MPSC Position Paper on Silicon Anodes for Li-ion Batteries

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BLUF. The United States is the world leader in the development of silicon anode-based batteries which offers up to a forty percent (40%) increase in capacity over traditional lithium-ion chemistries of the same configuration. This results in longer mission times for the dismounted solder and increased weapon payloads for unmanned vehicles. Development of the domestic production capability for this technology will help leapfrog the stranglehold the Chinese have on lithium-ion production.

Unlike many other emerging chemistries, **silicon anode materials are already in low-volume commercial use** in EVs and consumer electronics. Major OEMs, including Tesla and Porsche, are integrating silicon in small quantities, indicating that the technology readiness level (TRL) for basic adoption is **TRL 6–7**. The challenge is no longer scientific feasibility—it is **economic and infrastructural scale-up**. With targeted investment, the U.S. can lead in bringing this technology to mass market before the Chinese can dominate this battery market also.

The largest problem facing the further development of this technology is the lack of a clear demand signal that companies in the silicon-anode supply chain can use to gain the needed capital investment to build out the technology along with targeted investments by the DoD. If DoD is an early adopter, full scale commercialization will follow. Some recommendations on how this can be accomplished are:

- Establish low-rate initial production contracts for batteries using the technology
- Fund demonstration programs/projects to demonstrate the advantages of the technology
- Fund Manufacturing technology projects to reduce the cost of manufacturing the precursor products
- Create a **Silicon Anode Consortium** under MPSC to coordinate R&D, manufacturing, and sourcing

The Problem:
Despite U.S. R&D leadership, we remain dependent on Chinese supply chains and lack the domestic infrastructure to scale silicon-anode production. The primary barriers are **cost, capital intensity, fragmented investment**, and **insufficient near-term demand**. The DoD cannot justify private sector investment alone.

The Case for Investment:
Many are seeking government support, but silicon is uniquely poised to deliver transformative performance gains in **EVs, defense, and energy storage**—sectors with growing urgency and federal interest. With targeted investment, the U.S. can lead in commercializing this already-proven technology.

How to Create Demand Beyond DoD:

- **Federal Fleet Targets:** Require U.S.-made high-energy batteries in federal vehicle procurement.
- **EV OEM Incentives:** Provide tax credits tied to U.S.-sourced silicon battery content.
- **Early Demonstration Projects:** Fund deployments in logistics, aviation, and microgrids to validate and scale.
- **Buy-America Compliance:** Favor silicon-anode batteries in federally funded programs.

Priority Actions to Accelerate Commercialization:

1. **Bridge the Cost Gap:**
   • Subsidize U.S. silane and silicon precursors
   • Fund mid-scale infrastructure (TRL 6–8)
   • Support capex for scale-up equipment
   • Secure multi-year procurement contracts
2. **Strengthen Supply Chains:**
   • Incentivize domestic silicon production
   • Develop closed-loop recycling for silicon materials
   • Create a **Silicon Anode Consortium** under MPSC to coordinate R&D, manufacturing, and sourcing
3. **Modernize Government Funding Models:**
   • Establish a dedicated SBIR-to-scale transition fund
   • Distribute funding across multiple silicon technologies to reduce risk
   • Link manufacturing grants to real market demand
4. **Activate Industry Leadership:**
   • Form an MPSC-backed **industry committee** to align stakeholders and promote commercialization
   • Host regular roundtables for information sharing and coordination
   • Support shared pre-competitive data infrastructure

Conclusion:
Silicon-anode batteries are a rare case where **performance, feasibility, and strategic value align**—but without near-term, coordinated investment, the U.S. risks missing its window to lead. Bold action now will secure a domestic battery future that is innovative, competitive, and resilient.