



RELIABLE

Keeping the traffic flowing

Avenue2 (Maastricht, The Netherlands)

Europe's first double-decker tunnel relies on EcoStruxure
to deliver peace of mind for operators & commuters

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Life Is On

Schneider
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An infrastructure first for Europe

The A2 motorway near the Dutch city of Maastricht has long been an important route for traffic to and from Belgium, Germany, and France. As the gateway to Southern Europe, it has also long been a source of major traffic congestion. Add local traffic to the mix and that translates to around 45,000 vehicles using the motorway every day.

Since the opening of the (Koning Willem-Alexander) tunnel in December 2016, however, approximately 80% of the peak-hour congestion has successfully been diverted, with the cross-city bypass now taking five minutes instead of the previous 30 minutes or more.

The 2.3km tunnel took five years to build and is the first of its kind in Europe, effectively separating local traffic from transit traffic through four tunnel tubes stacked on top of each other.

The project was also part of the city's integrated sustainability plan by allowing the community to claim back the *parklaan*, or green space on top of the tunnel. Replacing the original highway with 2000 trees not only offered an idyllic green promenade for pedestrians and cyclists, as well as property and economic opportunities for the community, but more importantly, it reconnected a city that was previously divided.

The A2 tunnel construction project was carried out by the Avenue2 Consortium, consisting of construction engineering company Ballast Nedam and contractor Strukton, following a comprehensive planning period.

Stringent new tunnel standards

The tunnel's unique and complex design led the Dutch Ministry of Infrastructure and the Environment to introduce a new National Tunnel Standard (the Landelijke Tunnel Standard or "LTS") to ensure that the highest standards of safety and security were

Goal

Deliver a comprehensive monitoring and control solution that would successfully and safely manage the complex automation demands of Europe's first dual-level tunnel used by more than 45,000 vehicles a day.

Solution

Complete automation & energy distribution systems based on EcoStruxure for Industry, the IIoT-enabled architecture and platform with integrated software.

Results

- Tunnel control system that successfully satisfies more than 10,000 requirements of the National Tunnel Standard
- High availability, real-time redundancy solution minimizes the possibility of tunnel closures
- Delivered on time and on budget, with 80% of the peak-hour traffic congestion successfully diverted

adhered to. As a result, more than 50 different traffic and tunnel management technical installations were implemented in accordance with the new LTS. Each ensures smooth traffic flow, preventing and detecting incidents, as well as ensuring sufficient measures are in place for timely responses to emergencies. Operating these 50+ subsystems – including energy supply, lighting, ventilation, emergency stations, CCTV surveillance, fire alarm systems, and more – presented a number of complexities, however.

An integrated tunnel control system

Schneider Electric was selected as the end-to-end partner to manage the efficient monitoring and control of the various tunnel and traffic-related subsystems throughout the system. The solution is built on Schneider’s EcoStruxure, the IIoT-enabled architecture and platform, with integrated software and expert services.

The full system architecture comprises:

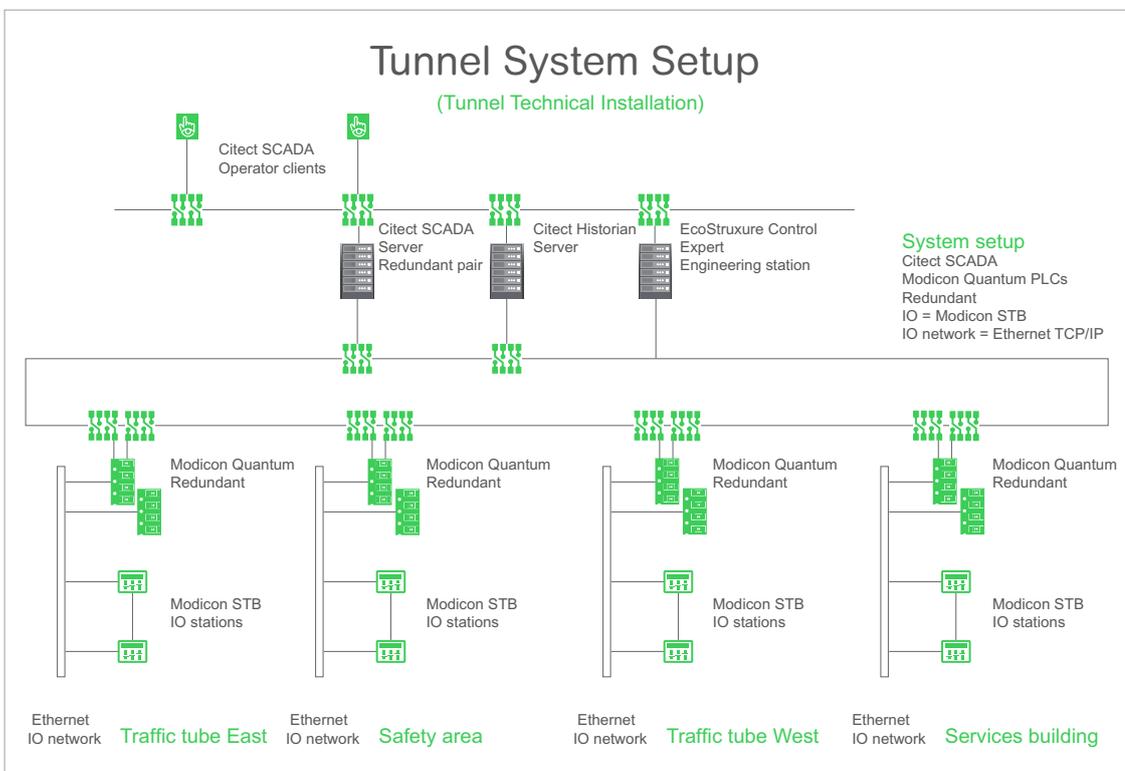
- AVEVA’s* Citect SCADA redundant servers
- AVEVA’s* Citect Historian

- Modicon Quantum PLCs (7 redundant PLCs with hot standby and 3 single PLCs)
- Modicon STB I/O (300 STBNIC2212 | 10,000 I/O)
- Unity Application Generator (UAG) and EcoStruxure Control Expert
- M580 PLCs and Magelis HMI
- Ethernet IP and Modbus TCP
- MV transformers and switchgear
- LV iPCB, LV distribution and Altivar drives
- UPS
- Sensors (>1000)

Citect SCADA, with redundant Citect SCADA servers integrated with hot standby Quantum PLCs, is at the heart of the control system that is responsible for the entire tunnel automation and energy distribution system. Because of the LTS requirements, as well as the need to consistently translate those standards into the PLC control system, a comprehensive software guideline was written with a dedicated library built for the equipment layer. The equipment layer was then generated from the central design database with the functional specification translated directly into the software.

“During the design and realization phases, we worked closely together to coordinate these automated systems with each other. We are very proud that we have finalized this project with Schneider Electric on time and with success.”

— Hans van Engelen,
Project Manager,
Traffic & Tunnel Technical
Installations (VTTI)
Software, Avenue2



Central command rooms: The brains of the tunnel

The A2 tunnel is operated from two main command rooms, one located in a service building at the south end and the other on the north side. These rooms function as the “brains of the tunnel,” managing the data convergence for the entire tunnel system as well as monitoring and controlling the more than 50 tunnel and traffic-related systems.

System failures are not an option for such a critical application. The solution’s robustness – thanks to the high levels of reliability and availability of the Quantum PLCs, configured with EcoStruxure Control Expert software, and Citect SCADA – and its adherence to the stringent tunnel standards were key to its selection for the project.

The tunnel’s Citect-based SCADA control system ensures that the vast volume of monitored information is seamlessly

displayed to operators in a user-friendly graphical interface on workstations in both control rooms. Operators can view the system status in real time, taking swift corrective action as needed on any of the tunnel and traffic-related technical subsystems being remotely controlled.

More than a solution partner

Close collaboration and transparency between all the parties involved in the A2 project were vital to the project’s successful delivery. From the outset, and throughout the extensive planning period, everyone remained firmly focused on the ultimate objectives and fully committed to completing the tunnel within the set timeframe and allocated budget.

Schneider Electric went beyond being a solution partner to actively collaborating in the project team, ensuring the project was successfully delivered on time.

“It’s extremely rewarding to see our integrated solutions at the heart of such a significant infrastructure project for The Netherlands that will continue to have a positive impact on the community for years to come.”

— Maaïke Nieuwenhuis,
Business Development
Manager,
Schneider Electric



80%
of peak-hour traffic
congestion diverted

EcoStruxure™ Plant

Innovation At Every Level



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EcoStruxure™

Innovation At Every Level

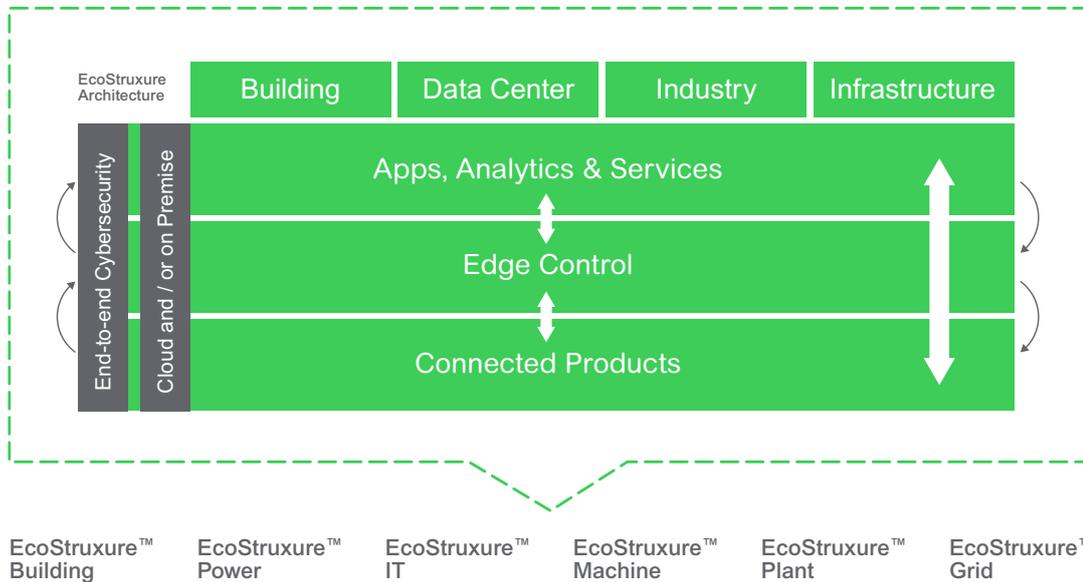
IoT-enabled solutions that drive operational and energy efficiency

EcoStruxure is Schneider Electric’s open, interoperable, IoT-enabled system architecture and platform.

EcoStruxure delivers enhanced value around safety, reliability, efficiency, sustainability, and connectivity for our customers.

EcoStruxure leverages advancements in IoT, mobility, sensing, cloud, analytics, and cybersecurity to deliver Innovation at Every Level including Connected Products, Edge Control, and Apps, Analytics & Services. EcoStruxure™ has been deployed in 480,000+ sites, with the support of 20,000+ system integrators and developers, connecting over 1.6 million assets under management through 40+ digital services.

One EcoStruxure architecture, serving 4 End Markets with 6 Domains of Expertise



Connected Products

The Internet of Things starts with the best things. Our IoT-enabled best-in-class connected products include breakers, drives, UPSs, relays, sensors, and more. Devices with embedded intelligence drive better decision-making throughout operations.

Edge Control

Mission-critical scenarios can be unpredictable, so control of devices at the edge of the IoT network is a must. This essential capability provides real-time solutions that enable local control at the edge, protecting safety and uptime.

Apps, Analytics & Services

Interoperability is imperative to supporting the diverse hardware and systems in building, data center, industry, and grid environments. EcoStruxure enables a breadth of agnostic Applications, Analytics, & Services for seamless enterprise integration.

Find out more about EcoStruxure

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Learn More



Discover EcoStruxure™:
Innovation at Every Level



Explore the solutions of
EcoStruxure for Industry



Drive productivity with
Modicon controllers



Discover Magelis HMI



Discover Software



Contact us to find out more

Schneider Electric

Schneider Electric Industries SAS
35, rue Joseph Monier - CS 30323
F92506 Rueil-Malmaison Cedex, France

www.schneider-electric.com

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