

WITH A CLEAR HEAD AND COMPASSIONATE HEART

DIGITAL SYSTEM COCKPIT IN EVENT OF EMERGENCY SITUATIONS:
WORKFORCE MANAGEMENT INCLUDING GEO MAPPING ENABLES RAPID
RECONSTRUCTION OF NATURAL GAS SUPPLY IN THE AHR REGION

USER STORY



A photograph of a construction site. Several large, flexible pipes are laid out on a muddy, debris-strewn ground. One prominent pipe is bright yellow, while others are black. The pipes are surrounded by broken concrete blocks, wooden planks, and other construction materials. In the background, a person's legs are visible, suggesting active work. The scene is brightly lit, indicating daytime.

[illegible]

After water masses had receded, it was quite obvious that devastated grid damages had taken place such as among other things 133 km of destroyed natural gas pipelines, 14 damaged or destroyed gas pressure regulating stations, eleven destroyed Ahr crossings and thousands of affected grid connections. On the next day it was clear that the reconstruction would mean a race against time, specifically the winter of 2021/22.

Martin Friedrich, Team Leader Workforce Management in the Technical Information Systems Department at enm, outlines in an interview the solutions adopted and describes the role of IT in restoring the gas supply in the badly affected lower Ahr region.

A circular portrait of Martin Friedrich, a man with short brown hair and a beard, smiling. He is wearing a dark blue suit jacket over a white collared shirt. The background of the portrait is a blurred outdoor scene with greenery and a building.

Martin Friedrich
Team Leader Workforce Management in the Technical
Information Systems Department Energieversorgung
Mittelrhein AG

From the grid operator's point of view: What was the first indication of the extent of the disaster?

Martin Friedrich: Water and sludge incursions and washing away of the entire pipeline ensured that there were large gas losses in the affected area during the disaster. Since it was no longer known where gas was still controlled and where it was leaking out of the pipeline, the valves were closed. With the shutdown, the pressure in the pipeline dropped, so that additional water was able to penetrate into the gas pipes and partly also into house connections via heating boilers, which were under water.

Foto: Sascha Ditscher/evm



What was your core task in the weeks and months after 15 July 2021?

In addition to the pipeline reconstruction our focus was on repairing the gas connections in domestic, commercial and industrial sectors, this meant decommissioning the connections, repairing and recommissioning. We are responsible for ensuring that gas is available as quickly as possible. The customer is then responsible for the heating system.

"There are a lot of tasks that needed to be promptly coordinated."

Martin Friedrich, Team Leader Workforce Management in the Technical Information Systems Department, enm

What challenges do you face on day 1 after the Flood?

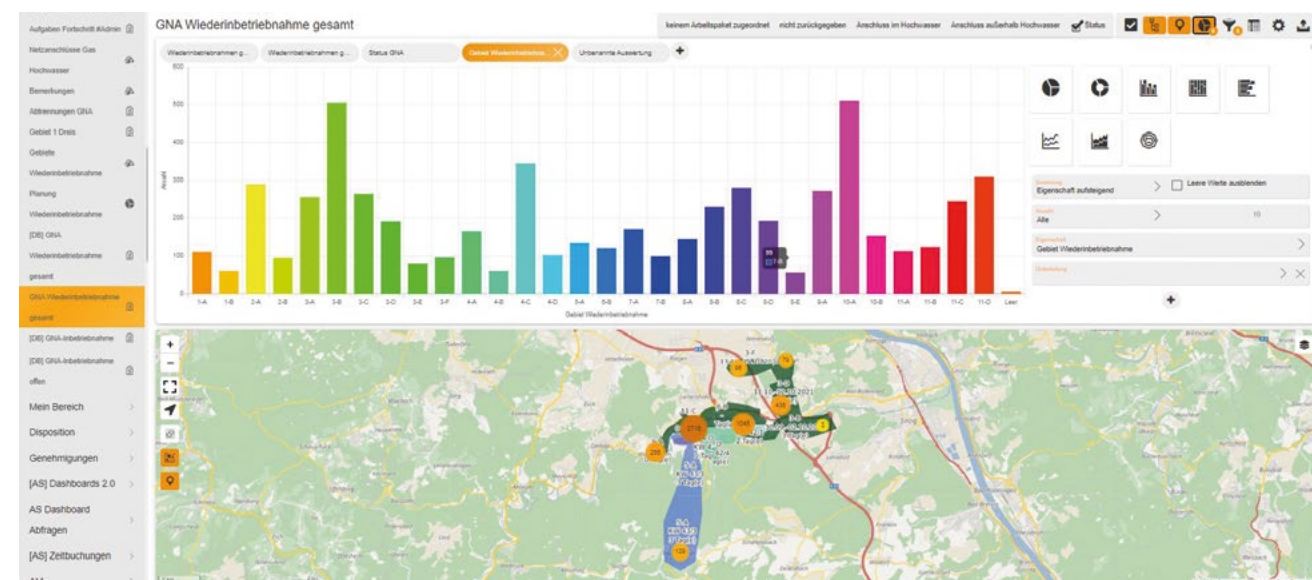
Personnel were ordered from various companies. At first we assessed outside damages especially the local pipe grid. We started immediately shutting down all services in buildings, before supply could be resumed, all gas connections had to be closed. We're talking about over 7,000 connections in the lower Ahr region, the taps had to be closed and sealed in every building so that the pressure could be put back into the grid as soon as possible.

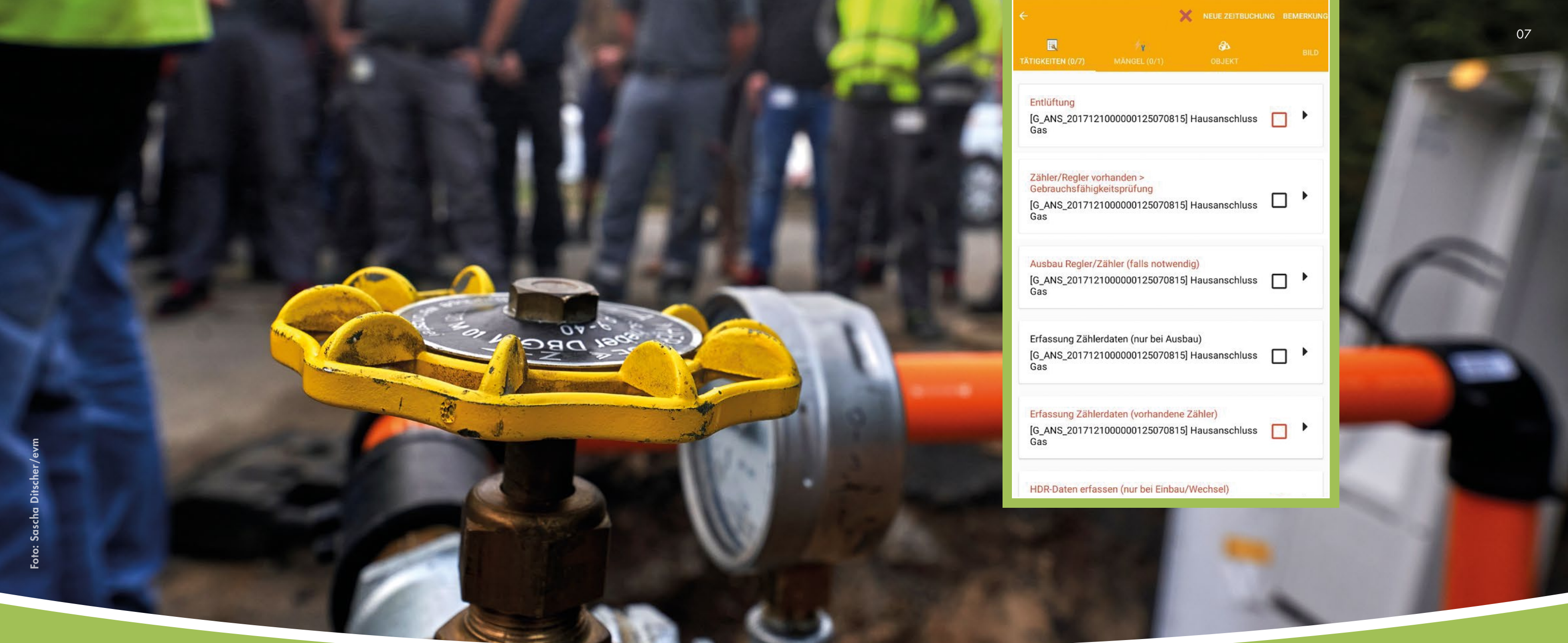
More than 7,000 gas connections had to be checked in the lower Ahr region: Which parameters were prioritized?

There was no priority necessary for decommissioning. We could only work on areas as far as access was possible, many areas were destroyed in such a way that there was no access possible for recommissioning, however we primarily focused on the pipe grid, and then we worked on areas that could be put back into operation the quickest way possible.

If life and limb are directly endangered a proper documentation of all shutdowns is of secondary importance as the 15 July 2021 situation in the lower Ahr region was different. The flood as well as the danger to life were gone, but the destruction was existent, as well as an almost incomprehensible mass of tasks that had to be quickly completed before winter. How did you start?

In the beginning, we tried to understand the available blueprint. First we marked our local positions in order to carry out the shutdowns, however, this practice soon reached its limit because of the number of connections as well as the high number of employees being so large that it was very difficult to monitor everything. There are multiple tasks that have to be coordinated easily and promptly.





←
NEUE ZEITBUCHUNG
BEMERKUNG

TÄTIGKEITEN (0/7)
MÄNGEL (0/1)
OBJEKT
BILD

Entlüftung

[G_ANS_2017121000000125070815] Hausanschluss Gas ☐

Zähler/Regler vorhanden > Gebrauchsfähigkeitsprüfung

[G_ANS_2017121000000125070815] Hausanschluss Gas ☐

Ausbau Regler/Zähler (falls notwendig)

[G_ANS_2017121000000125070815] Hausanschluss Gas ☐

Erfassung Zählerdaten (nur bei Ausbau)

[G_ANS_2017121000000125070815] Hausanschluss Gas ☐

Erfassung Zählerdaten (vorhandene Zähler)

[G_ANS_2017121000000125070815] Hausanschluss Gas ☐

HDR-Daten erfassen (nur bei Einbau/Wechsel)



5
MONTHS

after the emergency situation in the Ahr region, gas supply was completed. "With the support of numerous partners from all over Germany, we succeeded in rebuilding and repairing a total of 133 km of gas pipeline that had been affected and partially destroyed by the flood," explained Josef Rönz, Chairman of the Board of evm. Regarding gas control stations, river crossings and other facilities had been built. In total, the

evm-Group invested around 25 million euros in reconstructing the gas grid. By mid-December 2021, the result of these efforts was a complete service of all intact gas heating systems in the Ahr region. The evm-Group fully achieved its target to restore gas supply in the affected area by December 2021. A total of 8,250 grid connections in the Ahrweiler region were affected by the flood and initially cut off from the gas supply.



80
GRID OPERATORS

as well as energy suppliers, pipe and civil engineering companies, engineering firms and installation companies from all over Germany lent a hand from July to December 2021 in the Ahr region. "In total, more than 500 employees from external companies and about 230 employees of the evm Group were involved. I deeply express my sincere thanks to everyone for this fantastic joint effort," emphasized Josef Rönz, Chairman of the evm board.



Approx. 90
TECHNICIANS

at peak times were working simultaneously to carry out decommissioning, repairs and recommissioning of the gas connections. They were always in contact with the operations center and dispatch via the GS-Touch workforce app. Our mobile app was also used to document the complete work, this was necessary to carry out the subsequent activities before the beginning of winter in a professional manner according to applicable law.

What results did you draw from this, as time passed?

In order to manage all these damages quickly, we decided on a really solid combined system of a Geo-information and the GS-Service. For many years this system has been proved in a day to day planning and maintenance program as well as in keeping record of operations and documentation. Although in general we also worked on established and well structured communities, streets and houses, we decided to work on maps because water knows no borders.

"Water knows no borders. That's why we decided to use the map during reconstruction."

Martin Friedrich, Team Leader Workforce Management of Energieversorgung Mittelrhein AG

How can you describe the cooperation between GIS and workforce management?

Firstly we clustered the flooded region and divided "Bad Neuenahr - Ahrweiler" into sectors, so everybody was well informed about all geo data. All data was visualized with QGIS maps, so the instruction service had all information because of the various colors showing the single objects and their processing status. The GIS was fed with current data from GS-Service and the dispatchers could see from the display who was working where and when.



Apropos: How did the technicians receive the correct information?

The orders were synchronized on the mobile app, the company's own staff as well as the external workers were also equipped in the course of training, therefore everybody was able to start directly without having morning meetings, the availability of 70 additionally prepared tablets meant that we had a maximum of 45 devices in use, i.e. 90 people outside.

The GS-Touch app is the mobile solution of our GS-Service system, it offers a daily task overview with a map, where you can record defects, take pictures and report completed tasks on site. The information is synchronized with the database continuously or after the shift.

How did the information promptly return to the operations center? How did dispatchers and technicians communicate?

The technicians outside called the operations center to request new tasks. The dispatcher marked and filtered the selected work package, name and recorded information via the system, the work allocation was thus done and appeared on the tablet, it has proven itself during decommissioning and recommissioning. To illustrate it a little more concretely, the technician receives new tasks, synchronizes the task list, which is available offline. All in all, this was exactly what we needed.

To what extent?

When necessary, the app was quickly set up or modified, we had work packages including short and coherent checklists with documentation of the most important data. All needed information ended in everyday scheduling and controlling, directly in the center of GS-service data pool.

With a clear head and compassionate heart: Your company received a lot of help from all over the country, especially technical workers from outside were readily available. Did they all worked on the same app?

Precisely, without the app we couldn't have been able to integrate all technicians. They all had been trained on the system so they were quickly operational. Because of regular staff changes we did a lot of training. All tasks could be handled by GS-Touch system including the use for task completion. We preconditioned that a primarily set up checklist also controls all local work. This procedure is so self evident that for us it is easy to forget, but we all know that this is a fundamental help for external workers.

You talked about the easy handling of the app. Why was it necessary?

Because we didn't know all needs from the very beginning. For us the situation was also very new and we were enabled to modify our GS-Touch. Either way we had a grateful start to our decommissioning work. The first area we worked on was not flooded, so it was manageable for us to start. We clustered an entire area, and from the beginning the tablets provided a helpful start enabling us to assign tasks and objects via app/tablet. Using a scanned in Identity card, the results could be easily related to the technicians. In case of problems, it was possible to correct items later on, therefore we connected all external technicians on the basis of our system data, which was ideal for us.

In the centrally flooded area, did you only sent your own technicians?

It varied. In some cases, regulators and meters had to be removed or the connection had to be

completely disconnected due to the main connection having water damage due to water in the main line. The technicians were then able to enter comments in the app and document the whole thing with a photo. Via app the technicians were able to comment and document using a photo at the same time, we recorded all meter data in our GS-Touch during decommissioning.



The race against time was omnipresent: In order to be operationally effective, how did you optimize all procedures?

Besides the map view and the app on the tablets, the dashboards from GS-Web were certainly

our real wild cards. GS-Web is also a GreenGate browser-based mobile application, one connects to a website, log's in and starts, with GS-Web we had direct information about status and progress per area together with a number of tasks scheduled, open or completed.

"Besides the map view and the GS-Touch app on the tablets, the dashboards from GS-Web were certainly our real wild cards."

Martin Friedrich, Team Leader Workforce Management in the Technical Information Systems Department, enm

Together with a number of analyzed tasks/processes. This was our biggest success in planning work in the field. Everyone understood where and what was being done because of the monitoring possibilities of GS-Web, for a utility this is optimal. It was also obvious that we had a solid data base for continuous public information. In this context we at enm were all aware that Greengate as our software provider increased the number of mobile licenses to 250 free of charge for half a year.

How was the recommissioning undertaken on the IT side?

For the recommissioning, we again created a task definition on the tablets in GS-Touch. The work steps and documentation were based on object properties that had been stored for each object based on findings from the de-commissioning. This included documenting the venting, whether it be meters/controllers, removal if necessary, resealing systems if the pipes were damaged and recording data on the system.

In retrospect how did the recommissioning proceed?

It was simpler for our area because people were already familiar with GS-Web and GS-Touch. The acceptance from the start showed that we had something which actively supported the entire process. Such a major task would not be feasible with pieces of paper or Excel lists. With current, consistent inform from the operational

management system at your fingertips, one is already very well positioned. Via GS-Web an overview of the current status and progress in the respective area was always at hand. In addition, a reliable planning and forecast for the work ahead had to be derived.

To what extent are regulations actually relevant in this context?

Regarding regulations we are very precise, the last person to work on the installation is ultimately

responsible. In the case of facilities where we were able to carry out the commissioning ourselves with an installer and pipes were tested for serviceability. Flue gas measurements were then taken. The primary goal was for the customer to once again have heating, hence cooperation with supporting installers from various guilds to put the system back into operation, no exception was made in this situation.

A final assessment was recorded in GS-Touch to have an overview of the situation.

Please give us a brief summary: According to the experiences from the Ahr region, what are the prerequisites for being able to act quickly and precisely in the event of a disaster?

Firstly, one should always pay attention to consistent data, i.e. have an up-to-date digital shadow of the infrastructure and processes. Secondly, flexible IT systems that can be adapted to the situation are needed. Thirdly, colleagues who think and act pragmatically are indispensable. In the end, they are the real key to success.



APPLIKATIONS- STECKBRIEF

User

Energienetze Mittelrhein GmbH & Co. KG (enm)

Industry

Energy supply

Supported processes

- House connection control
- Fault management
- Valve control
- Construction measures
- Resource planning
- Disposition
- Controlling

Software used

GS-Service* - GS-Manager - GS-Touch -
GS-Web - QGIS**

Challenge

- Max. 5 months time to restore gas supply to over 7,000 connections in the Ahr region flood area
- Effective workforce management with the involvement of personnel, some of whom were not local
- Intersubjective, time and location-independent provision of information on infrastructures and processes
- Mobile, legally compliant, enm-compliant and intuitively applicable documentation and feedback of completed activities/damage/deficiencies
- Flexibility of scheduling in ongoing operations, including consideration of current evaluations

Procedure

Digitally recorded infrastructures, equipment, spare parts and personnel in the GS system matched with QGIS; external personnel continuously trained in the use of GS-Touch; issue of tablets accessible via identity card to two-person teams; documentation of completed activities/damage/deficiencies while on the road; results-dependent disposition during ongoing deployment.

GreenGate services

Comprehensive support in process analysis and conceptual design of the application for disaster relief; support in customizing/adapting applications GS-Touch and GS-Web; increase to 250 mobile licenses for 6 months free of charge

Result

Enm was able to completely restore the gas supply in the Ahr region within 5 months and thus at the beginning of the heating season.

**As a subordinate system to ERP, GS-Service from GreenGate integrates planning, documentation and monitoring functions and business applications into an information and management system for e.g. workforce management, operations management, maintenance and materials management. The object-oriented software - designed as a scalable client/server solution - is based on standard technology and works under current Microsoft operating systems. Due to the open system architecture, GS-Service can be connected to other systems (GIS, ERP, DMS, PLM, CRM, PLS, SPS). GreenGate mobile applications such as GS-Touch and GS-Web run on common end devices (smartphone, tablet, etc.) with common operating systems (Android, iOS). GS-Touch covers standard workflows for tasks, activities and events. GS-Web is the browser-based application (intranet/internet) for viewing, editing and analyzing content from the GS-System.*

***QGIS (formerly Quantum-GIS) is a free geographic information system software for viewing, editing, capturing and analyzing spatial data.*



GreenGate AG, based in Germany (Windeck) and Switzerland (Seengen), has been developing highly adaptable and innovative software solutions for the maintenance of plants and infrastructures since the year 2000. Customers from the manufacturing industry as well as the energy, water and wind sectors use the GS-Service software in the area of technical plant and spare parts management, maintenance planning and for operational management tasks.

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