# **Puget Sound Energy: Technical Infrastructure and Security Posture Analysis**

**1. Executive Summary:**

Puget Sound Energy (PSE), the largest utility in Washington state, is undergoing a significant transformation driven by ambitious clean energy goals and the need to modernize its aging infrastructure. This analysis delves into PSE's technical infrastructure, encompassing its information technology (IT) and operational technology (OT) environments, digital transformation initiatives, security posture, vendor relationships, and digital footprint, all based on publicly available information. The findings reveal a hybrid technology landscape with a mix of legacy systems and increasing adoption of cloud services and smart grid technologies. PSE demonstrates a commitment to cybersecurity, evidenced by its dedicated security team and adherence to industry standards. However, the occurrence of physical security incidents highlights areas for potential improvement in their overall security strategy. The company's active engagement in technology procurement through formal processes and partnerships with a diverse range of vendors underscores its commitment to innovation and modernization. These factors collectively present several opportunities for NCC Group to offer specialized services in cybersecurity, OT security, cloud security, physical security assessments, and regulatory compliance within the energy sector.

**2. Puget Sound Energy: Company Overview:**

Puget Sound Energy (PSE) was established in 1997 through the merger of two long-standing entities, Puget Sound Power & Light Company and Washington Energy Company 1. The roots of PSE's predecessor companies trace back to the late 19th century, with operations commencing as early as the 1870s 2. This extensive history indicates a substantial legacy of infrastructure development and potential complexities associated with integrating and modernizing older systems. As the oldest and largest electric and natural gas utility in Washington state, PSE serves a vast customer base and manages a significant infrastructure network 3. The utility provides essential services to over 1.2 million electric customers and more than 800,000 natural gas customers across Western Washington 3. Their service area spans approximately 6,000 square miles, presenting logistical and management challenges inherent to a geographically dispersed operational footprint 3. PSE is headquartered in Bellevue, Washington 3, and operates as a privately-owned entity under the ownership of a consortium of long-term infrastructure investors, including AIMCo, BCI, OMERS, and PGGM 3. This ownership structure can influence the company's long-term investment strategies and its approach to managing risks associated with technological advancements and security.

PSE's service area encompasses several counties in Western Washington. Electric service is provided in Island, King, Kitsap, Kittitas, Pierce, Skagit, Thurston, and Whatcom counties 3, while natural gas service is available in King, Kittitas, Lewis, Pierce, Snohomish, and Thurston counties 3.

A core strategic objective for PSE is the ambitious transition to clean energy. The company has set an aspirational goal to become a Beyond Net Zero Carbon energy company by 2045 7. Key milestones in this transition include achieving coal-free electricity by 2025, becoming carbon-neutral by 2030, and ultimately reaching 100% clean electricity by 2045 3. To achieve these goals, PSE is making significant investments in renewable energy resources such as wind, solar, and hydroelectric power, as well as in enhancing energy efficiency across its service area 3. Furthermore, PSE recognizes the critical role of modernizing its energy infrastructure, including the development of a smart grid and the upgrading of transmission lines, to facilitate the integration of these new energy sources and ensure a reliable energy supply 7.

**3. Analysis of Technical Infrastructure:**

PSE's technical infrastructure comprises a blend of established and emerging technologies across its IT and OT environments. The IT infrastructure supports business operations, customer management, and data analytics, while the OT infrastructure is responsible for the real-time monitoring and control of the energy generation, transmission, and distribution systems.

The IT technology stack includes a comprehensive suite of enterprise applications. SAP ECC serves as a central system for managing various aspects of the business, including enterprise asset management 51. SAP IS-U FICA and Billing handles customer accounts and billing processes 51. PSE also utilizes other SAP modules for sales, supply chain, human resources, customer relationship management, and device management 51. Complementing these SAP systems are several non-SAP applications. MDMS is likely used for managing the vast amounts of meter data, while GIS is crucial for visualizing and analyzing spatial data related to their infrastructure 26. Click Schedule and Work Manager are used for managing field operations and mobile workforces, and OMS aids in tracking and resolving power outages 51. EnergyCAP provides energy management software for both PSE and its customers 52. For procurement and vendor management, PSE employs SAP Ariba and Supplier.io 14. Data analytics capabilities are enhanced by Splunk Enterprise 55. PSE also leverages cloud services from Microsoft Azure 27, Oracle Database and Oracle Utilities 52, and Salesforce CRM 52. Internal collaboration and project management are supported by Microsoft SharePoint and Azure DevOps 57, while the public website content is managed using Sitecore CMS 57.

The OT environment is characterized by the extensive use of SCADA systems for real-time monitoring and control of the electric power grid 40. Key communication protocols within the OT environment include DNP3 and Modbus 67. PSE is actively modernizing its OT infrastructure by implementing IP-based SCADA networks 45. The integration of distributed energy resources (DERs) such as solar and storage is facilitated by the use of smart inverters that adhere to SunSpec interoperability standards and communicate using protocols like IEEE 2030.5, DNP3, and Modbus TCP 67. Power Conversion System (PCS) controls are essential for managing the energy flow from these DERs and storage systems 67. While legacy remote telemetry units are still present, PSE is in the process of replacing them as part of its modernization efforts 45.

PSE is actively pursuing digital transformation across its operations. A significant focus is on grid modernization, which involves substantial investments in new equipment, software, and communication platforms to enhance reliability, efficiency, and the integration of clean energy resources 11. Cloud adoption is another key aspect of their digital transformation strategy, with a move towards Microsoft Azure for various services and data management 27. PSE is also deploying smart technologies, including ADMS for real-time grid monitoring and control, AMI for advanced metering and communication with customers, and smart street lighting for energy efficiency and remote management 24. The development of a Virtual Power Plant (VPP) with AutoGrid is underway to aggregate and manage distributed energy resources 39. Furthermore, PSE has implemented a "Get to Zero" initiative focused on enhancing digital customer service capabilities 81.

PSE's network architecture is evolving with the modernization of its infrastructure. While traditionally relying on serial communication in the OT environment, the implementation of modern IP-based SCADA networks indicates a shift towards IP-based communication 45. The integration of wireless networks is also becoming increasingly important for connecting smart devices and enabling remote management 44. There is also potential for the use of LTE cellular and broadband technologies to facilitate communication with distributed energy resources 73.

PSE's data center strategy involves a hybrid approach. While they maintain traditional data centers, including four existing facilities that are being consolidated 82, they are also adopting modular data centers for increased scalability 82. A strategic move towards cloud services is evident with the adoption of Microsoft Azure for various applications and data storage needs 27. This hybrid strategy allows PSE to leverage the benefits of both on-premise and cloud infrastructure 46.

Recognizing the need to upgrade its aging infrastructure, PSE has ongoing modernization efforts targeting various systems. This includes the replacement of legacy analog networks and obsolete remote telemetry units 45, upgrades to electric distribution and transmission systems 38, and the replacement of aging underground electric cables 38. Additionally, PSE is modernizing its internal operations, such as warehouse management, with the implementation of SAP EWM 83.

**4. Assessment of Security Posture:**

PSE demonstrates a strong focus on both cybersecurity and physical security, recognizing the critical importance of protecting its infrastructure and ensuring reliable service 84. The company has a dedicated Security, Risk and Compliance team led by a Chief Information Security Officer (CISO), Eileen Figone 84. This team includes managers responsible for IT Cyber Defense Center, Cyber Risk Management, and IT Compliance, indicating a structured approach to addressing various aspects of cybersecurity 84. PSE adheres to industry best practices and security standards, including NIST-IR 7628, which is specifically designed for smart grid cybersecurity 72. The company also possesses knowledge of established security and internal control frameworks such as ISO 27001, NIST 800-53, COBIT, and COSO 87, and has experience in implementing and managing compliance requirements like NERC and SOX 87. A proactive approach to security is further evidenced by their focus on developing and maintaining comprehensive IT security policies, standards, and best practices 87.

While primarily focusing on proactive measures, PSE has experienced security-related incidents. In November 2024, a "bomb cyclone" caused power outages in King County, highlighting the impact of severe weather events on energy infrastructure 55. More concerning are the physical attacks on substations that occurred in December 2022, affecting both PSE and Tacoma Power. These incidents involved vandalism and fire, indicating potential vulnerabilities in the physical security of critical infrastructure and the potential for significant service disruptions 88. PSE acknowledges a general awareness of threats to power systems and takes these matters seriously 89. There has also been a reported increase in physical security incidents targeting the energy sector 90. Despite these incidents, PSE maintains a focus on cyber risk management and actively works to protect its systems from potential cybersecurity threats through risk assessments, vulnerability management, and penetration testing 87.

As a regulated utility, PSE operates within a stringent compliance and regulatory landscape. The Washington Utilities and Transportation Commission (UTC) provides oversight on various aspects of PSE's operations, including rates, services, and facilities 17. Compliance with NERC Transmission Planning (TPL) Reliability Standards is essential for ensuring the reliability of the bulk electric system 45. PSE also adheres to regulations outlined in the Washington Administrative Code (WAC), which cover areas such as conservation targets and resource planning 18. A significant regulatory driver is the Clean Energy Transformation Act (CETA), which mandates PSE's ambitious transition to clean energy and requires the development of detailed implementation plans 3.

PSE employs a proactive risk management approach to identify and mitigate technology and security risks. Their Cyber Risk Management team plays a crucial role in conducting risk assessments, managing vulnerabilities, and performing penetration testing to identify and address potential weaknesses in their systems 87. The development and implementation of security policies and procedures provide a foundational layer of defense 87. Continuous monitoring and incident response capabilities are in place to detect and address security incidents effectively 87. Safety and compliance standards are also integral to their overall risk management strategy 87.

**5. Vendor Relationships and Technology Procurement:**

PSE has established relationships with a diverse range of technology vendors and partners to support its operations and strategic initiatives. AutoGrid (part of Schneider Electric) is a key partner in the development of PSE's Virtual Power Plant 39. Modern Hydrogen is collaborating with PSE on innovative decarbonization technologies 11. EnergyCAP provides software solutions for energy management 52. SAP serves as a critical enterprise resource planning (ERP) system, managing various core business processes 51. Salesforce CRM is utilized for managing customer interactions 52. Microsoft is a key cloud provider through its Azure platform 27. Opower provides a customer service platform to enhance customer engagement 28. Form Energy is partnering with PSE to evaluate multi-day energy storage solutions 20. Uplight and GridX are collaborating with PSE on time-varying rate pilot programs 11. ISN supports PSE in managing contractor safety and compliance 119. Auritas provides content management solutions for PSE's SAP environment 58. Bates White Economic Consulting serves as an independent evaluator for PSE's RFPs 36.

PSE employs a structured approach to technology procurement. They utilize formal Requests for Proposals (RFPs) to acquire new energy resources and potentially other significant technology solutions 21. The procurement team reviews supplier registrations through the Supplier.io portal and manages source-to-pay processes using SAP Ariba 14. PSE encourages participation from diverse suppliers in its procurement processes 21. Voluntary and targeted RFPs are issued based on identified needs 21. Technology purchases related to large-scale processing, data storage, and application platforms undergo evaluation 77. In some cases, independent evaluators are involved in the RFP process to ensure objectivity and fairness 36.

**6. Technical Challenges and Strategic Focus:**

PSE faces several technical challenges as it undertakes significant grid modernization and clean energy transition initiatives. Integrating new technologies such as DERs, energy storage systems, and electric vehicle charging infrastructure with the existing grid presents complexities related to interoperability, grid stability, and managing bidirectional power flow 11. Ensuring the reliability and stability of the energy supply during this transition is paramount and requires careful planning, robust monitoring, and advanced control systems 11. Managing a large and geographically diverse service area adds another layer of complexity to infrastructure upgrades and security management 3. PSE must also navigate the evolving regulatory landscape, particularly ensuring compliance with the Clean Energy Transformation Act (CETA) and aligning technology investments accordingly 3.

The transition to renewable energy sources has a significant impact on PSE's technology and security. Integrating intermittent renewable generation (wind, solar) requires advanced grid management systems with sophisticated forecasting and control capabilities to ensure a stable energy supply 11. The integration of battery storage solutions is crucial for enhancing grid stability and managing peak demand, introducing new assets that require careful monitoring and robust security measures 11. Furthermore, the increasing deployment of renewable energy assets and smart grid infrastructure necessitates heightened cybersecurity considerations, as these new systems may have different security protocols and vulnerabilities compared to traditional infrastructure 87.

PSE is actively exploring and adopting emerging technologies to address these challenges and achieve its strategic goals. Virtual Power Plants (VPPs) are being developed to aggregate distributed energy resources and provide grid services 11. The Advanced Distribution Management System (ADMS) is being implemented for real-time grid monitoring and control 24. Battery storage projects are being tested and deployed across various scales 11. Smart Street Lighting is being adopted for energy conservation and remote management 41. PSE is also exploring clean hydrogen technology through a partnership with Modern Hydrogen as a potential pathway for decarbonizing its natural gas system 11. Community microgrid demonstration projects are underway to enhance local resilience and integrate renewable energy sources 33. Additionally, PSE is evaluating multi-day energy storage solutions with Form Energy to address the intermittency of renewable energy 20 and exploring transportation electrification to support the adoption of electric vehicles by its customers 8.

**7. Digital Footprint Analysis:**

PSE maintains a significant digital footprint through its public website and various online services. The comprehensive website (pse.com) serves as a central hub for customers to access information about services, programs, energy efficiency tips, renewable energy options, and customer support resources 27. Customers can manage their accounts online, including paying bills, tracking energy usage, and submitting service requests 27. Real-time information on power outages is provided through an outage map and reporting tools 27. PSE also offers information on rebates and incentives for energy-efficient upgrades and renewable energy adoption 11. For customers interested in solar energy, PSE provides resources for interconnection and net metering 37. Suppliers and vendors can access a dedicated portal (Supplier.io and SAP Ariba) for registration and submitting proposals for RFPs 36. PSE has also launched a Clean Energy Planning website to promote transparency and engage stakeholders in the development of its Integrated System Plan (ISP) 11.

PSE actively engages with the public through social media platforms, including Facebook and Twitter 55. The company utilizes its newsroom and press releases to disseminate important announcements, partnerships, and project updates 8. To ensure data privacy, PSE employs secure messaging for communicating sensitive account information via email 135. Customers can also interact with PSE through a dedicated mobile app 81.

**8. Conclusion and Strategic Implications for NCC Group:**

Puget Sound Energy is a utility undergoing a significant transformation driven by clean energy mandates and the need to modernize its infrastructure. This analysis reveals a complex hybrid technology environment encompassing both IT and OT systems, with a growing reliance on cloud services and smart grid technologies. PSE demonstrates a commitment to cybersecurity, but the occurrence of physical security incidents suggests potential vulnerabilities in their overall security posture. The company's active engagement with a diverse range of technology vendors through formal procurement processes highlights its focus on innovation and modernization.

These findings present several strategic opportunities for NCC Group:

* **OT/ICS Cybersecurity Services:** PSE's reliance on SCADA systems and industrial control protocols like DNP3 and Modbus, coupled with the modernization of its OT infrastructure, creates a demand for specialized OT cybersecurity services. NCC Group's expertise in OT security assessments, vulnerability management, and incident response can help PSE secure its critical operational systems.
* **Renewable Energy and Smart Grid Security:** The integration of renewable energy resources and the deployment of smart grid technologies like AMI and ADMS introduce new security challenges. NCC Group can offer tailored security solutions for these emerging areas, ensuring the secure integration and operation of DERs and smart grid infrastructure.
* **Cloud Security Assessments:** PSE's adoption of Microsoft Azure necessitates expertise in cloud security best practices. NCC Group can provide cloud security assessments, configuration reviews, and ongoing monitoring services to ensure the security of PSE's cloud-based applications and data.
* **Physical Security Assessments:** The physical attacks on PSE's substations underscore the importance of a holistic security strategy that includes physical security. NCC Group's capabilities in physical security assessments can help PSE identify and mitigate vulnerabilities in its critical infrastructure.
* **NERC-CIP Compliance Consulting:** As a regulated utility, PSE must comply with NERC-CIP standards. NCC Group's expertise in regulatory compliance can assist PSE in meeting these requirements, including risk assessments, control implementation, and audit preparation.
* **Web Application Security Testing and Digital Footprint Analysis:** PSE's significant digital footprint, including its customer-facing website and online services, requires robust security measures. NCC Group can provide web application security testing, vulnerability assessments, and digital footprint analysis to identify and address potential weaknesses.
* **Security Awareness Training:** To complement technical security measures, NCC Group can offer security awareness training programs for PSE employees and contractors, helping to mitigate risks associated with human error.

NCC Group should position itself as a trusted partner to Puget Sound Energy, emphasizing its comprehensive expertise in both IT and OT security within the energy sector. Highlighting experience with regulatory compliance, cloud security, and the unique challenges of grid modernization and clean energy transition will resonate with PSE's strategic priorities. A phased approach, starting with detailed security assessments, would allow NCC Group to demonstrate its value and build a long-term relationship with PSE.

**Table 1: Puget Sound Energy's Clean Energy Goals and Timelines**

| **Goal** | **Target Year** | **Relevant Snippets** |
| --- | --- | --- |
| Coal-free electricity | 2025 | 3 |
| Carbon-neutral | 2030 | 3 |
| 100% clean electricity | 2045 | 3 |

**Table 2: Puget Sound Energy's Key Technology Vendors**

| **Vendor Name** | **Technology/Service Provided** | **Relevant Snippets** |
| --- | --- | --- |
| AutoGrid (Schneider Electric) | Virtual Power Plant Development | 39 |
| Modern Hydrogen | Decarbonization Technology | 11 |
| EnergyCAP | Energy Management Software | 52 |
| SAP | ERP System | 51 |
| Salesforce | CRM System | 52 |
| Microsoft | Azure Cloud Services | 27 |
| Opower | Customer Service Platform | 28 |
| Form Energy | Energy Storage Technology | 20 |
| Uplight | Clean Energy Technology, Customer Engagement | 11 |
| GridX | Enterprise Rate Platform | 118 |
| ISN | Contractor Management System | 119 |
| Auritas | Content Management for SAP | 58 |
| Bates White Economic Consulting | Independent Evaluator for RFPs | 36 |

**Table 3: Summary of Potential Security Vulnerabilities and NCC Group's Relevant Services**

| **Potential Vulnerability Area** | **Description based on Analysis** | **NCC Group's Relevant Services** |
| --- | --- | --- |
| OT/ICS Security | Integration of IP-based SCADA, communication protocols (DNP3, Modbus), and DERs expands the attack surface. | OT/ICS security assessments, vulnerability management, penetration testing, incident response. |
| Cloud Security | Migration to Azure requires securing cloud configurations, data, and applications. | Cloud security assessments, configuration reviews, threat detection and response. |
| Physical Security | Recent attacks on substations highlight vulnerabilities in physical security controls. | Physical security assessments, risk analysis, converged security strategies. |
| Regulatory Compliance | Mandatory compliance with NERC-CIP requires specialized expertise. | NERC-CIP compliance consulting, audit preparation, control implementation. |
| Web Application Security | Customer-facing online services (website, account management, supplier portal) are potential targets. | Web application security testing, vulnerability assessments, penetration testing. |
| Converged IT/OT Security | Increasing integration requires a unified security strategy across both environments. | Integrated IT/OT security assessments, converged security program development. |

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