



Long-Duration Realities: Infrastructure Governance, Capital Intensity, and FERC–NERC Compliance

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From predictable assets to interacting systems of risk

Infrastructure governance has entered a different era. For board directors, qualified risk directors, and C-suite leaders, the old separation between strategy, capital planning, operations, regulatory affairs, and compliance no longer holds. Electric demand is being reshaped by data centers, artificial intelligence, electrification and advanced manufacturing. Supply is becoming more diverse across renewables, storage, natural gas, nuclear and distributed resources. Weather, water scarcity, supply-chain bottlenecks, cyber intrusion and local permitting can disrupt projects whose useful lives extend for decades. The governance challenge is not simply that each risk has grown; it is that several risks can invalidate the same investment thesis at once.ⁱ

For example, drought can constrain both hydropower and cooling; heat raises peak demand; a hurricane can affect electricity, telecoms, roads and personnel simultaneously; and an attack on remote access can threaten physical operations. The relevant board test is therefore: what happens when two or three plausible assumptions fail together? An integrated risk map should identify common-mode failures across power, water, natural gas, telecommunications and transport—not merely present five separate risk registers.ⁱⁱ

Regulatory change: six U.S. developments boards should know

1 | FERC reframes large-load interconnection and cost causation

In June 2026, the Federal Energy Regulatory Commission opened separate Federal Power Act Section 206 show-cause proceedings directed at six RTO/ISO regions under its jurisdiction. The proceedings ask regional operators to justify or reform tariffs for data centers and other large loads. Topics include consumer protection, project readiness, reliability, transmission-service alternatives and the allocation of upgrade costs. This was the opening of region-specific proceedings—not one already-finalized nationwide large-load tariff. The practical question is who pays if infrastructure is built and the forecast customer does not materialize. Directors

should request evidence of site control, permits, financing, nonduplicative interconnection requests, credit support and contractual minimum charges before authorizing the full build.ⁱⁱⁱ

2 | NERC and FERC address the behavior of computational loads

NERC's May 4 Level 3 computational-load alert identified deficiencies in some entities' processes for modeling, studying, commissioning and operating these loads. In July, FERC directed the North American Electric Reliability Corporation—not the Nuclear Regulatory Commission—to develop new or modified standards and registration criteria by December 31, 2026. The directive concerns standards under development; it should not be described as completed computational-load compliance rules. For directors, the issue is that a very large electronically controlled customer may create system effects through its response to voltage and frequency disturbances, not solely through the amount of energy it purchases.^{iv}

3 | Cyber and physical-security standards evolve

In March, FERC approved revisions to 11 CIP standards to accommodate virtualization, alongside CIP-003-11 safeguards for low-impact BES Cyber Systems and revisions to a control-center definition. In September, FERC approved CIP-014-4 concerning physical security of critical transmission assets, with an associated implementation plan. Approval and effective compliance dates are distinct: boards should ask for the company's applicability assessment, implementation timeline and exception inventory rather than assume every new requirement is immediately in force. The January NERC CIP Roadmap is a further prompt to examine emerging gaps outside a narrow annual audit scope.^v

4 | Weather and resource mix sharpen reliability questions

NERC's 2026 Summer Reliability Assessment found that solar, battery and some natural-gas additions strengthened seasonal readiness, while accelerating load growth, high temperatures, drought and operating conditions kept risks elevated in some areas. It is not a declaration that every region faces identical risk. The board response is locational and systems-based: review reserve margins, fuel and water dependencies, restoration time, weatherization and the availability of critical spares in the particular service territory.^{vi}

5 | State commissions develop distinct large-load safeguards

Virginia's State Corporation Commission approved Dominion's GS-5 large-load class in November 2025, with implementation scheduled for January 1, 2027. The SCC's 2026 materials explain the 14-year obligations for applicable new customers, minimum charges linked to contracted demand, collateral safeguards and related transmission cost-allocation work. The approval was a 2025 action with important 2026 implementation and follow-through—not a rule newly enacted in September. Texas took a different route in June 2026: the PUCT approved ERCOT's "Batch Zero" approach to collectively assess qualifying large-load connections of at least 75 MW. The common issue is forecast credibility; the jurisdiction-specific instruments are different.^{vii}

6 | Federal executive action affects energy and grid supply chains

Federal executive policy also affects the planning environment, but directors must distinguish legal instruments. Executive Order 14386, issued in February 2026, addresses the use of coal generation in a national-defense context. Separately, an April 20 presidential determination under Section 303 of the Defense Production Act addresses domestic grid equipment and supply chains, identifying items such as transformers, high-voltage components, power electronics and electrical core steel. The April instrument is a presidential determination, not itself a newly issued executive order. Board implications include asset-life assumptions, procurement concentration, exposure to policy changes, and whether projects depend on equipment with prolonged lead times; neither instrument displaces applicable FERC, state, local or environmental requirements.^{viii}

Capital discipline: NPV is necessary; option value is additional

A long-duration project can meet an engineering need yet fail an affordability, financing or prudence test. FERC Orders 1920, 1920-A and 1920-B address long-term regional transmission planning and cost allocation, including an expanded role for state regulators. The board should demand a project memo that separates engineering necessity, expected regulatory recovery, customer cost allocation, cash-flow durability and enterprise value. The rate case and the interconnection timetable are not footnotes; they are central assumptions of the investment case.^{ix}

NPV, IRR and payback test value under modeled assumptions. Strategic option value asks what choices an initiative creates or preserves: the ability to scale, defer, repurpose, connect new demand, or avoid a future bottleneck. A modular substation expansion, for example, may have limited immediate standalone returns yet preserve a valuable route to future load or added generation. Rather than attach a pseudo-precise premium to “strategic value,” compare explicit scenarios, the costs of preserving optionality, downside exposure and the ability to reverse a decision. Stage gates should require evidence on four dimensions: actual customer commitments and utilization; refreshed economics and cost to complete; interconnection, permits, supply chain and recovery prospects; and cyber, vendor and architectural readiness. Scale when evidence improves; pause, redesign or stop when demand fades, costs breach agreed limits, recovery becomes untenable or a better alternative arises.^x

This also clarifies the shareholder-versus-customer question. Reliability and public safety define minimum operating obligations, while boards still have choices about timing, technology, finance and allocation of costs. Credit providers focus on leverage and liquidity; shareholders want credible returns; consumers and commissions challenge undue cost shifting; host communities examine land, water and local impact. Boards should not declare a single stakeholder the winner. They should make the trade-offs auditable and explain who receives each benefit, who carries each risk and how investment remains financeable.^{xi}

Digital innovation without importing brittle operating risk

AI can improve load forecasting, inspection, predictive maintenance, asset health, outage response and customer service. But a model cannot repair the identity architecture, unsupported firmware or unreliable data feeding it. In essential infrastructure, IT and operational technology (OT)—SCADA, relays, meters, gateways and legacy IoT—have different availability and patching constraints. Boards should ask where AI directly or indirectly affects switching, dispatch, physical maintenance or customer decisions; whether humans can override it; and which legacy dependency could corrupt or expose its output. Modernizing data quality, access control and segmentation may be more consequential than purchasing another AI product.^{xii}

Cyber oversight should similarly shift from “did the control pass the audit?” to “can the essential service continue safely and recover within our required window?” NERC CIP applies according to the relevant system, entity and standard scope; public issuers separately have SEC cybersecurity disclosure and governance requirements. An integrated assurance map should connect critical assets to obligations, owners, evidence, incident response and board escalation. Useful dashboard metrics include open high-severity findings, age of vendor-access exceptions, segmentation coverage, tested recovery time, NERC mitigation plans and critical-asset physical-security exposure.^{xiii}

The electric, gas, water and digital networks also need a shared resilience lens. Power is necessary for water treatment and communications; water may be needed for cooling; gas availability may affect dispatchable electric generation; fiber and transport affect response and restoration. An effective board exercise asks which external service cannot be replaced within a critical recovery window, and which common vendor, corridor or floodplain connects seemingly independent exposures.^{xiv}

Supply chains and private capital: move from pilots to utility-grade deployment

Transformers, switchgear, protective relays, power electronics, software, specialized labor and even standardization of equipment design can constrain delivery as much as financing. Directors should examine single-source exposure, lead times, strategic spares, firmware provenance, service access, supplier viability and schedule contingency. The 2026 Defense Production Act determination reinforces why domestic equipment capacity has become a federal policy concern, but it does not remove the need for commercial supplier diligence.^{xv}

Private-sector venture capital and growth equity can accelerate technologies that a regulated utility may be unable to build itself: asset intelligence, OT security, distributed flexibility, water-energy efficiency and construction productivity. VC is not generally a substitute for financing the whole regulated transmission network. The utility’s obligation is to bring utility-grade due diligence to innovation: reliability and cybersecurity gates, interoperability, measurable benefits, vendor survivability, and a credible commercial route after the pilot. ARPA-E’s technology-to-market and 2026 SCALEUP Ready initiatives illustrate how structured milestones can bridge invention and deployment. Corporate venture investments, pilots and partnerships can preserve strategic access without putting the core operating system at startup risk.^{xvi}

Fusion: preserve access without assuming commercial delivery

Fusion deserves a strategic place on the horizon, but it should not be used to fill a near-term reliability gap in a utility resource plan. DOE's June 2026 roadmap targets a pathway toward pilot plants and commercial fusion power in the mid-2030s; this is a program objective, not a guarantee of delivered power. In February 2026, the Nuclear Regulatory Commission proposed a technology-neutral regulatory framework for fusion machines, with rulemaking still in progress. Directors can consider research partnerships, pilot offtake, minority strategic exposure and site options, while insisting on milestones for repeatable performance, materials and fuel cycle, plant-level net electricity, licensing, cost, insurance and schedule before underwriting commercial-scale capital. Fusion is a useful real-option case study: buy learning and optionality before buying construction risk.^{xvii}

International parallels: similar tensions, different legal mechanisms

In the United Kingdom, Ofgem's RIIO-3 final determinations were issued in December 2025 and the new five-year electricity-transmission, gas-transmission and gas-distribution price-control period began April 1, 2026. That framework connects approved revenue, investment and outputs, while Ofgem's cyber-resilience guidance provides another governance lens. Distinguish the 2026 commencement of an already-determined price control from a new September 2026 decision.^{xviii}

The European Commission's Grids Package was proposed in December 2025; it contains proposals concerning cross-border planning, cost-sharing and faster permitting. It should not be described as fully enacted EU law as of this update. The Commission's March 2026 Clean Energy Investment Strategy proposes stronger access to capital and de-risking for grid investment. Separately, the EU cross-border-electricity cybersecurity network code is an existing delegated regulation, not a brand-new 2026 enactment. For international boards, the practical questions are jurisdictional scope, project maturity, permitting, financing and verified control performance.^{xix}

Australia's Australian Energy Market Operator published its final 2026 Integrated System Plan on June 25. It is a whole-of-system planning roadmap, not a single binding utility tariff or blanket project approval. By modeling generation, storage, networks, gas support and consumer resources together, it demonstrates the same challenge facing U.S. directors: avoid approving one asset based on a forecast that ignores system-wide constraints and alternatives.^{xx}

The board playbook: three questions, one integrated decision

The overarching governance response is not to convert directors into system operators. It is to require management to connect regulatory, financial, technology and operational evidence before authorization. Three questions make a useful full-board agenda: (1) How does our capital plan perform under materially different demand, interest-rate, climate and cost-recovery scenarios? (2) Which legacy technology, external infrastructure dependency or vendor could cause the greatest service interruption? (3) What explicit evidence and thresholds would make us accelerate, pause, redesign or stop an investment? Those questions translate strategic uncertainty into a decision architecture.

A practical 30/60/90-day sequence starts with maps of the capital pipeline, large-load commitments, rate-case and regulatory dependencies, critical-asset inventory and cyber exceptions. Next, convene a cross-committee session linking audit/risk, technology and strategy, including a tabletop that compares a U.S. electric utility with an international electric-water utility. Finally, approve an integrated dashboard with owners and escalation thresholds: demand maturity, capex variance, recovery status, schedule and transformer lead times, critical spares, NERC control exceptions, remote access, tested restoration time and affordability impacts. The object is better decision control, not a thicker board pack.

Infrastructure stewardship is ultimately a decades-long obligation. Future customers, employees, investors and communities will live with the assets approved today. The essential director question remains: are those assets safe, financeable, recoverable and strategically useful across multiple plausible futures?

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Infrastructure boards do not govern in quarters; they govern through rate cases, technology cycles, regulatory regimes, cyber threat shifts, and asset lives measured in decades. The director question is not simply “Is this compliant?” It is: “Will this asset remain safe, financeable, recoverable, and strategically useful across multiple futures?”

#Infrastructure #BoardGovernance #RiskGovernance #FERC #NERC #NERCCIP #Utilities #CyberRisk #EnergyTransition
#CapitalAllocation #GridReliability #AI #PublicCompanyBoards #PrivateCompanyBoards

ⁱ <https://www.iea.org/reports/energy-and-ai/energy-demand-from-ai>, and <https://www.iea.org/reports/electricity-2026/executive-summary> and https://www.nerc.com/globalassets/our-work/assessments/nerc_sra_2026.pdf

ⁱⁱ <https://www.nerc.com/newsroom/2026-State-of-Reliability-Report> and <https://www.ferc.gov/news-events/news/ferc-launches-aggressive-targeted-action-speed-large-load-integration>

ⁱⁱⁱ <https://www.ferc.gov/news-events/news/fact-sheet-building-future-through-electric-regional-transmission-planning>; <https://www.ferc.gov/explainer-transmission-planning-and-cost-allocation-final-rule> and <https://www.ferc.gov/news-events/news/ferc-launches-aggressive-targeted-action-speed-large-load-integration>

^{iv} <https://www.nerc.com/globalassets/programs/bpsa/alerts/level-3-computational-load-alert.pdf> and <https://www.ferc.gov/news-events/news/summaries-july-2026-commission-meeting>

^v <https://www.ferc.gov/news-events/news/ferc-action-new-reliability-safeguards-american-power-grid>, <https://www.ferc.gov/news-events/news/summaries-september-2026-commission-meeting>, https://www.nerc.com/globalassets/our-work/reports/special-reports/nerc_cip_roadmap_01122026.pdf and <https://www.nerc.com/standards/reliability-standards>

^{vi} <https://www.nerc.com/newsroom/2026-State-of-Reliability-Report> and <https://www.nerc.com/newsroom/2026-State-of-Reliability-Report>

^{vii} <https://www.scc.virginia.gov/about-the-scc/newsreleases/release/scc-issues-order-on-dev-biennial-review-2025/scc-rules-in-dev-biennial-review-case.html>, <https://www.scc.virginia.gov/about-the-scc/scc-facts/> and <https://www.ercot.com/news/release/06182026-puct-approves-ercots>

^{viii} <https://www.whitehouse.gov/presidential-actions/2026/02/strengthening-united-states-national-defense-with-americas-beautiful-clean-coal-power-generation-fleet/> and <https://www.whitehouse.gov/presidential-actions/2026/04/presidential-determination-pursuant-to-section-303-of-the-defense-production-act-of-1950-as-amended-on-grid-infrastructure-equipment-and-supply-chain-capacity/>

^{ix} <https://www.ferc.gov/what-state-regulators-need-know-about-order-no-1920-b> and <https://www.ferc.gov/news-events/news/fact-sheet-building-future-through-electric-regional-transmission-planning-and>

^x <https://www.ferc.gov/news-events/news/ferc-launches-aggressive-targeted-action-speed-large-load-integration> and <https://arpa-e.energy.gov/about/tech-to-market/commercialization>

^{xi} <https://www.ferc.gov/news-events/news/ferc-launches-aggressive-targeted-action-speed-large-load-integration> and <https://www.ofgem.gov.uk/energy-regulation/how-we-regulate/energy-network-price-controls>

^{xii} <https://www.iea.org/reports/energy-and-ai/energy-demand-from-ai>, <https://nvlpubs.nist.gov/nistpubs/CSWP/NIST.CSWP.29.pdf> and <https://www.energy.gov/ceser/cybersecurity-baselines-electric-distribution-systems-and-der-and-guidance>

^{xiii} <https://www.ferc.gov/industries-data/electric/industry-activities/cyber-and-grid-security>, https://www.nerc.com/globalassets/our-work/reports/special-reports/nerc_cip_roadmap_01122026.pdf, <https://www.ferc.gov/media/reliability-standard-cip-014-3>, <https://www.sec.gov/rules-regulations/2023/07/s7-09-22> and <https://www.ferc.gov/news-events/news/summaries-september-2026-commission-meeting>

^{xiv} <https://www.energy.gov/ceser/cybersecurity-baselines-electric-distribution-systems-and-der-and-guidance>, <https://www.nerc.com/globalassets/programs/bpsa/alerts/level-3-computational-load-alert.pdf> and <https://www.iea.org/reports/energy-and-ai/energy-demand-from-ai>

^{xv} <https://www.whitehouse.gov/presidential-actions/2026/04/presidential-determination-pursuant-to-section-303-of-the-defense-production-act-of-1950-as-amended-on-grid-infrastructure-equipment-and-supply-chain-capacity/> and https://www.nerc.com/globalassets/our-work/reports/special-reports/nerc_cip_roadmap_01122026.pdf

^{xvi} <https://arpa-e.energy.gov/about/tech-to-market/commercialization>, <https://arpa-e.energy.gov/news-and-events/news-and-insights/doe-announces-first-projects-under-scaleup-ready-program-2026> and https://energy.ec.europa.eu/topics/funding-and-financing/clean-energy-investment_en

^{xvii} <https://www.energy.gov/fusion/fusion-energy> and <https://www.nrc.gov/materials/fusion/rulemaking-status>

^{xviii} <https://www.ofgem.gov.uk/decision/riio-3-final-determinations-electricity-transmission-gas-distribution-and-gas-transmission-sectors>, <https://www.ofgem.gov.uk/energy-regulation/how-we-regulate/energy-network-price-controls> and <https://www.ofgem.gov.uk/guidance/riio-2-cyber-resilience-guidelines>

^{xix} https://energy.ec.europa.eu/topics/infrastructure/european-grids_en, https://energy.ec.europa.eu/topics/funding-and-financing/clean-energy-investment_en and https://eur-lex.europa.eu/eli/reg_del/2024/1366/en

^{xx} <https://www.aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp>