

## Topic Area 3: Quantum Facilities for Applied Computing, Sensing, and Security (qFACSS)

*Supporting Offices: FECM, OE, CESER, OTT\**

	Year 1/Phase 1	Year 2/Phase 2	Year 3/Phase 3
<b>TOTAL</b>	<b>\$1,250,000</b>	<b>\$1,250,000</b>	<b>\$1,250,000</b>

*\*Funding total may increase depending on A-Posteriori funding commitment and additional commercialization subtask. More information may be needed.*

### Description

The electric sector is undergoing rapid changes, growing in complexity, and continues to be extremely vulnerable to cyber-attacks, physical incidents, and existential threats. Last year, President Biden signed into law H.R.7535, the Quantum Computing Cybersecurity Preparedness Act,<sup>5</sup> which encourages federal agencies to prepare for a quantum computing threat that could break today's encryption keys. Adding to the complexity, new business models are emerging as larger portions of the economy, such as transportation, are electrified and intermittent resources and new energy storage solutions are developed and incorporated into the electric grid. Quantum Information Science (QIS) however does not only serve as a threat, but can also play a part in addressing both the grid's vulnerabilities and the grid's increasing complexity as the grid evolves to meet changing requirements and goals in the energy sector.

This qFACSS Topic Area will explore the following areas:

1. Quantum computing for optimization and contingency analysis;
2. Quantum key distribution (QKD) and post quantum cryptography (PQC) for grid cybersecurity; and
3. Quantum sensing for grid timing and synchronization with DERs (redundancy, GPS synchronization, or GPS replacement), grid anomaly detection, positioning, navigation, and timing for mobile storage (EVs with vehicle-to-everything capability), CO<sub>2</sub> management (e.g. pipeline or generation plant leakage detection, hydrogen leakage detection, and CO<sub>2</sub> sequestration and CO<sub>2</sub> storage), and geothermal detection/imaging.

This Topic Area will involve a lab data call to inventory currently developed QIS technologies at the labs that could be leveraged for the grid as outlined above and described in more detail below.

In parallel, This Topic Area will facilitate a Request for Information (RFI), open to both industry and lab input, to gain a holistic understanding of the landscape of QIS technologies qualified will help inform ongoing partnerships and future RDD&D funding opportunities as well as this Lab Call Topic Area if timely. Meanwhile, relevant and discrete projects under the DOE V2X MO<sup>6</sup>

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<sup>5</sup> [H.R.7535 – Quantum Computing Cybersecurity Preparedness Act | U.S. Congress](#)

<sup>6</sup> [Vehicle-to-Everything \(V2X\) Memorandum of Understanding \(MOU\) | U.S. Department of Energy](#)