.
- Improving the collection of near-misses/learning opportunities that are documented and then communicated to the organization.
- Injury prevention focused training, with again, a special focus on ergonomics in the field and office.
- Continue to broadcast a daily safety message to the entire organization.
- Re-run a defensive driving course.
- Conduct chainsaw training for all line workers.
- Provide violence de-escalation training for all field personnel.
- Audit pre-job planning tailboards to ensure that they are being used effectively.

2.3.5 Damage Prevention Plan

VEC is a member of Dig Safe and adheres to their procedures for the mapping, marking of our facilities and locating of our facilities. We contract locate services to Vermont Underground Locators (VTLocators) and map all transmission, distribution primary, and secondary underground facilities in our GIS system. VEC does not map member owned secondary systems but our underground locating contractor, VTLocators, will locate them when requested by VEC or the member. In addition to mapping, VEC marks new underground systems with marking tape and above ground stakes.

VEC utilizes an internal OP-26 that identifies procedures and protocols for marking, locating VEC facilities, and the protocols for VEC excavating work. VEC's procedure follows PUC Rule 3.800 and V.S.A. Chapter 86 to guarantee the reliability of service to our members, avoid damage to VEC underground facilities, and ensure the safety of our employees and the public. VEC OP-26 can be found in Appendix-E.

2.3.6 Safety Impacts of Distributed Generation

VEC takes safety very seriously, especially when it comes to managing ever increasing grid complexity due in large part to distributed generation. Some of the activities VEC is engaged in to bring safety awareness and ongoing training to employees and members include:

- All VEC construction, including the interconnection of Distributed Energy Resource (DER) projects, is conducted in compliance with all applicable and required standards such as:
    - NESC – The National Electrical Safety Code (e.g., utilities)
    - NEC – The National Electric Code (e.g., electricians, members, interconnects with utilities, etc.)
    - OSHA 1910.269
    - IEEE1547 – Standard for Interconnecting Distributed Resources with Electric Power Systems
    - UL1741 - The Standard for Inverters, Converters and Controllers for use in Independent Power Systems
- VEC verifies anti-islanding requirements prior to placing generation into service.
- VEC conducts task briefings on the possibility of back feed from residential/commercial solar installation or other large generators (e.g., whole house battery systems, wind, etc.). We require a visual open, testing for

de-energized line, and proper grounding techniques. This is the same process we go through after a restoration of power or re-connecting to the grid.

- VEC periodically audits electrical services to identify and correct any potential safety concerns.
- VEC regularly communicates to its members the dangers of standby generators.
- VEC's Safety Committee meets regularly and discusses any known or potential safety concerns, including the hazards of reverse power flow associated with certain DER's. The Manager of Safety and Security takes these reviews and shares them with a large audience of field workers due monthly district safety meetings.
- VEC is collaborating with ISO-NE, VELCO, and other Distribution Utilities to develop plans to avoid system-wide blackouts caused by energy emergencies.

2.4 Prioritizing Cybersecurity

VEC believes a strong cyber-security culture is essential to ensure the reliability of the electric grid now and in the future. The most significant risk is human behavior. Social engineered attacks, those designed to exploit the weaknesses of people rather than systems, are the most common and dangerous. Furthermore, with the increased use of technologies such as SCADA and AMI, VEC's various business and operations systems have become better able to communicate with each other. These integrated, autonomous, and complex systems have accelerated evolution of more sophisticated threats and attacks.

2.4.1 Program Management

VEC recognizes and meets these evolutions with a commensurate level of cyber-security. VEC utilizes a layered, "Defense in Depth" approach to cyber security to safeguard member information and business systems. Defense in Depth is an approach to cybersecurity, layering a series of defensive mechanisms to protect valuable data and information. If one mechanism fails, other steps up immediately to thwart an attack. Additionally, VEC follows the Department of Energy Electric Sector Cybersecurity Capability Maturity Model (DOE ES-C2M2) to evaluate, prioritize, and improve cybersecurity capabilities. Using the ES-C2M2 framework, VEC has increased its cyber capabilities to address a wide-ranging array of both technical and socially engineered attacks.

Each year VEC looks to improve one Maturity Indicator Level (MIL) in at least two domains as outlined by the C2M2 model. VEC measures success by working toward achieving an overall Maturity Indicator Level (MIL) score of 3 in each domain. Annually, we develop specific key performance indicators approved by the Board of Directors that hold the company and specific personnel accountable to improve one MIL score in each of two domains.

2.4.2 Threat Identification

We rely on several organizations and various software tools to keep us informed of threats. The organizations include the Vermont Intelligence Center, the Department of Energy Electricity Information Sharing and Analysis Center (E-ISAC), NERC, Department of Homeland Security (DHS), and VELCO. VEC has a dedicated cybersecurity steering committee that puts together an annual plan for improvement and mitigates and cyber threats. The North American

Electric Reliability Corporation (NERC) has identified the greatest cyber-security risks facing the North American electric grid today (in order):

- Human error
- Access control management
- Insider access
- Insufficient training
- Lack of vigilance by all stakeholders

VEC also performs annual penetration tests to identify any weak spots on its systems.

2.4.3 Threat Management

Internally, VEC uses separate domains for its Information Technology (IT) (e.g., regular corporate network, computers, firewalls, etc.) and its Operations Technology (OT) (e.g., SCADA, Control Center connectivity, firewalls, etc.), each domain treating the other as if it is an outside entity. Each domain has procedures in place for isolating from each other and islanding from any external or public connections. Where possible and appropriate, each group uses different sources and equipment for the various functions of cybersecurity including network devices, network segmentation, network isolation, intrusion detection, endpoint protection, and system event and information monitoring. This model includes continual improvement on both systems (e.g., upgrades, updates, patches) and personnel (e.g., training).

Externally, VEC collaborates with partners and professionals such as the Department of Homeland Security (DHS) and the National Guard to develop and exercise its cyber-security skills to identify areas for improvement. VEC participates in cyber-exercises annually with the DHS and National Guard (Vigilant Guard, Cyber Yankee). VEC monitors and participates in the following forums to identify and share emerging threats and best practices:

- Multi-Sector Information Sharing and Analysis Center (MS-ISAC)
- Electrical Sector Information Sharing and Analysis Center (E-ISAC)
- United State Computer Emergency Readiness Team (US-CERT)
- Industrial Control Systems Emergency Readiness Team (ICS-CERT)
- SANS Institute and Internet Storm Center
- VT Fusion Center

2.4.4 Training our Staff

VEC trains, tests, and develops its employees in the areas of cyber-security awareness and good cyber-hygiene. VEC's cyber-security team conducts training for, and testing on, all VEC employees bi-annually. All new employees are given an overview of cybersecurity topics and the importance of keeping themselves, and VEC, safe from a variety of threats. Completion of cybersecurity awareness training is required prior to being given access to network resources. Employees discuss cyber-security awareness topics as part of a "Safety/Cyber Minute" before the start of most meetings. Additionally, VEC's cyber-security team provides an in-depth review of threats weekly for members of Engineering and Operations (E&O), especially field personnel. E&O shares this information with the entire company via the corporate internet.

Email security also continues to be a focus through ongoing training, awareness, and bi-annual testing to help protect VEC resources from one of most common malware attack vectors. The single weakest links in the information

security chain are people who may be uneducated or negligent, vulnerable to attacks both inside and outside an organization.

We also focus on password security and increased use of two-factor authentication, specifically related to the accounts used to administer network resources. VEC plan to implement a new password server in conjunction with YubiKey two-factor authentication. This will allow flexibility and will end reliance on shared credentials.

2.5 Developing a Culture of Innovation and Learning

The electric business is rapidly changing, with data, electrons and money moving to a distributed model, flowing dynamically and continuing to evolve. We must continue to adapt our business models, grid operations, and products and services to meet member needs and provide energy choices.

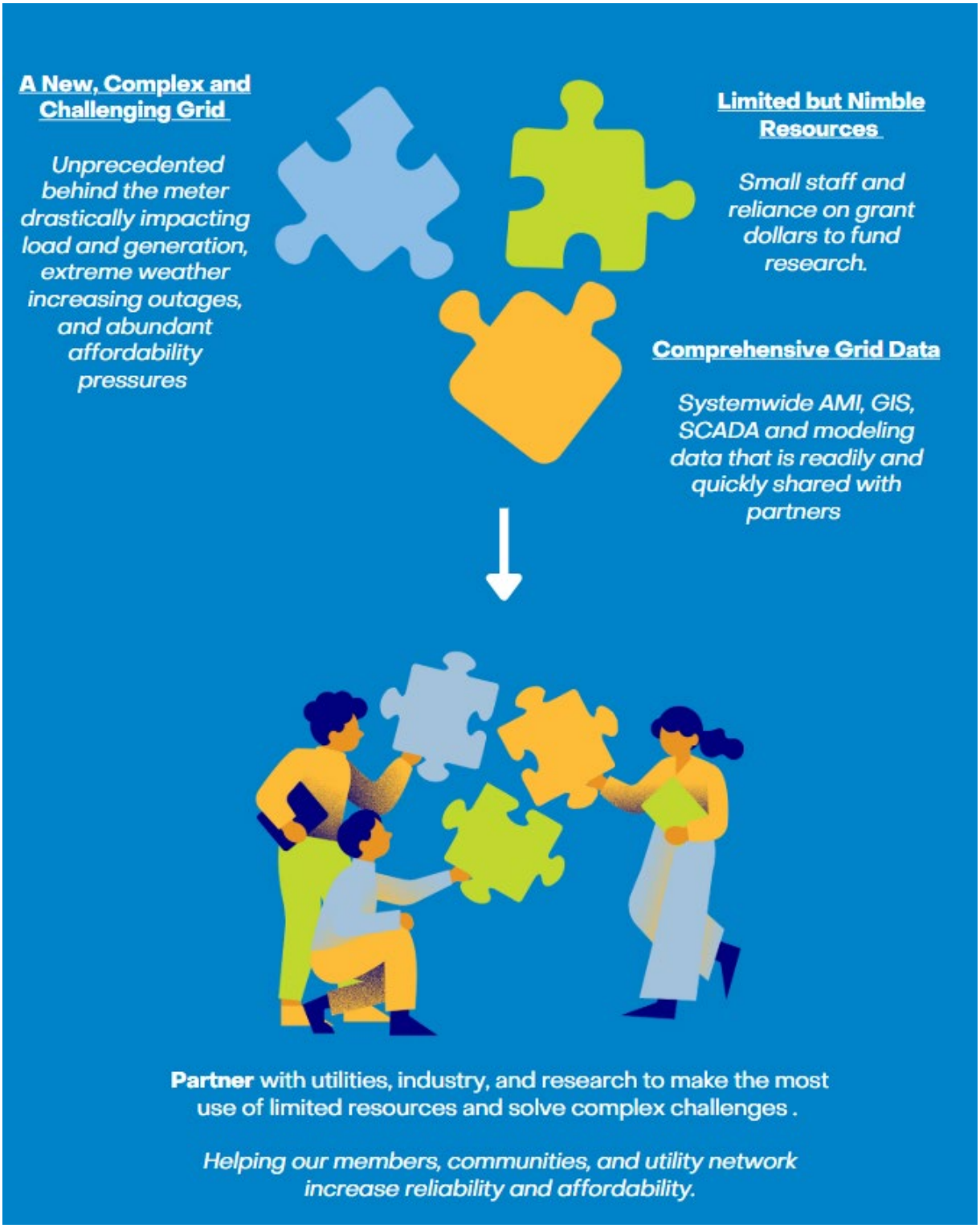
For VEC, innovation is the ideation and execution of new or improved products, services, and functions for our members and staff. This section details why we innovate, what our place is in the innovation landscape and our overall innovation strategy at VEC. Like the process of innovation itself, an innovation strategy involves continual experimentation, learning, and adaptation.

VEC recently pub

2.5.1 VEC's place in the Innovation Landscape

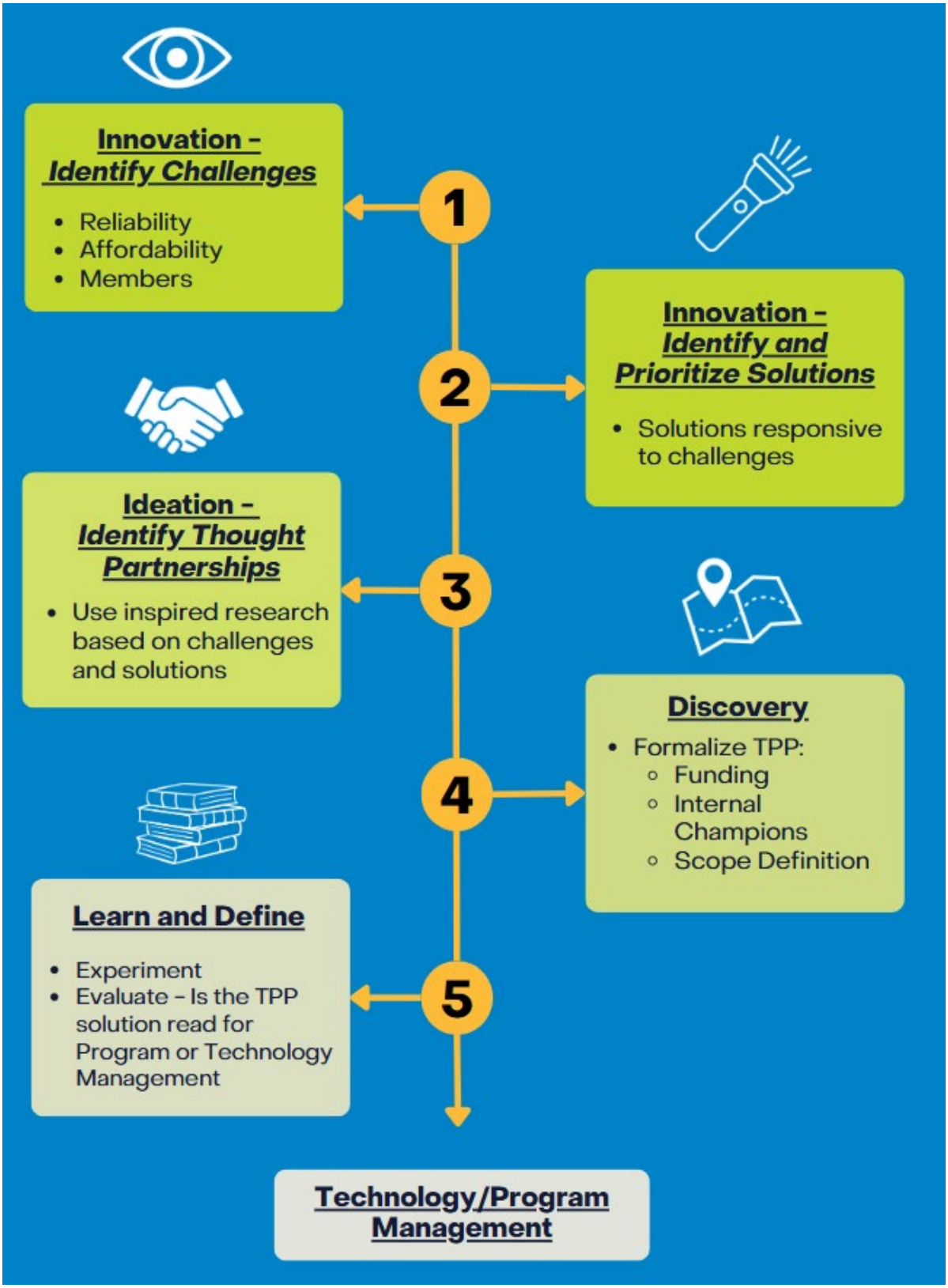
Although often small, particularly in the utility space, cooperatives are often spearheading innovation. For example, in the early days of retailing, products were fetched by an assistant from shelves while customers waited in front of the counter. A Swedish Cooperative opened the first self-service store in Europe. The first Self-service stores in Denmark, The UK, German, Norway and Austria were also opened by consumer cooperatives. https://core.ac.uk/download/pdf/30826139.pdf

VEC's goal is to create Thought Partnership Projects that helps our members, communities, and utility network increase reliability and affordability.



2.5.2 VEC's Innovation Framework

VEC's Innovation Framework is listed below:



2.5.3 VEC 2024 Innovation Report

VEC recently published a report highlighting the people, work and learnings from our Thought Partnership Projects

Each TPP (thought partnership project) includes a summary of goals, learnings and next steps. An example project is provided below:

TPP : UVM Energysheds

Create tools to simulate the growth of DER and develop models that help communities make decisions

ENERGY
Office of Energy Efficiency and Renewable Energy

Thought Partnership Project Overview

1. Tool Development: Create tools to evaluate economic, environmental, and social trade-offs of energyshed characteristics.
2. Simulation Tools: Develop tools to understand Distributed Energy Resource (DER) development within energysheds.
3. Community Engagement: Provide a model for community decision support and broaden stakeholder participation in local energy systems.

Challenges Addressed

Electric Vehicles and Heat Pumps Growth

- *Many voltage constrained end of line locations, not suited for load growth*

Strategic Goals

Engage Members

- Reduce impacts of electrification on the grid
- Focus on energy equity

Learnings

- **Co-simulation:** capabilities using VEC distribution feeders and VELCO transmission network will support future scenario analysis
- **Heat Pump Impact** : high adoption scenario shows minimal distribution transformer overloading but does indicate some low voltage violations on primary lines
- **Model Validation :** using EdgeZero sensors and SCADA data is needed

Next Steps

- Validation of GridLAB-D models against sensor data (SCADA, EdgeZero, GridMetrics)
- Extend tools to include other DU feeders (GMP, SED)
- Optimization on transmission side
- Review planning tool with stakeholders (Glover Energy Committee for VEC territory)

University of Vermont · Stowe Electric Department · VELCO · Vermont Electric Co-op