HOW IS QUANTUM COMPUTING BEING USED TODAY?

D-Wave's customers, collaborators, and users have built more than 250 quantum and quantum-hybrid applications to explore how available quantum technology can address complex private sector and public optimization issues. Below is a sample of those use cases; find more examples on our website.

SUPPLY CHAIN MANAGEMENT & MANUFACTURING

Near-term quantum computing could improve manufacturing efficiency, cargo management, and help ensure critical goods and materials don't languish and clog the supply chain.

SavantX/Port of LA: Supply Chain Management
An optimization application improved Pier 300's cargo handling efficiency by 60%. Turnaround time for the trucks picking up cargo containers was improved by 12%.

Pattison Food Group: E-commerce Delivery Optimization
The largest purveyor of food and healthcare products in western Canada is using D-Wave technology in production to automate scheduling for its delivery drivers, reducing what was once an 80-hour task to just 15 hours each week, an 80% time savings.

DENSO Corporation: Factory Optimization
A proof of concept demonstrated that D-Wave technology improved efficiency of automated guided vehicle routing in factories by 15% compared to classical computers.

ENVIRONMENTAL, SOCIAL & GOVERNANCE (ESG)

Quantum computing can help with ESG efforts by reducing waste, lowering emissions, and improving safety.

Groovenauts/Mitsubishi: Waste Collection Optimization
An optimized route reduced the distance from 2,300 km to 1,000 km. As a result, CO2 emissions would be reduced by approximately 57% and the number of vehicles reduced by nearly 59%.

NATIONAL SECURITY

Davidson Technologies: Missile Defense Optimization
A quantum application could address a hypothetical missile attack. The demo factored in a wide set of variables, including wind, rain, lightning, and solar flare activity, and analyzed more than 67 million possible solutions, generating an answer in approximately 13 seconds.

FINANCE

Mastercard: Financial Services
Company is building quantum applications to optimize customer loyalty and rewards, cross-border settlement, and fraud management.

ENERGY INFRASTRUCTURE

E.ON: Grid Reliability
The German utility provider is exploring how quantum computing platforms can address electric grid reliability and identify vulnerabilities in power plants or on the electrical grid.

DRUG DISCOVERY

Menten AI: Protein Design
Quantum hybrid solvers designed peptide therapeutics that could potentially help fight COVID-19.

GOVERNMENTS

Governments are pursuing practical quantum computing for security, economic, and climate initiatives.

The **Australian government** is evaluating how quantum computing applications can improve its transportation system and enable autonomous vehicles to conduct last-mile re-supply operations.

The **Japanese government** supported building quantum applications to reduce CO2 emissions during waste collection, optimize construction projects, and improve tsunami evacuation routes.

The **United Kingdom** is currently looking at the feasibility of quantum applications with an 18-month or less timeframe for a variety of industries, including manufacturing, transportation and financial services. The U.K.'s 10-year Quantum Strategy focuses on application development, talent development, and user access to quantum systems for researchers and businesses as well as focused funding for commercialization.

The Industry Committee of the **Canadian House of Commons** recommended a "quantum sandbox" program where different government agencies come together to identify problems that could be solved using near-term quantum applications.

PUBLIC SECTOR

To remain competitive, the U.S. government must collaborate with industry to build near-term applications that explore how quantum computing technology, available today, can provide efficiencies and optimize challenging public sector problems. For example, quantum computing could be used to optimize:

- Infrastructure development
- Employee shift scheduling of thousands of employees across hundreds of locations
- Electricity grid resilience via balanced distributed energy generation, adaptation of future energy sources, and placement of EV equipment
- Emergency response planning such as evacuation routes
- Transportation networks like buses, trains, and traffic flow
- Sustainability efforts focused on reducing emissions and waste
- Space industry launch scheduling
- Weather modeling to better predict violent storms
- Supply chain management and logistics