Specialist Certification in EU Energy Law

International Energy Law and Cooperation

International Energy Law refers to the body of legal norms that govern the production, transmission, distribution and consumption of energy across national borders. It draws on principles of public international law, such as sovereignty, the duty to cooperate, and the prohibition of unlawful interference, while also incorporating sector-specific instruments like the Energy Charter Treaty and various bilateral agreements. The primary aim is to create a stable, predictable framework that encourages investment, facilitates trade, and promotes sustainable development. For example, the Energy Charter Treaty establishes a dispute-settlement mechanism that allows an investor from one member state to bring a claim against another member state for alleged breaches of the treaty's investment protection provisions. A practical challenge is the treaty's ambiguous language on state-owned enterprises, which can lead to divergent interpretations by national courts.

European Union Energy Law is a subset of international energy law that operates within the EU's supranational legal order. It is characterised by a hierarchy of sources: Primary law (the Treaties), secondary law (Directives, Regulations, Decisions, Recommendations) and case law of the European Court of Justice (ECJ). The EU's ambition to create an Internal Energy Market is embodied in the Third Energy Package, a legislative package adopted in 2009 that introduced a series of reforms aimed at market liberalisation and unbundling. The Third Energy Package requires Member States to separate the ownership of transmission networks from the operation of generation and supply businesses – a process known as unbundling. This structural separation is intended to prevent discriminatory access and promote competition, but it also raises practical challenges related to the valuation of network assets and the coordination of cross-border projects.

Directive is a legislative act that binds Member States to achieve a particular result, while leaving them discretion as to the form and methods of implementation. In the energy sector, the most influential directive is the Renewable Energy Directive (RED II), which sets a collective EU target of at least 32 % renewable energy in final consumption by 2030. Member States must transpose the directive into national law, creating mechanisms such as feed-in tariffs, auctions or contracts-for-difference to support renewable generation. A key challenge lies in balancing the need for a level playing field with respect for national energy mixes and market conditions. Some Member States have introduced generous subsidies that risk distorting competition, prompting scrutiny under EU state-aid rules.

Regulation differs from a directive in that it is directly applicable in all Member States without the need for national transposition. The EU Emissions Trading System (ETS) Regulation is the cornerstone of Europe's climate policy. It establishes a cap-and-trade system that limits the total amount of greenhouse gas emissions from covered sectors, primarily power generation and large industrial installations. Companies receive or purchase emission allowances, which they can trade on the market. The ETS creates a price signal that incentivises low-carbon technologies. However, the system faces challenges such as overallocation of allowances, which can depress the carbon price and reduce the incentive for emission reductions. The

recent “Market Stability Reserve” was introduced to address this issue by automatically adjusting the supply of allowances.

Decision is a binding act addressed to specific Member States, individuals or companies. In the energy context, the European Commission may issue a decision on the approval of a state-aid scheme that subsidises renewable electricity. The decision will set conditions that the Member State must fulfil to ensure compatibility with the internal market. For instance, a decision may require the beneficiary to limit the amount of support provided or to phase out the aid by a certain date. The targeted nature of decisions enables the Commission to address specific concerns while maintaining overall policy coherence.

Recommendation and Opinion are non-binding instruments that the EU institutions use to guide Member States. The European Commission regularly issues recommendations on best practices for energy efficiency, grid integration of renewables, or the implementation of the Energy Poverty strategy. Although not legally enforceable, recommendations can influence national legislation and serve as benchmarks for monitoring progress. A practical example is the Commission’s recommendation on the development of smart meters, which encourages Member States to adopt advanced metering infrastructure to improve demand-side management.

Implementing Act is a technical measure adopted by the Commission to ensure uniform application of a regulation. In the context of the ETS, the Commission issues implementing acts that define the methodology for allocating free allowances to sectors at risk of carbon leakage. These acts are essential for maintaining the integrity of the system and preventing market fragmentation.

Energy Union is a policy framework launched by the European Commission in 2015 to ensure secure, affordable, and sustainable energy for all EU citizens. It comprises five dimensions: Energy security, internal market, energy efficiency, decarbonisation and research & innovation. The Energy Union seeks to strengthen cross-border cooperation, diversify supply sources, and accelerate the transition to a low-carbon economy. One concrete initiative under the Energy Union is the creation of the European Energy Security Strategy, which outlines measures to reduce dependence on external fossil fuel imports, develop strategic reserves and enhance the resilience of critical infrastructure.

Internal Energy Market is the core concept behind EU energy integration. It aims to create a single market for electricity and gas where consumers can benefit from competition, lower prices and a wider choice of suppliers. The internal market is built on four pillars: Market liberalisation, cross-border infrastructure, unbundling and competition law enforcement. The development of cross-border interconnectors, such as the Baltic-Nordic electricity link, exemplifies the practical application of the internal market principle. Nevertheless, the market faces obstacles including regulatory divergence, differing national priorities and the need for significant investment in grid capacity.

Third Energy Package introduced two key directives – the Electricity Directive* and the *Gas Directive* – and a regulation on the conditions for access to the transmission networks. The package mandated the creation of independent Transmission System Operators (TSOs) and the establishment of a European regulator network, the Agency for the Cooperation of Energy Regulators (ACER). ACER plays a vital role in coordinating cross-border market rules, monitoring market coupling and developing network codes. A

challenge for ACER is ensuring consistent implementation across Member States with diverse regulatory cultures and market structures.

Renewable Energy Directive (RED II) sets binding national targets for the share of renewable energy in gross final consumption. It also introduces a sustainability framework for biofuels and bioliquids, requiring that they achieve minimum greenhouse gas emission savings. The directive creates a system of Guarantees of Origin, which certify the renewable origin of electricity, gas or heat. These certificates can be traded, allowing producers to demonstrate compliance and consumers to verify the renewable content of their energy. The practical challenge lies in preventing double counting and ensuring the integrity of the tracking system, especially when certificates cross national borders.

Emissions Trading System (ETS) is the EU's flagship climate-policy tool. It operates on a cap-and-trade principle, where a limited number of emission allowances are distributed or auctioned to covered entities. The allowance price is determined by market forces, providing a cost-effective incentive to reduce emissions. The ETS has been extended to the aviation sector and is being considered for maritime transport. One persistent challenge is "carbon leakage," where firms relocate production to jurisdictions with less stringent climate policies. To mitigate this, the EU provides free allowances to sectors at risk, but the allocation mechanisms must be carefully calibrated to avoid market distortion.

State Aid rules are designed to prevent Member State measures that could distort competition within the internal market. Energy-related state aid includes subsidies for renewable projects, feed-in tariffs, or support for fossil-fuel extraction. The European Commission assesses state aid on the basis of the "market economy operator" test, which compares the terms of the aid with those that would be offered in a competitive market. A notable case involved a German "EEG" (Renewable Energy Sources Act) scheme, where the Commission concluded that the feed-in tariff was compatible with the internal market after the German government introduced a degression mechanism to limit the cost burden.

Competition Law in the EU is primarily enforced through Articles 101 and 102 of the Treaty on the Functioning of the European Union (TFEU), which prohibit anti-competitive agreements and the abuse of dominant positions. In the energy sector, competition law is applied to prevent collusion among generators, discriminatory access by network operators, or the abuse of market power by dominant suppliers. The ECJ has delivered landmark judgments on "price-cap regulation" and "market power abuse" in the electricity market, shaping the legal landscape for future cases.

Public Service Obligations (PSOs) are duties imposed on energy utilities to ensure the provision of essential services, such as universal access, supply security or social tariffs for vulnerable consumers. PSOs are justified when they serve the public interest and are proportionate to the objective pursued. In practice, a Member State may require a gas distributor to maintain service in remote rural areas where market forces would not otherwise support supply. The challenge is to balance the cost of PSOs with the principle of non-discrimination, ensuring that the obligations do not confer an undue advantage on the incumbent operator.

Energy Charter Treaty (ECT) is an international multilateral agreement that establishes a framework for energy cooperation, investment protection and dispute settlement. It covers the entire energy value chain,

from exploration to distribution, and includes provisions on trade, transit and transparency. The treaty's dispute-settlement mechanism allows investors to bring claims before international arbitration tribunals. Recent debates have focused on the treaty's compatibility with the EU's climate goals, as the investment protection clauses may shield fossil-fuel projects from termination, creating tension with the EU's decarbonisation agenda.

Energy Community Treaty extends the EU internal energy market to neighboring countries in Southeast Europe and the Eastern Mediterranean. Signatory states commit to implementing EU energy legislation, including the Third Energy Package, and to aligning their regulatory frameworks with EU standards. The Energy Community has established a Court of Justice that mirrors the ECJ, providing a judicial avenue for dispute resolution. A practical challenge for the Energy Community is ensuring that the capacity-building resources are sufficient to enable full compliance with the EU's complex regulatory regime.

Bilateral Agreements are negotiated directly between two states to regulate the supply, transit or joint development of energy resources. Examples include gas supply contracts between the EU and Russia, or electricity interconnection agreements between France and Spain. These agreements often contain "force majeure" clauses, pricing formulas linked to market indices, and dispute-resolution mechanisms that may involve arbitration under the International Chamber of Commerce (ICC). While bilateral deals can be flexible and tailored, they may also create fragmentation if they conflict with EU competition rules or the internal market principles.

Joint Undertaking is a public-private partnership instrument used by the EU to fund research and innovation projects, particularly in the energy sector. The Important Projects of Common European Interest (IPCEI) framework is a notable example, supporting large-scale initiatives such as offshore wind farms or hydrogen infrastructure. Joint undertakings receive co-financing from the EU budget and private investors, with the aim of achieving economies of scale and fostering cross-border collaboration. The legal challenge lies in ensuring that the co-financing does not constitute prohibited state aid, requiring careful design of the funding structure.

Market Liberalisation refers to the process of opening up the energy sector to competition, typically by separating generation, supply and transmission functions and by granting consumers the right to choose their energy provider. Liberalisation is intended to increase efficiency, drive down prices and stimulate innovation. In practice, the EU has implemented liberalisation through a series of directives that set out timelines for opening markets, establishing consumer protection rules and defining the role of national regulators. However, market liberalisation can be hindered by entrenched incumbents, regulatory capture or insufficient infrastructure to enable genuine competition.

Unbundling is the structural separation of network ownership from the operation of generation or supply activities. The EU distinguishes between "ownership unbundling," "accountable separation" and "functional separation," each with different levels of separation required. Ownership unbundling, the most stringent form, requires that the network owner cannot hold any share of the generation or supply business. This principle is central to preventing discriminatory access and ensuring a level playing field for new entrants. A practical difficulty is the valuation of the network assets, which must be determined in an arm's-length

transaction to avoid hidden subsidies.

Capacity Allocation is the process by which transmission capacity on interconnectors or internal networks is assigned to market participants. Allocation mechanisms can be based on auction, first-come-first-served or administrative methods. The EU's "capacity allocation and congestion management" (CACM) regulation sets out common rules to guarantee non-discriminatory access and to manage congestion efficiently. A challenge arises when the demand for capacity exceeds the available supply, leading to high allocation costs and potentially limiting the integration of renewable generation.

Congestion Management deals with the situation where the physical limits of the transmission network prevent the simultaneous flow of all scheduled electricity. The EU requires TSOs to apply transparent, market-based congestion-management procedures, such as redispatch, counter-trade or price coupling. Effective congestion management is essential for the operation of a single European electricity market and for the integration of intermittent renewable sources. However, the coordination of congestion-management actions across borders can be complex, especially when national priorities differ.

Grid Access is the right of generators, suppliers and consumers to connect to the transmission or distribution network on fair, transparent and non-discriminatory terms. The EU's grid-access rules prescribe procedures for connection requests, technical standards and timelines. An example is the "connection guarantee" for renewable projects, which obliges the TSO to provide a connection within a defined period, subject to certain conditions. The challenge is to balance the need for rapid connection of renewables with the technical constraints of the existing grid and the cost of necessary upgrades.

Balancing refers to the real-time matching of electricity supply and demand to maintain system stability. Balancing services are provided by the TSO and are remunerated through market mechanisms such as the "imbalance price." In the EU, the "Balancing Rules" set out the responsibilities of market participants, the calculation of imbalance charges and the role of balancing markets. The integration of variable renewable energy sources increases the need for flexible balancing resources, such as storage or demand-response, creating new business opportunities but also requiring regulatory adaptation.

Renewable Energy Certificates (RECs) are tradable instruments that represent the environmental attributes of renewable electricity generation. In the EU, RECs are known as Guarantees of Origin (GoOs). They enable producers to prove the renewable origin of their electricity, and allow suppliers to demonstrate compliance with renewable-energy obligations. The GoO system is managed by national registries that are interoperable across the EU, facilitating cross-border trading of certificates. A practical issue is ensuring the integrity of the certificate chain to prevent fraud or double counting.

Guarantees of Origin are electronic documents that certify that a specific amount of electricity was generated from renewable sources. They are issued by national competent authorities and can be transferred between parties. The EU has established a framework for the mutual recognition of GoOs, which supports the development of a pan-European renewable-energy market. However, the administrative burden of registering, tracking and retiring certificates can be significant, especially for small-scale producers.

Feed-in Tariffs are policy instruments that guarantee a fixed price for renewable electricity over a specified period, usually linked to the cost of generation plus a reasonable profit margin. The German EEG scheme is a classic example, where producers receive a premium above the market price for solar or wind power. Feed-in tariffs provide investment certainty and have been instrumental in the rapid deployment of renewables. Yet, they can lead to high subsidy costs, prompting governments to transition to auction-based mechanisms that aim to achieve lower, market-driven prices.

Net Metering allows electricity consumers who generate their own power, for example through rooftop solar panels, to export excess electricity to the grid and receive a credit against their consumption. Net metering policies vary across Member States, with some offering full retail-rate compensation and others applying a lower feed-in price. The practical benefit is the encouragement of distributed generation and the reduction of peak demand. The challenge lies in designing tariffs that reflect the true cost of grid usage while avoiding cross-subsidisation between prosumers and non-prosumers.

Energy Efficiency Directive (EED) sets binding measures to improve energy efficiency across the EU, including a target of a 32.5 % Improvement in primary energy consumption by 2030. The directive requires Member States to establish national energy-efficiency action plans, conduct regular energy-audit programmes for large enterprises, and implement a “neighbourhood renovation factor” to promote building retrofits. The EED also introduces a “quota” system for energy-efficiency obligations on energy distributors, encouraging them to achieve savings for their customers. Implementation challenges include financing the upfront costs of renovation and ensuring the quality of energy-audit services.

Energy Taxation Directive (ETD) harmonises the taxation of energy products and electricity to avoid distortions in the internal market. The directive sets minimum tax rates for fuels and electricity, while allowing Member States to apply reduced rates for environmentally friendly energy sources. The ETD also provides a framework for exemptions or reduced rates for certain sectors, such as public transport or agriculture. A current challenge is aligning the ETD with the EU’s climate objectives, as low tax rates on fossil fuels can undermine the carbon-pricing signal from the ETS.

Climate Change Mitigation is a core objective of EU energy policy, reflected in the EU’s long-term strategy for a climate-neutral economy by 2050. Mitigation measures include the expansion of renewable generation, the promotion of energy efficiency, and the implementation of carbon pricing mechanisms. Legal instruments such as the RED II, the ETS Regulation and the Climate Law (European Climate Law) provide the regulatory basis for mitigation actions. The main difficulty is reconciling the rapid deployment of clean technologies with the need to maintain energy security and affordability.

Carbon Pricing is the economic principle of assigning a cost to carbon dioxide emissions, thereby internalising the externality associated with climate change. The EU’s primary carbon-pricing instrument is the ETS, but member states may also apply national carbon taxes. Carbon pricing influences investment decisions, making low-carbon technologies more attractive. However, setting an appropriate price level is challenging, as it must be high enough to drive change but not so high as to cause economic hardship or competitive disadvantages for carbon-intensive industries.

Carbon Border Adjustment Mechanism (CBAM) is a proposed EU measure that would impose a carbon price

on imports of certain goods, such as steel, cement and electricity, to prevent carbon leakage. CBAM aims to level the playing field between EU producers subject to the ETS and foreign producers operating under less stringent climate regimes. The mechanism would require importers to purchase CBAM certificates corresponding to the embedded emissions of their products. The legal complexity lies in ensuring compliance with World Trade Organization (WTO) rules, avoiding discrimination, and establishing robust verification procedures for the carbon content of imported goods.

Energy Security concerns the uninterrupted availability of energy at affordable prices. EU policy addresses energy security through diversification of supply sources, development of strategic reserves, and the enhancement of cross-border interconnections. The EU's strategic reserves directive obliges Member States to maintain a minimum level of oil reserves equivalent to 90 days of net imports. For gas, the "Regulation on Security of Gas Supply" sets out obligations for member states to prepare for supply disruptions, including the development of alternative supply routes and the establishment of emergency response plans. A key challenge is balancing security with the transition to renewable energy, as the intermittency of renewables can create new vulnerabilities.

Supply Diversification is a strategy to reduce dependence on a single energy source or supplier. The EU has pursued diversification by developing liquefied natural gas (LNG) terminals, investing in renewable projects across different regions, and supporting the construction of new pipelines that connect to alternative sources. For example, the Southern Gas Corridor links Azerbaijan's gas fields to the EU, providing an alternative to Russian supplies. Diversification reduces geopolitical risk but often requires substantial capital investment and coordinated regulatory frameworks.

Strategic Reserves are stockpiles of energy commodities maintained by governments to mitigate the impact of supply shocks. The EU's oil reserve requirement is a concrete illustration, where member states must hold a minimum quantity of oil in national reserves. In the gas sector, the "Regulation on Security of Gas Supply" establishes a "gas storage obligation" that mandates operators to maintain a certain level of storage capacity. Managing strategic reserves involves logistical considerations, such as the location of storage facilities, and financial aspects, including the cost of maintaining idle inventories.

Interconnection refers to the physical links that allow electricity or gas to flow between different national transmission systems. Interconnections are essential for market integration, cross-border trade and the balancing of renewable generation. The EU sets target levels for interconnection capacity, expressed as a percentage of the installed generation capacity of each member state. Projects such as the "North Sea Wind Power Hub" illustrate the strategic importance of interconnection for enabling large-scale offshore wind development. However, interconnection projects often encounter regulatory delays, environmental concerns and financing gaps.

Cross-Border Trade in energy is facilitated by the EU's internal market rules, which require transparent procedures for the exchange of electricity and gas across national borders. The "Market Coupling" mechanism aligns national electricity markets to create a single European market, allowing the most economical cross-border trades to be executed automatically. In the gas sector, the "ENTSO-Gas" framework coordinates the operation of transmission networks to enable seamless gas flows. Practical

challenges include harmonising market designs, dealing with differing capacity allocation rules, and managing the impact of national subsidies on cross-border competition.

Market Coupling is a technical process that integrates national electricity markets by matching supply and demand across borders, thereby creating a single price zone. The EU has implemented “tight” market coupling, where the coupling algorithm directly considers the physical constraints of interconnectors. The result is increased market efficiency, reduced price differentials and better utilisation of renewable generation. A difficulty lies in the need for high-quality data exchange and real-time coordination among TSOs, which can be hindered by national data-privacy regulations or legacy IT systems.

Capacity Mechanisms are policy tools that provide payments to electricity generators to ensure sufficient capacity is available to meet peak demand. The EU distinguishes between “capacity remuneration mechanisms” (CRMs) that are compatible with state-aid rules and those that are not. For instance, the UK’s Capacity Market and France’s “capacity remuneration” scheme have been scrutinised by the European Commission to ensure they do not distort competition. The design of capacity mechanisms must balance the need for reliability with the risk of crowding out investment in low-carbon technologies.

Ancillary Services are essential grid-support functions that maintain system stability, such as frequency control, voltage regulation and reserve provision. In the EU, ancillary services are procured through competitive markets, with TSOs defining the technical specifications and remuneration schemes. The integration of distributed energy resources (DERs), like battery storage and demand-response, expands the pool of providers for ancillary services, creating new market opportunities. However, regulatory frameworks must evolve to accommodate the participation of non-traditional actors and to ensure fair compensation.

System Operator is a neutral entity responsible for the real-time operation of the electricity or gas transmission system. In the EU, the role of the system operator is split between the Transmission System Operator (TSO) for the high-voltage grid and the Distribution System Operator (DSO) for lower-voltage networks. System operators must ensure non-discriminatory access, manage congestion, and coordinate balancing. The independence of the system operator is a key principle of the EU’s unbundling rules, intended to prevent conflicts of interest and to promote transparent market functioning.

Transmission System Operator (TSO) is the entity that owns, operates and maintains the high-voltage electricity transmission network. TSOs are regulated by national authorities but must comply with EU network codes that set technical and market standards. They are responsible for allocating transmission capacity, managing congestion, and providing balancing services. The EU’s “Regulation on Electricity Transmission System Operators” establishes a framework for the coordination of TSOs, including the creation of the “European Network of Transmission System Operators for Electricity” (ENTSO-E). A major challenge for TSOs is the integration of large-scale renewable generation, which requires upgrades to the grid and the implementation of advanced control technologies.

Distribution System Operator (DSO) manages the medium- and low-voltage networks that deliver electricity to end-users. The EU is increasingly focusing on the role of DSOs in the energy transition, as they become key enablers of demand-side management, smart-metering and the integration of distributed generation. The “Regulation on Distribution System Operators” sets out the obligations of DSOs to provide transparent

access, ensure network reliability and support the rollout of renewable technologies. One practical difficulty is that many DSOs are municipal utilities with limited financial resources, making it harder to fund necessary network reinforcements.

National Regulatory Authority (NRA) is the independent body in each Member State tasked with overseeing the energy market, enforcing competition rules, and protecting consumer interests. NRAs are members of ACER, which provides a platform for coordination and the development of common regulatory approaches. The NRA's responsibilities include licensing of energy suppliers, monitoring market conduct, and adjudicating disputes between market participants. A key challenge is ensuring that NRAs have sufficient expertise and resources to keep pace with rapid technological change, such as the emergence of blockchain-based energy trading platforms.

European Commission is the executive institution of the EU, responsible for proposing legislation, implementing policies and enforcing EU law. In the energy field, the Commission drafts directives and regulations, conducts state-aid control, and monitors compliance with the internal market rules. The Commission also leads the development of the EU's climate strategy, including the "Fit for 55" package, which proposes revisions to the ETS, the Renewable Energy Directive and the Energy Taxation Directive. The Commission's enforcement powers include the ability to initiate infringement proceedings before the ECJ when a Member State fails to transpose or apply EU law correctly.

European Parliament shares legislative authority with the Council of the EU under the ordinary legislative procedure. Members of the European Parliament (MEPs) scrutinise and amend energy legislation, ensuring that the interests of citizens, environmental groups and industry are represented. The Parliament's Committee on the Environment, Public Health and Food Safety (ENVI) is the principal forum for discussing energy and climate legislation. The Parliament's role in budgetary matters also influences the allocation of EU funds for energy projects, such as those under the "Connecting Europe Facility" (CEF).

Council of the EU represents the governments of the Member States and, together with the European Parliament, adopts energy legislation. The Council's configuration for energy matters is the "Energy Council," which meets regularly to discuss the implementation of the Energy Union, the progress of the internal market and the coordination of climate policies. The Council's decisions often reflect compromises between Member States with differing energy mixes and strategic interests, which can affect the pace and ambition of EU energy reforms.

European Court of Justice (ECJ) is the highest judicial authority in the EU, tasked with interpreting EU law and ensuring its uniform application across Member States. The ECJ has delivered landmark judgments in the energy sector, such as the "Commission v. Germany" case on state-aid for renewable subsidies, and the "Eneco v. ACER" case on the interpretation of network codes. The Court's rulings shape the legal landscape for energy markets, influencing how national measures are assessed for compatibility with EU law. A practical challenge is the length of litigation, which can delay the implementation of urgently needed reforms.

Case Law provides guidance on the interpretation of energy-related provisions. For instance, the ECJ's decision in "Bottacini v. E.ON" clarified the scope of "public service obligations" in the context of electricity

supply, establishing that PSOs must be proportionate and non-discriminatory. Another important case, “Kraftwerk Union v. Commission,” addressed the compatibility of state-aid schemes with the internal market, emphasizing the need for a transparent selection criteria. Practitioners rely on case law to assess the legality of national measures and to anticipate potential challenges.

State-Aid Control is the system through which the European Commission monitors and authorises subsidies that could distort competition. Energy-related state aid includes subsidies for renewable electricity, assistance for energy-intensive industries, and support for strategic reserves. The Commission evaluates aid based on the “market-economy operator” test, assessing whether the aid confers an advantage that would not have been granted under normal market conditions. A notable challenge is the need to balance climate objectives with competition rules, as generous subsidies for renewables may be deemed incompatible unless justified by the EU’s climate goals.

Subsidies are financial contributions from the public sector that support specific economic activities. In the energy sector, subsidies can take the form of direct grants, tax exemptions, feed-in tariffs or guaranteed prices. While subsidies can accelerate the deployment of clean technologies, they also risk creating market distortions if not properly designed. The EU’s “Guidelines on State Aid for Environmental Protection and Energy” provide a framework for assessing the compatibility of subsidies, emphasising transparency, proportionality and the avoidance of double counting.

Investment Protection is a principle of international investment law that safeguards foreign investors against arbitrary or discriminatory treatment. The Energy Charter Treaty and many bilateral investment treaties contain “fair and equitable treatment” clauses, as well as “most-favoured-nation” (MFN) provisions. Investors may invoke these clauses in arbitration proceedings if they believe that a host state’s policy change, such as the termination of a renewable energy contract, breaches their contractual expectations. The tension between investment protection and the right of states to pursue environmental policies is a hotly debated issue, with recent arbitral awards highlighting the need for clear, forward-looking contractual clauses.

Dispute Settlement mechanisms provide the means for resolving conflicts arising from energy contracts, regulatory decisions or investment disputes. In the EU, disputes can be addressed through national courts, the ECJ, or specialised bodies such as ACER’s dispute-resolution panel. Internationally, parties may resort to arbitration under institutions like the International Centre for Settlement of Investment Disputes (ICSID) or the International Chamber of Commerce (ICC). A practical challenge is the fragmentation of jurisdiction, which can lead to parallel proceedings and inconsistent outcomes. Some scholars advocate for a unified EU energy-dispute settlement framework to enhance legal certainty.

Arbitration is a private dispute-resolution process where the parties agree to submit their case to an independent tribunal, whose decision is binding. Energy contracts often contain arbitration clauses to provide a neutral forum, especially when parties are from different jurisdictions. The “Energy Charter Treaty Arbitration Rules” are frequently used for investment-related disputes. While arbitration offers speed and expertise, critics argue that it can undermine public policy goals, particularly when investors challenge climate measures that affect the profitability of their projects.

Mediation is a voluntary, collaborative process in which a neutral mediator assists the parties in reaching a mutually acceptable settlement. In the energy sector, mediation can be employed to resolve disputes over grid access, contract renegotiations or regulatory compliance. The EU has promoted mediation as a cost-effective alternative to litigation, especially for cross-border disputes where time is of the essence. However, the success of mediation depends on the willingness of the parties to compromise and the availability of skilled mediators with sector-specific knowledge.

Greenhouse Gas Emissions are the primary drivers of climate change, and the energy sector is the largest source of emissions in the EU. Legal instruments targeting GHG reductions include the ETS, the Renewable Energy Directive, and national climate-action plans. Accurate measurement, reporting and verification (MRV) of emissions are essential for the functioning of these instruments. The EU's "Regulation on the Governance of the Energy Union" requires Member States to submit annual emissions inventories, which are then validated by the European Environment Agency. A key challenge is ensuring data quality and consistency across jurisdictions.

Kyoto Protocol was the first international treaty that set binding emission-reduction targets for developed countries. Although the EU has moved beyond Kyoto to the Paris Agreement, the Protocol's mechanisms, such as Joint Implementation (JI) and the Clean Development Mechanism (CDM), have influenced the design of the EU's internal carbon market. The EU's "EU ETS" can be linked to other compliance markets, creating opportunities for cost-effective emission reductions through the purchase of verified emission reductions from projects in developing countries. However, linking raises concerns about the environmental integrity of offset credits and the potential for "double counting."

Paris Agreement is the global climate accord that aims to limit warming to well below 2 °C above pre-industrial levels. The EU has incorporated the Paris objectives into its "European Climate Law," which enshrines the 2050 climate-neutrality target in binding legislation. The Agreement's "Nationally Determined Contributions" (NDCs) require each Member State to set its own emission-reduction pathway, which must be regularly updated and reported. Aligning national energy policies with the EU's climate objectives while respecting the flexibility granted by the Paris framework presents a complex legal and policy balancing act.

Carbon Leakage refers to the risk that firms relocate production to jurisdictions with less stringent climate policies, thereby undermining the environmental objectives of the EU's climate measures. To address carbon leakage, the EU provides free emission allowances to sectors deemed at risk, such as cement, steel and aluminium. The allocation of free allowances must be proportionate and transparent, and the Commission regularly reviews the list of sectors covered. A persistent challenge is accurately identifying which sectors are truly at risk, as over-generous allocations can weaken the carbon price signal.

Energy Poverty describes the situation where households are unable to afford adequate energy services, leading to adverse health and social outcomes. The EU's "Energy Poverty Observatory" monitors the prevalence of energy poverty and recommends policy actions, such as targeted social tariffs, energy-efficiency retrofits and awareness campaigns. Legal measures may include the introduction of "vulnerable-customer" protections in national electricity and gas supply contracts. The challenge is to design interventions that alleviate energy poverty without distorting market competition or creating undue

fiscal burdens.

Energy Justice is a normative concept that emphasises fairness in the distribution of energy benefits and burdens. It encompasses procedural justice (participation in decision-making), distributive justice (equitable allocation of costs and benefits) and recognitional justice (acknowledgement of different groups' needs).