

Improved profitability of a hydrogen filling station as a result of correct cascade management

The use of HyValve hydrogen valves from Eugen Seitz AG significantly reduces energy losses during the hydrogen refueling process.



Starting position

How can I make my hydrogen filling station even more profitable? Entrepreneur Peter Klock asks himself this question as he gazes with pride at his latest project, the Hydrogen Turbo Station – the first H₂ filling station in his home town of Kloppenberg.

He runs through in his mind the individual components of the filling station and considers where there is still room for improvement. His thoughts come to a stop at the priority panel. For the gaseous hydrogen to get from the fuel pump to the vehicle, it has to be brought from the storage banks through the priority panel. This interface represents an essential component of the refueling process.

The challenge

The higher the hydrogen pressure in a storage reserve, the greater the density and the smaller the volume that is required for a given mass of hydrogen. However, it takes a lot of energy to compress it. When a vehicle is refueled with hydrogen, the pressure difference between the vehicle's fuel tank and the storage bank from which it is drawn should be as low as possible – and yet high enough to guarantee a high flow rate. At the same time, the pressure in the storage bank should not drop too low during the refueling process, because otherwise expensive compression energy has to be used to raise the pressure level before the next refueling process. By selecting components with minimal pressure losses, a good flow rate is guaranteed and the financial benefits are exploited to optimum effect.

This is why Peter Klock is sure that there's still room for improvement at the priority panel interface in particular, and he is looking for the right solution.

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Solution

A cascade system is needed in the priority panel to ensure that the storage banks do not lose too much pressure. Several storage banks with different pressure levels have to operate in harmony with one another. When a vehicle is refueled, cascade management ensures that fuel is first drawn from the storage bank with the lowest pressure. When the pressure difference falls below a certain level, the refueling process switches to the second and finally the third storage bank. This enables energy efficiency to be maximized. The costs of gas compression can be minimized.

In the course of his research, Peter Klock comes across Eugen Seitz AG in Switzerland. This company specializes in installing solenoid hydrogen valves to create compact cascade systems. This way, an energy balance is achieved that cushions losses and gives Mr. Klock an improved balance sheet.

Implementation

Full of enthusiasm about his new findings, Peter Klock contacts Eugen Seitz AG. His requirements are listened to attentively and a solution is worked out together. The H₂ sales expert explains to him again in detail why the cascade system in the priority panel is relevant and what it has to do with his profitability. As a commercially-minded entrepreneur, Peter Klock is impressed by the commitment of the expert. He's sure that the Hydrogen Turbo Station will continue to increase in value.

Benefits

- High-quality product, delivering reliability and safety
- Efficient use of resources
- Increased profitability
- Faster refueling than with other alternative drive technologies
- Availability of the filling station is guaranteed
- Supports the expansion of the hydrogen economy and can contribute to the achievement of climate targets (net zero)