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PRESS RELEASE

WINTERSHALL DEA INVESTING IN HYDROGEN STORAGE AND TRANSPORTATION START-UP

- Wintershall Dea invests in hydrogen storage and transport solutions for a decarbonised energy supply
- AMBARtec's unique HyCS technology offers one of the most compact and efficient ways to store and transport hydrogen
- The HyCS storage system can flexibly get hydrogen to end consumers using standard 20-foot containers – by road, rail or sea

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Kassel/Hamburg. As part of its efforts to position itself along the hydrogen and CO₂ value chains, Wintershall Dea is investing in a promising new technology for storing and transporting hydrogen developed by the Dresden-based start-up AMBARtec AG. In the latter's recent funding round, Wintershall Dea became the start-up's lead investor via its fully-owned subsidiary Wintershall Dea Technology Ventures GmbH. In addition to underlining its confidence in AMBARtec's new technology, this investment also highlights Wintershall Dea's commitment to supporting the development of a hydrogen market in Germany and Europe.

Wintershall Dea is excited about AMBARtec's unique HyCS (Hydrogen Compact Storage) technology, as the system offers what is currently the most compact as well as one of the most cost- and energy-efficient

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methods to store and transport hydrogen. “We are continuously expanding our carbon management and hydrogen portfolio to help enable the decarbonised economy of the future,” says Hugo Dijkgraaf, Wintershall Dea’s Chief Technology Officer (CTO). “To scale up the hydrogen market, it will be key to have an efficient and flexible way to transport it – which is precisely where AMBARtec’s smart HyCS technology comes in.”

The HyCS technology is based on a process of loading and unloading hydrogen into a storage unit containing iron. The loading process involves reducing the iron by introducing hydrogen, which releases steam. To unload the hydrogen, steam is reintroduced into the storage unit, which oxidises the iron.

This novel technology, which has the potential to become a game changer in the storage and transportation of hydrogen, offers several advantages over conventional methods, including:

- **Compactness:** The HyCS technology offers the highest storage density available. For example, one litre of HyCS storage can store twice as much hydrogen as other hydrogen storage technologies – or 10 times as much energy as lithium-ion batteries.
- **Cost & Energy Efficiency:** This advantage in terms of compactness also translates into additional savings for transportation and storage space.



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- **Sustainability:** Iron is available readily, widely and in sufficient quantities to serve as a storage medium.

AMBARtec's HyCS storage system uses a standard 20-foot intermodal container (TEU) that can hold 600 kg (20,000 kWh) of hydrogen. These containers, which do not have to be cooled nor bear the danger of hydrogen losses, can be transported by truck, train or ship. At present, there is only a single vessel worldwide that is capable of and purpose-built for transporting liquid hydrogen. The hydrogen, which is maintained at a temperature of -253°C , is held in a single tank with a maximum capacity of 1,250 cubic metres. In comparison, this same volume could collectively fit into just 134 containers using the AMBARtec technology. Currently, the largest container ship can carry slightly over 24,000 TEU which represent 24,000 containers of the AMBARtec system.

"With our new shareholders, we are ideally positioned to roll out our technology into all relevant markets and applications," said AMBARtec CEO Matthias Rudloff. "Wintershall Dea is opening the door to the international energy business and enabling new business cases, and private investors will push us forward to decentralised and independent power islands based on green hydrogen."

Wintershall Dea, Europe's leading independent gas and oil producer, recently announced that it is expanding its activities in carbon management and hydrogen solutions. More detailed information on its



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plans for low-carbon hydrogen as well as carbon capture and storage (CCS) projects can be found online at: [Hydrogen & CCS | Wintershall Dea AG](#)

About Wintershall Dea

Wintershall Dea is Europe's leading independent natural gas and oil company with more than 120 years of experience as an operator and project partner along the entire E&P value chain. The company with German roots and headquarters in Kassel and Hamburg explores for and produces gas and oil in 13 countries worldwide in an efficient and responsible manner. With activities in Europe, Russia, Latin America and the MENA region (Middle East & North Africa), Wintershall Dea has a global upstream portfolio and, with its participation in natural gas transport, is also active in the midstream business. **More in our [Annual Report](#).**

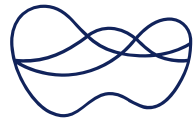
As a European gas and oil company, we support the EU's 2050 carbon neutrality target. As our contribution, we have set ourselves ambitious targets: We want to be net zero across our entire upstream operations – both operated and non-operated – by 2030. This includes Scope 1 (direct) and Scope 2 (indirect) greenhouse gas emissions on an equity share basis. Wintershall Dea will also bring its methane emissions intensity below 0.1 per cent by 2025 and maintain zero routine flaring of associated gas in its operations. In addition, we plan to reduce emissions resulting from the use of hydrocarbons by applying CCS and low-carbon hydrogen technologies, potentially building up a business abating 20-30 million tonnes of CO₂ per annum by 2040. **You can find more about this in our [Sustainability Report](#).**

Wintershall Dea was formed from the merger of Wintershall Holding GmbH and DEA Deutsche Erdoel AG in 2019. Today, the company employs around 2,500 people worldwide from almost 60 nations.

More information on the Internet at www.wintershalldea.com or follow us on [Twitter](#), [Facebook](#), [LinkedIn](#), [YouTube](#) and [Instagram](#).

About AMBARtec

AMBARtec AG is a technology start-up company in the energy and hydrogen



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storage business, founded and located in Dresden since 2020. With a scientific and engineering background and years of research, we developed our own Hydrogen Compact Storage (HyCS®) technology based on the reduction and oxidation of iron. The technology is in the upscaling phase to a storage capacity of up to 600 kilogram of hydrogen. The technology is available for reference projects from year 2023 on.

We, as AMBARtec, want the green energy transition to become a success story. That's why we have developed a robust process for storing renewable energy – based on hydrogen. Our innovative HyCS® technology will pave the way for sustainable system integration of renewable power.

For our clients, we plan and develop solutions for compact and long-term energy storage for transport, decentralised regeneration with combined heat and power (CHP) and peak shaving, and for the future mobility.