



The future role of hydrogen in the HVAC sector

SPOT ON | HVAC | AUGUST 2021

“Hydrogen has the potential to be the solution for a cleaner future. It’s pleasing to see the increased activity in the sector as leading players bet on hydrogen as a key component of their future models. We expect this trend to continue driving developments in the market.

In this newsletter we evaluate the pros and cons of hydrogen, and how the race towards a goal of net-zero carbon emissions by 2050 is powering rapid evolution in the energy sector, particularly in HVAC, and what this means for the future.”

PHILIP BARKER
HVAC SPECIALIST, OAKLINS

MARKET OBSERVATIONS

Essential versatility

An overview of the challenges posed by the goal of net-zero carbon emissions, and the key role hydrogen could play in meeting that target.

02

M&A ACTIVITY

Trend watch

Recent transactions in the green hydrogen sector highlight the rising interest and opportunities in this part of the energy market.

05

CASE STUDY

Powerhouse agreement

We look at the global cooperation accord reached between FISCHER and WEICHAJ Power.

06





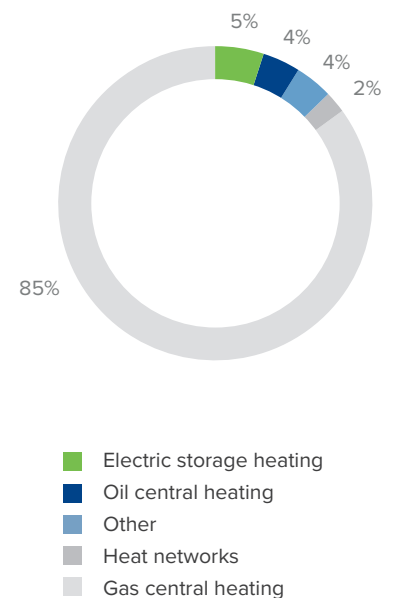
Market observations

According to the UK's Department for Energy and Climate Change, a third of the country's greenhouse gas emissions come from central heating sources¹ with the wider energy sector accounting for around 75% of the greenhouse gas emissions responsible for driving up global temperatures². With a growing number of countries announcing pledges to achieve net-zero emissions over the coming decades, transitioning reliance away from traditional energy sources remains one of the biggest challenges on the narrow path to achieving net zero, particularly in the wake of expanding populations and ambitious economic growth plans.

In the net-zero roadmap to 2050 set out by the International Energy Agency, the versatility of hydrogen and hydrogen-based fuels mean they are expected to be essential in plugging the gaps where electricity cannot easily or economically replace fossil fuels.

Hydrogen can be used as a feedstock, a fuel or an energy carrier and storage with many applications across industry, transport, power and construction, and is highly efficient (1kg of hydrogen can produce as much energy as 2.8kg of natural gas). In addition, hydrogen does not emit CO₂ or pollute the air through certain processing methods, and can therefore help to decarbonise heating processes. The amount of hydrogen currently used in the UK and Europe as an alternative energy source remains limited, and when it is used it's largely produced from fossil fuels. This includes heating applications, with 85% of UK homes currently relying on the natural gas grid for heating. This is particularly significant given that the UK government has announced a gas and oil boiler ban in newly built homes from 2025 in order to cut 14% of UK emissions from home heating³.

Split of fuel sources for UK homes



Source: Baxi Heating

¹ Government plan to slash emissions from heating – GOV.UK

² Climate change: Ban new gas boilers from 2025 to reach net-zero – BBC News

³ The future of heat – Baxi Heating

At present, there are a number of methods for producing hydrogen; however the key processes are “grey”, “blue” and “green”.

Grey hydrogen

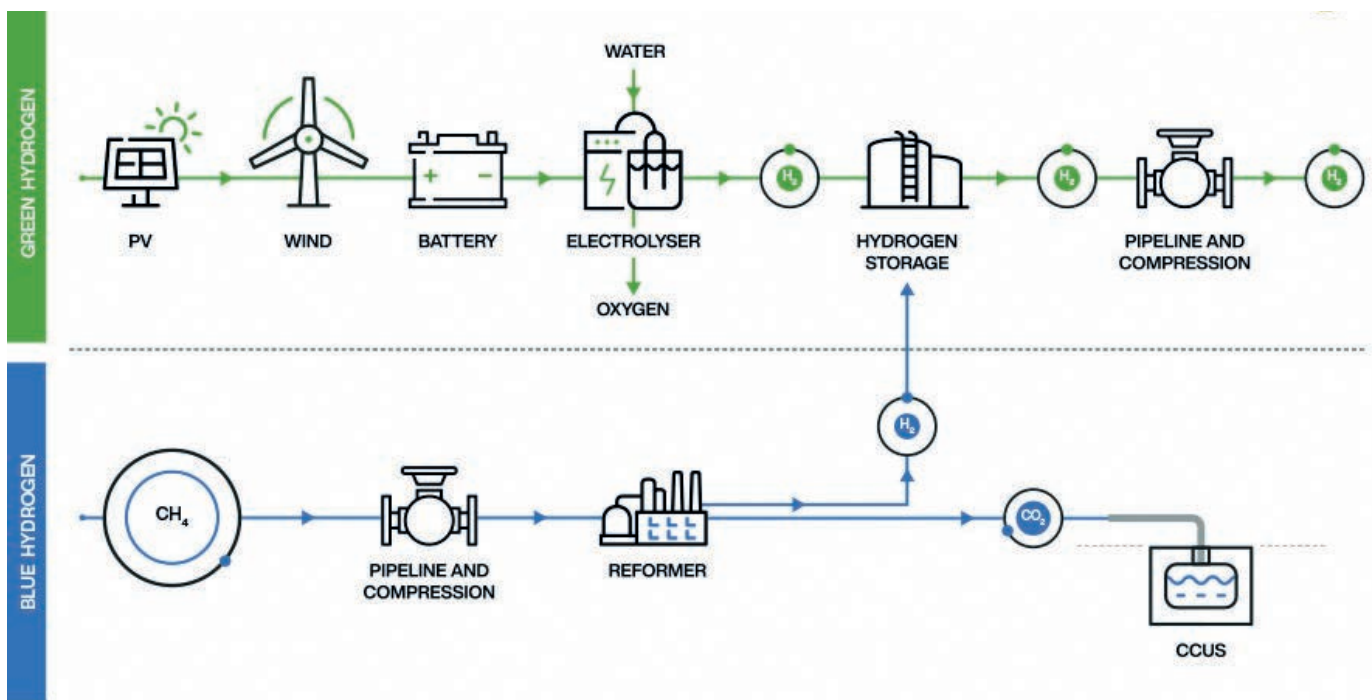
Grey hydrogen, also known as fossil-based hydrogen, refers to hydrogen produced using fossil fuels as feedstock, mainly the reforming of natural gas or the gasification of coal in which hydrogen and CO₂ are produced and subsequently released into the atmosphere. This represents the bulk of hydrogen created today, and the life-cycle greenhouse gas emissions from the production of fossil-based hydrogen are high.

Blue hydrogen

Blue hydrogen, also known as fossil-based hydrogen with carbon capture, is the same as grey hydrogen but the CO₂ produced is then captured and stored using carbon capture technologies. As the greenhouse gases are captured, this mitigates the environmental impact on the planet, and the hydrogen can be used in other industrial processes, making it a non-waste product. Up to 90% of the CO₂ can be stored in tanks or underground caverns, thereby preventing emissions and the creation of greenhouse gas effects⁴. Producing blue hydrogen can achieve life-cycle carbon emission savings of up to 85% when compared to natural gas boilers being used today⁵.

Green hydrogen

Green hydrogen, also known as renewable hydrogen, is hydrogen produced through the electrolysis of water where the source of electricity comes from a renewable process, such as offshore wind. This is the key end goal for hydrogen fuel products as the full life-cycle greenhouse gas emissions of the production of renewable hydrogen are close to zero, and its byproducts are simply oxygen and hydrogen.

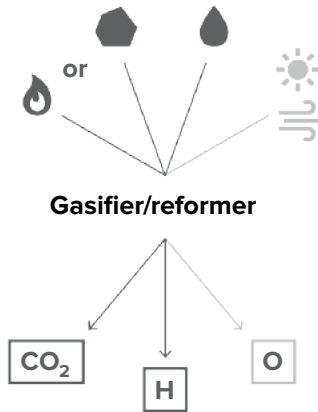


Source: Petrofac

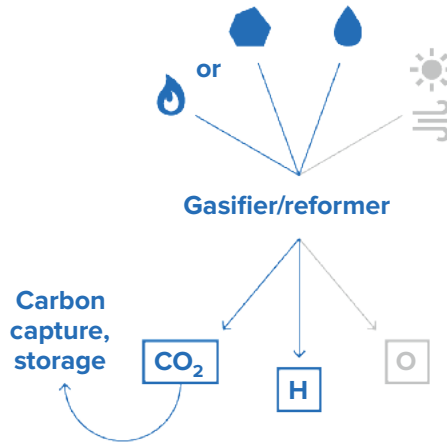
⁴The difference between green hydrogen and blue hydrogen – Petrofac

⁵Hype or gripe: the detail of blue vs green hydrogen – Vaillant

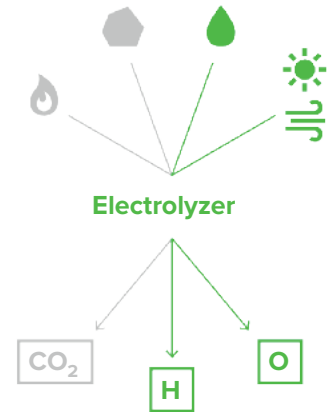
Grey hydrogen uses fossil fuels and produces carbon dioxide as a byproduct



Blue hydrogen captures and stores most of the carbon dioxide output



Green hydrogen's byproduct is oxygen



Raw materials: Water Coal Natural gas Solar/wind

Source: Bloomberg

Is hydrogen the solution for a cleaner future?

On the narrow road to a net-zero carbon 2050, it appears that hydrogen could be the missing piece of the clean energy puzzle. However, for heating and hot water applications, there are a number of challenges that prevent the ambitious goal of net zero being achieved.

Firstly, 85% of homes in the UK currently rely on gas central heating, and hydrogen boilers are only now being trialed in test homes using prototypes being developed by industry leaders such as Worcester Bosch, Viessmann and Baxi. British Gas predicts that it will be over a decade before they are available for domestic use. Therefore, there is a threat that hydrogen won't get past the tipping point fast enough to mitigate a rapidly warming climate⁶.

Secondly, producing enough green hydrogen to replace all UK boilers is estimated to require around 30 times more offshore wind than is currently available⁷, and would require 20% of the gas pipe system to be replaced as hydrogen cannot travel through iron piping. This could cost the UK taxpayer an estimated US\$39bn per year⁷.

Thirdly, storing and processing hydrogen poses a higher safety risk than methane as hydrogen is more flammable due to its energy store⁸.

Conclusion

It is clear that hydrogen offers great long-term potential thanks to its versatility and efficiencies, and has received the support of many governments and companies worldwide that back hydrogen as the key to a cleaner future.

Despite the potential, it seems to have faced many obstacles to a smooth take-off as discussed above, meaning that market adaptation issues exist and therefore hydrogen generation from clean sources is still 2–3 times costlier than natural gas/coal. There has not been sufficient traction on the development of hydrogen infrastructure to counter this but individual nations have increased their hydrogen R&D and spending, suggesting that progress is being made to adopt hydrogen as a mainstream source of energy⁹.

⁶ Is Green Hydrogen Viable? With Government Support, It Can Be – Bloomberg

⁷ Switching all boilers to hydrogen 'is impractical' – The Times [London]

⁸ Hydrogen Boilers: The future of heating in the UK? – Heatable

⁹ Betting on Hydrogen has gone high: M&A – FutureBridge



M&A activity

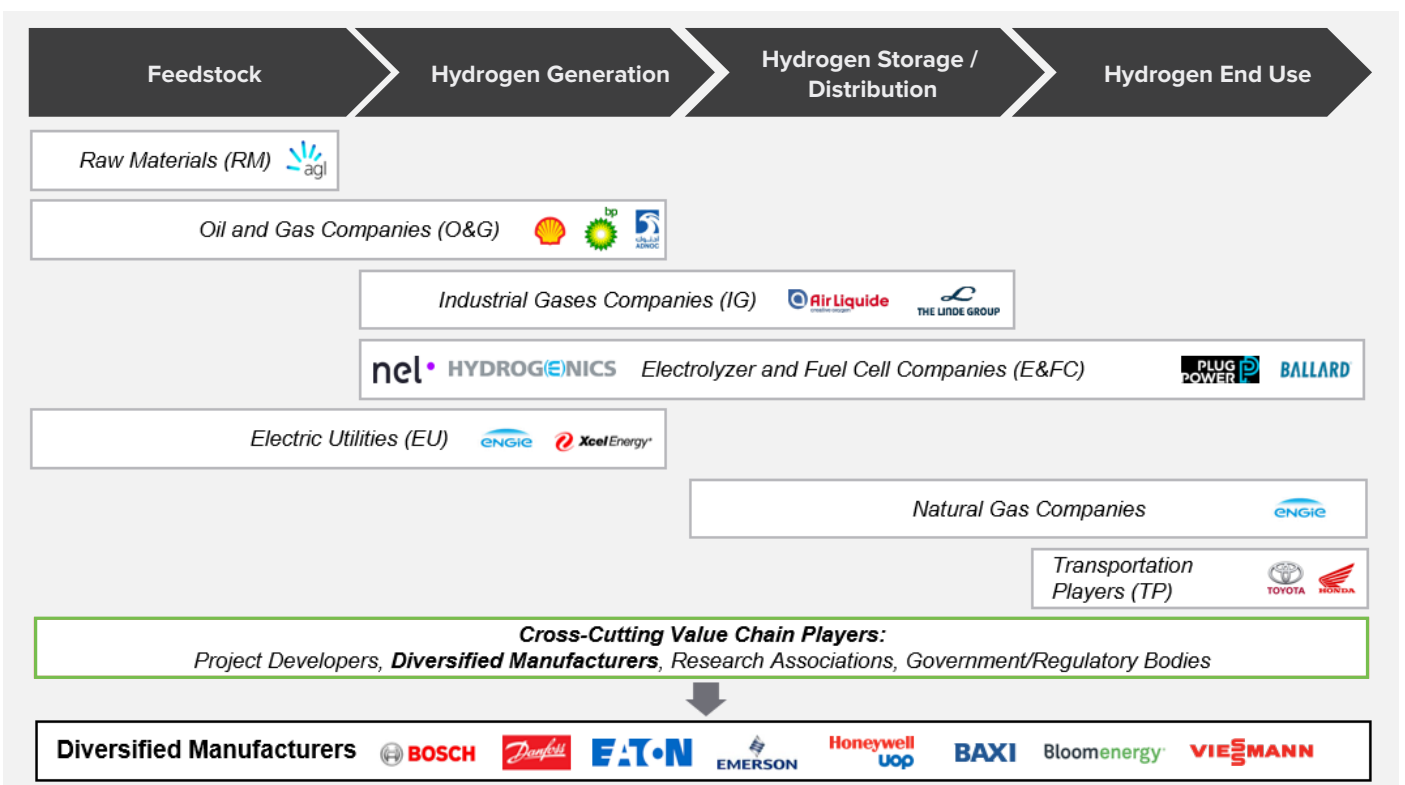
There has been a surge in M&A activity across different industry segments as leading players bet on hydrogen as a key component of their future models. Different players are collaborating to either increase their know-how or improve their competitive positioning. This means that companies that have spent years developing and

commercializing hydrogen technology could seem like targets for larger energy or industrials companies.

However, soaring multiples in the hydrogen space make this more challenging for investors. For example, smaller hydrogen companies such as Bloom Energy [NYSE:BE], Ballard Power

Systems [NASDAQ:BLDP] and Plug Power [NASDAQ:PLUG] all emerged from 2020 with stronger balance sheets and valuation multiples. As a result, they are in a position to be able to look to vertically integrate and lead the industry instead of being targets for existing power or industrial companies¹⁰.

Mapping out the hydrogen value chain



Source: FutureBridge Analysis

¹⁰ Hydrogen burns brightly in 2021 with M&A, investment opportunities – Mergermarket

Oaklins has identified a number of recent deals in the green hydrogen sector that support some of these trends:

- April 2021 – **Taiwan Cement Corporation**, a manufacturer of cement-related products, acquired **Engie EPS S.A.**, a provider of energy storage systems, for US\$261 million (21.7x revenue multiple)
- January 2021 – Investment firms **Trilantic North America** and **Climate Adaptive Infrastructure LLC** acquired **Intersect Power LLC**, a provider of power generation and storage projects for US\$127 million
- December 2020 – **Xebec Adsorption Inc.**, a manufacturer of air and gas purification and filtration equipment, acquired **HyGear Technology and Services B.V.**, a producer of industrial hydrogen and nitrogen gas processing plants and purification systems, from **Oost NL** for US\$150 million (8.8x revenue multiple, 29.6x EBITDA multiple)
- October 2020 – **Gaztransport & Technigaz SA**, a provider of cryogenic membrane containment systems for the maritime transportation and storage of liquefied gas, acquired **Areva H2Gen**, a provider of electrolyzers for the production of green hydrogen for an undisclosed amount
- September 2019 – **Cummins Inc.**, a manufacturer of diesel and natural gas engines, acquired **Hydrogenics Corp.**, a manufacturer of hydrogen generation products, for US\$290 million (7.5x revenue multiple)
- March 2019 – **MAN Energy**, a German provider of large-bore diesel and gas engines and turbomachinery, acquired **H-Tec Systems GmbH**, a manufacturer of hydrogen stacks and electrolyzers for power gap fillers, integrated grid systems and wind parks, from **GP Joule GmbH** for an undisclosed amount.

Case study

FISCHER has agreed on a global cooperation between FISCHER Fuel Cell Compressor and WEICHAI Power

FISCHER Spindle Group AG (FISCHER) has agreed on a global cooperation between FISCHER Fuel Cell Compressor (FFCC) and WEICHAI Power Company Limited.

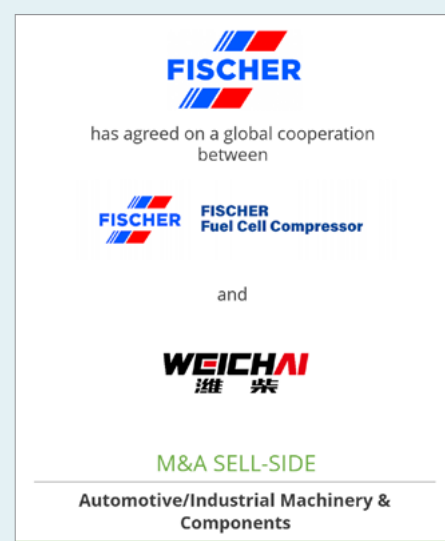
FISCHER Fuel Cell Compressor (FFCC) is a subsidiary of FISCHER Spindle Group (FISCHER) and a leading Swiss supplier of electronic micro turbo compressors (EMTC), used as an air supplier in fuel cell powertrains. FFCC's EMTC technology suits the needs of fuel cell powertrains, thanks to the company's aerodynamic PPro (Precision Speed Profile) gas bearings that enable an oil- and particle-free compression. In addition, the technology ensures a contact- and wear-free operation due to minimal bearing friction and slim design. FFCC focuses on the automotive fuel cell market, where vehicles powered by hydrogen fuel cells, with a zero-emission capability, are a fast-growing segment.

WEICHAI Power, founded in 2002, is a comprehensive automobile and equipment manufacturing industry group in China. It owns Shaanxi Heavy-duty Motor Company Limited, Shaanxi Fast Gear Co. Ltd., Zhuzhou Torch Sparkplugs Co., Ltd., KION Group AG, Linde Hydraulics GmbH & Co. KG, Dematic and dozens of other companies in a cluster, building a new pattern of coordinated development across the three industrial sectors – complete vehicle, powertrain and intelligent logistics – that make up the country's automotive industry and creating a competitive industrial chain.

FISCHER is a global specialist in precise, fast and powerful rotation. The company is a technology leader in precision spindle manufacturing, milling heads and air compressors for fuel cell technology. As a partner of both prominent machine builders and end users, FISCHER serves the key global markets. With a presence

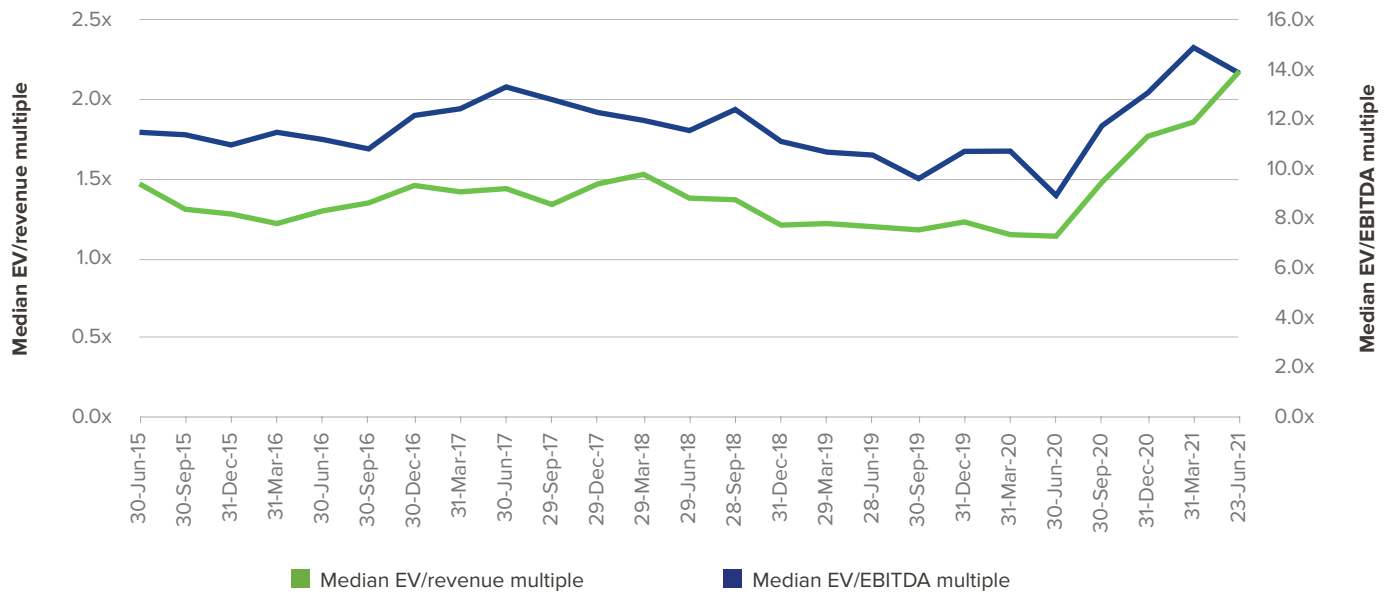
in six locations (Switzerland, Germany, USA, China, Taiwan and Russia), the company employs 400 people.

Oaklins' team in Switzerland advised the owners and management of FISCHER throughout this M&A sell-side process.



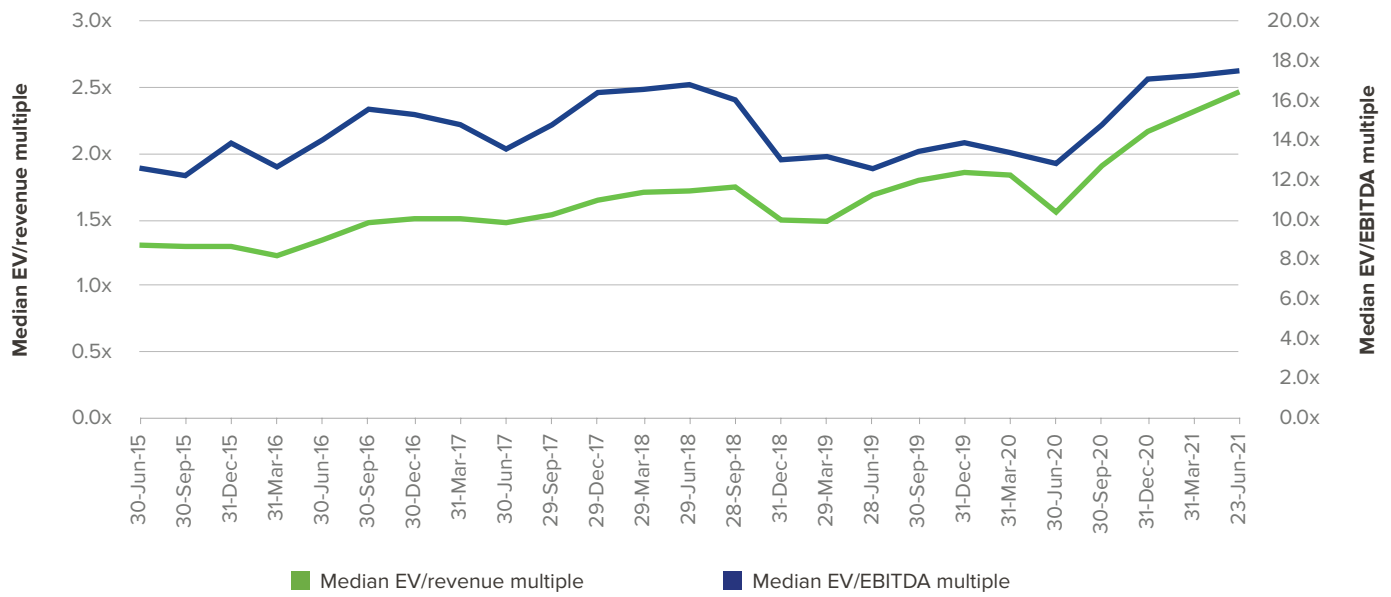
Selected public company valuation trends

EMEA HISTORICAL MULTIPLES



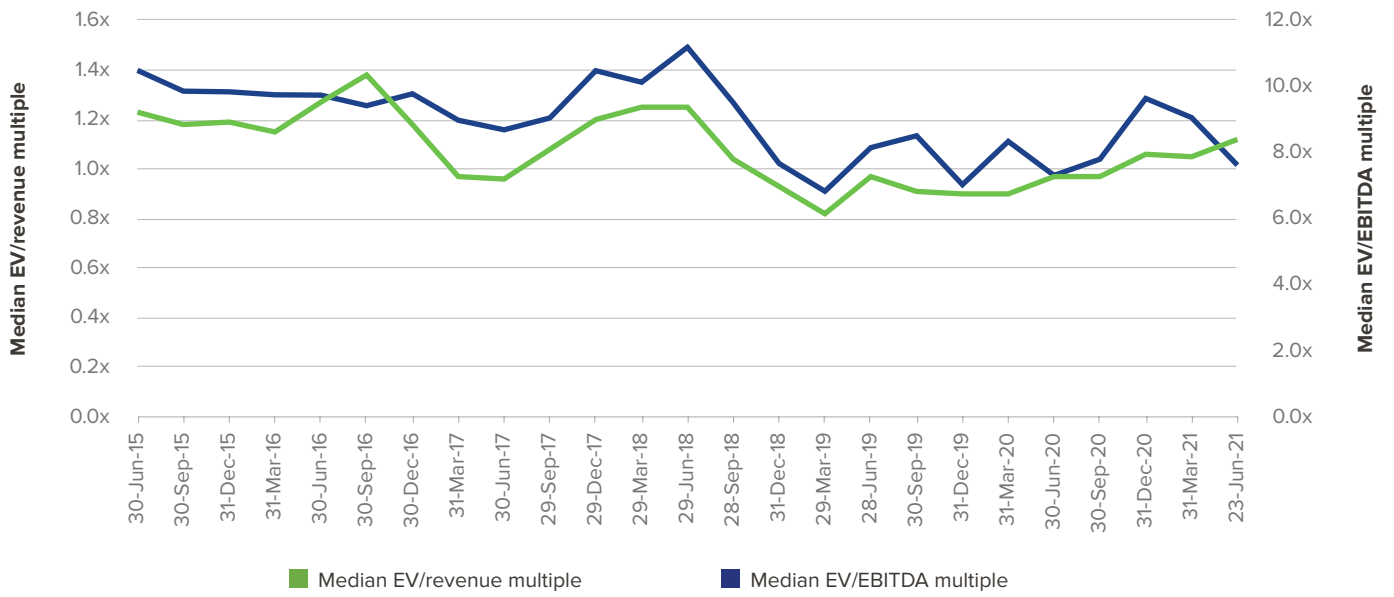
Source: Mergermarket

AMERICAS HISTORICAL MULTIPLES



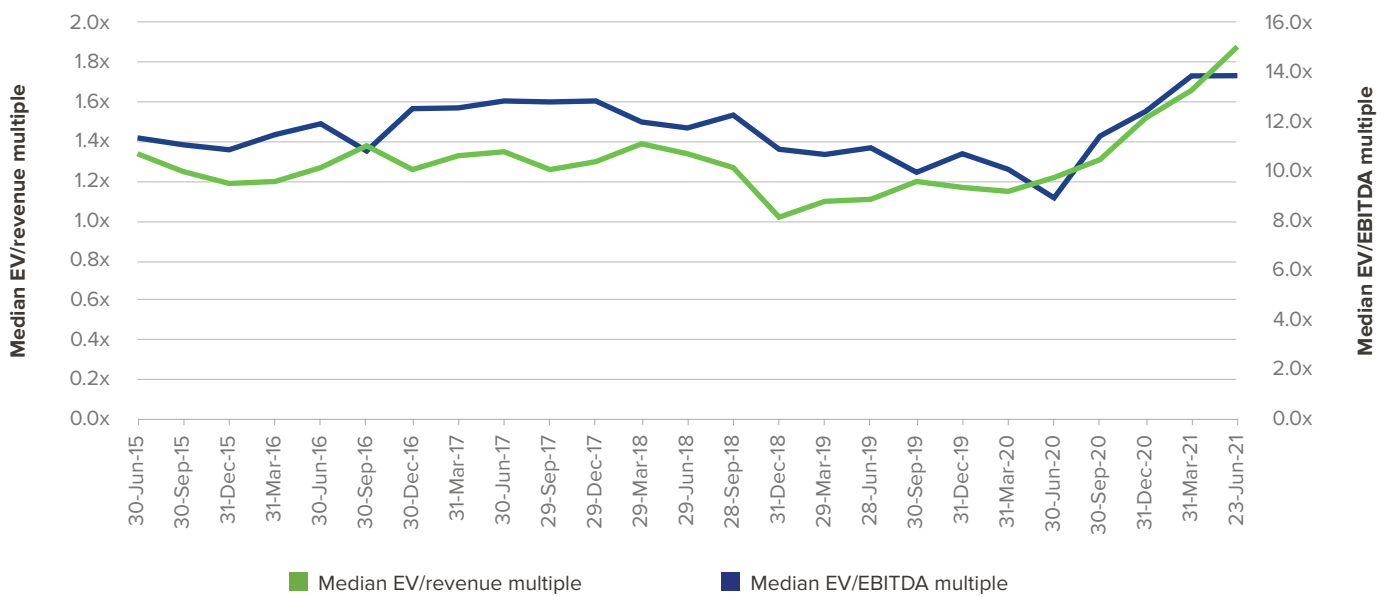
Source: Mergermarket

ASIA-PACIFIC HISTORICAL MULTIPLES



Source: Mergermarket

GLOBAL HISTORICAL MULTIPLES



Source: Mergermarket

Deep local roots, global commitment

Oaklins brings you opportunities from across the world and we meet you with our expertise wherever you are

OAKLINS OFFERS A COMPREHENSIVE RANGE OF SERVICES

- M&A advisory (buy- and sell-side)
- Growth equity and equity capital markets advisory
- Debt advisory
- Corporate finance services

HVAC is one of our focus areas. Combining comprehensive sector knowledge with global execution has led Oaklins to become one of the most experienced M&A advisors in the HVAC sector, with a large network of relevant market players worldwide. This results in the best possible merger, acquisition and divestment opportunities for HVAC companies.

If mergers, acquisitions, or divestitures of businesses or business units are part of your strategy, we would welcome the opportunity to exchange ideas with you.

✉ PHILIP BARKER

HVAC Specialist
London, United Kingdom
T: +44 20 7131 8682

Philip leads Oaklins' HVAC team and is a director of mergers & acquisitions and head of industrials at Oaklins Smith & Williamson, one of Oaklins' member firms in the UK. Previously, he spent 20 years as head of industrials at Oaklins Cavendish. Philip has completed over 15 sales in the HVAC sector, including assisting Oaklins Sweden on the sale of VoltAir Systems, air handling units for heat recovery in buildings, to Volution; the sale of Energy Technique, fan coils and commercial heating products, to Volution; the sale of Greenwood Air Management, ventilation and extractor fans, to Zehnder; the sale of Levolut, solar shading screens, to Alumasc; working with Oaklins Denmark to sell York Novenco, HVAC+R systems for marine and offshore, to Dania Capital; and the sale of Nuair, fans and ventilation systems, to ECI Private Equity.



Oaklins is the world's most experienced mid-market M&A advisor, with over 850 professionals globally and dedicated industry teams in more than 45 countries. We have closed 1,700 transactions in the past five years.

Oaklins disclaimer

This report is provided for information purposes only. Oaklins and its member firms make no guarantee, representation or warranty of any kind regarding the timeliness, accuracy or completeness of its content. This report is not intended to convey investment advice or solicit investments of any kind whatsoever. No investment decisions should be taken based on the contents and views expressed herein. Oaklins and its member firms shall not be responsible for any loss sustained by any person who relies on this publication.

© 2021 Oaklins. All rights reserved.

Oaklins is the collective trade name of independent member firms affiliated with Oaklins International Inc. For details of the nature of affiliation, please refer to www.oaklins.com/legal.