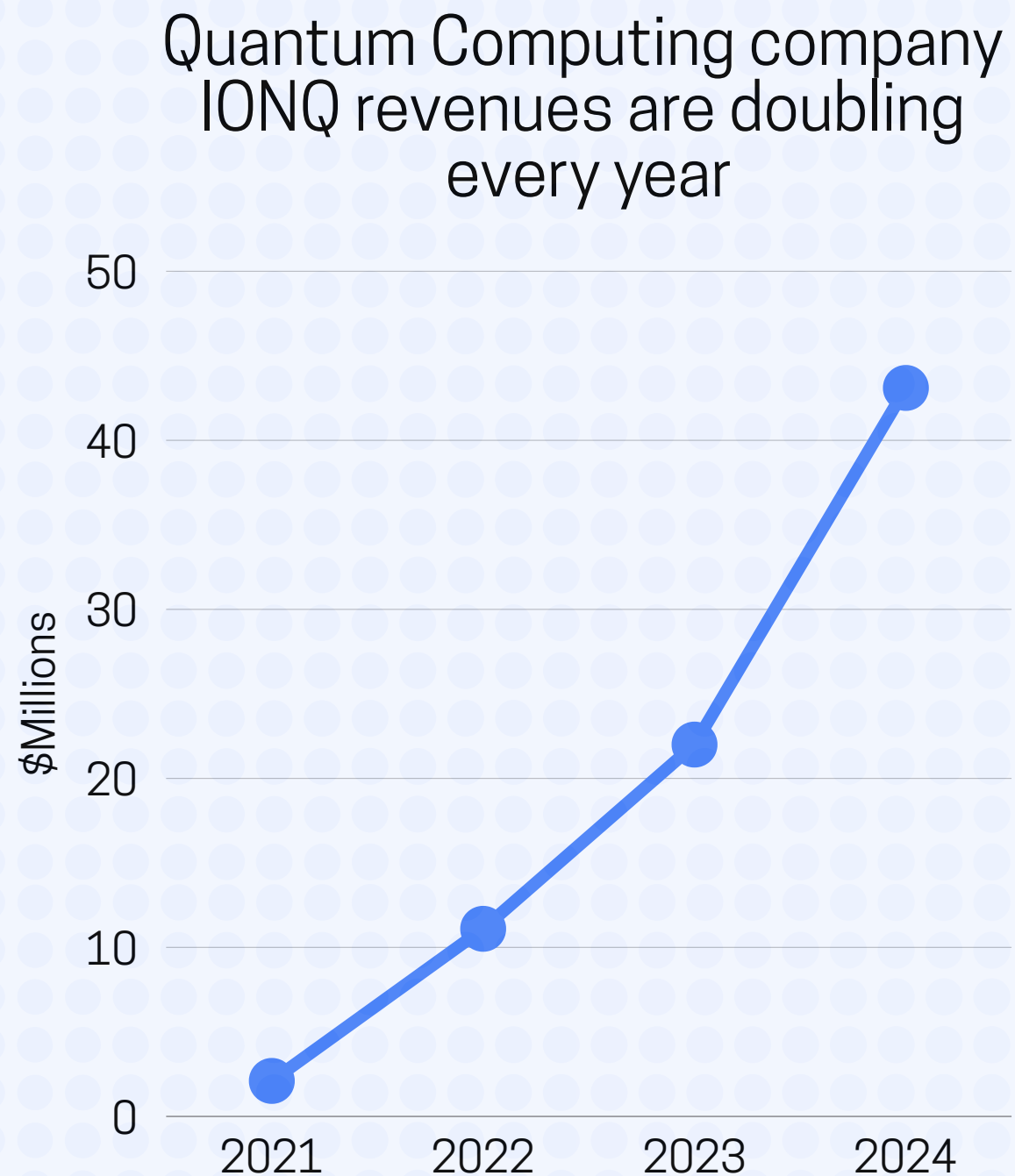


Isn't Quantum Years away?

- Quantum Computers are **already deployed on all major cloud platforms** (AWS, Google and Azure)
- **Actively used** in various industries, incl. medicine, defence and finance
- **Pure quantum company revenues are growing exponentially**



Q-Day definition

The point at which quantum computers can break classical encryption, exposing secrets, sensitive data and vulnerable financial systems.

Quantum *Today*

 Who we are Investors News and views Careers Online banking Contact

HSBC demonstrates world's first-known quantum-enabled algorithmic trading with IBM

25 Sep 2025

- Promising trial with IBM explored the ability of quantum computers to optimise bond trading
- Experiment delivered up to 34% improvement in predicting the probability of winning customer inquiries in the European corporate bond market

White paper: Landmine detection using Quantum Photonic Vibrometer

Jeevanandha Ramanathan, Malvika Garikapati, Yong Meng Sua

July 17, 2024

IonQ And Kipu Quantum Break New Performance Records For Protein Folding And Optimization Problems

Research Greg Bock • June 20, 2025

 IONQ

COLLEGE PARK, MD — JUNE 9, 2025

IonQ Speeds Quantum-Accelerated Drug Development Application with AstraZeneca, AWS, and NVIDIA.

Largest demonstration of its kind combines leading hardware, platforms, and techniques to achieve 20 times speedup over previous demonstrations

Ecosystem collaboration marks significant step toward designing more efficient ways of producing pharmaceuticals

Insider Brief

- Kipu Quantum and IonQ have jointly solved the most complex protein folding problem ever executed on a quantum computer, successfully modeling a 3D structure of up to 12 amino acids using IonQ's Forte hardware and Kipu's BF-DCQO algorithm.
- The project also set records for solving dense quantum problems, including all-to-

Quantum Use Cases

Artificial Intelligence and Machine Learning

Cryptography and Data Security

Drug Discovery and Development

Disease Risk Predictions

Financial Modeling and Portfolio Optimization

Traffic Optimization and Smart Cities

Weather Forecasting and Climate Modeling

Grid Optimization

Material Science and Design

Protein Folding

Quantum Chemistry

Design Optimization

Quantum in Space

Supply Chain and Inventory Optimization

Breaking Bitcoin

Multiple sources converge on a Quantum Computer being expected to break Bitcoin's cryptography within 2-9 years. Q-Day risk is growing every day. **Breaking Bitcoin (ECC) is easier than RSA.**

- 1 Jameson Lopp, Bitcoin Developer (2024):
50% risk within 4-9 years
- 2 Pierre-Luc Dallaire-Demers, PhD, Math / Physics, specializing in Quantum Simulations (2025):
2-6 years ECC will be attacked by Quantum machine
- 3 McKinsey, 2024:
Q-Day within 2-10 years (RSA 2048 broken, ECC sooner)
- 4 2017 Bitcoin Quantum Paper:
As few as 2330 qubits (logical quantum processing units) **needed to break Bitcoin's elliptic curve cryptography (ECC)** - note most leading QC companies expect this 2000+ qubits **within 4 years.**
 - Dr. Michael Naehrig (Principal, **Microsoft**)
 - Dr. Martin Roetteler (VP, **IonQ**)
 - Dr. Kristin Lauter (Director, **Meta**)
- 5 US Department of War, 2025:
Cryptographically relevant quantum computers may be **possible in as soon as 3 years**

Bitcoin Q-Day: 2-9 years

Very high risk in **4 years**

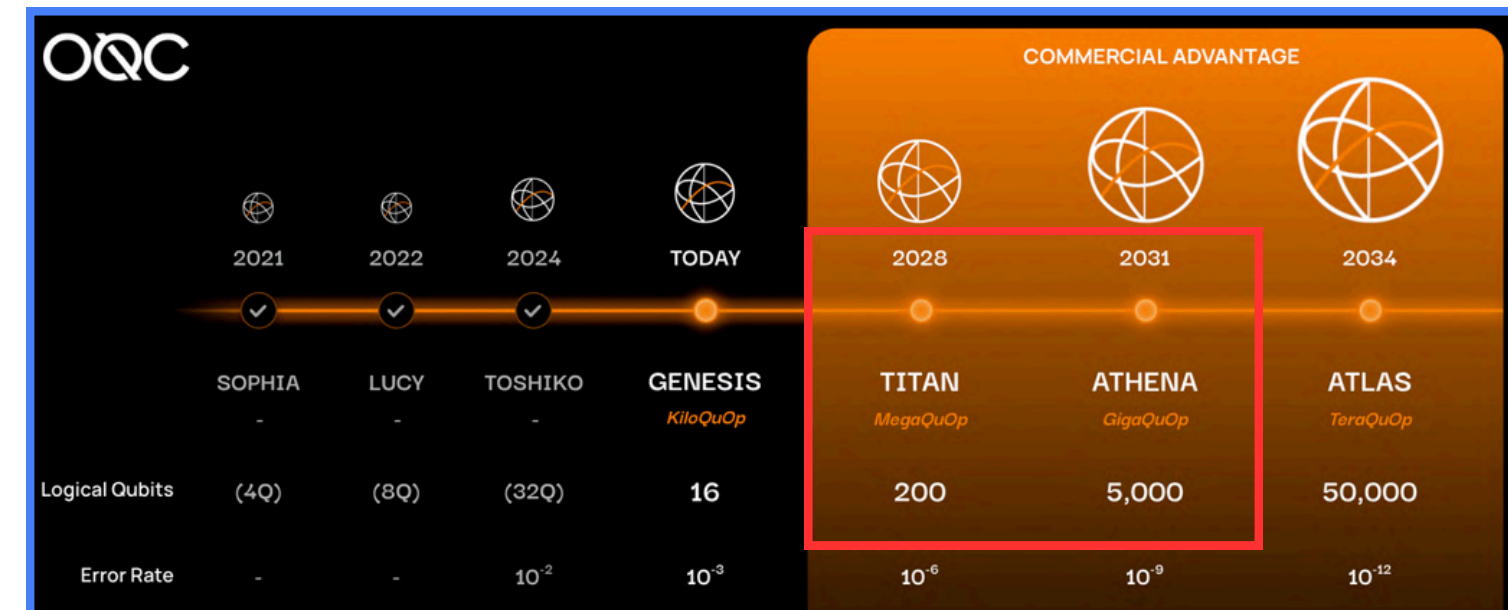
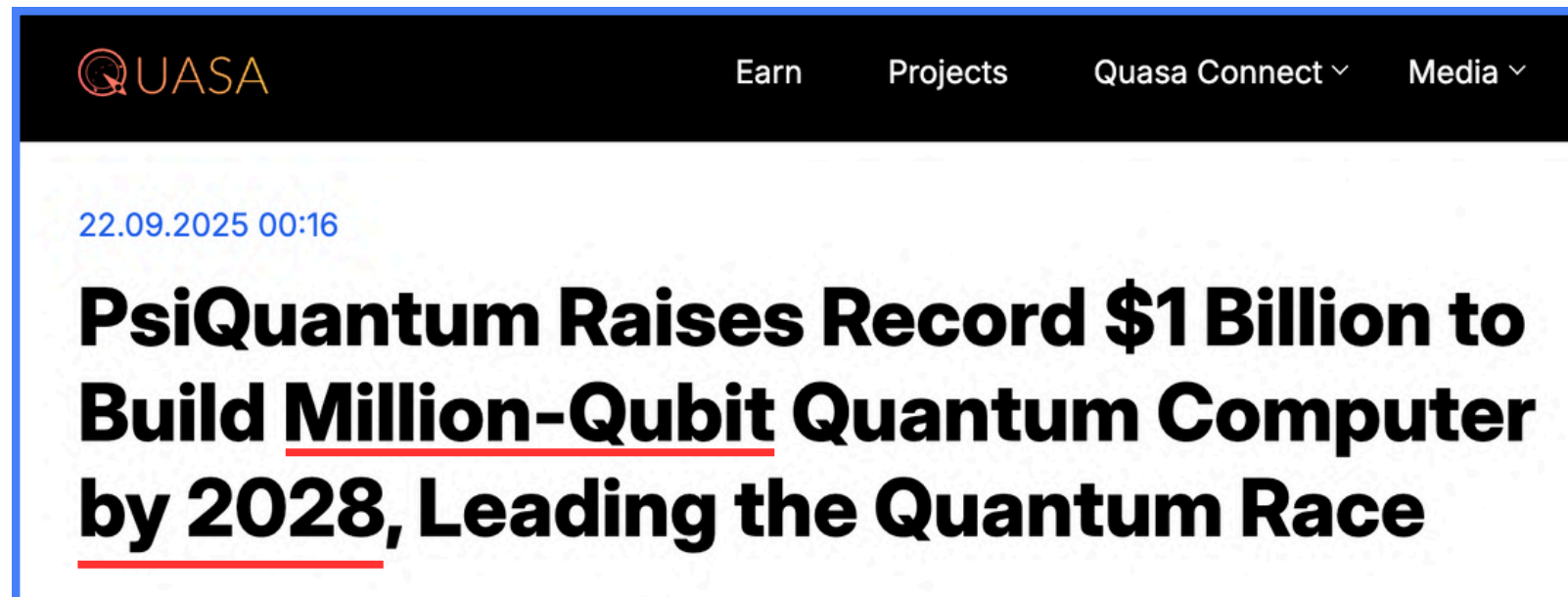
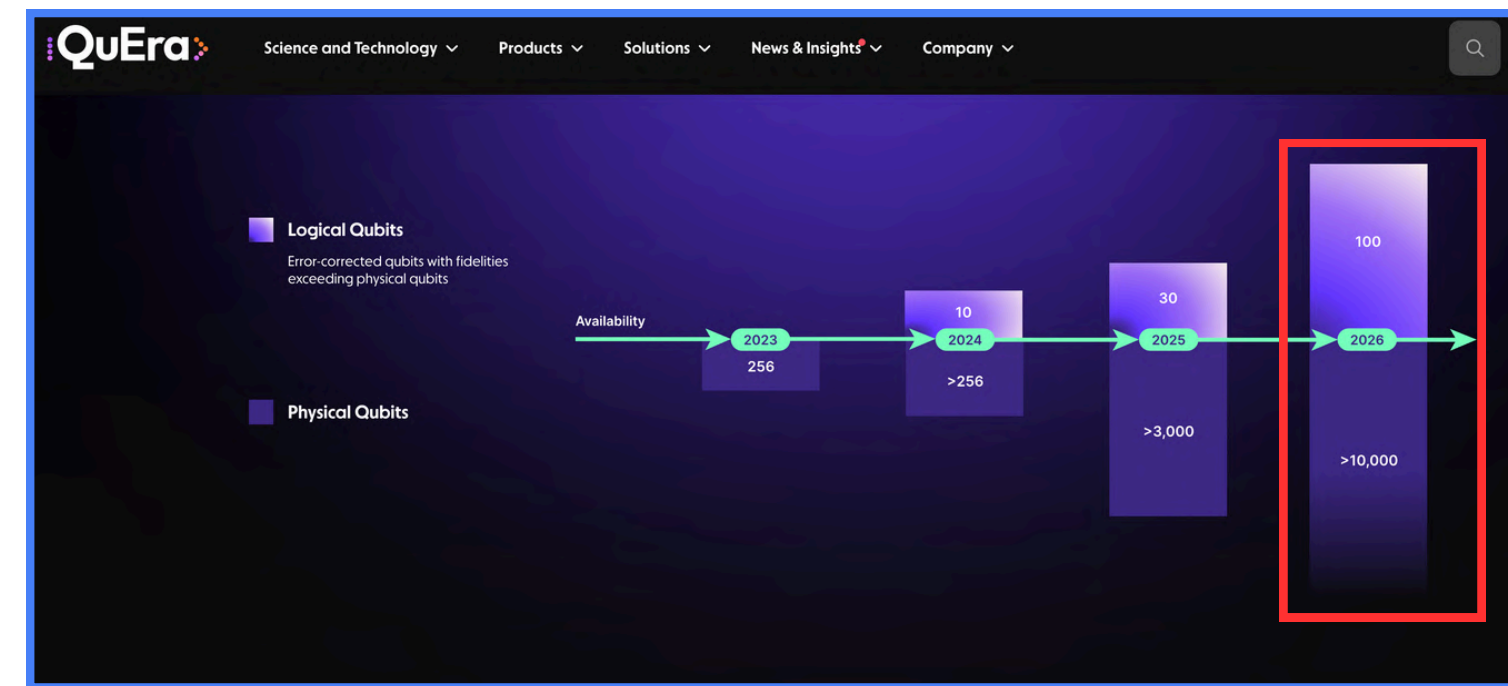
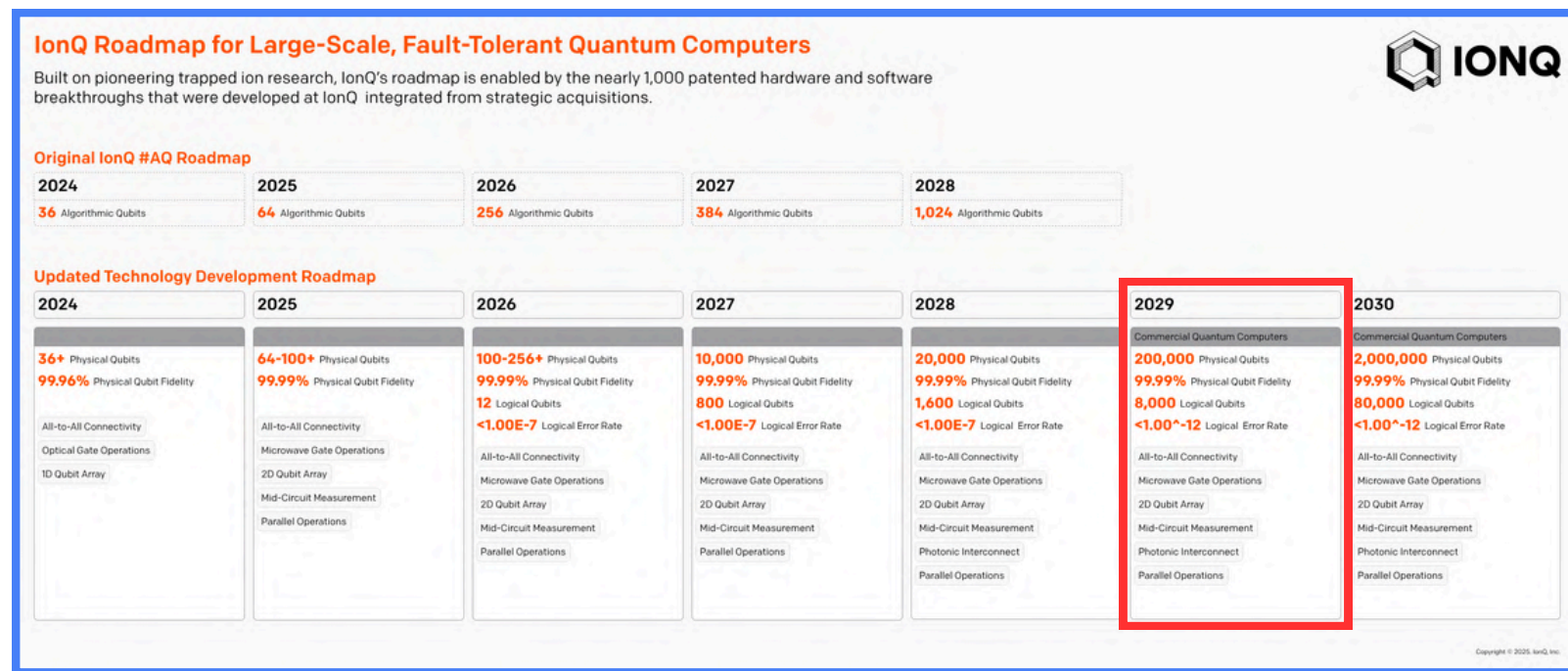


**We have until
2027-2029**

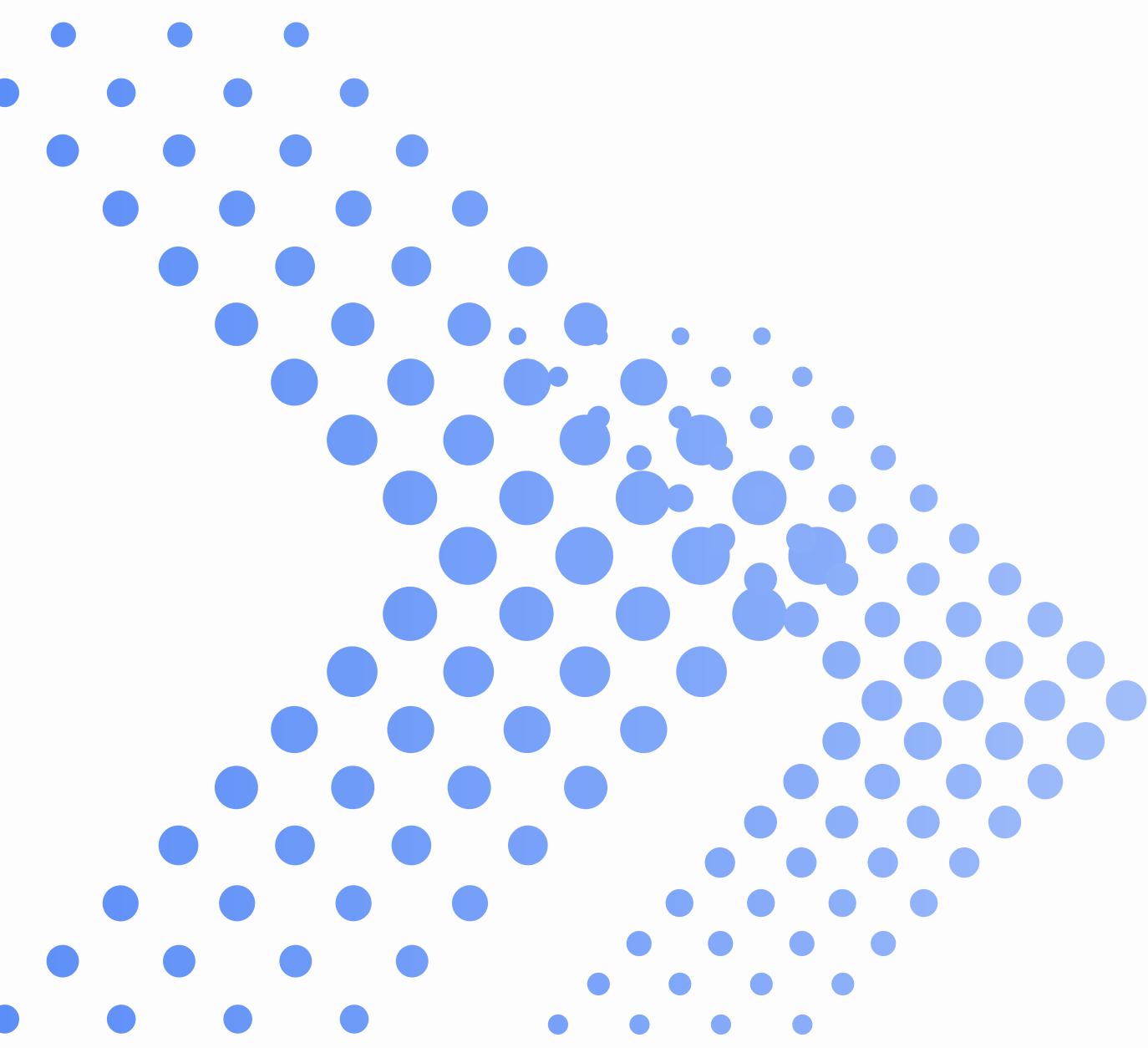
2000+ Logical Qubits by 2029

Capriole Investments
CONFIDENTIAL

Leading Quantum firms are projecting 3000 logical qubit capability within 4-5 years.



BCG's 100+ Quantum Use Cases



1	Quantum-advantaged mathematical function	Sparse matrix math			
4	Computational problem types	Simulation  (\$175 billion–\$330 billion)	Optimization  (\$100 billion–\$220 billion)	Machine learning  (\$95 billion–\$250 billion)	Cryptography  (\$40 billion–\$80 billion)
100+	High-value industry use cases (Sizing at tech maturity)	Pharma: Drug discovery \$40 billion–\$80 billion	Finance: Portfolio optimization \$20 billion–\$50 billion	Automotive: AV AI algorithms Up to \$10 billion	Government: Encryption and decryption \$20 billion–\$40 billion
		Aerospace: CFD \$10 billion–\$20 billion	Insurance: Risk management \$10 billion–\$20 billion	Finance: AML and anti-fraud \$20 billion–\$30 billion	
		Chemistry: Catalyst design \$20 billion–\$50 billion	Logistics: Network optimization \$50 billion–\$100 billion	Tech: Search/advertising optimization \$50 billion–\$100 billion	
		Energy: Solar conversion \$10 billion–\$30 billion	Aerospace: Route optimization \$20 billion–\$50 billion	Other use cases \$25 billion–\$110 billion	Corporate: Encryption and decryption \$20 billion–\$40 billion
		Finance: Market simulation (e.g., derivatives pricing) \$20 billion–\$35 billion			
		Other use cases \$75 billion–\$115 billion			

McKinsey's \$2T of Value

Capriole Investments
CONFIDENTIAL

QC presents a \$1T to \$2T opportunity, with rapid acceleration expected in the coming five to ten years.

Preliminary

Industry	Key segment for QC	Economic value ¹		2035 market size, \$ trillion	Value at stake with incremental impact of QC by 2035, \$ billion
		~2025–2030	~2030–2035		
Financial industry ¹	Financial services	++	+++	14.1	400–600
Global energy & materials	Oil and gas	+	++		
	Sustainable energy ²	+	+++		200–500
	Chemicals	++	+++	6.1	
Travel, transport, & logistics	Travel, transport, and logistics	+	+++	14.1	200–500
Pharmaceuticals & medical products	Pharmaceuticals	++	+++	3.1	
Advanced industries	Automotive	+	++	8.3	70–400
	Aerospace and defense	+	++		
	Advanced electronics	+	++		
	Semiconductors	+	++		50–100
Insurance	Insurance	+	++		
Telecommunications, media, & technology	Telecommunications	+	++		900–2,000
	Media	+	+		
Total					900–2,000

¹Quantum computing technologies and industry is immature and has high uncertainty for viability and value of use cases. Business-value estimates are preliminary and intended to guide research toward high-value-potential areas, not as definitive projections for business value. Insurance is not included.

²Sustainable energy market is expected to grow rapidly from 2022–2035; however, the 2035 market size is influenced by numerous factors and challenging to predict.

Source: McKinsey analysis; Oxford Economics