

Success Story: Turnkey substation modernization

Market Served
Food and beverage manufacturing



Eaton designed and built a new substation for a national food and beverage manufacturer's facility concerned with downtime during expansion

Location:

Northeast, US

Segment:

Food and beverage manufacturing

Solution:

Turnkey substation modernization

Problem:

How to address growing demand without causing disruptions

Results:

Eaton served as a "one-stop" shop and delivered a 69kv substation with two new step down transformers, provisions for two future transformers and two full 5kV main-tie-to-main switchgear lines ups offering full redundancy to accommodate expected customer loads with provisions for future growth.

"The customer not only benefited in the short term cost savings and design advantages, but Eaton also provided solutions and the necessary platform that will address potential future concerns."

Background

An established food and beverage manufacturer faced a challenging situation; how to address growing demand without causing service and manufacturing disruptions. There are typically three options – expand the existing facility, build a brand-new facility, or purchase and refurbish an existing facility.

Regardless of the solution implemented, the customer was faced with almost doubling the size of the existing power distribution system, which would require building a new substation or significantly expanding the existing infrastructure.

Challenge

Determine the best solution to enable growth in the manufacturing facility, while coordinating with local utility provider and complying with all standard requirements.

Solution

Eaton has been involved in high voltage substation construction for over 20 years and is ideally suited to undertake a substation project of this magnitude; long project duration requiring multiple disciplines including engineers, construction managers and project managers. Eaton worked with a consulting firm that acted as a liaison with the customer. Eaton provided a comprehensive turnkey / EPC solution for the 69kV to 5kV substation, providing different priced alternatives and conceptual designs best suited to the customer.

Once the customer decided to expand the existing facility, Eaton looked at areas next to the existing substation and concluded that building a new substation adjacent to the existing substation could minimize downtime and outages during load transfer. There were multiple discussions with the consultant and the customer that centered around the technical details – transition between old and new substations and connection between the outdoor substation and facility load, power ratings, redundancy and resiliency in terms of cost benefit features with the new equipment.



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From a technical point of view, the customer's existing facility had two 69kV lines coming into a Main-Tie-Main arrangement through two overloaded step down transformers that were over 40 years old. Eaton's proposed solution involved a 69kV substation with two new step down transformers, provisions for two future transformers, two full 5kV main-tie-to-main switchgear lines ups offering full redundancy to accommodate expected customer loads with provisions for future growth.

Resiliency and redundancy were important factors for the customer and Eaton's solution met those requirements by providing two new 12 MVA transformers so that if one of the transformers goes offline, the other transformer can run the plant with sufficient capacity.

Eaton also designed the solution to meet potential future requirements – base arrangement with concrete foundations, grounding and conduits were provided, enabling the customer to add two more transformers in the future if necessary, without any major hassle or downtime.

Eaton designed and built a block building complete with a cable vault to house the 5kV switchgear, control panel, station service loads, and battery system.

The overall solution was designed with safety as a top priority while also performing regular maintenance without causing any downtime and load shortages. The customer could control the equipment from a remote panel within their office. Integral remote racking was provided to enhance safety by placing distance between maintenance personnel and operation of the switchgear.

Results

Eaton completed the project within the customer's timeframe, leveraging in-house expertise to provide the best-in-class, turnkey solution coordinating with the customer, consulting firm and the utility. The project provided the customer:

- **A safer substation**

The existing substation required the customer to call the utility every time any type of switching was needed. Due to the equipment's age, this could have resulted in downtime in the facility. The new equipment recommended and installed by Eaton allowed autonomous switching of the transformers without calling the utility. Eaton's fully redundant substation improves the safety and reduces the likelihood of potential production and revenue loss for the next 40-50 years.

- **Cost savings**

Eaton angled the yard for the substation eliminating the need for an additional 69kV utility pole and lines, saving the utility both money and time. Also the 5kV switchgear was constructed with a cable vault underneath providing flexibility to swap and add loads providing potential future cost savings.

- **The design advantages**

Eaton built a custom protection house to fit all the customized controls into the substation. The protection house was fabricated and tested offsite prior to installation to minimize installation and onsite commissioning. The provision for two future transformers significantly eases the customer's engineering requirements allowing for potential future expansion of the facility.

Summary

In summary, Eaton provided a solution that met the customer's current demand requirements, provided cost savings through design advantages and developed solutions to meet the customer's future needs.



Block building containing switchgear



Duplex control board complete with HMI, control switches and 69kV relays (on opposite side, not shown)

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Printed in USA
Pub No: CS027007EN / GG
November 2019

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