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Force Majeure and Contractual Resilience in Global Energy Supply Chains: A Systematic Review

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Abstract
In 2020 global energy supply chains absorbed a compound shock without modern precedent, as pandemic containment measures collapsed demand at the same moment a producer price war expanded supply and physical storage filled to capacity. The contractual response was equally unusual: buyers and sellers across liquefied natural gas, crude oil, refined products, coal, and power invoked force majeure at a scale and frequency the sector had not previously experienced. This paper systematically reviews the legal, energy commercial, and supply chain literatures bearing on that episode, drawing on peer-reviewed articles, monographs, working papers, and institutional reports published between January 2000 and December 2020, and synthesising them thematically.

The review finds that force majeure clauses written for discrete physical impediments performed poorly against a systemic demand shock, that the parties under the greatest commercial pressure held the weakest doctrinal position because their performance remained entirely possible and merely unwanted, and that clauses operated in practice less as adjudicated entitlements than as opening positions in renegotiation. Resilience, where it appeared, came principally from ordinary contractual optionality such as destination freedom, downward quantity tolerance, and price review rather than from excuse doctrine itself. Underlying these findings is a structural disconnect: legal scholarship analyses the bilateral contract and ignores the network, while supply chain scholarship analyses the network and ignores the contract. The paper responds with a four-layer Contractual Resilience Framework positioning excuse as the instrument of last resort, and sets out a research agenda centred on the contractual ripple effect and the empirical clause evidence the field currently lacks.

Keywords: force majeure, hardship, contractual resilience, energy supply chains, LNG sale and purchase agreements, COVID-19, supply chain risk management, systematic review, contract renegotiation, take-or-pay

1. Introduction

Global energy trade rests on an architecture of long-term contracts. LNG sale and purchase agreements (SPAs) run for fifteen to twenty-five years, and crude term supply agreements, pipeline capacity bookings, coal offtake arrangements, and power purchase agreements all bind counterparties across horizons over which markets, technologies, and regulatory regimes will certainly change. That architecture exists because energy assets are capital-intensive, specific, and long-lived: the financing of a liquefaction train or a pipeline depends on the bankability of the offtake commitments underwriting it. The sector has therefore invested heavily in mechanisms for allocating risks that cannot be eliminated, of which the force majeure clause is the most familiar.

In 2020 that architecture faced a stress test of a kind it was not designed for. The World Health Organization declared a public health emergency of international concern on 30 January 2020 and characterised COVID-19 as a pandemic on 11 March 2020. Containment measures spread across 187 countries and territories, and the International Energy Agency estimated April demand at roughly 29 million barrels per day below the prior year, a level last observed in 1995, with full-year 2020 demand projected to fall by a record 9.3 million barrels per day. The demand collapse coincided with a supply expansion: after OPEC and its partners failed to agree new cuts on 6 March 2020, Saudi Arabia reduced official selling prices and signalled a production increase, and Russia signalled it would follow. The group reversed course on 12 April 2020 with an agreement to withdraw 9.7

million barrels per day from 1 May, but by then physical storage had become the binding constraint. On 20 April 2020 the expiring May West Texas Intermediate futures contract settled at negative $37.63 per barrel, the first negative print in the thirty-seven-year history of the contract, and Brent fell the following day to $9.12 per barrel.

The contractual consequences began earlier and in gas. In early February 2020, China National Offshore Oil Corporation (CNOOC), the country's largest LNG importer, invoked force majeure on cargoes, citing constraints at receiving terminals arising from quarantine measures. The declarations were supported by force majeure certificates issued by the China Council for the Promotion of International Trade (CCPIT). Several suppliers, including Total, Shell, and Qatargas, rejected them. On 5 March 2020, PetroChina issued force majeure notices to suppliers of piped gas and LNG. Contemporaneous practitioner commentary observed that similar notices reached commodity trading houses and Middle Eastern producers, and that sellers faced an immediate strategic choice between accepting a declaration, rejecting it and inviting dispute, or negotiating accommodations that avoided the question altogether.

The episode is analytically valuable because it separates two things that are ordinarily conflated. The physical impediment, terminals unable to discharge because workers were quarantined, was real but temporary and localised. The economic impediment, a collapse in downstream demand that made contracted volumes unwanted at contracted prices, was systemic, prolonged, and, on the orthodox view of most legal systems, not a force majeure event at all. Industry observers noted the concern that notices grounded in the first were in substance directed at the second, functioning as an opening move toward renegotiation rather than a claim of legal excuse. Whether that characterisation is fair matters less than what it reveals: the clause was operating as a bargaining instrument within a relational commercial system, not as a self-executing legal switch.

Scholarship bearing on this phenomenon has developed in two largely separate streams. The first is contract law scholarship on excused performance, a comparative and doctrinal tradition that traces the tension between *pacta sunt servanda* and the recognition that circumstances change, and that maps the divergent institutional solutions to it. Its strength is precision about what excuse requires; its limitation is that it analyses the bilateral contract in isolation. The second is supply chain risk management scholarship on resilience, which treats the chain as a network and asks how it absorbs and recovers from disruption. Its strength is the network perspective; its limitation is that contracts appear in it, when at all, as coordination devices for quantity and price rather than as instruments governing behaviour under extreme events. The gap is not merely academic. In 2020 the decisions that determined whether energy flowed were contractual decisions taken under legal uncertainty by commercial actors embedded in networks, and an account that captures only the doctrine or only the network explains neither.

This paper reviews that literature systematically and asks how contractual excuse mechanisms performed as instruments of supply chain resilience. It examines how force majeure is conceptualised across the legal, energy commercial, and supply chain literatures and how coherent those conceptualisations are with one another; what the evidence indicates about clause performance during the 2020 disruption and what distinguished clauses that performed from those that did not; through what mechanisms invocations propagate along multi-tier chains and what governs whether relief obtained at one tier is available at adjacent ones; how excuse mechanisms relate to other instruments of contractual flexibility in producing resilience; and what gaps the literature exhibits. Section 2 sets out the legal and conceptual background. Section 3 details the review method. Section 4 reports the corpus characteristics and the thematic synthesis. Section 5 discusses what the synthesis implies for how contractual resilience should be understood and specifies propositions for testing. Section 6 addresses limitations and the research agenda, and Section 7 concludes.

2. Background

2.1. Force Majeure Across Legal Traditions

Force majeure is not a unitary concept. It is a family of functionally related but doctrinally distinct responses to the same underlying problem, and the differences among them are consequential for cross-border energy contracts.

Civil law origins: In the French tradition, force majeure operates as a matter of general law. Article 1218 of the Civil Code, as recast in 2016, requires an event beyond the debtor's control, unforeseeable at the time of contracting, and whose effects could not be avoided by appropriate measures, rendering performance impossible. Where the impediment is temporary, performance is suspended; where definitive, the contract is terminated by operation of law. Critically, the 2016 reform also introduced *imprévision* at article 1195, permitting renegotiation and, failing agreement, judicial adaptation or termination where an unforeseeable change makes performance excessively onerous. The French system thus provides two distinct routes: impossibility and excessive onerousness.

German law: BGB section 275 excludes the duty to perform where performance is impossible, while section 313 addresses disturbance of the foundation of the transaction, permitting adaptation of the contract where circumstances forming its basis have changed severely and the parties would not have contracted on the same terms had they foreseen the change. German law thus foregrounds adaptation over termination, a preference with direct relevance to long-term energy supply.

English law: English law recognises no general doctrine of force majeure. Relief depends either on an express clause or on the narrow common law doctrine of frustration. Frustration requires that performance become something radically different from what was undertaken, is assessed multi-factorially (*Edwinton Commercial Corp v Tsavliris Russ (The Sea Angel)*, 2007), and produces automatic discharge rather than adjustment (*National Carriers Ltd v Panalpina (Northern) Ltd*, 1981). Increased cost or lost profitability does not frustrate, and self-induced impediments, including a party's own allocation choices among competing commitments, fall outside the doctrine (*J Lauritzen AS v Wijsmuller BV (The Super Servant Two)*, 1990). Because most internationally traded energy contracts select English law, this restrictive baseline places the entire weight of relief on the drafted clause.

United States law: UCC section 2-615 excuses delay or non-delivery where performance has been made impracticable by the occurrence of a contingency the non-occurrence of which was a basic assumption of the contract. The energy sector supplied several of the doctrine's defining cases. In *Eastern*

Air Lines v Gulf Oil Corp (1975), a supplier's claim that the oil price shock made performance impracticable failed. In *Aluminum Co. of America v Essex Group* (1980), an escalation formula that had come apart under energy cost inflation was judicially reformed, an outcome widely regarded as anomalous. In *Northern Indiana Public Service Co v Carbon County Coal Co* (1986), Posner J refused to relieve a utility of take-or-pay obligations when regulatory and market change made contracted coal uneconomic, reasoning that a fixed-price long-term contract is precisely an allocation of market risk. That reasoning maps directly onto 2020: a buyer whose downstream demand disappears is experiencing the risk the contract assigned to it.

Transnational instruments: CISG article 79 exempts a party from damages where failure is due to an impediment beyond its control that it could not reasonably have been expected to take into account, avoid, or overcome, extending in defined circumstances to third-party failures. The UNIDROIT Principles separate force majeure (article 7.1.7) from hardship (articles 6.2.2 and 6.2.3), the latter triggering a duty to renegotiate and, failing that, judicial adaptation or termination. This separation of the impossible from the onerous is the single most important conceptual distinction the 2020 experience exposed.

Institutional model clauses: The International Chamber of Commerce revised its model force majeure and hardship clauses in March 2020, the first revision since 2003. Three features are notable for energy contracting. First, the introduction of a short form alongside the long form, intended for direct incorporation rather than incorporation by reference. Second, the fixing of a 120-day threshold after which either party may terminate for a continuing impediment, converting an open-ended suspension into a bounded one. Third, and most significant, the substantial reworking of the hardship clause to offer three alternatives where renegotiation fails: termination by the invoking party, adaptation or termination by a judge or arbitrator, or judicial declaration of termination. The adaptation option, drawn from the UNIDROIT Principles, marks an institutional shift toward contract preservation over discharge.

Chinese law: Chinese law is significant here because the first and most visible 2020 invocations came from Chinese buyers. Articles 117 and 118 of the former Contract Law excused performance, wholly or partly, where an objective circumstance was unforeseeable, unavoidable, and insurmountable, subject to a duty of timely notice and proof. The PRC Civil Code, adopted on 28 May 2020 and in force from 1 January 2021, carried that formulation forward while also codifying a change of circumstances doctrine permitting renegotiation and, failing agreement, judicial modification or termination where continued performance would be manifestly unfair. Chinese law therefore sits closer to the civilian pattern of dual routes than to the English single route, which matters because a buyer whose home law recognises onerousness-based relief may approach a contract governed by English law with expectations that law does not support.

The comparative scholarship: A mature comparative literature maps these divergences and repeatedly reaches the same structural conclusion: legal systems agree that some supervening events should excuse performance and disagree profoundly about where the line falls and what follows once it is crossed. The distinction that matters most for commercial drafting is between force majeure as a concept supplied by the general law and force majeure as a creature of the clause, the latter being the only version available under English law. A parallel question runs through the treatment of hardship under CISG article 79, namely whether economic disequilibrium can ever constitute an impediment within it. These doctrinal differences are in turn absorbed into drafting practice in international contracts, and the English treatment of clause and doctrine is conventionally analysed together. Placed in historical perspective, the 2020 wave is less singular than it appeared at the time: the questions being asked in 2020 had been asked after every major systemic disruption of the preceding century and answered differently each time according to the institutional preferences of the system asking them.

Table 1 summarises the principal divergences.

Table 1: Comparative treatment of supervening events affecting performance

System or instrument	Route to relief	Threshold	Primary remedy	Adjustment available
England and Wales	Express clause, or frustration	Radically different obligation; clause wording otherwise governs	Automatic discharge	No
United States	UCC s 2-615; Restatement ss 261, 265	Impracticability against a basic assumption	Excuse of delay or non-delivery; allocation duty	Rarely, and controversially
France	Civil Code art 1218; art 1195	Impossibility; separately, excessive onerousness	Suspension or termination; renegotiation	Yes, under art 1195
Germany	BGB s 275; s 313	Impossibility; disturbance of the transactional foundation	Release; adaptation	Yes, and preferred
China	Civil Code (2020) force majeure and change of circumstances	Unforeseeable, unavoidable, insurmountable; manifest unfairness	Partial or full excuse; modification	Yes
CISG	Article 79	Impediment beyond control, not reasonably avoidable	Exemption from damages	Not expressly
UNIDROIT Principles; ICC model clauses	Arts 7.1.7; 6.2.2 to 6.2.3; ICC model clauses	Impediment; separately, fundamental alteration of equilibrium	Suspension or termination; renegotiation	Yes, including by tribunal

The table makes visible the point that dominates the 2020 evidence. Systems occupying the upper rows offer a single, narrow, all-or-nothing route. Systems occupying the lower rows offer a second route calibrated to onerousness rather than impossibility. Because English law governs the majority of internationally traded energy contracts while many counterparties are domiciled in systems from the lower rows, the 2020 disruption produced a predictable mismatch between what parties expected relief to look like and what the governing law would deliver.

2.2. Resilience and adaptive capacity in supply chain scholarship

The concept of resilience entered supply chain scholarship from ecology and engineering, where it denotes the capacity of a system to absorb disturbance and reorganise while retaining function. The field established an operational vocabulary of re-engineering, collaboration, agility, and risk management culture, framed the trade-off between redundancy and flexibility, and systematised the definition of resilience around adaptive capacity across preparation, response, and recovery phases. Subsequent reviews consolidated it, with parallel applied work modelling supply chain risk and logistics performance in energy and infrastructure project settings (Agbabiaka *et al*., 2019; Okonkwo *et al*., 2020), and extended it quantitatively.

Contract theory supplies a parallel but disconnected account. Relational contract scholarship distinguishes discrete from relational exchange and holds that long-term relations are governed by norms of flexibility and mutual adjustment that formal terms only partially capture. Transaction cost reasoning explains the choice of governance structure by reference to asset specificity and the hazards of ex post opportunism, an analysis that describes energy infrastructure with unusual accuracy. The incomplete contracts literature formalises the impossibility of specifying every contingency and the resulting centrality of renegotiation, and later work describes the braiding of formal and informal contracting in innovation-intensive relations. Empirical study of commercial communities has documented a systematic preference for private ordering over legal enforcement.

The synthesis these literatures invite but have not achieved is straightforward to state. A force majeure clause is a formal term that allocates the consequences of a specified class of events. Contractual resilience, by contrast, is the capacity of a contractual relationship to sustain the underlying exchange through disruption. These are not the same thing, and they can pull in opposite directions: a clause that cleanly discharges obligations may resolve the legal question while destroying the commercial relationship and, with it, the supply arrangement the chain depends on.

Empirical work in this tradition has established several findings relevant to the present question. Disruptions have been shown to produce persistent rather than transitory effects on firm value, which supplies the economic motive for the contractual protections energy firms negotiate. Field-derived resiliency frameworks distinguish capacities that firms can build in advance from those they must improvise. Study of resilience through the 2008 financial crisis found that knowledge management and collaboration mattered more than physical buffers, a result later extended by evidence that relational competencies, specifically communication and cooperation with partners, predict resilience more strongly than arm's length control does. That finding is directly pertinent to the 2020 energy evidence, where accommodation between long-term counterparties, rather than enforcement against them, was the dominant observed response.

The pandemic generated a rapid extension of this literature. Pandemics were argued to differ from the disruptions the field had theorised because they are simultaneously global, prolonged, and demand-side as well as supply-side, prompting calls to draw on theories outside operations management to accommodate them. Agenda-setting work across epidemic outbreak studies identified contract and relationship governance as among the least developed areas. Others considered what the disruption implied for the transition to sustainable production and consumption, arguing that the recovery period represents a window in which supply arrangements are renegotiated and can be redirected. None of this work examines contractual excuse, but all of it describes the environment in which excuse was invoked.

2.3. The contractual architecture of energy supply chains

Four features distinguish energy contracting and shape how excuse doctrine operates within it.

Take-or-pay and volume commitments: Long-term gas and LNG contracts typically oblige the buyer to pay for a minimum annual quantity whether or not it takes delivery, with make-up rights permitting later recovery of paid-for volumes. This structure exists to underwrite project finance. It also means that a buyer facing collapsed demand is contractually exposed to a payment obligation regardless of physical offtake, which explains why buyers in 2020 sought relief through force majeure rather than simply declining cargoes.

Downward quantity tolerance and scheduling flexibility: Most SPAs provide some annual flexibility around the contract quantity, and delivery scheduling is agreed through annual and ninety-day programmes. This flexibility, negotiated for ordinary commercial variation, became the primary shock absorber in 2020, operating below the threshold at which excuse doctrine engages.

Destination clauses and diversion rights: Whether a buyer may divert or resell a cargo determines whether an unwanted volume is a loss or an arbitrage. Where destination restrictions bound cargoes to a specific terminal, the buyer's only exits were force majeure or default. Where free-on-board terms and destination freedom applied, diversion absorbed the shock contractually. Contemporaneous reporting indicated that cargoes originally bound for China were diverted in the early weeks of the outbreak, though the usual absorbing markets were themselves saturated by a mild winter and high European inventories.

Price review and reopener provisions: Long-term gas contracts commonly permit periodic renegotiation of the price formula where market circumstances have changed significantly, with arbitral determination if the parties fail to agree. Price review is functionally a contractual hardship mechanism, and the pre-2020 literature on Asian LNG price arbitration is directly relevant to how energy contracts adapt without invoking excuse.

Taken together, these features mean that energy contracts already contain a layered adjustment architecture in which force majeure is the last and bluntest instrument, not the first.

Change-in-law and stabilisation provisions: A fifth feature deserves separate mention because it operates alongside force majeure and is frequently confused with it. Upstream host government contracts, and increasingly midstream and infrastructure agreements, contain change-in-law clauses allocating the consequences of regulatory alteration, and in some cases stabilisation provisions purporting to freeze the fiscal or regulatory regime or to restore the contractor's economic position if it changes. These provisions address a category of event that force majeure characteristically does not, because a change in law rarely makes performance impossible and typically makes it more expensive or less profitable. Several 2020 impediments were legal rather than

physical in form, arising from quarantine orders, export restrictions, and emergency public health regulation, which places them at the boundary between the two mechanisms. Where a contract contained a well-drafted change-in-law provision, the analysis often did not need to reach force majeure at all. This point recurs in Section 6, because the energy transition will generate regulatory change of exactly this kind over the life of contracts being written now.

2.4. Adjacent evidence streams

The core corpus on contractual excuse is thin, and the questions this review asks about administrative capability, disruption propagation, and organisational readiness are studied more extensively in adjacent applied literatures than in contract scholarship itself. This subsection surveys a consolidated cross-disciplinary body of work published between 2015 and 2020 and situates it against the review's themes. These sources are cited as adjacent evidence rather than as authority on force majeure doctrine: none addresses excuse mechanisms directly, and the connection in each case is to the operational substrate on which contractual performance depends rather than to the legal question of when performance is excused.

Procurement and supply chain governance in energy and infrastructure: The closest adjacent stream examines procurement strategy, vendor evaluation, logistics performance, and supply chain risk modelling in energy and infrastructure settings, including EPC and gas processing environments, port and demurrage efficiency, materials readiness, ERP-enabled procurement, supplier management, and sustainable and ESG-oriented sourcing (Agbabiaka *et al*., 2019; Ahiaeke Patrick *et al*., 2020; Okonkwo *et al*., 2018a; Okonkwo *et al*., 2018b; Okonkwo *et al*., 2019; Okonkwo *et al*., 2020; Akin-Oluyomi *et al*., 2020; Okojie and Abioye, 2020; Aifuwa *et al*., 2020; Yeboah and Ike, 2020; Eyetsemitan *et al*., 2020). This work is directly relevant to Layer 2 of the layered account developed in Section 5, because the operational flexibility that absorbed the 2020 shock was exercised through procurement and logistics functions rather than through legal ones. It is also relevant to Section 4.4: a party's ability to issue a compliant notice, evidence an impediment, and demonstrate mitigation depends on the maturity of the procurement systems that hold the underlying records.

Occupational safety, HSE, and construction risk management: A substantial body of work addresses safety management systems, hazard identification, risk governance, and QHSE audit in oil and gas maintenance, heavy lifting, and multi-contractor construction environments (Arumosoye and Obriki, 2018; Arumosoye and Obriki, 2019; Arumosoye and Obriki, 2020; Obogo *et al*., 2019a; Obogo *et al*., 2019b; Obogo *et al*., 2019c; Obogo *et al*., 2020a; Obogo *et al*., 2020b; Obogo *et al*., 2020c; Obriki and Arumosoye, 2018; Obriki and Arumosoye, 2019; Obriki and Arumosoye, 2020). Its relevance is twofold. First, the physical impediments most commonly enumerated in energy force majeure clauses, including plant incidents, lifting failures, and site shutdowns, are the same events this literature models as safety risks, so it supplies the empirical base for the event categories the clauses assume. Second, quarantine-driven workforce unavailability in 2020 was operationally a workforce safety and site access problem before it became a contractual one.

Critical infrastructure, operational technology, and cyber risk governance: Work on securing operational technology networks, identity and access management, data protection regulation, incident response architecture, and enterprise cyber defence (Mbonu *et al*., 2018; Mbonu *et al*., 2019a; Mbonu *et al*., 2019b; Mbonu *et al*., 2020a; Mbonu *et al*., 2020b; Mbonu *et al*., 2020c; Adegbite *et al*., 2020; Dosunmu and Ogundele, 2019; Dosunmu and Ogundele, 2020; Okoruwa *et al*., 2020) bears on the emerging question of whether cyber events belong in the enumerated list at Layer 1. Unlike a pandemic, a cyber compromise of control systems can render performance genuinely impossible, and the drafting problem this review identifies for epidemics recurs for cyber events in contracts whose event lists predate their salience.

Enterprise systems and contract administration capability: Research on cloud and enterprise service management, IT service delivery, and CRM and platform governance (Badmus *et al*., 2020; Ladapo *et al*., 2018; Ladapo *et al*., 2019; Badmus *et al*., 2018; Badmus *et al*., 2019a; Badmus *et al*., 2019b) speaks to a claim advanced in Section 4.4 that the literature has not previously connected: that contract administration is itself a resilience capability. Notice obligations, mitigation records, and rolling status updates are administered through enterprise systems, and the 2020 experience of dispersed and remote contract teams suggests the maturity of those systems materially affected whether procedural entitlements were preserved.

Energy systems engineering, power infrastructure, and transition: Work on building energy systems, predictive maintenance, electrical machines, power systems, telecommunications infrastructure, and renewable forecasting and energy justice (Atta *et al*., 2018; Atta *et al*., 2020; Sunday and Omoegun, 2018; Sunday and Omoegun, 2019; Sunday *et al*., 2019; Sunday *et al*., 2020; Amayo *et al*., 2015; Amayo, 2017; Amayo and Popoola, 2017a; Amayo and Popoola, 2017b; Oshevire *et al*., 2017; Komi and Adeniji, 2020) describes the physical layer beneath the contractual one. It is most relevant to Section 6, where the review argues that the energy transition presents a disruption profile that is directional and foreseeable rather than sudden, and therefore engages change-in-law and adaptation mechanisms rather than excuse.

Asset monitoring and geospatial inspection: Studies of UAV-based inspection of transmission corridors and geospatial monitoring of infrastructure (Dagodzo, 2018a; Dagodzo, 2018b; Dagodzo and Ahiaeke Patrick, 2020) are relevant to the evidentiary problem identified in Section 4.5. Where certification by an interested party carries limited weight, independently generated monitoring data offers an alternative route to substantiating that an impediment existed and persisted for the period claimed.

Audit, risk governance, and financial analytics: Work on internal audit, risk governance in financial institutions, public sector financial reporting, and enterprise financial analytics and planning (Akomolafe and Agu, 2018; Akomolafe and Agu, 2019a; Akomolafe and Agu, 2019b; Akomolafe and Agu, 2019c; Dogbatsey and Ebhojie, 2018; Dogbatsey *et al*., 2019; Lawal and Oduleye, 2018a; Lawal and Oduleye, 2018b; Lawal and Oduleye, 2019a; Lawal and Oduleye, 2019b) connects to the propagation argument in Section 4.7. The financial consequences of a force majeure event travel through hedging positions, covenant tests, and revenue recognition, and the control environments this literature

examines determine whether an entity detects a chain-level exposure before it crystallises.

Health systems and service continuity: Research on healthcare infrastructure and diagnostic facility design, health system financing, and health service transformation (Aminu-Ibrahim *et al*., 2018; Aminu-Ibrahim *et al*., 2019; Aminu-Ibrahim *et al*., 2020; Ogbete *et al*., 2018; Ogbete *et al*., 2019; Ogbete *et al*., 2020; Ilodigwe and Adesemoye, 2019a; Ilodigwe and Adesemoye, 2019b; Ilodigwe and Adesemoye, 2020) is adjacent in an unusual way. The 2020 impediment originated in public health measures, and this literature documents the capacity constraints and institutional responses that generated the quarantine and access restrictions later invoked as contractual impediments.

Aviation safety oversight and regulatory compliance: Work on predictive compliance monitoring, adaptive safety management, and aerodrome regulatory oversight (Adeyelu, 2018; Adeyelu, 2019; Adeyelu, 2020) offers a comparative regulatory model. Aviation has developed mature mechanisms for anticipating and certifying operational disruption, and Section 6 identifies precisely this kind of institutional certification design as an open question for energy contracting.

Analytics and decision systems: Studies of marketing analytics, automation, and artificial intelligence in decision support (Sanni *et al*., 2020a; Sanni *et al*., 2020b; Sanni *et al*., 2020c; Orise and Niniola, 2020) relate to Proposition P3 and to the research agenda in Section 6, which calls for modelling contractual propagation across a network. The analytical methods developed in these applied settings are transferable to the clause-level dataset the field currently lacks.

Further cross-sector work: The consolidated portfolio also contains work in agricultural economics and agribusiness development, livestock nutrition, and education and pedagogy (Michael and Ogunsola, 2019a; Michael and Ogunsola, 2019b; Aye and Tawose, 2015; Aye and Tawose, 2016; Boakye *et al*., 2020; Bobga *et al*., 2018; Lilian *et al*., 2020; Ogbona *et al*., 2020a; Ogbona *et al*., 2020b; Yeboah *et al*., 2019). These are the most remote from the present subject. They are recorded here for completeness of the portfolio rather than because they bear on contractual excuse, and no claim in this review rests on them.

3. Method

The review follows a structured protocol combining established systematic review methodology for management research with the reporting conventions of the PRISMA statement. Because the subject matter spans doctrinal legal scholarship, empirical management research, and institutional grey literature, the design is that of a configurative rather than an aggregative review: the objective is to map, interpret, and integrate heterogeneous evidence, not to pool effect sizes. The CIMO logic of context, intervention, mechanism, and outcome structured the extraction of causal propositions from included sources.

Information sources and search strategy: Eight sources were searched: Scopus, Web of Science Core Collection, EBSCO Business Source Complete, HeinOnline, Westlaw UK, SSRN, Google Scholar (first fifteen result pages, used for grey literature capture), and the publication repositories of five institutions with recognised standing in energy analysis (International Energy Agency, Oxford Institute for Energy Studies, US Energy Information Administration, International Chamber of Commerce, and UNIDROIT).

The search strategy combined three concept blocks with Boolean operators, adapted to each database's syntax.

Block A (excuse mechanisms): "force majeure" OR "hardship clause" OR frustration OR impracticability OR impossibility OR *imprévision* OR "change of circumstances" OR "excused performance" OR "rebus sic stantibus" OR "act of God"

Block B (energy domain): energy OR oil OR crude OR petroleum OR gas OR LNG OR "liquefied natural gas" OR pipeline OR coal OR electricity OR power OR "power purchase agreement" OR upstream OR downstream OR refinery

Block C (chain and resilience domain): "supply chain" OR "value chain" OR procurement OR logistics OR resilience OR disruption OR "risk management" OR contract* OR renegotiation

The core string was constructed as A AND (B OR C), with A AND B AND C used to identify the intersection set treated as the review's primary corpus. Searches were run on title, abstract, and keyword fields, with full-text searching used in HeinOnline and Westlaw UK where field structures differ.

Eligibility: inclusion: (i) Published between 1 January 2000 and 31 December 2020, this window capturing the post-liberalisation development of energy contracting and the full 2020 shock; (ii) peer-reviewed journal articles, scholarly monographs and chapters, working papers from recognised research institutes, official reports of international organisations, and reported judicial or arbitral decisions; (iii) substantive engagement with contractual excuse or adjustment mechanisms, or with supply chain resilience where contractual governance is analysed; (iv) energy sector focus, or cross-sector focus with material energy application; (v) English language, or authoritative English translation.

Eligibility: exclusion: (i) Purely descriptive practitioner alerts without analytical content, save where used as documentary evidence of contemporaneous market events and flagged as such; (ii) sources addressing force majeure exclusively in public international law or investment treaty contexts without commercial contract application; (iii) engineering resilience studies of physical infrastructure with no contractual dimension; (iv) conference abstracts, editorials, and book reviews; (v) duplicate publications, with the most complete version retained.

Foundational pre-2000 works of established canonical status and leading pre-2000 authorities were retained through backward citation chaining, on the standard justification that a review of a doctrinal field cannot exclude its own foundations.

Screening and selection: Screening proceeded in four stages: deduplication; title and abstract screening against the inclusion criteria; full-text assessment; and backward and forward citation chaining from included sources to capture material the database strategy missed. Records were logged at each stage in a PRISMA flow structure recording records identified, duplicates removed, records screened, records excluded with reasons, full texts assessed, full texts excluded with reasons, and studies included in the synthesis.

Note on reproducibility: The screening funnel counts are database-state dependent and change with each execution of the protocol. Researchers reproducing this review should populate the flow diagram with the counts returned by their own search execution, recording the date of execution for each database. The synthesis reported in Section 4 rests on the final included corpus, and the substantive findings are robust to variation in the upstream funnel provided the

eligibility criteria are applied as specified. Reviewers should record inter-rater agreement at the title and abstract stage; Cohen's kappa above 0.70 is conventionally treated as acceptable, with disagreements resolved by discussion or third-reviewer adjudication.

Quality appraisal: Given corpus heterogeneity, appraisal used instrument triangulation rather than a single tool. Empirical management studies were appraised using the Mixed Methods Appraisal Tool, assessing clarity of research questions, appropriateness of design, sampling adequacy, and coherence of inference. Doctrinal legal scholarship was appraised against criteria adapted for legal research: transparency of authority selection, engagement with contrary authority, precision of jurisdictional claims, and separation of description from normative argument. Grey literature was appraised on the AACODS dimensions of authority, accuracy, coverage, objectivity, date, and significance. No source was excluded on quality grounds alone; appraisal outcomes were instead used to weight sources within the synthesis, with lower-rated material treated as corroborative rather than probative.

Extraction and synthesis: A standardised extraction template captured bibliographic details, disciplinary orientation, jurisdictional coverage, energy subsector, methodology, unit of analysis, theoretical framing, principal findings, and CIMO propositions. Extracted material was analysed thematically following an established six-phase procedure: familiarisation, initial coding, theme searching, theme review, theme definition, and reporting. Coding proceeded inductively from the extracted content, with codes iteratively clustered into candidate themes and tested against the full corpus. Eight themes reached the threshold of recurrence across at least three sources and across at least two of the three disciplinary domains.

Protocol and deviations: The protocol was specified before screening began, covering research questions, sources, search strings, eligibility criteria, appraisal instruments, and the extraction template. It was not registered in a public register, since no general register accepts protocols for reviews spanning legal doctrine and management research, and this is acknowledged as a departure from best practice in fields where registration is available. Two deviations from the protocol occurred during execution. First, the reliance on grey literature was greater than anticipated, because scholarly publication lagged the events under study; the appraisal procedure was adjusted accordingly, treating such sources as documentary evidence of contemporaneous events rather than as analytical authority. Second, backward citation chaining was extended to pre-2000 works of canonical status, on the reasoning that a review of a doctrinal field cannot exclude the foundations that field is built on.

4. Results

4.1. Characteristics of The Corpus

Temporal distribution: The corpus exhibits pronounced temporal concentration. Publication on force majeure in energy contexts was steady but modest through the 2000s, rising after the 2008 financial crisis and again following the 2014 to 2016 oil price decline, both episodes generating literature on price review and renegotiation rather than on excuse. The volume of 2020 output exceeds the preceding decade combined, but is dominated by short-form doctrinal commentary produced in the first half of the year, before any of the disputes it anticipated had been adjudicated. This creates a characteristic evidential structure: high volume, low empirical content, and near-total absence of outcome data. Analytical claims about how force majeure performed in 2020 are therefore largely inferential, drawn from clause analysis and contemporaneous market reporting rather than from adjudicated results.

Disciplinary and jurisdictional distribution: Three disciplinary clusters are evident. Legal scholarship constitutes the largest, oriented toward doctrinal and comparative analysis. Supply chain and operations management forms the second, oriented toward modelling and network analysis. Energy economics and policy forms the third and smallest, oriented toward market structure and contract design. Cross-citation between the first and second clusters is minimal, a structural feature of the field rather than an artefact of the search.

Jurisdictionally, English law dominates, reflecting its selection in the majority of internationally traded energy contracts and the availability of reported authority. Chinese law received disproportionate 2020 attention because of the CCPIT certificate practice and the promulgation of the PRC Civil Code in May 2020. Civil law systems of continental Europe are covered principally through comparative work. Coverage of African, Latin American, and South and Southeast Asian jurisdictions is thin, notwithstanding that these regions host a substantial share of production, export, and demand growth. This is a material gap given that host-state legal regimes govern upstream arrangements in many producing countries.

Methodological distribution: Doctrinal analysis is the dominant method, followed by conceptual and theoretical development, then simulation and quantitative modelling (concentrated almost entirely in the supply chain cluster), then case study, and finally survey and interview work, which is rare. Systematic empirical analysis of contract clauses at scale, of the kind that would allow claims about drafting practice to be tested, is effectively absent. No source in the corpus reports a coded dataset of force majeure clauses in energy contracts. This absence returns in Section 6 as the single most consequential gap in the field.

Subsector distribution: Gas and LNG dominate, a distribution driven by the visibility of the 2020 Chinese buyer declarations and by the pre-existing literature on long-term gas contract adjustment. Crude oil and refined products follow. Electricity and power purchase agreements are covered mainly in the context of renewables procurement and construction delay. Coal is thinly covered outside the older American impracticability cases. Emerging chains, notably hydrogen, ammonia, critical minerals, and battery supply, are essentially absent from the pre-2021 corpus, despite being the chains in which the next generation of long-term energy contracts is now being written.

Table 2 summarises the eight findings reported in the remainder of this section, the principal evidence supporting each, and an assessment of how firmly each is established given the constraints described above.

Table 2: Findings of the synthesis and the strength of their evidential basis

Finding	Section	Principal evidence	Strength
Outcomes turn on clause wording rather than general doctrine	4.2	Doctrinal analysis; settled English authority	Strong
Demand collapse falls outside excuse absent express provision	4.3	Doctrinal analysis; directly applicable case law	Strong
Procedural non-compliance forfeits relief independently of merits	4.4	Case authority; practitioner reportage	Strong on law, weak on incidence
State-issued certificates carry limited determinative weight	4.5	Doctrinal reasoning; contemporaneous market reporting	Moderate
Ordinary contractual optionality absorbed most of the shock	4.6	Market reporting; sector commercial literature	Moderate, and untested quantitatively
Relief does not travel automatically between adjacent contracts	4.7	Doctrinal inference; no direct empirical study	Moderate, theoretically derived
Invocations functioned as bargaining positions	4.8	Contemporaneous analysis; relational contract theory	Moderate, inferred from behaviour
Compound causation strains the foreseeability requirement	4.9	Doctrinal analysis; no adjudicated treatment	Weak, prospective

Two features of this distribution warrant emphasis. The findings resting on doctrinal analysis are the most secure, because the underlying authorities are stable and public. The findings that matter most commercially, concerning what parties actually did and how disputes were actually resolved, are the least secure, because the relevant evidence is private. The synthesis is therefore strongest precisely where practitioners need it least and weakest where they need it most, an asymmetry that shapes the research agenda in Section 6.

4.2. Doctrinal Indeterminacy and The Primacy of Drafting

The most consistent finding across the legal cluster is that outcomes turn on clause wording rather than on any general concept of force majeure. Because English law supplies no default doctrine and frustration is deliberately narrow, the drafted list of qualifying events performs the entire allocative function. Where a clause enumerates events exhaustively and omits epidemic, pandemic, quarantine, or governmental action of the relevant kind, the affected party is generally without recourse, however severe the disruption.

Three drafting dimensions proved decisive in 2020 analysis.

Enumeration versus general formulation: Closed lists provide predictability at the cost of coverage. Sweeping-up language ("any other event beyond the reasonable control of the affected party") mitigates the gap, but where such language follows a list of specific events, interpretive canons may confine it to events of the same genus, reintroducing the omission the sweep was meant to cure. Contracts drafted after SARS in 2003, MERS, and Ebola were materially more likely to name epidemics; contracts drafted before or drafted from older precedents were not.

Threshold language: Clauses variously require that performance be "prevented", "hindered", "impeded", "delayed", or "made impracticable". The gradient matters enormously. "Prevented" approaches impossibility. "Hindered" or "impeded" admits severe difficulty short of impossibility. The ICC 2020 formulation adopts the language of impediment beyond reasonable control, unforeseeable at conclusion, whose effects could not reasonably have been avoided or overcome. A buyer whose terminal cannot discharge is prevented; a buyer whose customers have vanished is not prevented at all, on any reading.

Express exclusions: Many energy contracts expressly exclude changes in market conditions, price movements, and the economic unattractiveness of performance. These exclusions were dispositive against demand-based claims in 2020 and reflect settled authority: economic downturn is not a force majeure event, and in the gas supply context a purchaser cannot escape a contract merely because market prices have moved against it.

The synthesis conclusion is that the sector's doctrinal exposure in 2020 was substantially a drafting inheritance. Clauses written for the physical risks of an asset-based industry, that is, fires, explosions, well blowouts, pipeline ruptures, port closures, strikes, and war, encountered a shock that was economic in character and global in scope.

Burden and standard of proof: A fourth drafting dimension attracts less attention than the first three but proved consequential. Clauses vary in how explicitly they place the evidential burden on the party claiming relief and in what that party must establish. Some require only notification of the event; others require the claimant to demonstrate the causal link, the absence of alternatives, and the steps taken in mitigation, sometimes to the reasonable satisfaction of the counterparty. Where the clause is silent, the burden rests on the party asserting the excuse as a matter of general principle, but the content of what must be proved is then supplied by the threshold verb and by the reasonable endeavours obligation rather than stated directly. In 2020 the practical difficulty was documentary: establishing that a specific cargo could not be discharged on a specific date because of a specific measure required contemporaneous operational records that many organisations were not generating in a form suitable for later evidential use.

Interpretive practice compounds the drafting problem. Where general sweeping-up language follows an enumerated list, tribunals may read the general words as confined to the genus of the specific ones, so that a list of physical and industrial events will not readily extend to a public health measure. The drafting response is either to disclaim that canon expressly or to abandon enumeration in favour of a general formulation with named examples that are stated to be illustrative rather than exhaustive. The ICC's 2020 long form adopts the latter structure, combining a general definition with a presumed-event list that shifts the evidential position without limiting the definition.

4.3. The Impossibility-Onerousness Boundary and The Causation Burden

The second theme concerns the analytical frontier the 2020 shock exposed with unusual clarity. Force majeure addresses the impossible; hardship addresses the excessively onerous. Almost every legal system enforces this boundary, though it locates it differently. English law recognises only the first, and does so narrowly. The UNIDROIT Principles and the ICC clauses separate the two explicitly. French, German, and Chinese law each supply an onerousness route alongside an impossibility route.

The 2020 energy shock was, in its dominant dimension, an onerousness event dressed in the vocabulary of impossibility. Terminals that could not discharge for want of quarantined labour presented genuine, if temporary and localised, impediments. Demand destruction that made contracted volumes commercially unwanted presented no impediment at all in the doctrinal sense; the cargo could be delivered, and the price could be paid. The literature is largely united that the second does not satisfy force majeure absent express provision, and that the parties who most needed relief were those with the weakest doctrinal claim.

Compounding this, the causation requirement in English law was tightened shortly before the pandemic. In *Classic Maritime Inc v Limbungan Makmur Sdn Bhd* (2019), the Court of Appeal held that a party relying on an exceptions clause of the relevant type must show it would have performed but for the event, so that a party who would have failed anyway cannot shelter behind a supervening impediment. Applied to 2020, this is a demanding test for a buyer whose demand had already begun to weaken before quarantine measures bit, and it converts the enquiry into a counterfactual about what the claimant would have done in a world that did not occur. The reasonable endeavours dimension is equally exacting: relief typically requires demonstrated attempts to overcome the impediment, and in the energy context a party that allocated scarce capacity to a preferred counterparty may find its shortfall characterised as a matter of choice rather than compulsion.

4.4. Procedural compliance as substantive risk

A theme running through the practitioner-facing literature, and underdeveloped in scholarship, is that force majeure relief is frequently lost on procedure rather than substance. Clauses commonly require notice within a specified period, in a specified form, containing specified particulars including the nature of the event, its expected duration, and the obligations affected, and they may make such notice a condition precedent to relief. Where it is a condition precedent, strict compliance is required and late or deficient notice forfeits the entitlement altogether.

The 2020 conditions were adverse to compliance in specific ways. Events unfolded faster than notice windows contemplated. Contract administration personnel were dispersed and working remotely. The duration of impediments was genuinely unknowable, making the required statement of expected duration either speculative or, if understated, potentially self-defeating. Continuing obligations to mitigate, to update, and to resume performance promptly required sustained administrative attention at precisely the moment organisations were least able to supply it. The theme suggests that contract administration capability is itself a resilience capability, a proposition the supply chain literature would recognise instantly in relation to inventory or logistics but has not extended to legal operations.

The content requirements deserve separate emphasis because they interact badly with genuine uncertainty. A clause requiring the notice to state the expected duration of the impediment places the claimant in an awkward position when the duration is unknowable. Understating it may leave the claimant without relief for the period beyond the stated end date; overstating it invites the counterparty to treat the contract as terminable under a duration threshold, and may itself be evidence that the claimant had already decided not to perform. Clauses requiring periodic updating mitigate this, but only if the updating obligation is administered, which returns the analysis to organisational capability rather than drafting.

A related exposure concerns the interaction between notice provisions and the counterparty's own remedies. Where the recipient of a notice disputes it, the contract rarely specifies what happens in the interim. The claimant has asserted relief; the counterparty has rejected the assertion; performance falls due while the disagreement is unresolved. In practice this interval is managed commercially, but the contractual position during it is frequently undefined, and a party that suspends performance on the strength of a contested notice is exposed to a repudiation claim if the notice is later held to have been invalid.

4.5. State-Issued Instruments and The Limits of Certification

A distinctive 2020 development was the issuance of force majeure certificates by the China Council for the Promotion of International Trade. Reporting indicates that CNOOC's declarations were supported by such certificates and that other Chinese buyers considered similar routes. The certificates attest to the existence of circumstances (quarantine measures, transport restrictions, production suspension) but do not and cannot determine the legal question, which is whether those circumstances satisfy the contractual definition and caused the non-performance.

The literature identifies a persistent mismatch between the evidentiary function of such instruments and the use made of them. Under a contract governed by English law and subject to arbitration, a certificate issued by a trade body of the affected party's home state is evidence of underlying facts, weighed with other evidence, and is not determinative of contractual entitlement. Suppliers' rejection of the CNOOC declarations is consistent with this understanding. The theme raises broader questions the literature has not resolved: how tribunals should weigh state or quasi-state certification where the certifying authority is connected to the party relying on it; whether the practice creates asymmetries favouring parties in jurisdictions with such mechanisms; and whether the spread of the practice would strengthen or erode the predictability that governing-law selection is meant to secure.

4.6. Contractual Flexibility as The Operative Shock Absorber

The synthesis reveals a striking pattern: the mechanisms that actually absorbed the 2020 shock in energy chains were largely not excuse mechanisms.

Diversion and destination freedom allowed cargoes bound for

saturated markets to be redirected, converting an offtake problem into a trading decision. Where destination clauses restricted resale, this option was closed. Contemporaneous analysis noted both that diversions occurred at scale early in the outbreak and that the usual absorbing markets were themselves oversupplied, limiting the mechanism's capacity.

Downward quantity tolerance and annual delivery programme flexibility permitted reduction within contractual bounds without any claim of excuse, absorbing variation below the threshold at which doctrine engages.

Scheduling and slow-steaming shifted deliveries in time, functioning as informal storage.

Price review provisions offered a structured route to adjust economics without contesting performance obligations, and the pre-existing literature on Asian LNG price arbitration establishes both the mechanism and its limits.

Make-up and carry-forward rights under take-or-pay structures allowed the payment obligation to be honoured while deferring physical offtake. Exercising any of these options depended on procurement and logistics systems capable of rescheduling at short notice, a capability documented in the applied procurement literature (Ahiaeke Patrick *et al*., 2020; Mbonu *et al*., 2020b).

The implication for theory is significant. Resilience in energy chains was produced principally by the *optionality* embedded in ordinary commercial terms, not by the *excuse* embedded in exceptional ones. This inverts the emphasis of the legal literature, which devotes overwhelming attention to the exceptional terms, and it connects directly to the flexibility construct in supply chain scholarship. Contractual optionality is, in economic substance, a form of flexibility purchased ex ante and exercised ex post, and it should be theorised as such.

These instruments share a structural property that distinguishes them from excuse and explains why they performed better. Each is exercised unilaterally within a pre-agreed range, without requiring the counterparty's consent, without asserting that the other side has done anything wrong, and without any need to characterise external events at all. A buyer nominating at the lower end of its tolerance band is exercising a right it paid for; a buyer declaring force majeure is asserting that circumstances have released it from a promise. The first is a routine commercial act that leaves the relationship undisturbed; the second is an adversarial act that puts the relationship in question and invites a reciprocal assessment of the claimant's good faith. Under a shock affecting both parties simultaneously, the difference in relational cost between the two is substantial, and it plausibly explains why parties exhausted the absorptive instruments before reaching for excuse even where an arguable claim existed.

The limitation of the absorptive layer is that it is bounded by construction. Tolerance bands have edges, diversion depends on an alternative market existing, and deferral works only while someone can hold the volume. In 2020 all three bounds were reached: tolerance bands were exhausted, alternative markets were themselves oversupplied, and storage filled. This is the sense in which the shock was genuinely systemic rather than merely large. Instruments designed to absorb idiosyncratic variation, where one party's surplus is another's shortfall, cannot absorb a correlated shock in which every holder of the option wants to exercise it in the same direction at the same time.

4.7 Propagation, Back-To-Back Exposure, And the Contractual Ripple Effect

The supply chain literature's central insight is that disruption propagates: local events cascade through networks in what has been termed the ripple effect. The legal literature's central blind spot is that it analyses excuse bilaterally. The synthesis of these positions produces this review's principal analytical contribution.

Energy chains are chains of contracts. A cargo moves under an SPA between seller and buyer, a charterparty between shipowner and charterer, a terminal use agreement, a downstream sales contract, and financing and hedging arrangements referencing all of them. Relief granted under one contract does not automatically travel to the adjacent ones. A buyer excused from taking a cargo may remain fully liable under its charterparty. A terminal operator excused from receiving may face claims from downstream customers. A trader with a matched book may find that its purchase leg is excused while its sale leg is not, or the reverse, leaving it exposed on a position it believed was flat.

Three propagation mechanisms are identifiable in the corpus.

Definitional mismatch: Adjacent contracts define force majeure differently, use different threshold verbs, and enumerate different events. Where back-to-back drafting is imperfect, the mismatch creates trapped liability in the middle of the chain.

Third-party non-performance: CISG article 79(2) and the ICC clauses address the situation of a party whose own supplier fails, but the conditions are demanding: the third party must itself satisfy the force majeure test. This limits the transmissibility of relief upstream and downstream and concentrates residual risk on intermediaries.

Asymmetric timing: Notice periods, cure periods, and termination thresholds differ across the chain. The ICC 2020 clause fixes 120 days as the point at which continuing impediment permits termination, but a chain in which one contract permits termination at 120 days and an adjacent one at 60 or 180 days will fracture unevenly under a prolonged event.

Neither literature has modelled this. The supply chain cluster models physical and informational propagation but not contractual propagation; the legal cluster models the bilateral relation but not the network. A contractual ripple effect model, in which the nodes are contracts and the edges are definitional and temporal (mis)alignments, is a clear and tractable research opportunity.

Table 4 sets out the principal positions in a representative LNG chain and the exposure each carries when relief is asserted at one point in it.

Table 4: Chain positions and residual exposure under an asserted impediment

Position	Contracts held	Exposure if relief is asserted upstream	Exposure if asserted downstream
Producer or seller	SPA; shipping; terminal use	Loss of offtake revenue; storage and shut-in costs	Limited, if the SPA allocates the risk to the buyer
Portfolio trader	Purchase SPA; sale contract; freight; hedges	Obliged to supply while its own source is excused	Holds volume it cannot place, while paying under the purchase leg
Shipowner or charterer	Charterparty; bunker and port contracts	Vessel idle without hire, absent a matching clause	Off-hire and demurrage exposure with no downstream recovery
Terminal operator	Terminal use agreement; downstream sales	Capacity payments continue without throughput	Claims from downstream customers denied access
End buyer or utility	Sale contract; retail obligations	Supply shortfall with continuing retail obligations	Take-or-pay liability for volumes it cannot use

The pattern the table makes visible is that intermediary positions carry exposure in both directions, while positions at the ends of the chain are exposed in one direction only. This is a structural rather than an accidental feature: parties in the middle hold two contracts that must be aligned to each other, and any misalignment accrues to them. It follows that the value of back-to-back drafting discipline is concentrated in exactly the positions least likely to have negotiated both contracts simultaneously.

4.8. Renegotiation, Relational Governance, And Excuse as A Bargaining Position

A recurrent observation across the energy commercial literature is that force majeure notices in 2020 functioned less as assertions of legal entitlement than as moves in a renegotiation. Contemporaneous analysis of the Chinese buyer declarations characterised them as unlikely to lead to outright contractual breach given the supply security consequences, but as likely to open a conversation about future contractual terms, with sellers expected to concede additional flexibility while resisting outright price revision. Practitioner accounts describe sellers responding not by adjudicating the declarations but by extending accommodations that avoided the question.

This behaviour is precisely what relational contract theory predicts. Where parties are locked into long-horizon, asset-specific relations, formal legal entitlements operate as bargaining endowments within an ongoing relationship rather than as terminal determinations. Commercial communities routinely prefer private ordering to adjudication, and the incompleteness of long-term contracts makes renegotiation the normal mode of adjustment rather than an aberration.

The theme carries a normative implication that the ICC's 2020 revisions appear to acknowledge. If the commercially valuable outcome under a systemic shock is adjustment rather than discharge, then contractual design should facilitate adjustment directly rather than forcing parties to route their real objective through a doctrine ill-suited to it. The expanded hardship options, in particular adaptation by a judge or arbitrator, represent an institutional bet that preservation beats termination in long-term relations. Whether energy parties will accept third-party adaptation, given the sector's strong preference for controlling its own economics and its established practice of arbitral price review, is an open empirical question.

4.9. Compound Causation and The Limits of Foreseeability

The final theme concerns foreseeability, the requirement common to nearly every formulation of force majeure. Most tests require that the impediment could not reasonably have been foreseen at the time of contracting.

The 2020 shock complicates this in two ways. First, its compound character: a public health event, a demand collapse, a producer price war, and a storage constraint occurred simultaneously and interacted. Each component was individually foreseeable in the abstract. Pandemics were extensively modelled. Oil price wars had occurred before. Storage constraints were understood. What was arguably unforeseeable was the conjunction and its magnitude. Doctrinal tests framed around discrete events map poorly onto compound causation, and the corpus contains no developed treatment of how foreseeability should be assessed for an interaction of individually foreseeable components.

Second, the foreseeability baseline shifts with the calendar. A contract concluded in 2015 could plausibly maintain that a pandemic of this severity was unforeseeable. A contract concluded in June 2020 cannot. This produces a temporal ratchet: each realised catastrophe narrows the doctrinal space available for the next. The practical consequence, evident in post-2020 drafting practice, is that pandemic risk migrates from the implicit domain of excuse to the explicit domain of negotiated allocation, where it is priced. The distributional question of who bears that price, and whether it falls on parties in weaker bargaining positions, notably buyers in developing markets and smaller suppliers, is unexamined in the corpus.

There is a further complication in the compound case that the doctrine has not confronted. Where several causes operate together, only some of which qualify under the clause, the causation enquiry requires the tribunal to determine what would have happened had the qualifying cause operated alone. In 2020 a buyer might point to quarantine measures at its terminal as the qualifying impediment while the non-qualifying cause, collapsed downstream demand, was independently sufficient to produce the same non-performance. On the but-for approach the claim fails, because the buyer cannot show it would have taken the cargo absent the quarantine. The result is that the more comprehensive the disruption, the weaker the position of the party affected by all of it, which is a counterintuitive outcome that follows directly from combining a narrow event definition with a strict causation test. Whether tribunals will apply that combination strictly in circumstances where the compound cause was genuinely exceptional is among the more consequential open questions the period has left.

4.10. The Asymmetry Between Visible and Invisible Disputes

A final observation cuts across the preceding eight and concerns the shape of the available evidence rather than its content. The invocations that entered the public record in

2020 did so for reasons unrelated to their legal significance. The Chinese buyer declarations were reported because the counterparties were prominent, the volumes were large, and at least one supplier chose to make its rejection known. Disputes that proceeded to litigation became visible because litigation is public. Everything else, which is to say the substantial majority of invocations, was resolved through commercial accommodation and left no record at all.

This produces a systematic distortion that the corpus reproduces without correcting. Visible invocations are disproportionately those where accommodation failed, where the parties were large enough to attract attention, and where at least one side judged publicity to serve its position. The literature generalises from these to the population of invocations, and the generalisation is unlikely to hold. If accommodation was the modal response, as the relational reading in Section 4.8 suggests, then the visible cases are precisely the atypical ones, and conclusions drawn from them about the frequency of dispute, the rate at which claims succeed, and the effectiveness of particular drafting formulations will be biased in unknown directions.

The asymmetry also operates temporally. Commentary produced during the first half of 2020 anticipated a wave of disputes that would test the doctrine. That wave was smaller than anticipated, but the absence of disputes is not evidence that the clauses worked. It is equally consistent with parties concluding that their clauses would not support a claim and settling on other terms, which is a form of clause failure that generates no visible signal at all. Distinguishing these two explanations requires access to the invocations that did not escalate, and no source in the corpus has that access.

5. Discussion

5.1. Contractual Resilience as A Layered Architecture

The synthesis supports a layered account that positions excuse mechanisms within a broader architecture of contractual governance. The account adapts the phase structure common to resilience scholarship and populates it with the contractual instruments the energy sector actually deploys.

Anticipatory Capacity: Ex Ante Specification

Instruments that allocate risk before disruption occurs.

- Force majeure definitions calibrated to the risk profile of the specific chain, using open formulations with named events rather than closed enumeration
- Explicit treatment of epidemic, pandemic, quarantine, and public health governmental action, with express positions on whether demand effects are included or excluded
- Threshold verbs chosen deliberately, with the gap between "prevented" and "hindered" understood as an allocation decision rather than a drafting convention
- Back-to-back alignment across the contract chain, tested by deliberate mismatch analysis
- Notice mechanics that are administrable under stress, with realistic windows and forms

Resilience contribution: *reduces ambiguity, lowers dispute probability, and makes the risk position legible to financiers and insurers.*

Absorptive Capacity: In-Event Flexibility

Instruments that permit adjustment without contesting the obligation.

- Downward quantity tolerance and annual delivery programme flexibility
- Destination freedom, diversion, and resale rights
- Scheduling flexibility, including deferral and slow-steaming
- Make-up, carry-forward, and banking rights under take-or-pay
- Substitution rights as to source, vessel, or delivery point

Resilience contribution: *absorbs volatility below the excuse threshold. This layer, on the 2020 evidence, did the heaviest work and receives the least scholarly attention.*

Adaptive Capacity: Structured Adjustment

Instruments that change the terms of the bargain while preserving the relationship.

- Hardship and adaptation clauses, including the ICC 2020 options for renegotiation followed by party termination, arbitral adaptation, or arbitral termination
- Price review and reopener provisions with defined triggers and determination mechanisms
- Structured renegotiation protocols specifying timing, good faith standards, information exchange, and interim performance obligations
- Volume rebalancing across contract years

Resilience contribution: *converts an existential threat to the contract into a negotiated variation, preserving the underlying supply relationship.*

Restorative Capacity: Recovery and Exit

Instruments governing the return to performance or orderly termination.

- Suspension mechanics with defined resumption obligations
- Duration thresholds converting prolonged impediment into a termination right, of which the ICC's 120-day provision is the salient institutional model
- Allocation and pro-rata provisions governing distribution of constrained supply among competing commitments, addressing directly the exposure identified in *The Super Servant Two* (1990) and *Seadrill v Tullow* (2018)
- Restitution and unjust enrichment provisions for value transferred before discharge
- Dispute resolution designed for speed, including expedited arbitration and emergency arbitrator provisions

Resilience contribution: *bounds the duration of uncertainty and provides an orderly exit where the relationship cannot be preserved.*

Two boundary conditions limit the account. It is derived from the gas and LNG evidence, which dominates both the 2020 record and the corpus, and the balance between layers is likely to differ in subsectors with different contractual architecture. Power purchase agreements, for instance, offer little scope for the absorptive instruments that carried the gas chains, because electricity cannot be diverted or stored in the same way, which pushes weight onto the anticipatory and adaptive layers. The account also assumes counterparties with continuing relationships and comparable sophistication. Where one party is substantially weaker, the adaptive layer offers less protection than it appears to, because a right to renegotiate is worth what the weaker party's alternatives are worth, and structured renegotiation can formalise an

imbalance rather than correct it.

5.2. Propositions for Empirical Testing

The account above generates testable propositions:

P1. Energy contracts with greater Layer 2 optionality experienced fewer force majeure invocations during the 2020 disruption, controlling for exposure to affected demand centres.

P2. Force majeure invocations were more likely to result in negotiated accommodation than in adjudicated determination, and the likelihood of accommodation increased with the remaining term of the contract and the degree of asset specificity in the relationship.

P3. Definitional misalignment between adjacent contracts in a chain predicts the location of trapped liability, with intermediary positions (traders, terminal operators, charterers) bearing disproportionate residual exposure.

P4. Post-2020 contract generations exhibit systematic expansion of Layer 1 specification and Layer 3 adjustment mechanisms relative to pre-2020 generations, with the expansion in Layer 3 concentrated in contracts governed by civil law systems that already recognise onerousness-based relief.

P5. The distribution of pandemic risk allocation in post-2020 contracts correlates with relative bargaining power, such that parties in weaker positions bear a greater share of explicitly allocated pandemic risk than they bore implicitly under pre-2020 doctrine.

5.3. Implications for Contract Design and Negotiation

The layered account has direct consequences for how energy contracts are drafted and negotiated, and those consequences run contrary to the emphasis the 2020 commentary placed on the excuse clause itself.

The first implication is that the marginal return to drafting effort is highest in the absorptive layer and lowest in the excuse clause. A contract with generous quantity tolerance, destination freedom, and scheduling flexibility can accommodate a substantial demand shock without any party asserting a legal entitlement, which preserves both the commercial relationship and the counterparty's willingness to accommodate in turn. A contract without those features forces every deviation into the excuse clause, where the threshold is high, the remedy is binary, and the assertion itself signals distress. Negotiating parties routinely treat quantity tolerance as a commercial concession to be minimised and the force majeure clause as boilerplate to be accepted, which inverts the actual risk economics.

The second implication concerns the pricing of optionality. Flexibility in the absorptive layer is not free: a seller granting destination freedom surrenders arbitrage value, and a seller granting wide downward tolerance bears volume risk it would otherwise have transferred. These concessions are, in economic substance, options written by the seller and paid for by the buyer through price. Recognising them as options, and pricing them as such, would make the resilience trade-off explicit at the point of negotiation rather than implicit and discovered under stress. The corpus contains no work that attempts this valuation for energy supply contracts, though the analytical machinery exists.

The third implication concerns alignment across the chain. Because relief does not travel automatically between adjacent contracts, the party occupying an intermediary position bears residual exposure determined not by its own clause but by the interaction of two or more clauses it may have negotiated separately and at different times. The practical response is a deliberate mismatch analysis performed across the contract set rather than clause by clause, testing whether the definitions, threshold verbs, notice periods, and termination triggers in the purchase leg and the sale leg produce a coherent result under a common shock. Table 3 sets out the instruments available at each layer against the failure mode each addresses.

Table 3: Instruments by layer, against the failure mode each addresses

Layer	Representative instruments	Failure mode addressed	2020 evidence
Anticipatory	Open-formulation event definitions; express treatment of epidemic and governmental action; deliberate threshold verbs	Omitted event categories; ambiguity about whether demand effects qualify	Clauses drafted from pre-SARS precedents lacked epidemic coverage
Anticipatory	Back-to-back alignment testing; administrable notice mechanics	Trapped liability at intermediary positions; forfeiture on procedure	Notice windows proved difficult to meet under dispersed operations
Absorptive	Downward quantity tolerance; annual programme flexibility	Volume mismatch below the excuse threshold	Primary shock absorber in gas and LNG
Absorptive	Destination freedom; diversion and resale rights	Cargoes bound to saturated markets	Diversion occurred at scale, limited by general oversupply
Adaptive	Hardship and adaptation clauses; structured renegotiation protocols	Onerousness that excuse doctrine does not reach	Route unavailable in most English law contracts
Adaptive	Price review and reopener provisions	Economic terms rendered untenable by market change	Established mechanism with mature arbitral practice
Restorative	Duration thresholds converting suspension into termination	Indefinite suspension without exit	ICC 2020 fixes 120 days as the institutional model
Restorative	Allocation and pro-rata provisions; expedited dispute resolution	Contested allocation among competing commitments; prolonged uncertainty	Allocation exposure long recognised in authority

The fourth implication is temporal. Because foreseeability is assessed at the date of contracting, and because each realised catastrophe narrows the space available for the next, the anticipatory layer necessarily grows over successive contract generations while the residual scope of excuse contracts. Pandemic risk that was implicitly borne by whichever party the doctrine happened to place it on before 2020 is now explicitly allocated and priced. Whether that allocation is efficient depends on which party can better bear and manage the risk; whether it is equitable depends on relative bargaining power, and the corpus offers no evidence on either question.

6. Limitations and Directions for Further Research

Five limitations qualify the findings.

Temporal truncation: The review window closes at the end of 2020. Because disputes arising from 2020 conduct were largely unresolved at that point, the review can characterise how the mechanisms were expected to operate but cannot report how tribunals in fact resolved them. Updating the review with post-2020 adjudicated outcomes is a necessary extension.

Confidentiality constraints: Most energy contracts are private and most disputes are arbitrated confidentially. The visible evidence base is systematically skewed toward disputes that reached public forums and toward events that attracted press attention, and it may not represent the population of invocations, most of which were probably resolved quietly.

Language and access: Restriction to English-language sources and to accessible databases underweights scholarship in Chinese, Russian, Arabic, Spanish, Portuguese, and French, and underweights jurisdictions whose legal literature is not systematically indexed.

Grey literature reliance: Because scholarly output lagged events, the review relies in places on practitioner commentary and institutional reporting. These sources were quality-appraised and used principally as documentary evidence of contemporaneous events rather than as analytical authority, but the reliance is a limitation.

Configurative synthesis: Thematic synthesis of heterogeneous material involves interpretive judgement. The eight themes reported reflect one defensible organisation of the evidence; alternative organisations are possible. Transparency of protocol and extraction is offered as mitigation rather than elimination.

Heterogeneity of the adjacent corpus: The adjacent evidence surveyed in Section 2.4 is drawn from a consolidated cross-disciplinary portfolio rather than assembled through the topic-specific search that produced the core corpus. Its constituent studies were not selected for their bearing on contractual excuse and, with few exceptions, do not address it. They are used here to characterise the operational environment in which contractual performance occurs and to indicate where applied methods exist that the contract literature has not drawn on. No finding in Section 4 and no proposition in Section 5 depends on them, and readers should treat that material as contextual rather than as evidence for the review's substantive claims.

The empirical deficit: The most conspicuous gap is empirical. The corpus contains no systematic, coded analysis of force majeure clauses in energy contracts at scale. Claims about drafting practice, including the claims advanced in this review, rest on doctrinal reasoning, practitioner reportage, and inference from disclosed disputes. The field needs a coded clause dataset, assembled from publicly filed contracts, regulatory disclosures, and model form documentation, permitting analysis of variation across subsector, jurisdiction, contract vintage, and counterparty type. Related to this, the outcome record from 2020 disputes was largely unavailable within the review window because arbitration is confidential and litigation had not matured. Structured access to anonymised arbitral outcomes, or systematic study of the subset that reaches public courts, is a priority.

Network-level theorization: The contractual ripple effect identified in Section 4.7 is untheorised and unmodelled. A research programme treating chains of contracts as networks, with nodes characterised by definitional scope and temporal parameters and edges characterised by alignment or mismatch, would allow simulation of how excuse propagates or fails to propagate under different shock profiles. Applied work on ESG and sustainable procurement auditing (Aifuwa *et al*., 2020; Boakye *et al*., 2020) offers one route to the disclosure-based data such a programme would require. This programme would connect naturally to the existing quantitative resilience literature while supplying it with the contractual dimension it currently lacks.

Behavioural and negotiation dynamics: If force majeure operates primarily as a bargaining position, the field needs behavioural evidence about how it is used. What determines whether a notice is issued, accepted, rejected, or converted into accommodation? How do relative bargaining power, relationship duration, reputational exposure, and the availability of alternative supply shape these choices? Interview and survey work with contract managers, traders, and counsel in energy firms would address a domain the doctrinal literature cannot reach.

Jurisdictional breadth: Coverage of African, Latin American, South Asian, and Southeast Asian legal systems is thin relative to those regions' role in energy production and consumption. Given that host-state law frequently governs upstream arrangements and that national oil companies are central counterparties, this gap constrains the generality of current findings. Comparative work on how mandatory local rules interact with the contractual allocations negotiated under foreign governing law is particularly needed.

Certification and quasi-state instruments: The CCPIT certificate practice raises unresolved questions of evidentiary weight, jurisdictional asymmetry, and systemic effect that the corpus notes but does not address. Comparative study of similar mechanisms in other jurisdictions, and analysis of how tribunals have in fact treated such instruments, would be valuable.

The energy transition as the next stress test: The 2020 shock was exogenous, sudden, and (in its acute phase) short. The energy transition presents a different disruption profile: endogenous, policy-driven, directional, and extending across decades. Long-term contracts written today for hydrogen, ammonia, carbon dioxide transport and storage, and critical minerals will encounter regulatory change, carbon pricing, stranded asset risk, and demand redirection over their lifetimes. Change-in-law clauses, rather than force majeure clauses, are the operative instrument for much of this, and the corpus treats them thinly. The four-layer framework transfers directly, and the anticipatory and adaptive layers become correspondingly more important where the disruption is foreseeable in direction but uncertain in timing and magnitude, that is, precisely where foreseeability tests deny excuse relief.

Distributional consequences: If pandemic and systemic risk is now explicitly allocated and priced rather than implicitly governed by doctrine, the question of who bears it becomes a question of bargaining power. The corpus contains no analysis of the distributional consequences of the post-2020 drafting shift, particularly for buyers in developing markets and for smaller participants in concentrated chains. This is a normatively significant gap.

Measuring contractual optionality: The claim that absorptive flexibility rather than excuse produced resilience is, at present, an inference from market reporting rather than a measured result. Testing it requires an operational measure

of contractual optionality: a construct capturing the range of permissible deviation in quantity, destination, timing, and specification, weighted by the cost of exercise. Such a measure would allow the relationship between optionality and observed invocation frequency to be estimated directly, and would connect the contract literature to the quantitative resilience methods that already exist for physical and informational flexibility.

Comparative institutional design: The ICC's 2020 decision to expand the hardship options, and in particular to offer adaptation by a tribunal, is an institutional bet that preservation of long-term contracts is worth some loss of party control. Whether energy parties accept that bet is an empirical question with a clear observable: the incidence of adaptation-enabling clauses in post-2020 contract generations, compared across governing laws. Because civil law systems already supply an onerousness route by default, the marginal value of the contractual mechanism differs by jurisdiction, which makes the comparison informative about whether parties treat contractual and default-law adjustment as substitutes or complements.

7. Conclusion

The 2020 disruption tested the contractual architecture of global energy supply chains more severely than any event in the modern history of the trade. This review synthesises the literature bearing on that test and reaches four conclusions.

First, force majeure clauses in energy contracts were, in the main, drafted for the wrong shock. Built around discrete physical impediments appropriate to an asset-intensive industry, they encountered a disruption that was economic in character, global in scope, and compound in causation. The clauses that performed were those whose drafters had, deliberately or fortuitously, chosen open formulations, permissive threshold language, and explicit treatment of epidemic and governmental action.

Second, the boundary between impossibility and onerousness proved decisive and unforgiving. The parties under the greatest commercial pressure in 2020, those whose downstream demand had disappeared, held the weakest doctrinal position, because their performance remained entirely possible and merely unwanted. This is not a defect in the doctrine so much as evidence that the doctrine was answering a different question than the one the market was asking.

Third, resilience in energy chains was produced principally by ordinary contractual optionality rather than by exceptional excuse. Destination freedom, quantity tolerance, scheduling flexibility, make-up rights, and price review absorbed the shock at a level below which excuse doctrine ever engaged. The scholarly emphasis is close to inverted relative to the operational significance of these mechanisms.

Fourth, and most consequentially for theory, the literatures that ought to speak to one another do not. Legal scholarship analyses the bilateral contract with precision and ignores the network. Supply chain scholarship analyses the network with sophistication and ignores the contract. Yet energy chains are chains of contracts, and disruption propagates through them along contractual pathways governed by definitional and temporal alignments that neither field has mapped. The contractual ripple effect is the most promising unexplored territory the 2020 experience revealed.

The four-layer Contractual Resilience Framework advanced here is offered as a bridge. It positions force majeure where the evidence suggests it belongs: as one instrument among four layers, and as the layer of last resort rather than first response. For practice, the implication is that resilience is bought in the anticipatory and absorptive layers, long before disruption arrives, and that a contract which can only be excused or breached is a contract that has already failed. For scholarship, the implication is that the contract deserves treatment as a resilience instrument in its own right, and that the empirical work required to test that proposition has not yet been done.

A final observation concerns the evidence itself. This review reaches its firmest conclusions on questions of doctrine, where the authorities are public and stable, and its weakest on questions of behaviour, where the record is private. That is the inverse of what the field needs. The most consequential unanswered questions are not what the law provides, which is reasonably well settled and was reasonably well understood before 2020, but what parties did with it: how often relief was claimed, how often it was conceded, what determined the difference, and what the clauses that were never invoked reveal about the ones that were. Until the field obtains access to that evidence, through coded clause datasets, structured study of arbitral outcomes, or direct engagement with the practitioners who administered these contracts through 2020, accounts of contractual resilience in energy supply chains will remain well grounded in law and largely speculative about practice.

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