

Quantum computing sustained by cash, not physics

Archer Materials (ASX:AXE) is developing a qubit processor chip that could potentially operate at room temperature and integrate into modern electronics. Archer has received patents for the ¹²CQ chip technology in Hong Kong, USA, EU, China, Japan, South Korea, and Australia. AXE is making the processor chip in Sydney, building on Australia's critical mass of expertise in quantum computing. Alongside this development, Archer is developing a Biochip – a lab-on-chip using graphene to enable multi-disease detection and compatibility with digitised processing. These two technologies represent substantial potential advances in applications, power and efficiency in their respective sectors. Archer intends to licence production and use of these two technologies to third parties under patent. Following execution of an exclusive licence agreement with University of Sydney in December 2018 AXE has divested a range of mineral projects and exploration rights focused on magnesite and graphite with the final divestment of mineral assets completed in FY22. Aware of the extensive R&D necessary to achieve the company's vision, AXE has focused on raising capital via placements, share purchase plans (SPPs), and options issues and exercises. These activities leave AXE with \$26.4m in cash at 30 June 2022 as the company gears up to produce the ¹²CQ quantum processor chip and progresses its biochip design toward commercial fabrication.

Business model

Archer aims to commercialise a mobile compatible quantum processor using its ¹²CQ processor design. The first step to commercialisation has been to gain patents in relevant jurisdictions to allow commercial operations in those markets. These have now largely been achieved. Archer now intends to de-risk the technology by building an operational qubit processor chip prototype. Once achieved, partnerships with well-resourced organisations in the semiconductor industry are intended to lead to production.

Patent grants and proof of concept advances key

AXE recorded operating cash outflow of -\$4.2m in FY22 with proceeds from the issue of shares of \$25.6m leaving the company in a strong short-term cash position. ¹²CQ chip patents were granted in Hong Kong in August and Australia in May. The qubit material was integrated with mobile compatible HEMT technology in February. AXE fabricated devices for qubit electronics in June, and achieved sub-10 nanometre fabrication in August. This will increase AXE's quantum devices' compatibility with existing industrial foundry processes.

Proof of concept then valuation upside

Archer's peer group in quantum computing R&D and commercialisation include Google, the Chinese government, a range of US government agencies and academic institutions, and IBM (which is a partner). These are formidable peers. In the listed space AXE fits in the semiconductor sector with companies developing chips for specific purposes such as Brain Chip (ASX:BRN), BluGlass (ASX:BLG) and Weebit Nano (ASX:WBT). Until AXE has shown proof of operation and a route to commercialisation of its technologies it is difficult to calculate a valuation.

Historical earnings and ratios (in A\$m unless otherwise stated)

Year end	Revenue	EBITDA adj.*	NPAT adj.*	NPAT rep.	EPS adj.* (c)
06/19a	0.1	(1.6)	(1.8)	(1.7)	(0.008)
06/20a	0.0	(2.7)	(2.9)	(2.8)	(0.013)
06/21a	0.1	(2.6)	(1.1)	(6.6)	(0.004)
06/22a	0.0	(2.6)	0.0	(14.1)	(0.057)

Source: Company data; *EBITDA, NPAT and EPS adjusted for one-time, non-cash items

Semiconductors

9th September 2022

Share Details

ASX code	AXE
Share price (8-Sept)	\$0.78
Market capitalisation	\$177.5M
Shares on issue	227.5M
Net cash at 30-Jun-2022	\$26.4M
Free float	~86%

Share Performance (12 months)



Upside Case

- Proof of concept of the ¹²CQ processor
- More milestones achieved in Biochip fabrication
- Partnerships with large semiconductor producers

Downside Case

- Delays in moving from design to hardware
- Inability to integrate a quantum processor into a commercial device
- Lack of commercial interest

Catalysts

- Milestones in producing a quantum processor
- Fabrication of the Biosensor chip

Comparable Companies (Aust/NZ)

Weebit Nano (ASX:WBT), BluGlass (ASX:BLG), BrainChip Holdings (ASX:BRN)

Board and Management

Greg English	Exec. Chairman
Bernadette Harkin	Director
Kenneth Williams	Director
Dr Mohammad Choucrair	CEO
Damien Connor	CFO

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FINANCIAL SERVICES GUIDE

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Effective Date: 6th May 2021



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