

## Deployment Planning

**Voltage as a Service (VAAS)**<sup>TM</sup> is an energy-saving service solution for regulating and optimising the voltage supplied to electrical equipment to the optimal level for efficient operation. The purpose of VAAS is to reduce energy consumption, lower electricity bills, and decrease carbon emissions by ensuring that electrical devices operate at their most efficient voltage level.

### Planning steps

Deploying a VAAS system involves several planning steps to ensure the system's effectiveness, cost-efficiency, and integration with existing infrastructure. This Application Note provides a structured approach for planning the deployment of a VAAS system

#	Step	Description
1	<b>Define Objectives and Requirements</b>	Determine the primary goals of the VAAS project, such as reducing energy consumption, lowering electricity bills, improving power quality, or extending the lifespan of electrical equipment.
2	<b>Conduct an Initial Site Survey and Assessment</b>	<b>Site Audit</b> The VAAS service provider will assess the electrical infrastructure, including the main distribution board, transformers, and any existing voltage regulation equipment. Identify voltage levels at different points in the facility and note any voltage fluctuations.
		<b>Load Profile Analysis</b> The VAAS service provider will analyse the load profile to understand the variability and demand patterns of the facility. This will help the VAAS service provider in deciding between dynamic and fixed ratio systems.
		<b>Power Quality Measurements</b> The VAAS service provider will Measure power quality parameters like voltage stability, harmonic distortion, power factor, and transient voltages to identify areas where VAAS can provide the most benefits.
3	<b>Identify Potential Savings and Benefits</b>	<p>The VAAS service provider will estimate potential energy savings based on the initial site survey data and the expected impact of voltage reduction on different types of loads (e.g., lighting, motors, HVAC systems).</p> <p>The facility owner/operator should evaluate other benefits such as reduced equipment wear and tear, lower maintenance costs, and enhanced power quality.</p>
4	<b>Select the Appropriate Technology</b>	<p>The VAAS service provider will choose between dynamic and fixed ratio voltage optimisation based on the site requirements:</p>
		<b>Dynamic Voltage Optimisation (DVO)</b> Suitable for sites with varying load profiles that need real-time voltage adjustments.

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		<p>Fixed Ratio Voltage Optimisation (FRVO)      Ideal for sites with stable load profiles where a constant voltage reduction will suffice.</p> <p>The VAAS service provider will Select the appropriate VO equipment, such as VO units, transformers with tap changers, or electronic voltage regulators, depending on the chosen optimisation strategy.</p>
5	<b>Develop a Project Plan and Budget</b>	<p>Cost Estimation      The VAAS service provider will be making the capital investment, so the they will prepare their own internal budget that includes equipment costs, installation costs, potential site modifications, ongoing maintenance, and monitoring.</p> <p>ROI Analysis      Perform a Return on Investment (ROI) analysis considering potential energy savings, reduced equipment replacement costs, and other benefits.</p> <p>Timeline      Develop a project timeline that includes the advised project timetable provided by the VAAS service provider (who is responsible for all equipment procurement, installation, testing, commissioning, and training phases).</p>
6	<b>Ensure Regulatory Compliance and Obtain Approvals</b>	<p>Verify that the deployment complies with relevant electrical standards and regulations (e.g., IEEE, IEC) and any local grid code requirements.</p> <p>Obtain necessary approvals from regulatory bodies, utility companies, and internal stakeholders.</p>
7	<b>Select VAAS Service Provider</b>	<p>Engage an experienced service provider specialising in voltage optimisation and electrical systems.</p> <p>Choose reputable suppliers for VAAS systems to ensure quality, reliability, and after-sales support.</p>
8	<b>Design and Engineering</b>	<p>Electrical Design      The VAAS service provider will create their own detailed electrical designs and schematics for the VAAS system, including placement of VAAS units, connections to the main distribution board, and integration with existing electrical infrastructure.</p> <p>Control and Monitoring System Design      If implementing DVO, the VAAS service provider will design the control and monitoring system to allow for real-time adjustments based on load conditions.</p>
9	<b>Prepare for Installation</b>	<p>Coordinate with the VAAS service provider will to schedule installation at a time that minimises disruption to facility operations.</p> <p>The VAAS service provider will ensure all necessary equipment, tools, and materials are on-site and ready for installation.</p>
10	<b>Install and Commission the System</b>	<p>The VAAS service provider will install the VO equipment according to the design specifications and safety standards.</p> <p>The VAAS service provider will conduct thorough testing and commissioning to ensure the system operates correctly and achieves the desired voltage optimisation and power quality improvements.</p>



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		The VAAS service provider will verify system integration with existing infrastructure and any control and monitoring systems.
11	<b>Training and Documentation</b>	<p>The VAAS service provider will provide training for facility staff on operating and maintaining the VAAS system, including understanding system parameters, monitoring performance. The VAAS service provider will be responsible for troubleshooting common issues.</p> <p>The VAAS service provider will create comprehensive documentation, including system schematics, operation manuals, and maintenance schedules that might be applicable.</p>
12	<b>Monitor Performance and Fine-Tune the System</b>	<p>The VAAS service provider will establish a process for ongoing monitoring of the VAAS system's performance using energy management software or monitoring tools. The VAAS service may include a cloud dashboard for tracking key metrics such as voltage levels, energy consumption, power quality, and equipment performance.</p> <p>The VAAS service provider will adjust system settings, especially for dynamic systems, to optimise energy savings and power quality based on actual load conditions.</p>
13	<b>Evaluate Results and Report Savings</b>	<p>After a defined period, evaluate the system's performance against initial objectives. Measure energy savings, power quality improvements, and overall ROI.</p> <p>Provide a detailed report to stakeholders highlighting the benefits, savings achieved, and any recommendations for further optimisation.</p>

## Conclusion

Effective planning for a VAAS system deployment will be largely performed by the VAAS Service Provider, who will acquire a thorough understanding of site requirements, and perform careful selection of technology, precise engineering design, and detailed post-installation monitoring. Each step will be carefully executed VAAS Service Provider to ensure that the VAAS system delivers the expected benefits and integrates seamlessly with existing infrastructure.

Voltage as a Service (VAAS) offers both immediate and long-term financial benefits while aligning with broader strategic goals related to sustainability, operational efficiency, and risk management. These benefits make VAAS an attractive proposition for businesses looking to reduce energy costs, enhance their environmental credentials, and improve their overall competitiveness.

Voltage as a Service (VAAS) can provide a very useful contribution to a company's plans to meet its Carbon emission targets, as well as reporting requirements. Voltage as a Service (VAAS) provides the right voltage to electrical equipment, ensuring efficiency, cost savings, environmental benefits and performance reporting while maintaining equipment performance and longevity.

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