PLURALISTIC RECONCILIATION OR RELATIVE POLITICIZATION: EMERGING ENERGY SECURITY THROUGH QUANTIZING GEOECONOMICS

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ABSTRACT

This article reconciles the "old" and "new" for energy security conceptualization and jurisprudence, which requires a shift in ontology and perception of international trade law that could be provided by quantizing geoeconomics. It provides a critical discussion on the incompatibilities surrounding energy security to provide context for investigating the traditional normative underpinnings of energy security jurisprudence. It follows a holistic case study on provisions invoked for energy security objectives, revealing significant deficiencies in the energy security practice of international trade law. The study proposes the open-realism, quantum-based, and diverse-sympathetic theoretical framework of quantizing geoeconomics to acknowledge the convergence of energy security probabilities in a geoeconomic holography, thereby addressing practical problems in interpretation and application. It further breaks jurisprudence binaries, achieving pluralistic reconciliation between energy security and economic liberalization.

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In an era of transition, this article presents a novel, systematic study of energy security dynamics through a multidisciplinary framework.

KEYWORDS: *energy security, clean energy transition, quantizing geoeconomics, quantum theories, security protection, economic liberalization, international economic law*

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I. INTRODUCTION

The spikes and volatility of energy prices in the aftermath of Russia's invasion of Ukraine, particularly for natural gas in European markets and fossil fuels globally, highlight the inherent vulnerabilities of the current energy system and the significance of energy security for the economy.[1] Nearly all countries responded proactively to the collision of the COVID pandemic and energy security crisis.[2] China, for instance, announced the

[1] *World Energy Outlook 2022*, INT'L ENERGY AGENCY 181 (2022), https://iea.blob.core.windows.net/assets/830fe099-5530-48f2-a7c1-11f35d510983/WorldEnergyOutlook2022.pdf.

[2] For discussions of trade-related implications of the pandemic, see generally Bryan Mercurio & Pratyush Nath Upreti, *From Necessity to Flexibility: A Reflection on the Negotiations for a TRIPS*

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14th Five-Year Plan for a Modern Energy System in March 2022, which calls for measures to simultaneously promote energy supply security and clean energy transitions, while emphasizing the central importance of energy security, and framing it as a component of national security.[3] This rise in political concern over energy security has been accompanied by a closer scrutiny of the existing trade architecture and its traditional normative underpinnings, concentrating both on whether the multilateral trading system imbues the resilience to address novel security challenges and whether the jurisprudence has provided sufficient legal tools for trade measures with energy protection objectives.[4]

Central to the scrutiny is the incompatibility between what is conceived as "old" and "new".[5] The multilateral trading system is designed with, at most, the traditional conception of energy security, which does not explicitly cover the new energy security paradigm that emphasizes the convergence of short- and long-term energy security in the clean energy transition and is not clear on what it means to consider energy as a security issue.[6] Moreover, panel decisions made in a neoliberal order, in which deeper economic integration was seen as contributing to mitigating conflicts, are suspected of being off-balance for energy security disputes in the geoeconomic order, in which economic interdependence is regarded as a security risk.[7] In the most

Waiver for Covid-19 Vaccines and Treatments, 21(5) WORLD TRADE REV. 633 (2022); Chad P. Bown, *The WTO and Vaccine Supply Chain Resilience During a Pandemic*, 26(2) J. INT'L ECO. L. 343 (2023).

[3] Shi Si Wu Xian Dai Neng Yuan Ti Xi Gui Hua ("十四五"现代能源体系规划) [*14th Five Year Plan for a Modern Energy System*], NAT'L DEV. & REFORM COMM'N OF PRC (2022), https://www.ndrc.gov.cn/xxgk/zcfb/ghwb/202203/P020220322582066837126.pdf.

[4] *See generally* Vitaliy Pogoretskyy & Kim Talus, *The WTO Panel Report in EU-Energy Package and Its Implications for the EU's Gas Market and Energy Security*, 19(4) WORLD TRADE REV. 531 (2020); Anna-Alexandra Marhold, *Unpacking the Concept of 'Energy Security': Lessons from Recent WTO Case Law*, 48 LEGAL ISSUES ECON. INTEGRATION 147 (2021); Henok Asmelash, *The First Ten Years of WTO Jurisprudence on Renewable Energy Support Measures: Has the Dust Settled Yet?*, 21(4) WORLD TRADE REV. 455 (2022); Yuanyuan Zhang, *Tensions Between International Economic Law and the EU Energy Security Regulations During the Securitization of EU-Russian Gas Relations: Way Forward?*, 57(3) J. WORLD TRADE 433 (2023).

[5] For similar discussions on the outdated conventional understanding of trade agreements, see *generally* Kathleen Claussen, *Next-Generation Agreements and the WTO*, 21(3) WORLD TRADE REV. 380 (2022).

[6] *See* JONNA NYMAN, THE ENERGY SECURITY PARADOX: RETHINKING ENERGY (IN)SECURITY IN THE UNITED STATES AND CHINA 2-3 (2018).

[7] *See* Anthea Roberts et al., *Toward a Geoeconomic Order in International Trade and Investment*, 22(4) J. INT'L ECON. L. 655, 676 (2019); Harlan Grant Cohen, *Nations and Markets*, 23(4) J. INT'L ECON. L. 793, 815 (2020); Zhang, *supra* note 4, at 435. *See also* Patrick Low, *The WTO in Crisis: Closing the Gap between Conversation and Action or Shutting Down the Conversation?*, 21(3) WORLD TRADE REV. 274, 287 (2022). It is also analyzed as a strong judicial institution (such as the WTO Appellate Body) in a weak political system (the consensus-based WTO ministerial conferences and General Council); *see* William J. Davey, *WTO Dispute Settlement: Crown Jewel or Costume Jewelry?*, 21(3) WORLD TRADE REV. 291, 299 (2022).

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fundamental sense, the combination of the material transition from a fossil fuel energy system to a clean energy one, on the one hand, and the paradigm shift from neoliberalism to geoeconomics, on the other, has frustrated the renewed discussion on the reconciliation between (energy) security protection and economic liberalization. Consequently, whether the emerging energy security paradigm amid the clean energy transition in a geoeconomic order represents the negative politicization or pluralistic reconciliation between energy security and economic liberalization in international economic law remains unclear.

In response to this question, this article undertakes a holistic case analysis with critical international legal studies through the theoretical framework of "quantizing geoeconomics". Quantizing geoeconomics is a multidisciplinary framework designed to conceptualize geoeconomics in economic-security dynamics in international economic law.[8] It follows three courses of quantum international relations (quantum IR): the analogical course that uses quantum theories as mere metaphors (Course I), the ontological course that adopts quantum theories as ontologies (Course II), and the quantizing post-critique course that employs quantum theories as critically analytical methods (Course III).[9] It analyses geoeconomics on the premise of a holographic ontology with features of the probabilities of wave functions, as evidenced by the practices of China and the US under cooperative and competitive geoeconomics.[10] It is applied later to elucidate the theoretical relevance of extrapolating a quantum worldview in international economic law by constructing an ideal-typical taxonomy on the dualistic classification of cybersecurity scholarship, and further proposes approaches for pluralistic reconciliation.[11]

Despite the novel establishment and application of quantizing geoeconomics, the framework has been criticized for two reasons. First, the geoeconomic narrative lacks applicability to humanity's shared challenges, such as environmental protection and energy security. It is believed that there is no clear evolution from neoliberalism to geoeconomics, but rather different perspectives on rising security vulnerabilities caused by economic interdependence that may suggest a shifting hierarchy of objectives.[12] Consequently, while geoeconomics is cognizant of the relative economic

[8] *See generally* Xinyue Li, *Quantizing Geoeconomics: Emerging Geoeconomics in International Economic Law Through a Quantum Worldview*, 17(1) ASIAN J. WTO & INT'L HEALTH L. & POL'Y 5 (2022).
[9] *See id.* at 16.
[10] *See generally id.*
[11] *See generally* Xinyue Li, *A Parallel Narrative: Pluralistic Reconciliation Through Quantizing Geoeconomics in (Cyber)security Governance in International Economic Law*, 18(1) ASIAN J. WTO & INT'L HEALTH L. & POL'Y 89 (2023).
[12] *See* ANTHEA ROBERTS & NICOLAS LAMP, SIX FACES OF GLOBALIZATION: WHO WINS, WHO LOSES, AND WHY IT MATTERS 10-11 (2021).

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power of states and possesses the capacity to undergird political power in international economic law, it undervalues the common resolution to achieve governance coordination on core matters and is thus flawed for addressing novel challenges in international law. Second, it appears that quantizing geoeconomics does not generate normative benefits and practical contributions for international legal practice. The theoretical framework is too abstract because it relies on exotic theories, derivational logic, and multidisciplinary methodology to construct a classical problem in a way that is far from its day-to-day practice. Therefore, the proposed pluralistic reconciliation may not be a healthy "pluralism", but rather a mindless 'relativism' in an interpretative narrative that is unremunerative for solving actual security disputes. In response to these critiques, this article evaluates the normative payoffs and practical implications of quantizing geoeconomics by using quantum theories to critically analyze the conception and jurisprudence of energy security in international trade regimes.

In other words, this article seeks to reconcile the "old" and "new" for the conceptualization and jurisprudence of energy security, which necessitates a shift in ontology and perception of the international economic law that could be provided by quantizing geoeconomics for the innovative development of appropriate governance frameworks. Section II critically discusses two incompatibilities surrounding energy security: the inability of the traditional energy security to combine short- and long-term energy security amid the clean energy transition, and the inability of both the national security-centered approach and the continuum of energy security to account for energy security dynamics in an indetermined geoeconomic order. Section III holistically investigates energy security jurisprudence, demonstrating the practice of potential legal provisions for energy security objectives and significant deficiencies which cannot be addressed by improving exception clauses within the international trade legal framework. Considering the emergence of the new energy security paradigm covered by international economic rules, the rise of geoeconomic approaches to economic-security norm creation, and the steady disintegration of traditional binaries, such as those between legalism (hard law) and realism (soft rules), Section IV proposes the adoption of the open-realism, quantum-based, and diverse-sympathetic theoretical framework of quantizing geoeconomics to recognize the convergence of energy security probabilities (targeting Incompatibility I) in the geoeconomic holography (addressing Incompatibility II), remedying practical deficiencies examined in Section III. It follows a better understanding through quantizing geoeconomics on jurisprudence binaries, particularly between legalism and realism, by favoring an inclusive legal ideology for pluralistic reconciling that seems irreconcilable under conventional scholarship and perceptions. Finally, it presents the primary

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normative payoff and practical implications of the pluralistic reconciliation through quantizing geoeconomics, which is the rejection of the coherent program for the world order and the establishment of a novel given code in the sense of a universalized legal ideology for international law scholars and practitioners to innovatively comprehend the new energy security dynamics amid the clean energy transition in a geoeconomic order. Section V concludes by discussing the limitations and outlining the road ahead.

II. THE "OLD" AND THE "NEW" SURROUNDING ENERGY SECURITY

The current debates on conceptualizing energy security in international trade law revolve around two incompatibilities. First, the conventional definition of energy security excludes the new energy security paradigm in the midst of the clean energy transition. Second, the irreconciliation between the common national security-centered approach to energy security (namely the negative energy security), which results in the energy security paradox, and the continuum of energy security, which incorporates both negative and positive energy security but is arguably vulnerable in the geoeconomic order. Understanding the contesting stances between what is constructed as "old" and "new" is imperative to exploring how change could occur, and how quantizing geoeconomics fits the tasks.

A. Incompatibility I: From Traditional Energy Security Towards New Energy Security Paradigm

Despite the significance of energy security in international relations (IR) and international law, neither an international or regional consensus nor a legally binding definition of energy security exists.[13] As it rose to prominence during the 1970s oil crises, the frequent starting point of classical energy security studies is the two "A"s of energy security, namely availability and affordability,[14] which remain at the core of the International Energy Agency's (IEA) definition—that energy security is "the

[13] *See* ANNA-ALEXANDRA MARHOLD, ENERGY IN INTERNATIONAL TRADE LAW: CONCEPTS, REGULATION AND CHANGING MARKETS 243 (2021); Marhold, *supra* note 4, at 148. *See also* DANIEL YERGIN, THE QUEST: ENERGY, SECURITY AND THE REMAKING OF THE MODERN WORLD 266 (2012); *International Energy Security: Common Concept for Energy Producing, Consuming and Transit Countries*, ENERGY CHARTER SECRETARIAT (2015), https://www.energycharter.org/what-we-do/trade-and-transit/trade-and-transit-thematic-reports/international-energy-security-common-concept-for-energ y-producing-consuming-and-transit-countries-2015/.

[14] *See* David A. Deese, *Energy: Economics, Politics, and Security*, 4(3) INT'L SEC. 140, 140 (1979); Meghan L. O'Sullivan, *The Entanglement of Energy, Grand Strategy, and International Security*, *in* THE HANDBOOK OF GLOBAL ENERGY POLICY 30, 31 (Andreas Goldthau eds., 2022); Juliann Emmons Allison & Kathleen J. Hancock, *The Politics of Energy in a Changing Climate: An Introduction*, *in* THE OXFORD HANDBOOK OF ENERGY POLITICS 2, 4 (Juliann Emmons Allison & Kathleen J. Hancock eds., 2020).

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uninterrupted availability of energy sources at an affordable price".[15] Building upon the two "A"s, multiple components constituting an energy security index have been extensively discussed in the literature since 2010, including the adequacy of capacity as the "absolute dimension" and sustainability as the "relative dimension";[16] the metrics of technology development and efficiency; environmental sustainability, regulation, and governance;[17] and the combination of multidisciplinary indicators.[18] These components are acknowledged by the UN's definition of energy supply security (a more specific term), which is characterized as "the continuous availability of energy in varied forms, in sufficient quantities, and at reasonable prices".[19] Therefore, international organizations and scholars have generally agreed that the essence of energy security is the resilience of energy markets against volatility in two dimensions: the short-term energy security safeguarded by adequate reactions to sudden supply and demand changes, which tackles the demand side and prioritizes energy efficiency; and the long-term energy security ensured by making timely energy investments to achieve sustainable development, which targets the synchronization of scaling up a range of clean energy technologies with scaling back fossil fuels.[20] These two dimensions—which, a decade ago, were criticized as "a tenuous link" that would only result in sluggishness, if not utter paralysis, in energy security decision-making and dispute settlement[21]—have been recently recognized as the "security-sustainability nexus" in the clean energy transition,[22] underlining the new energy security paradigm in striving for net zero.

While the short- and long-term dimensions contribute to the conceptualization of traditional energy security, which was once considered

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[15] *Emergency Response and Energy Security: Ensuring the Uninterrupted Availability of Energy Sources at an Affordable Price*, INT'L ENERGY AGENCY, https://www.iea.org/areas-of-work/energy-security (last visited Mar. 10, 2024).

[16] *See* Lynne Chester, *Conceptualising Energy Security and Making Explicit its Polysemic Nature*, 38 ENERGY POL'Y 887, 891 (2010).

[17] *See generally* Benjamin K. Sovacool & Ishani Mukherjee, *Conceptualizing and Measuring Energy Security: A Synthesized Approach*, 36(8) ENERGY 5343 (2011); Benjamin K. Sovacool, *An International Assessment of Energy Security Performance*, 88 ECOLOGICAL ECON. 148 (2013).

[18] *See generally* André Månsson et al., *Assessing Energy Security: An Overview of Commonly Used Methodologies*, 73 ENERGY 1 (2014).

[19] U.N. DEV. PROGRAMME, WORLD ENERGY ASSESSMENT: ENERGY AND THE CHALLENGE OF SUSTAINABILITY 113 (2000).

[20] *See World Energy Outlook 2022*, *supra* note 1, at 183; MARHOLD, *supra* note 13, at 243; *Securing Clean Energy Technology Supply Chains*, INT'L ENERGY AGENCY 9-10 (2022), https://iea.blob.core.windows.net/assets/0fe16228-521a-43d9-8da6-bbf08cc9f2b4/SecuringCleanEnergyTechnologySupplyChains.pdf.

[21] *See* Gal Luft et al., *Energy Security and Climate Change: A Tenuous Link*, *in* THE ROUTLEDGE HANDBOOK OF ENERGY SECURITY 43, 45 (Benjamin K. Sovacool ed., 2010).

[22] *See generally* Thea Riofrancos, *The Security–Sustainability Nexus: Lithium Onshoring in the Global North*, 23(1) GLOB. ENV'T POL. 20 (2023).

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"impractical to universally define" as it is both "inherently slippery"[23] and "polysemic in nature",[24] their internal nexus tends to be underestimated, subject to the conventional perception of a linear process system for fossil fuels.[25] The existing energy sector is a series of interconnected, but largely independent, delivery channels, and "energy" is commonly used as an abstraction for the unidirectional energy system, which involves extracting natural resources or raw materials; trading fossil fuels, such as crude petroleum and natural gas; transforming fuels to generate electricity and heat; and delivering the resultant products to users.[26] The linear process system generates linear analytical approaches or resolutions.[27] The short-term energy security, for instance, transforms into actionable problems within nations, and policies are designed on that basis; yet that gives rise to further conundrums for the long-term energy security, and the search for solutions to those new problems may be detrimental to what has been accomplished.[28] Thus, the traditional conception of energy security presents a binary divergence between the short-term and long-term objectives, preventing the incorporation of the new energy security paradigm into international policies and law. One primary obstacle, among others, is the lack of understanding of the material foundation—the process system[29]—in the clean energy transition, which is shifting from a linear to nonlinear structure. In the Net Zero Emission by 2050 Scenario, the IEA predicts that the unidirectional energy system will be supplanted by an intricate web of interactions, where the large premium on flexibility enabled by digital science and technologies will become a central component of system reliability.[30] Therefore, the new energy security paradigm necessitates a comprehension of the multi-directional energy flow across a complex, digital, and ubiquitous interdependent system, where the convergence of short- and long-term energy security is of preeminent importance (see Figure 1).

[23] ROLAND DANNREUTHER, ENERGY SECURITY 10 (2017).
[24] Chester, *supra* note 16, at 893.
[25] *See* NYMAN, *supra* note 6, at 22.
[26] *See* MARHOLD, *supra* note 13, at 7-8.
[27] *See* Chester, *supra* note 16, at 893.
[28] *See generally* Robert Goodin et al., *The Public and its Policies*, *in* THE OXFORD HANDBOOK OF PUBLIC POLICY 3 (Robert Goodin et al. eds., 2006).
[29] *See* Månsson et al., *supra* note 18, at 11.
[30] *See World Energy Outlook 2021*, INT'L ENERGY AGENCY 250-51 (Figure 6.2) (2021), https://iea.blob.core.windows.net/assets/4ed140c1-c3f3-4fd9-acae-789a4e14a23c/WorldEnergyOutlook2021.pdf. For discussions on the interaction between science and technologies and international economic law, see BRYAN MERCURIO & KUEI-JUNG NI, SCIENCE AND TECHNOLOGY IN INTERNATIONAL ECONOMIC LAW: BALANCING COMPETING INTERESTS 1-4 (2013); SHIN-YI PENG ET AL., GOVERNING SCIENCE AND TECHNOLOGY UNDER THE INTERNATIONAL ECONOMIC ORDER: REGULATORY DIVERGENCE AND CONVERGENCE IN THE AGE OF MEGAREGIONALS 3-11 (2018).

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FIGURE 1: From Traditional Energy Security to a New Energy Security Paradigm



- Material Foundation: A linear system, emphasis on fossil fuels
- Analytical Approaches and Solutions: binary
- Divergence between short-term and long-term energy security, focuses on keeping the supply-demand balance.

- Material Foundation: A nonlinear system, emphasis on clean energy
- Analytical Approaches and Solutions: interactive, interdependent, holistic
- Convergence between short-term and long-term energy security, focuses on addressing the "security-sustainability nexus".

B. Incompatibility II: From the National Security-Centered Approach Towards the Continuum of Energy Security and More

Besides the incompatibility between the traditional energy security and new energy security paradigm, whose resolution requires a convergence between the dichotomous conceptions of short- and long-term energy security, another crucial debate surrounds what it means to understand energy as a security issue. This debate essentially concerns how energy is understood as a security issue, specifically addressing questions such as (1) "security for whom?", (2) "security through which theory", and (3) "security from what threats?",[31] and the consequences of these understandings. Scholarly literature and policy discourse have developed two distinct approaches towards understanding the interplay between energy and security, depending on whether the term should emphasize national energy security concerns about country-specific energy portfolios or international energy security caused by the global reliance on energy resources:[32] namely

[31] *See* Aleh Cherp & Jessica Jewell, *The Concept of Energy Security: Beyond the Four As*, 75 ENERGY POL'Y 415, 415 (2014).
[32] *See* Scott Victor Valentine, *The Fuzzy Nature of Energy Security*, *in* THE ROUTLEDGE HANDBOOK OF ENERGY SECURITY 56, 58-59 (Benjamin K. Sovacool ed., 2010); Luft et al., *supra* note 21, at 45.

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the national security-centered approach and the continuum of energy security (see Figure 2).

FIGURE 2: From the National Security-Centered Approach to the Continuum of Energy Security



	The National Security-Centered Approach	The Continuum of Energy Security
(1) Security for whom?	• State actors	• State and non-state actors
(2) Security through which theory?	• The Copenhagen School of Securitization • Geopolitics under realism	• Anthropocene and security through a critical approach
(3) Security from what threats?	• Threats on national autonomy and domestic market posed by foreign energy dependencies. (Short-term energy security)	• Threats posed by unstable ecosystem and insecure human beings. (Long-term energy security)
(4) Frequently used frames	• Negative energy security: ○ Energy securitization ○ Energy diplomacy & energy weapons	• A continuum of negative and positive energy security: ○ Energy governance

The national security-centered approach, which incorporates energy security into states' national security agendas based on securitization or geopolitical thinking, has been traditionally regarded as mainstream by IR and security studies.[33] The Copenhagen School of securitization has had a profound influence on the national security-centered approach to energy.[34]

[33] *See* NYMAN, *supra* note 6, at 22.
[34] *See id.* at 26; BARRY BUZAN ET AL., SECURITY: A NEW FRAMEWORK FOR ANALYSIS 23-24, 71-93 (1998).

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They argue that labelling an issue under "security" is an act that effectively moves it from the realm of regular politics and to that of security where emergence measures are enabled, and hence, cases of state actors' existential threats that legitimize the violation of rules constitute "securitization".[35] As securitization can be understood as either the extreme version of politicization or the opposition to politicization—"a failure to deal with issues as normal politics"[36]—it is seen to have inevitable negative effects,[37] often associated with militarization, threat-defense thinking, and weaponization of strategic goods (such as energy). Therefore, while anti-security scholars criticize the Copenhagen School of securitization for being overly reliant on problematic neoliberal state practices,[38] their value rests on the emphasis of negative energy security which serves states' short-term energy security objectives.

How state actors utilize their energy instruments to shape the international environment and advance national security goals is further discussed by scholars who argue in favor of the "geopolitics of energy" through the realist approach.[39] Energy security can be a strategic objective in itself, referred to as "energy diplomacy",[40] or the means to achieve other strategic objectives, referred to as "energy weapons".[41] In the former scenario, states use their power to give their energy companies a competitive edge to enhance access to markets and secure energy supply, and promote energy diversification or other strategic approaches to make use of all available resources.[42] In the latter scenario, energy resources and infrastructure dependencies are used as economic and political strategies in pursuit of foreign policy objectives—strategic goods presented by "soft power with a hard edge".[43] In extreme circumstances, these strategies may evolve into "weapons", as evidenced by Russia's weaponization of energy

[35] *See* BUZAN ET AL. *supra* note 34, at 23-25; AURORA GANZ, FUELLING INSECURITY: ENERGY SECURITIZATION IN AZERBAIJAN 36 (2022).
[36] *See* BUZAN ET AL. *supra* note 34, 29.
[37] *See* Ole Wæver, *Politics, Security, Theory*, 42 SEC. DIALOGUE 465, 469 (2011).
[38] *See generally* MARK NEOCLEOUS, CRITIQUE OF SECURITY (2008).
[39] Meghan L. O'Sullivan, *The Entanglement of Energy, Grand Strategy, and International Security*, *in* THE HANDBOOK OF GLOBAL ENERGY POLICY 30, 31 (Andreas Goldthau ed., 2013).
[40] *See generally* Anna Herranz-Surrallés, *An Emerging EU Energy Diplomacy? Discursive Shifts, Enduring Practices*, 23(9) J. EUR. PUB. POL'Y 1386 (2016); Steven Griffiths, *Energy Diplomacy in a Time of Energy Transition*, 26 ENERGY STRATEGY REV. 1 (2019).
[41] *See generally* Anatole Boute, *Weaponizing Energy: Energy, Trade, and Investment Law in the New Geopolitical Reality*, 116(4) AM. J. INT'L L. 740 (2022).
[42] *See* Zhang, *supra* note 4, at 437.
[43] *See* Andreas Goldthau & Nick Sitter, *Soft Power with a Hard Edge: EU Policy Tools and Energy Security*, 22(5) REV. INT'L POL. ECON. 941, 943-44 (2015). *See generally* HONG ZHAO, CHINA AND ASEAN: ENERGY SECURITY, COOPERATION AND COMPETITION (2015); REM KORTEWEG, ENERGY AS A TOOL OF FOREIGN POLICY OF AUTHORITARIAN STATES, IN PARTICULAR RUSSIA (2018); MARGARITA M. BALMACEDA, POLITICS OF ENERGY DEPENDENCY: UKRAINE, BELARUS, AND LITHUANIA BETWEEN DOMESTIC OLIGARCHS AND RUSSIAN PRESSURE (2018).

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dependencies in February 2022 which is criticized as a radical departure from the liberal energy regime embodied in the Energy Charter Treaty (hereinafter "ECT") and WTO multilateral trading system, two representative instruments of international economic law.[44] Therefore, the national security-centered approach equates energy security with ensuring states have a continuous supply of affordable energy, regardless of the cost of others. While this approach may mitigate the threat posed by foreign energy dependencies, it enables zero-sum competition between states over energy, increases tensions between states, and encourages continued consumption of fossil fuels, ultimately making states, the environment, and human beings less secure—hence, resulting in the "energy security paradox".[45]

The continuum of energy security, which takes the complex interdependent realities of the Anthropocene and the entangled realities of (in)security as the theoretical foundation, is proposed to address the energy security paradox.[46] The Anthropocene and security theories are both adopted through a critical approach, where emphasis is placed on the current phase in history when natural and human forces have become intertwined, with inseparable (in)securities.[47] Energy security is, thereby, not about national autonomy or a stable free market, but about a stable ecosystem and secure human beings.[48] Instead of viewing negative and positive energy security in binary terms, and arguing for a complete shift from one to another, usually drawing upon the Copenhagen School, the continuum of energy security regards energy security practices as evolutionary, encouraging works towards more positive practices—in other words, long-term, sustainable security for all entangled beings and the worlds on which they depend.[49] Some scholars take the continuum stance through the lens of liberalism, referring to their approach as "energy governance", and highlighting regional and international interdependence and the mutual gains actors can obtain from energy trade and cooperation.[50] Thus, energy is separated from national

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[44] *See* Boute, *supra* note 41, at 741; Zhang, *supra* note 4, at 434-35. For a historical analysis on the development of Russian foreign policy since the end of the Cold War, see JEFFREY MANKOFF, RUSSIAN FOREIGN POLICY: THE RETURN OF GREAT POWER POLITICS 279 (2d ed., 2011).

[45] *See* NYMAN, *supra* note 6, at 2-3.

[46] *See id*. at 4-5.

[47] *See generally* Will Steffen et al., *The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature*, 36(8) AMBIO 614 (2007); Jan Zalasiewicz et al., *The New World of the Anthropocene*, 44 ENV'T SCI. & TECH. 2228 (2010).

[48] *See* NYMAN, *supra* note 6, at 138.

[49] *See id*. at 140-41.

[50] Charles Ebinger & Govinda Avasarala, *The "Gs" and the Future of Energy Governance in a Multipolar World*, *in* THE HANDBOOK OF GLOBAL ENERGY POLICY, *supra* note 39 , 190, 190 (2013). *See generally* Wenhua Shan & Peng Wang, *The International Legal Framework for Belt and Road Energy Cooperation: Progress and Prospect*, 20(2) J. WORLD INV. & TRADE 259 (2019); Kaho Yu, *Energy Cooperation Under the Belt and Road Initiative: Implications for Global Energy Governance*, 20(2-3) J. WORLD INV. & TRADE 243 (2019).

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political and security objectives, and incorporated into international governance structures with both state and non-state actors.[51] The goal is to achieve two priorities of global governance—generating long-term benefits (especially in combating energy poverty) and reducing insecurities (particularly in the clean energy transition)—by developing common rules, standards, forums for dialogues, and dispute settlement mechanisms.[52] Whereas the continuum of energy security contributes to the conceptualization of energy security as a multidimensional and evolving concept that has no intrinsic positive or negative nature, it fails to take into account the new geoeconomic order and its implications for economic-security issues. Therefore, the field requires a theoretical framework that clarifies what it means to understand energy as a security issue in a geoeconomic order, or in other words, a better understanding of what goes on under the *façade* of energy security rule-application or policy-implementation.[53]

III. ENERGY SECURITY JURISPRUDENCE IN INTERNATIONAL TRADE LAW

Thus far I have discussed the two sets of incompatibilities between the "old" and "new" conceptions of energy in security. The first set relates to the inability of the traditional understanding of energy security to incorporate the convergence of short- and long-term energy security in the clean energy transition. The second relates to the inability of both the national security-centered approach and continuum of energy security to holistically comprehend energy as a security issue in an emerging geoeconomic order. These incompatibilities are among the new shifts in economic policy that bring into question (some) traditional understandings of international trade law, and challenge the diverse normative foundations of the energy security practice of international trade law.[54]

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[51] *See* Florian Baumann, *Europe's Way to Energy Security: The Outer Dimension of Energy Security: From Power Politics to Energy Governance*, 15(1) EUR. FOREIGN AFFS. REV. 77, 91 (2010); Gilles Carbonnier & Fritz Brugger, *The Development Nexus of Global Energy*, *in* THE HANDBOOK OF GLOBAL ENERGY POLICY, *supra* note 39, 64, 75.

[52] *See* THIJS VAN DE GRAAF ET AL., GLOBAL ENERGY GOVERNANCE IN A MULTIPOLAR WORLD 40-49 (2016); VOLKER ROEBEN, TOWARDS A EUROPEAN ENERGY UNION: EUROPEAN ENERGY STRATEGY IN INTERNATIONAL LAW 245-48 (2018).

[53] For the significance of theory building for energy dynamics, see Kathleen J. Hancock et al., *The Politics of Energy Regionalism*, *in* THE OXFORD HANDBOOK OF ENERGY POLITICS 172, 186-87 (Kathleen J. Hancock & Juliann Emmons Allison eds., 2018); Martti Koskenniemi, *What Is Critical Research in International Law? Celebrating Structuralism*, 29(3) LEIDEN J. INT'L L. 727, 730 (2016).

[54] *See* Andrea K. Bjorklund & Gabrielle Marceau, *New (Paradigms in) International Economic Law*, 26(1) J. INT'L ECON. L. 3, 3 (2023).

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Practitioners and scholars of international trade law have recognized that the political and economic dimensions of energy security make it more vulnerable to a slippery slope of protectionism than other security issues.[55] Considering its strategic preponderance as a security issue, energy security is commonly viewed as an emerging aspect of national security, and consequently, a prospective sub-provision of (general or essential security) exceptions.[56] Subjecting energy security to the general usage of exception clauses in trade agreements means imposing a "holistic" process of "weighing and balancing" between the sovereign right of energy security protection against trade liberalization,[57] and that its successful invocation would justify member states' trade-restrictive measures.[58] Moreover, embedded with broader aims in a green economy concept,[59] energy sector-targeted policies can be readily devised with environmental objectives and protectionist results.[60] For instance, the WTO Trade Policy Review Body reviews two types of trade-restrictive measures with objectives of "improving the security of energy supply, completing the internal energy market, boosting energy efficiency, and decarbonizing the economy", including broad trade incentives (such as tariff exemptions) and specific instruments to support the clean energy transition (such as subsidies, local content requirements, research and development support, corporate income

[55] *See* Zhang, *supra* note 4, at 436-38.

[56] *See* Tatiana Lacerda Prazeres, *Trade and National Security: Rising Risks for the WTO*, 19(1) WORLD TRADE REV. 137, 143 (2020); J. Benton Heath, *The New National Security Challenge to the Economic Order*, 129 YALE L.J. 1020, 1042, 1082 (2020); Oliver Hailes, *Lithium in International Law: Trade, Investment, and the Pursuit of Supply Chain Justice*, 25(1) J. INT'L ECON. L. 148, 164 (2022).

[57] Appellate Body Report, *European Communities — Measures Prohibiting the Importation and Marketing of Seal Products*, 5.169, 5.214-.215, WTO Doc. WT/DS400/AB/R, WT/DS401/AB/R (adopted June 18, 2014) [hereinafter *EC — Seal Products* Appellate Body Report]. *See also* Daria Boklan & Amrita Bahri, *The First WTO's Ruling on National Security Exception: Balancing Interests or Opening Pandora's Box?*, 19(1) WORLD TRADE REV. 123, 123 (2020).

[58] *See* Mark Wu & James Salzman, *The Next Generation of Trade and Environment Conflicts: The Rise of Green Industrial Policy*, 108(2) NW. U.L. REV. 401, 405 (2014); Tania Voon, *Can International Trade Law Recover? The Security Exception in WTO Law: Entering a New Era*, 113 AJIL UNBOUND 45, 49 (2019); J. Benton Heath, *Trade and Security Among the Ruins*, 30(2) DUKE J. COMPAR. & INT'L L. 223, 239-43 (2020); Wolfgang Weiß, *Adjudicating Security Exceptions in WTO Law: Methodical and Procedural Preliminaries*, 54(6) J. WORLD TRADE 829, 849, 852 (2020); Pramila Crivelli & Mona Pinchis-Paulsen, *Separating the Political from the Economic: The* Russia–Traffic in Transit *Panel Report*, 20(4) WORLD TRADE REV. 582, 592 (2021).

[59] *See generally Practitioner's Guide to Strategic Green Industrial Policy*, P'SHIP ACTION ON GREEN ECON. (2016), https://www.unido.org/sites/default/files/2016-11/practitioners_guide_to_green_industrial_policy_1__0.pdf; *Green Industrial Policy and Trade: A Tool-Box*, P'SHIP ACTION ON GREEN ECON. (2017), https://www.un-page.org/files/public/green_industrial_and_tr ade_policy_a_tool-box.pdf; Ann Harrison et al., *Green Industrial Policy in Emerging Markets*, 9 ANN. REV. RES. ECON. 253 (2017).

[60] *See* Wu & Salzman, *supra* note 58, at 405-06; Mandy Meng Fang, *Old Wine in a New Bottle? Green Industrial Policy and the Use of Safeguards in the Solar Sector*, 55(4) J. WORLD TRADE 573, 576 (2021).

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tax, and employment-related policies).[61] Scholars observe that both categories are adopted to create more favorable conditions for the expansion of domestic clean energy industries and their share in the global energy economy, with some instruments amounting to trade barriers established under "renewable energy protectionism".[62] They may trigger disputes as they are susceptible to being inconsistent with WTO rules unless falling within exceptions, such as the General Agreement on Tariffs and Trade (hereinafter "GATT") Article XX, or limitations of the scope of an obligation provided by trade agreements,[63] for example, the derogation from national treatment under GATT Article III:8 for "government procurement . . . not with a view to commercial resale"[64] and limitation for general elimination of quantitative restriction under GATT article XI:2(a) which is "temporarily applied to prevent or relieve critical shortage of . . . products essential to the exporting contracting party".[65] Therefore, energy security inevitably becomes regulated by international economic law and is at the heart of the next generation of international security-economic disputes in the age of geoeconomics.

The issue is how energy security can be invoked in trade disputes as a legalized justification for trade restrictions. A steady rise in disputes concerning energy trade, accompanied by the emerging concept of energy

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[61] Comm. on Trade & Env't, *Environmental Database for 2020 - Note by the Secretariat*, at 10, WTO Doc. WT/CTE/EDB/20 (Jan. 28, 2022).

[62] *See* Joanna I. Lewis, *The Rise of Renewable Energy Protectionism: Emerging Trade Conflicts and Implications for Low Carbon Development*, 14(4) GLOB. ENV'T POL. 10, 11 (2014); Joanna I. Lewis, *Green Industrial Policy After Paris: Renewable Energy Policy Measures and Climate Goals*, 21(4) GLOB. ENV'T POL. 42, 43 (2021). For a detailed discussion on what makes specific instruments for clean energy transition (such as the renewable energy subsides) vulnerable to legal disputes as compared to fossil fuel subsidies, see generally Aaron Cosbey & Petros C. Mavroidis, *A Turquoise Mess: Green Subsidies, Blue Industrial Policy and Renewable Energy: The Case for Redrafting the Subsidies Agreement of the WTO*, 17(1) J. INT'L ECON. L. 11 (2014); Henok Birhanu Asmelash, *Energy Subsidies and WTO Dispute Settlement: Why Only Renewable Energy Subsidies Are Challenged*, 18(2) J. INT'L ECON. L. 261 (2015); Ilaria Espa & Gracia Marín Durán, *Renewable Energy Subsidies and WTO Law: Time to Rethink the Case for Reform Beyond Canada: Renewable Energy/Fit Program*, 21(3) J. INT'L ECON. L. 621 (2018).

[63] General Agreement on Tariffs and Trade, Oct. 30, 1947, 61 Stat. A11, 55 U.N.T.S. 194 [hereinafter GATT]. The WTO Appellate Body distinguished between "exceptions" and "limitation of the scope of an obligation", see Appellate Body Report, *China — Measures Related to the Exportation of Various Raw Materials*, ¶ 334, WTO Doc. WT/DS394/AB/R, WT/DS395/AB/R, WT/DS398/AB/R (adopted Feb. 22, 2012) [hereinafter *China — Raw Materials* Appellate Body Report].

[64] Appellate Body Report, *Canada — Certain Measures Affecting the Renewable Energy Generation Sector (Canada — Renewable Energy)*, WTO Doc. WT/DS412/AB/R (adopted May 24, 2013); Appellate Body Report, *Canada — Measures Relating to the Feed-in Tariff Program (Canada — Feed-In Tariff Program)*, WTO Doc. WT/DS426/AB/R (adopted May 24, 2013); Appellate Body Report, *India — Certain Measures Relating to Solar Cells and Solar Modules*, WTO Doc. WT/DS456/AB/R (adopted Oct. 14, 2016) [hereinafter *India — Solar Cells* Appellate Body Report].

[65] *China — Raw Materials* Appellate Body Report, *supra* note 63.

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security,[66] makes it possible to investigate existing WTO jurisprudence and answer three questions. First, how did member states employ energy security to justify trade-restrictive measures? Second, how did panels and the Appellate Body (hereinafter "AB") interact with justifications for trade restrictions on the ground of energy security? Third, what are the deficiencies of the energy security jurisprudence provided by the WTO Dispute Settlement Body (hereinafter "DSB")?

A. Direct Accommodation of Short-Term Energy Security Under GATT Article XX(j)

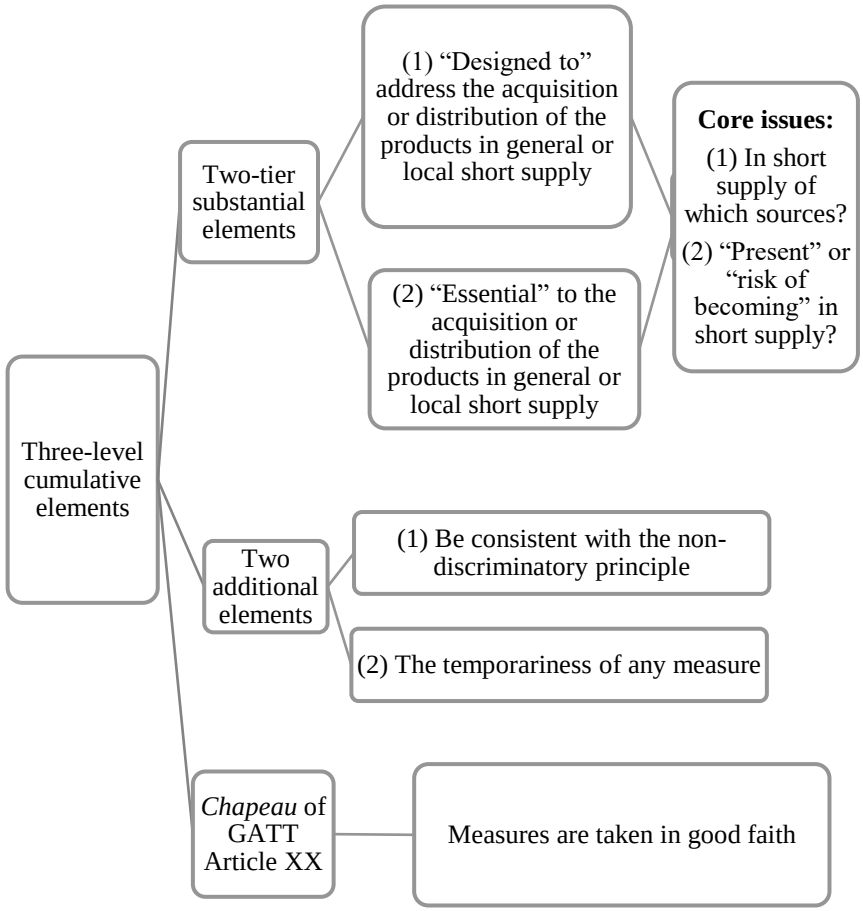
If states seek to justify trade-restrictive measures on the grounds of short-term energy security, specifically the broadening of domestic industries, they may adopt GATT Article XX(j) for measures "essential to the acquisition or distribution of products in general or local short supply". The AB in *India — Solar Cells* and the panel in *EU — Energy Package* established the three-level cumulative elements that parties must satisfy to justify a challenged measure under Article XX(j), as shown in Figure 3, with "products in general or local short supply" at the interpretative center for substantial elements.[67]

[66] *See* Marhold, *supra* note 4, at 147-48.

[67] *India — Solar Cells* Appellate Body Report, *supra* note 64, ¶¶ 5.55-.71; Panel Report, *European Union and Its Member States — Certain Measures Relating to the Energy Sector*, ¶¶ 7.247-.248, WTO Doc. WT/DS476/R (under appeal Sept. 21, 2018) [hereinafter *EU — Energy Package* Panel Report].

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FIGURE 3: Three-Level Cumulative Elements for GATT Article XX(j)



Two points were made: the first concerns the question of "products in short supply from which sources", and the second concerns whether Article XX(j) covers products "at risk of becoming" in short supply. The AB in *India — Solar Cells* rejected India's argument that, in pursuit of "energy security and ecologically sustainable growth", domestic manufacturing capacity and resilience for solar cells were "essential for the acquisition or distribution of products in general or local short supply" under Article XX(j),[68] holding that

[68] *India — Solar Cells* Appellate Body Report, *supra* note 64, ¶¶ 5.78-.83.

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an objective evaluation and balance of different considerations must be demonstrated to establish "supply from all sources" is insufficient.[69] The balance of different considerations shall include *inter alia* the reliability of local and transnational supply chains, the level of economic development of the relevant member, and a holistic consideration of the supply-demand relation's evolvement.[70] These criteria, observed later in the *EU — Energy Package*,[71] reflect the short-term energy security that is safeguarded by adequate reactions to sudden supply and demand changes.

The panel in *India — Solar Cells* further dismissed India's position that Article XX(j) could be applied to preventive measures for products "at risk of becoming in short supply",[72] finding that the ordinary meaning of "products in short supply" means that the products are "presently in short supply".[73] Assuming for the sake of argument, the panel noted only "imminent risks" of a shortage—a clearly foreseen harm that is on the very verge of occurring—could be potentially covered.[74] Interestingly, the argument based on "imminent risks of becoming" was directly rejected in the *EU — Energy Package* when the panel was confronted with a long-lasting geopolitical conflict between the EU and Russia.[75] The EU specifically appealed the "erroneous legal interpretation" of the term "in short supply",[76] yet the AB is unable to review appeals given its ongoing vacancies.[77]

The two points for the interpretation of Article XX(j) reflect the direct accommodation of short-term energy security on the one hand, and the incapacity to extend to long-term energy security on the other. While it could be argued that there is a plausible connection between the objectives of Article XX(j) and the long-term energy security, by the fact that the panel once conceded that "imminent risks" of shortage could be potentially covered, trade-restrictive measures relevant to long-term energy security are

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[69] *Id.* ¶¶ 5.70-.72, 5.89, 6.4; Panel Report, *India — Certain Measures Relating to Solar Cells and Solar Modules*, at ¶ 7.199, WTO Doc. WT/DS456/R (adopted Oct. 14, 2016) [hereinafter *India — Solar Cells* Panel Report]; WTO, *WTO Analytical Index: GATT 1994 - Article XX (Jurisprudence)*, 68-69 (Jan. 23, 2023).

[70] *India — Solar Cells* Appellate Body Report, *supra* note 64, ¶¶ 5.70-.72, 5.89, 6.4.

[71] *EU — Energy Package* Panel Report, *supra* note 67, ¶¶ 7.1333-.1334.

[72] *India — Solar Cells* Panel Report, *supra* note 69, ¶ 7.248.

[73] *Id.* ¶¶ 7.243-.245.

[74] *Id.* ¶ 7.264.

[75] *EU — Energy Package* Panel Report, *supra* note 67, at ¶¶ 7.1325, 7.1348-.1353. For the geopolitical conflict, see generally Kim Talus & Moritz Wüstenberg, *WTO Panel Report in the* EU — Energy Package *Dispute and the European Commission Proposal to Amend the 2009 Gas Market Directive*, 37(3) J. ENERGY & NAT. RES. L. 327 (2019); Vasyl Chornyi & Anna-Alexandra Marhold, *In Uncharted Waters: The Contested Legal and Political Landscape of Nord Stream 2*, *in* EUROPEAN ENERGY LAW REPORT XIV 171 (Martha M. Roggenkamp & Catherine Banet eds., 2021).

[76] Notification of an appeal by the European Union, *European Union and Its Member States — Certain Measures Relating to the Energy Sector*, at 17, WTO Doc. WT/DS476/6 (Sept. 25, 2018).

[77] Communication from the Appellate Body, *European Union and Its Member States — Certain Measures Relating to the Energy Sector*, WTO Doc. WT/DS476/8 (Nov. 21, 2018).

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still unlikely to be justified if the invoking party fails to demonstrate satisfaction of other requirements in the three-level cumulative elements. As the panel remarked, while the security of energy supply is a broad concept that contains short- and long-term dimensions,[78] not all measures for this objective will be "essential to the acquisition or distribution" under Article XX(j).[79]

B. Indirect Involvement of Energy Security Under GATT Article XX(d)

As applying GATT Article XX(j) requires respondents to meet the high threshold of the three-level cumulative elements, states might invoke other general exceptions as circumventions, such as GATT Article XX(d) for measures "necessary to secure compliance with laws or regulations".[80] The issue hinges on the standard to which laws or regulations measures are taken to secure compliance with.[81] In *India — Solar Cells*, the AB built upon the initial interpretation of "rules and regulations" in *Mexico — Taxes on Soft Drinks*[82] and held that two approaches can be adopted to identify rules within the scope of Article XX(d), which do not include general objectives that are "aspirational, declaratory, and solely descriptive".[83] One approach, which is fairly straightforward, is to identify a specific, legally enforceable rule, obligation, or requirement under a single provision of one domestic legislation with which it seeks "secure compliance" for the purposes of Article XX(d).[84] The other, adopted by India, is to identify a given rule, obligation, or requirement by reference to, or deriving from, several elements or parts of one or more instruments under its domestic legal system,[85]

[78] *EU — Energy Package* Panel Report, *supra* note 67, ¶¶ 7.1370-.1371.
[79] *Id.* ¶ 7.1371.
[80] To successfully raise a defense under Article XX(d), a respondent has the burden of demonstrating satisfaction with three key elements that are similar to the general analytical framework set out in Article XX(j). Specifically, the three cumulative elements enumerated in Article XX(d) are as follows: (1) the measure is 'designed' to 'secure compliance with laws and regulations' that are consistent with the provisions of the GATT 1994; (2) the measure at issue is 'necessary' to secure such compliance; and (3) the measure at issue meets the requirement set out in the chapeau of GATT Article XX, which requires measures to be taken in good faith. *See* WTO, *supra* note 69, at 41; Appellate Body Report, *Thailand — Customs and Fiscal Measures on Cigarettes from the Philippines (Thailand-Cigarettes (Philippines))*, ¶ 177, WTO Doc. WT/DS371/AB/R (adopted July 15, 2011).
[81] *India — Solar Cells* Appellate Body Report, *supra* note 64, ¶ 5.105.
[82] *Id.* ¶ 5.106; Appellate Body Report, *Mexico — Tax Measures on Soft Drinks and Other Beverages (Mexico — Taxes on Soft Drinks)*, ¶ 79, WTO Doc. WT/DS308/AB/R (adopted Mar. 24, 2006).
[83] *India — Solar Cells* Panel Report, *supra* note 69, ¶¶ 7.311, 7.313; *India — Solar Cells* Appellate Body Report, *supra* note 64, ¶ 5.133.
[84] *India — Solar Cells* Appellate Body Report, *supra* note 64, ¶ 5.127.
[85] *Id.*

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denoting a more complex process for panels to consider all characteristics of the instruments while avoiding exclusive evaluation of any single characteristic such as the particularities of legal systems.[86] The AB thereby dismissed India's argument, which was based mainly on a single characteristic, and concluded that India had not demonstrated that the provisions of domestic instruments "when read together" set out the legal obligation "to secure ecologically sustainable growth while addressing India's energy security challenge, and ensuring compliance with its obligations relating to climate change".[87]

The jurisprudence in *India — Solar Cells* indicates that although the threshold for successful invocation of Article XX(d) appears to be lower than that of Article XX(j), members are confronted with practical difficulties in proving that domestic legal instruments qualify as "laws or regulations" within Article XX(d) due to the panel's arbitrarily bifurcated approach. On the one hand, the panel acknowledged that the evaluation must take all considerations into account, including the specific features of the instruments and the particularities of members' legal systems, on a case-by-case approach; on the other hand, it established six explicit standards which hold true for developed states, instruments, and approaches.[88] In practice, the explicit elements may give rise to a de facto undifferentiated treatment dominated by "disproportionate Western influence" in the WTO forums.[89] This pattern, therefore, is suspected to be on the verge of judicial overreaching or misunderstanding,[90] creating an unfavorable judicial status for members without Westernized legal systems, or at the very least, for any respondents who choose the second approach which leads to a higher threshold and a more complex process for successful invocation.

[86] For six particular standards and one open-ended description for consideration, see *id.* ¶ 5.150.
[87] For detailed provisions, see *India — Solar Cells* Panel Report, *supra* note 69, ¶¶ 7.269-.283; *India — Solar Cells* Appellate Body Report, *supra* note 64, ¶¶ 5.151, 5.94.
[88] *India — Solar Cells* Appellate Body Report, *supra* note 64, ¶ 5.150.
[89] *See* ANTHEA ROBERTS, IS INTERNATIONAL LAW INTERNATIONAL? 280 (2017). *See generally* UNITED STATES HEGEMONY AND THE FOUNDATIONS OF INTERNATIONAL LAW (Michael Byers & Georg Nolte eds., 2003).
[90] There is a need for WTO panels and the Appellate Body [hereinafter AB] to be warned against judicial activism. For detailed discussions, see generally Richard H. Steinberg, *Judicial Lawmaking at the WTO: Discursive, Constitutional, and Political Constraints*, 98(2) AM. J. INT'L L. 247 (2004). *See also* Lorand Bartels, *The Separation of Powers in the WTO: How to Avoid Judicial Activism*, 53(4) INT'L & COMPAR. L.Q. 861, 894-95 (2004); Joost Pawwelyn, *The Sutherland Report: A Missed Opportunity for Genuine Debate on Trade, Globalization and Reforming the WTO*, 8(2) J. INT'L ECON. L. 329, 345 (2005); Isabelle Van Damme, *25 Years of Law and Practice at the WTO: Did the Appellate Body Dig Its Own Grave?*, 26(1) J. INT'L ECON. L. 124, 127 (2023).

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C. Indirect Involvement of Energy Security Under General Agreement on Trade in Services Article XIV(a)

Another circumvention for states indirectly involving energy security to justify a trade-restrictive measure is to adopt general exceptions for protecting public morals. General exceptions for protecting public morals are usually stipulated under GATT Article XX(a) for measures "necessary to protect public morals" and, for trade in services, under General Agreement on Trade in Service (hereinafter "GATS") Article XIV(a) for measures "necessary to protect public morals or to maintain public order".[91] This section focuses on the latter, as it was invoked in *EU — Energy Package.* The analysis, nonetheless, is generative for public moral and public order exceptions in various agreements, because panels prefer to warrant a similar approach for the purposes of analyzing these standards.[92]

When invoking GATS Article XIV(a), at the core, the respondent must demonstrate satisfaction with footnote 5, that "the public order exception may be invoked only where a genuine and sufficiently serious threat is posed to one of the fundamental interests of society", and subsequently, three cumulative elements.[93] Both parties in *EU — Energy Package* structured their arguments based on the standard in footnote 5,[94] presenting the merits of the panel report for *EU — Energy Package* on the recognition of both short- and long-term dimensions for clean energy security as a part of public order under Article XIV, and the confirmation of a lower threshold for satisfaction. Specifically, the panel followed the approach established for "public morals" in *EC — Seal Products*, holding that "public order" under Article XIV(a) concerns fundamental interests of society that do not need to be "specific and easily identified".[95] Energy security therefore was a fundamental interest of society within the meaning of footnote 5 to Article XIV(a), even without a precise definition focusing on the short-term dimension.[96] Moreover, the panel dismissed Russia's argument that "mere conjecture or speculation" is not sufficient for invoking GATS Article

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[91] General Agreement on Trade in Services, art. XIV(a), Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1B, 1869 U.N.T.S. 183, 33 I.L.M. 1167 (1994) [hereinafter GATS].

[92] *See EU — Energy Package* Panel Report, *supra* note 67, ¶ 7.1153.

[93] The three cumulative elements are: (1) the measure is "designed" to protect public morals or to maintain public order; (2) the measure at issue is "necessary" to protect public morals or to maintain public order; and (3) the challenged measure satisfies the requirements of the chapeau of GATS Article XIV, meaning that the measure is not 'applied in a manner which would constitute a means of arbitrary or unjustifiable discrimination between countries where like conditions prevail, or a disguised restriction on trade in services'. *See id.* ¶¶ 7.228-.231.

[94] *Id.* ¶¶ 7.1135, 7.1145-.1151.

[95] *Id.* ¶¶ 7.1152-.1153; *EC — Seal Products* Appellate Body Report, *supra* note 57, ¶ 5.199.

[96] *EU — Energy Package* Panel Report, *supra* note 67, ¶ 7.1156.

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XIV(a),[97] finding that the threshold of "a genuine and sufficiently serious threat" is lower than that of "an imminent risk" in GATT XX(j),[98] as it refers to "the potential consequences or the potential gravity of the effects of a threat materializing".[99]

Despite the EU's defense being unsuccessful because it failed to demonstrate fulfilment of the chapeau of Article XIV,[100] *EU — Energy Package* shows that trade restrictions for energy security objectives may be easier to justify under the public policy exception for two reasons. On the technical level, the threshold for demonstrating "a genuine and sufficiently serious threat to a fundamental interest of society" under GATS Article XIV(a) is lower than that of "presently in short supply" under GATT Article XX(j).[101] On the general level, the WTO forum has, to an extent, accepted strategically constructed arguments based on the protection of energy security in the clean energy transition. As evidenced by the EU's definition, the short-term energy security risks are expanded to include "social unrest" and "political action" that could last for years, and the long-term energy security risks are linked with obstacles related to the "traditional fragmentation of the EU market" for clean energy and the "relatively limited number of foreign sources of supply".[102] In doing so, a nexus between the IEA-defined short- and long-term dimensions is recognized, exemplifying how a convergence of two dimensions could benefit states' defense in applying the WTO general exceptions.

D. Energy Security Potential Under the Security Exception and Freedom of Transit

Given the recent resurgence of national security protection in a geoeconomic order and the new energy security paradigm in the clean energy transition, states might attempt to invoke the national security exception under GATT Article XXI(b), or similar provisions under Comprehensive and Progressive Agreement for Trans-Pacific Partnership (hereinafter "CPTPP") and Regional Comprehensive Economic Partnership (hereinafter "RCEP"), for "any action which it considers necessary for the protection of its essential security interests".[103] Although GATT Article XXI(b) does not cover

[97] *Id.* ¶¶ 7.1167, 7.1189.
[98] *Id.* ¶ 7.1166.
[99] *Id.* ¶ 7.1163.
[100] *Id.* ¶ 7.1254. The EU appealed this "erroneous finding"; nevertheless, the Appellate Body [hereinafter AB] is unable to review appeals given its ongoing vacancies. *Notification of an appeal by the European Union*, *supra* note 76, at 3-4.
[101] *See* Marhold, *supra* note 13, at 263.
[102] *EU — Energy Package* Panel Report, *supra* note 67, ¶ 7.1151.
[103] CPTPP refers to Comprehensive and Progressive Agreement for Trans-Pacific Partnership, effective since 30 December 2018. RCEP refers to Regional Comprehensive Economic Partnership, effective since 1 January 2022.

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peacetime action taken for political or economic reasons by its original meaning,[104] the panels of *Russia — Traffic in Transit* and *Saudi Arabia — Intellectual Property* failed to establish a referenceable threshold of provisional justification by only requiring minimal legal and factual evidence, and conducting a circular assessment on whether trade-restrictive measures are plausible and imposed in good faith.[105] Energy security could therefore be considered under Article XXI(b). In addition, trade restrictions for energy security objectives may be justifiable under CPTPP Article 29.2(b), as it does not include requirements provided by GATT Article XXI(b), reflecting the US's stance on the self-judging national security exception.[106] RCEP Article 18.13(b)(iii) further extends the security exception to any action "taken to protect critical public infrastructures", including "power infrastructure", which could encompass clean energy resources and materials that are viewed as a component of a wide spectrum of economic security interests as developed by China.[107] In exceptional cases when energy security is a crucial aspect of national security which is not precluded in trade agreements, states may be able to justify their trade-restrictive measures under the customary defense of necessity under Article 25 of the International Law Commission's Articles on the Responsibility of States for Internationally Wrongful Acts.[108] The application of security exceptions on the grounds of energy security is ultimately conditioned by states' positions on whether the new energy security paradigm constitutes national security, how security exceptions could be invoked, and to what extent these invocations should be reviewed,[109] as international judicial bodies shall act "cognizant of their political context and perceived legitimacy".[110]

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[104] Panel Report, *Russia — Measures Concerning Traffic in Transit (Russia — Traffic in Transit)*, ¶¶ 7.67-.77, WTO Doc. WT/DS512/R (adopted Apr. 26, 2019).

[105] *Id.*; Panel Report, *Saudi Arabia — Measures Concerning the Protection of Intellectual Property Rights (Saudi Arabia — IPRs)*, WTO Doc. WT/DS567/R (circulated June 16, 2020). *See also* Crivelli & Pinchis-Paulsen, *supra* note 58, at 593; Jacob Gladysz, *The National Security Exception in WTO Law: Emerging Jurisprudence and Future Direction*, 52(3) GEO. J. INT'L L. 835, 838 (2021).

[106] *See* Hailes, *supra* note 56, at 164.

[107] *See* Weihuan Zhou et al., *Trade vs. Security: Recent Developments of Global Trade Rules and China's Policy and Regulatory Responses from Defensive to Proactive*, 22(2) WORLD TRADE REV. 193, 204 (2023). *See also* You Ji, *China's National Security Commission: Theory, Evolution and Operations*, 25 J. CONTEMP. CHINA 178, 190 (2016).

[108] *See* Int'l L. Comm'n, Draft Articles on Responsibility of States for Internationally Wrongful Acts, with Commentaries, U.N. Doc. A/56/10, at 80 (2001).

[109] For how states may influence the development of jurisprudence, see Zhou et al., *supra* note 107, at 201-02. *See also* Ben Czapnik & Bryan Mercurio, *The Use of Trade Coercion and China's Model of 'Passive-Aggressive Legalism'*, 26(2) J. INT'L ECON. L. 322, 322-42 (2023).

[110] James McCall Smith, *WTO Dispute Settlement: The Politics of Procedure in Appellate Body Rulings*, 2(1) WORLD TRADE REV. 65, 75 (2003).

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Furthermore, general principles of international law provide potential instruments to fill in the gap between energy security and existing provisions.[111] In the context of infrastructure-dependent energy security, such as natural gas transit via third states, the principle of freedom of transit stipulated under GATT Article V:2 may be adopted from the standpoint of systemic integration of general international law sources with WTO law.[112] As WTO law is not a self-contained regime in a "closed legal circuit" that is isolated from public international law,[113] the interpretation of freedom of transit must take into account other relevant principles in a broader legal environment, including the principles of effective right and economic cooperation.[114] Nonetheless, considering the cost-effectiveness of using general principles in litigation (especially with a malfunctioning appellant system) and the political sensitivity of energy security issues (particularly amid the clean energy transition in a geoeconomic order), it remains to be seen whether states will prefer alternative remedial approaches, such as diplomacy and consultation, before resorting to international law.[115]

IV. QUANTIZING GEOECONOMICS: PLURALISTIC RECONCILIATION BETWEEN ENERGY SECURITY AND ECONOMIC LIBERALIZATION

The investigation of two questions, how states did and may invoke energy security justifications for trade-restrictive measures and how WTO DSB responded to these justifications, reveals distinct deficiencies in the jurisprudence of energy security amid the clean energy transition in a geoeconomic order. First, the direct accommodation of energy security under GATT Article XX(j), "products in general or local short supply", is equipped with a high threshold that only concerns the short-term security of energy supply with minimum geopolitical influence, thus showing an inability to incorporate the long-term energy security. Second, the indirect involvement of energy security under GATT Article XX(d), "secure compliance with laws and regulations", is subjected to judicial overreaching or misunderstanding as the WTO DSB established an arbitrarily bifurcated approach to identify "laws and regulations". Third, the other indirect involvement of energy security under GATS XIV(a), "protect public order",

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[111] *See* Int'l L. Comm'n, Rep. of the ILC Study Group, Fragmentation of International Law: Difficulties Arising from the Diversification and Expansion of International Law, U.N. Doc. A/CN4/L702, at 12-13 (2006).

[112] *See* Vitaliy Pogoretskyy, *Freedom of Transit and the Principles of Effective Right and Economic Cooperation: Can Systemic Interpretation of GATT Article V Promote Energy Security and the Development of an International Gas Market?*, 16(2) J. INT'L ECON. L. 313, 351 (2013).

[113] *See* Int'l L. Comm'n, Rep. of the ILC Study Group, Fragmentation of International Law: Difficulties Arising from the Diversification and Expansion of International Law, U.N. Doc. A/CN4/L682 and Add1, at 37 (2006).

[114] *See* Pogoretskyy, *supra* note 112, at 347.

[115] *Id*. at 351-52.

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despite its lower invocation threshold, could only be potentially justified based on a strategically constructed definition for energy security that converges its short- and long-term dimensions for clean energy. Finally, energy security objectives have not been justified under security exceptions and general principles, such as the freedom of transit, leaving both challenges and opportunities for future dispute settlements. Therefore, the latest development in energy security-related jurisprudence settled individual disputes at hand, but unfortunately frustrated the renewed discussion on the reconciliation between (energy) security protection and economic liberalization in an emerging global order.

Literature has focused on how to address these practical difficulties or additional scrutiny [116] by improving exception clauses within the international trade legal framework,[117] such as by identifying unanswered analytical questions,[118] adopting different interpretation approaches,[119] and evaluating innovations in trade agreements.[120] Nevertheless, the expansion of security areas (such as energy security) covered by international economic rules, the rise of novel approaches (such as geoeconomics) to economic-security norm creation, and the steady disintegration of the traditional binaries, such as those between legalism (hard law) and realism (soft rules), between normativity and concreteness,[121] are challenging the traditional normative underpinnings of international economic law.[122] Improving energy security jurisprudence ultimately amounts to the reconciliation between what is conceived as "old" and "new", which requires a shift in perception of the international judicial process from the adversary of substantial domestic, democratic decisions to the impetus for innovative conceptualization and development of appropriate governance frameworks internationally, regionally, and nationally.[123] The theoretical framework of quantizing geoeconomics is experimented with for this precise objective, and its merits lie within the nature of quantum measurement and holism theories — they highlight the probability of existence and the irreducibility of a given order.

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[116] Rambod Behboodi & Christopher Hyner, *Countervailing Climate Change: Emissions Trading and the SCM Agreement*, 50 GEO. J. INT'L L. 599, 622 (2019).
[117] *See generally* Zhang, *supra* note 4; Gladysz, *supra* note 105.
[118] *See generally* Crivelli & Pinchis-Paulsen, *supra* note 58.
[119] *See generally* Boklan & Bahri, *supra* note 57.
[120] *See generally* Hailes, *supra* note 56.
[121] *See* MARTTI KOSKENNIEMI, THE POLITICS OF INTERNATIONAL LAW 331-32, 360 (1st ed., 2011). *See* MARTTI KOSKENNIEMI, FROM APOLOGY TO UTOPIA: THE STRUCTURE OF INTERNATIONAL LEGAL ARGUMENT 3 (2006); *See generally* Martti Koskenniemi, *Imagining the Rule of Law: Rereading the Grotian 'Tradition'*, 30(1) EUR. J. INT'L L. 17 (2019).
[122] *See* Bjorklund & Marceau, *supra* note 54, at 3.
[123] *See* Rosie Cooney & Andrew Lang, *Taking Uncertainty Seriously: Adaptive Governance and International Trade*, 18(3) EUR. J. INT'L L. 523, 544 (2007).

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A. Quantizing Geoeconomics on Incompatibility I: Convergence of Energy Security Probabilities

As discussed in Section II, the resolution of the incompatibility between the traditional energy security and new energy security paradigm requires a convergence between the dichotomous conceptions of short- and long-term energy security for the multi-directional energy process system in the clean energy transition. Traditionally, short- and long-term energy security were viewed as alternatives with distinctive consequences,[124] overlooking the possibility of co-existence of different types as well as the probability of a higher reality of governance. They were ontologically determined by the Newtonian classical sense, which represents the mainstream analytical philosophy in the study of political science and law before the interdisciplinary experiment with quantum theories by Wendt.[125] Quantizing geoeconomics, which is later established and applied for economic-security irreconciliation in international economic law by using quantum measurement theory on the analogical level (Course I),[126] offers theoretical groundings for the integration of traditional dichotomies for energy security.

Quantum measurement theory establishes that the quantum probabilities of reality, which are known as "wave functions", constantly change with different potentials; therefore, measurement or observation makes the wave function collapse into just a single outcome.[127] As it highlights the probabilities of reality, quantum measurement theory has been metaphorically adopted by legal scholars to explain the uncertainty of national-international relations and the complexity of compliance with international law.[128] In other words, what is essentially different between the traditional short- and long-term divergence and their convergence through quantum theories (or, as an applied theory in social science, quantum IR) is their underlying philosophy: the former reflects a classical Newtonian logic that an order is to be understood as its most basic constituent, thereby short- and long-term energy security are constructed for the traditional linear energy process system; and the latter is intrinsically opposed to the Newtonian interpretation and holds that an order is irreducible to particles,

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[124] *See* INTERNATIONAL ENERGY AGENCY, *supra* note 1, at 183.
[125] *See generally* ALEXANDER WENDT, QUANTUM MIND AND SOCIAL SCIENCE: UNIFYING PHYSICAL AND SOCIAL ONTOLOGY (2015).
[126] *See generally* Li, *supra* note 8.
[127] *See* Wendt, *supra* note 125, at 94.
[128] *See generally* Necati Polat, *International Law, the Inherent Instability of the International System, and International Violence*, 19 OXFORD J. LEGAL STUD. 51 (1999); Chantal Thomas, *What Does the Emerging International Law of Migration Mean for Sovereignty*, 14(1) MELBOURNE J. INT'L L. 392 (2013). Anthony D'Amato, *Groundwork for International Law*, 108(4) AM. J. INT'L L. 650, 650 (2014); *See generally* Yana Stoeva, *The 'Uncertainty Hypothesis' in International Economic Law*, 2(1) CHINESE J. GLOB GOVERNANCE 44 (2016); Markus G. Puder, *Brexit—Disentangling the Quantum in Law and Politics*, 52(1) GEO. WASH. INT'L L. REV. 13 (2020).

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hence the convergence between short- and long-term energy security is preferable for a complex, digital, and interdependent system amid the clean energy transition. Therefore, quantum measurement theory incorporated into the theoretical framework of quantizing geoeconomics may be regarded as superior for addressing the incompatibility between traditional energy security and the new energy security paradigm, as manifested in practices where the interpretation of GATT Article XX(j) excludes a consideration for long-term energy security and the invocation of GATS Article XIV(a) requires sophisticatedly constructed definition for energy security.

The adoption of quantizing geoeconomics, for example, as part of the theoretical framework embodied in the preambles of international economic agreements, would fundamentally guarantee the convergence between short- and long-term energy security. As such, "products in general or local short supply" under GATT Article XX(j), may be interpreted to enable lower thresholds for "the sources in short supply" and "risks of becoming in short supply", accommodating both short- and long-term energy security. Even if such an interpretation for GATT Article XX(j) is suspected as a gateway for protectionism, it would offer at the very least an operatable standard for defining the emerging energy security in international economic conflicts, clarifying to what extent the energy security of states can be indirectly involved in "public morals or public order" under general exceptions such as GATT Article XX(a) and GATS Article XIV(a). By incorporating a novel conceptual framework in preambles, member states may be allowed ample room to justify trade restrictive measures on grounds of emerging energy security. This contributes to the reconciliation between energy security and economic liberalization in the transition from a neoliberal order to a geoeconomic one.

B. Quantizing Geoeconomics on Incompatibility II: Energy Security in Geoeconomic Holography

The second incompatibility between the national security-centered approach and the continuum of energy security prompts a holistic comprehension of energy as a security issue in an emerging geoeconomic order. On the one hand, the theoretical framework of quantizing geoeconomics highlights the strategic importance of energy security as an emerging aspect of national security (the merit of the national security-centered approach); on the other hand, it recognizes the pluralist and fluid nature of geoeconomics with cooperative and competitive potentials (the merit of the continuum of energy security).[129] Its central value is situated

[129] *See* Li, *supra* note 8.

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within the adoption of quantum holism theory on the ontological level (Course II),[130] which addresses the energy security paradox resulting from energy securitization and the omission of the rising geoeconomic order from the energy governance perspective—two criticized aspects of existing approaches. It further paves ways for emerging energy security to be reasonably integrated within security exceptions, such as GATT Article XXI(b), CPTPP Article 29.2(b), and RCEP Article 18.13(b)(iii), and general principles such as freedom of transit under GATT Article V:2.

Quantum holism theory proposes that the universe is a holographic projection: "what appears on the surface is encoded information about what is inside".[131] It thus generates a new perspective for the whole-part relation: what is seen as a particle is an approximate "abstraction of a much greater totality of structure".[132] While IR scholars have explored the quantum holographic ontology to an extent,[133] it has not yet been experimented with by international law scholars. Quantizing geoeconomics innovatively proposes that geoeconomics is a quantum system with a holographic whole-part relation, with the whole as the shared geoeconomic wave function and the parts as the states' security-related practices at the national, regional, and international levels.[134] This demonstrates that the whole is almost identical to the parts, meaning that the increasing geoeconomic strategies will substitute states' actions that violate the geoeconomic order; conversely, the parts are not identical to the whole, meaning that states have different probabilities of collapsing the geoeconomic wave function into cooperative or competitive conditions in specific fields of energy security.[135] This encourages investigations of pluralist geoeconomic dynamics in various energy security issues without the predetermined assumption that geoeconomics only leads to the negative politicization of energy security objectives in international trade law. Hence, interpreting emerging energy security under security exceptions would not be easily subjected to the alleged negative geoeconomic order, or the so-called politicization or de-legalization of international economic law.[136]

Moreover, the whole-part relation in a hologram is elaborated upon as the constant holomovement of enfoldment (the transition from whole to part) and unfoldment (the transition from part to whole).[137] This emphasizes that

[130] *Id.* at 23.
[131] Zeeya Merali, *Theoretical Physics: The Origins of Space and Time*, 500(7464) NATURE 516, 516-17 (2013); Chengxin Pan, *Enfolding Wholes in Parts: Quantum Holography and International Relations*, 26 EUR. J. INT'L RELATIONS 14, 16 (2020).
[132] DAVID BOHM, WHOLENESS AND THE IMPLICATE ORDER 234 (2002).
[133] *See generally* Pan, *supra* note 131.
[134] *See* Li, *supra* note 8, at 23-30.
[135] *Id.* at 30.
[136] *See* Giorgio Sacerdoti, *The Challenges of Countering Politicization of Trade Relations and Revitalizing the Multilateral Rule-Based System*, 22 J. WORLD INV. & TRADE 335, 337-38 (2021).
[137] Bohm, *supra* note 132, at 233; Pan, *supra* note 131, at 23.

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the geoeconomic order with the holographic character is not static, but dynamic and interactive in its formation.[138] Through entanglements within energy security issues in international economic law in the geoeconomic hologram and with other economic linkages such as the environment, public health, and human rights,[139] they generate an unpredictable global economic order in a "kaleidoscopic world",[140] posing challenges to conventional perceptions of the integrity and resilience of energy security protection and economic liberalization.[141] An inclusive perception for understanding the relationship between energy security and economic liberalization provided by quantizing geoeconomics would imbue more cautiousness, or allow rooms for the benefit of doubt, in reading into principles and rules in various types of legal systems with diverse social and historical background, such as those involved in GATT Article XX(d). It may also help to generate a modest platform for mutual learning and understanding between members and decision-makers, boosting exploration, coordination, and adaptation in seeking alternative remedial methods for similar conflicts in the future.

C. Quantizing Geoeconomics on Jurisprudence Binaries: From Balance to Inclusion

One of the problematic binaries for the jurisprudence on energy security is that the excessive pursuit of legalism or legal formalism on paper, affected by neoliberalism, has dictated a judicial process in practice, in the midst of a transitional period, without necessary consideration of policies that are closely linked to the vital interests of states amid the clean energy transition in a geoeconomic order.[142] Quantizing geoeconomics, however, does not argue that the balance between traditional binaries needs recalibration, as the

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[138] Li, *supra* note 8, at 31.

[139] *See* Locknie Hsu, *The Evolution of the 'Trade and...' 'Debate'—A View from ASEAN*, 26(1) J. INT'L ECON. L. 188, 188 (2023).

[140] *See generally* EDITH BROWN WEISS, ESTABLISHING NORMS IN A KALEIDOSCOPIC WORLD: GENERAL COURSE ON PUBLIC INTERNATIONAL LAW (2019).

[141] Quantum entanglement theory establishes that the observation of an object can instantaneously influence the behavior of another object at a great distance without requiring the use of any physical force involved. It proves that near-simultaneous interconnectivity creates entanglements, and highlights how this produces spill-over effects and butterfly effects. The 2022 Nobel Prize in Physics is awarded to Alain Aspect, John Clauser and Anton Zeilinger 'for experiments with entangled photons, establishing the violation of Bell inequalities and pioneering quantum information science'. *See The Nobel Prize in Physics 2022*, THE ROYAL SWEDISH ACAD. OF SCI.S (Oct. 4, 2022), https://www.nobelprize.org/prizes/physics/2022/press-release/. *See generally* JOHN KEANE, POWER AND HUMILITY: THE FUTURE OF MONITORY DEMOCRACY (2018). *See also* Paul-Antoine Moreau et al., *Imaging Bell-type Nonlocal Behavior*, 5(7) SCI. ADVANCES 1, Figure 2, at 5 (2019).

[142] For an example of the debate between realism and legalism in international law, see Nicolas Abouchedid, *Notre Dame Law School Hosts Symposium on International Law: Realism vs Legalism*, THE IRISH ROVER (Feb. 27, 2020), https://irishrover.net/2020/02/realism-vs-legalism/.

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existing practice of achieving balance often indicates setting out a hierarchy for reference and correction, subconsciously eliminating other probabilities. Instead, it favors a new legal ideology in international economic law that geoeconomic considerations in legal practice does not indicate the politicization of law,[143] leading to a pluralistic reconciliation between what seems irreconcilable under conventional scholarship and perceptions.

For energy security protection in international trade law, the transitions from the "old" to "new" surroundings of energy security, from a neoliberal to geoeconomic order, dictate at the very least a retrospect of non-legalistic thoughts. Security protection and national autonomy, which characterized the emerging geoeconomic order,[144] have been conventionally associated with the political realist view of IR laid down representatively by E. H. Carr,[145] and later the offensive realism by Mearsheimer.[146] Realist schools of thought have been selectively accommodated by international law scholars who believe, to an extent, that international power politics emphasizes the security-economic conflict that international economic law aims to regulate, and that realism is most relevant for states' actions in the international sphere.[147] However, realism, and pragmatism that manifests a middle way between legalism and realism, are vulnerable to critique as they offer inconsistent legal argumentation methods that would distance practitioners from daily work in order to enable its critical evaluation and reflection.[148] In such situations, the habitual practice of monistic legalism becomes ideology, its continuing pursuit the sole criterion for its success without pluralistic considerations.[149] A major issue—in the times of transitioning—is the overestimation of legal qualities in an entangled trading system.[150]

Insofar as international law is phenomenological—that is, it exists to the extent it is seen to exist—the ontological and epistemological questions of what it is and how we explicitly conceptualize it determine its relevance and direction.[151] Building on Alexander Wendt's constructivist theory and later

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[143] Legal ideology as a universalizing project is discussed in DUNCAN KENNEDY, A CRITIQUE OF ADJUDICATION: FIN DE SIÈCLE 39-70 (1st ed., 1998).
[144] *See* Roberts and Lamp, *supra* note 12, at 11.
[145] *See generally* E. H. CARR, THE TWENTY YEARS' CRISIS 1919-39 (Michael Cox ed., 2016).
[146] *See generally* JOHN J. MEARSHEIMER, THE TRAGEDY OF GREAT POWER POLITICS (2014).
[147] *See* HEDLEY BULL ET AL., HUGO GROTIUS AND INTERNATIONAL RELATIONS 38 (1992); J. Patrick Kelly, *Judicial Activism at World Trade Organization: Developing Principles of Self-Restraint*, 22(3) NW. J. INT'L L. & BUS. 353, 387 (2002); Pawwelyn, *supra* note 90, at 345; MALCOLM N. SHAW, INTERNATIONAL LAW 9-10 (9th ed., 2021).
[148] For examples of inconsistent legal argumentations, see Van Damme, *supra* note 90, at 130-31.
[149] *See* HERBERT MARCUSE, ONE-DIMENSIONAL MAN: STUDIES IN THE IDEOLOGY OF ADVANCED INDUSTRIAL SOCIETY 131-33 (1964); KOSKENNIEMI, *supra* note 121, at 601.
[150] Resisting 'the temptation of even more legalization' is crucial. Pawwelyn, *supra* note 90, at 346. *See also* Kelly, *supra* note 147, at 387-88.
[151] *See* Martti Koskenniemi et al., *Comments on Chapters 1 and 2*, *in* UNITED STATES HEGEMONY AND THE FOUNDATIONS OF INTERNATIONAL LAW 91 (Michael Byers & Georg Nolte eds., 2003);

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the quantum IR theory, international economic law is what its community makes of it, in that the legal structure (exceptions) has no effect or power apart from process (conceptualization, interpretation, application, and adaptation based on different streams of scholarship, ontologies, and perceptions).[152] An inclusive approach is to understand energy security in international trade law amid the geoeconomic order through a quantum worldview—on the premise of a holographic ontology (adopting quantum holism theory ontologically) with analogical features of the probabilities of wave functions (adopting quantum measurement theory analogically)—through the theoretical framework of quantizing geoeconomics.[153] The bottom line for this experiment is that the existence of international energy and trade relations entails the existence of international law,[154] though admittedly, it has relative autonomy *vis-à-vis* politics and ethics.[155]

The study of the irreconciliation between energy security and economic liberalization through a quantum worldview, although labeled as open-realism, is not restricted to a description, or taxonomy, of international law and IR theories, arguments, or positions. My sympathies in developing quantizing geoeconomics rest with the realist argument that security competition and power politics must opt-in to the conceptualization of international law,[156] the deconstructivist (or constructivist, from an IR perspective) argument that international law is merely a platform, structure,

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JAN KLABBERS, INTERNATIONAL LAW 349-50 (4th ed., 2024); Martti Koskenniemi, *Establishing Norms in a Kaleidoscopic World*, 39 AM. J. INT'L L. 211, 211 (2022).

[152] *See generally* Alexander Wendt, *Anarchy Is What States Make of It: The Social Construction of Power Politics*, 46(2) INT'L ORG. 391 (1992); Alexander Wendt, *Constructing International Politics*, 20(1) INT'L SEC. 71 (1995); Alexander Wendt, *The Mind–Body Problem and Social Science: Motivating a Quantum Social Theory*, 48(2) J. THEORY SOC. BEHAV. 188 (2018); James Der Derian & Alexander Wendt, *'Quantizing International Relations': The Case for Quantum Approaches to International Theory and Security Practice*, 51(9) SEC. DIALOGUE 399 (2020); Alexander Wendt, *Why IR Scholars Should Care About Quantum Theory, Part I: Burdens of Proof and Uncomfortable Facts*, 14 INT'L THEORY 119 (2022); Alexander Wendt, *Why IR Scholars Should Care About Quantum Theory, Part II: Critics in the PITs*, 14 INT'L THEORY 193 (2022); *See also* Bohm, *supra* note 132, at 61. The argument that "international economic law is what its community makes of it" also resonates with Oliver Wendell Holmes Jr.'s well-known revelation of law, stating that:

> The life of the law has not been logic: it has been experience. The felt necessities of the time, the prevalent moral and political theories, intuitions of public policy, avowed or unconscious, even the prejudices which judges share with their fellowmen, have had a good deal more to do than the syllogism in determining the rules by which men should be governed.

OLIVER WENDELL HOLMES, THE COMMON LAW 3-4 (2009).

[153] *See* Li, *supra* note 8.

[154] *See* Klabbers, *supra* note 151, at 3.

[155] *See generally* Jan Klabbers, *The Relative Autonomy of International Law or the Forgotten Politics of Interdisciplinarity*, 1(1-2) J. INT'L L. & INT'L RELATIONS 35 (2004).

[156] *See generally* Mearsheimer, *supra* note 146.

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and discourse,[157] and the critical argument that international law is inherently political.[158] It also attempts to reach further to a conceptualization of international economic law, or in other words, what it is possible to think or believe in under quantum theories as philosophies. It does not attempt to make new interpretations of the law but explains how the making of legal interpretations or reforms in the geoeconomic order is possible. In other words, it delineates the conceptual narrative that controls the production of the humble, pluralistic reconciliation of what seems impossible under orthodox or classical scholarship.

D. Pluralistic Reconciliation Through Quantizing Geoeconomics

Quantizing geoeconomics regards the conventional irreconciliation as pluralistic reconciliation between energy security protection and economic liberalization in international trade law through a quantum worldview. Thus, its normative payoff is the break of boundaries between what is "old" and "new", reconciling what seemed irreconcilable. Non-quantum perceptions—such as the binaries of legalism and realism—commits the error of attempting to persuade that they have finally grasped the deep structural logic that conflict has to do with an opposition between "optimism" and "pessimism", "multilateralism" and "unilateralism", "cosmopolitanism" and "nationalism", "developed north or west" and "developing south or east", "communist regimes" and "capitalist regimes", "totalitarian system" and "democratic system", and so on.[159] Furthermore, they adhere to a meta-narrative, stating that we can only satisfy any of them at the expense of others, to eliminate existing conflicts.[160] When these conceptualizations influence the formulation, interpretation, and application of security-related provisions in international economic law, they become disrespectful to the infinitely more diverse character of the collective and individual observation in the evolving geoeconomic or non-geoeconomic order with novel, entangled challenges. Therefore, pluralistic reconciliation through quantizing geoeconomics can be justified by respecting the existence of conflicting ideals within pluralistic governance models, aiming to grow into not only a scholarship but also a body of knowledge that reshapes the ontology, perception, and comprehension of the economic-security order in the era of geoeconomics.

Quantizing geoeconomics further demonstrates its practical potential by inviting international scholars, practitioners, and decision-makers to

[157] *See generally* KOSKENNIEMI, *supra* note 121.
[158] *See generally* Martti Koskenniemi, *Miserable Comforters: International Relations as New Natural Law*, 15(3) EUR. J. INT'L RELATIONS 395 (2009).
[159] *See* KOSKENNIEMI, *supra* note 121, at 559.
[160] *Id.*

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consciously "reimagine the game, reconstruct its rules, and redistribute the prizes" in the transitioning period for energy security,[161] which traditional international economic law scholarship cannot do alone.[162] It provides a novel given code in the sense of a universalized legal ideology, as a complement for existing codes, to innovatively conceptualize the energy security dynamics in a geoeconomic order and establish a pluralistic reconciliation between energy security protection and economic liberalization in international economic law. This code recognizes that political sensitivity is an integral part of energy security amid the clean energy transition in a geoeconomic order. Formal and informal deference to national autonomy should be deemed as an approach towards pluralistic reconciliation rather than the politicization of international economic law, unless proven otherwise. As such, both international economic law on paper and in practice should construct an acknowledgement of the geoeconomic nature of energy security-related issues and make modest, inclusive deference to national autonomy where applicable.

V. CONCLUSION

For a comprehensive reading on the theoretical framework of quantizing geoeconomics, it is essential to supplement this article with two prior works. One establishes quantizing geoeconomics and applies it to the overall international economic order.[163] The other adopts quantizing geoeconomics to investigate scholarship on cybersecurity governance, elucidating its theoretical implications for pluralistic reconciliation on the institutional level.[164] Building upon previous endeavors, this research specifically focuses on the theoretical incompatibilities of emerging energy security and the practical deficiencies of energy security-related rules in international trade law. It therefore embraces dual aims: first, to offer a testable conceptual framework for the reconciliation between emerging energy security and international economic law; and second, to propose operational standards for future dispute settlement, rule-designing, and order-transforming in relation to the new energy security paradigm.

The traditional normative underpinnings of the international trade regime are facing mounting challenges due to the emergence of the new energy security paradigm covered by international economic rules, the rise of geoeconomic approaches to economic-security norm creation, and the

[161] *Id*. at 561.
[162] *See* Ryan Martinez Mitchell, *International Law as Project or System?*, 51(3) GEO. J. INT'L L. 623, 688 (2009).
[163] *See generally* Li, *supra* note 8.
[164] *See generally* Li, *supra* note 11.

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steady disintegration of the traditional binaries, such as those between legalism (hard law) and realism (soft rules).[165] Improving energy security conceptualization and jurisprudence ultimately comes down to the reconciliation between what is conceived as "old" and "new", which requires a shift in ontology and perception of the international economic law for the innovative development of appropriate governance frameworks. The theoretical framework of quantizing geoeconomics is adopted for this objective.

The two sets of incompatibilities between the "old" and "new" surroundings of energy security refer to, first, the inability of the traditional understanding of energy security to incorporate the convergence of short- and long-term energy security in the clean energy transition, and second, the inability of both the national security-centered approach and continuum of energy security to holistically comprehend energy as a security issue in an emerging geoeconomic order. They prompt a critical investigation on energy security-related jurisprudence in international trade law, which reveals significant deficiencies of the energy security practice of international trade law. Specifically, the empirically problematic jurisprudence relates to the incapacity for long-term energy security under GATT Article XX(j), the suspected judicial overreaching under GATT Article XX(d), the requirement for a strategically constructed definition for energy security convergence in the clean energy transition under GATS Article XIV(a), and potential for energy security objectives to be justified under security exceptions and general principles, such as the freedom to transit. Recent literature has attempted to address these practical difficulties by improving exception clauses within the international trade legal framework. However, given the current economic-security challenges on (some) traditional normative foundations of international economic law, holistic efforts are needed to reintegrate the "old" and "new" in conceptualization, along with traditional binaries in jurisprudence that have been hitherto disoriented.

The theoretical framework of quantizing geoeconomics presented here might help to navigate through the energy security debate from relative politicization towards pluralistic reconciliation. By using quantum measurement theory on the analogical level, it recognizes the convergence of energy security probabilities, and thus provides theoretical groundings for the integration of traditional short- and long-term dichotomies for energy security in general exceptions such as GATT Article XX(j) and GATS Article XIV(a). By using quantum holism theory on the ontological level, it situates energy security within the geoeconomic order with holographical characteristics, targeting the energy security paradox resulting from energy securitization and the omission of the rising geoeconomic order from the

[165] *See* Bjorklund & Marceau, *supra* note 54, at 3.

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energy governance perspective—two drawbacks of the national security-centered approach and the continuum of energy security. This provides routes for emerging energy security to be reasonably integrated within security exceptions and general principles. It also generates a modest platform for mutual learning in situations that involve GATT Article XX(d), and promotes coordination in seeking alternative remedial methods for future conflicts. Quantizing geoeconomic further seeks to promote a better understanding on jurisprudence binaries, particularly between legalism and realism, proposing an inclusive legal ideology for the pluralistic reconciling of what seems irreconcilable under conventional scholarship and perceptions. The primary normative payoff of the pluralistic reconciliation through quantizing geoeconomics is the rejection of the one coherent program for the world order, considering it offers an open-realism, quantum-based, and diverse-sympathetic model. Its practical implications are thereby manifested by providing a novel given code in the sense of a universalized legal ideology, as a supplement to existing codes, for international law scholars and practitioners to innovatively comprehend the new energy security dynamics amid the clean energy transition in a geoeconomic order.

Quantizing geoeconomics contributes an open-realistic, quantum-based, and diverse-sympathetic framework to support the ontological enlightenment or perception transformation needed to facilitate the modest, pluralistic reconciliation for security protection in international trade regimes, and to supplement rather than substitute orthodox scholarship on the premise of empirically problematic jurisprudence. The framework is open-realistic in that it exploratorily utilizes quantum theories in conceptualizing the surroundings and jurisprudence of energy security to reconcile a classical issue in international economic law. It is, by nature, quantum-based, as one of its core intentions is to explore the possibilities of quantum theories as analogy, ontology, and critical analytical method in the study of energy security in international law. It is also diverse-sympathetic because its probability, inconclusiveness, and openness enable a pluralistic venue to incorporate realistic, deconstructivist, and critical viewpoints, among others, into the rigid, taken-for-granted practice of legalism that no longer serves the best interests amid the current era of transitioning. It further embodies many other probabilities for reconceptualizing, repurposing, and reframing the existing international legal order toward a humble, pluralistic inclusion.

However, as Wendt remarks, "quantum social science is not a turn, it is a question."[166] Accessibility and acceptability limit the experimentation of any multidisciplinary theoretical framework, such as quantizing geoeconomics on energy security issues in international economic law. The

[166] Wendt, *supra* note 152, at 207.

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question of how to bridge the knowledge disparities among multiple disciplines for the readership of international law lies ahead. Future research must also examine how international judicial bodies refer to new theories in order to elucidate the applicability of this multidisciplinary theoretical framework and advance the revived economic-security debate. As it evolves through observation and measurement of its readers, multiple quantum legal approaches may adapt international economic law, and international law in general, to the contemporary philosophical and professional reality and broaden its outreach in a transdisciplinary way and beyond.

臺大學術期刊資料庫

REFERENCES

Books

BALMACEDA, MARGARITA M. (2018), POLITICS OF ENERGY DEPENDENCY: UKRAINE, BELARUS, AND LITHUANIA BETWEEN DOMESTIC OLIGARCHS AND RUSSIAN PRESSURE.

BOHM, DAVID (2002), WHOLENESS AND THE IMPLICATE ORDER.

BULL, HEDLEY ET AL. (1992), HUGO GROTIUS AND INTERNATIONAL RELATIONS.

BUZAN, BARRY ET AL. (1998), SECURITY: A NEW FRAMEWORK FOR ANALYSIS.

BYERS, MICHAEL ET AL. (2003), UNITED STATES HEGEMONY AND THE FOUNDATIONS OF INTERNATIONAL LAW.

CARR, E. H. (2016), THE TWENTY YEARS' CRISIS 1919-39 (Michael Cox ed.).

DANNREUTHER, ROLAND (2017), ENERGY SECURITY.

GANZ, AURORA (2021), FUELLING INSECURITY: ENERGY SECURITIZATION IN AZERBAIJAN.

HOLMES, OLIVER WENDELL (2009), THE COMMON LAW.

KEANE, JOHN (2018), POWER AND HUMILITY: THE FUTURE OF MONITORY DEMOCRACY.

KENNEDY, DUNCAN (1998), A CRITIQUE OF ADJUDICATION: FIN DE SIÈCLE (1st ed.).

KLABBERS, JAN (2024), INTERNATIONAL LAW (4th ed.).

KORTEWEG, REM (2018), ENERGY AS A TOOL OF FOREIGN POLICY OF AUTHORITARIAN STATES, IN PARTICULAR RUSSIA.

KOSKENNIEMI, MARTTI (2006), FROM APOLOGY TO UTOPIA: THE STRUCTURE OF INTERNATIONAL LEGAL ARGUMENT.

KOSKENNIEMI, MARTTI (2011), THE POLITICS OF INTERNATIONAL LAW (1st ed.).

MANKOFF, JEFFREY (2012), RUSSIAN FOREIGN POLICY: THE RETURN OF GREAT POWER POLITICS (2d ed.).

MARCUSE, HERBERT (1964), ONE-DIMENSIONAL MAN: STUDIES IN THE IDEOLOGY OF ADVANCED INDUSTRIAL SOCIETY.

MARHOLD, ANNA-ALEXANDRA (2021), ENERGY IN INTERNATIONAL TRADE LAW: CONCEPTS, REGULATION AND CHANGING MARKETS.

MEARSHEIMER, JOHN J. (2014), THE TRAGEDY OF GREAT POWER POLITICS.

MERCURIO, BRYAN & KUEI-JUNG NI (2013), SCIENCE AND TECHNOLOGY IN INTERNATIONAL ECONOMIC LAW: BALANCING COMPETING INTERESTS.

NEOCLEOUS, MARK (2008), CRITIQUE OF SECURITY.

NYMAN, JONNA (2018), THE ENERGY SECURITY PARADOX: RETHINKING ENERGY (IN)SECURITY IN THE UNITED STATES AND CHINA.

臺大學術期刊資料庫

PENG, SHIN-YI ET AL. (2018), GOVERNING SCIENCE AND TECHNOLOGY UNDER THE INTERNATIONAL ECONOMIC ORDER: REGULATORY DIVERGENCE AND CONVERGENCE IN THE AGE OF MEGAREGIONALS.
ROBERTS, ANTHEA & NICOLAS LAMP (2021), SIX FACES OF GLOBALIZATION: WHO WINS, WHO LOSES, AND WHY IT MATTERS.
ROBERTS, ANTHEA (2017), IS INTERNATIONAL LAW INTERNATIONAL?.
ROEBEN, VOLKER (2018), TOWARDS A EUROPEAN ENERGY UNION: EUROPEAN ENERGY STRATEGY IN INTERNATIONAL LAW.
SHAW, MALCOLM N. (2021), INTERNATIONAL LAW (9th ed.).
UNITED NATIONS DEVELOPMENT PROGRAMME (2000), WORLD ENERGY ASSESSMENT: ENERGY AND THE CHALLENGE OF SUSTAINABILITY.
VAN DE GRAAF, THIJS ET AL. (2016), GLOBAL ENERGY GOVERNANCE IN A MULTIPOLAR WORLD.
WEISS, EDITH BROWN (2019), ESTABLISHING NORMS IN A KALEIDOSCOPIC WORLD: GENERAL COURSE ON PUBLIC INTERNATIONAL LAW.
WENDT, ALEXANDER (2015), QUANTUM MIND AND SOCIAL SCIENCE: UNIFYING PHYSICAL AND SOCIAL ONTOLOGY.
YERGIN, DANIEL (2011), THE QUEST: ENERGY, SECURITY AND THE REMAKING OF THE MODERN WORLD.
ZHAO, HONG (2015), CHINA AND ASEAN: ENERGY SECURITY, COOPERATION AND COMPETITION.

Articles

Allison, Juliann Emmons & Kathleen J. Hancock (2020), *The Politics of Energy in a Changing Climate: An Introduction*, *in* THE OXFORD HANDBOOK OF ENERGY POLITICS, (Juliann Emmons Allison & Kathleen J. Hancock eds.).
Asmelash, Henok (2022), *The First Ten Years of WTO Jurisprudence on Renewable Energy Support Measures: Has the Dust Settled Yet?*, 21(4) WORLD TRADE REVIEW 455.
Asmelash, Henok Birhanu (2015), *Energy Subsidies and WTO Dispute Settlement: Why Only Renewable Energy Subsidies Are Challenged*, 18(2) JOURNAL OF INTERNATIONAL ECONOMIC LAW 261.
Bartels, Lorand (2004), *The Separation of Powers in the WTO: How to Avoid Judicial Activism*, 53(4) INTERNATIONAL & COMPARATIVE LAW QUARTERLY 861.
Baumann, Florian (2010), *Europe's Way to Energy Security: The Outer Dimension of Energy Security: From Power Politics to Energy Governance*, 15(1) EUROPEAN FOREIGN AFFAIRS REVIEW 77.
Behboodi, Rambod & Christopher Hyner (2019), *Countervailing Climate Change: Emissions Trading and the SCM Agreement*, 50 GEORGETOWN JOURNAL OF INTERNATIONAL LAW 599.

臺大學術期刊資料庫

Bjorklund, Andrea K. & Gabrielle Marceau (2023), *New (Paradigms in) International Economic Law*, 26(1) JOURNAL OF INTERNATIONAL ECONOMIC LAW 3

Boklan, Daria & Amrita Bahri (2020), *The First WTO's Ruling on National Security Exception: Balancing Interests or Opening Pandora's Box?*, 19(1) WORLD TRADE REVIEW 123.

Boute, Anatole (2022), *Weaponizing Energy: Energy, Trade, and Investment Law in the New Geopolitical Reality*, 116(4) THE AMERICAN JOURNAL OF INTERNATIONAL LAW 740.

Bown, Chad P. (2023), *The WTO and Vaccine Supply Chain Resilience during a Pandemic*, 26(2) JOURNAL OF INTERNATIONAL ECONOMIC LAW 343.

Carbonnier, Gilles & Fritz Brugger (2013), *The Development Nexus of Global Energy*, *in* THE HANDBOOK OF GLOBAL ENERGY POLICY 64 (Andreas Goldthau ed.).

Cherp, Aleh & Jessica Jewell (2014), *The Concept of Energy Security: Beyond the Four As*, 75 ENERGY POLICY 415.

Chester, Lynne (2010), *Conceptualising Energy Security and Making Explicit its Polysemic Nature*, 38 ENERGY POLICY 887.

Chornyi, Vasyl & Anna-Alexandra Marhold (2021), *In Uncharted Waters: The Contested Legal and Political Landscape of Nord Stream 2*, *in* EUROPEAN ENERGY LAW REPORT XIV 171 (Martha M. Roggenkamp & Catherine Banet eds.).

Claussen, Kathleen (2022), *Next-Generation Agreements and the WTO*, 21(3) WORLD TRADE REVIEW 380.

Cohen, Harlan Grant (2020), *Nations and Markets*, 23(4) JOURNAL OF INTERNATIONAL ECONOMIC LAW 793.

Cooney, Rosie & Andrew Lang (2007), *Taking Uncertainty Seriously: Adaptive Governance and International Trade*, 18(3) EUROPEAN JOURNAL OF INTERNATIONAL LAW 523.

Cosbey, Aaron & Petros C. Mavroidis (2014), *A Turquoise Mess: Green Subsidies, Blue Industrial Policy and Renewable Energy: The Case for Redrafting the Subsidies Agreement of the WTO*, 17(1) JOURNAL OF INTERNATIONAL ECONOMIC LAW 11.

Crivelli, Pramila & Mona Pinchis-Paulsen (2021), *Separating the Political from the Economic: The* Russia–Traffic in Transit *Panel Report*, 20(4) WORLD TRADE REVIEW 582.

Czapnik, Ben & Bryan Mercurio (2023), *The Use of Trade Coercion and China's Model of 'Passive-Aggressive Legalism'*, 26(2) JOURNAL OF INTERNATIONAL ECONOMIC LAW 322.

D'Amato, Anthony (2014), *Groundwork for International Law*, 108(4) THE AMERICAN JOURNAL OF INTERNATIONAL LAW 650.

臺大學術期刊資料庫

Damme, Isabelle Van (2023), *25 Years of Law and Practice at the WTO: Did the Appellate Body Dig Its Own Grave?*, 26(1) JOURNAL OF INTERNATIONAL ECONOMIC LAW 124.

Davey, William J. (2022), *WTO Dispute Settlement: Crown Jewel or Costume Jewelry?*, 21(3) WORLD TRADE REVIEW 291.

Deese, David A. (1979), *Energy: Economics, Politics, and Security*, 4(3) INTERNATIONAL SECURITY 140.

Derian, James Der & Alexander Wendt (2020), *'Quantizing International Relations': The Case for Quantum Approaches to International Theory and Security Practice*, 51(9) SECURITY DIALOGUE 399.

Ebinger, Charles & Govinda Avasarala (2013), *The "Gs" and the Future of Energy Governance in a Multipolar World*, *in* THE HANDBOOK OF GLOBAL ENERGY POLICY 190.

Espa, Ilaria & Gracia Marín Durán (2018), *Renewable Energy Subsidies and WTO Law: Time to Rethink the Case for Reform Beyond Canada: Renewable Energy/Fit Program*, 21(3) JOURNAL OF INTERNATIONAL ECONOMIC LAW 621.

Fang, Mandy Meng (2021), *Old Wine in a New Bottle? Green Industrial Policy and the Use of Safeguards in the Solar Sector*, 55(4) JOURNAL OF WORLD TRADE 573.

Gladysz, Jacob (2021), *The National Security Exception in WTO Law: Emerging Jurisprudence and Future Direction*, 52(3) GEORGETOWN JOURNAL OF INTERNATIONAL LAW 835.

Goldthau, Andreas & Nick Sitter (2015), *Soft Power with a Hard Edge: EU Policy Tools and Energy Security*, 22(5) REVIEW OF INTERNATIONAL POLITICAL ECONOMIC 941.

Goodin, Robert et al. (2006), *The Public and its Policies*, *in* THE OXFORD HANDBOOK OF PUBLIC POLICY 3 (Robert Goodin et al. eds.).

Griffiths, Steven (2019), *Energy Diplomacy in a Time of Energy Transition*, 26 ENERGY STRATEGY REVIEW 1.

Hailes, Oliver (2022), *Lithium in International Law: Trade, Investment, and the Pursuit of Supply Chain Justice*, 25(1) JOURNAL OF INTERNATIONAL ECONOMIC LAW 148.

Hancock, Kathleen J. et al. (2018), *The Politics of Energy Regionalism*, *in* THE OXFORD HANDBOOK OF ENERGY POLITICS 172 (Kathleen J. Hancock & Juliann Emmons Allison eds.).

Harrison, Ann et al. (2017), *Green Industrial Policy in Emerging Markets*, 9 ANNUAL REVIEW OF RESOURCE ECONOMICS 253.

Heath, J. Benton (2020), *The New National Security Challenge to the Economic Order*, 129 YALE LAW JOURNAL 1020.

Heath, J. Benton (2020), *Trade and Security Among the Ruins*, 30(2) DUKE JOURNAL OF COMPARATIVE & INTERNATIONAL LAW 223.

臺大學術期刊資料庫

Herranz-Surrallés, Anna (2016), *An Emerging EU Energy Diplomacy? Discursive Shifts, Enduring Practices*, 23(9) JOURNAL OF EUROPEAN PUBLIC POLICY 1386.

Hsu, Locknie (2023), *The Evolution of the 'Trade and...' 'Debate'—A View from ASEAN*, 26(1) JOURNAL OF INTERNATIONAL ECONOMIC LAW 188.

Ji, You (2016), *China's National Security Commission: Theory, Evolution and Operations*, 25 JOURNAL OF CONTEMPORARY CHINA 178.

Kelly, J. Patrick (2002), *Judicial Activism at World Trade Organization: Developing Principles of Self-Restraint*, 22(3) NORTHWESTERN JOURNAL OF INTERNATIONAL LAW & BUSINESS 353.

Klabbers, Jan (2004), *The Relative Autonomy of International Law or the Forgotten Politics of Interdisciplinarity*, 1(1-2) JOURNAL OF INTERNATIONAL LAW & INTERNATIONAL RELATIONS 35.

Koskenniemi, Martti (2009), *Miserable Comforters: International Relations as New Natural Law*, 15(3) EUROPEAN JOURNAL OF INTERNATIONAL RELATIONS 395.

Koskenniemi, Martti (2016), *What Is Critical Research in International Law? Celebrating Structuralism*, 29(3) LEIDEN JOURNAL OF INTERNATIONAL LAW 727.

Koskenniemi, Martti (2019), *Imagining the Rule of Law: Rereading the Grotian 'Tradition'*, 30(1) EUROPEAN JOURNAL OF INTERNATIONAL LAW 17.

Koskenniemi, Martti (2022), *Establishing Norms in a Kaleidoscopic World*, 39 The AMERICAN JOURNAL OF INTERNATIONAL LAW 211.

Koskenniemi, Martti et al. (2003), *Comments on Chapters 1 and 2*, *in* UNITED STATES HEGEMONY AND THE FOUNDATIONS OF INTERNATIONAL LAW 91 (Michael Byers & Georg Nolte eds.).

Lewis, Joanna I. (2014), *The Rise of Renewable Energy Protectionism: Emerging Trade Conflicts and Implications for Low Carbon Development*, 14(4) GLOBAL ENVIRONMENTAL POLITICS 10.

Lewis, Joanna I. (2021), *Green Industrial Policy After Paris: Renewable Energy Policy Measures and Climate Goals*, 21(4) GLOBAL ENVIRONMENTAL POLITICS 42.

Li, Xinyue (2022), *Quantizing Geoeconomics: Emerging Geoeconomics in International Economic Law Through a Quantum Worldview*, 17(1) ASIAN JOURNAL OF WTO & INTERNATIONAL HEALTH LAW AND POLICY 5.

Li, Xinyue (2023), *A Parallel Narrative: Pluralistic Reconciliation Through Quantizing Geoeconomics in (Cyber)security Governance in International Economic Law*, 18(1) ASIAN JOURNAL OF WTO & INTERNATIONAL HEALTH LAW AND POLICY 89.

臺大學術期刊資料庫

Low, Patrick (2022), *The WTO in Crisis: Closing the Gap between Conversation and Action or Shutting Down the Conversation?*, 21(3) WORLD TRADE REVIEW 274.

Luft, Gal et al. (2010), *Energy Security and Climate Change: A Tenuous Link*, *in* THE ROUTLEDGE HANDBOOK OF ENERGY SECURITY 43 (Benjamin K. Sovacool ed.).

Månsson, André et al. (2014), *Assessing Energy Security: An Overview of Commonly Used Methodologies*, 73 ENERGY 1.

Marhold, Anna-Alexandra (2021), *Unpacking the Concept of 'Energy Security': Lessons from Recent WTO Case Law*, 48 LEGAL ISSUES OF ECONOMIC INTEGRATION 147.

Merali, Zeeya (2013), *Theoretical Physics: The Origins of Space and Time*, 500(7464) NATURE 516.

Mercurio, Bryan & Pratyush Nath Upreti (2022), *From Necessity to Flexibility: A Reflection on the Negotiations for a TRIPS Waiver for Covid-19 Vaccines and Treatments*, 21(5) WORLD TRADE REVIEW 633.

Mitchell, Ryan Martinez (2009), *International Law as Project or System?*, 51(3) GEORGETOWN JOURNAL OF INTERNATIONAL LAW 623.

Moreau, Paul-Antoine et al. (2019), *Imaging Bell-type Nonlocal Behavior*, 5(7) SCI. ADVANCES 1.

O'Sullivan, Meghan L. (2013), *The Entanglement of Energy, Grand Strategy, and International Security*, *in* THE HANDBOOK OF GLOBAL ENERGY POLICY 30 (Andreas Goldthau ed.).

O'Sullivan, Meghan L. (2022), *The Entanglement of Energy, Grand Strategy, and International Security*, *in* THE HANDBOOK OF GLOBAL ENERGY POLICY 30 (Andreas Goldthau eds.)

Pan, Chengxin (2020), *Enfolding Wholes in Parts: Quantum Holography and International Relations*, 26 EUROPEAN JOURNAL OF INTERNATIONAL RELATIONS 14.

Pawwelyn, Joost (2005), *The Sutherland Report: A Missed Opportunity for Genuine Debate on Trade, Globalization and Reforming the WTO*, 8(2) JOURNAL OF INTERNATIONAL ECONOMIC LAW 329.

Pogoretskyy, Vitaliy & Kim Talus (2020), *The WTO Panel Report in EU-Energy Package and Its Implications for the EU's Gas Market and Energy Security*, 19(4) WORLD TRADE REVIEW 531.

Pogoretskyy, Vitaliy (2013), *Freedom of Transit and the Principles of Effective Right and Economic Cooperation: Can Systemic Interpretation of GATT Article V Promote Energy Security and the Development of an International Gas Market?*, 16(2) JOURNAL OF INTERNATIONAL ECONOMIC LAW 313.

Polat, Necati (1999), *International Law, the Inherent Instability of the International System, and International Violence*, 19 OXFORD JOURNAL OF LEGAL STUDIES 51.

臺大學術期刊資料庫

Prazeres, Tatiana Lacerda (2020), *Trade and National Security: Rising Risks for the WTO*, 19(1) WORLD TRADE REVIEW 137.
Puder, Markus G. (2020), *Brexit—Disentangling the Quantum in Law and Politics*, 52(1) THE GEORGE WASHINGTON INTERNATIONAL LAW REVIEW 13.
Riofrancos, Thea (2023), *The Security–Sustainability Nexus: Lithium Onshoring in the Global North*, 23(1) GLOBAL ENVIRONMENT POLITICS 20.
Roberts, Anthea et al. (2019), *Toward a Geoeconomic Order in International Trade and Investment*, 22(4) JOURNAL OF INTERNATIONAL ECONOMIC LAW 655.
Sacerdoti Giorgio (2021), *The Challenges of Countering Politicization of Trade Relations and Revitalizing the Multilateral Rule-Based System*, 22 JOURNAL OF WORLD INVESTMENT & TRADE 335.
Shan, Wenhua & Peng Wang (2019), *The International Legal Framework for Belt and Road Energy Cooperation: Progress and Prospect*, 20(2) JOURNAL OF WORLD INVESTMENT & TRADE 259.
Smith, James McCall (2003), *WTO Dispute Settlement: The Politics of Procedure in Appellate Body Rulings*, 2(1) WORLD TRADE REVIEW 65.
Sovacool, Benjamin K. & Ishani Mukherjee (2011), *Conceptualizing and Measuring Energy Security: A Synthesized Approach*, 36(8) ENERGY 5343.
Sovacool, Benjamin K. (2013), *An International Assessment of Energy Security Performance*, 88 ECOLOGICAL ECONOMIC 148.
Steffen, Will et al. (2007), *The Anthropocene: Are Humans Now Overwhelming the Great Forces of Nature*, 36(8) AMBIO 614.
Steinberg, Richard H. (2004), *Judicial Lawmaking at the WTO: Discursive, Constitutional, and Political Constraints*, 98(2) THE AMERICAN JOURNAL OF INTERNATIONAL LAW 247.
Stoeva, Yana (2016), *The 'Uncertainty Hypothesis' in International Economic Law*, 2(1) THE CHINESE JOURNAL OF GLOBAL GOVERNANCE 44.
Thomas, Chantal (2013), *What Does the Emerging International Law of Migration Mean for Sovereignty*, 14(1) MELBOURNE JOURNAL OF INTERNATIONAL LAW 392.
Valentine, Scott Victor (2010), *The Fuzzy Nature of Energy Security*, *in* THE ROUTLEDGE HANDBOOK OF ENERGY SECURITY 56 (Benjamin K. Sovacool ed.).
Voon, Tania (2019), *Can International Trade Law Recover? The Security Exception in WTO Law: Entering a New Era*, 113 AJIL UNBOUND 45.
Wæver, Ole (2011), *Politics, Security, Theory*, 42 SECURITY DIALOGUE 465.

臺大學術期刊資料庫

Weiß, Wolfgang (2020), *Adjudicating Security Exceptions in WTO Law: Methodical and Procedural Preliminaries*, 54(6) JOURNAL OF WORLD TRADE 829.

Wendt, Alexander (1992), *Anarchy Is What States Make of It: The Social Construction of Power Politics*, 46(2) INTERNATIONAL ORGANIZATION 391.

Wendt, Alexander (1995), *Constructing International Politics*, 20(1) INTERNATIONAL SECURITY 71.

Wendt, Alexander (2018), *The Mind–Body Problem and Social Science: Motivating a Quantum Social Theory*, 48(2) JOURNAL FOR THE THEORY OF SOCIAL BEHAVIOUR 188.

Wendt, Alexander (2022), *Why IR Scholars Should Care About Quantum Theory, Part I: Burdens of Proof and Uncomfortable Facts*, 14 INTERNATIONAL THEORY 119.

Wendt, Alexander (2022), *Why IR Scholars Should Care About Quantum Theory, Part II: Critics in the PITs*, 14 INTERNATIONAL THEORY 193.

Wu, Mark & James Salzman (2014), *The Next Generation of Trade and Environment Conflicts: The Rise of Green Industrial Policy*, 108(2) NORTHWESTERN UNIVERSITY LAW REVIEW 401.

Wüstenberg, Kim Talus & Moritz (2019), *WTO Panel Report in the* EU — Energy Package *Dispute and the European Commission Proposal to Amend the 2009 Gas Market Directive*, 37(3) JOURNAL OF ENERGY & NATURAL RESOURCE LAW 327.

Yu, Kaho (2019), *Energy Cooperation Under the Belt and Road Initiative: Implications for Global Energy Governance*, 20(2-3) JOURNAL OF WORLD INVESTMENT & TRADE 243.

Zalasiewicz, Jan et al. (2010), *The New World of the Anthropocene*, 44 ENVIRONMENTAL SCIENCE & TECHNOLOGY 2228.

Zhang, Yuanyuan (2023), *Tensions Between International Economic Law and the EU Energy Security Regulations During the Securitization of EU-Russian Gas Relations: Way Forward?*, 57(3) JOURNAL OF WORLD TRADE 433.

Zhou, Weihuan et al. (2023), *Trade vs. Security: Recent Developments of Global Trade Rules and China's Policy and Regulatory Responses from Defensive to Proactive*, 22(2) WORLD TRADE REVIEW 193.

Cases

Appellate Body Report, *Canada — Certain Measures Affecting the Renewable Energy Generation Sector (Canada — Renewable Energy)*, WTO Doc. WT/DS412/AB/R (adopted May 24, 2013).

Appellate Body Report, *Canada — Measures Relating to the Feed-in Tariff Program (Canada — Feed-In Tariff Program)*, WTO Doc. WT/DS426/AB/R (adopted May 24, 2013).

臺大學術期刊資料庫

Appellate Body Report, *China — Measures Related to the Exportation of Various Raw Materials*, WTO Doc. WT/DS394/AB/R, WT/DS395/AB/R, WT/DS398/AB/R (adopted February 22, 2012).
Appellate Body Report, *European Communities — Measures Prohibiting the Importation and Marketing of Seal Products*, WTO Doc. WT/DS400/AB/R, WT/DS401/AB/R (adopted June 18, 2014).
Appellate Body Report, *India — Certain Measures Relating to Solar Cells and Solar Modules*, WTO Doc. WT/DS456/AB/R (adopted October 14, 2016).
Appellate Body Report, *Mexico — Tax Measures on Soft Drinks and Other Beverages (Mexico — Taxes on Soft Drinks)*, WTO Doc. WT/DS308/AB/R (adopted March 24, 2006).
Appellate Body Report, *Thailand — Customs and Fiscal Measures on Cigarettes from the Philippines (Thailand-Cigarettes (Philippines))*, WTO Doc. WT/DS371/AB/R (adopted July 15, 2011).
Panel Report, *European Union and Its Member States — Certain Measures Relating to the Energy Sector*, WTO Doc. WT/DS476/R (under appeal September 21, 2018).
Panel Report, *India — Certain Measures Relating to Solar Cells and Solar Modules*, WTO Doc. WT/DS456/R (adopted October 14, 2016).
Panel Report, *Russia — Measures Concerning Traffic in Transit (Russia — Traffic in Transit)*, WTO Doc. WT/DS512/R (adopted April 26, 2019).
Panel Report, *Saudi Arabia — Measures Concerning the Protection of Intellectual Property Rights (Saudi Arabia — IPRs)*, WTO Doc. WT/DS567/R (circulated June 16, 2020).

Treaties

General Agreement on Tariffs and Trade, October 30, 1947, 61 Stat. A11, 55 U.N.T.S. 194.
General Agreement on Trade in Services, Apr. 15, 1994, Marrakesh Agreement Establishing the World Trade Organization, Annex 1B, 1869 U.N.T.S. 183, 33 I.L.M. 1167 (1994).

WTO-Related Documents

Committee on Trade and Environment, *Environmental Database for 2020 - Note by the Secretariat*, WTO Doc. WT/CTE/EDB/20 (January 28, 2022).
Communication from the Appellate Body, *European Union and Its Member States — Certain Measures Relating to the Energy Sector*, WTO Doc. WT/DS476/8 (November 21, 2018).

臺大學術期刊資料庫

Notification of an appeal by the European Union, *European Union and Its Member States — Certain Measures Relating to the Energy Sector*, WTO Doc. WT/DS476/6 (September 25, 2018).

WTO, *WTO Analytical Index: GATT 1994 - Article XX (Jurisprudence)* (January 23, 2023).

U.N. Documents

International Law Commission, Draft Articles on Responsibility of States for Internationally Wrongful Acts, with Commentaries, U.N. Doc. A/56/10 (2001).

International Law Commission, Report of the ILC Study Group, Fragmentation of International Law: Difficulties Arising from the Diversification and Expansion of International Law, U.N. Doc. A/CN4/L702 (2006).

International Law Commission, Report of the ILC Study Group, Fragmentation of International Law: Difficulties Arising from the Diversification and Expansion of International Law U.N. Doc. A/CN4/L682 and Add.1 (2006).

Internet Sources

Abouchedid, Nicolas, *Notre Dame Law School Hosts Symposium on International Law: Realism vs Legalism*, THE IRISH ROVER (February 27, 2020), https://irishrover.net/2020/02/realism-vs-legalism/.

Emergency Response and Energy Security: Ensuring the Uninterrupted Availability of Energy Sources at an Affordable Price, INTERNATIONAL ENERGY AGENCY, https://www.iea.org/areas-of-work/energy-security.

Green Industrial Policy and Trade: A Tool-Box, PARTNERSHIP FOR ACTION ON GREEN ECONOMIC (2017), https://www.un-page.org/files/public/green_industrial_and_trade_policy_a_tool-box.pdf.

International Energy Security: Common Concept for Energy Producing, Consuming and Transit Countries, ENERGY CHARTER SECRETARIAT (2015), https://www.energycharter.org/what-we-do/trade-and-transit/trade-and-transit-thematic-reports/international-energy-security-common-concept-for-energy-producing-consuming-and-transit-countries-2015/.

Practitioner's Guide to Strategic Green Industrial Policy, PARTNERSHIP FOR ACTION ON GREEN ECONOMIC (2016), https://www.unido.org/sites/default/files/2016-11/practitioners_guide_to_green_industrial_policy_1__0.pdf.

Securing Clean Energy Technology Supply Chains, INTERNATIONAL ENERGY AGENCY (2022), https://iea.blob.core.windows.net/assets/0fe16228-521a-43d9-8da6-bbf08cc9f2b4/SecuringCleanEnergyTechnologySupplyChains.pdf.

臺大學術期刊資料庫

Shi Si Wu Xian Dai Neng Yuan Ti Xi Gui Hua (“十四五”现代能源体系规划) [*14th Five Year Plan for a Modern Energy System*], NATIONAL DEVELOPMENT AND REFORM COMMISSION OF PRC, https://www.ndrc.gov.cn/xxgk/zcfb/ghwb/202203/P020220322582066837126.pdf.

The Nobel Prize in Physics 2022, THE ROYAL SWEDISH ACADEMY OF SCIENCES (October 4, 2022), https://www.nobelprize.org/prizes/physics/2022/press-release/.

World Energy Outlook 2021, INTERNATIONAL ENERGY AGENCY (2021), https://iea.blob.core.windows.net/assets/4ed140c1-c3f3-4fd9-acae-789a4e14a23c/WorldEnergyOut look2021.pdf.

World Energy Outlook 2022, INTERNATIONAL ENERGY AGENCY (2022), https://iea.blob.core.windows.net/assets/830fe099-5530-48f2-a7c1-11f35d510983/WorldEnergyOutlook2022.pdf.

臺大學術期刊資料庫