Specialist Certification in EU Energy Law

Internal Energy Market

ACER (Agency for the Cooperation of Energy Regulators) – Related terms: European Network of Transmission System Operators (ENTSO-E), regulatory cooperation. EU-wide regulator that monitors the internal energy market, ensures consistent application of EU energy rules and resolves cross-border disputes. Example: ACER issues network codes on capacity allocation. Practical application: Market participants must comply with ACER guidelines when bidding for transmission capacity. Challenges: Balancing national regulatory autonomy with EU-wide harmonisation, especially in rapidly evolving renewable markets.

Acquis Communautaire – Related terms: EU law, harmonisation, energy directives. The body of existing EU legislation, including energy law, that Member States must adopt. Example: The Electricity Directive 2009/72/EC forms part of the acquis. Practical application: New Member States must transpose the acquis into national law before full market participation. Challenges: Aligning divergent national legal frameworks with the acquis, especially concerning subsidies and market liberalisation.

Aggregated Demand Response – Related terms: Demand-side flexibility, smart grids, ancillary services. The collective reduction of electricity consumption by multiple consumers to support system balance. Example: A portfolio of industrial plants reduces load by 10 MW during a peak-price period. Practical application: Aggregators receive remuneration from Transmission System Operators (TSOs) for providing this flexibility. Challenges: Coordinating many small participants, ensuring reliable performance, and developing transparent remuneration mechanisms.

Balancing Mechanism – Related terms: Real-time balancing, imbalance settlement, ancillary services. The process by which TSOs adjust generation or consumption to match actual supply and demand in real time. Example: When a wind farm under-produces, the TSO procures upward regulation from a gas plant. Practical application: Market participants submit bids/offers to the balancing market and are compensated for deviations. Challenges: Integrating high shares of intermittent renewables while maintaining system stability and cost-effectiveness.

Capacity Mechanism – Related terms: Capacity market, reliability, remuneration. A policy tool that guarantees a payment to generators for maintaining available capacity, ensuring security of supply. Example: The UK Capacity Market awards contracts to gas plants for 2030-2032. Practical application: Helps bridge the investment gap for peaking plants in markets with high renewable penetration. Challenges: Compatibility with EU state-aid rules, potential distortion of competition, and defining “adequate” capacity.

Carbon Leakage – Related terms: Border adjustments, competitiveness, emissions trading. The risk that firms relocate production to jurisdictions with looser climate policies, undermining emission reduction goals. Example: Steel producers might move to a non-EU country to avoid the EU ETS cost. Practical application: EU may adopt Carbon Border Adjustment Mechanism (CBAM) to level the playing field. Challenges: Legal

disputes under WTO rules, accurate measurement of embedded emissions, and political resistance.

Cross-Border Capacity Allocation – Related terms: Transmission rights, congestion management, EU electricity market. The method by which transmission capacity on interconnectors is assigned to market participants from different Member States. Example: Allocation of 500 MW on the France-Germany interconnector via the EU's flow-based market coupling. Practical application: Enables efficient cross-border trade and price convergence. Challenges: Managing congestion, aligning national allocation rules, and dealing with divergent market designs.

Directive 2009/72/EC (Electricity Directive) – Related terms: Internal market, unbundling, consumer rights. Establishes the legal framework for the EU electricity market, covering generation, transmission, distribution and supply. Example: Requires Member States to separate transmission from generation activities ("ownership unbundling"). Practical application: Provides the basis for market liberalisation and consumer protection. Challenges: Implementation disparities, resistance from incumbent utilities, and adaptation to emerging technologies.

Directive 2009/73/EC (Gas Directive) – Related terms: Gas market, third-party access, unbundling. Sets out the EU framework for the natural gas market, promoting competition and security of supply. Example: Mandates non-discriminatory access to gas pipelines for third parties. Practical application: Enables multiple suppliers to compete for end-users, lowering prices. Challenges: Aligning national gas infrastructures, dealing with legacy contracts, and integrating gas with electricity markets.

EU Emissions Trading System (EU ETS) – Related terms: Carbon market, allowance allocation, compliance. The cornerstone of EU climate policy, capping total emissions from covered sectors and allowing trading of emission allowances. Example: Power plants must surrender one allowance per tonne of CO_2 emitted. Practical application: Creates a price signal for low-carbon investment. Challenges: Over-allocation, price volatility, and ensuring coverage of all relevant sectors.

EU Energy Union – Related terms: Energy security, sustainability, competitiveness. A strategic framework aiming to integrate energy markets, diversify supply, and achieve climate goals. Example: The "Ten-Point Action Plan" outlines measures for grid integration and renewable deployment. Practical application: Guides Member State policies toward a more interconnected market. Challenges: Reconciling national interests, financing infrastructure, and meeting the 2030 climate targets.

Eurostat Energy Statistics – Related terms: Data collection, transparency, market monitoring. The EU statistical office's database on production, consumption, trade and prices of energy commodities. Example: Provides annual data on electricity generation by fuel type for each Member State. Practical application: Informs policy decisions, market analysis and research. Challenges: Ensuring data comparability, timeliness, and coverage of emerging technologies.

European Network of Transmission System Operators for Electricity (ENTSO-E) – Related terms: Grid codes, market coupling, system operation. The association of European electricity TSOs that develops network codes and coordinates cross-border flows. Example: ENTSO-E publishes the "Ten-Year Network Development Plan" outlining needed grid investments. Practical application: Provides the technical basis for

the internal electricity market. Challenges: Aligning investment priorities, financing large-scale projects, and integrating high levels of renewables.

European Network of Transmission System Operators for Gas (ENTSO-G) – Related terms: Gas balancing, capacity allocation, infrastructure development. The counterpart of ENTSO-E for the gas sector, coordinating gas transmission networks across the EU. Example: ENTSO-G develops the "Gas Grid Map" showing interconnection capacities. Practical application: Supports the EU gas market integration and security of supply. Challenges: Harmonising technical standards, addressing seasonal demand fluctuations, and facilitating the transition to hydrogen.

European Union (EU) State-Aid Rules – Related terms: Competition law, subsidies, Commission control. Legal framework that prohibits Member States from granting selective advantages that distort competition, unless justified. Example: A Member State may grant aid for renewable projects if it meets the "de minimis" threshold. Practical application: Ensures that capacity mechanisms or subsidies do not unfairly advantage domestic firms. Challenges: Interpreting complex criteria, balancing climate objectives with competition principles.

FIT (Feed-in Tariff) – Related terms: Renewable support, guaranteed price, contract-for-difference. A policy instrument that guarantees a fixed price for electricity generated from renewables over a set period. Example: German "EEG" tariff guarantees €120/MWh for on-shore wind. Practical application: Stimulates investment in renewable generation. Challenges: Cost burden on consumers, market distortions, and transition to market-based mechanisms.

FERC (Federal Energy Regulatory Commission) – Related terms: Transatlantic cooperation, regulatory convergence, market design. The U.S. Agency that regulates interstate electricity transmission and wholesale markets. Example: FERC's "Order 2222" enables aggregators to participate in wholesale markets, a model watched by EU regulators. Practical application: Provides reference points for EU reforms on demand-side participation. Challenges: Aligning differing regulatory philosophies and legal frameworks.

Grid Code – Related terms: Technical standards, system operation, compliance. A set of rules governing the connection, operation and use of the electricity transmission network. Example: ENTSO-E's "Grid Code – Part B" defines frequency control requirements. Practical application: Ensures safe and reliable grid operation across borders. Challenges: Updating codes to accommodate new technologies such as storage and electric vehicles.

Harmonisation – Related terms: Legal convergence, market integration, EU directives. The process of aligning national laws and regulations to achieve a uniform internal energy market. Example: Aligning national net-billing rules with the EU's renewable energy directive. Practical application: Reduces regulatory barriers for cross-border trade. Challenges: Overcoming entrenched national interests and differing market structures.

Hydrogen Strategy for a Climate-Neutral Europe – Related terms: Green hydrogen, EU taxonomy, energy transition. The EU's roadmap to develop hydrogen as a key energy carrier for decarbonisation. Example: Targets 6 GW of renewable hydrogen electrolyzers by 2024. Practical application: Creates new market

opportunities for renewable electricity and gas infrastructure. Challenges: Scaling production, establishing certification schemes, and integrating hydrogen into existing gas networks.

Imbalance Settlement – Related terms: Balancing market, deviation penalties, market participants. The financial mechanism that settles the differences between contracted and actual electricity volumes. Example: A consumer that consumes 5 MWh more than contracted pays an imbalance charge. Practical application: Incentivises accurate forecasting and penalises deviations. Challenges: Designing fair pricing formulas and managing high volatility from renewable intermittency.

Incentive Regulation – Related terms: Performance-based regulation, price caps, investment incentives. A regulatory approach that links utility revenues to performance indicators such as efficiency or service quality. Example: An electricity distribution operator receives a higher allowed revenue if it reduces losses. Practical application: Encourages cost-effective investments and innovation. Challenges: Setting appropriate benchmarks and avoiding under-investment in essential assets.

Internal Energy Market (IEM) – Related terms: Liberalisation, cross-border trade, EU energy policy. The EU's overarching goal to create a single, borderless market for electricity and gas, characterised by competition, security of supply and sustainability. Example: The EU's "Third Energy Package" laid the foundations for the IEM. Practical application: Enables consumers to choose suppliers, promotes price convergence and facilitates renewable integration. Challenges: Overcoming fragmented national regulations, investing in interconnection capacity, and addressing market power.

Joint Allocation (JA) – Related terms: Capacity allocation, flow-based coupling, market coupling. A mechanism that allocates transmission capacity simultaneously across multiple borders based on a common algorithm. Example: The EU's "Flow-Based Market Coupling" uses JA to optimise cross-border exchanges. Practical application: Improves utilisation of interconnectors and reduces price differentials. Challenges: Data exchange requirements, computational complexity, and aligning national allocation rules.

Market Coupling – Related terms: Price coupling of regions, congestion management, flow-based. The integration of separate national electricity markets into a single market by jointly clearing cross-border capacity. Example: The "Day-Ahead Market Coupling" aligns bids across the EU, producing a single price for interconnected zones. Practical application: Increases market liquidity and promotes efficient generation dispatch. Challenges: Managing congestion, ensuring transparent allocation, and coping with divergent market designs.

National Regulatory Authority (NRA) – Related terms: National energy regulator, ACER, oversight. The body appointed by each Member State to enforce EU energy rules domestically. Example: Italy's ARERA supervises electricity and gas markets. Practical application: Issues licences, monitors compliance and enforces consumer protection. Challenges: Maintaining independence, coordinating with ACER, and adapting to EU-wide reforms.

Network Code – Related terms: Grid code, technical standards, ENTSO-E. Detailed rules developed by ENTSO-E and adopted by the Commission that govern the operation of the transmission system. Example: "NC C 2" defines capacity allocation methods for cross-border flows. Practical application: Provides a

common technical basis for market participants. Challenges: Keeping codes up-to-date with rapid technological change and ensuring consistent implementation across Member States.

Oil-to-Gas Switching – Related terms: Fuel diversification, security of supply, gas market. The policy option that enables electricity generators to replace oil-fired units with gas-fired ones, improving efficiency and reducing emissions. Example: Poland's "Oil-to-Gas" programme subsidises conversion of oil boilers to gas. Practical application: Enhances flexibility of the generation mix. Challenges: Ensuring sufficient gas infrastructure, price volatility, and aligning with climate targets.

Operational Reserve – Related terms: Ancillary services, frequency control, balancing. The capacity that TSOs keep on standby to respond quickly to sudden imbalances. Example: A 50 MW gas turbine provides upward reserve to cover unexpected wind drops. Practical application: Guarantees system reliability and prevents blackouts. Challenges: Cost allocation, integrating renewable-based reserves, and ensuring fast response times.

Power Purchase Agreement (PPA) – Related terms: Renewable contracts, corporate procurement, off-take. A long-term contract in which a buyer agrees to purchase electricity from a specific generator at a predetermined price. Example: A tech company signs a 15-year PPA with a solar farm. Practical application: Provides revenue certainty for project developers and enables corporate sustainability goals. Challenges: Negotiating price terms, regulatory risk, and aligning with market price signals.

Price Coupling of Regions (PCR) – Related terms: Market coupling, day-ahead market, flow-based. The algorithm that simultaneously matches supply and demand across multiple bidding zones to obtain a single market price. Example: PCR 2 + 2 + 2 integrates Central, Nordic and Baltic regions. Practical application: Enhances price convergence and cross-border trade efficiency. Challenges: Managing transmission constraints, data quality, and coordinating timelines among TSOs.

Renewable Energy Sources (RES) – Related terms: Feed-in tariff, auction scheme, green certificates. Energy generated from naturally replenishing sources such as wind, solar, hydro and biomass. Example: In 2023, RES accounted for 45 % of EU electricity generation. Practical application: Drives decarbonisation and reduces dependence on fossil fuels. Challenges: Intermittency, grid integration, and ensuring cost-effective support mechanisms.

Regulatory Asset Base (RAB) – Related terms: Incentive regulation, cost-of-service, investment recovery. The value of assets on which a regulated utility is allowed to earn a return. Example: A distribution network's RAB determines its allowed revenue under a price-cap regime. Practical application: Provides a transparent method for recovering investment costs. Challenges: Valuation accuracy, aligning incentives with performance, and avoiding over-capitalisation.

Renewable Energy Directive (RED II) – Related terms: 2030 Climate target, national renewable targets, EU taxonomy. The EU legislation that sets binding renewable energy targets for Member States (at least 32 % of total energy by 2030). Example: Each Member State must submit a National Renewable Energy Action Plan. Practical application: Guides national policy and subsidy design. Challenges: Achieving targets amid varying resource endowments and market conditions.

Risk Hedging – Related terms: Financial derivatives, contracts for difference, market volatility. Strategies employed by market participants to protect against price fluctuations. Example: A wind farm enters a CfD to lock in a reference price for its output. Practical application: Stabilises revenue streams and encourages investment. Challenges: Counterparty risk, regulatory uncertainty, and the need for transparent benchmark prices.

Security of Supply – Related terms: Strategic reserves, interconnection, demand-side management. The assurance that energy demand can be met at any time, even under adverse conditions. Example: The EU maintains a strategic gas reserve equivalent to 60 days of consumption. Practical application: Informs capacity adequacy assessments and emergency response planning. Challenges: Balancing cost-effectiveness with resilience, especially as share of intermittent renewables grows.

Spectrum of Market Participants – Related terms: Generators, suppliers, aggregators, consumers. The diverse actors that operate within the internal energy market, each with distinct roles and obligations. Example: Small-scale renewable producers may sell electricity via a local supplier or directly on the exchange. Practical application: Promotes competition and consumer choice. Challenges: Ensuring equal access to market platforms and preventing concentration of market power.

Strategic Energy Infrastructure (SEI) – Related terms: Projects of common interest, EU funding, cross-border links. Large-scale energy assets deemed essential for the EU's energy policy objectives. Example: The "North Sea Wind Energy Hub" is identified as an SEI. Practical application: Receives priority financing and streamlined permitting. Challenges: Coordinating multinational investment, environmental assessments, and public acceptance.

System Operator (SO) – Related terms: TSO, DSO, balancing, grid management. The entity responsible for the real-time operation of the transmission or distribution network. Example: National Grid Electricity System Operator (ESO) in the UK. Practical application: Balances supply and demand, maintains frequency and voltage, and coordinates cross-border exchanges. Challenges: Integrating high levels of renewable generation and managing congestion.

Target Model – Related terms: Third-energy package, unbundling, market transparency. The EU framework that defines organisational separation, accounting rules and governance for electricity and gas markets. Example: The "Ownership Unbundling" model requires the transmission system to be owned independently of generation assets. Practical application: Prevents conflicts of interest and promotes competition. Challenges: Implementing complex structural changes and ensuring compliance across diverse jurisdictions.

Transmission System Operator (TSO) – Related terms: Grid operator, balancing, capacity allocation. The company that owns and operates the high-voltage transmission network, ensuring the transport of electricity from generators to distribution networks. Example: RTE in France acts as the TSO for the French grid. Practical application: Manages congestion, allocates cross-border capacity and provides ancillary services. Challenges: Funding network reinforcements, integrating renewables and maintaining system security.

Unbundling – Related terms: Vertical separation, ownership unbundling, functional separation. The legal

requirement that transmission activities be separated from generation and supply to prevent anti-competitive behaviour. Example: The “Independent System Operator” model separates system operation from asset ownership. Practical application: Enables third-party access to the grid on non-discriminatory terms. Challenges: Complex restructuring of incumbent utilities and ensuring effective coordination between separated entities.

Value-Based Tariff (VBT) – Related terms: Cost-reflective pricing, consumer protection, regulatory oversight. A tariff design that reflects the actual cost of providing a service, encouraging efficient consumption. Example: A VBT for electricity distribution may include a component linked to peak-hour usage. Practical application: Aligns consumer incentives with network cost drivers. Challenges: Designing transparent cost allocation methods and avoiding price volatility for vulnerable consumers.

Virtual Power Plant (VPP) – Related terms: Aggregation, demand-side response, renewable integration. A digital platform that aggregates distributed energy resources (DERs) such as solar PV, batteries and flexible loads to act as a single market participant. Example: A VPP bids 20 MW of aggregated capacity into the balancing market. Practical application: Provides flexibility services and monetises otherwise idle assets. Challenges: Data privacy, coordination of heterogeneous resources, and regulatory acceptance.

Wholesale Electricity Market – Related terms: Day-ahead market, intraday market, market coupling. The market where large-scale electricity trades occur, typically between generators, suppliers and traders. Example: EPEX Spot operates the day-ahead market for several European zones. Practical application: Determines the market price for electricity and facilitates cross-border trade. Challenges: Price volatility, market power, and integration of intermittent generation.

Zero-Carbon Electricity – Related terms: Decarbonisation, renewable generation, carbon accounting. Electricity generated without emitting CO_2, typically from wind, solar, hydro or nuclear sources. Example: In 2022, Denmark achieved a 100 % share of zero-carbon electricity on several days. Practical application: Enables corporations to claim carbon-neutral electricity for their operations. Challenges: Managing variability, ensuring sufficient storage and transmission capacity, and verifying carbon-free status.