

myFC Lab Stories
 Stockholm, January 20, 2022

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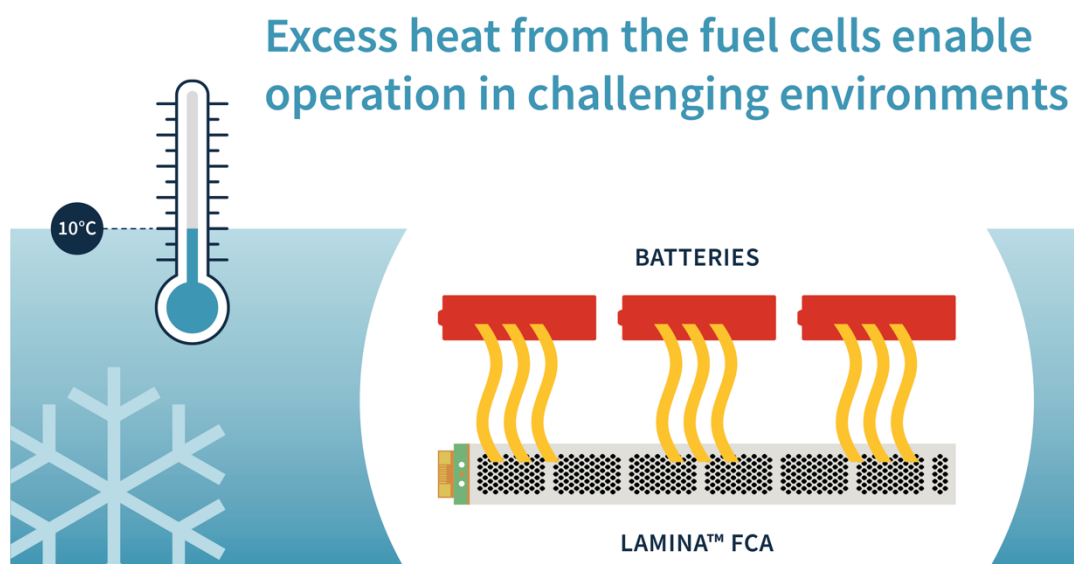
Waste heat from fuel cells aids sustainable operations in cold environments

An ordinary Otto engine has an efficiency of 30 percent. Fuel cells are better, more than 50% of the hydrogen gas is converted to electrical energy and the rest is transformed into heat that can be used to increase the overall efficiency of the systems. An example where the heat can be reused in a smart way are applications with automated vehicles, designed for cool environments.

– When it gets cold, the robots' batteries are negatively affected, and they start to perform less well. But a combination with fuel cells can solve the problem, says Sebastian Weber, CTO at myFC.

In the food industry's automated inventory management, the batteries' loss of capacity during cooling is a problem. In temperatures below 10 degrees Celsius, the effect is noticeable.

– If it is minus degrees, the capacity decreases almost exponentially. An automated storage robot (AGV) that is powered by batteries in that environment will inevitably perform significantly less well and will last shorter, says Sebastian Weber.



Waste that gets useful. The fuel cells' trait that they emit heat is useful in applications for refrigerated environments, such as robots that handle food. The heat causes the system's cold-sensitive buffer batteries to perform well, even though the temperature drops to refrigerator levels.

The intralogistics industry in particular is an area where myFC's patented technology with micro fuel cells has several advantages. The technology is flexible and modular and can be accommodated in the narrow spaces that AGVs offer.

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But battery-powered robots perform inferior in chilled environments, something that could be helped if they were powered by a combination of micro fuel cells and batteries. When the storage robots' batteries are joined with hydrogen-powered micro fuel cells, the operating share of the time increases radically and the batteries also have a significant extension of their service life, which saves costs and reduces the need to produce new batteries. The hydrogen gas fills up very quickly, a few minutes are enough. Then the robot can roll out and work again, with a constantly fully charged battery that guarantees the possibility of fast power outlets when needed. The food industry is a segment where online commerce has had a strong impact in recent years, and where highly automated warehouses are increasingly used.

- However, they have problems with the cold affecting the systems negatively. All robots that are battery-powered are affected, says Sebastian Weber.

When combined with fuel cells, however, the problem of the batteries losing capacity when the temperature drops disappear. The waste heat of the fuel cells keeps both them and the batteries heated to a favorable room temperature which means that they keep their charge.



Robotized warehouse. British Ocado Group builds highly automated warehouses, so-called Micro Fulfillment Centers (MFC). Their customers include the Swedish ICA Group, which is building up a new warehouse for food handling in Västerås.

In applications that are not in continuous operation, the waste heat of the fuel cells can also be used to preheat the systems, and at the same time charge the batteries without having to be connected to a charging station.

- In that case they function much like a passenger compartment or engine heater that provides a good working temperature before the systems are put into use. It increases efficiency and reduces energy consumption, says Sebastian Weber.

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About myFC

Swedish innovation company myFC offers thin, scalable fuel cells that are easy to dimension and adapt to any electric application. myFC develops hybrid technology solutions combining batteries and hydrogen-based micro fuel cells for extended usage and reduced carbon footprint. The company was founded in 2005 and was listed on Nasdaq First North Growth Market in 2014. Its headquarters are in Stockholm. For more information, visit myFC.se