seedz.

Energy for good.

Application platform as a service.
effective | reliable | secure

Energy for good.

We close the gap and secure existing infrastructures with Seedz® smart gateway solution DataWeeder®.
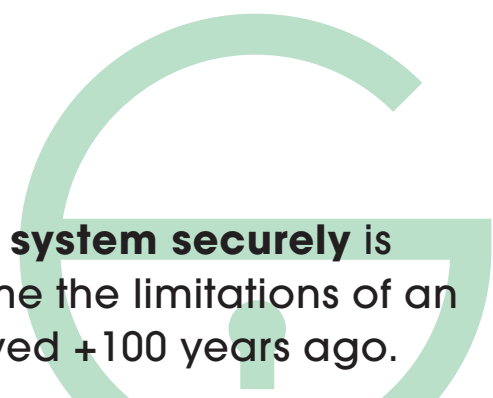
Seedz provides an application Platform as a Service (aPaaS), which contains a data capturing and machine learning solution. It transfers secure and encrypted remote data from e.g. substations via IP connection based on common IEC protocols and Modbus.

Current status: changing technology and security challenges

Utilities are in the process of a **paradigm change,** moving from a grid built over the past **100 years** into smart energy/**Grid 2.0** while securing the daily operations for their mission-critical infrastructures. Balancing conventional and renewable energy is essential to maintain high power quality. At the same time, utilities are facing the digital transformation from circuit-switched into packet-switched technology, superseding the aged installed legacy base.

This challenge effectively means to define secure **migration strategies** to the new systems under Grid 2.0, while protecting and securing sensitive communications and industry applications.

Current solutions such as **SCADA-Systems are basically static** and use **generic tunnels** to connect remote substations, where front-end-servers use various different VPN's (Virtual Private Networks) or IPSec (Internet Protocol Security) implementations. The structure of IPsec-VPNs is complex, error prone and costly. Commercial IPSec solutions are black-box approaches, therefore diverse firewall problems, security and access cannot be reliably controlled. Further, they require expensive VPN concentrators, especially using mobile networks for data communication. The use of pre-shared keys poses further security vulnerabilities and also increases the attack surface.

We know **unlocking the system securely** is the only way to overcome the limitations of an energy network conceived +100 years ago.

The future: what is different about Seedz platform compared to competitors?

Seedz application Platform as a Service (aPaaS) offers the possibility to virtualise your entire point to point connections to unlock your grid securely. Seedz aPaaS comes along with a smart gateway soltuion called DataWeeder™ offering a variety of interfaces to connect your assets securely (wired/wireless). Each DataWeeder™ contains a **crypto chip** and can be extended with **quantum cryptography**.

The connection acts as an intelligent proxy, capable of transmitting common IEC protocols such as IEC 60870-5-104 and Modbus using **end-to-end-encryption**. Seedz solution is highly scalable and capable of handling tens of thousands of DataWeeders™. Seedz uses **machine learning (ML)** algorithms to strengthen our platform security. We are ready to assist and work with our clients to develop a smarter management for a greener grid by using ML algorithms. As we provide a secure communication platform for the grid, our goal is to grow it into grid recommendation and assistance engine with real-time optimization of supply and demand.

Seedz solution was **designed with comprehensive security** in mind. In addition to end-to-end-encryption, the platform also implements individual **digital certificate infrastructure per customer** incl. a **crypto chip** in each DataWeeder™. Furthermore, it offers superior protection implementing elliptic curve cryptography (ECC), which utilizes faster, smaller, and more efficient cryptographic keys compared to conventional cryptographic methods. Our **public key infrastructure (PKI)** prevents non-authorised access and we have designed a specialised implementation of packet inspection of the IEC60870-5-104 protocol for each connection.

Seedz solution can be installed in parallel to the existing infrastructure and the Seedz team will provide integration services helping clients migrate to the new platform. Seedz platform provides out of the box integration with e.g. Highlight (IDS), we will work with utility providers to integrate and support their current SCADA Systems.
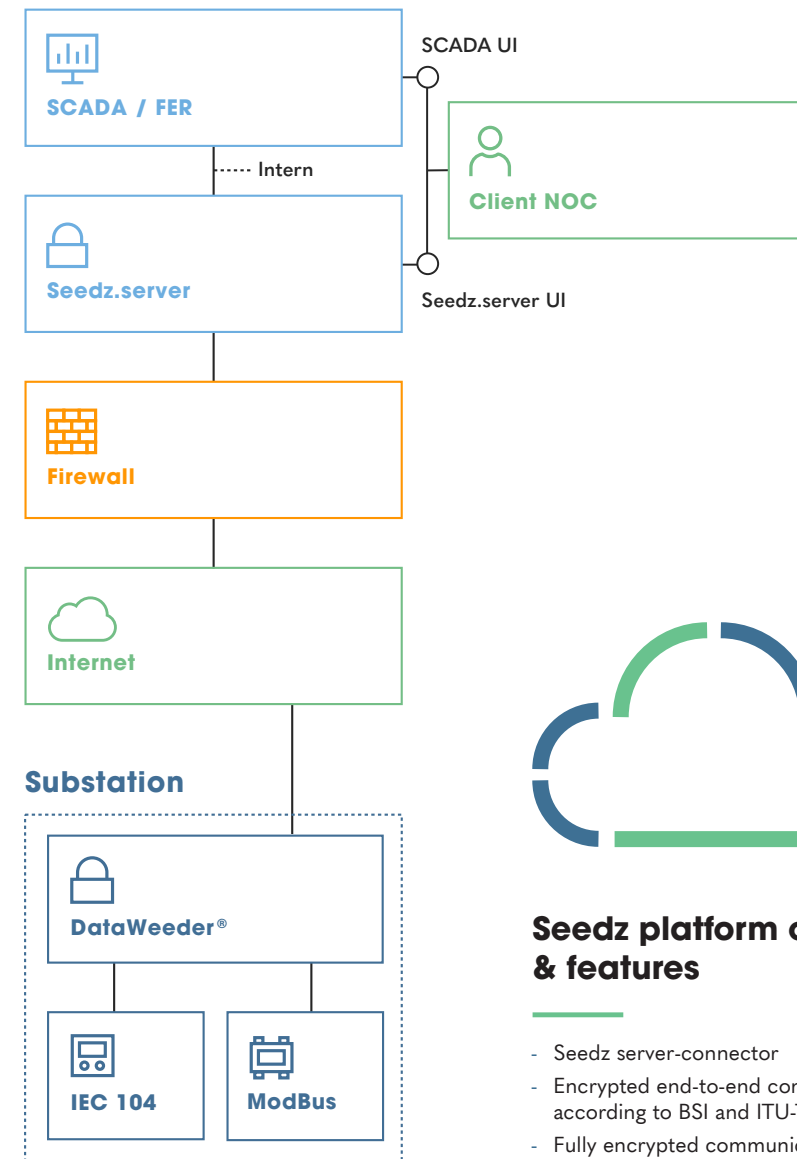
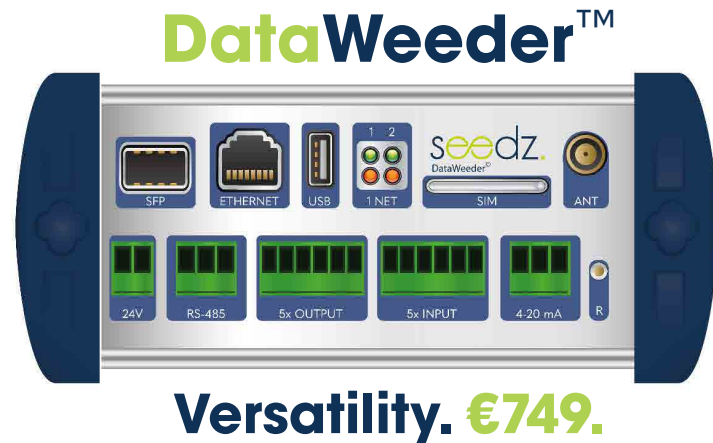## Seedz platform components & features

- Seedz server-connector
- Encrypted end-to-end communication according to BSI and ITU-T X.805 guidelines
- Fully encrypted communication (AES256)
- Electronic signatures and certification for authentification
- Authorization based on elliptic curve cryptography (ECDHA)
- Seamless platform updates, with possibility of a rollback
- DataWeeder™ (smart gateway solution)
- Interfaces to connect to SCADA systems via IEC60870-5-104 or Modbus
- SFP support (optical and copper)

Unlock your grid.

Unlock your grid securely with Seedz smart gateway solution DataWeeder™ and migrate your legacy into the digital age for a highly flexible and greener grid.
—

DataWeeder™

Versatility. €749.

Figure 1: Energy flow at a single node, which represents one country.
-> bus (thick horizontal line) -> energy carrier (electric, transport, heat, hydrogen and methane) ->different loads (triangles) -> energy sources (circles) -> storage units (rectangles) -> converters (lines connecting buses)

Solutions
—

SOLAR PRO

DataWeeder connects your inverter bi-directionally according to VDE-A-N 4105.

STORAGE

DataWeeder integrates and monitors your storage systems intelligently, securely and efficiently.

VEHICLE-TO-GRID

DataWeedeer optimises charging time and discharging electricity back into the grid at beneficial times.

METERING

DataWeeder connects securely into your smart meter infrastructure according to national security standards and regulations.

STREETLIGHTS

DataWeeder converts street lights into smart sensing to measure noise, CO2, temperature, fine particle emissions, NOX, etc.

BUILDINGS

DataWeeder monitors and optimises the flow of your heating technologies within your different densitiy areas to reduce your carbon footprint.
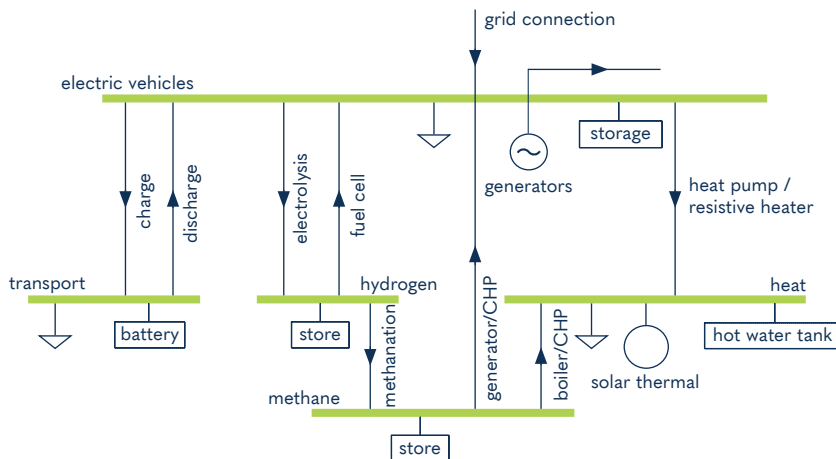
*ask for a quote of our monthly subscriptions of our solutions.

Sector coupling can **reduce over 35%** of total system costs.

Cost effective,
highly scalable and secure.

Exceeding industry standards
DataWeeder™ & Seedz system security.

Standards

- Compliant with NERC-CIP, BDEW whitepaper and ISO/IEC27000, security framework ITU-T X.805, complies also to minimum security standard according to § 8 clause 1 BSI

Encryption

- Complete end-to-end-encryption of enterprise networks
- Encrypted communication with TLS using elliptic-curve cryptography (ECC)
- Data encryption with AES256
- Cryptochip on DataWeeder™ available
- Quantum cryptography/Quantum key distribution*

Certification authority

- Every DataWeeder™ has its own unique key and a signed certificate, issued by Seedz certificate authority, which prevents non-authorised access

Compatibility

- Supporting IEC60870-5-101/104, Modbus
- Mobile Network 2G/3G*/4G/5G*/LTE
- Ethernet/SFP (fibre/copper)
- Powerline communication (PLC)*
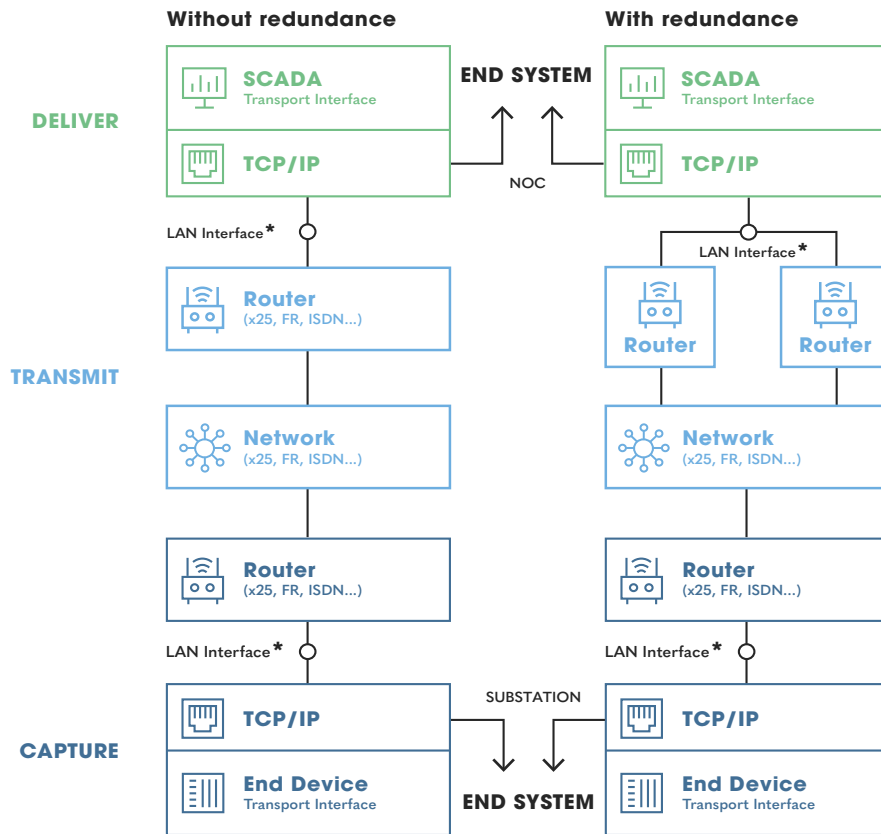- MBus*/MBus wireless*
- LTE450*/LoRa*

*upon request

We believe **inefficiency** and **waste** should be long gone concepts, when three hours of sunlight could power the earth for one year.

How does it work?
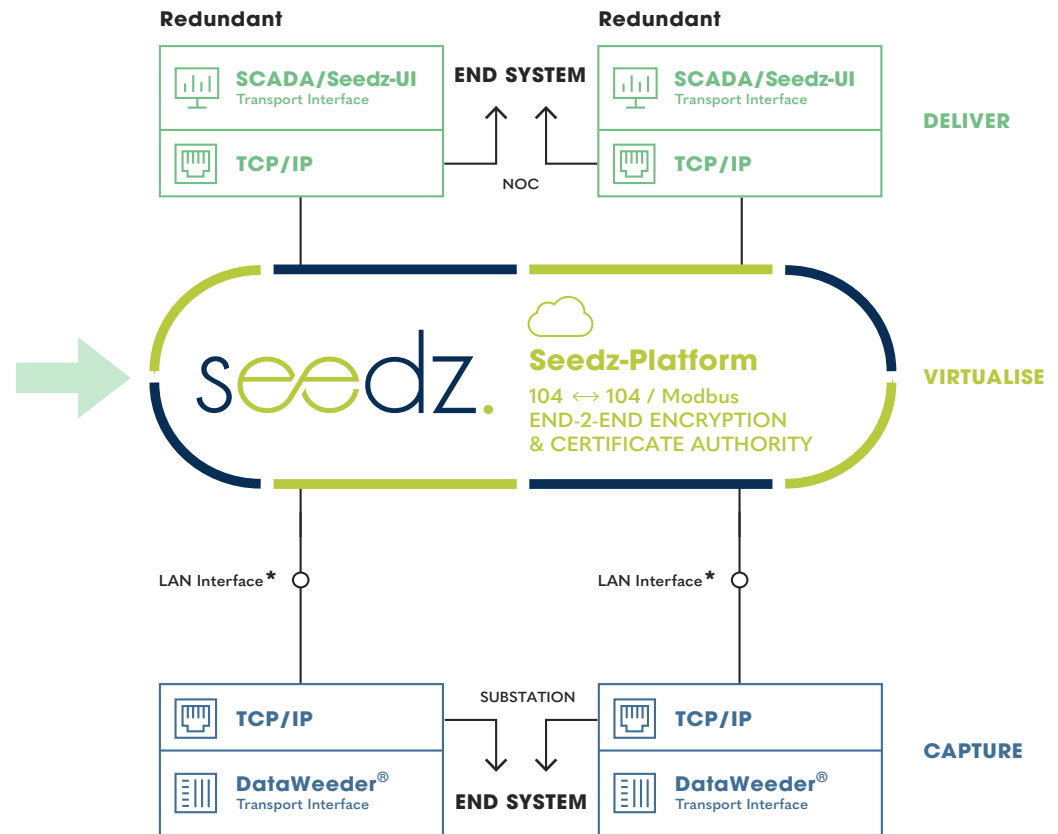
Example of secure virtualisation for substations.

1 DataWeeder™ installed in substation.

2 DataWeeder™ connects to one or more sensor(s) via IP Link using SFP/Ethernet/serial port (RS485), etc.

3 Connects securely with an encrypted connection (TLS) to Seedz server-connector (wireless/wired).

4 Checks server identity. Seedz server-connector prevents unauthorised access, verifies certificate legitimacy.

5 Connection provides secure bi-directional communication channel between SCADA and the IEC60870-5-104 supervisory control system in substations as well as Modbus.
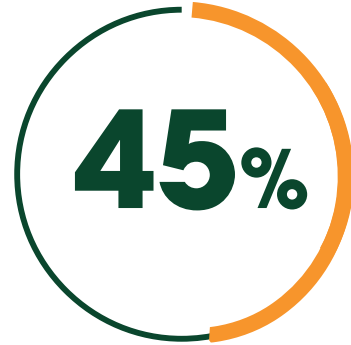
Legacy today

Without redundance

| DELIVER | SCADA Transport Interface |
| | TCP/IP |

END SYSTEM

NOC

LAN Interface *

TRANSMIT	Router (x25, FR, ISDN...)
	Network (x25, FR, ISDN...)
	Router (x25, FR, ISDN...)

LAN Interface *

| CAPTURE | TCP/IP |
| | End Device Transport Interface |

SUBSTATION

END SYSTEM

*LAN-Schnittstelle kann redundant sein

With redundance

| SCADA Transport Interface |
| TCP/IP |

LAN Interface *

Router   Router

Network (x25, FR, ISDN...)

Router (x25, FR, ISDN...)

LAN Interface *

| TCP/IP |
| End Device Transport Interface |

SUBSTATION

END SYSTEM

Seedz-Platform

Redundant

| DELIVER | SCADA/Seedz-UI Transport Interface |
| | TCP/IP |

END SYSTEM

NOC

Redundant

| SCADA/Seedz-UI Transport Interface |
| TCP/IP |

seedz.

Seedz-Platform
104 ↔ 104 / Modbus
END-2-END ENCRYPTION
& CERTIFICATE AUTHORITY

VIRTUALISE

LAN Interface *   LAN Interface *

| CAPTURE | TCP/IP |
| | DataWeeder® Transport Interface |

SUBSTATION

END SYSTEM

| TCP/IP |
| DataWeeder® Transport Interface |

2050

Germany's long-term goal to become largely greenhouse gas neutral by 2050.

We enable seamless access to renewable energy to create a new data-fueled energy era: agile | precise | secure.

45%

Share of renewable energies in gross electricity consumption in Germany 2021.

225 TWh

Total energy supply in Germany from renewable energy sources in 2021.

Energy for good**.**

youseedweweed AG
gotthardstrasse 26
6300 zug
switzerland
info@seedz.energy