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The Limits of Strategic Reach:

Commitment Overhang, Power Conversion, and the Erosion of Strategic Optionality

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Abstract

Great-power overstretch is often framed as a mismatch between external commitments and economic resources. This paper develops a diagnostic framework centered on three linked concepts: commitment overhang, strategic free capacity, and strategic optionality. It integrates partially nonfungible resource bottlenecks, burn and lock-in portfolio effects, and external feedback. Additional strategic reach generates usable power only when cumulative converted value exceeds lifecycle and systemic burden and when sustainment and regeneration preserve minimum reserves. The 2026 U.S.–Israel–Iran conflict illustrates high-burn depletion; Greenland illustrates potential lock-in while distinguishing existing Pituffik obligations and pre-existing modernization from uncertain incremental commitments; and Canada–EU cooperation illustrates diversification intent without presuming measurable U.S. leverage loss. The paper uses the strategic poison pill only as a diagnostic metaphor for negative cumulative net conversion, distinct from optionality loss. The paper neither estimates a universal threshold nor claims that any case has crossed one. Its contribution is to integrate commitment portfolios, capacity regeneration, and external adaptation into a framework for explaining how strategic reach can expand while discretionary capacity for future contingencies contracts.

Keywords: strategic overstretch; commitment overhang; strategic optionality; regeneration bottlenecks; power conversion; asymmetric interdependence; U.S. strategy; great-power competition

Working Paper

1. Introduction

Debates over the sustainability of U.S. global power often begin with a fiscal question: how much additional security expenditure can the United States afford? That question is necessary but insufficient. A state with a large economy, deep sovereign-debt markets, substantial military capacity, and access to external capital can continue financing overseas commitments after their marginal strategic return has begun to decline. Fiscal affordability is therefore an incomplete measure of strategic sustainability.

A more useful question is whether an additional commitment expands or reduces the strategic capacity available for the next contingency. This distinction is especially relevant in 2026. CBO estimated approximately $38 billion in Department of Defense costs associated with combat operations against Iran through August 1 and assessed that heavy interceptor use would leave relevant inventories reduced for several years. Later Pentagon and CENTCOM reporting provided a higher cumulative estimate through September 3, but the public breakdown combines obligated operating costs with estimated replacement requirements. Section 4.1 therefore separates those categories rather than treating the headline total as cash expenditure already incurred (CBO, 2026b; Tiron, 2026; Grayer & Fox, 2026).

Greenland presents a different temporal problem. On September 18, the governments of Greenland, Denmark, and the United States announced that they expected to sign an agreement to strengthen security in the Arctic and North Atlantic, subject to parliamentary procedures. Denmark and Greenland stated that the arrangement would preserve the sovereignty and territorial integrity of the Kingdom of Denmark and Greenlandic self-determination (Statsministeriet, 2026). The relevant analytical issue is therefore not territorial acquisition but whether a broader security architecture would create incremental infrastructure, logistics, surveillance, protection, and sustainment obligations.

A third development illustrates partner-side adaptation. In her September 16 State of the Union address, European Commission President Ursula von der Leyen proposed opening the door for Canada to become the EU's first "associate member" and outlined an "Alliance for the Future" spanning technology, defense industry, energy, critical minerals, AI, cyber, supply chains, and the Arctic (European Commission, 2026). Canadian Prime Minister Mark Carney welcomed the broader ambition and emphasized strategic autonomy, diversification, and collective resilience rather than conventional EU accession. U.S. President Donald Trump later criticized the proposal and threatened trade measures if he regarded the arrangement as hostile (Office of the Prime Minister of Canada, 2026a; Melander et al., 2026).

Together, these cases raise a broader power-conversion problem. Strategic expansion can consume scarce inventories, create durable obligations, generate recursive protection requirements, induce material countermeasures, and alter partners' incentives to diversify or share burdens. The central distinction is between nominal strategic reach and usable power: additional access, infrastructure, commitments, and influence increase usable power only when their converted value exceeds lifecycle and systemic burden and critical capacity dimensions remain above minimum reserves.

The framework is organized around three core concepts: commitment overhang, strategic free capacity, and strategic optionality. Burn and lock-in commitments, protection recursion, the strategic poison pill, competitive expansion feedback, control-induced diversification, justificatory portability, and the power-conversion threshold are treated as mechanisms or diagnostics rather than coequal concepts. The paper does not claim that the United States has reached fiscal or military exhaustion. Its narrower claim is that strategic sustainability can deteriorate before insolvency when depletion and new commitments persistently reduce free capacity in a binding dimension faster than it can be restored.

2. Conceptual Framework

2.1 From Imperial Overstretch to Commitment Overhang

The relationship between external commitments and national resources is a longstanding concern in strategic studies. Kennedy (1987) emphasized the risk that military and imperial commitments could outrun their economic foundations. Friedberg (1989) cautioned, however, against treating economic constraints as mechanically determinative of U.S. strategy, noting that the sustainability and distribution of strategic burdens are political as well as economic questions. MacDonald and Parent (2018) likewise show that great powers facing relative decline retain scope for retrenchment, adaptation, and reallocation rather than moving automatically toward collapse.

Deep-engagement scholarship adds an important counterpoint: retrenchment can itself impose costs by weakening deterrence, reassurance, and access. Brooks, Ikenberry, and Wohlforth (2012) argue that forward commitments can generate security benefits that would be costly to replace if withdrawn. The framework developed here therefore does not presume that external commitments are net burdens; it asks how efficiently additional reach is converted into usable power at the margin.

Several adjacent literatures identify mechanisms incorporated here. Security-dilemma theory explains how measures taken to increase one state’s security can induce costly countermeasures by others even without uniformly aggressive intent (Jervis, 1978; Glaser, 1997). Alliance theory emphasizes exchange and asymmetry rather than simple capability aggregation (Morrow, 1991). Interdependence scholarship treats concentrated dependence as both a source of leverage and a source of vulnerability (Hirschman, 1980; Keohane & Nye, 2012), while work on hegemonic exit shows how alternative patrons and networks can weaken an incumbent’s monopoly on influence (Cooley & Nexon, 2020).

These literatures imply that aggregate economic capacity is only one boundary of strategic sustainability. A state can remain solvent, technologically advanced, and militarily powerful while becoming constrained by the composition and distribution of its commitments. Three distinctions are central. First, commitments operate on different time horizons: active conflict consumes capability immediately, whereas bases, access agreements, extended deterrence, and strategic infrastructure can impose lower current costs but durable future obligations.

Second, many strategic resources are only weakly substitutable. Financial authority can be exercised quickly; industrial regeneration often cannot. Appropriating funds for interceptors does not immediately restore expended magazines, and expanding shipbuilding, trained personnel, solid-rocket-motor production, specialized electronics, airlift, or maintenance capacity requires time and fixed investment. Recent CSIS assessments place manufacturing lead times for several high-demand weapons systems at roughly 25 to 51 months despite industrial-base expansion (McGinn & Dilts, 2026). Third, commitments interact: a military facility creates operational capability but also requires logistics, energy, communications, physical and cyber defense, maintenance, and redundancy. Portfolio burden can therefore exceed the arithmetic sum of nominal program costs.

These dynamics motivate the concept of commitment overhang: the accumulated stock of security, protection, sustainment, replenishment, infrastructure, political, and opportunity-cost obligations generated by prior strategic decisions that constrain future choice. Unlike public debt, commitment overhang can take the form of replenishment obligations created by prior depletion, maintenance backlogs, forces already committed to existing missions, infrastructure requiring continued protection, industrial production queues, access and sustainment obligations, or reduced cross-theater mobility. The critical variable is therefore not national power in the aggregate, but the share of usable capacity that remains unencumbered and available for reallocation.

2.2 Strategic Commitments as a Portfolio

Strategic commitments are better assessed as a portfolio than as independent decisions. Two temporal forms are especially useful. Burn commitments consume current capability through munitions expenditure, operational tempo, logistics, maintenance, and near-term restoration. Lock-in commitments encumber future capacity through infrastructure, sustainment, force protection, and modernization. The distinction is analytical rather than normative: either type can be strategically justified, but each stresses the state on a different time horizon. Lock-in burden is assessed within a specified strategic horizon h, such as a multiyear defense-planning or infrastructure cycle, rather than by summing indefinite future costs. The relevant question is how much capacity and expenditure become encumbered within the horizon over which decision-makers must preserve flexibility.

The problem arises when burn and lock-in commitments draw on the same resource system. The U.S.–Iran conflict is primarily a burn case, whereas an expanded Arctic security architecture would be more heavily weighted toward lock-in; both coexist with commitments in Europe, the Indo-Pacific, homeland defense, and global maritime operations. The appropriate unit of analysis is therefore the portfolio, including interaction burdens created when commitments compete for common inventories, logistics, industrial capacity, personnel, and reserve forces.

This portfolio perspective is consistent with prior analysis of the United States as an operational-control center whose global reach depends on integrated bases, intelligence, logistics, alliances, and scarce high-end forces. The same architecture that enables cross-theater control also exposes the United States to competing regional demands and common resource bottlenecks (Wu, 2026c).

2.3 Protection Recursion and Commitment Growth

Strategic assets can generate recursive protection requirements because the asset itself must be sustained and defended. A radar site, for example, requires reliable power, communications, housing, logistics, software, cyber defense, physical security, maintenance, redundancy, and, under higher-threat conditions, air and missile defense. Supporting systems may in turn require protection. Protection recursion refers to this second-order burden: the lifecycle burden of a strategic asset extends beyond acquisition to operation, protection, maintenance, and regeneration.

Protection recursion does not imply that additional infrastructure necessarily reduces power; it identifies a burden that acquisition accounting can obscure. The issue is especially important for external strategic nodes, which can increase deterrence, access, intelligence, logistics, or alliance cohesion while also importing risk and reducing freedom to disengage. Prior work on external strategic-node dependency shows that high-value partners or forward assets can remain indispensable even as the costs of managing, defending, or politically accommodating them rise (Wu, 2026a). Strategic value and lifecycle burden must therefore be assessed jointly.

Concept hierarchy. Commitment overhang is the accumulated burden stock; strategic free capacity is the residual resource condition; strategic optionality is the decision space enabled by that residual capacity. The remaining concepts identify mechanisms, feedbacks, or diagnostic outcomes linking these three core terms.

2.4 The Strategic Poison Pill

A strategic poison pill is defined here as an acquisition, commitment, or security responsibility that generates positive early strategic value but produces negative cumulative net conversion over a specified observation or planning horizon. The term is a metaphor for a negative net-conversion outcome, not a corporate-governance or treaty-clause device. It is subordinate to the core framework: negative net conversion need not reduce strategic optionality if the commitment does not bind a critical capacity dimension.

The poison-pill condition is therefore expressed as a cumulative accounting relationship rather than as a one-period subtraction. The equations in this paper are conceptual identities and diagnostic ratios rather than estimated structural models. Empirical application requires strategic value and burden to be placed on a commensurable scale and, where effects occur across multiple periods, to be weighted consistently over time.

$$\boldsymbol{NCV_i^{cum}(t) = \sum_{\tau=0}^{t} \delta^{\tau} \times [v_i(\tau) - c_i(\tau)]} \qquad \textbf{(1)}$$

where $NCV_i^{cum}(t)$ denotes the cumulative net converted value of commitment $i$through time t; $v_i(\tau)$ is the converted strategic value generated in period τ; $c_i(\tau)$ is the corresponding lifecycle and systemic burden; and $0 < \delta \leq 1$ is a temporal weighting factor. Setting $\delta = 1$ yields an undiscounted cumulative accounting. Burden may include acquisition, sustainment, protection, regeneration, interaction, opportunity, competitor-response, and adaptation effects, provided that these components are measured or normalized on the same analytical scale.

The diagnostic condition is: $NCV_i^{cum}(t) < 0$, following an initially positive value profile. This condition indicates negative cumulative net conversion over the specified observation or planning horizon. It does not, by itself, imply a decline in strategic free capacity or strategic optionality.

Two implications follow. First, strategic value can change as maintenance costs rise, threats evolve, competitors respond, or technologies change. Second, a commitment can remain individually valuable yet reduce portfolio efficiency if interaction and opportunity costs constrain flexibility elsewhere. This is the portfolio paradox of strategic expansion: individually defensible commitments can collectively narrow strategic choice.

2.5 Sustainment and Regeneration Capacity, Strategic Free Capacity, and Strategic Optionality

The principal constraint on sustained strategic reach is not wealth alone but the ability to sustain and regenerate usable capability across partially substitutable dimensions. CBO's February 2026 baseline projected a federal deficit of $1.9 trillion, or 5.8 percent of GDP, and debt held by the public equal to 101 percent of GDP. These figures indicate fiscal constraint but not an immediate inability to finance additional activity (CBO, 2026a). Fiscal capacity is therefore treated here as the capacity to finance sustainment and regeneration, not as "regeneration" in the same physical sense as industrial production, force readiness, logistics, or administrative absorption.

Military and industrial regeneration operate on slower and less flexible timelines. CSIS estimates that several high-demand U.S. munitions programs still face manufacturing lead times measured in years despite multiyear agreements and industrial investment. Planned expansion of PAC-3 MSE, THAAD, and other missile production shows that regeneration can accelerate, but also that appropriation and physical restoration are distinct processes (McGinn & Dilts, 2026; Cancian & Park, 2026).

Because these dimensions are not perfectly fungible, residual strategic capacity is represented as a vector rather than a scalar:

$$\boldsymbol{SFC_t = K_t - L_t - Q_t^{min}} \tag{2}$$

Strategic free capacity is the vector of residual usable capacity at time t. K is the usable capacity stock; L is capacity that remains physically available but is encumbered by existing obligations; and Q^{min} is the minimum contingency-reserve vector. The vector can be decomposed across fiscal-financing, industrial, military, logistical, and administrative dimensions. Components should not be arithmetically summed unless normalized to a common scale; a surplus in one dimension cannot automatically offset a binding shortage in another.

The missing bridge between regeneration and free capacity is the capacity-stock transition. For each critical, stock-like capacity dimension j, usable capacity changes through regeneration or additions G and through depletion D, where D includes operational expenditure, attrition, retirement, or other losses that remove capability from the usable stock:

$$\boldsymbol{K_{j,t+1} = K_{j,t} + G_{j,t} - D_{j,t}} \tag{3}$$

Equation (3) applies most directly to stock-like capacity dimensions, such as munitions inventories, deployable platforms, trained personnel, logistics capacity, or maintenance throughput. Fiscal-financing and administrative capacity require dimension-specific operationalization rather than literal inventory accounting.

Because L represents capacity that remains physically or functionally available but is encumbered by existing commitments, whereas D removes capability from K, the two terms are conceptually distinct and should not be double-counted. Combining the stock transition with Equation (2) yields the change in strategic free capacity:

$$\boldsymbol{\Delta SFC_{j,t} = G_{j,t} - D_{j,t} - \Delta L_{j,t} - \Delta Q_{j,t}^{min}} \quad \textbf{(4)}$$

This identity captures cases in which mission load remains unchanged while inventories continue to decline: if $\Delta L_{j,t} = 0$and minimum reserve requirements are unchanged, depletion in excess of regeneration reduces free capacity in dimension j. For cross-dimensional diagnosis, define net capacity pressure as:

$$\boldsymbol{P_{j,t} = max\{0,\ D_{j,t} + \Delta L_{j,t} + \Delta Q_{j,t}^{min}\}} \quad \textbf{(5)}$$

An auxiliary bottleneck-pressure ratio can then be defined as:

$$\boldsymbol{\Gamma_t = \max_{j:G_{j,t}>0} \left(\frac{P_{j,t}}{G_{j,t}}\right)} \quad \textbf{(6)}$$

Γ_t is an auxiliary diagnostic indicator rather than an independent threshold theorem. Values above one indicate that, in at least one critical dimension with positive regeneration, current depletion and net increases in encumbrance or reserve requirements exceed usable regeneration during the observation period. Because $P_{j,t}$ is bounded below by zero, reductions in commitment load or reserve requirements are not interpreted as negative capacity pressure.

Where $G_{j,t} = 0$, Γ_t is undefined and Equation (4) should instead be evaluated directly through the sign and magnitude of $\Delta SFC_{j,t}$. A dimension with zero regeneration and positive net pressure therefore requires direct stock analysis rather than ratio interpretation. “Persistence” must also be specified *ex ante* in empirical applications—for example, as consecutive monthly observations or a defined campaign phase—rather than inferred from a single period.

Strategic free capacity is a resource condition; strategic optionality is the decision space that condition enables. “Strategic optionality” is not introduced here as a new term: optionality already denotes the preservation of actionable choices under uncertainty (Datta & Kutzewski, 2023). This paper uses the concept more narrowly in an interstate-strategic context to mean the ability to respond to an additional contingency, reallocate capability, or assume a new commitment without materially weakening existing obligations or breaching minimum reserves. The poison-pill condition concerns cumulative net conversion; Equations (2)–(4) describe capacity stocks and encumbrance; $\Gamma_t$summarizes bottleneck pressure; and the power-conversion threshold introduced later concerns marginal value. None of these conditions mechanically implies the others.

2.6 Core Propositions

The framework generates six propositions.

- **Proposition 1: Burn–Lock-In Proposition.** Strategic commitments impose different temporal burdens: burn commitments consume current capability, whereas lock-in commitments encumber future capacity. Sustainability analysis should distinguish the two.
- **Proposition 2: Portfolio Interaction Proposition.** The combined burden of multiple commitments can exceed their individually assessed burdens because they compete for common inventories, logistics, industrial capacity, personnel, maintenance systems, political attention, and reserves.
- **Proposition 3: Regeneration-Gap Proposition.** Strategic overstretch becomes more likely when, in at least one critical and weakly substitutable dimension, depletion plus net new commitments and reserve requirements persistently exceed usable regeneration.
- **Proposition 4: Optionality Proposition.** An early manifestation of overstretch is a declining ability to address an additional contingency without weakening an existing obligation or breaching minimum reserves.
- **Proposition 5: Justificatory Portability Hypothesis.** Security rationales used to justify expanded external control may become politically portable to competitors even though they create no corresponding legal entitlement. Such portability constitutes only the first stage of the hypothesized mechanism; legitimation would require observable audience uptake or acceptance. The present cases do not establish that either portability or legitimation has occurred.
- **Proposition 6: Control-Induced Diversification Proposition.** Repeated use of asymmetric dependence as coercive leverage can increase incentives for highly integrated partners to diversify. Exclusive leverage declines only where alternatives become usable at sufficient scale and switching costs are manageable; diversification may also increase shared allied capacity and reduce burden on the dominant actor.

These propositions are diagnostic, not predictive. They neither establish a universal numerical threshold for overstretch nor imply that every new commitment produces net strategic loss.

2.7 Scope Conditions and Boundary Conditions

The framework is most likely to bind under four conditions: concurrent commitments; nonfungible or weakly substitutable critical resources; material regeneration lags; and protection recursion around external nodes or assets. External-feedback mechanisms additionally require actors with both capacity and incentive to respond. Competitive expansion matters most when rivals can generate material countermeasures; control-induced diversification matters most when partners have credible alternative markets, suppliers, institutions, security arrangements, or technological networks.

The mechanisms are weaker when capacity is abundant and readily substitutable, commitments are modular or reversible, allies absorb substantial protection and sustainment burdens, production can expand on operationally relevant timelines, or partners lack viable alternatives. Lock-in assessments also depend on the selected strategic horizon h. These scope conditions make the framework conditional rather than a general claim that strategic expansion necessarily erodes optionality.

3. Research Design and Evidentiary Scope

This theory-building working paper uses three contemporary developments as mechanism-based illustrations rather than matched cases for causal identification. The 2026 U.S.–Israel–Iran conflict illustrates operational burn, inventory depletion, and regeneration; Greenland illustrates prospective lock-in, infrastructure, and protection recursion; and Canada–EU cooperation illustrates diversification under asymmetric dependence. Because the cases differ substantially in legal status, military intensity, and institutional form, the comparison is conceptual rather than causal or statistical.

Terminology follows the level of analysis. The paper uses “U.S.–Israel–Iran conflict” for the broader regional conflict system and the author’s Day 200 dataset, and “U.S.–Iran conflict” for the narrower dyad relevant to Department of Defense cost accounting and direct U.S.–Iran combat operations. This is a substantive scope distinction: the narrower dyad isolates U.S. operational burden, whereas the broader label captures the interconnected conflict system.

The analytical cutoff is September 19, 2026, 12:00 ET. This cutoff defines the paper’s evidentiary freeze: information that became available only after that time is not incorporated into the present version, even when it concerns events that occurred earlier. It is distinct from the project’s event-assignment rule. In MCCM analysis, events are assigned to the noon-to-noon analytical day in which they actually occurred, based on event time rather than publication time; later reporting normally updates the evidentiary record of the original event rather than creating a new event (Wu, 2026e). The paper also builds on prior work on systemic warfare, which treats military capability as dependent on interconnected logistics, infrastructure, energy, information, industrial, and alliance systems rather than on isolated battlefield platforms (Wu, 2026d).

No aggregate estimate of total global economic loss is used as a central variable because direct destruction, fiscal expenditure, asset repricing, energy-price effects, insurance costs, shipping disruption, and opportunity costs rest on different accounting bases and time horizons. The narrower analytical question is whether commitments are accumulating faster than the capabilities required to sustain them and whether external responses increase burden or reduce converted strategic value.

The evidentiary standard varies by proposition. Contemporary cost, inventory, and production data support the burn mechanism; Greenland provides only a prospective illustration of lock-in because incremental obligations under the emerging arrangement are not public; and Canada–EU evidence demonstrates diversification intent and institutional network-building rather than measured U.S. leverage loss. The justificatory-portability hypothesis is the least directly tested proposition and requires future process tracing of rhetorical borrowing, audience uptake, and policy linkage. **Table 1** summarizes these evidentiary limits and the observations that would weaken each claim.

Table 1. Proposition–Evidence Correspondence and Falsification Conditions

Proposition	Evidence Used Here and Current Status	Observation That Would Weaken the Claim
P1 Burn–Lock-In	Iran provides a documented high-burn illustration. Greenland remains a prospective lock-in case because incremental obligations under the emerging arrangement are unspecified.	Comparable lifecycle evidence shows no meaningful difference in temporal burden or encumbrance.
P2 Portfolio Interaction	Shared munitions, logistics, industrial suppliers, maintenance, and strategic lift make interaction plausible, but no portfolio-wide interaction coefficient is estimated.	Commitments prove operationally separable, with little competition for common bottleneck resources.
P3 Regeneration Gap	CBO and CSIS document inventory depletion and multiyear replacement or manufacturing lags. Public data are insufficient to estimate K, L, Qmin, D, G, or Γ on a common scale.	Regeneration and additions consistently match or exceed depletion, net new load, and reserve requirements in all binding dimensions.
P4 Optionality	Candidate observables include reserve drawdown, cross-theater transfers, delayed programs, and extended deployment cycles. The present paper does not claim that the United States has crossed an optionality threshold.	Sustained pressure produces no reserve erosion, forced substitution, deployment stress, or deterioration in response capacity.
P5 Reciprocal Legitimation (hypothesis)	Legal and normative scholarship establishes the relevance of justificatory claims and territorial norms, but the 2026 cases do not trace actual borrowing or audience acceptance.	Comparative process tracing finds no identifiable precedent invocation, discursive transfer, audience uptake, or policy linkage.
P6 Control-Induced Diversification	Canada–EU statements show diversification intent and early institutional network-building, not measurable U.S. leverage loss.	Alternatives remain unusable or too costly at scale, or new cooperation mainly expands shared allied capacity without reducing U.S. leverage.

Source: Author's synthesis of cited evidence. Status labels distinguish illustration, directional evidence, and untested hypotheses; no contemporary case is used to claim a quantified threshold crossing.

4. Burn and Lock-In in Practice: Iran and Greenland

4.1 Iran as a High-Burn Commitment

The 2026 U.S.–Iran operational dyad illustrates the distinction between fiscal expenditure and strategic consumption. CBO estimated approximately $38 billion in Department of Defense costs through August 1, including replacement of expended munitions and lost equipment, increased flying hours, operations, and fuel. CBO also cautioned that the estimate was incomplete because the Department had not provided all requested data and some government-wide costs were excluded. More important for this framework, CBO assessed that extensive use of missile-defense interceptors would leave relevant inventories reduced for several years and would become more consequential in a second conflict against an opponent with large ballistic- and cruise-missile inventories (CBO, 2026b).

Pentagon reporting provides a more recent and more decomposable empirical anchor, but its categories are not equivalent to cash expenditure. Bloomberg Government reported that a CENTCOM assessment sent to congressional defense committees placed the September 3 core estimate at approximately $43.6 billion: about $11.2 billion in obligated incremental operating costs, an estimated $28.1 billion requirement to replace expended munitions, and about $4.3 billion to replace equipment losses (Tiron, 2026). Bloomberg further reported that roughly $28 billion of the munitions-replacement requirement and the $4.3 billion equipment-replacement requirement were unfunded at the time. Thus, $32.4 billion, approximately 74.3 percent of the decomposable estimate, represents reported replacement requirements, not replenishment spending already executed.

Separate CNN reporting described a Pentagon headline total of $45.1 billion, comprising the $43.6 billion September 3 figure plus $1.5 billion in additional fuel costs (Grayer & Fox, 2026). Public materials do not permit complete line-item reconciliation between the CENTCOM categories reported by Bloomberg Government and the additional fuel figure. This paper therefore treats $43.6 billion as the decomposable reported estimate and $45.1 billion as a separately reported Pentagon headline estimate. Neither is a comprehensive measure of strategic burden: base-repair costs and the full set of indirect operating costs were excluded.

The composition of the core estimate is more analytically important than the headline total. Replacement requirements dominate the decomposable estimate, indicating that much of the reported burden concerns restoration liabilities created by converting accumulated stock into current battlefield effects. Fiscal authorization, obligation, procurement, delivery, integration, and restored deployable inventory are therefore analytically distinct stages.

Replacement share is useful as a descriptive indicator of cost-estimate composition. Here it denotes the share attributed to munitions and equipment replacement requirements; it does not measure the physical percentage of inventories depleted, the percentage already restored, or cash already disbursed. It therefore cannot by itself establish a commitment–regeneration gap.

The relevant variables are the rate of consumption, the rate and lead time of replacement, bottleneck-specific regeneration capacity, and the extent to which replacement requirements compete with other theaters. The Iranian case is best characterized as a high-burn commitment because it converts scarce, transferable capability into theater-specific consumption and future restoration requirements. Earlier analysis reached a similar conclusion: the United States retained substantial operational-control advantages while facing rising pressure from inventories, logistics, economic transmission, and cross-theater demands (Wu, 2026c, 2026e).

Illustrative operationalization. For a munitions dimension, operational expenditure enters the framework as depletion D even if the mission assignment L is unchanged. If regeneration G remains below D over a defined campaign period and Q^{min} is stable, Equation (4) implies declining free capacity in that dimension. CBO and CSIS provide directional evidence of depletion and multi-year replacement lags, but public data do not provide comparable physical quantities for D and G across the relevant inventories. The paper therefore does not compute Γ or claim that a quantified optionality threshold has already been crossed.

4.2 Greenland as a Potential High-Lock-In Commitment

Greenland has a different temporal profile. The United States already operates Pituffik Space Base in northwestern Greenland, where the Upgraded Early Warning Radar supports missile warning, missile defense, and space-domain awareness, and the Satellite Control Network supports satellite command and control (U.S. Space Force, 2024, 2026). Pituffik lies approximately 750 miles north of the Arctic Circle, is surrounded by ice for much of the year, and depends on specialized air and maritime logistics. The U.S. Space Force describes it as the Department of Defense's northernmost installation and the site of the world's northernmost deep-water seaport (U.S. Space Force, 2024).

The emerging trilateral security arrangement may expand the U.S. role, but its operational scope and burden-sharing terms are not yet public. The September 18 announcement states that the parties expect an agreement on stronger Arctic and North Atlantic security while preserving Danish sovereignty and Greenlandic self-determination, making any estimate of incremental U.S. obligations premature (Statsministeriet, 2026). Three layers should therefore be separated. First are existing Pituffik sustainment obligations. Second are pre-existing modernization plans, including the FY2027 request for initial procurement of a MARK IV-B tactical-weather site at Pituffik; that request predates the September 18 announcement and cannot be attributed to the emerging agreement (Department of the Air Force, 2026). Third are any additional access, infrastructure, surveillance, protection, or sustainment responsibilities created by a future agreement. Only the third category would constitute incremental lock-in attributable to the new arrangement. GAO has also documented Arctic asset shortages, competing demands, limited logistics and infrastructure, acquisition delays, and a service-wide Coast Guard shore-infrastructure backlog above $7 billion. That figure is not a Greenland cost estimate but illustrates the broader sustainment difficulty of Arctic operations (GAO, 2024).

Greenland is therefore best treated as a potential high-lock-in commitment rather than an observed large new liability. Existing U.S. facilities already require specialized sustainment; any additional lifecycle burden will depend on the final agreement, implementation choices, burden sharing, and whether planned modernization would have occurred anyway. The analytical question is whether incremental Arctic value, if pursued, can be generated without unduly constraining wider U.S. strategic optionality.

4.3 Interaction Between Burn and Lock-In

Iran and Greenland impose different burdens but draw on overlapping national systems. The Iran conflict consumes interceptors, operating hours, maintenance, logistics, and production capacity while creating replacement requirements that must be met through future industrial output. Expanded Arctic commitments would instead encumber infrastructure, personnel, surveillance systems, modernization, protection, and long-duration sustainment. Both coexist with commitments in Europe, the Indo-Pacific, homeland defense, global maritime operations, and other standing responsibilities.

These commitments interact because they compete for common resources. Missile-defense assets may be required in multiple theaters, while airlift, sealift, ISR, specialist personnel, industrial suppliers, energetics, electronics, repair infrastructure, and command attention are not infinitely expandable. Defense spending can therefore rise even as strategic free capacity falls: a larger budget may be absorbed by restoring depleted capability, sustaining existing infrastructure, or protecting prior commitments rather than creating additional discretionary power. Gross defense expenditure is thus an incomplete measure of strategic freedom.

Table 2. Iran and Greenland as Contrasting Burn–Lock-in Illustrations

Dimension	Iran Conflict	Greenland Security Architecture
Primary Commitment Type	High-burn commitment	Potential high-lock-in commitment
Core Strategic Logic	Current operational pressure, deterrence, coercion, and conflict management	Potential long-duration Arctic access, surveillance, denial, and strategic positioning
Time Profile	Immediate and ongoing	Gradual and potentially durable
Main Burden Mechanism	Consumption of interceptors, munitions, operational tempo, logistics, maintenance, force protection, and creation of replacement liabilities	Existing Pituffik sustainment plus possible incremental infrastructure, logistics, ISR, base support, environmental adaptation, and protection
Key Cost Form	Present capability depletion + future restoration liability	Existing lifecycle obligations + uncertain incremental future obligations
Resource Stress	Missile-defense inventories, air and naval operating hours, deployment cycles, logistics, industrial replenishment	Could draw on Arctic construction, maintenance, communications, energy, transport, protection, and modernization capacity
Regeneration Issue	Funding does not immediately restore inventory; reported cost estimates include large replacement requirements	Pre-existing modernization already requires funding; any additional lock-in from the emerging agreement remains unspecified
Protection Recursion	Regional assets and deployments create additional force-protection requirements	Additional nodes, if created, could require communications, logistics, physical defense, cyber defense, and redundancy
Interaction with Other Theaters	Competes with Indo-Pacific, Europe, homeland defense, and reserve requirements for transferable capabilities	Could draw on long-term budget, logistics, ISR, infrastructure, and force-allocation capacity also needed elsewhere
Main Optionality Risk	Slower response to another high-intensity contingency as transferable capability is consumed	Potential future rigidity if incremental resources become durably encumbered
Primary Strategic Value	Operational influence, deterrence, coercive leverage, and conflict management	Potential access, surveillance, strategic denial, and Arctic presence
Main Uncertainty	Duration, escalation, replacement lag, base-repair costs, and incomplete indirect-cost accounting	Final agreement, implementation scale, burden sharing, and distinction between pre-existing and incremental investments
Analytical Risk	Underestimating war consumption by focusing only on direct budgetary costs	Attributing existing or pre-planned Arctic costs to a new agreement without evidence of incrementality
Analytical Implication	Assess consumption, replacement requirements, production lead time, and bottleneck regeneration rather than headline expenditure alone	Separate existing obligations, pre-existing modernization, and any genuinely incremental future commitments before assessing lock-in

Source: Author's conceptualization based on CBO (2026b), Tiron (2026), Grayer and Fox (2026), Department of the Air Force (2026), U.S. Space Force (2024, 2026), GAO (2024), and Statsministeriet (2026).

Note: "Burn" denotes current capability consumption and associated restoration requirements; "lock-in" denotes durable future encumbrance. Greenland remains prospective: existing Pituffik burdens and pre-planned modernization are separated from still-uncertain incremental obligations under the emerging arrangement.

5. External Strategic Feedbacks

5.1 Justificatory Portability: A Hypothesis

Strategic expansion can also affect the arguments available to competing powers. This mechanism must be distinguished from international law. Article 2(4) of the UN Charter prohibits the threat or use of force against the territorial integrity or political independence of states, and one state's conduct does not create a legal right for another to annex territory or impose coercive territorial control (United Nations, 1945). The international response to Russia's attempted annexation of Donetsk, Kherson, Luhansk, and Zaporizhzhia reinforces that distinction: in October 2022, the UN General Assembly condemned the attempted annexations by 143 votes to 5 as inconsistent with Ukraine's sovereignty, territorial integrity, and the UN Charter (United Nations, 2022).

The proposed mechanism is political rather than legal. A major power may frame expanded external control as necessary for security, and competitors may later invoke structurally similar arguments in their own strategic environments. Similarity alone, however, does not establish legitimation or causal borrowing. Demonstrating the mechanism would require identifying a relevant audience, a traceable precedent or justificatory reference, a change in rhetoric or doctrine, and some degree of uptake. The concept therefore concerns the possible portability of justification, not equivalence between cases or the creation of legal precedent. Portability is analytically prior to legitimation: the former refers to the reuse or transfer of justificatory logic, whereas the latter requires evidence that relevant audiences accept, normalize, or otherwise validate that logic.

This paper treats justificatory portability as the hypothesized mechanism and reciprocal strategic legitimation as a possible downstream outcome that would require observable audience uptake. Scholarship on the post-1945 territorial-integrity norm shows why justificatory boundaries can matter politically even when formal law is unchanged (Zacher, 2001). The potential channel is not limited to annexation: strategic-space management can involve access, basing, logistics networks, maritime presence, exclusion authorities, infrastructure control, or investment restrictions. The present paper therefore does not infer legitimation from the mere existence of analogous security claims.

The empirical question for future work is whether one actor's justificatory logic is reused by another, for which audience, in what sequence, and with what observable effect on political acceptance or policy. The 2026 cases do not answer that question.

Justificatory portability is therefore shown in the integrated mechanism as a separate, unestablished hypothesis rather than as an observed feedback channel. Reciprocal strategic legitimation would constitute a downstream outcome only if such justificatory logic receives identifiable audience uptake. Comparative testing would require process tracing across multiple cases and should distinguish rhetorical borrowing from independent invocation of similar security interests.

5.2 Competitive Expansion Feedback

Material competitor response can make the cost of strategic expansion endogenous to interaction. This channel is consistent with security-dilemma theory: measures that increase one actor's security can reduce another's perceived security and generate countermeasures that raise costs on both sides (Jervis, 1978; Glaser, 1997). If Actor A expands access or control and Actor B responds with deployments, logistics, infrastructure, alliances, or denial capabilities, Actor A may then adjust again. The resulting costs did not exist when the original decision was assessed. This paper terms the process competitive expansion feedback.

At the system level, such interaction can increase commitments on multiple sides without any actor initially seeking broad overextension. One possible result is reciprocal overextension: repeated security responses raise commitment burdens across several major powers simultaneously. This differs from conventional imperial overstretch, which is usually framed as an individual state expanding beyond its carrying capacity.

The mechanism is especially relevant to networked conflict because military theaters share enabling systems. Prior research identifies cross-theater competition over munitions, tanker aircraft, logistics, industrial capacity, support nodes, and political attention even where conflicts retain separate command structures and political objectives (Wu, 2026c). A commitment that appears sustainable under a static estimate may therefore become less attractive once competitor adaptation is included.

5.3 Control-Induced Diversification

Partners can also respond to strategic pressure by reducing dependence. The logic is well established in the literature on power and interdependence. Hirschman (1980) showed how concentrated trade dependence can become an instrument of national power; Keohane and Nye (2012) distinguished vulnerability created by costly dependence from simple sensitivity to external change. Farrell and Newman (2019) extend this logic to network centrality, showing how control over key nodes can convert asymmetric interdependence into coercive leverage. Cooley and Nexon (2020) show how alternative patrons and networks can weaken an incumbent's monopoly on influence. Together, these literatures imply that leverage depends partly on the availability of substitutes.

Control-induced diversification describes a sequence in which dependence creates leverage, repeated use of leverage raises perceived vulnerability, and vulnerability increases incentives to diversify. The mechanism refers to efforts to build alternative economic, technological, institutional, or security connections; it does not require complete decoupling. Cha's (2023) concept of collective resilience similarly emphasizes that vulnerability to economic coercion can be reduced through diversification and coordinated alternatives without eliminating interdependence.

The effect is conditional. Use of leverage may increase incentives to build substitutes, but exclusive leverage declines only if those substitutes become usable at sufficient scale, switching costs are manageable, and institutional or technological interoperability permits practical reallocation. Diversification can also have the opposite portfolio effect for the dominant actor if it expands allied capacity, improves burden sharing, or reduces sustainment requirements. The mechanism therefore predicts incentives and possible network change, not a one-directional loss of influence.

5.4 Canada and the European Alternative Network

Canada's 2026 European strategy provides an illustration. Article 49 of the Treaty on European Union permits "any European State" meeting the relevant conditions to apply for membership, so Canada does not fit the conventional accession pathway (European Union, 2012). In her September 16 State of the Union address, however, von der Leyen proposed opening the door for Canada to become the EU's first "associate member" and outlined an Alliance for the Future spanning technology, integrated defense industrial bases, the Arctic, energy, critical minerals, batteries, AI, quantum, cyber, and economic security (European Commission, 2026). Because "associate member" is not a status defined in the EU treaties, the proposal is best understood as an institutional innovation rather than ordinary accession.

Carney's September 17 address is more significant analytically than the label. He argued that integration in trade, finance, supply chains, technology, and other domains can become a vulnerability when used coercively. Rather than advocating self-sufficiency, he emphasized diversification, collective resilience, and functional cooperation in critical minerals, defense industrial capacity, AI and compute, energy, space, payment systems, and research (Office of the Prime Minister of Canada, 2026a). Canadian government statements likewise framed deeper European ties as a means of increasing strategic autonomy, resilience, and sovereignty across critical minerals, defense, advanced technology, research, energy, and finance (Office of the Prime Minister of Canada, 2026b, 2026c).

Trump's subsequent criticism and threat of additional tariffs demonstrate disagreement over the initiative but do not establish that U.S. pressure alone caused Canada's diversification. Canada–EU cooperation predates the September proposal. The narrower claim is that current U.S.–Canada tensions may have increased the salience of concentrated-dependence risks while Europe offers a potential diversification channel whose practical value depends on scale, implementation, and switching costs (Melander et al., 2026).

The case illustrates a broader structural point. A deeply integrated partner can generate high strategic value with relatively low administrative burden for the dominant actor. If stronger leverage induces investment in genuinely usable alternatives, exclusive leverage may decline. Yet deeper Canada–EU cooperation could also expand allied industrial and security capacity and reduce some U.S. burdens. Its net effect on U.S. usable power is therefore ambiguous ex ante and should be assessed on both the value and burden sides of the framework.

5.5 Geographic Position and Functional Integration

The Canada–EU case also illustrates how strategic alignment can become more functionally organized. Traditional institutions are structured largely by geography, sovereignty, and treaty membership, whereas many strategic capabilities are organized through functional networks. Canada need not become geographically European to participate more deeply in European defense production, AI governance, critical-mineral supply chains, energy infrastructure, research programs, payments, or Arctic cooperation.

Geographic position can remain fixed while strategic connectivity changes. States can deepen participation in selected institutional or technological systems without entering a fully integrated political union. Carney made a similar distinction, arguing that inherited institutions are organized geographically while many strategic capabilities are organized functionally (Office of the Prime Minister of Canada, 2026a). This development also aligns with earlier analysis of the Western system as a differentiated, partially aligned network in which the United States remains highly central while Europe develops greater autonomous institutional and strategic capacity (Wu, 2026b).

Such overlap need not produce fragmentation. A state can remain embedded in a North American defense and economic structure while deepening European industrial, technological, financial, and institutional connectivity. These links create potential alternatives, but they reduce concentrated vulnerability or exclusive leverage only when they are usable at sufficient scale and at manageable switching cost. Where they primarily expand shared allied capacity, they may instead improve burden sharing.

6. Integrated Model and Power Conversion Frontier

6.1 Three Feedback Pathways

The framework separates two analytical channels. The net-conversion channel compares cumulative converted strategic value with cumulative lifecycle and systemic burden. The capacity-stock channel tracks usable stock, depletion, encumbered commitments, regeneration, and minimum reserves. Burn and lock-in can affect both channels; material competitor responses can add burden and commitment load; partner adaptation can reduce exclusive value if substitutes become usable, but it can also increase shared capacity or reduce burden. Declining net converted value therefore does not by itself imply declining strategic optionality.

Figure 1 accordingly separates material competitor response and partner adaptation from the hypothesized justificatory-portability mechanism. Strategic optionality contracts only when free capacity declines persistently in a binding dimension. Net value can fall without such a constraint, and capacity can tighten even when an individual commitment remains net positive.

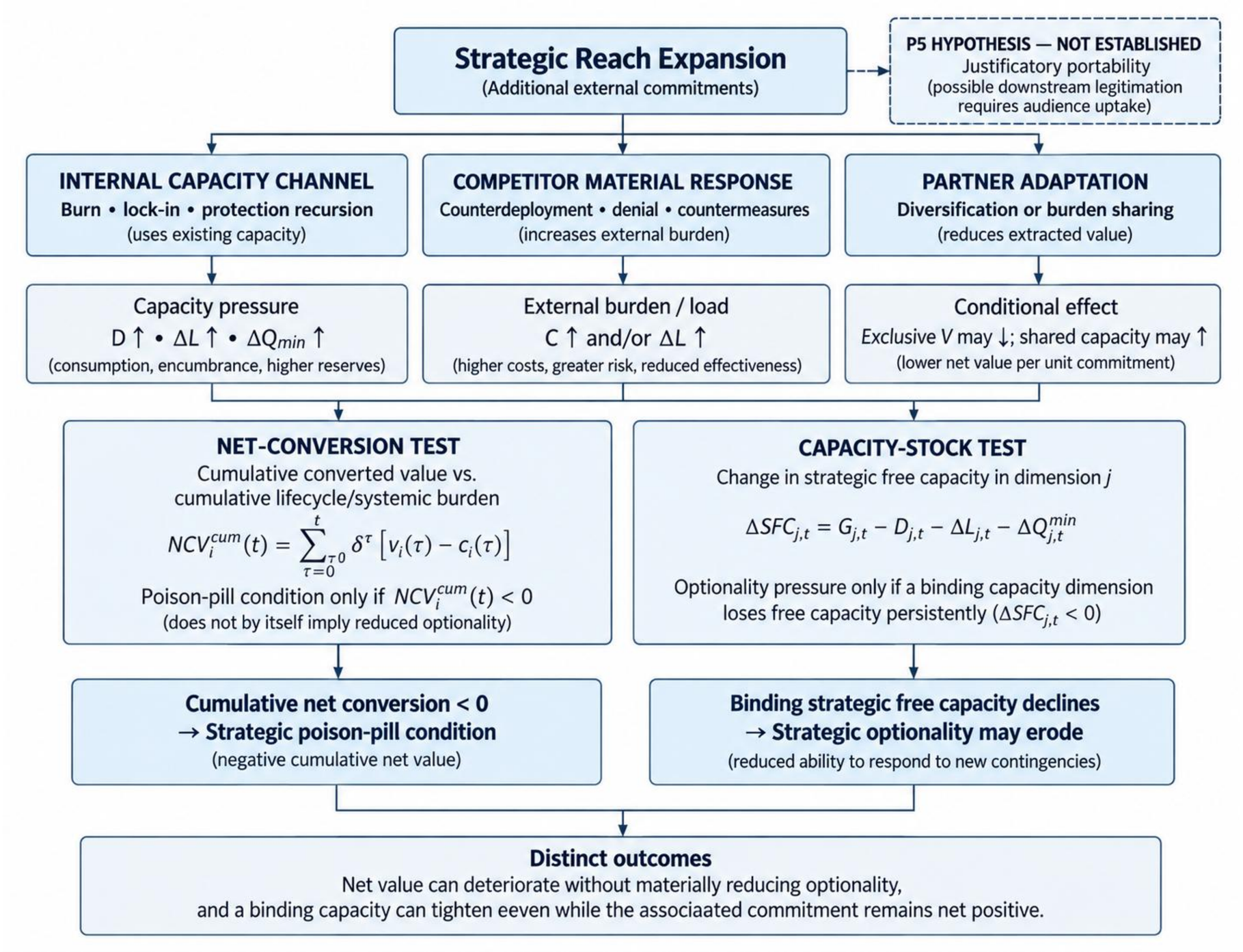

Figure 1. Strategic Reach, Net Conversion, and Strategic Optionality

Source: Author's conceptualization.

Note: Solid pathways represent the paper's mechanism-based channels. The dashed P5 pathway represents hypothesized justificatory portability. Reciprocal legitimation would require additional evidence of audience uptake and is not established by the present cases. Partner adaptation can reduce exclusive value where substitutes become usable, but it can also expand shared capacity or reduce burden. The net-conversion and capacity-stock tests are therefore distinct: a strategic poison-pill condition does not by itself establish loss of strategic optionality, and a binding capacity can tighten while the associated commitment remains net positive.

6.2 The Power Conversion Frontier

Strategic expansion should be evaluated not by reach alone but by the efficiency with which reach is converted into usable power.

Let R denote strategic reach, *V(R)* the converted strategic value associated with that reach, and *C(R)* its lifecycle and systemic burden on a commensurable analytical scale. This marginal comparison is separate from the bottleneck-specific capacity accounting in Section 2.5.

Define marginal net conversion as:

$$\boldsymbol{M(R) = \frac{dV(R)}{dR} - \frac{dC(R)}{dR}} \qquad \textbf{(6)}$$

R is strategic reach; *V(R)* is converted strategic value; *C(R)* is total lifecycle and systemic burden; and *M(R)* is the marginal net-conversion effect of an additional increment of reach.

A candidate Power Conversion Frontier occurs at R_f where marginal net conversion equals zero. To interpret R_f as a local crossing from power-enhancing to power-reducing expansion, $M(R)$ must change sign from positive immediately before R_f to negative immediately after it:

$$\boldsymbol{M(R_f) = 0, \quad M(R_f - \epsilon) > 0 > M(R_f + \epsilon)} \tag{7}$$

Without that local sign change, marginal equality identifies only a balance point, not evidence that additional reach has become net negative. The “frontier” is therefore a conceptual threshold for empirical testing, not a universal or already-estimated boundary.

A state may thus expand its strategic footprint while becoming less efficient at converting reach into usable power. This distinction is especially important in networked systems, where power depends on rerouting, substitution, regeneration, and coordination across nodes rather than possession alone. Prior work on systemic warfare likewise emphasizes the resilience and functionality of distributed operational systems (Wu, 2026d). A small commitment can have negative net conversion without materially affecting strategic optionality; optionality loss requires a separate binding-capacity mechanism.

7. Observable Indicators and Strategic Implications

Commitment overhang is analytically useful only if it can be distinguished empirically from ordinary expenditure. Three indicator groups matter most.

First, bottleneck and regeneration indicators: replacement time for scarce munitions, production lead times, depot throughput, repair-cycle duration, shipyard capacity, trained-personnel availability, airlift and sealift utilization, and industrial expansion rates, show whether depleted capability is being restored at operationally relevant speed. Current U.S. munitions debates illustrate why production rate and lead time can be more informative than procurement dollars alone (McGinn & Dilts, 2026; Cancian & Park, 2026). Replacement share can supplement these measures as a cost-estimate composition indicator, but it does not measure physical inventory depletion or restoration.

Second, commitment indicators show how much existing capacity is encumbered and whether new requirements force substitution elsewhere. Relevant measures include the share of major force elements assigned to standing or rotational missions, infrastructure sustainment requirements, reserve drawdown, the share of new spending devoted to earlier commitments, and forced transfers from other theaters. Third, network-response indicators capture competitor deployments, alternative basing, partner diversification, supply-chain restructuring, and institutional movement toward substitute networks. These value-side indicators matter because strategic reach can become less useful without a corresponding increase in physical burden.

The decisive empirical signal is not rising cost alone but forced trade-offs. If a new commitment can be absorbed without reducing reserves, delaying another program, extending deployment cycles, or weakening another theater, commitment overhang may remain limited. If satisfying one requirement increasingly requires sacrificing another, the constraint has become strategic rather than merely fiscal.

Measurement should therefore distinguish gross capacity, encumbered capacity, bottleneck-specific sustainment and regeneration, minimum reserves, and residual discretionary capacity. This last category—strategic free capacity—is most relevant to future choice. Potential adjustment mechanisms include faster regeneration, allied burden sharing, substitution, modular or reversible access, lower protection requirements, and selective retrenchment. These are analytical response categories, not recommendations for any particular policy. The framework's objective variable is the preservation of sufficient uncommitted, rapidly usable capacity.

Threshold status in this paper. Public evidence does not place K, L, Q^{min}, D, and G on comparable units across the relevant dimensions. The contemporary cases therefore demonstrate mechanisms and directional pressures rather than estimate Γ, locate the candidate frontier, or establish that the United States has crossed a strategic-overstretch threshold. A publishable empirical test would require repeated, dimension-specific observations and a pre-specified persistence window.

8. Conclusion

The sustainability of U.S. global power cannot be judged by asking whether the United States can afford one additional war, base, security agreement, or infrastructure project in isolation. The United States retains substantial fiscal, military, technological, industrial, and institutional resources, and the evidence examined here does not support a claim of imminent fiscal insolvency or military collapse. The relevant question is whether accumulated commitments are reducing the capacity available for the next contingency.

The U.S.–Iran operational dyad illustrates burn: current operations consume inventories, operating capacity, logistics, and regeneration time, while recent reporting shows that replacement requirements constitute a large share of the reported cost estimate. The case supports the distinction between financing replacement and physically restoring capability, but public data are insufficient to calculate a bottleneck threshold. Greenland illustrates potential lock-in rather than an observed large new liability: existing Pituffik obligations and pre-planned modernization must be separated from any incremental commitments created by the emerging arrangement. The Canada–EU case illustrates diversification intent and network-building under concentrated dependence, but it does not establish measurable U.S. leverage loss and could also generate burden-sharing benefits.

Taken together, the framework identifies three families of effects: internal burden accumulation, material competitor response, and partner adaptation. They operate through two distinct channels. Net converted value can fall because lifecycle and systemic burden rises or exclusive value declines; strategic optionality contracts only when depletion, new commitments, or reserve requirements persistently reduce free capacity in a binding dimension. The power-conversion threshold is a separate marginal condition requiring a sign change in marginal net conversion. Keeping these mechanisms distinct avoids treating burden growth, value loss, and loss of decision space as interchangeable outcomes.

Working Paper

A great power can remain wealthy, militarily formidable, globally present, and capable of meeting existing obligations while becoming less free to assume the next one. The central paradox is not that every additional commitment is costly, but that nominal reach and usable discretion can move in opposite directions. Commitment overhang becomes strategically consequential when it binds residual capacity; negative net conversion becomes a poison-pill outcome only when cumulative burden exceeds cumulative converted value over the defined horizon. The framework's contribution is to integrate nonfungible bottlenecks, commitment portfolios, and external feedback around a narrower question: how much strategic choice remains for what comes next?

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