

DECARBONIZATION OF DUAL-USE ENERGY INFRASTRUCTURE: THE ROLE OF ARBITRATION IN ESG COMPLIANCE DISPUTES

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Abstract:

The rapid advancing from classical computation to cloud-based, quantum-level generative AI in both civilian and defence sectors has placed unprecedented strain on dual-use energy infrastructures such as nuclear, fossil fuel, hydrogen, and solar systems that simultaneously serve grid consumers and military operations. This article dissects the resulting ESG compliance asymmetry at civilian operators face rigorous decarbonisation mandates under the CSRD, EU Taxonomy, and ISSB S2, while defence consumption of the same shared infrastructure escapes scrutiny through national-security carve-outs such as Taxonomy Article 9(2), CSRD Recital 16, and comparable exemptions and relaxations under USMCA and US SEC rules. This is not an accidental gap but a structural feature of overlapping treaty, supranational, and domestic regimes, and it is precisely this designed imbalance that generates disputes falling outside the reach of any single regulator or court.

The recent jurisprudence including Vattenfall v. Germany, Rockhopper v. Italy, Milieudefensie v. Shell, and Urgenda, the article traces the tribunals have steadily built an ESG enforcement architecture for civilian energy assets while relaxing the defence dimension largely unaddressed. It argues that arbitration mandates and not litigation or unilateral regulation — is the only forum equipped to hold together claims over the investment treaties, climate finance covenants, nuclear safeguards, and green-bond warranties within a single proceeding, while its confidentiality safeguards reconcile transparency norms with legitimate security demands.

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Recognising that no existing framework was built for this convergence, the article proposes a two-tier institutional architecture: a treaty-constituted oversight council supervising tribunal constitution, paired with a security-cleared panel for emergency interim measures. It closes by urging harmonised NDC accounting for dual-use emissions and dedicated procedural rules for the emerging field of "green arbitration."

Keywords: *Dual-Use Energy Infrastructure; ESG Compliance; Green Arbitration; National Security Carve-Outs; Decarbonisation Disputes*

Introduction:

The raising mandate for the technological shift from *Digital Binary Computation* to Cloud based *Quantum Level Generative AI* at both Civilian and Defence Sectors have increased the burden on the existing Dual-Use Energy Infrastructures, such as Nuclear Power, Fossil Fuel, Solar Energy, Hydrogen Cells, etc. Which have exponentially increased the burden on ESG (Energy, Social Governance) Compliance with unrealistic demands by Defence & Consumer usage, driving the conflict into Resolution majorly under Arbitration Instrument of the prevailing Industrial Standard.

The use of Dual use technology in energy sector is based on art of denoting rapid energy generation, transmission and storage all these made without any Separate civilian or commercial consumption in between the process. Use of Dual use Energy Infrastructure majorly falls in a unique Jurisdictional Genesis in the Export Control architecture of the **Wassenaar Arrangements (1996)** and under the classification of dual use at **Council Regulation (EU) 2021/821**.

The existing frameworks on dual use goods are complete parallel in operative ends making entire segments of dual use energy Infrastructure to be on *Lex Specialis derogat legi generali*²—The principle that specific instruments prevail over general ones governing the interaction between the ambient International Environmental Law regime and the specialist dual use energy framework. The dilemma between Efficiency in Civilian usage and Operative Effectiveness in Defence Usage making it an overlapping-normative frameworks operating at International, Supranational and domestic levels.

² Vattenfall AB v. Fed. Republic of Ger., ICSID Case No. ARB/12/12, Settlement (Sept. 2021),

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The dual use energy sector's peak aggregate effect of this pluralism is a compliance burden of asymmetric character: civilian operators are subjected to full ESG disclosure and performance obligations, whilst the defence sector — invoking national security carve-outs under, *inter alia*, EU Taxonomy Article 9(2), CSRD Recital 16, and USMCA Annex 14-E — exercises a structurally privileged position that creates precisely the intra-infrastructure ESG compliance differential that generates arbitrable disputes.

Decarbonisation Operative EPS Mandates and Defence SectorParadox:

The structural paradox at the core of the dual-use energy ESG Compliance as the decarbonisation mandate is at the opposite end of the on filed reality at defence sector from the root levels. The states which are all part of the Paris agreement has agreed to reduce the 45% of the emissions from the Energy sector by 2030 contrary to the same NDC community individually are placing a large quantity of AI defence Integrated defence systems, which operates at high-density power systems and the operational mandates at field level requires high volume of dense energy resources such as fossil fuels and nuclear baseload infrastructures.

The defence sector ESG carve-out operates through several legal mechanisms. Article 9(2) of EU Taxonomy Regulation (EU) 2020/852 excludes defence activities from the taxonomy's scope. Recital 16 of the CSRD acknowledges that certain defence-related information may be withheld for national security reasons under Directive 2009/81/EC (the Defence Procurement Directive). In the United States, the SEC Climate Disclosure Rules³ (17 CFR Part 210 et al., 2024) exempt classified governmental programmes. The consequence is that the ESG compliance asymmetry between civilian and defence users of shared energy infrastructure is both formally sanctioned and structurally corrosive of the integrity of ESG reporting.

The NDA states in the Paris Agreement have made a bipolarised views on approaching the ESG Compliance specifically in the dual use energy sector making more procedural burdens on the civilian sector and in the other hand relaxing the use of the same with defence sector, providing an abundance of high-density resources. This procedural imbalance are the major factors which constitute the burden over the dual use energy sectors making a huge stress on considering ESG hindrances for civilian sector⁴.

³SEC CDR ,17 CFR Part 210 et al., 2024

⁴ MOX Plant Case (Ireland v. United Kingdom)

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A hypothetical dual-use nuclear facility⁵ (e.g., a facility supplying both grid power and propulsion for a submarine fleet) is subject to the following simultaneous and irreconcilable demands:

- ESG Obligation (Civilian): Reduce carbon intensity by 45% by 2030 per CSRD and ISSB S2; achieve EU Taxonomy alignment for investor-grade green bond issuance.
- Operational Demand (Defence): Increase base-load generation capacity by 30% to service quantum AI data centres supporting classified defence AI programmes (e.g., autonomous weapons systems, surveillance AI).
- Regulatory Constraint (IAEA): Capacity upgrades require full Environmental Impact Assessment (EIA) and IAEA safeguards review under INFCIRC/540, with lead times of 5–7 years.
- Contractual Obligation (Investor): Green bond covenants and PPA terms include ESG performance warranties; breach triggers arbitration under ICC Rules 2021.

The resultant compliance gap is not amenable to administrative resolution and migrates, as the pilot paragraph observes, into arbitration — the only instrument capable of adjudicating the competing legal claims arising from this structural irreconcilability.

The overlapping procedural burdens create rise to the Energy disputes under the Paris Agreement and National laws with parallel proceedings under the Specifically created Councils between the member states. The Major role of Arbitrations is on the Contractual disputes arising from the Carbon Trading between the States, Industries and between different sectors. These ESG Compliance disputes are generally covered under the **“Green Arbitration.”**

Operative Sectoral Party Autonomy and Confidentiality in Dual Use Energy sector Arbitrations:

The Arbitral Confidentiality is vital in Dual use Energy Sector since the energy consumption of defence must be kept private and concealed for protecting valuable data of operative mandates of Key Military Installations, considering the vital reliance over energy sector in each of the recent wars globally, an entire nation's wealth is trapped under the execution of

⁵ Nuclear Tests Cases (Australia v. France; New Zealand v. France), ICJ Reports 1974, p. 253; ICJ Reports 1974, p. 457

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these energy resources effectively, since the nature of both sectors are contrary and reliant on each other on the collective outcome.

The dispute resolution mechanism under this sophisticated sector requires a dual tone of both ad hoc and Institutional nature of arbitrations based on the dispute centric approach concentrating on subjective parameters involved in the disputes, since each dispute has its own parametric sensitivity and national security involved at high stake.

The below are the major provisions involving major stakes at hand in this dual use energy sector.:

INSTRUMENT	KEY PROVISIONS APPLICABLE
Energy Charter Treaty (ECT), 1994	<i>Art. 2 (scope), Art. 10 (fair & equitable treatment, FET), Art. 13 (expropriation), Art. 26 (investor-State arbitration), Art. 7 (energy transit), Protocol on Energy Efficiency</i>
Paris Agreement, 2015	<i>Art. 2(1)(b) (finance flows consistent with low-carbon development), Art. 4 (NDCs), Art. 6 (carbon markets), Art. 9 (climate finance) — obligations on States with dual-use infrastructure in NDC accounting</i>
UNFCCC, 1992	<i>Art. 3 (precautionary principle), Art. 4 (commitments) — baseline framework for all climate-related ESG obligations</i>
Treaty on Non-Proliferation of Nuclear Weapons (NPT), 1968	<i>Art. IV (inalienable right to peaceful nuclear use) — dual-use nuclear; Art. VI (disarmament — relevant to defence energy)</i>
IAEA Statute, 1956 (as amended)	<i>Art. III (safeguards, inspections), Art. XII — civilian oversight of nuclear dual-use; Safeguards Agreements (INFCIRC/153, INFCIRC/540 Additional Protocol)</i>
Euratom Treaty, 1957	<i>Arts. 52–76 (nuclear supply), Art. 77 (safeguards) — applicable in EU Member States; civilian/defence overlap with NATO Article 5</i>
NATO Status of Forces Agreement (SOFA), 1951	<i>Art. VIII (claims arising from base operations) — energy infrastructure liabilities at dual-use installations</i>
Wassenaar Arrangement, 1996	Dual-use goods and technologies lists — classification of energy technologies; export controls affect ESG compliance supply

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	chains
New York Convention (NYC), 1958	<i>Art. I–V — recognition and enforcement of arbitral awards; applicable to ESG arbitral awards across 172 contracting States</i>
ICSID Convention, 1965	<i>Art. 25 (jurisdiction), Art. 26 (exclusivity), Art. 41 (kompetenz-kompetenz), Art. 42 (applicable law), Art. 53–54 (binding force and enforcement of awards)</i>
UNCITRAL Model Law, 1985 (rev. 2006)	<i>Art. 1 (scope), Art. 7 (arbitration agreement), Art. 17 (interim measures), Art. 28 (applicable rules of law)</i>
Mauritius Convention, 2014	UNCITRAL Transparency Rules — applies to investment treaty arbitration on matters of public interest including ESG and environmental disputes
Outer Space Treaty, 1967	<i>Art. IV — satellite-linked energy management systems (quantum AI backbone for dual-use grid management); sovereign responsibility for national space activities</i>

Dual Use Sectoral Arbitrations Procedural prospects:

This sector specifically requires a dispute centric approach with dimensional implementation with different instrumentalities to maximise the operative efficiency with industrial effectiveness. This will be achieved from the proposed dispute resolution architecture with two Parallel levels with contractual origination instruments such as Treaty based Arbitrations under special monitored by Council or Commissions constituted under the treaty by its member states e.g., Council on Regulation (EU) on Dual use goods. Furthermore, States concerning the national security can issue a special commission on such dual use energy sector segments to form a specialized Institutes for this administering the Arbitrations and maintaining panel of experts on requirement maintaining neutrality since major defence sector energy consumption is by the state itself⁶.

The dual use segment in energy sector needs a Special Interim mechanism since the defence sector has emergencies concerning the National Security at stake in other hand the same should not suppress the civilian interest at large at stake. The dispute resolution mechanism must be tailor made for each type of contracts, Treaties and statutes make the Instrumental

⁶ Inflation Reduction Act of 2022, Pub. L. No. 117-169, §§ 13701–13704 (codified as amended at I.R.C. §§ 45Y, 45V, 45Q, 48E).

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proactiveness in the resolution process. The principle of *dubio pro arbitratione* — In doubt, favour arbitration: Ambiguity in arbitration clauses of dual-use energy contracts or investment treaties is resolved in favour of arbitral jurisdiction — a principle of typical application endorsed by the ICC, ICSID, and UNCITRAL jurisprudence applies here.

Role of Arbitration in Dual use Energy Sector is clear on the following aspects:

- Creating a Formal Authority to oversee the resolution process before appointment of the Tribunal without affecting Neutrality and Independence.
- Technically Specialized Exclusive Panel Body for Interim Measure for Pre-Appointment stage- Emergency Arbitration.
- Enforcement and review Commissions/ Council constituted under Statue or Treaty⁷.

This elemental excellence in the dispute resolution mechanism is achieved from sustaining all the required mandates to provide fair and equal opportunity to all the parties of the arbitral proceedings ensuring **Party Autonomy** which forms a mandatory party of Private Adjudication. The jurisprudence surveyed reveals a consistent pattern: tribunals and courts have proven willing to enforce ESG obligations against States even where those obligations collide with sovereign regulatory discretion, while remaining largely silent on the defence-sector dimension of that collision. In **Vattenfall v. Germany**⁸, the accelerated nuclear phase-out following Fukushima was treated as a compensable expropriation notwithstanding its environmental motivation, Germany ultimately paying some €1.4 billion — establishing that ESG-consistent regulation is not, by itself, an ECT defence. **Rockhopper v. Italy**⁹ extended this logic to fossil fuel moratoria, holding that genuine environmental motivation does not shield a State from Article 13 liability, a result that has since hardened investor expectations against unilateral decarbonisation timelines. The pending *RWE* and *Uniper* claims against the Netherlands test the outer limit of this doctrine where the challenged asset performs a dual-use grid-resilience function indistinguishable from defence-sector security provision. Outside the investment-treaty context, **Milieudefensie v. Shell**¹⁰ imported downstream Scope 3 emissions into a civilian operator's duty of care — a holding with direct, if unexplored, implications for the carbon footprint that civilian energy suppliers absorb on behalf of

⁷ Gary B. Born, *International Commercial Arbitration* (3d ed. 2021),

⁸ *Vattenfall AB v. Fed. Republic of Ger.*, ICSID Case No. ARB/12/12, Settlement (Sept. 2021)

⁹ *Rockhopper Italia S.p.A. v. Italian Republic*, SCC Case No. V2017/163, Final Award (Aug. 24, 2022).

¹⁰ *Milieudefensie v. Royal Dutch Shell PLC*, ECLI:NL: RBDHA:2021:5339 (Hague Dist. Ct. May 26, 2021) (appeal pending).

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defence customers. *Urgenda* completed this arc by converting voluntary NDC pledges into judicially enforceable human-rights obligations, creating the very State action capable of triggering downstream ECT arbitration. The *MOX Plant* proceedings, though older, remain the clearest illustration of the jurisdictional multiplicity inherent to dual-use nuclear disputes, while *Bear Creek* introduced a nascent "clean hands" doctrine for ESG-S failures. Read together, these cases confirm that arbitral and judicial bodies have built, case by case, a functioning ESG enforcement architecture for civilian energy assets — without ever squarely confronting the defence carve-out that this article identifies as the field's central unresolved fault line.

Conclusion:

This research drives directly to the existing parallelism in Global ESG Compliance disputes and the prevailing Dual use Energy sector paradox between civilian and defence energy consumptions considering the uneven stress levied on the consumer end, relaxing the defence operative standards with future expansions. The research suggests creating separate Sectoral Infrastructure both with Treaty based and Institutional based speciality platform to accommodate the emerging platform.

Civilian operators bear the full weight of decarbonisation mandates under the CSRD, the EU Taxonomy, and ISSB S2, while defence consumption of the same infrastructure is insulated by national-security carve-outs under Taxonomy Article 9(2), CSRD Recital 16, and comparable exemptions in non-EU jurisdictions. This is not an incidental regulatory gap; it is a designed feature of the overlapping treaty, supranational, and domestic regimes examined above, and it is precisely this designed asymmetry that generates disputes falling outside the competence of any single regulator, court, or compliance authority.

Arbitration therefore emerges not as a default forum of convenience but as the *necessary* instrument for this sector, for three interlocking reasons. First, its consensual and adaptable procedural architecture allows a single tribunal to hold together claims that arise simultaneously under investment treaties (ECT Article 26), climate finance covenants (Paris Agreement Article 9), nuclear safeguards obligations (IAEA Safeguards Agreements), and commercial green-bond warranties — a jurisdictional plurality that no domestic court or single-treaty body could competently adjudicate in one proceeding. Second, arbitral confidentiality, ordinarily treated in ESG discourse as a transparency deficit to be minimised,

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performs an affirmative protective function in this sector: it permits the adjudication of defence-linked energy disputes without compelling disclosure of operationally sensitive data, thereby reconciling the Mauritius Convention's transparency norms for public-interest disputes with the legitimate confidentiality demands of national security. Third, the enforceability secured under the New York Convention and the ICSID Convention gives ESG-linked awards in this sector a cross-border finality that neither treaty-council determinations nor unilateral regulatory findings can match.

These features do not, however, make arbitration a self-sufficient solution. The analysis exposes a genuine institutional deficit: no existing arbitral framework was designed with the specific competence to adjudicate the technical, environmental, and security-classified dimensions of dual-use energy disputes concurrently. The proposed two-tier architecture — a treaty-constituted oversight council or commission exercising supervisory authority prior to tribunal constitution, coupled with a specialised, security-cleared panel empowered to grant emergency interim measures — responds directly to this deficit. Such a structure would preserve tribunal independence while ensuring that panellists possess the requisite technical and security clearance to engage meaningfully with classified operational evidence, a combination the present ad hoc/institutional dichotomy does not reliably deliver¹¹.

Looking forward, three developments merit particular attention from both the arbitral community and the international legal-policy community. First, the maturation of "green arbitration" as a distinct sub-field will require dedicated procedural rules — akin to the IBA Rules on the Taking of Evidence but calibrated to ESG metrics and dual-use classification — rather than the ad hoc importation of commercial arbitration procedure into fundamentally different disputes. Second, States party to both the Paris Agreement and instruments such as the NPT and the Wassenaar Arrangement should consider harmonising their NDC accounting methodologies to address, rather than obscure, dual-use emissions, since the present accounting silence is itself a driver of future disputes. Third, model arbitration clauses for green bonds and power purchase agreements involving dual-use infrastructure should explicitly anticipate the national-security carve-out, allocating in advance the evidentiary and confidentiality protocols that would otherwise be litigated ad hoc at the outset of every proceeding.

¹¹ Pierre-Marie Dupuy & Jorge E. Viñuales, *International Environmental Law* (2d ed. 2018),
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