Why silicon carbide is 'the new lithium'

Silicon carbide is being seen as the twenty-first century replacement of silicon in everything from microprocessors to power semiconductors, wind turbines and solar inverters.

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Silicon carbide, which can be made artificially, is being seen as the 21st century replacement of silicon in everything from microprocessors to power semiconductors, wind turbines and solar inverters.

Almost half of the incremental growth in power semiconductors globally over the next decade is expected to come from the installation of silicon carbide and it's being dubbed the "new lithium" in investment circles.

It's a timely example of productivity growth through innovation, the only real catalyst for economic growth and financial market opportunities.

Many of these opportunities are shown to Australian ultra high net worth investors before other investment communities simply because latent technologies require higher levels of scrutiny and risk assessment than established technologies.

Compact silicon carbide batteries are already being seen in Tesla's Model 3 electric vehicles. Twitter/ElonMusk

It has often been difficult for Australian investment communities to access these new megatrends without direct access to venture capital or hedge funds, but silicon carbide is different.

The market for silicon carbide powered microchips is expected to grow at 20 per cent compound a year until 2030, accounting for almost half of all growth in the global $US20 billion ($28 billion) power semiconductor market.

Australian investors can access this growth thematic via proxies such as iShares' PHLX Semiconductor ETF [SOXX:US], VanEck Vectors Semiconductor ETF [SMH:US] or Australia's quoted BetaShares Asia Technology Tigers ETF [ASIA:AU].

Silicon carbide is being viewed as a significant transformation of the entire power industry, and the conversion of the industry from silicon to silicon carbide has investment implications far beyond the upgrading of an existing incumbent technology.

Silicon carbide is already being used in several components within electric vehicles and early uptake is also evident within renewables, especially solar inverters.

Headquartered in North Carolina, this company has increased its operations not only in the US but China as well. An early producer of silicon carbide, it released the world's first commercial silicon carbide 'wafer' in 1991.

One of its technical advantages over existing silicon technologies is its size, with more compact silicon carbide batteries already being seen in Tesla's Model 3 electric vehicles. Given the anticipated growth in premium electric vehicles over the next five years, transport analysts expect other motor vehicle manufacturers to embrace this stepchange.

The silicon carbide market is, of course, still in an early phase of mass market adoption, with only certain applications such as solar and electric vehicles reaching an attractive tipping point in terms of cost benefit versus existing silicon technologies.

But for those investors who regret missing the lithium revolution, silicon carbide presents a contemporary opportunity to access a future technology, earlier than most.

But like any latent technology, industrial complexities remain; although silicon carbide has a very simple chemical formula, it can exist as numerous structures and hence its commercial production varies across manufacturers.

One of the US leaders in this space is Cree, which develops and manufactures light-emitting diodes (LEDs) as well as semiconductor products for power and radio-frequency applications using silicon carbide.

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Technology transfer questions remain about its further development and patenting in China. For those concerned about the US-China trade war or IP theft constraints, a more attractive alternative may be

Japan's Rohm Co, which manufactures custom linear integrated circuits and semi-conductor devices and is slowly adopting silicon carbide across a wide range of consumer electronics.

With fibre optics revolutionising telecommunications, graphite-epoxy the fuselages of commercial aviation and lithium the viability of modern-day electronics, savvy investors need to remain vigilant about what is coming next in the world of hard sciences, the economic progress these will herald and the financial investment implications new and superseding technologies will bring.

Silicon remains the most widely used material within power semiconductors and has been key in converting electricity from one form to another since the turn of the last century. But with claims that silicon carbide can halve the charging time of electric vehicles and increase the energy efficiency of power inverters by as much as 20 per cent, it is only a matter of time before a redundant technology is overtaken by a viable commercial replacement of the future.

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