



Strategic Defense & Federal Initiatives to Secure the Battery Supply Chain



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Background, Challenges, & Global Trends



Battery Development Over Time

Civil War Telegraph Wagons



WWI Telegraph Stations



Korea PRC-9



Vietnam PRC-77



Iraq & Afg. PRC-153



Military Capabilities

1860

1885

1910

1935

1960

1985

2010

2020

Commercial Applications



1912-1919

War Department /Commercial Battery Standardization



1991 Sony commercializes li-ion.

Dr. Goodenough, Dr. Yoshino, Dr. Whittingham invent the li-ion battery





"Battery technology and lithium ion batteries specifically, are the lifeblood of electrification and the future auto industry, but batteries are also essential to thousands of military systems from handheld radios, to unmanned submersibles and to future capabilities like lasers, directed energy weapons, and hybrid electric tactical vehicles...A healthy battery supply chain is essential to the military. When it comes to batteries, America needs to lead the world. That means innovation, but it also means manufacturing, ensuring we have healthy supply chains to get what we need, when we need it...The problem, however, is that China presently dominates that supply chain."



~ Deputy Secretary of Defense Dr. Kathleen Hicks
November 8th, 2021 Wayne State University



Lithium Cell Production 2020-2030

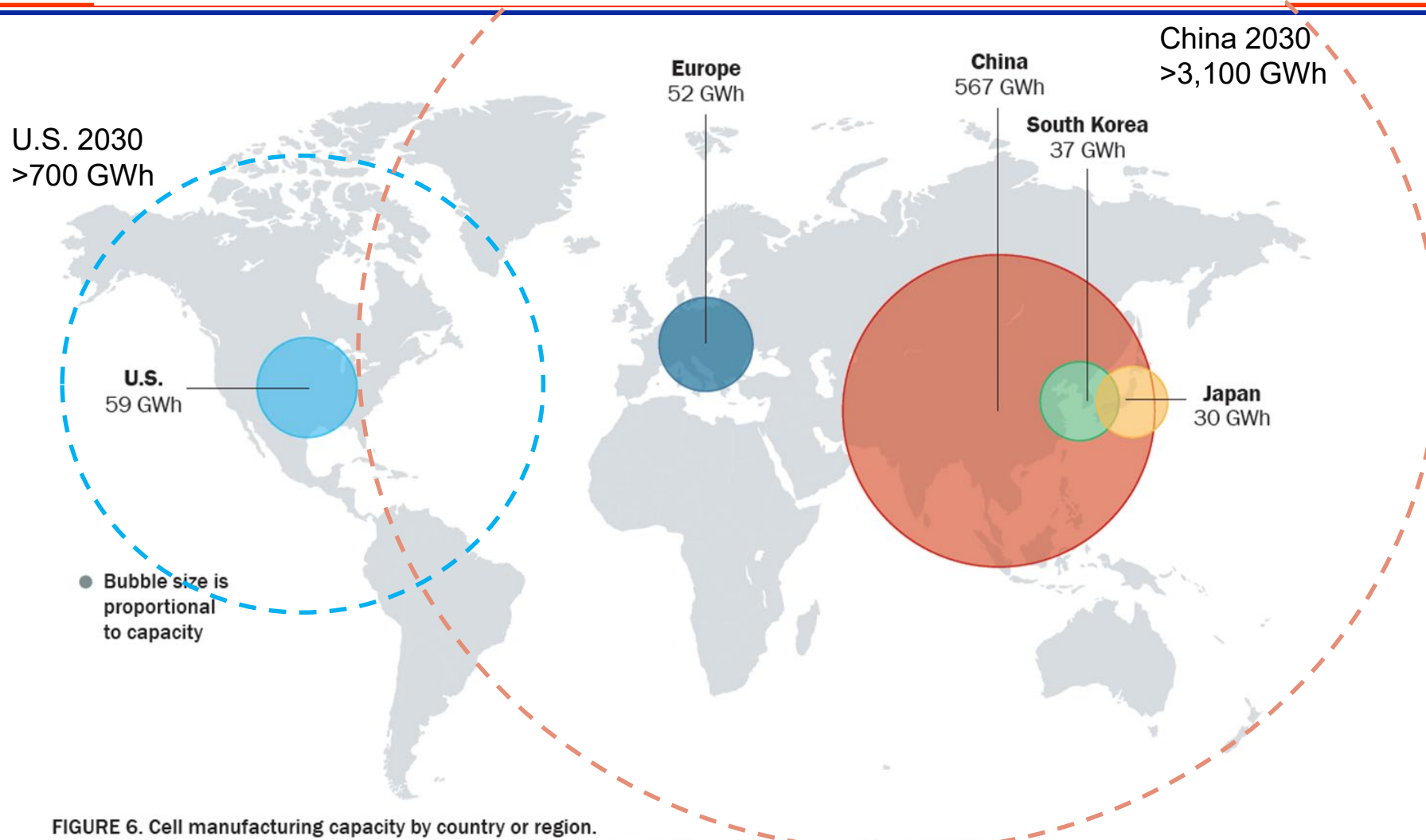
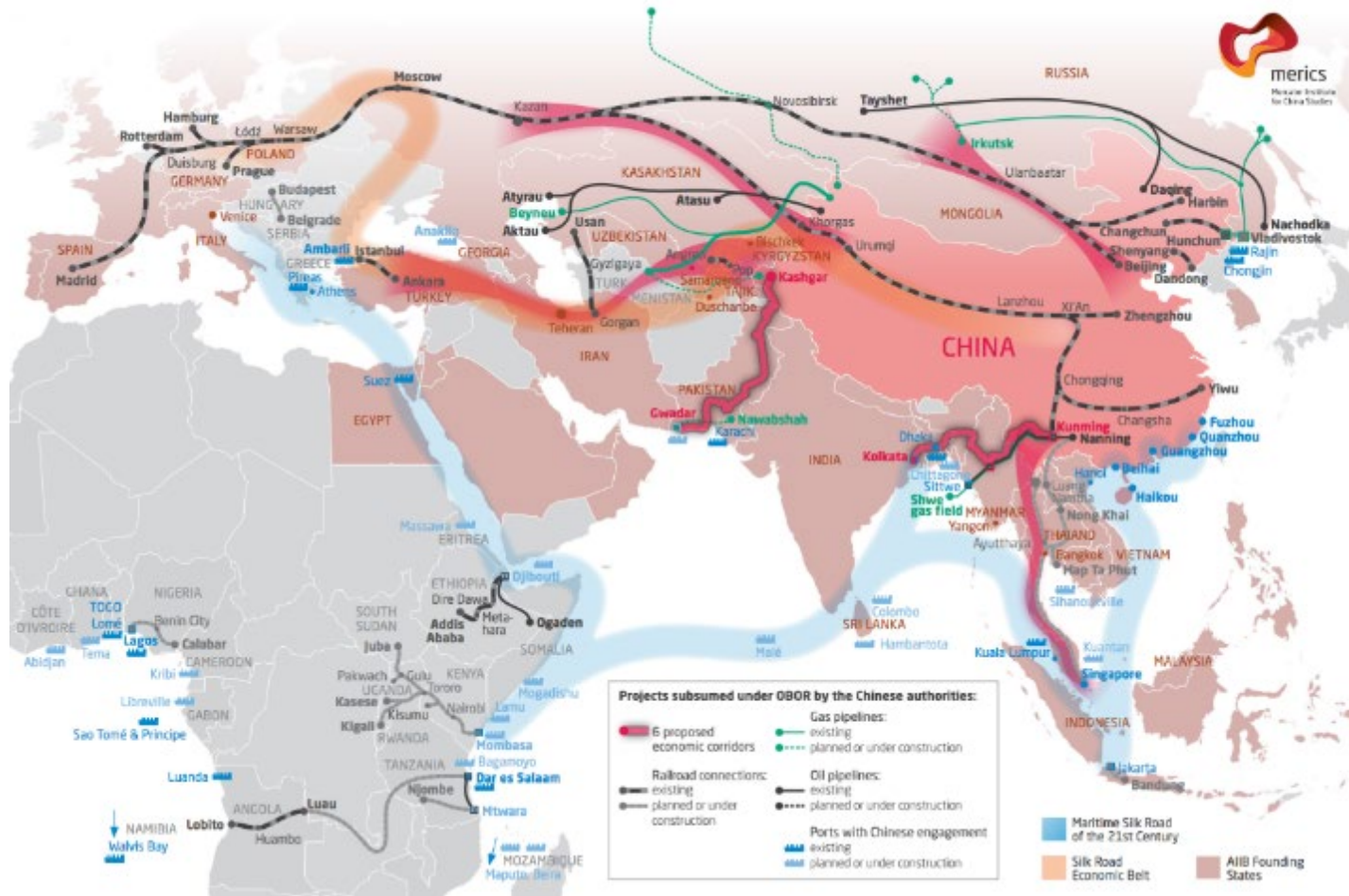


FIGURE 6. Cell manufacturing capacity by country or region.

Source: "Lithium-Ion Battery Megafactory Assessment", Benchmark Mineral Intelligence, March 2021.³²



China's Belt Road Initiative– 2049



For political, economic, and strategic reasons, the BRI is being leveraged to grow China's Electric Vehicle market and compete with US companies through subsidized materials, cell, and pack manufacturing.



Federal Initiatives



FCAB & National Blueprint

National Blueprint for Lithium Batteries 2021-2030



1 Secure access to raw and refined materials and discover alternates for critical minerals for commercial and defense applications



2 Support the growth of a U.S. materials-processing base able to meet domestic battery manufacturing demand



3 Stimulate the U.S. electrode, cell, and pack manufacturing sectors



4 Enable U.S. end-of-life reuse and critical materials recycling at scale and a full competitive value chain in the U.S.



5 Maintain and advance U.S. battery technology leadership by strongly supporting scientific R&D, STEM education, and workforce development



Strategy Signed June 2021

FCAB Charter Signed Sept 2020

BIL Funds allocated November 2021 (FY22-FY26)

Office	BIL Section	Funds
VTO	SEC. 40207. Battery Processing and Manufacturing	\$6,135M
VTO	SEC. 40208. Electric Drive Vehicle Battery Recycling and Second-Life Applications Program	\$ 200M
AMO	SEC. 40209. Advanced Energy Manufacturing and Recycling Grant Program	\$ 750M
OCED	SEC. 41201. Office of Clean Energy Demonstrations (Energy Storage Demonstration Pilot Grant Program, Section 41001)	\$ 355M
FECM	SEC. 40205. Rare Earth Elements Demonstration Facility	\$ 140M
FECM	SEC. 41003. Mineral security projects	\$ 600M
LPO	SEC. 40401. Department of Energy Loan Programs	\$ 0M

DOE Funding Opportunity Announcement Released, May 2nd 2022 (\$3.1B)



FCAB Executive Steering Group



Kelly Speakes-Backman

Department of
Energy



Mr. Richard Kidd

Department of
Defense



Ms. Halimah Najieb-Locke

Department of
Defense



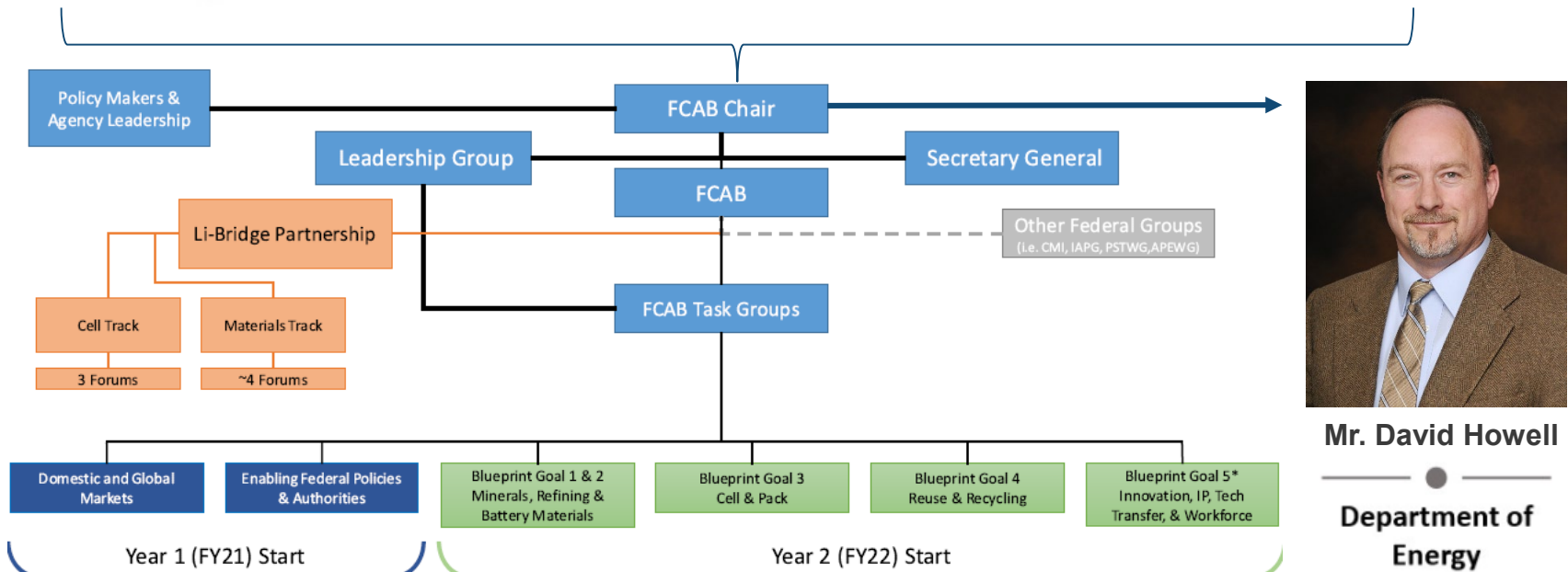
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Department of
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Defense Initiatives

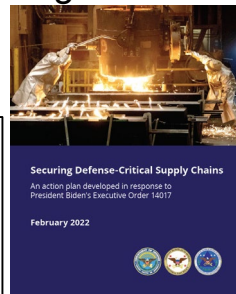


Department of Defense Strategic Objectives



DoD Battery Strategic Objectives

1. Provide DoD program offices with safe, effective, affordable, and standard energy storage options
2. Ensure access to battery systems when the supply chain is threatened
3. Reduce the total time required to develop, certify, and field safe advanced energy storage-enabled systems
4. Reduce the logistics burden associated with fielding and sustaining advanced batteries to the warfighter
5. Support the Department's climate objectives to achieve enduring readiness



Securing Defense-Critical Supply Chains: An action plan developed in response to President Biden's Executive Order 14017 February 2022

		China's Supply Chain Dominance	Custom Design Standards	Acquisition Policy	Supply Chain Data	Infrastructure	Organization & Structure
Internal	Rec B1.1: Develop a defense-specific lithium battery strategy	✓	✓	✓	✓	✓	✓
	Rec B1.2: Develop a prioritized plan to resolve battery infrastructure and analytic gaps				✓	✓	✓
	Rec B1.3: Use DoD investment authorities to leverage commercial investments	✓					
Interagency	Rec B2.1: Work with the DOE and interagency partners on integrated investment plans				✓		
	Rec B2.2: Coordinate recycling initiatives with DOE	✓					
International	Rec B3.1: Enhance interoperability and supply chain coordination	✓	✓				
Industry	Rec B4.1: Standardize and aggregate battery demand		✓			✓	

- ▲ Actively being worked
- ▲ Planning underway
- ▲ Future objective



DoD Battery Strategy Intent & Timeline

Strategy Objectives:

1. Provide DoD program offices with safe, effective, affordable, and standard energy storage options
2. Ensure access to battery systems when the supply chain is threatened
3. Reduce the total time required to develop, certify, and field advanced energy storage-enabled systems
4. Reduce the logistics burden associated with fielding advanced batteries to the warfighter
5. Enable the Department to accomplish climate objectives

Dept. of Energy BIL Resources

- DASD Kidd & DASD Locke - DoD Executive Participants
- **\$8B** mining, materials processing, cell and pack manufacturing, recycling



2022 Strategy Timeline:

JAN-MAR Service Inputs
MAY Initial Draft
JUN-SEP Staffing/Coordination
NOV Signature



Recent Industry Engagements



Industry Engagement Lessons Learned

1. **Demand** - Without a well communicated demand signal (3, 5, 10 years) industry cannot establish key supply relationships or make large internal investments
2. **Acquisition Policy** - DoD's focus on cost in acquisition has driven DoD battery companies to seek Asian solutions
3. **Domestic Ecosystem** - Industry lacks domestic choices for battery components and cells (Anodes, cathodes, foils, separators, tab leads, BMS systems, pouch material, and electrolyte)
4. **Workforce** - Industry is concerned about sufficient workforce given the projected exponential growth in domestic production

Industry Partners Recently Engaged

- CEO-Level Engagements
 - Northrup Grumman
 - BAE Systems
 - Lockheed Martin
 - Huntington Ingalls
- Industry Groups
 - Military Power Sources Committee
 - Battery Council International (BCI)
 - NattBatt
 - LiBridge

THALES

EnerSys

EAGLEPICHER
TECHNOLOGIES

STELLANTIS

gm DEFENSE

Ford

gm

STRYTEN ENERGY

NANOGRAP
TECHNOLOGIES

xentris
WIRELESS

EXO
COINTEL

SAMSUNG

EASTPENN

HARRIS

one
our next energy

TADIRAN
BATTERIES

TESLA

Bren-Tronics, Inc.
Intelligent Military Batteries & Charging Systems

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AMERICAN LITHIUM ENERGY

FORGE NANO

MOLICEL

inVENTUS
POWER

SAFT

PIEDMONT
LITHIUM

QUALLION
Powering Life.



Actions Underway

Actions

- OUSD(A&S) is
 - Developing a DoD battery strategy, that is resourced, ready for execution, and aligned with the emerging National Defense Strategy
 - Coordinating with OUSD(R&E) and Services to align future DoD requirements/ investments with commercial advancements
 - Incorporating industry inputs in strategy, policy, and investment
 - Planning international engagements on standardization and interoperability
 - Coordinating with the Interagency through FCAB (Commerce, State, Energy, and others) on investment and aggregate risk

Deliverables

- ✓ Supporting National Blueprint for Lithium Batteries execution (June 2021)
- ✓ EO14017 One year report (February 2022)
- Defense Advanced Battery Working Group Charter (July 2022)
- DoD Lithium Battery Strategy (November 2022)



