the global voice of
the legal profession®

Emerging themes and preliminary lessons from comparative research on energy regulation in the age of transition

IBA Energy, Environment, Natural Resources and Infrastructure Law Section (SEERIL)

November 2026

The International Bar Association (IBA), established in 1947, is the world's leading international organisation of legal practitioners, bar associations, law societies, law firms and in-house legal teams. The IBA influences the development of international law reform and shapes the future of the legal profession throughout the world. It has a membership of more than 80,000 lawyers, 190 bar associations and law societies, and 200 group member law firms, spanning over 170 countries. The IBA is headquartered in London, with offices in São Paulo, Seoul, The Hague and Washington, DC.

© 2026

International Bar Association
Chancery House, 53–64 Chancery Lane
London WC2A 1QS, United Kingdom
www.ibanet.org

All reasonable efforts have been made to verify the accuracy of the information contained in this report. The International Bar Association accepts no responsibility for reliance on its content. This report does not constitute legal advice. Material contained in this report may be quoted or reprinted, provided credit is given to the International Bar Association.

Disclaimer

This document reflects preliminary observations arising from comparative research conducted by volunteer members of the IBA's Energy, Environment, Natural Resources and Infrastructure Law Section (SEERIL) and its Committees. It is intended to contribute to ongoing professional discussion on energy regulation in the age of transition. It does not represent an official position of the International Bar Association, SEERIL or any participating organisation. The observations and preliminary lessons remain subject to further research, discussion and refinement.

Contents

Introduction: background and methodology 4

Theme 1: Technology neutrality 6

Theme 2: Assessment of regulatory impacts and outcomes 6

Theme 3: Accurate and transparent measurement 7

Theme 4: Proportionate and reasonable use of subsidies 8

Theme 5: Prioritisation of energy efficiency 8

Theme 6: Balancing energy security, energy access and sustainability considerations 9

Theme 7: Energy equity 10

Theme 8: Regulatory predictability, effective permitting and institutional capacity 10

Bibliography 11

Introduction: background and methodology

In 2015, all United Nations Member States adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs), a global blueprint for peace, prosperity, and environmental stewardship.[1] Achieving these goals requires respecting the limits of Earth's lifesupport systems, as described by the 'planetary boundaries' framework.[2] This framework identifies nine critical Earthsystem processes – such as climate change, biosphere integrity and freshwater use – that define a safe operating space for humanity.

For the legal community, this scientific and policy context creates a central challenge: how to support reliable and equitable access to energy while safeguarding natural resources and environmental systems. Sustainable development requires economic advancement, social wellbeing and environmental protection to be considered together, with particular attention to vulnerable populations. Energy regulation must therefore address security of supply, innovation and access, while also maintaining environmental integrity and social legitimacy.

Companies have an important role in responding to these challenges through the goods and services they provide and the way in which they manage their impacts on natural, human and social capital. At the same time, the proliferation of sustainability frameworks, reporting schemes and benchmarking tools, often based on different metrics, has increased regulatory and operational complexity. This places a premium on transparent governance, consistent measurement and legal clarity.

Digitalisation is also reshaping energy systems and the regulatory frameworks governing them. Digital tools may support decarbonisation by improving the management of energy use, logistics, infrastructure and resource efficiency. Their adoption nevertheless raises additional questions concerning procurement, data, transparency, accountability and regulatory oversight. Digitalisation therefore appears in this paper as a cross-cutting consideration rather than as a separate theme.

Periods of rapid technological change place particular importance on regulatory clarity, consistency and predictability. Enabling infrastructure must also develop alongside new technologies, including electricity grids, pipeline connections, processing facilities and systems for the transport and storage of CO_2. Because all energy technologies involve economic, environmental or social trade-offs, regulatory approaches need to be capable of assessing those trade-offs in the circumstances of each jurisdiction.

Responding to these challenges requires collaboration among governments, industry, the legal profession and wider stakeholder groups. Energy lawyers contribute experience in regulatory frameworks, industrial standards, contractual arrangements and land, title and subsurface rights. The speed and breadth of current change nevertheless require established legal approaches to be reconsidered and adapted to new technologies, policy objectives and forms of risk.

Against this background, discussions among members of the IBA Section on Energy, Environment, Natural Resources and Infrastructure Law (SEERIL), together with a review of regulatory developments across a range of jurisdictions, identified recurring themes concerning energy-transition policies and

1 United Nations General Assembly, 'Transforming our world: the 2030 Agenda for Sustainable Development' A/RES/70/1, 21 October 2015.

2 Johan Rockström and others, 'A Safe Operating Space for Humanity' (2009) 461 Nature 472–475; Johan Rockström and others, 'Planetary Boundaries: Exploring the Safe Operating Space for Humanity' (2009) 14(2) Ecology and Society 32.

regulatory frameworks. Experiences and views differed across jurisdictions and among contributors, but certain areas of convergence also emerged.

This paper provides a structured summary of those observations and of the preliminary lessons that contributors considered could reasonably be drawn from them. It does not prescribe a single regulatory model or offer definitive policy recommendations. Its purpose is to contribute to professional discussion about the characteristics that may support effective regulatory outcomes in different contexts.

The project began in November 2023 following the IBA Annual Conference in Paris and was led by the IBA Oil and Gas Law Committee. Following consultation across SEERIL Committees and members, participants identified eight topics that recurred in the research. A subgroup was formed for each topic to review legislation and regulatory approaches across a range of jurisdictions and to document common themes, contrasting experiences and examples associated with different regulatory outcomes.

The subgroups produced more than 90 pages of comments and supporting material. Their work was reviewed with input from members of the SEERIL Academic Advisory Group, who provided academic perspective and methodological challenge. A dedicated drafting team subsequently consolidated the material into the eight themes presented in this paper.

As a result, eight themes were identified:

1. Technology neutrality;
2. Assessment of regulatory impacts and outcomes;
3. Accurate and transparent measurement;
4. Proportionate and reasonable use of subsidies;
5. Prioritisation of energy efficiency;
6. Balancing energy security, energy access and sustainability considerations;
7. Energy equity; and
8. Regulatory predictability, effective permitting and institutional capacity.

The comparative material also reflects the continuing importance of energy production to national development, particularly in resource-producing economies. Energy production may generate public revenues, employment and domestic value chains, while supporting wider economic development. Regulatory frameworks may therefore need to consider both transition objectives and the contribution of energy activities to national capabilities and long-term economic diversification.

The themes that follow are intended to provide a framework for considering how regulatory systems are responding to technological change, sustainability objectives and differing national circumstances. They should be read as emerging observations and preliminary lessons rather than as a prescriptive model of good regulation.

Theme 1: Technology neutrality

A recurring observation in the comparative material was the potential value of technology-neutral regulatory approaches. In this paper, technology neutrality refers to approaches that focus primarily on desired outcomes rather than favouring particular technologies, except where objective and proportionate justification exists.

Across the jurisdictions reviewed, contributors frequently associated technology-neutral approaches with competition among viable solutions, regulatory adaptability, investment predictability and greater flexibility in the evolution of the energy mix.

At the same time, contributors recognised that the relevance and feasibility of particular technologies may vary across sectors. Technology neutrality at the level of overall regulatory design may therefore coexist with sector-specific pathways where these respond to demonstrable technical, economic or infrastructure differences.

Some contributors nevertheless noted that targeted intervention may also be justified where specific technologies face structural barriers or where sector-specific conditions warrant differentiated treatment.

Preliminary lesson emerging from the observations

Contributors generally considered that regulation focused on outcomes rather than prescribed technologies may improve flexibility, competition and regulatory durability. Targeted intervention may nevertheless be appropriate where justified by sector-specific conditions or demonstrable barriers, provided that it remains proportionate, transparent and reviewable.

Theme 2: Assessment of regulatory impacts and outcomes

Contributors frequently highlighted the importance of assessing the likely economic, environmental and social effects of regulatory intervention. Across the jurisdictions reviewed, broader impact assessment and early stakeholder engagement were often associated with more effective implementation. Conversely, insufficient assessment sometimes coincided with objections, disputes, delays or unintended effects in sectors beyond the immediate subject of the regulation.

This question has become particularly relevant as governments adopt measures to accelerate energy transition, promote renewable energy and energy efficiency and reduce greenhouse gas emissions. Such measures may affect agriculture, mining, industry, infrastructure, employment and public finances, as well as energy markets themselves. The research therefore pointed to the value of considering direct, indirect and distributional effects before adoption and of reviewing actual outcomes after implementation.

Examples reviewed referred to established approaches such as Regulatory Impact Assessments and Environmental and Social Impact Assessments as possible frameworks for systematic ex ante and ex post

evaluation. The appropriate methodology and level of detail will depend on the nature of the measure, the capacity of the relevant institutions and the circumstances of the jurisdiction concerned.

Stakeholder engagement was frequently identified as an important part of ex ante assessment. Relevant forms of engagement may include:

- consultation with affected industries and trade associations;
- participation by local communities, citizens and other affected stakeholders; and
- consultation on proposed environmental or social mitigation measures and, where relevant, capacity-building, training, technology transfer or local-content measures.

Ex post assessment can complement this process by examining whether a measure has achieved its intended objectives and whether it has produced material unintended effects. For significant regulations, contributors noted the potential value of review after an appropriate implementation period and, where justified, at subsequent intervals.

Preliminary lesson emerging from the observations

Contributors generally considered that proportionate ex ante assessment, meaningful stakeholder engagement and appropriate ex post review may improve regulatory design and implementation. The methods used should reflect the significance of the measure, the information available and the institutional capacity of the jurisdiction concerned.

Theme 3: Accurate and transparent measurement

Theme 2 considers when and how regulatory impacts should be assessed. This theme addresses the related but distinct question of how impact and performance should be measured, reported and compared over time.

Contributors frequently noted that credible regulation depends on the identification of relevant metrics, reliable data and clear reporting methodologies. These elements may support target-setting, monitoring, accountability and the identification of environmental, social and operational impacts. In relation to greenhouse gas emissions, for example, consistent monitoring, reporting and verification practices may improve the comparability of information across activities and supply chains.

International standards and certification schemes, including approaches based on ISO and GRI frameworks, were identified as possible means of improving consistency and stakeholder confidence. Their relevance and application nevertheless depend on the regulatory objective, the nature of the activity and the circumstances of the jurisdiction concerned.

Comparable considerations arise where digital systems are used for monitoring, forecasting or compliance. Contributors noted that the credibility of such systems may depend on the quality and

verifiability of their data, the transparency of relevant methodologies and the ability to audit or explain material outputs.

Preliminary lesson emerging from the observations

Contributors generally considered that clear methodologies, reliable data and proportionate reporting requirements may strengthen regulatory credibility and stakeholder confidence. Standardisation may improve comparability, but measurement frameworks should remain appropriate to their purpose and capable of adapting to changing evidence and technology.

Theme 4: Proportionate and reasonable use of subsidies

Subsidies may support investment, deployment and market development where technologies or activities face identifiable barriers. Contributors nevertheless observed that poorly designed or open-ended support may distort competition, increase costs, distribute benefits inequitably or contribute to stranded assets. International discussions concerning reform of inefficient fossil fuel subsidies were also noted, together with the need to consider energy poverty, energy security and just transition implications.

Across the examples reviewed, support measures associated with more effective outcomes frequently shared some of the following characteristics:

- a clearly defined policy objective and demonstrable rationale;
- transparent and non-discriminatory eligibility criteria;
- proportionality between the support provided and the objective pursued;
- limitation in duration and scope;
- periodic review and, where appropriate, sunset provisions; and
- compatibility with technology-neutral approaches, unless differentiated treatment is objectively justified.

These considerations may apply to different forms of support, including consumer measures, investment finance, infrastructure support and temporary assistance intended to address specific market or capacity constraints. Contributors also noted that competitive mechanisms, including auctions and carbon-pricing arrangements, may in some circumstances reduce reliance on direct subsidies or improve the allocation of support.

Effective oversight was identified as important in assessing whether support remains necessary, whether it is achieving its stated objective and whether it is creating unintended market or distributional effects.

Preliminary lesson emerging from the observations

Contributors generally considered that support measures are more likely to achieve their intended objectives where they are targeted, transparent, proportionate, time-limited and subject to review. The appropriate form and duration of support will nevertheless depend on the relevant sector, market conditions and national circumstances.

Theme 5: Prioritisation of energy efficiency

Energy efficiency was among the most frequently referenced considerations in the materials reviewed. Contributors associated it with lower costs, reduced resource consumption, improved system performance and a lower risk of overinvestment in infrastructure or technologies that may become obsolete as markets and technologies evolve.

The examples reviewed included regulatory requirements, financial incentives and sector-specific measures intended to integrate efficiency into policy and investment decisions. Some also indicated that targeted investment in energy-efficient technologies may contribute to emissions reduction and wider economic objectives.

Implementation may nevertheless be constrained by slow administrative processes, difficulties in stakeholder coordination, limited awareness, skills shortages, policy uncertainty and institutional capacity. These barriers may reduce uptake even where the economic or system benefits of efficiency are recognised.

Preliminary lesson emerging from the observations

Contributors generally considered that energy efficiency merits systematic consideration in regulatory and investment decisions because of its potential to reduce costs and resource use while improving system performance. The effectiveness of measures will depend on whether practical, financial and institutional barriers to implementation are also addressed.

Theme 6: Balancing energy security, energy access and sustainability considerations

A consistent observation across jurisdictions was the need to balance energy security, affordability, accessibility and sustainability. Contributors noted that the weight attached to each objective varies according to national circumstances, including resource endowment, geography, infrastructure, economic conditions and stages of social and institutional development.

This challenge is often described as the ‘energy trilemma’. The comparative material did not identify a single balance applicable across jurisdictions. Instead, it indicated that regulatory choices often

reflect tensions among reliability, cost, access and environmental objectives, as well as the capacity of governments, businesses and communities to implement change.

Policies that appear effective in one jurisdiction may therefore not be directly transferable to another. Contributors frequently associated more durable approaches with explicit consideration of local constraints, available infrastructure and the pace at which affected sectors and communities can adapt. The distribution of the resulting costs and benefits is considered separately under Theme 7.

Digitalisation introduces an additional dimension where energy security increasingly depends on digital infrastructure. In this context, contributors identified cybersecurity, system resilience and appropriate oversight as relevant considerations.

Preliminary lesson emerging from the observations

Contributors generally considered that regulatory frameworks are more likely to be workable and retain long-term acceptance where they balance security, affordability, access and sustainability in a manner responsive to national circumstances and implementation capacity.

Theme 7: Energy equity

Energy equity concerns how the costs, benefits and opportunities associated with transition are distributed among countries, communities and stakeholder groups. Contributors frequently noted that policies perceived as imposing disproportionate burdens or excluding affected groups may face reduced legitimacy and social acceptance.

Three related dimensions appeared repeatedly in the research. The first was distributional fairness, including the treatment of vulnerable communities and the allocation of transition costs and benefits. The second was participation, including opportunities for affected groups to contribute to decision-making. The third was capability, including access to finance, technology, skills and infrastructure needed to participate in and benefit from transition.

In resource-producing states, contributors also highlighted the relevance of national sovereignty over energy resources and the contribution of resource development to public revenues, employment and domestic economic capabilities. Equity considerations may therefore involve balancing international transition objectives with national development priorities.

Measures discussed in the comparative material included capacity building, technology transfer, appropriately designed local content requirements and improved access to investment capital. Contributors generally associated more credible approaches with transparency, competitiveness, time limitations and periodic review, particularly where preference or support mechanisms were used.

Digital access was identified as an emerging aspect of capability. Unequal access to digital technologies, data and supporting infrastructure may limit the ability of some countries or communities to participate in increasingly digitalised energy systems.

Preliminary lesson emerging from the observations

Contributors generally considered that attention to distributional fairness, participation and capability may strengthen the legitimacy and social acceptance of transition-related policies. Contributors generally favoured approaches that reflected national circumstances while seeking to avoid permanent dependencies or unjustified barriers to competition.

Theme 8: Regulatory predictability, effective permitting and institutional capacity

A significant proportion of the examples reviewed highlighted the importance of regulatory predictability and effective permitting for project development, financing and investment. Contributors associated unclear or rapidly changing requirements, fragmented responsibilities and uncertain approval timelines with delay, increased costs and reduced investor confidence.

Permitting difficulties were not attributed solely to the substance of regulatory requirements. The comparative material also pointed to administrative fragmentation, limited institutional capacity, skills gaps, insufficient coordination and inadequate stakeholder engagement as possible causes of delay or dispute.

Measures associated with more effective processes included clear procedural requirements, defined responsibilities, coordinated decision-making, enhanced permitting capability and greater predictability of timelines. Prioritised procedures or centralised coordination mechanisms were also identified in some jurisdictions, although their suitability depended on the legal and institutional context.

As permitting becomes increasingly digitalised, contributors identified transparency, auditability, data quality and appropriate human oversight as relevant considerations. Digitalisation may improve efficiency, but it should not obscure the basis on which decisions are made or reduce the ability of affected parties to understand and challenge them.

Institutional capacity emerged as a necessary complement to regulatory design. Contributors referred to technical expertise, professional development and sustained engagement among competent authorities, project developers and affected stakeholders as factors supporting effective implementation.

Preliminary lesson emerging from the observations

Contributors generally considered that regulatory predictability, effective permitting and institutional capacity are mutually reinforcing. Clear rules are unlikely to produce timely outcomes without capable institutions, while administrative efficiency should not come at the expense of transparency, legal safeguards or meaningful stakeholder engagement.

Bibliography

- European Parliament. (2024). AI and the Energy Sector: Briefing. www.europarl.europa.eu/RegData/etudes/BRIE/2024/741234/EPRS_BRI(2024)741234_EN.pdf
- European Union. (2024). Artificial Intelligence Act (EU AI Act). https://artificialintelligenceact.eu
- International Bar Association. (2014). Achieving Justice and Human Rights in an Era of Climate Disruption. www.ibanet.org/MediaHandler?id=0F8CEE12-EE56-4452-BF43-CFCAB196CC04
- International Bar Association. (2024). ESG (Environmental, Social and Governance) Hub. www.ibanet.org/esg-hub-page
- International Bar Association. (2024). Guidelines and Regulations to Provide Insights on Public Policies to Ensure AI's Beneficial Use as a Professional Tool. www.ibanet.org/PPID/Constituent/Multi-dsplry_Pract/anlbs-ai-report
- International Bar Association. (2025). Championing Sustainability in Changing Times: How Can Law Firms Adapt and Thrive? www.ibanet.org/conference-details/CONF2694
- International Bar Association. (2025). IBA guides and reports – Task Forces and Working Groups. www.ibanet.org/resources
- International Bar Association. (2025). SEERIL Section on Energy, Environment, Natural Resources and Infrastructure Law. www.ibanet.org/unit/Legal+Practice+Division/section/Energy%2C+Environment%2C+Natural%2C+Resources%2C+and%2C+Infrastructure%2C+Law%2C+Section%2C+%28SEERIL%29/205
- International Bar Association. (2024). IBA Group 2025 CSR Report. https://ibagroupit.com/wp-content/uploads/2022/10/iba-group-csr-report-2024.pdf
- International Energy Agency. (2023). Digitalization and Energy. www.iea.org/reports/digitalisation-and-energy
- International Energy Agency. (2023). Energy Efficiency 2023. www.iea.org/reports/energy-efficiency-2023
- International Energy Agency. (2024). Energy and AI Report. www.iea.org/reports/ai-and-energy
- OECD. (2012). Recommendation of the Council on Regulatory Policy and Governance. www.oecd.org/gov/regulatory-policy/49990817.pdf
- OECD. (2015). Principles for the Governance of Regulators. OECD Publishing. www.oecd.org/gov/regulatory-policy/principles-governance-regulators.htm
- Oxford Academic, AI-Driven Sustainability in Energy (2024)
- RAND Corporation. (2024). AI for Energy Security. www.rand.org/pubs/research_reports/RRA1234-1.html

- Task Force on Climate-related Financial Disclosures (TCFD). (2017). Final Report: Recommendations of the Task Force on Climate-related Financial Disclosures. www.fsb-tcfd.org/publications
- Tony Blair Institute. (2024). Green AI Policy Agenda. https://institute.global/policy/green-ai-policy-agenda
- United Nations. (2015). Sustainable Development Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all. https://sdgs.un.org/goals/goal7
- World Bank. (2017). Rethinking Power Sector Reform in the Developing World. https://openknowledge.worldbank.org/handle/10986/28923
- World Economic Forum, AI's Energy Paradox (2024)
- World Energy Council. (2024). World Energy Trilemma Index. www.worldenergy.org/transition-toolkit/world-energy-trilemma-index



the global voice of
the legal profession®

Chancery House
53-64 Chancery Lane
London WC2A 1QS
United Kingdom
www.ibanet.org