The new logistics revolution: Why energy mobility is the modern battlefield's greatest supply chain challenge

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Background

We regularly reach out to leading businesses and try to understand their orientations, concerns and interests.

This document presents an outcome of a similar assessment conducted in May-June 2026 with a focus on how the battlefield of tomorrow is evolving. For some aspects, perspectives of former soldiers and users were also gathered.

Management Summary

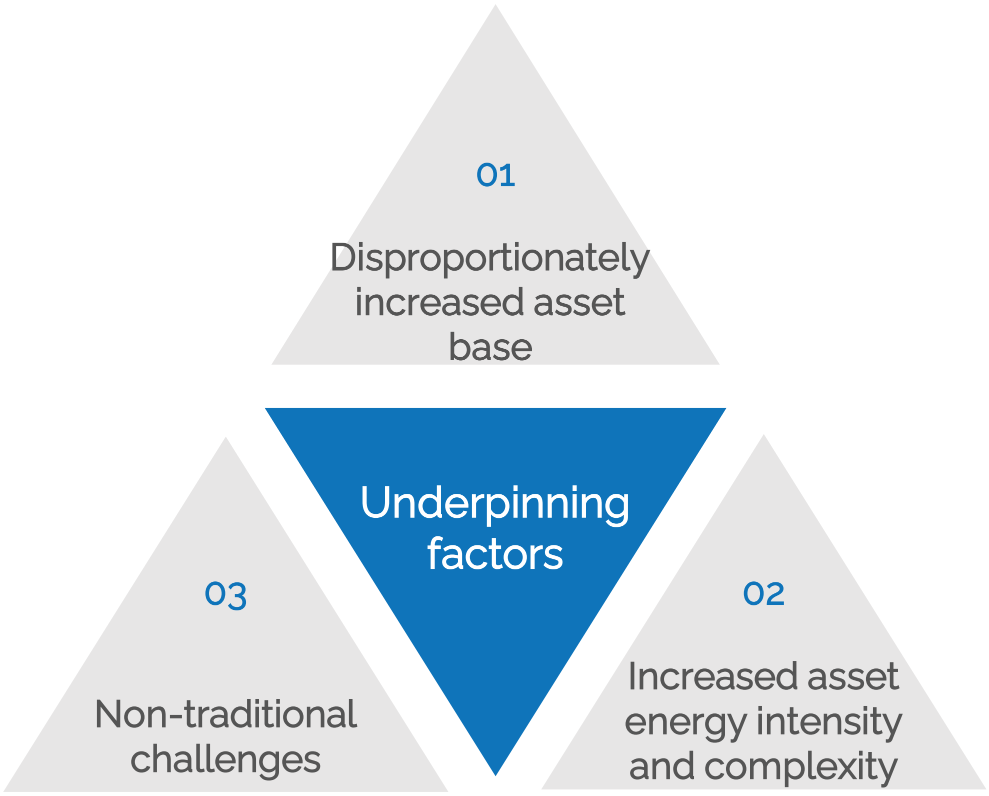
- The character of military logistics is undergoing a profound transformation. While armies have historically focused on moving food, fuel, ammunition, and medical supplies, the modern battlefield is increasingly dependent on electrical energy. Every new capability—from encrypted communications and thermal imaging to AI-enabled decision-making and autonomous systems—adds to the demand for reliable, portable power. As warfare becomes more digital and distributed, the ability to generate, store, transport, and intelligently manage electrical energy is emerging as a decisive operational capability.
- This shift is being accelerated by the rapid proliferation of unmanned and autonomous systems. Traditional force structures centred on a relatively small number of fuel-intensive tanks, aircraft, and armoured vehicles are giving way to battlefields populated by hundreds or even thousands of UAVs, robotic platforms, sensors, and electronic warfare systems. Each asset has unique charging cycles, battery requirements, and operational priorities, dramatically increasing the complexity of battlefield energy management and transforming logistics into a real-time energy orchestration challenge.
- Unlike conventional fuel, electricity cannot simply be transported in bulk and dispensed when required. It must be generated, stored in batteries or other media, converted, and distributed through resilient networks that can survive attack. This has led to growing interest in distributed microgrids, hybrid-electric vehicles, portable renewable energy systems, intelligent charging infrastructure, and AI-driven energy management platforms capable of optimizing thousands of interconnected energy assets across contested operational environments.
- The increasing dependence on electrical power also creates new vulnerabilities and new strategic priorities. Charging stations, battery inventories, power electronics, and energy distribution networks become critical elements of military readiness alongside ammunition and fuel. Success in future conflicts will depend not only on possessing advanced weapons and autonomous systems, but on ensuring that energy reaches the tactical edge with the same speed, resilience, and precision as information and logistics.
- This transformation presents a significant business opportunity across the defence and energy ecosystems. Demand is expected to grow for advanced batteries, portable energy storage, smart charging systems, battlefield microgrids, hybrid propulsion, AI-based energy management software, and standardized power architectures that enable interoperability across platforms. At the same time, modern militaries will need to reorganize around energy as a core operational function, integrating energy planning into force design, logistics, procurement, and doctrine. Dedicated battlefield energy management capabilities may become as essential to future military success as traditional fuel and ammunition supply chains.

Instead of managing energy for tens of major platforms, Army commanders increasingly need to manage power for tens of thousands of distributed electronic assets, each with different charging cycles, battery chemistries, priorities, and operational timelines.

The logistics challenge has shifted from fuel management to energy orchestration.

Sources : Industry estimates, Stonesbury Research

3 key underpinning factors define for modern armies the need to actively (re)plan battlefield energy orchestration



Disproportionately increased asset base Exponential increase in the number of assets	With increased penetration of UAVs and unmanned systems (UAV[1], UGV[2], UUV[3]s), a forward unit is seeing its asset inventory increase from tens of assets to tens of thousands of assets spanning all sizes and constructs
Increased asset energy intensity and complexity Increased electrification of assets rushing up demand from existing platforms; multiple chemistry logistics needed	Modern platforms are increasingly having stronger electrical architectures to manage the much larger energy loads as compared to platforms that were being operated a generation ago. Additionally, the plethora of different assets require management of multiple chemistries that traditional armed units did not have to contend with.
Non-traditional challenges Building an energy value chain that is pervasive but also secure and if possible invisible	Unlike civilian networks, the energy network of the battlefield has to be high availability, interoperable, dispersed (with the ability to integrate multiple platforms and varied chemistries of energy generation and storage), secure to disruption from enemy attacks and most importantly largely invisible so as to not attract enemy attention.

UAV[1]- Unmanned Aerial Vehicle UGV[2]- Unmanned Ground Vehicle, UUV[3]s - Unmanned Underwater Vehicle

Sources : Industry estimates, Stonesbury Research

1 – UAS driven disproportionately larger asset base is forcing a reconfiguration of the fighting unit's capabilities

- For decades, military force projection relied on a relatively small number of expensive, highly capable, manned platforms which included fighter aircraft, transport aircraft, heavy-medium and light assault vehicles (MBT[4]s, APC[5]s, IFV[6]s, MRAP[7]s, MRLS[8], Artillery platforms and Air-defence platforms), Utility vehicles and Reconnaissance vehicles. These were classified as platforms that were either sensors, seekers or driving battlefield transparency.
- Each of these assets consumed either fuel or energy stored in batteries – which represented a complex but relatively manageable logistics problem. For most western armies - a brigade traditionally operated a defined number of vehicles.
- As the battlefield turns from manned to unmanned, some critical changes are underway
    - Firstly, A brigade is now forced to operate not only its traditional complement of vehicles but also additionally hundreds of reconnaissance UAVs, hundreds of FPV[9] attack UAVs, tens of autonomous ground vehicles, hundreds of counter-UAV and Electronic warfare sensors and nodes. Instead of managing energy for upto a hundred major platforms, commanders increasingly need to manage power for tens of thousands of distributed electronic assets, each with different charging cycles, battery chemistries, priorities, and operational timelines. The logistics challenge has shifted from fuel management to energy orchestration. A tank may require one fuel resupply every few days. A quadcopter may require three battery changes before lunch.
    - Secondly, modern warfare is increasingly seeing quantity become a strategic variable. The balance of power is shifting back from capability of asset towards umber of assets deployed., The Armenia-Azerbaijan and Ukraine-Russia conflict are confirming that there is a real dividend in deploying large number of assets and larger the deployment volume, stronger is the on-field advantage.

"An outside-in assessment of Ukraine-Russia conflict is suggesting that a front-line unit is today requiring 15–20,000 battery charging events every week, just to maintain status quo on the battlefield."

Traditional position
Hundreds of assets

Emerging Reality
Tens of thousands of assets

Fig 1. Expansion of asset base

High Urgency of need to equip and deploy tens of thousands of unmanned assets in additional to traditional assets

"The new reality is that units need UAVs in addition to traditional manned contingent "

Shift away from focus on capability of platforms to shear number of assets deployed

""Having a few UAVs is no longer of value, the game changing impact happens when you have significant numbers to deploy"

MBT[4]- Main Battle Tank, APC[5]-Armoured Personnel Carrier, IFV[6]– Infantry Fighting Vehicle, MRAP[7] – Mine resistant and Armoured Protected, MRLS[8] – Multiple Rocket Launch System, FPV[9] – First Person View

Sources : Industry estimates, Stonesbury Research

2 – Increased energy intensity and complexity at asset level requires armies to reconfigure their approaches

- The growing energy challenge on the battlefield is not simply a consequence of having more military platforms — it is equally driven by the fact that higher energy intensity sought for every new generation of military assets. This is happening due to significantly higher levels of networked computing, advanced communication and now AI driven hardware (sensors, processors) becoming standard platform gear. This is leading to energy intensity creep across all categories of equipment. For example :-
    - Modern main battle tanks (MBTs require onboard electrical generation capacity of 20–40 kW, a three- to five-fold increase over earlier generations. Next-generation ICVs being developed are already being designed with architectures of 100–500 kW of exportable electrical power to support external sensors, UAVs and future directed-energy weapons.
    - Fifth-gen combat aircraft require ~2.5X more electrical generation capacity as compared to 4th gen fighters..
    - Naval platforms are witnessing an even steeper increase in energy demand.
    - Most mounted sensors (radars/sonars) are today having anywhere between 2X-3X of the energy requirement as compared to previous generation products
    - Even the individual soldier has undergone a comparable transformation. During the Gulf War, a typical infantry soldier carried 3 to 5 battery-powered devices consuming approximately 100 Wh of electrical energy per day. Today's digitally connected soldier routinely carries 20–30 electronic systems. Daily energy consumption has consequently increased to 300–600 Wh, while batteries alone may account for 15–20% of the soldier's carried load during extended operations.
- Instead of, as earlier transporting only diesel fuel and a mix of batteries, future energy logistics chains are already being built around Deisel, Batteries, Charging stations, Power converters, Spare battery modules, Solar systems, Hydrogen cartridges, Portable generators and even micro-grid components. The problem statement thus becomes more diverse and technically complex. Energy supply chains evolve from moving one commodity to managing an ecosystem.

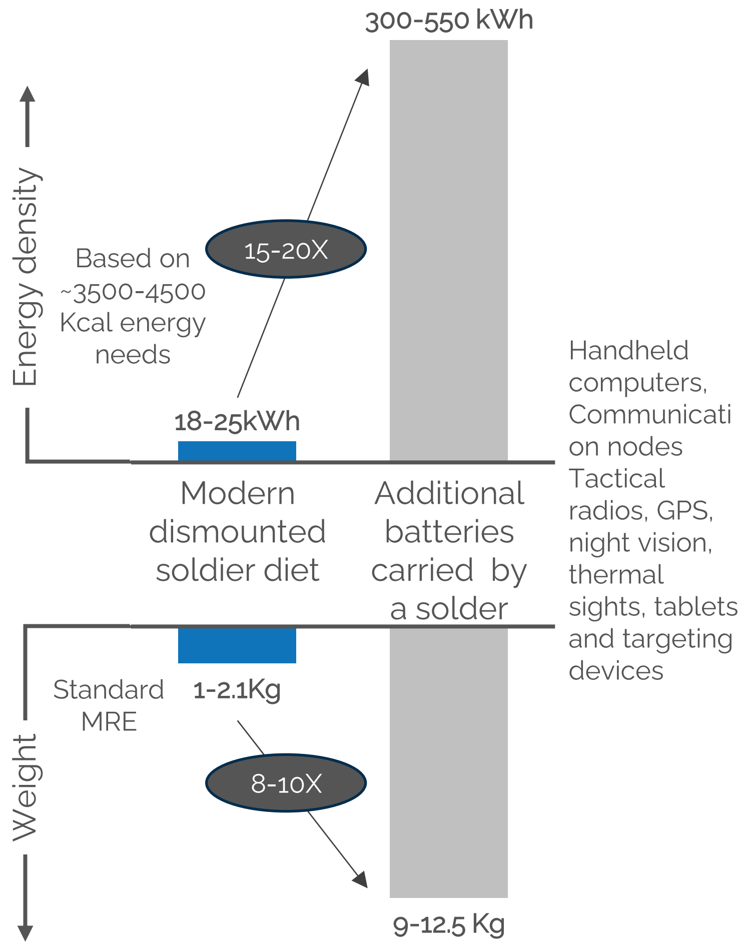


Fig 2. Energy density & weight consideration for a soldier

Sources : Industry estimates, Stonesbury Research

3 – Unlike civilian architectures, army energy supply chain has additional non-traditional design considerations

- Modern military operations are increasingly conducted in remote, austere and contested environments where reliable civilian energy infrastructure either does not exist or cannot be relied upon. Whether operating in deserts, mountains, Arctic regions, dense forests, island chains or deep inland theatres, deployed forces often function hundreds of kilometres from fixed electrical grids and established fuel infrastructure. At the same time, traditional logistics are becoming more vulnerable to long-range precision fires, UAVs and electronic surveillance. The result is that armies can no longer depend on frequent resupply or host-nation power. Instead, they must generate, store, distribute and intelligently manage energy organically through deployable microgrids, hybrid power systems, mobile storage and autonomous energy logistics.
- Unlike civilian grids that are engineered for 99.9–99.99% uptime, battlefield energy networks must deliver effectively 100% mission availability despite operating under constant attack. For example, in the Ukraine-Russia conflict, long-range missiles and low-cost UAVs have repeatedly targeted fuel depots, substations and logistics hubs, making energy infrastructure a primary target. A single loss of power incident can disable multiple sensors and command posts, directly impacting combat operations.
- Modern military formations are evolving from managing hundreds of fuel-consuming platforms to hundreds of thousands of electrical assets. A brigade may simultaneously support 1,000+ UAVs, 300+ radios, 200+ thermal sights and 100+ robotic systems, each with different battery chemistries, voltages and charging cycles. Energy networks are starting to be designed therefore to integrate disparate sources like diesel generators, lithium-ion batteries, LFP batteries, solar arrays and hydrogen fuel cells.
- Concentrated energy infrastructure is increasingly untenable. As war becomes more asymmetric, COTS[10] based UAS platforms (stand-alone or swarms) are able to rebalance battlefield outcomes by targeting high value assets. Future battlefield energy systems thus need dispersed generation, silent battery storage, hybrid-electric vehicles and mobile charging nodes that minimize thermal, acoustic and electromagnetic signatures. In modern warfare, reducing the detectability of energy infrastructure is becoming as important as protecting tanks, aircraft and command posts.

Every New Capability Brings Another Battery - The transition to AI will further increase demand.

Battlefield System	Typical Power Requirement
Soldier radio	10–30 W
Battlefield tablet	20–60 W
Rugged laptop	50–150 W
Thermal weapon sight	10–40 W
Small quadcopter	150–600 W (flight)
Portable radar	0.5–5 kW
Counter-UAV jammer	2–20 kW
Mobile command post	10–100 kW
EW system	10–100 kW
High-energy laser	50–300+ kW

Fig 3. Energy intensity of various deployed assets

COTS[10]- Commercially-off-the-shelf

Sources : Industry estimates, Stonesbury Research

This issue requires addressal of three core challenges whilst undertaking redesign of the energy supply chain

Contested Logistics

Persistent surveillance and precision strike capabilities ensure that traditional logistics no longer enjoys sanctuary. - Fuel depots, electrical substations, charging stations, and generator farms become attractive targets. Resilient energy networks require a mix of distributed microgrids, decentralized power generation, mobile battery storage, renewable energy integration, and autonomous energy routing.

Hidden cost of batteries

Exponential growth in battery-powered equipment is a significant logistical burden – manufacture, transport, monitoring, charging, maintenance and replacement/disposal. Different military systems often require incompatible battery formats, increasing inventory complexity and reducing interoperability. Additionally recharge cycles consume time and infrastructure. In prolonged conflicts, battery supply chains themselves may become strategic vulnerabilities.

Convergent, co-locational nature with Data backbone

As military operations become increasingly digital, the battlefield's energy backbone will inevitably converge with its data backbone. Every sensor, AI processor, communication node, UAV, and command system requires both power and connectivity to function. This convergence complicates the design of energy supply chain by making accommodations for the data side of things.

Energy SCM challenges

- Design & delivery
- Resilience & Security
- Interoperability
- Cost efficiency
- Scalability and future readiness

Mission objectives

- Longer endurance for dismounted troops.
- Greater availability of autonomous systems.
- Reduced dependence on vulnerable fuel convoys.
- More resilient C3I[11] networks.
- Faster deployment of high-energy weapons.

C3I[11]- Command, Control, Communication and Intelligence

Sources : Industry estimates, Stonesbury Research

The above results in a set of time defined universe of technology choices and a clear set of actions for corporations

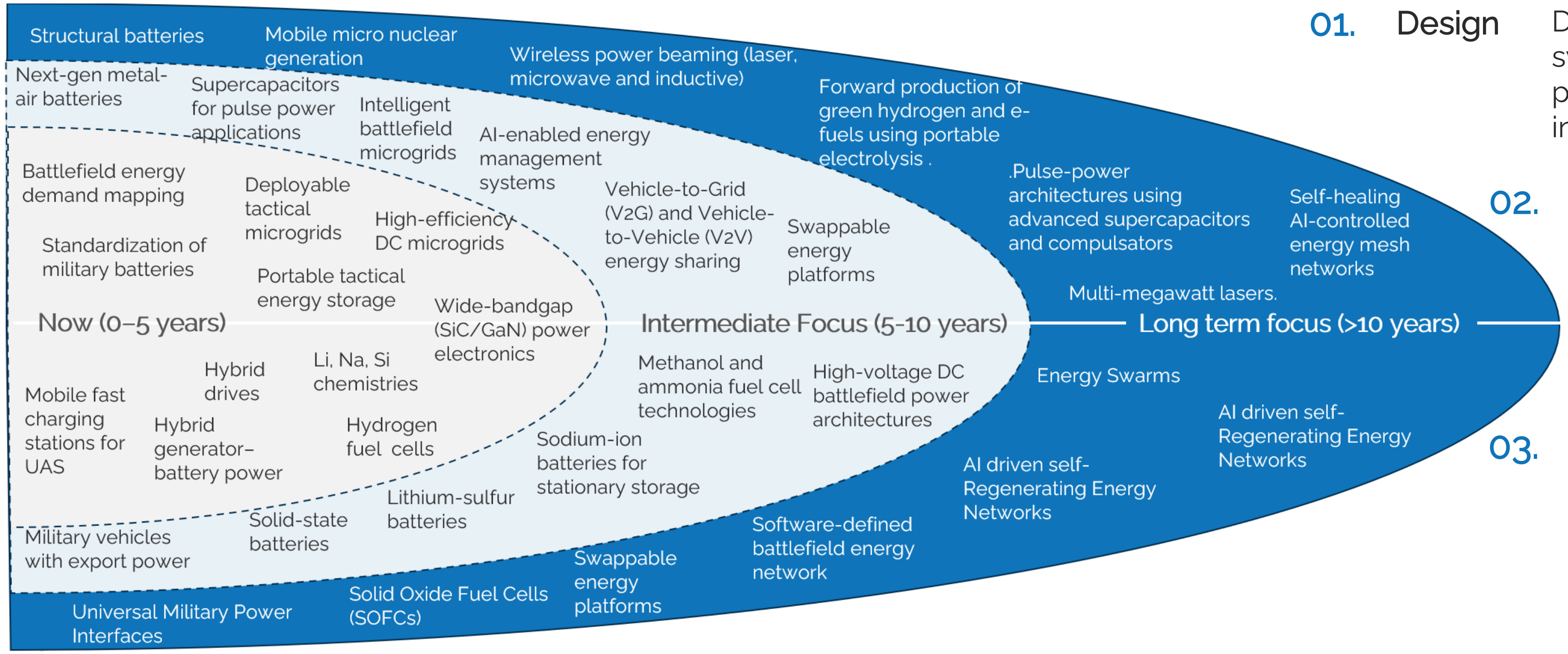


Fig 4. Technology horizon for battlefield energy management

What should companies need to think about?

01. Design — Design platforms as energy hubs, not just combat systems, with standardized power architectures, export power capability, bidirectional charging and seamless integration with manned and unmanned assets.

02. Invest — Invest in next-generation energy technologies by building capabilities in advanced battery chemistries (solid-state, lithium-sulfur, sodium-ion), hydrogen fuel cells, power electronics and tactical microgrids.

03. Network — Develop software-defined energy management capabilities using AI-enabled energy orchestration, digital twins, predictive maintenance and integrated energy-data networks as core platform differentiators.

04. Partner — Build strategic partnerships across the energy ecosystem with a view towards creating an open architecture platform

Sources : Industry estimates, Stonesbury Research

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