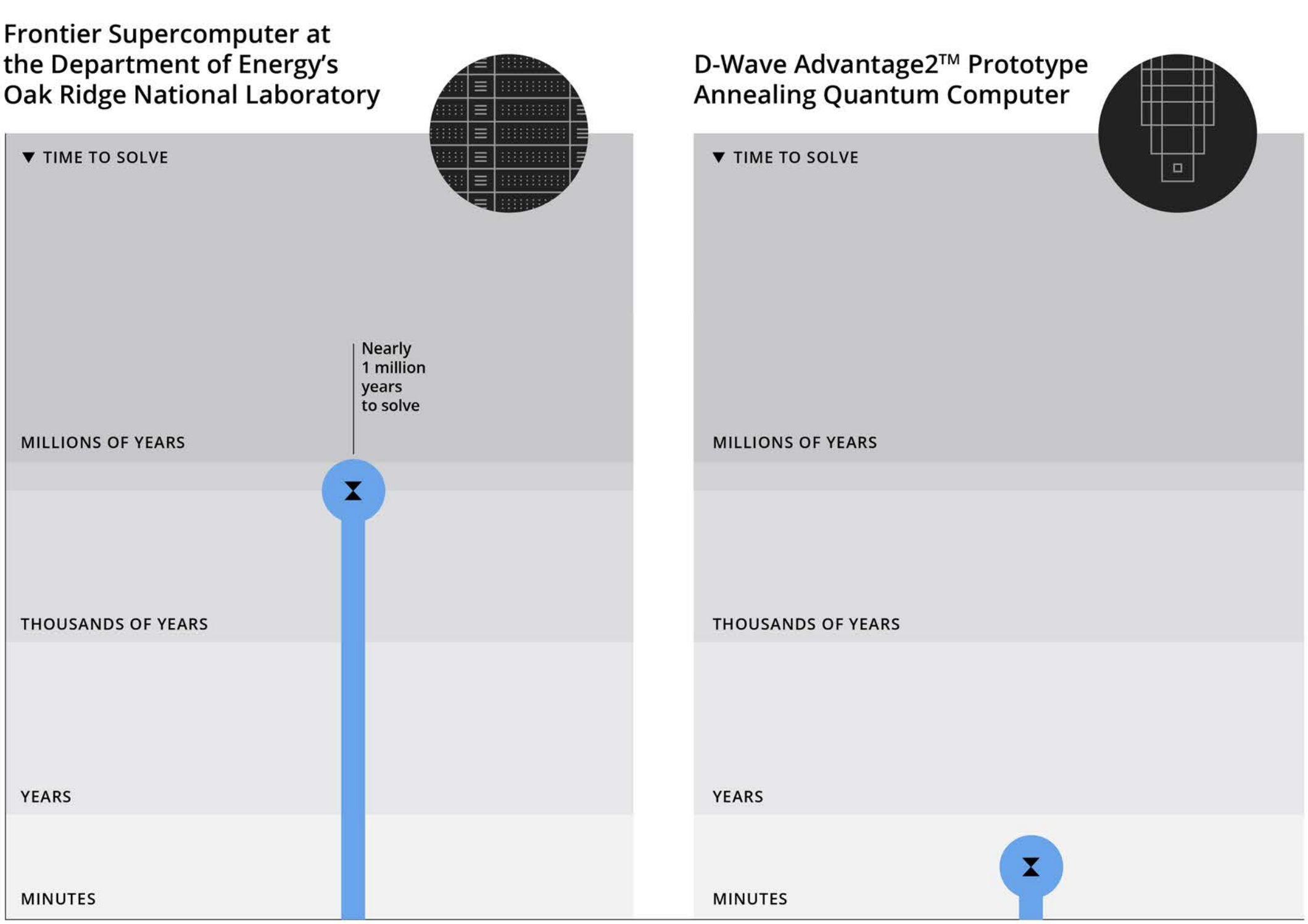
Beyond Classical: Quantum Realized in Action

In a scientific breakthrough published in Science, we've demonstrated that D-Wave's annealing quantum computers can solve useful problems beyond the reach of Frontier, one of the world's most powerful supercomputers.

Quantum Outperforms Classical on a Useful Magnetic Materials Simulation

Understanding the quantum nature of magnetic materials is crucial to finding new ways to use them. Magnetic materials are widely used in medical imaging, electronics, superconductors, electrical networks, sensors, and motors. There's no shortage of applications for the discovery of new magnetic materials. But materials discovery is a computationally complex, energy-intensive, and expensive task. What if we could use a quantum computer to more efficiently run these computations, or even calculate something that's impossible to solve with a classical computer?

A team of scientists led by D-Wave simulated the behavior of a suite of lattice structures and sizes across a variety of evolution times and delivered multiple important material properties on the quantum and classical computers. D-Wave's quantum computer performed the most complex simulation, a biclique lattice, in minutes and with a level of accuracy that would take nearly one million years and more than the world's annual electricity consumption to solve using the supercomputer.



What is a Biclique Lattice?

It is a complex network structure that is the building block of many artificial neural networks. Magnetic materials simulations, like those conducted in D-Wave's research, use computer models to study how tiny particles not visible to the human eye react to external factors.

Learn more about the research: **www.dwavequantum.com/beyond-classical**