

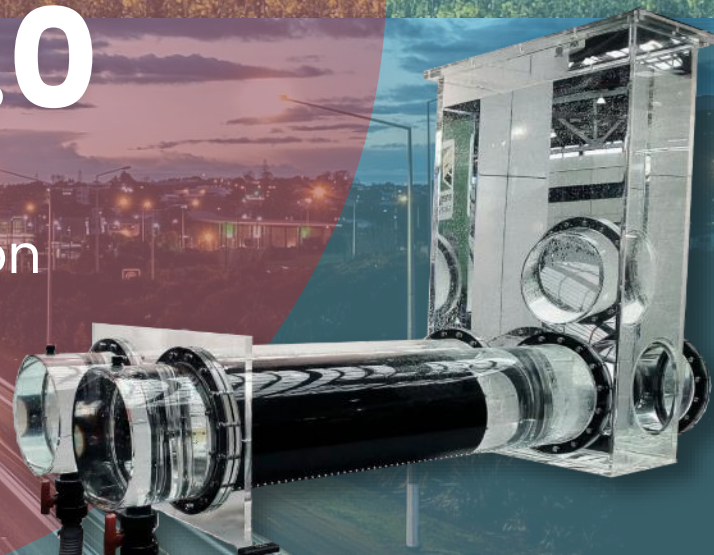


AGS PowerRoad 2.0

Buoyancy-Based Slipping
Forced Cooled Power Transmission

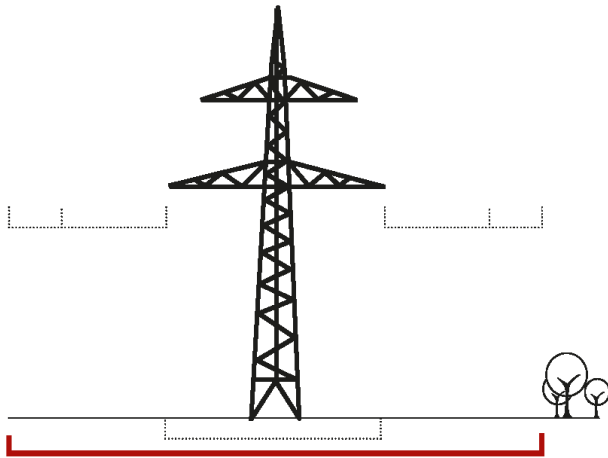
enabled by

AGS System-Technology

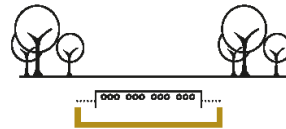




One of these power lines hardly takes up any space!



72 m



20 m



1,7 m

An aerial photograph of a forest with a large, cleared, brownish path or clearing running through it. The path is flanked by dense green trees. The word "Challenge" is written in large, white, bold letters across the bottom of the image. The entire image is framed by a large white circle.

Challenge



Challenge

- High-voltage power lines are essential for the future of energy supply, as renewables require constant transmission of power from sources to where it is most urgently needed
- The power grid is a **bottleneck of the energy transition** in Germany
- Grid expansion is **delayed by years** due to citizen protests against overhead lines, landscape conservation, legal claims of affected landowners
- Both land cables and conventional underground cables face similar problems: they take up **too much space, damage the environment** and are **not connected to other infrastructure** (roads)
- hoped-for acceleration of grid expansion through the option of underground cabling (since 2015) has not been achieved to date





Solution

AGS PowerRoad 2.0

In the AGS process, a so-called **cable-carrier pipe system** is inserted into a **water-filled duct**. In the state of “weightlessness”, the frictional forces between the cable-carrier pipe and the duct during installation are virtually zero in straight-line sections. This **minimizes used space** and **facilitates grid construction**.



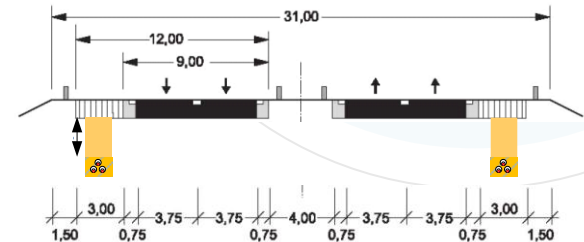
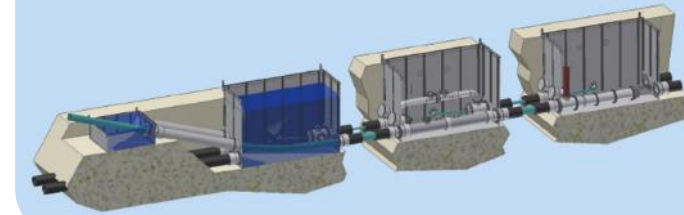
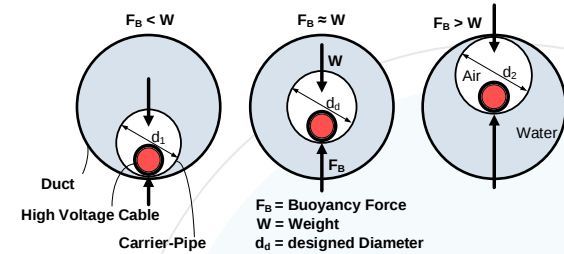
Solution: AGS PowerRoad 2.0

- Water-filled empty line pipe infrastructure can be an **integral** part of the existing basic road infrastructure due to minimal space required
- Flexible, reversible and easily exchangeable cable laying
- Active water cooling increases security and enables use of waste heat from power cables
- The imperative to **bundle different infrastructures**, such as roads and power lines, is anchored in German law



Solution: AGS PowerRoad 2.0

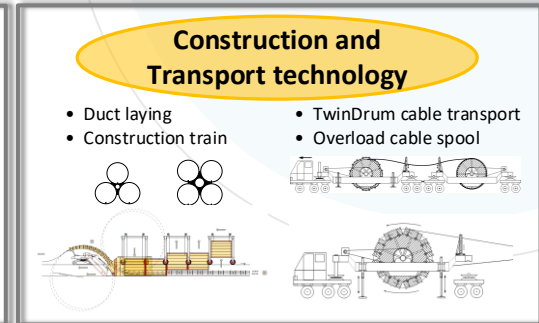
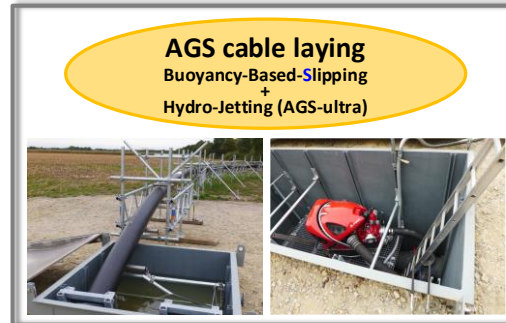
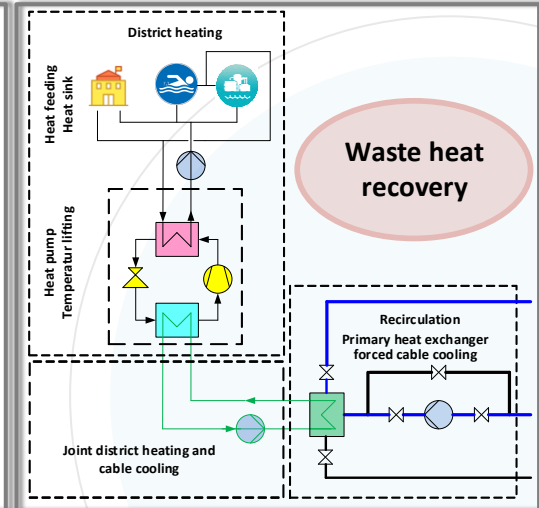
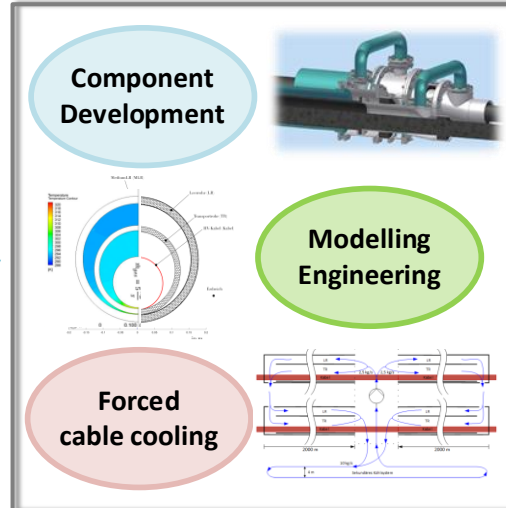
- AGS PowerRoad 2.0 is **already extensively tested**
- Reversibility, reduced use of space, longer cables and bundling with other infrastructure lead to **lower cost than conventional underground cables**
- Reduction of electromagnetic fields and generally **more environmentally friendly than conventional cable lines**
- More social acceptance enables **faster grid expansion**



AGS System-Technology

Simple and efficient –
360° complete process solution:

- Development & engineering
- Transport & construction
- Cable laying
- Forced cable cooling & waste heat recovery





Value Proposition



- **Market-ready system technology** which could also be universally deployed and **easily installed** by construction and installation companies using state-of-the-art technologies; innovative construction and installation technology for cable laying and replacement:

- **ultra-narrow** (< 2 m)
- **ultra-long** (> 2 km)
- **reversible**



- Flexibility that enables **adaptation to future technology standards**, i.e. it is possible to later replace the installed cables without repeated underground work and without having to install ducts again (conventional ducts carry great damage potential and are much more expensive during replacement)



- Can be **installed under roadways** and **combined with other infrastructure** such as the charging grid for electromobility or broadband internet



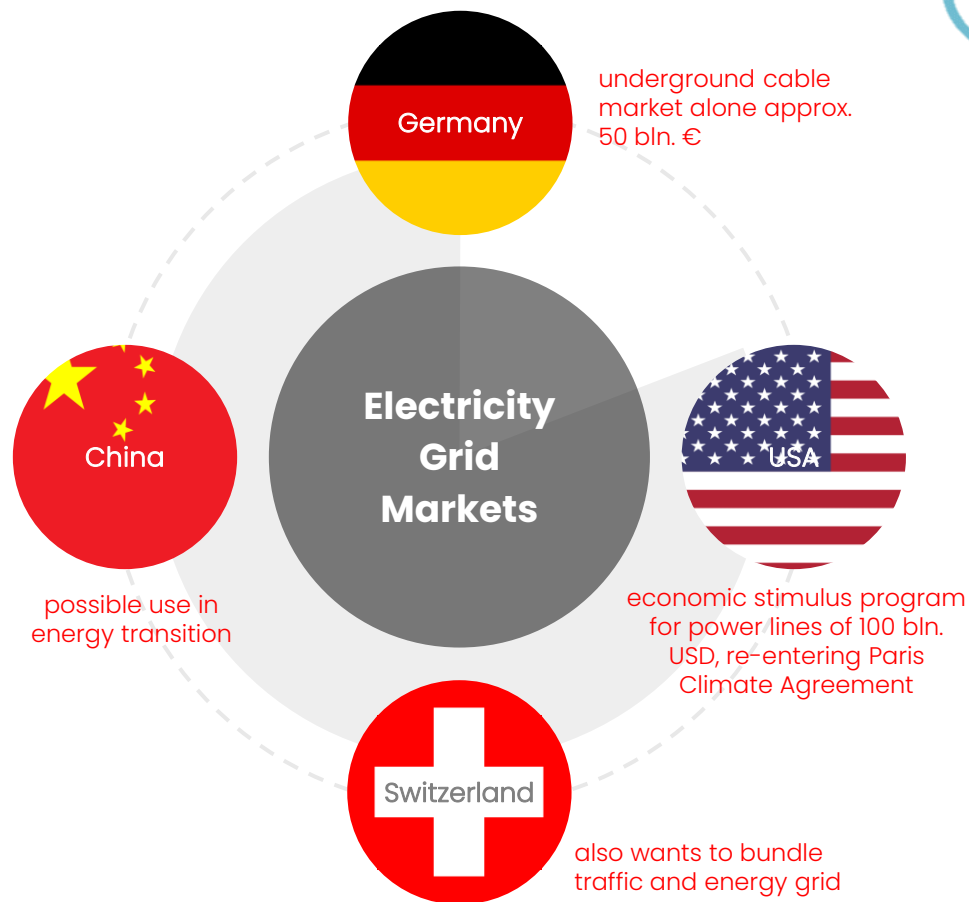
- **Water cooling** and optional **use of waste heat**



- No more lengthy approval processes – **profitable, sustainable, uncontroversial**

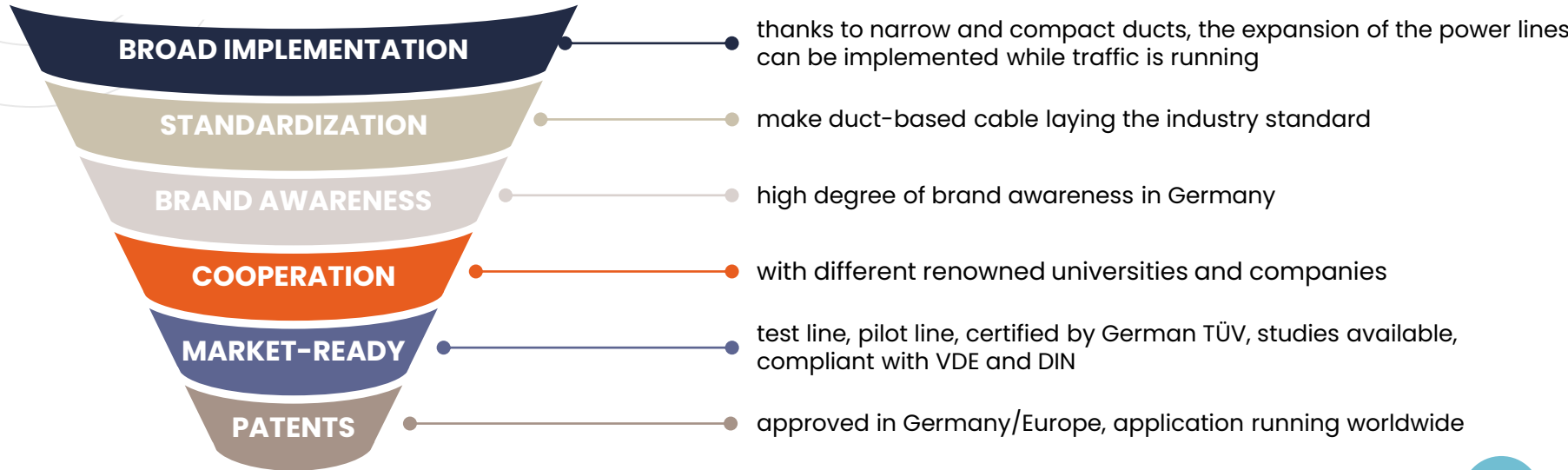
Market

- At least **80% of electricity demand** shall be covered by renewable energies by 2050; this **requires a considerable expansion and renewal of the electricity grid**
- The **legally prescribed priority of underground cables** for HVDC in Germany will make the energy turnaround even more expensive and thus further burden citizens and the economy; compared to conventional underground cable laying, **AGS is significantly cheaper**
- The German government's resource efficiency program ProgRes III defines **infrastructure bundling as strategic goal**





Market Strategy





Accolades



IKU, Innovation
Award for
Climate and
Environment,
2017



Energy Award,
2017



Hermes Award,
2017



German-Dutch
Business Award,
2017



Deutschland,
Land der Ideen:
Landmark in the
Land of Ideas,
2017



German
Renewables
Award, 2018



Euroforum Start-
up Award, 2019



Team



**Dr. Dipl.-Oec. Rolf
Hamann**

Founder, Director
Dinslaken Office



**Dipl.-Ing. Werner
Spiegel**

Founder, Director
Remscheid Office

Shareholder Structure:

- Stadtwerke Stade GmbH, Stade:
unmittelbare Beteiligung, 20%
- Thüga AG, München:
mittelbare Beteiligung, 4%

Contact

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