

Removing carbon from the equation

Sustainable flow control solutions
for effective carbon capture



Towards reliable and efficient carbon capture

To reach net-zero goals by 2050, carbon emissions must be heavily curtailed in industrial environments. Carbon capture, utilization and storage can help reach carbon targets with the help of Valmet's reliable and high-performing valves.

Moving towards technologies based on hydrogen is an end goal, but for now it is not possible to convert all processes or energy production to be fossil-free. Carbon capture, utilization and storage (CCUS) is the process of capturing CO₂ from large point sources such as fossil or biomass based fuels for power generation or industrial facilities in, for example, the cement or chemical industries.

Benefits for industry and society

CCUS covers a range of technologies and can help tackle emissions in sectors where it can be difficult to abate them normally, for example in coal-fired power plants, refineries, cement plants, or petrochemical

plants. Carbon capture technologies can often be retrofitted to existing plants enabling them to also gain from advances in decarbonisation. With efficient technologies using high reliable components, such as Neles™ and Jamesbury™ valves, actuators and controllers, companies can reduce emissions, comply with legislation, and help future-proof their operations.

For wider society, as well, advances in CCUS provide benefits. The technology can facilitate the transition to a low-carbon energy system by reducing emissions while fossil fuels are phased out, helping to mitigate climate change and improve air quality while maintaining access to affordable energy.



Meeting adaption challenges

As with the adoption of any technology, increased use of CCUS processes involves challenges to adopters. It can be costly to implement carbon capture technologies, while scaling them up to meaningful levels presents logistical issues.

At Valmet, we help our flow control customers benefit from decades of valve expertise to deliver improved sustainability and cost benefits. We provide valve solutions for absorption, adsorption, and other related carbon capture processes.

Your expert valve partner

For decades we have been developing, producing and supplying valves for absorption, adsorption, or any other carbon dioxide separation process. We pass this expertise on to our customers, enabling them to meet carbon capture requirements and challenges efficiently and cost-effectively.

Our wide range of segment, ball, butterfly, globe and other valves are well-proven in many industries and are trusted globally to provide reliable and productive operation.

We take our single-source supplier responsibility seriously. Our valves are designed to provide long-term trouble-free operation even under severe conditions.

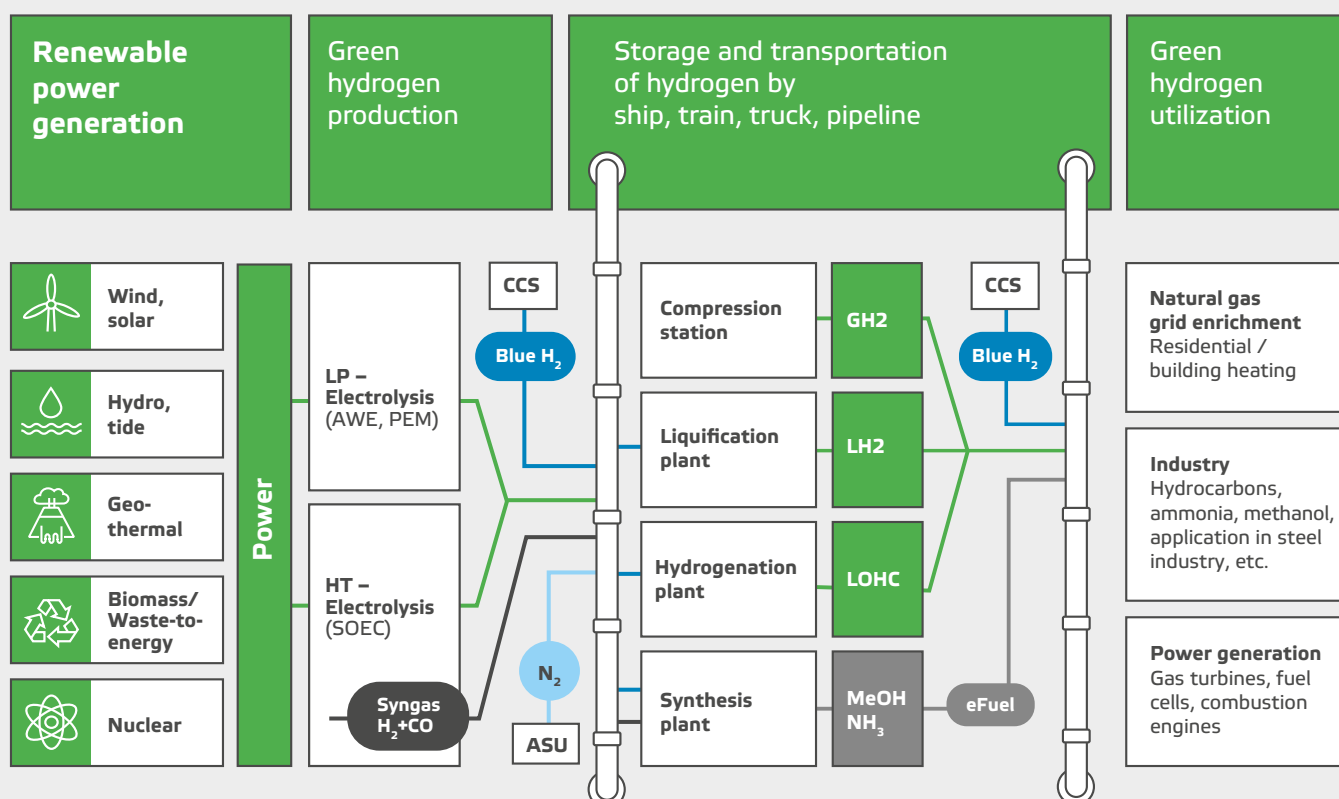
A total lifecycle solution

Not only do our products ensure reliability and productivity in demanding applications, as part of our total solutions offering they also provide competitive advantages in process reliability, accuracy, efficiency, and uptime.

At Valmet, we understand that industrial gas manufacturers are under intense pressure to deliver. As such, we organize our service offering and comprehensive product line to provide a total solution that can help you to achieve higher levels of productivity and reliability from day-one through the entire lifecycle of your plant.

Long-term reliability

- CAPEX and OPEX savings
- Increased uptime and profits
- Optimize efficiency and reduce waste
- Process insights and maintenance cost reduction
- Improved safety and sustainability
- 24/7 global field support
- Experienced sales and service personnel



Key applications in carbon capture

Valmet has long experience in delivering high-performance flow control solutions for demanding applications, like the ones involved in modern carbon capture, utilization and storage.



Absorption

CO₂ absorption is a process in which a fluid (such as process gases containing CO₂, flue gases, etc.) is dissolved by a chemical solvent that has the property of absorbing CO₂ molecules.

In the oil & gas industry these chemical solvents, typically amine based, have been used for decades to purify or “sweeten” natural gas by removing CO₂. Nevertheless, solvents and processes have been optimized and the technology continues to be developed, especially with regard to the importance of applying CO₂-absorption in CCUS projects to reach the net zero target by 2050.

Valmet’s flow control valves have been applied in absorption plants since the 70s, controlling the flow of challenging mediums like acid gases and amine-based solvents under high pressure and temperatures. Our products have been constantly developed and adapted with an emphasis on excellent controllability through optimum valve sizing. The choice of materials is tailored to the process medium and guarantees optimum durability, safety and cost efficiency.

With our many years of experience in absorption processes we can also offer solutions for future developments, making flow control in absorption systems as efficient and reliable as possible.

Adsorption

Adsorption is the process whereby atoms, ions, or molecules from one substance adhere to the surface of another. The process plays a critical role in CCUS projects to separate CO₂ including purification of carbon dioxide and even hydrogen.

Pressure, temperature and vacuum swing adsorption (PSA/TSA/VSA) are important parts of industrial gas manufacturing and CO₂ separation. The more effective these processes are, the more profitable the plant is.

To keep swing adsorption processes running valves must reliably overcome a number of application challenges and process stresses.

Valmet’s flow control valves are designed to reliably overcome these application challenges. Our valves boast very high device integrity allowing for maximal operational safety. High tightness for gaseous mediums also minimizes health and safety risks.



Cryogenic separation

Valmet's expertise covers the entire separation process from purification to distribution. The reliability and long lifecycle of our products makes us the world leader in cryogenic valves.

Although the triple point of carbon dioxide is only -56.56°C (-69.8°F) at 4.17 bar(g)/61 psig, the cryogenic separation takes place in challenging operational and environmental conditions. Correct material selection and emission control are essential. Valve designs have to provide long-lasting safe tight shutoff operations to avoid health hazards and production interruptions.

Our cryogenic valves are the result of extensive R&D efforts and testing within our state-of-the-art cryogenic lab. We use advanced construction materials that are proven to overcome process conditions and extend the time between scheduled maintenance, providing increased uptime and reduced costs.

Synthetic methanol, efuels and ammonia synthesis

To obtain sustainable synthesis gas, greenhouse gas-free or balanced-produced hydrogen and carbon monoxide are used.

Synthetic methanol

Optimal performance in methanol plants requires properly performing valves. Poorly responding valves in the synthesis loop negatively affect overall process efficiency. Toxic fugitive emissions also need to be addressed – we offer type approved superior tight valves according to ISO15848-1.

Efuels

To run the Fischer-Tropsch synthesis reliably and obtain the same high quality fuels as those produced conventionally, control valves have to be able to effectively handle abrasive catalyst-containing flow mediums. This requires well-designed, accurate and properly sized control valves as provided by Valmet Flow Control.

Ammonia synthesis

In ammonia synthesis, valves play a vital role in controlling the flow of synthesis gas into the converter. Our valves operate reliably at high temperatures and pressure, improving the synthesis loop efficiency and keeping operating costs down, allowing for maximal operational safety. High tightness for gaseous mediums also minimizes health and safety risks.



Add value to your valves

All our solutions are designed, engineered and tested to push forward process and cost improvements. In combining them with our global expertise and advanced valve sizing tools we create true added value for your business, wherever you are.

With our many decades of service experience, we provide the highest standard of parts and services that your projects rely on. From project start up and commissioning, we are with you every step of the way to help monitor performance, reduce downtime, and eliminate unplanned valve failures.

Global, certified solutions

Valmet carbon capture solutions and associated services are fully certified, as are our professional service personnel. Our technicians have been trained in industrial gas applications such as ATEX certified equipment or oxygen valve repair and provide local support with best-in-class tools and service facilities.

40 Valmet service centers around the world ensure that our service experts are never far away from where they are needed. Continuous cooperation with global manufacturers and licensors ensures that our technology is constantly improving and developing, so that your business does the same.

Nelprof™ sizing and selection tool

The number one tool for control valve sizing with extensive control performance and analysis.

- Easy selection of safety-critical system components
- Fast and reliable on/off valve selection
- Intuitive UI for quick and efficient use



Key flow control technologies for carbon capture

Valmet offers a wide range of field-proven flow control devices and technologies for demanding carbon capture applications. Every device is thoroughly tested and based on technologies that you can rely on to deliver the performance you expect.

Butterfly valves



Our Neles™ and Jamesbury™ lines of butterfly valves are designed to optimize the efficiency of process operations. Available with wafer style, lugged, or double-flanged body types they are versatile and cost-efficient solutions for many on/off and control applications.

Ball valves



The wide range of Neles, Neles Easyflow™, and Jamesbury automated and manual ball valves are manufactured with improved process safety and efficiency in mind. For control applications our ball valves provide Q-trim™ technology for noise attenuation.

Globe valves



Neles globe valves provide the best possible control accuracy with all the benefits of linear control valves. Engineered to be safe and sustainable, our globe valves provide high reliability in a wide range of industries.

Cryogenic valves



Valmet offers a range of Neles butterfly valves designed and tested for use in cryogenic applications. They offer safe and accurate performance across a wide temperature range to as low as -200°C (-320°F).

Actuators



Our Neles B-series, Neles Easyflow RNP (rack and pinion) and Jamesbury QPX actuators offer excellent performance in these demanding applications. They offer an extremely long life cycle and excellent control.

Smart devices



We offer a full range of intelligent valve controllers, valve positioners and safety solenoids under the Neles and Stonel™ product brands.



Valmet's professionals around the world work close to our customers and are committed to moving our customers' performance forward – every day.

Valmet Flow Control Oy

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