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Batteries, Not AI, Will Define the Next Geoeconomic Era

CHINESE DOMINANCE AND THE WESTERN RESPONSE

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Abstract

The global transition toward electric vehicles and renewable energy represents a fundamental shift in the world's techno-economic paradigm. Drawing on discussions during my June 2026 visit to ETLA in Helsinki, this brief argues that the true engine of this transformation is the battery, the foundational technology uniting production and consumption in the emerging electric age. This memorandum is published alongside a companion brief by Petri Rouvinen (2026) examining the EU's response to this shift, the proposed Industrial Accelerator Act (IAA).

Through decades of deliberate industrial policy, China has secured command over the entire clean technology triad of solar power, batteries, and electric vehicles. Meanwhile, Western automakers, particularly in the United States, risk being stranded on a shrinking island of internal combustion engine technology amid political whiplash.

In this brief, I synthesize the mechanisms driving China's rise, examine the strategic implications of the electric technology stack, and offer insights for decision-makers seeking to build a competitive and resilient industrial future.

Tiivistelmä

Akut, ei tekoäly, määrittävät seuraavan geoekonomisen aikakauden: Kiinan ylivalta ja lännen vastaus

Globaali siirtymä sähköautoihin ja uusiutuvaan energiaan merkitsee perustavanlaatuista murrosta maailman teknistaloudellisessa paradigmassa. Kesäkuussa 2026 Elinkeinoelämän tutkimuslaitoksessa (Etla) käytyjen keskustelujen pohjalta esitän tässä muistiossa, että tämän murroksen varsinaisena ajurina on akku. Se on perusteknologia, joka yhdistää tuotannon ja kulutuksen orastavalla sähköistymisen aikakaudella. Tämä muistio julkaistaan yhdessä Petri Rouvisen (2026) sisarmuistion kanssa, jossa tarkastellaan EU:n vastausta tähän muutokseen, eli ehdotettua teollisuuden vauhdittamissäädöstä (Industrial Accelerator Act, IAA).

Vuosikymmeniä kestäneen määrätietoisen teollisuuspolitiikkansa ansiosta Kiina on saavuttanut hallitsevan aseman koko puhtaan energian kolminaisuudessa: aurinkovoimassa, akuissa ja sähköautoissa. Samanaikaisesti länsimaiset autonvalmistajat, erityisesti Yhdysvalloissa, ovat vaarassa jäädä polttomoottoriteknologian kutistuvalle saarekkeelle poliittisen poukkoilun keskellä.

Vedän tässä muistiossa yhteen Kiinan nousua ajavat mekanismit, tarkastelen ”sähköisen teknologiapinon” strategisia vaikutuksia ja tarjoan näkemyksiä päättäjille, jotka pyrkivät rakentamaan kilpailukykyistä ja kriisinkestävää teollista tulevaisuutta.

Martin Kenney is a Distinguished Professor Emeritus at the University of California, Davis, and a globally recognized scholar in technology clusters, platform economics, and the clean technology transition.

Martin Kenney on Kalifornian yliopiston Davisin kampuksen ansioitunut emeritusprofessori ja kansainvälisesti tunnettu teknologiakeskittymien, digitaalisten alustojen ja puhtaan teknologian siirtymän tutkija.

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Kiitokset: Tämä muistio pohjautuu kesäkuussa 2026 Helsingissä pidettyyn seminaariin, jota isännöi Business Finlandin, Etlan ja LUT-yliopiston yhteinen FinGeo-hanke (Suomen geotaloudellinen pelikirja: Strategioita kansalliseen arvonluontiin). Haluan kiittää Etlaa ja Petri Rouvista vieraanvaraisuudesta, antoisista keskusteluista sekä toimituksellisesta tuesta tämän muistion viimeistelyssä.

Keywords: Electric vehicles, Battery supply chain, Geopolitics, Industrial policy, Energy transition

Avainsanat: Sähköautot, Akkujen toimitusketju, Geopolitiikka, Teollisuuspolitiikka, Energiasiirtymä

JEL: F13, L52, L62, O38, Q42

Petroleum paradigm demise

When I began my career as a solar energy planner for the county of San Diego in 1979, during the height of the second oil crisis, alternative energy was merely a backup plan. Returning to California after my June 2026 seminar in Helsinki, it is clear that the dynamic has entirely flipped.

We are not just tweaking our transportation habits; we are witnessing the end of a 300-year techno-economic cycle dominated by Western industrial powers and the post-World War II petrodollar: we are not merely replacing gas-powered cars with battery-powered ones. We are undergoing a complete replacement of the petroleum paradigm with an electricity-centric global economy. For discussion, see Kenney (2026) and my interview in Helsingin Sanomat (HS Viikko 39/2026, 25.9.2026, pages A10–A11).

For nations like Finland and the broader European Union, understanding this shift is an existential economic necessity. The future industrial landscape will be dictated by those who control the elements of this new era. If Western decision-makers fail to recognize the speed at which this transition is occurring, accelerated by the closure of the Straits of Hormuz, they will find their domestic industries hopelessly outdated.

Battery: The "One ring" to "Unite them all"

In public discourse, electric cars capture the imagination. However, the electric vehicle is merely the most visible wrapper for the true disruptive technology: the battery.

Batteries serve as the linchpin technology of the 21st century because they allow us to time-shift energy, solving the intermittency problem of renewables like solar and wind. They are the "one ring" that unites the clean technology triad: solar generation, wind generation, and electric mobility.

As the power density of batteries increases and their costs plummet, they will replace fossil fuels across massive swaths of the global economy. This scale-up has delivered one of clean technology's most dramatic cost reductions, with utility-scale battery storage costs falling by about 93% since 2010 (IEA, 2026). Further, inexpensive solar generators and batteries will allow the vast swath of people in developing countries to access electricity that provides them with electric light, the ability to pump and/or clean water, easy operation of electric-powered tools, and the myriad other applications that electricity allows.

The global battery market is expanding at a staggering rate. Recent analysis projects that it will grow to 4.2 terawatt-hours by 2030 and 6.8 terawatt-hours by 2035 (Kortis et al., 2026). Over 85 percent of this is driven by lithium-ion batteries, fueled largely by electric vehicles and stationary energy storage.

Furthermore, technology is evolving rapidly beyond lithium (Kortis et al., 2026). By mid-2026, major Chinese manufacturers like CATL entered mass production of sodium-ion battery cells, which will shave 15–20% off storage costs vis-à-vis lithium. Because sodium is available nearly everywhere (unlike highly concentrated lithium deposits), this technology avoids geopolitical vulnerabilities.

The shift to electricity will disrupt legacy global supply chains ranging from sulfur (a byproduct of oil refining) to helium (tied to natural gas extraction), fundamentally altering global trade balances and weakening the traditional petrostates.

China's ecosystem

China has emerged as the undisputed global leader in electric vehicles and the underlying battery supply chain. This dominance was not an accident of the free market; it was the result of long-term state planning, aggressive local experimentation, and fierce entrepreneurial dynamism.

Today, the statistics are staggering (IEA, 2026). In 2025, China accounted for nearly 75% of all electric cars produced globally. Nearly all battery cells used worldwide are supplied by companies headquartered in China, South Korea, or Japan, but China accounted for over 80% of battery cell production.

The evolution of China's electric vehicle policy occurred in four distinct, orchestrated phases (Kenney, 2025):

- **Technology Development (2001–2009):** The central government heavily funded R&D partnerships between existing automakers and universities to establish core technological capabilities.
- **Pilot Production (2009–2013):** Initiatives like the "Ten cities, Thousand vehicles" program tested electric vehicle adoption by mandating their use within municipal public service fleets.
- **Large-Scale Adoption (2013–2018):** Aggressive subsidies, tax exemptions, and licensing advantages spurred mass consumer adoption, making China the world's largest electric vehicle market by 2015.
- **Market Competition (2018–Present):** The government gradually withdrew subsidies and raised technical standards to foster fierce domestic market competition, forcing weaker firms out and strengthening the survivors.

Through these targeted policies, China placed an early and successful bet on lithium iron phosphate (LFP) battery chemistry. This technology proved significantly cheaper and highly thermally stable compared to the nickel-cobalt solutions historically favored by European, Japanese, and Korean competitors.

By 2025, lithium iron phosphate batteries accounted for over 55% of electric vehicle batteries deployed globally (IEA, 2026). This scale has resulted in a massive pricing advantage. In 2025, battery pack prices in China were 30% lower than in North America, and 35% in Europe.

Shrinking internal combustion

While China races ahead, legacy automakers in the United States and Europe risk being stranded on a shrinking island of internal combustion engine technology.

This risk is particularly acute in the United States, where the new political environment has created massive policy whiplash. In 2025, the new Trump administration enacted legislation (the "One Big Beautiful Bill Act") that repealed Biden's 2022 "Inflation Reduction Act" subsidies for solar, wind, and electric vehicles.

- The elimination of electric vehicle tax credits is projected to cut the electric vehicle share of new U.S. vehicle sales significantly by 2030.
- The termination of the National Electric Vehicle Infrastructure program further crippled the rollout of necessary charging stations.
- Consequently, while electric vehicle battery deployment expanded by almost 15% in the European Union in 2025, it entirely stagnated in the United States.

American and European automotive companies now face a severe structural disadvantage. They are heavily reliant on "multi-propulsion platforms," meaning they build internal combustion, hybrid, **and** fully electric vehicles on the same assembly lines. This brings about challenges:

- **Divided Focus:** Maintaining multiple powertrain programs stretches engineering resources and raises fixed costs.
- **Design Compromises:** Multi-propulsion platforms often retain internal combustion-oriented structural elements, which add unnecessary weight and reduce aerodynamic efficiency.
- **The Clean-Sheet Advantage:** Conversely, Chinese new entrants utilize "clean sheet" electric vehicle designs and manufacturing innovations, enabling massive scale and cost efficiencies that legacy automakers struggle to match.

Losing leadership in this transition threatens more than just the automotive sector. The "electric tech stack" – including batteries, electric motors, power electronics, and advanced software – has many uses, including military applications.

These foundational technologies are equally applicable to unmanned aerial systems, military ground vehicles, and grid-scale energy storage. The fact that China has come to dominate this technology stack means that all nations will have to reconsider their geopolitical positions.

Of course, a cleantech-driven economy will allow many more countries to become energy self-sufficient and thus be less vulnerable to economic sanctions-led coercion.

During my Helsinki talk, ETLA's Petri Rouvinen accurately framed the European dilemma. The European Union recognized early on that controlling the battery value chain was vital for the future of its automotive industry.

However, efforts by European firms have been insufficient to keep pace with developments in China.

The European Commission's proposed Industrial Accelerator Act (IAA), published in March 2026, represents a direct legislative response. The question remains as to whether European firms will feel that attempting to compete with those in China is a valuable use of their resources. As noted, Petri discusses the IAA in a companion ETLA Brief.

Blueprint for the West

The global automotive value chain is not just shifting; it is being entirely rewritten on Chinese timelines. Intense domestic competition in China is squeezing profit margins, pushing their manufacturers to seek higher profits overseas. In 2025, Chinese electric car exports doubled to a record high of over 2.5 million vehicles, though only 30–40% were EVs (IEA, 2026).

For policymakers and industry leaders in Europe and the United States, inaction or relying solely on legacy internal combustion profits guarantees long-term obsolescence. To remain relevant and secure in the electric age, decision-makers must consider the following strategies:

- **Extract knowledge through joint ventures:** Western governments cannot simply wall off their economies. It is too late. They should cautiously permit joint ventures with leading Chinese battery firms. However, these agreements must be structured with mandates to maximize localized learning and technology transfer – mirroring the exact strategy China used against Western automakers in the 1990s.
- **Invest in next-generation chemistries:** Attempting to beat China on existing lithium iron phosphate technology through subsidies alone is a losing battle. Public-private partnerships must finance research and development into leapfrog technologies, such as scaling advanced sodium-ion architectures or commercializing solid-state batteries.
- **Build collaborative supply networks:** Policymakers must align with trusted international partners to forge supply chains that are – to borrow a term coined by Zysman, Tyson, and Kenney (2025) – Competitive, Resilient, Sustainable, and Secure (CRSS). No single Western nation can build a fully localized supply chain; regional alliances are mandatory.

We must adjust to the new geopolitical realities. The electric age has arrived, and it is imperative that Western industries abandon the illusion that internal combustion will continue to be central to our industries, recognize and adjust to our trailing position, and actively search for a viable, competitive path forward.

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