Balancing Strategic, Geopolitical, and Legal Challenges: Dimensions of China-EU Energy Transition and Renewable Energy Cooperation

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Kunjie Wang

Postdoctoral Researcher, Faculty of Law, University of Coimbra

Abstract

This report examines the strategic, geopolitical and legal dimensions of China–EU energy transition and renewable energy cooperation against the broader background of global decarbonisation, climate governance and changing understandings of energy security. It argues that the energy transition has become a core field through which China and the European Union pursue climate neutrality, economic modernisation, technological competitiveness and security of supply, while also testing the resilience of their comprehensive strategic partnership. The report first situates China–EU green cooperation within the evolution from environment- and climate-focused dialogue to a broader energy-transition partnership, structured through high-level political mechanisms, soft-law instruments and programmatic cooperation. It then analyses the interaction between international climate law, domestic energy and climate legislation, and international economic law, showing that both sides display partial legal convergence around renewable energy, energy efficiency, carbon reduction and green industrial transformation, despite significant differences in regulatory design and legal technique. Particular attention is given to renewable energy cooperation as both the most promising and the most contested area of the partnership, where deep interdependence in clean-energy value chains coexists with trade disputes, subsidy concerns, strategic distrust and debates over competitiveness, overcapacity and market access. The report further considers the role of WTO rules and renewable energy subsidies, arguing that existing trade disciplines both constrain and shape climate-oriented industrial policy. It concludes that China–EU cooperation remains indispensable for global green transformation, but its future depends on whether both sides can move beyond ad hoc

dialogue towards more structured regulatory cooperation, clearer subsidy disciplines, resilient clean-energy supply chains and a balanced approach that reconciles climate ambition, legal certainty, economic fairness and energy security.

Keywords

China–EU Energy Cooperation; Climate-Energy Governance; Energy Transition; Renewable Energy Law; WTO Subsidy Rules.

1. Introduction

1.1 Global Energy Transition

The contemporary global energy transition forms the structural backdrop of this study. It refers not merely to a gradual shift in the dominant energy mix, but to a deliberate, policy-driven transformation of energy systems aimed at decarbonisation, climate resilience and sustainable development. Energy production and use account for the bulk of anthropogenic greenhouse gas emissions; climate change and the "energy problem" are thus analytically inseparable.[1] At the same time, energy systems remain the backbone of economic growth, social welfare and national security, which means that the transition unfolds under multiple, sometimes competing, policy objectives.[2]

Historically, energy transitions—from traditional biomass to coal, from coal to oil and gas—were lengthy processes driven largely by technological and economic forces.[3] The current transition is distinctive in at least three respects. First, it is explicitly norm-guided: under the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement, states have undertaken obligations to limit global temperature increase and to pursue climate-resilient development pathways.[4] Second, renewables and efficiency are not just marginal supplements but are recognised as central pillars of mitigation strategies.[5] Third, the transition is framed as a "just" and inclusive transformation, which must reconcile decarbonisation with development needs and social equity.[6] This combination of climate imperatives, technological innovation and justice concerns distinguishes the present phase from earlier, predominantly market-driven fuel shifts.[7]

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[1] Goodstein, David, and Michael Intriligator. *Climate Change and the Energy Problem: Physical Science and Economics Perspective*. World Scientific, 2013.
[2] Coyle, Eugene D., and Richard A. Simmons. *Understanding the Global Energy Crisis*. Purdue University Press, 2014.
[3] Warde, Paul. "Energy Consumption in England and Wales, 1560-2004." (2007).
[4] *Powering the Twin Engines: Navigating China–EU Climate Cooperation*. CGTN Europe, Peking University's Institute of Carbon Neutrality, and the Institute for European Environmental Policy (IEEP), May 2025.
[5] Quaschning, Volker V. *Renewable Energy and Climate Change*. John Wiley & Sons, 2019; Frass-Ehrfeld, Clarisse. *Renewable Energy Sources*. Kluwer Law International, 2009.
[6] Stagner, Jacqueline A., and David SK Ting, eds. *Renewable Energy for Mitigating Climate Change*. CRC Press, 2021.
[7] Markard, Jochen. "The Next Phase of the Energy Transition and Its Implications for Research and Policy."

Scholarship on energy transitions emphasises their systemic and multi-level character. Markard, for example, conceptualises the "next phase" of the energy transition as one in which niche technologies (such as solar PV and wind) have moved into the mainstream and now require deep reconfiguration of infrastructures, markets, regulation and user practices.[8] International organisations such as the International Renewable Energy Agency (IRENA) similarly stress that achieving a 1.5°C-compatible pathway requires rapid deployment of renewables, electrification of end-use sectors, demand-side efficiency and innovation across storage, grids and system integration.[9] At the same time, studies of subsidies and market design highlight that legacy support for fossil fuels and poorly targeted state aid can slow or distort this process, calling for reforms that align financial flows with climate goals.[10]

China and the European Union (EU) have emerged as central actors in this global transformation. Both have adopted long-term climate neutrality objectives—carbon neutrality by 2060 in China, and climate neutrality by 2050 in the EU—anchored in successive planning cycles, legislation and policy packages.[11] In China, the evolution from coal-dominated growth to a more diversified, lower-carbon energy structure has been documented in policy analyses of the "green revolution" under the 12th Five-Year Plan and subsequent strategies.[12] These studies point to a gradual strengthening of environmental constraints on energy development, expanding support for renewables and efficiency, and the integration of climate targets into domestic planning and regulation. Recent integrated assessments of China's energy and climate goals in the context of the Paris Agreement

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Nature Energy 3.8 (2018): 628-633.

[8] Ibid.

[9] IRENA, *Innovation Priorities to Transform the Energy System*, 2018.

[10] Von Moltke, Anja, et al. *Energy Subsidies: Lessons Learned in Assessing Their Impact and Designing Policy Reforms*. Routledge, 2017; Madrid, Gustavo E. *Regulation of Subsidies and State Aids in WTO and EC Law*. Kluwer Law International, 2007; Farah, Paolo Davide, and Elena Cima. "WTO and Renewable Energy: Lessons from the Case Law." *Journal of World Trade* 49.6 (2015).

[11] For China's 2030/2060 targets and integration into energy and climate policy, see Mo, Jianlei, et al. "China's Energy and Climate Policy Goals in the Context of the Paris Agreement." *Economic Research Journal* 9 (2018); *China's Green Revolution: Energy, Environment and the 12th Five-Year Plan*. Chinadialogue Report, 2011. For the EU, see Romppanen, Seita, and Kaisa Huhta. "The Interface between EU Climate and Energy Law." *Maastricht Journal of European and Comparative Law* 30.1 (2023).

[12] Fan, Ying, and Yi, Bowen. "Evolution, Driving Mechanism, and Pathway of China's Energy Transition." *Management World* 8 (2021); *China's Green Revolution* (Chinadialogue Report, 2011), supra note 11.

emphasise the scale of the challenge in peaking emissions before 2030 while maintaining security of supply and economic development.[13]

The EU, for its part, has progressively embedded climate objectives within its internal energy market law and broader environmental acquis. The European Green Deal and the European Climate Law establish a legally binding 2050 climate-neutrality objective and intermediate targets for 2030, while legislative packages such as "Fit for 55" re-shape emissions trading, effort sharing, renewables, efficiency and energy taxation.[14] EU energy law scholarship has highlighted how climate considerations are increasingly "hard-wired" into market rules—through instruments such as the Emissions Trading System (ETS), renewable energy directives and network codes—blurring the traditional boundary between climate and energy law.[15]

More broadly, the evolution of EU energy law demonstrates that the energy transition is not merely a sectoral adjustment in energy policy, but part of a wider legal and societal transformation. EU energy law has developed into an increasingly integrated and complex framework in which market integration, decarbonisation, sustainability, security of supply, renewable energy, energy efficiency and solidarity operate as mutually reinforcing objectives. This also explains why the EU's energy transition is increasingly linked not only to climate neutrality and green transformation, but also to questions of affordability, social fairness and just transition.[16]

From a governance perspective, the global energy transition also redefines the content of "energy security". Classical understandings centred on physical availability and price stability of fossil fuels are being reframed around secure access to clean energy, resilient infrastructures and diversified supply chains for critical energy transition minerals

[13] Mo et al. (2018), supra note 11.
[14] Romppanen and Huhta (2023), supra note 11.
[15] Ibid.
[16] Canelas de Castro, Paulo. "Developments of European Union Energy Law and Policy: Towards Integration, Decarbonisation, and Security of Supply." *Contemporary Issues of International and European Union Law and Recognition Ceremony: Tribute to Professor Dr. Manuel Lopes Porto* (2026): 143–223.

(CETMs).[17] The 2023 report of the EU–China Energy Cooperation Platform (ECECP) on energy security under the energy transition underscores that both the EU and China now conceptualise energy security in terms of a low-carbon, flexible and resilient system, while simultaneously grappling with new vulnerabilities such as price volatility in gas markets, geopolitical tensions and technology dependencies.[18]

These dynamics have important legal ramifications. As the literature on renewable energy law shows, legal frameworks must simultaneously steer investment toward clean technologies, reform existing support schemes, and ensure compatibility with international trade and investment rules.[19] Domestic legal systems are thus under pressure to develop coherent renewable energy regimes, to refine the regulation of subsidies and state aids, and to integrate environmental and climate principles—such as precaution, prevention and polluter-pays—into energy regulation.[20] In China, this has culminated in the adoption of Energy Law, which embeds green, low-carbon transition and the 2030/2060 targets in its purposes clause and coordinates sectoral laws on renewables, electricity and other energy sources.[21] In the EU, climate-energy integration has proceeded through successive packages that link emissions reduction, market liberalisation, renewables and efficiency, generating an increasingly dense interface between climate and energy norms.[22]

Against this background, the present project situates China–EU climate and energy interactions within the broader global energy transition. It asks how international climate law and evolving understandings of energy security shape domestic legal reforms in China and the EU; how far climate objectives are integrated into energy governance; and to what extent cooperation between these two actors can function as "twin engines" for global green

[17] *Energy Security in the Context of Energy Transition – Lessons and Challenges within Europe and within China*. EU–China Energy Cooperation Platform (ECECP) Report, 2023.
[18] Ibid.
[19] Crossley, Penelope. *Renewable Energy Law: An International Assessment*. Cambridge University Press, 2019; Ottinger, Richard L. *Renewable Energy Law and Development*. Edward Elgar Publishing, 2013; and Peeters, Marjan, and Thomas Schomerus (eds). *Renewable Energy Law in the EU: Legal Perspectives on Bottom-up Approaches*. Edward Elgar Publishing, 2014.
[20] Von Moltke et al. (2017), supra note 10; Wang, Yongjie. *Study on WTO Subsidies Settlement Dispute System*. Zhejiang University Press, 2013.
[21] *Energy Law of the People's Republic of China* (adopted 2024, in force 1 January 2025).
[22] Seita and Huhta (2023), supra note 11.

transformation, as suggested by recent joint analyses.[23] These questions provide the conceptual bridge from the global context to the more specific examination of China–EU cooperation on environment and climate.

1.2 China–EU Green Cooperation on Environment, Climate and Energy

China–EU green cooperation on environment, climate and energy has evolved over more than three decades from a relatively narrow, project-based engagement to a broad "green partnership" that now constitutes one of the principal pillars of their comprehensive strategic relationship.[24] While the institutional architecture originally developed around environmental protection and climate change, recent analyses stress that the clean and low-carbon energy transition is now an integral dimension of this partnership, with climate and energy cooperation increasingly treated as mutually reinforcing "twin engines" of China–EU relations.[25]Against this background, both sides present climate and green energy cooperation as a "ballast stone" and as a distinctive "green" pillar within a more complex geopolitical relationship.[26]

1.2.1 Evolution of the Environment–Climate–Energy Partnership

The evolution of China–EU cooperation on environment, climate and energy can be divided, in broad terms, into three phases.

(a) From technical assistance to structured dialogue (1990s–mid-2000s)

Cooperation in the environmental field began in the 1980s and 1990s through bilateral projects and programmes focused on pollution control, environmental management and capacity-building.[27] Early initiatives included environmental cooperation programmes between China and individual Member States, as well as EU-funded projects supporting

[23] *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4.
[24] *China–EU Cooperation on Environment and Climate: Progress and Prospects*. Research Center for Xi Jinping Thought on Ecological Civilization, National Energy Conservation Center, Xinhua Institute and Institutes of Science and Development, Chinese Academy of Sciences, 2024.
[25] Ibid; *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4.
[26] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24.
[27] Ibid.

environmental policy development.[28] Over time, this ad hoc cooperation was gradually institutionalised. In 2003, the two sides established a Ministerial Environmental Policy Dialogue, which created a regular platform for exchanging views on environmental legislation, pollution control and sustainable development.[29]

(b) Climate change enters the core agenda (mid-2000s–2015)

From the mid-2000s onwards, climate change emerged as a distinct and increasingly central theme. The parties launched a partnership on climate change, supporting cooperation on clean energy technologies, energy efficiency and climate policy.[30] In parallel, initiatives such as the China–EU Environment and Development Programme and the EU–China Biodiversity Programme broadened the agenda to include ecological protection and sustainable development.[31] These developments were embedded in wider political frameworks, notably the 2003 Comprehensive Strategic Partnership and the 2003–2020 policy papers that progressively elevated environment and climate to priority areas of cooperation.[32]

The adoption of the Paris Agreement in 2015 marked a further turning point. In the same year, China and the EU issued a Joint Statement on Climate Change, reaffirming their commitment to an ambitious international climate regime and launching a partnership on low-carbon cities.[33] Building on this, the 2013–2015 and 2014–2020 cooperation programmes increasingly linked climate and energy, with support for emissions trading, renewable energy deployment and low-carbon urban development.[34] In this period, therefore, energy issues began to move from a largely technical supporting role—through cooperation on clean energy technologies and efficiency—towards a more explicit framing of climate and energy as interconnected policy domains within the bilateral partnership.[35]

[28] Ibid.
[29] Ibid; see also Fu, Cong. "China-EU Green Cooperation: Evolution of and Opportunities and Challenges Faced by Partnership." *Pacific Journal* 11 (2021).
[30] Ibid.
[31] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24.
[32] Ibid.
[33] Ibid.
[34] Ibid.
[35] Ibid; Fu (2021), supra note 29.

(c) Towards a "green partnership" and high-level environment–climate–energy dialogue (2015–present)

From 2015 onwards, cooperation on climate change and clean energy was embedded more explicitly in high-level political instruments. In July 2018, the EU and China adopted a Leaders' Statement on Climate Change and Clean Energy, in which they committed to "step up" cooperation on the "worldwide transition towards low greenhouse gas emission and climate-resilient economies", including through intensified political, technical, economic and scientific collaboration on climate and clean energy.[36] The Commission's press release emphasised the parties' shared determination to implement the Paris Agreement, enhance domestic climate policies and expand cooperation on emissions trading, clean energy technology and sustainable finance.[37]

In parallel, the 2013 *EU–China 2020 Strategic Agenda for Cooperation* ushered in a more comprehensive approach to green development. The Agenda commits both sides to "strengthen dialogue and cooperation on environment and climate change" and to "promote green, low-carbon, circular and sustainable development" as part of their broader partnership. This agenda has been operationalised through a series of memoranda of understanding (MoUs), including on circular economy cooperation and on emissions trading, as well as sectoral initiatives in areas such as air quality, water management and chemicals. Although framed in terms of environment and climate, these instruments increasingly point to the green and low-carbon transformation of the energy system—through, for example, promotion of circular economy practices and low-carbon technologies—as a key area of cooperation.[38]

A major qualitative shift occurred in 2020. At the September 2020 leaders' meeting, China and the EU agreed to establish a High-Level Environment and Climate Dialogue (HECD) and to build a China–EU "Green Partnership". According to the 2024 joint think-tank report on China–EU cooperation on environment and climate, this decision elevated environment and

[36] "EU and China Step up Cooperation on Climate Change and Clean Energy." *European Commission, Directorate-General for Climate Action*, Press Release, 16 July 2018.
[37] Ibid.
[38] *EU–China 2020 Strategic Agenda for Cooperation* (2013); *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24.

climate to a fifth pillar of the comprehensive strategic partnership—alongside peace, growth, reform and civilisation—and positioned "green" as a new "distinctive colour" of China–EU relations. Although formally focused on environment and climate, the HECD's agenda from the outset has been closely connected with the low-carbon energy transition, including through discussions on carbon markets, green finance and just transition.[39]

Since its formal launch, the HECD has met regularly. The first dialogue in February 2021, co-chaired by China's Vice-Premier Han Zheng and Executive Vice-President Frans Timmermans, reaffirmed both sides' commitments to the Paris Agreement, China's 2030/2060 "dual-carbon" goals and the EU's climate neutrality objective, and called for making green cooperation a "new highlight and engine" of the comprehensive strategic partnership.[40] The second and subsequent dialogues, as reflected in joint press communiqués, have addressed topics including carbon markets, methane mitigation, biodiversity (including COP15), green finance, circular economy and just transition. These themes all have important implications for the design of climate and energy policies and for the governance of the green energy transition.

By 2025, the frequency and breadth of these high-level exchanges underpin a dense architecture of cooperation mechanisms. The 2025 report *Powering the Twin Engines: Navigating China–EU Climate Cooperation* emphasises that, on the 50th anniversary of diplomatic relations, China and the EU have acted as "twin engines" in advancing the UNFCCC process and the Paris Agreement, and argues that they should continue to play this role in accelerating the global green transition. In that perspective, climate governance and the green energy transition are treated as mutually reinforcing dimensions of a single strategic agenda. At the same time, both Chinese and European analyses acknowledge that the partnership is operating in a more complex geopolitical environment, with trade tensions, technology competition and security concerns testing the resilience of climate and energy

[39] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24; *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4.
[40] "China, EU hold high-level dialogue on environment, climate." Xinhua, 2 February 2021. Available at: https://english.www.gov.cn/statecouncil/hanzheng/202102/02/content_WS6018e549c6d0f72576944f7b.html (accessed May 1, 2026).

cooperation.[41]

1.2.2 Dialogue Mechanisms and Legal Instruments for Environment–Climate–Energy Cooperation

The evolution described above has been mediated through a rich set of legal and institutional instruments. While relatively few are "hard law" treaties in the classical sense, a dense network of joint statements, MoUs, cooperation programmes and dialogue mechanisms has created a normative and procedural framework for China–EU cooperation on environment, climate and energy.

(a) Political frameworks and soft-law instruments

At the political level, the China–EU Comprehensive Strategic Partnership (2003) and subsequent policy papers provide the overarching framework within which environmental and climate cooperation is situated.[42] The 2013 *EU–China 2020 Strategic Agenda for Cooperation* is particularly significant: it identifies "sustainable development" and "environment and climate change" as priority areas, calls for enhanced cooperation on pollution control, biodiversity, low-carbon development and resource efficiency, and encourages joint work on multilateral environmental agreements.[43]

Within this framework, several soft-law instruments have been central in structuring climate-related cooperation. The 2015 *EU–China Joint Statement on Climate Change* affirmed both parties' determination to work together for an ambitious Paris outcome and launched initiatives such as the China–EU Partnership on Low-Carbon Cities.[44] The 2018 *EU–China Leaders' Statement on Climate Change and Clean Energy* further deepened this commitment, explicitly linking climate action and clean energy cooperation and calling for enhanced collaboration on emissions trading, clean energy technology, energy efficiency,

[41] *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4.
[42] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24.
[43] Ibid.
[44] Ibid.

sustainable finance and green growth.[45]

In parallel, MoUs and joint roadmaps have anchored sectoral cooperation. The MoU on circular economy cooperation and the associated *EU–China Circular Economy Roadmap* commit both sides to exchange experiences on circular economy policies, standards, eco-design and waste management—a theme closely linked to climate mitigation and sustainable resource use.[46] Another key MoU concerns emissions trading: cooperation on emissions trading has been framed by agreements and projects that support China's pilot and national ETS development, drawing on EU experience in market design, monitoring, reporting and verification (MRV).[47]

The following table summarises selected environmental and climate cooperation mechanisms that are particularly relevant to the legal and governance context of China–EU energy transition cooperation.

Table 1. Selected EU–China Environmental and Climate Cooperation Mechanisms Relevant to Energy Transition (2003–2025)

Year/Period	Mechanism, Document or Event	Main Legal-Governance Significance
2003	EU–China Ministerial Environmental Policy Dialogue	Established a regular high-level framework for cooperation on environmental legislation, pollution control, sustainable development, biodiversity and international environmental governance, providing the institutional basis for later climate- and energy-related cooperation.
2005	EU–China Joint Statement on Climate Change; China–EU Climate Change Partnership	Brought climate change into the core bilateral agenda and linked it with clean energy, energy efficiency, renewable energy, clean coal, carbon capture and storage, hydrogen, fuel cells, and power generation and transmission.
2010	China–EU Ministerial Dialogue Mechanism on	Institutionalised regular political and technical exchange on climate-policy

[45] "EU and China Step up Cooperation on Climate Change and Clean Energy" (2018), supra note 36.
[46] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24.
[47] Ibid; ECECP. *Energy Security in the Context of the Energy Transition* (2023), supra note 17.

	Climate Change	development, implementation and cooperation projects.
2013	EU–China 2020 Strategic Agenda for Cooperation	Identified sustainable development, environment and climate change as priority areas of cooperation, and promoted green, low-carbon, circular and sustainable development within the broader strategic partnership.
2015	EU–China Joint Statement on Climate Change	Reinforced cooperation around the Paris climate process and supported the development of low-carbon cities, climate-policy implementation and closer links between climate action and energy transition.
2018	EU–China Leaders' Statement on Climate Change and Clean Energy	Explicitly connected climate action with clean-energy cooperation and called for enhanced cooperation on emissions trading, clean-energy technology, energy efficiency, sustainable finance and green growth.
2018	Memorandum of Understanding on Circular Economy	Established the formal bilateral framework for circular-economy cooperation, connecting environmental governance with resource efficiency, product life cycles, waste reduction and sustainable industrial transformation.
2018	Memorandum of Understanding to Enhance Cooperation on Emissions Trading	Strengthened cooperation on carbon-market governance, including technical exchange on emissions trading design, monitoring, reporting and verification, and support for China's carbon-market development.
2020	China–EU Green Partnership and establishment of the High-Level Environment and Climate Dialogue	Elevated environment and climate cooperation within the comprehensive strategic partnership and linked green cooperation with clean-energy development, green recovery, carbon markets, biodiversity and just transition.
2021	First and Second EU–China High-Level Environment and Climate Dialogues	Addressed China's dual-carbon goals, the European Green Deal, climate and biodiversity cooperation, and multilateral climate issues, including preparations for COP26.
2022	Third EU–China High-Level Environment and Climate Dialogue	Discussed green and low-carbon development, climate-policy implementation, energy security, green-energy transition and

		electricity-market reform, showing a clearer connection between the climate dialogue and energy-transition governance.
2023	Fourth EU–China High-Level Environment and Climate Dialogue	Identified future cooperation areas including circular economy, biodiversity, chemicals management, plastic pollution, national carbon markets, climate adaptation, methane-emissions control and clean-energy transition.
September 2023	First EU–China High-Level Policy Dialogue on Circular Economy	Renewed the bilateral circular-economy agenda and identified plastics, batteries and remanufacturing as priority areas for practical cooperation.
December 2023	First China–EU Partnership Dialogue highlighting circular economy among typical green cooperation cases	Confirmed circular economy as an active and visible field of bilateral green cooperation.
April 2024	EU–China Circular Economy Cooperation Roadmap jointly endorsed	Translated the circular-economy cooperation agenda into concrete workstreams on plastics, battery value chains and remanufacturing.
May 2024	EU–China workshop on plastics	Launched technical cooperation on plastics policy, life-cycle approaches and product regulation.
October 2024	EU–China workshop on battery value chains and recycling	Advanced cooperation on battery governance, recycling and value-chain management, linking circular economy with clean-energy industrial chains.
February 2025	EU–China workshop on remanufacturing in Beijing	Deepened exchange on remanufacturing policy, industrial practice and value-chain cooperation, further consolidating circular economy as a practical cooperation track.

Source: Official materials of the European Commission and the National Energy Administration of the People's Republic of China.

(b) Dialogue mechanisms as legal-institutional frameworks

Dialogue mechanisms for environment, climate and energy function as institutionalised – albeit predominantly soft-law – frameworks that structure China–EU green cooperation, even though they are not treaties in the strict sense. The High-Level Environment and Climate Dialogue (HECD), announced by leaders in 2020 and convened annually since 2021, provides a political umbrella under which both sides regularly exchange information on

domestic environmental, climate and related energy policies, align priorities for multilateral negotiations and identify areas for technical cooperation, such as emissions trading, circular economy, biodiversity and the green transition. From the third HECD onwards, official accounts explicitly frame cooperation as covering "environment, climate and energy", and the 2023–2024 dialogues repeatedly underline that "green should be the most distinctive colour" of China–EU cooperation and that the green transition is a shared focus.[48]

Parallel to the HECD, the EU–China Energy Dialogue, established in the mid-1990s and reinforced by subsequent understandings on the implementation of EU–China energy cooperation, serves as the dedicated sectoral forum for energy policy, security and market issues. Under this framework, the National Energy Administration and the European Commission (DG Energy) discuss energy transition pathways, security of supply, renewable deployment, electricity market design and emerging areas such as hydrogen and energy system integration, and this work is operationalised through the ECECP and related technical platforms that prepare studies, capacity-building and pilot projects. Recent meetings of the Energy Dialogue, held back-to-back with sessions of the HECD, confirm that the overarching objective of China–EU energy cooperation is to accelerate the clean energy transition while ensuring energy security in order to address climate change, thereby linking the energy track directly to the broader environment–climate agenda.[49]

The development of the EU–China Energy Dialogue and related energy-cooperation mechanisms may be summarised as follows:

Table 2. Selected Development of EU–China Energy Dialogue and Energy Cooperation Mechanisms (1994–2025)

Year/Period	Mechanism, Document or Meeting	Main Legal-Governance Significance
1994 / 1997	EU–China Energy Dialogue established; Energy Working Group meetings developed	Created the early institutional framework for bilateral energy exchange, initially focused on energy security, energy

[48] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24.
[49] Ibid; ECECP. *Energy Security in the Context of the Energy Transition* (2023), supra note 17.

		efficiency, renewable energy, clean energy systems and global energy markets.
2005	Memorandum of Understanding on China–EU Dialogue on Energy and Transport Strategies; China–EU Climate Change Partnership	Linked energy cooperation with climate cooperation, including energy efficiency, energy conservation, renewable energy, clean coal, carbon capture and storage, hydrogen, fuel cells, and power generation and transmission.
2009–2010	Europe–China Clean Energy Centre and related clean-energy cooperation initiatives	Strengthened technical cooperation on clean coal, renewable energy, new energy technologies, energy efficiency and clean-energy capacity-building.
2012	First EU–China High-Level Meeting on Energy; EU–China Joint Declaration on Energy Security	Marked a move toward a strategic energy-consumer partnership, with attention to energy security, electricity markets, grid access, renewable integration and demand-side management.
2016	EU–China Roadmap on Energy Cooperation (2016–2020)	Provided a more structured framework for cooperation on energy security, infrastructure development, market transparency, renewable energy and electricity-market reform.
2019	8th EU–China Energy Dialogue; Joint Statement on the Implementation of EU–China Cooperation on Energy; launch of the EU–China Energy Cooperation Platform	Shifted the Energy Dialogue toward a more implementation-oriented structure and created a platform for technical, analytical and policy support.
22 June 2020	9th Meeting of the EU–China Energy Dialogue, online	Addressed clean energy and green development, energy security and global energy markets, electricity-market reform and regulation, and energy technology and innovation cooperation.
31 March 2022	10th Meeting of the EU–China Energy Dialogue, online	Focused on energy security, the global energy transition, electricity markets and energy reform, and international energy cooperation.
12 October 2023	11th Meeting of the EU–China Energy Dialogue, Beijing	Discussed energy security and transition, renewable energy, electricity-market reform, green electricity certification and green hydrogen, showing a more operational clean-energy agenda.
14 July 2025	12th Meeting of the EU–China	Reaffirmed that EU–China energy

	Energy Dialogue, Beijing	cooperation aims to accelerate the clean-energy transition while taking energy security into account; continued cooperation on transition acceleration, energy security, transition benefits and energy-market design.

Source: Official materials of the European Commission and the National Energy Administration of the People's Republic of China.

These dialogues also have a legal-procedural dimension. Joint press communiqués following the HECD and the Energy Dialogue typically set out agreed priorities, identify areas for future work (for example, on methane, nature-based solutions, green finance or just transition) and sometimes outline concrete cooperation projects or working groups. While non-binding, such documents crystallise mutual expectations and can influence subsequent domestic regulatory and policy processes.[50]

(c) Programmatic cooperation and funding instruments

Programmatic cooperation instruments—EU-funded projects, joint programmes and platforms—translate political commitments into concrete activities. The ECECP, for instance, has supported dialogues and studies on energy transition, energy security and market reform, providing technical input that feeds into both sides' policy debates.[51] Earlier programmes in the environmental field, such as the China–EU Environment and Development Programme and the China–EU Biodiversity Programme, similarly combined capacity-building, pilot projects and policy dialogue.[52]

These programmes often draw on EU external funding instruments and Chinese co-financing, creating a hybrid legal environment where EU financial regulations, project agreements and Chinese domestic procedures intersect. In practice, they function as laboratories for testing policy approaches—such as emissions trading, low-carbon urban planning or green

[50] Ibid.
[51] ECECP. *Energy Security in the Context of the Energy Transition* (2023), supra note 17.
[52] Ibid; *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24.

finance—which may later be reflected in domestic legislation or bilateral commitments.[53]

(d) Normative implications for the present study

Taken together, these instruments have gradually constructed a multi-layered legal and institutional architecture for China–EU cooperation on environment, climate and energy. They embed shared objectives (Paris implementation, low-carbon development, circular economy), provide channels for technical and regulatory exchange, and create expectations of sustained engagement even amidst broader political tensions.[54] At the same time, much of this framework remains soft-law and dialogue-based, raising questions about its resilience and enforceability when confronted with competing priorities in trade, technology and security.

For the purposes of this project, this architecture serves two functions. First, it defines the external legal and policy environment within which China and the EU pursue their respective climate and energy transitions. Second, it offers concrete sites—joint statements, MoUs, dialogues and programmes—through which international and bilateral norms may be internalised into domestic energy and environmental law. Subsequent chapters will examine how, and to what extent, these cooperative instruments shape the convergence of climate and energy law in China and the EU, and whether the "twin engines" metaphor is matched by legal and institutional practice.

[53] *EU–China Cooperation on Green Recovery and Green Stimulus – An Overview of Green Recovery Measures in the EU & Their Implications for EU–China Relations*. EU Report, 2020.
[54] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24; *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4.

2. Strategic Partnership in Energy Transition: Stimulating Economic Cooperation and Political Dialogue

2.1 Integrating Energy Transition into the Strategic Partnership

China–EU relations have been framed as a "comprehensive strategic partnership" since 2003, and from the late 2010s onwards, climate and green development have been progressively elevated within this framework. The 2020 decision to build a China–EU "Green Partnership" and to establish the HECD formally added "green" as a fifth pillar of the partnership, alongside peace, growth, reform and civilisation. In Chinese and European policy discourse, this "green" pillar is explicitly linked to the low-carbon energy transition, and recent official and think-tank reports describe climate and green energy cooperation as a "distinctive colour" and a "ballast stone" of the relationship.[55]

The 2025 joint report *Powering the Twin Engines: Navigating China–EU Climate Cooperation* goes one step further by characterising China and the EU as "twin engines" of global climate governance and the green transition.[56] On the occasion of the 50th anniversary of diplomatic relations, the report argues that both parties have been central in advancing the UNFCCC and the Paris Agreement and should continue to drive global decarbonisation through ambitious domestic action and strengthened cooperation.[57] This framing places climate and energy transition not at the margins but at the strategic core of the partnership: energy transition becomes both a shared objective and a field in which the overall direction of China–EU relations is tested.

Chinese and European analyses converge on several structural drivers that push energy transition into the heart of the strategic partnership. First, both sides have adopted long-term climate neutrality goals—carbon neutrality by 2060 in China and climate neutrality by 2050

[55] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24; Li, Xinlei. "China–EU Green Cooperation Partnership: An Enabler for Good Global Climate Energy Governance." *FT Chinese*, 9 August 2023.
[56] *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4.
[57] Ibid.

in the EU—which require a fundamental transformation of energy systems.[58] Second, the notion of energy security has shifted from a narrow focus on fossil fuel supply and prices towards a broader concern with secure access to clean energy, resilient infrastructures and diversified supply chains for critical energy transition technologies and materials. Third, both parties view the green transition as a key engine for economic modernisation, industrial competitiveness and technological leadership, which in turn influences their external economic and industrial policies.[59]

These structural drivers are reflected in the evolution of the bilateral agenda. The 2018 *EU–China Leaders' Statement on Climate Change and Clean Energy* explicitly links climate action and clean energy, committing both sides to "step up" cooperation on the "worldwide transition towards low greenhouse gas emission and climate-resilient economies" and emphasising collaboration on emissions trading, clean energy technologies, energy efficiency, sustainable finance and green growth.[60] Subsequent policy documents and joint statements, including the *EU–China 2020 Strategic Agenda for Cooperation* and the 2024–2025 reports on China–EU environment and climate cooperation, consistently underscore the importance of green and low-carbon development, circular economy and clean energy as cross-cutting themes of the partnership.[61]

At the same time, academic literature highlights that energy transition is not only a field of cooperation but also a source of interdependence and potential friction. Studies on the EU–China relationship in global climate governance and on their cooperation on climate change and energy security underline that both actors are simultaneously partners, competitors and systemic rivals in the climate–energy domain.[62] On the one hand, their leadership is indispensable for the credibility of the Paris regime; on the other, their respective strategies in renewable deployment, industrial policy and energy security can generate tensions, especially

[58] Mo et al. (2018), supra note 11; *China's Green Revolution* (Chinadialogue Report), supra note 11.
[59] *EU–China Cooperation on Green Recovery and Green Stimulus* (EU Report, 2020), supra note 53.
[60] "EU and China Step up Cooperation on Climate Change and Clean Energy" (2018), supra note 36.
[61] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24; *EU–China 2020 Strategic Agenda for Cooperation* (2013).
[62] Liu, Lei, Tong Wu, and Ziqianhong Wan. "The EU-China Relationship in a New Era of Global Climate Governance." *Asia Europe Journal* 17.2 (2019): 243-254.

where trade and investment interests collide.[63]

From a legal perspective, the integration of energy transition into the strategic partnership has two main implications. First, it intensifies the interaction between international climate law, domestic climate and energy law and the bilateral soft-law framework, as the parties seek to align their strategic narratives with legal commitments at multiple levels.[64] Second, it reinforces the need to understand China–EU energy relations through a multi-dimensional lens that includes not only economics and geopolitics but also the evolving architecture of climate and energy law on both sides.[65] Subsequent sections of this chapter therefore examine how energy transition is discussed and negotiated within political dialogues, how it is underpinned by hard-law and soft-law instruments, and how these dynamics shape economic cooperation.

2.2 Political Coherence and Challenges in Energy Dialogue

The political management of energy transition within the China–EU partnership is channelled primarily through two high-level dialogue tracks: the HECD, which focuses on environment and climate (and increasingly the green energy transition), and the EU–China Energy Dialogue, which addresses energy policy, markets and security.[66] These dialogues are complemented by leaders' meetings, sectoral working groups and the work of platforms such as ECECP, which provides analytical input on energy security, energy transition pathways and regulatory reform.

On paper, these mechanisms create a relatively coherent architecture. The HECD sets overarching priorities on climate and green development, including commitments to implement the Paris Agreement, enhance carbon markets, promote green finance and advance

[63] Holzer, Constantin, and Haibin Zhang. "The Potentials and Limits of China–EU Cooperation on Climate Change and Energy Security." *Asia Europe Journal* 6.2 (2008): 217-227.
[64] *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4; Liu, Wu and Wan (2019), supra note 62.
[65] Holzer and Zhang (2008), supra note 62; Greenpeace and Shanghai Institutes for International Studies (SIIS). *The Race and Cooperation in China–EU Clean Energy Investment* [中欧清洁能源投资的竞跑与合作], Shanghai Institutes For International Studies and Greenpeace Research Report, 2023.
[66] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24.

just transition. The Energy Dialogue, in turn, provides a forum for detailed discussions between the National Energy Administration and the European Commission (DG Energy) on topics such as electricity market design, renewable integration, hydrogen, gas markets and energy security. The 2025 round of dialogues, held back-to-back, explicitly linked the objectives of accelerating the clean energy transition and ensuring energy security in order to address climate change.[67]

Yet recent European and Chinese assessments highlight important challenges for political coherence. On the EU side, debates on "de-risking" from China, concerns about supply chain dependencies in solar PV and batteries, and the adoption of instruments such as the Net-Zero Industry Act (NZIA), the Critical Raw Materials Act (CRMA) and the Carbon Border Adjustment Mechanism (CBAM) have contributed to a perception in China that the EU is moving towards a more protectionist stance in green industrial policy.[68] A 2024 EU policy paper on "engaging with China on climate" acknowledges this tension, noting that the EU must "balance cooperation and competition" with China and guard against carbon leakage and unfair trade practices while still working together on global climate goals.[69]

Chinese commentators similarly warn that the EU's "green agenda" has shown signs of slowing down under the combined pressures of energy price shocks, industrial competitiveness concerns and geopolitical instability. They argue that some European policy debates risk instrumentalising the discourse of "overcapacity" in Chinese clean energy industries—particularly solar PV and electric vehicles—in ways that may undermine mutual trust and the willingness to cooperate. At the same time, other Chinese analyses stress that, notwithstanding these frictions, there remains a strong structural complementarity between the EU's demand for affordable clean technologies and China's large-scale manufacturing capacity, and that continued dialogue is necessary to prevent a "lose–lose" outcome in sectors

[67] *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4.
[68] Zhao, Bin, and Lixuan Li. "Breaking the 'Overcapacity' Narrative: Prospects for China–EU Energy Cooperation Remain" ["破'产能过剩'论, 中欧能源合作仍有前景"]. FT Chinese, 2024; Keßler, Christina. *Between Competition and Co-operation: How to Engage with China on Climate*. EU Policy Brief, 27 June 2024.
[69] Ibid.

such as solar PV.[70]

These political dynamics feed back into the operation of the dialogues themselves. The HECD and Energy Dialogue are formally presented as spaces for pragmatic, technical cooperation, but they increasingly have to process issues that sit at the intersection of climate ambition, green industrial policy and security. For example, the 2023 and 2024 rounds of discussions placed greater emphasis on the resilience of energy systems, diversification of supply, and the governance of critical raw materials and clean energy supply chains, alongside traditional topics such as emissions trading and renewable integration.[71]

From the perspective of this study, the key point is that political coherence in China–EU energy dialogue cannot be taken for granted. While both sides continue to affirm, in official documents, that "green should be the most distinctive colour" of their cooperation and that climate and energy remain areas of shared interest, the substantive content of that cooperation is increasingly shaped by broader debates on security, competitiveness and technological rivalry.[72] The next sections examine how this interplay is reflected in economic and commercial cooperation and in the underlying legal frameworks.

2.3 Economic and Commercial Cooperation in Energy Transition

Economic and commercial cooperation in the energy transition has developed along three main dimensions: trade in clean energy goods, cross-border investment and project cooperation, and joint research and innovation activities.

In trade, the EU and China have become deeply interdependent in clean energy value chains. Analyses of renewable energy in EU–China relations note that the EU has relied heavily on imports of Chinese solar PV modules and components, while China has imported European technology and equipment in sectors such as wind power, grid management and

[70] *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4.
[71] Ibid; *Between Competition and Co-operation* (2024), supra note 68.
[72] Li (2023), supra note 55; *Between Competition and Co-operation* (2024), supra note 68; Fu, Cong. "Why Is the EU's 'Green Agenda' Slowing Down?." *Globe* 16 (2024): 42-45.

high-efficiency generation.[73] A series of reports on China–EU clean energy investment and technology cooperation emphasise that this interdependence reflects complementary comparative advantages: China's large domestic market and manufacturing scale on the one hand, and the EU's experience in regulatory design, system integration and advanced equipment on the other.

Cross-border investment and project cooperation have expanded in parallel. Studies of Sino-European cooperation on renewable energy document joint ventures and cooperative projects in onshore and offshore wind, solar parks, grid modernisation and smart-city pilots, including in third countries along the Belt and Road and in European member states.[74] The ECECP has highlighted, for instance, the role of European utilities and technology providers in supporting China's power sector reform and renewable integration, as well as Chinese companies' participation in European renewable tenders and manufacturing projects. A 2023 report on China–EU clean energy investment describes this as a "race and cooperation" dynamic: both sides compete in global clean energy markets but also invest in each other's energy transition.[75]

Joint research and innovation represent a third strand of cooperation. Under the umbrella of the global clean energy partnership, China and the EU have engaged in technology cooperation on areas such as offshore wind, carbon capture and storage, smart grids and energy storage. A 2023 article on China–EU technology cooperation under the global clean energy partnership underscores the importance of coordinated investment in innovation, open standards and demonstration projects to accelerate the diffusion of low-carbon technologies. EU-funded programmes and Chinese research initiatives have supported joint laboratories, pilot projects and networks that link universities, research institutes and companies in both regions.[76]

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[73] Liu, Wu and Wan (2019), supra note 62.
[74] Holzer and Zhang (2008), supra note 63; Zhou, Yunheng, and Weiqing Song. "Sino-European Cooperation on Renewable Energy Development." *The International Spectator* 52.4 (2017): 145-156.
[75] *The Race and Cooperation in China–EU Clean Energy Investment* (2023), supra note 65.
[76] Zhou and Song (2017), supra note 74.

At the same time, economic cooperation in the energy transition is confronted with growing strategic and legal challenges. The history of trade tensions in the solar PV sector—culminating in EU trade defence measures and subsequent negotiated arrangements—illustrates how quickly cooperation can slide into conflict when industrial and trade interests are perceived as threatened.[77] Recent Chinese analyses on "how to avoid a lose–lose situation" in the PV industry warn that renewed trade frictions, driven by narratives of "overcapacity" and defensive industrial policy, could undermine both sides' ability to achieve their climate and energy goals efficiently. European commentators likewise note that the EU must avoid undermining its own green transition by simultaneously tightening climate objectives and restricting access to affordable clean technologies.[78]

Against this background, economic and commercial cooperation in the energy transition is best understood as a field of "competitive interdependence". The EU and China remain key markets and suppliers for each other in clean energy goods and services, and numerous projects and investments continue, but the policy environment is increasingly shaped by concerns about strategic autonomy, security of supply and fair competition. This has direct implications for the design and operation of legal frameworks, to which we now turn.

2.4 Sectoral Agreements in Energy Transition: Hard Law Dimensions

Hard-law frameworks relevant to China–EU energy transition cooperation operate at three levels: international climate law, domestic climate and energy law, and international economic law (notably trade and investment law).[79] These regimes do not form a neat hierarchy; rather, they create overlapping legal constraints and opportunities within which bilateral sectoral cooperation must be designed.

At the international level, both China and the EU are key parties to the UNFCCC and the Paris Agreement. The Paris framework requires parties to prepare, communicate and maintain successive nationally determined contributions (NDCs), to pursue domestic mitigation

[77] Liu, Wu and Wan (2019), supra note 62.
[78] *Between Competition and Co-operation* (2024), supra note 68.
[79] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24.

measures with the aim of achieving them, and to align financial flows with low-emission, climate-resilient development.[80] The EU has embedded its Paris commitments in the European Climate Law and in successive climate and energy packages, while China has integrated its 2030 peaking and 2060 neutrality goals into medium- and long-term planning documents and sectoral policies.[81] The 2025 *Powering the Twin Engines* report stresses that both parties "must fully implement the Paris Agreement" and that their NDCs and long-term strategies provide the overarching legal–policy framework for domestic energy transition measures.[82] Doctrinally, these treaty commitments are increasingly treated as the core of an emerging body of "international climate change law" – a specialised branch of international environmental law whose implementation necessarily requires far-reaching changes in energy systems.

At the domestic level, the legal frameworks for energy transition in the EU and China are becoming more structured and comprehensive. On the EU side, scholarship on the interface between EU climate and energy law highlights how climate objectives have been "hard-wired" into the internal energy market through legislation on renewable energy, energy efficiency, emissions trading, infrastructure and market design.[83] The European Green Deal and the "Fit for 55" package further strengthen this integration by revising targets and instruments across the climate–energy acquis.[84] In this scholarship, climate law is portrayed as a dynamic driver that increasingly shapes the content and direction of energy law, whereas core energy-market rules and institutional competences provide the relatively more static structures against which that evolution occurs.[85]

In China, recent work on the evolution of energy and climate governance, combined with new legislation, points to a rapid consolidation of the legal basis for energy transition. Analyses of China's "green revolution" under the 12th Five-Year Plan and subsequent

[80] Ibid.
[81] Mo et al. (2018), supra note 11; *China's Green Revolution* (Chinadialogue Report), supra note 11.
[82] *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4.
[83] Romppanen and Huhta (2023), supra note 11.
[84] *EU–China Cooperation on Green Recovery and Green Stimulus* (EU Report, 2020), supra note 53.
[85] Romppanen and Huhta (2023), supra note 11; Jackson, John H. *Sovereignty, the WTO, and Changing Fundamentals of International Law*. Vol. 18. Cambridge University Press, 2006.

policies show how environmental constraints, renewable development and efficiency measures have been progressively tightened. This trajectory culminated in the adoption of the Energy Law of the People's Republic of China in 2024 (in force 2025), which is described in official and academic commentary as the first foundational or basic law for the energy sector. The Energy Law explicitly embeds green and low-carbon development, the 2030/2060 targets, and the shift from dual control of energy consumption to dual control of carbon emissions, and it coordinates sectoral laws such as the Renewable Energy Law and Electricity Law. In terms of the dynamic–static lens employed in this project, the Energy Law performs a structural (static) function by consolidating energy governance in a single framework statute, while the inclusion of dual-carbon and ecological-civilisation objectives introduces dynamic pressure for progressive decarbonisation of the energy system.

International economic law adds a further layer. Academic analyses of EU–China cooperation on climate change and energy security note that WTO rules, subsidies disciplines and trade remedies have played a central role in structuring disputes and negotiations over renewable energy support schemes and clean energy goods.[86] Work on renewable energy subsidies and WTO law emphasises the tension between industrial support for renewables and the constraints of the subsidies and countervailing-measures regime, as well as the need for reforms that better account for climate objectives.[87] Similar concerns appear in broader analyses of energy subsidies and investment/financing mechanisms for renewables.[88] These debates are highly relevant for the EU and China, given their past disputes in solar PV and the current salience of trade and industrial policy in clean technologies.[89] In legal terms, the WTO and related economic-law regimes function as relatively static frameworks that may constrain, channel or re-shape dynamic climate and energy-transition policies, particularly where those policies take the form of targeted subsidies, local-content measures or defensive

[86] Holzer and Zhang (2008), supra note 63.
[87] Espa, Ilaria, and Gracia Marín Durán. "Renewable Energy Subsidies and WTO law: Time to Rethink the Case for Reform beyond Canada–Renewable Energy/Fit Program." *Journal of International Economic Law* 21.3 (2018): 621-653; Farah and Cima (2015), supra note 10.
[88] Von Moltke, Anja, et al. *Energy Subsidies: Lessons Learned in Assessing Their Impact and Designing Policy Reforms*. Routledge, 2017; Deng, Yanfei, and Wei Guo. "A Review of Investment, Financing and Policies Support Mechanisms for Renewable Energy Development." *Proceedings of the Tenth International Conference on Management Science and Engineering Management*. Singapore: Springer Singapore, 2016.
[89] Holzer and Zhang (2008), supra note 63.

trade instruments.[90]

Hard-law sectoral agreements specifically on energy transition between China and the EU remain limited. Cooperation has largely taken the form of soft-law instruments and programmes, rather than binding treaties. Nevertheless, domestic climate and energy laws, together with international trade and investment rules, define the legal space within which bilateral energy transition cooperation must operate.[91] They constrain certain forms of industrial policy, shape support schemes for renewables and influence the treatment of foreign investors and suppliers in energy markets. Understanding these hard-law dimensions is essential for assessing both the opportunities and the limits of China–EU energy transition cooperation. Within the analytical framework of this study, international climate law and domestic climate/energy law can be seen as dynamic drivers of convergence, while international economic law and basic energy-market rules provide structural parameters that may either facilitate or impede that convergence.[92]

2.5 The Role of Soft Law in Energy Transition Cooperation

Given the relative paucity of binding bilateral treaties on energy transition, soft-law instruments and dialogue processes play a central role in China–EU cooperation. Joint statements, memoranda of understanding, roadmaps, cooperation programmes and high-level dialogues collectively form a dense but largely non-binding governance architecture.[93] In the China–EU context, soft law is not merely residual: it is the primary mode through which the parties articulate common principles, align their transition narratives and experiment with regulatory cooperation in politically and economically sensitive sectors such as energy and climate.[94]

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[90] Espa and Durán (2018), supra note 87.
[91] Holzer and Zhang (2008), supra note 63; Liu, Wu and Wan (2019), supra note 62.
[92] Romppanen and Huhta (2023), supra note 11; Jackson (2006), supra note 84; and Holzer and Zhang (2008), supra note 63.
[93] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24; *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4; Liu, Wu and Wan (2019), supra note 62.
[94] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24; *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4; Holzer and Zhang (2008), supra note 63.

As noted in Chapter 1, the 2020 decision to create a Green Partnership and the HECD, the 2018 Leaders' Statement on Climate Change and Clean Energy, the 2015 Joint Statement on Climate Change and the EU–China 2020 Strategic Agenda for Cooperation all take the form of political or soft-law commitments.[95] They set out shared objectives—such as supporting Paris implementation, promoting green, low-carbon and circular development, developing carbon markets and cooperating on clean energy—and identify priority areas for action.[96] Legally, these texts can be read as progressive soft-law codifications of common principles (support for the Paris Agreement, sustainable development, circular economy, just and orderly transition) that subsequently guide the design and interpretation of more specific bilateral and domestic instruments.

At the operational level, soft-law instruments structure sectoral cooperation. MoUs on circular economy and emissions trading create frameworks for policy dialogue and technical assistance.[97] The EU–China Energy Dialogue and the HECD operate on the basis of agreed agendas and joint press communiqués, which, while non-binding, specify issues to be addressed, work streams to be pursued and, in some cases, pilot projects or working groups to be established. The ECECP and other platforms are governed by project agreements and terms of reference that reflect political guidance but do not create classical treaty obligations.[98] In practice, this gives rise to a form of procedural regularity: recurring dialogues, programmes and reviews that, although formally soft, structure expectations about consultation, information exchange and follow-up in a way that resembles institutionalised cooperation under hard-law regimes.[99]

Soft-law instruments also shape expectations and generate normative effects. The 2025

[95] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24; *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4; *EU–China Cooperation on Green Recovery and Green Stimulus* (EU Report, 2020), supra note 53.
[96] Ibid.
[97] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24; *EU–China Cooperation on Green Recovery and Green Stimulus* (EU Report, 2020), supra note 53.
[98] Romppanen and Huhta (2023), supra note 11; ECECP. *Energy Security in the Context of the Energy Transition* (2023), supra note 17.
[99] Holzer and Zhang (2008), supra note 63; Liu, Wu and Wan (2019), supra note 62.

Powering the Twin Engines Navigating China-EU Climate Cooperation report, while authored by think tanks rather than governments, is explicitly endorsed by senior officials and positions China and the EU as joint leaders in climate and green transition.[100] Blog and policy pieces on "balancing climate cooperation and competition" and on "how to engage with China on climate" contribute to the interpretive environment in which soft-law commitments are understood, by arguing for approaches that reconcile climate ambition with economic security and industrial policy.[101] Chinese commentaries responding to European debates on "overcapacity" in clean energy industries likewise use the language of partnership and mutual benefit to contest more defensive narratives and to argue for preserving the cooperative core of China–EU energy relations.[102] These documents thus participate in a broader discursive construction of China–EU climate and energy cooperation, signalling to domestic and international audiences that the parties see themselves as "twin engines" of global climate governance and that energy transition is central to that role.[103]

From a legal perspective, this soft-law architecture has ambiguous implications. On the one hand, it provides flexibility to adapt cooperation to changing political circumstances and to experiment with new forms of technical and regulatory collaboration without the delays and rigidity associated with treaty-making. On the other, its non-binding nature raises questions about durability and enforceability, particularly when cooperation comes under pressure from trade disputes or security concerns. This ambivalence mirrors wider debates in international climate law about the Paris Agreement's blend of binding and non-binding elements and its reliance on transparency and peer pressure rather than classic enforcement; in both the multilateral and bilateral settings, the central question becomes how far such hybrid arrangements can steer behaviour over time.

For the purposes of this project, soft-law instruments are therefore not merely diplomatic

[100] *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4.
[101] *Between Competition and Co-operation* (2024), supra note 68; San Martín, Blanca Marabini. "EU Climate Concerns: Balancing Climate Cooperation and Competition with China." Crossroads Europe Blog, 2024.
[102] Zhao and Li (2024), supra note 68.
[103] *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4; Holzer and Zhang (2008), supra note 63; *Between Competition and Co-operation* (2024), supra note 68.

background but key components of the legal landscape of China–EU energy transition cooperation. They mediate between hard-law commitments (under international climate and economic law and domestic climate–energy legislation) and the practical operation of economic and political relations. They also constitute important sites of dynamic interaction, where new issues—such as just transition, CBAM, critical minerals or the resilience of clean-energy supply chains—can be introduced and framed before they are reflected in hard-law instruments. Whether these soft-law frameworks can be further integrated or formalised, and how they might help to manage strategic and legal challenges in renewable energy cooperation, will be addressed in Chapter 3 and in the concluding chapter.

3. Renewable Energy Cooperation: Navigating Legal and Strategic Complexities

Renewable energy has gradually become the most visible and politically sensitive layer of China–EU energy transition cooperation. While Chapter 2 analysed how the global energy transition is integrated into the broader China–EU strategic partnership and the mix of hard- and soft-law instruments that structure that partnership, this chapter narrows the focus to renewable energy as a distinct yet deeply embedded sub-field. Existing scholarship and recent policy reports converge in treating renewable energy as a key vector through which climate, energy security and industrial policy objectives are simultaneously pursued, but also as a domain where trade tensions, technology competition and security concerns are increasingly pronounced.[104]

The chapter proceeds in five steps. Section 3.1 traces the expansion of renewable energy in China–EU relations, highlighting the emergence of renewables as a central theme in political dialogue, cooperation programmes and economic relations. Section 3.2 examines the legal frameworks that govern renewable energy cooperation, including international and bilateral soft-law instruments, as well as the internal climate-energy regimes of the EU and China. Section 3.3 turns to geopolitical and economic challenges. Section 3.4 provides a focused analysis of WTO rules and renewable energy subsidies, drawing in particular on recent Chinese scholarship. Section 3.5 concludes with an assessment of future strategic and legal prospects for deepening China–EU renewable energy cooperation.

3.1 The Expansion of Renewable Energy in China–EU Relations

The expansion of renewable energy in China–EU relations is rooted in a combination of shared climate objectives, converging concerns over energy security and growing economic interdependence in clean-energy industries. Early analyses of Sino-European renewable

[104] Zhou and Song (2017), supra note 74; Yu, Pei, Ruixue Hao, and Yongping Sun. "China–EU Technology Cooperation under the Global Clean Energy Partnership." [全球清洁能源合作伙伴关系下的中欧技术合作] *European Studies* 4 (2023): 30-54.

energy cooperation emphasised that both sides face similar challenges – decarbonising energy systems, reducing dependence on imported fossil fuels and addressing local air pollution – and that these shared pressures create a strong material basis for cooperation. At the same time, China and the EU possess complementary strengths: Europe has long-standing regulatory experience and technological leadership in many renewable sectors, while China has rapidly built up large-scale manufacturing capacity and deployment experience.[105]

From the late 1990s, this complementarity began to be reflected in institutionalised frameworks. The EU–China summit, established in 1998, quickly emerged as the key political channel for addressing energy and climate issues at the highest level.[106] Subsequent summits produced a series of political declarations that increasingly singled out renewable energy, including the 2012 China–EU Joint Declaration on Energy Security and the 2015 China–EU Joint Statement on Climate Change, which refer to cooperation on renewable energy development, energy efficiency and low-carbon technologies as central pillars of the partnership. The 2016 EU–China Roadmap on Energy Cooperation (2016–2020) went further by identifying the transformation of energy systems and the deployment of renewables as explicit objectives of energy cooperation, and by calling for coordination on electricity markets, integration of variable renewables and energy-efficiency standards.[107]

Parallel to these summit-level commitments, a dense network of specialised cooperation mechanisms emerged. Recent Chinese analysis of EU–China energy cooperation shows how, alongside the regular China–EU summit, mechanisms such as the EU–China High-Level Energy Meeting (since 1994) and the EU–China Energy Dialogue (since 2006) have provided sectoral platforms to materialise summit-level consensuses on energy cooperation, with a strong focus on clean and renewable energy and energy efficiency.[108] The Europe–China Clean Energy Centre (ECCE, launched in 2010) and later the EU–China Energy Cooperation

[105] Šekarić Stojanović, Nevena. "EU-China Renewable Energy Cooperation: Barriers and Prospects." Institute of International Politics and Economics, 2024. 221-239.
[106] Zhou and Song (2017), supra note 74.
[107] *Between Competition and Co-operation* (2024), supra note 68; Zhou and Song (2017), supra note 73; Šekarić Stojanović (2024), supra note 105.
[108] Zhou and Song (2017), supra note 74.

Platform (ECECP, launched in 2019) have supported joint research, capacity-building and policy exchanges on topics such as renewable support schemes, power market reform and the integration of variable renewables.

These institutional structures coincided with a rapid domestic expansion of renewable energy in both polities. On the Chinese side, energy strategy documents since the mid-2010s have prioritised a shift away from coal and towards non-fossil sources, with substantial investments in wind and solar and the closure of outdated, highly polluting power plants. China has become the world's largest producer of renewable energy and has announced targets to peak CO_2 emissions before 2030 and raise the share of non-fossil fuels in primary energy consumption to around 20 per cent by that date.[109] On the EU side, legal and policy commitments to increase the share of renewables, reduce greenhouse gas emissions and improve energy efficiency have been progressively tightened and embedded in the internal energy market, as discussed in detail by Romppanen and Huhta.[110]

Economic relations have both reflected and reinforced this trend. The Sino-European cooperation report stresses that mutual market access and bilateral investment in renewable energy can simultaneously enhance energy security, support climate goals and stimulate industrial development on both sides. Empirical work on Chinese investment in the EU renewable energy sector shows that such investment has been driven by a combination of motives, including access to advanced technology, entry into mature markets, and diversification away from domestic overcapacity in traditional sectors. At the same time, European companies have invested in and partnered with Chinese firms in order to tap into rapidly growing deployment markets, benefit from economies of scale in manufacturing and participate in joint innovation projects.[111]

Recent analyses confirm that this economic interdependence has deepened. A 2023 research

[109] Mo et al. (2018), supra note 11.
[110] Romppanen and Huhta (2023), supra note 11.
[111] Curran, Louise, Ping Lv, and Francesca Spigarelli. "Chinese Investment in the EU Renewable Energy Sector: Motives, Synergies and Policy Implications." *Energy Policy* 101 (2017): 670-682; Zhang, Chao. "The EU–China Energy Cooperation: toward a Reciprocal Partnership?." *Asia Europe Journal* 19.2 (2021): 259-273.

report on China–EU clean energy investment characterises the relationship as a "race and cooperation" dynamic in which both sides seek leadership in key clean-energy technologies, while remaining highly interlinked through trade, investment and cross-border value chains. The report highlights substantial Chinese investment in European renewable energy assets, as well as European participation in Chinese renewables and grid projects, and argues that maintaining open markets and predictable regulatory environments is crucial for sustaining this mutual engagement.[112]

At the same time, the political context of renewable energy cooperation has become more complex. The 2024 review paper on EU–China renewable energy cooperation adopts a three-dimensional analytical framework – normative, economic and (geo)political – and concludes that, although there is significant alignment in energy- and climate-related policies and substantial economic potential, cooperation is constrained by broader geopolitical tensions and concerns about critical materials and technological leadership. The paper notes that China and the EU are simultaneously partners, competitors and systemic rivals, and that renewable energy thus functions as a domain where sustainable development goals, industrial policy and strategic rivalry intersect.[113]

Yet, despite these tensions, the same analyses underscore that renewables remain one of the most promising areas for constructive engagement. The Global Clean Energy Partnership narrative stresses opportunities for technology cooperation, joint R&D and multilateral initiatives in renewables, even as trade frictions and security concerns arise.[114] Sino-European renewable energy cooperation is therefore best characterised as an evolving field in which deepening institutionalisation and economic integration co-exist with heightened political sensitivity. This duality provides the backdrop for the legal analysis in Section 3.2.

3.2 Legal Frameworks for Renewable Energy Cooperation

[112] *The Race and Cooperation in China–EU Clean Energy Investment* (2023), supra note 65.
[113] Šekarić Stojanović (2024), supra note 105; San Martín (2024), supra note 101.
[114] Yu, Hao, and Sun (2023), supra note 104; Šekarić Stojanović (2024), supra note 105.

The legal frameworks relevant to China–EU renewable energy cooperation are multi-layered. They comprise, first, international climate and energy commitments that drive domestic renewable policies; second, bilateral political instruments and roadmaps that single out renewables as priority areas; third, the internal climate-energy regimes of the EU and China, which define the regulatory environment for renewable deployment and investment; and, finally, trade and investment rules that condition support schemes and market access. Rather than a single "renewable energy agreement", cooperation operates within this composite legal environment, in which hard-law obligations, soft-law commitments and evolving domestic legislation interact.[115]

(a) International and bilateral normative frameworks

At the international level, China and the EU are both parties to the UNFCCC and the Paris Agreement. Their nationally determined contributions (NDCs) and long-term strategies place renewable energy at the centre of decarbonisation pathways, as reflected in Chinese modelling work on energy and climate policy and in EU climate-energy packages.[116] The 2024 China–EU think-tank report on environment and climate cooperation emphasises that full and effective implementation of the Paris Agreement – including the scaling up of renewable energy and energy efficiency – is a shared legal-policy baseline for both sides.[117]

Against this background, a set of bilateral soft-law instruments explicitly integrate renewable energy into China–EU cooperation. The 2015 China–EU Joint Statement on Climate Change identifies renewable energy and energy efficiency as priority areas for joint action, including through technology cooperation and policy dialogue.[118] The 2016 EU–China Roadmap on Energy Cooperation (2016–2020) sets out objectives for cooperation in "new and renewable

[115] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24; *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4; Zhou and Song (2017), supra note 74; Espa and Marín Durán (2018), supra note 87; Šekarić Stojanović (2024), supra note 105; Liu, Yingquan. "Legal Issues of Renewable Energy Subsidies." PhD dissertation, 2020.
[116] Mo et al. (2018), supra note 11; Romppanen and Huhta (2023), supra note 11.
[117] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24; *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4.
[118] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24; Zhou and Song (2017), supra note 74; Šekarić Stojanović (2024), supra note 105.

forms of energy", electricity market reform and integration of high shares of variable renewables, and calls for the alignment of policies to support the transformation of energy systems.[119] The 2018 EU–China Leaders' Statement on Climate Change and Clean Energy further links climate objectives to clean-energy cooperation, highlighting joint work on emissions trading, renewable energy deployment, energy efficiency and sustainable finance.[120]

Subsequent initiatives have operationalised these commitments. The ECECP is mandated to provide analysis and policy support on priority areas agreed in the 2019 Joint Statement on the Implementation of EU–China Energy Cooperation, including renewable energy, power market reform and energy security.[121] ECECP reports prepared for the EU–China Energy Dialogue include comparative studies on policies to support the construction of renewable generation capacity and the integration of variable renewables, which in practice function as reference documents for both sides' regulatory reforms.[122] A 2025 joint report on climate cooperation similarly underscores that renewable energy and energy efficiency are twin engines of the China–EU "green partnership".[123]

These instruments are predominantly soft law. They do not create binding treaty obligations but articulate shared objectives, identify priority sectors and establish procedural arrangements (dialogues, working groups, joint studies) through which renewable energy cooperation is pursued. As argued in Chapter 2, such soft-law frameworks can nonetheless have significant legal relevance: they guide the allocation of financial and institutional resources, shape expectations of reciprocal action and, over time, may influence the interpretation and development of domestic law and international commitments.

(b) EU internal legal framework and its external projection

[119] *Between Competition and Co-operation* (2024), supra note 68; Zhou and Song (2017), supra note 74; Yu, Hao, and Sun (2023), supra note 104.
[120] "EU and China Step up Cooperation on Climate Change and Clean Energy" (2018), supra note 36; Yu, Hao, and Sun (2023), supra note 104; Šekarić Stojanović (2024), supra note 105.
[121] *Between Competition and Co-operation* (2024), supra note 68; Yu, Hao, and Sun (2023), supra note 104.
[122] *Between Competition and Co-operation* (2024), supra note 68.
[123] *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4.

On the EU side, renewable energy cooperation with China is embedded in a dense and increasingly integrated climate–energy acquis. Analyses of the EU framework show how EU climate law (centred on the European Climate Law and the EU's greenhouse-gas reduction targets) and EU energy law (covering the internal energy market, renewable energy, energy efficiency and infrastructure) have evolved as distinct disciplines but now exhibit significant dynamic and static interactions. EU legislation sets binding targets for greenhouse-gas reduction, renewable energy shares and energy efficiency improvements, and progressively aligns energy-market design with decarbonisation objectives.[124]

This internal framework has at least three implications for China–EU renewable energy cooperation. First, the EU's binding renewable energy targets and sustainability standards create a regulatory benchmark that shapes trade and investment relations. Analyses of EU–China relations characterise the EU as a "bilateral norm leader" in climate policy, exporting regulatory approaches – including on renewable energy support, grid access and environmental standards – through cooperation and external action. Second, internal market rules and state-aid control discipline renewable energy support schemes, leading to a shift from feed-in tariffs to more market-based mechanisms such as auctions. Comparative studies note that these changes influence how the EU engages with partners, including China, on issues such as competitive neutrality and support for clean-energy industries. Third, the EU's external energy and climate policy increasingly emphasises the consistency of external partnerships with internal decarbonisation pathways, reinforcing expectations that cooperation with China should support – and not undermine – the integrity of the internal market and the European Green Deal.

While EU renewable energy legislation is formally unilateral, its external projection is reinforced by soft-law instruments and cooperation platforms discussed above. For example, ECECP comparative reports on renewable energy policies explicitly draw on EU legal standards and are used in policy dialogues with Chinese counterparts. Scholarship on EU–China energy cooperation notes that the EU's advanced regulatory framework gives it

[124] Romppanen and Huhta (2023), supra note 11.

leverage in shaping the terms of cooperation, even where no binding bilateral agreement exists.

(c) China's domestic renewable energy law and the new Energy Law

China's domestic legal framework for renewable energy has undergone rapid development over the past two decades. The Renewable Energy Law (2005, amended 2009) established key principles such as priority connection and purchase of renewable electricity, cost-sharing mechanisms and the creation of a renewable energy development fund. However, detailed implementation has relied heavily on a complex web of secondary regulations and policy documents, with subsidy schemes and fund management rules scattered across multiple instruments.[125]

Chinese legal scholarship highlights both the achievements and the limitations of this framework. China's renewable subsidy regime has played a crucial role in supporting rapid deployment but suffers from low degrees of legal codification, fragmented authority and questions of WTO compatibility.[126] The study stresses that many support measures remain policy-based rather than law-based, and calls for a more systematic legal framework that aligns domestic subsidies with international economic rules while ensuring long-term stability for investors.[127]

Recent developments respond to some of these concerns. Commentaries on the Energy Law of the People's Republic of China stress that it is the first foundational law for the energy sector, providing an overarching legal framework that explicitly incorporates the "green and low-carbon" transition, the 2030 peaking and 2060 neutrality goals and the shift from dual control of energy consumption and intensity to dual control of carbon emissions. The Energy Law is designed to coordinate sectoral laws, including the Renewable Energy Law and the Electricity Law, and to promote market-oriented reforms while safeguarding energy security.

[125] *The Race and Cooperation in China–EU Clean Energy Investment* (2023), supra note 65.
[126] Liu (2020), supra note 115.
[127] Ibid; *The Race and Cooperation in China–EU Clean Energy Investment* (2023), supra note 65.

In parallel, recent 2025 policy-legal commentaries describe ongoing reforms to the Renewable Energy Law and the Electricity Law as part of a broader move towards market-based integration of renewables. These include discussions on improving mechanisms for renewable consumption, enhancing grid-planning obligations and revising subsidy structures to address arrears and curtailment. Another strand of the 2025 debate on market-oriented reform of renewable energy emphasises the need to clarify rights and obligations of market participants, strengthen long-term price signals and improve the legal status of green certificates and other market instruments.

From the perspective of China–EU cooperation, these domestic legal developments have two main implications. First, they increase the legal certainty of China's renewable energy regime, which is relevant for European investors and technology providers considering long-term engagement in Chinese markets. Second, they affect the interface with international economic law, as reforms to subsidy schemes and market design are undertaken with explicit reference to WTO rules and concerns about trade disputes – questions that will be examined in detail in Section 3.4.

(d) Interfacing frameworks and emerging patterns of legal convergence

When viewed together, the international, bilateral and domestic frameworks outlined above reveal a complex pattern of partial legal convergence in China–EU renewable energy cooperation. Both sides have embedded renewable energy into their core climate and energy strategies and laws; both participate in the Paris regime and articulate long-term decarbonisation goals that presuppose large-scale deployment of renewables. Bilateral political instruments and roadmaps explicitly single out renewables as priority areas for cooperation, with ECECP and related platforms translating these priorities into comparative legal and policy analysis.[128]

At the same time, significant structural differences persist. EU renewable energy law is

[128] *Between Competition and Co-operation* (2024), supra note 68; Zhou and Song (2017), supra note 74; Yu, Hao, and Sun (2023), supra note 104.

strongly anchored in binding quantitative targets, internal-market rules and state-aid control, producing a highly codified and judicialised legal environment.[129] China's framework, by contrast, has historically relied more on planning instruments and policy-based subsidies, and – despite recent codification through the Energy Law and ongoing revisions of the Renewable Energy Law – continues to exhibit a lower degree of legalisation and greater administrative discretion. These differences affect how each side conceives the role of law in guiding the energy transition and shape expectations in bilateral cooperation, particularly in relation to market access, competitive neutrality and support for domestic industries.[130]

From a legal-theoretical perspective, the interaction of these frameworks illustrates the dynamic interface between climate law, energy law and international economic law that has been highlighted in analyses of China–EU cooperation and of the EU's climate–energy acquis. Renewable energy co-operation operates at this interface: international climate commitments drive domestic renewable legislation; domestic regimes influence trade and investment patterns; and disputes or concerns under WTO law feed back into the design of support measures. The resulting legal landscape is neither fully harmonised nor purely fragmented; rather, it is characterised by evolving patterns of convergence in objectives and instruments, tempered by enduring divergences in institutional design and regulatory technique.

This multi-layered legal setting provides the foundation for the more focused analyses in Sections 3.3 and 3.4, which will examine, respectively, how geopolitical and economic tensions manifest themselves in the renewable sector and how WTO subsidy rules constrain and shape China–EU renewable energy cooperation.

3.3 Geopolitical and Economic Challenges in Renewable Energy Cooperation

Despite the strong functional complementarity between China's manufacturing capacity and the EU's technological and regulatory strengths, renewable energy cooperation unfolds in a

[129] Romppanen and Huhta (2023), supra note 11.
[130] *The Race and Cooperation in China–EU Clean Energy Investment* (2023), supra note 65; Zhou and Song (2017), supra note 74; Šekarić Stojanović (2024), supra note 105.

context of growing geopolitical tension and economic rivalry. Recent scholarship and policy analysis increasingly describe the relationship as one of "competition within cooperation," in which climate and energy goals are shared but instruments and industrial strategies diverge. A recent review of EU–China renewable energy cooperation identifies three interlocking layers of constraint: strategic distrust, economic security concerns and distributional conflicts over the value created in green supply chains.[131]

From a geopolitical perspective, the deterioration of the broader China–EU relationship has constrained the scope for energy partnership. Analyses of EU–China energy cooperation stress that, since the late 2010s, the EU has come to frame China simultaneously as a partner, an economic competitor and a systemic rival, and this "triple framing" increasingly shapes energy and climate interactions.[132] The armed conflict between Russia and Ukraine sharpened European debates on energy security and strategic dependencies, reinforcing calls to "de-risk" critical supply chains, including those for solar PV, batteries and other clean-energy technologies where China has become the dominant global supplier.[133] Chinese policy commentary similarly notes that geopolitical tensions, sanctions environments and technology controls create an external environment in which the green partnership must navigate heightened security logics and a more fragmented multilateral order.[134]

Economic-security concerns are particularly acute in relation to renewable energy industries. Chinese and European analyses converge in recognising that both sides are now major investors in clean energy and key nodes in global supply chains for wind, solar and electric vehicles, but that their positions are asymmetric: China has built the world's largest clean-power manufacturing base, while the EU is a diversified investor with strengths in offshore wind, grid infrastructure, storage and hydrogen.[135] Recent joint work on clean-energy investment stresses that China and the EU are the two largest global investors in

[131] Šekarić Stojanović (2024), supra note 105.
[132] Zhang (2021), supra note 111.
[133] *Energy Security in the Context of Energy Transition – Lessons and Challenges within Europe and within China* (2023), supra note 17.
[134] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24.
[135] *The Race and Cooperation of China-EU Clean Energy* Investment (2023), supra note 65.

clean energy, with China's 2022 clean-energy investment accounting for almost half of the world total and the EU ranking second; yet it also underlines that this shared leadership has intensified "race-to-zero" competition over technologies, finance and standards. The report explicitly characterises future China–EU relations in this field as shaped by both "race" and "cooperation," and warns that geopolitical tensions and slow global growth heighten the risk that green industrial policy is used defensively, rather than to expand joint gains.[136]

The legacy of earlier trade disputes continues to shape perceptions of risk. A detailed legal analysis of the EU–China solar panel dispute shows how EU anti-dumping and anti-subsidy investigations into Chinese PV products, culminating in minimum price undertakings in 2013, brought climate and trade objectives into open conflict.[137] The case involved one of the largest trade volumes ever subjected to EU trade-defence instruments, exposed deep divisions within the EU among member states and industrial constituencies, and generated significant mistrust on the Chinese side.[138] Later studies on EU–China energy security cooperation underline that, although the dispute was eventually settled, it left a persistent "scar" in the relationship and highlighted the vulnerability of renewable energy cooperation to protectionist pressures.[139]

Current debates on "overcapacity" and fair competition in clean-tech markets echo these earlier controversies. Recent Chinese policy analysis rejects the narrative of chronic Chinese overcapacity in solar and other clean technologies and instead attributes price declines to scale effects, learning-by-doing and expanding global demand.[140] From this perspective, portraying China's export strength primarily as a threat risks undermining the cost reductions that have enabled rapid renewable deployment worldwide, and both sides are encouraged to

[136] Ibid.
[137] Plasschaert, Sylvain R. F. "Assessing the Solar Energy Dispute between the European Union and the People's Republic of China." No. 01/2016. *European Centre for International Political Economy* (*ECIPE) Working Paper*, 2016.
[138] Ibid.
[139] Garlick, Jeremy. "China–EU Energy Security Cooperation: The Case for Renewables." *Power Shifts in East Asia and Their Implications for Asia–Europe Relations*, Wydawnictwo Uniwersytetu Łódzkiego (2019): 145-158.
[140] Zhao and Li (2024), supra note 68.

avoid being drawn into zero-sum competition shaped by third-party strategic agendas.[141] Complementing this, specialist commentary on photovoltaic industry cooperation warns that escalating trade-defence measures and local-content requirements may produce a "lose–lose" outcome, raising costs for European consumers and slowing global decarbonisation while also harming Chinese producers.[142]

EU industrial and climate policy developments add further complexity. Chinese analyses of the EU's Net Zero Industry Act (NZIA) interpret this instrument as a means of re-orienting clean-tech manufacturing towards European production locations, reducing external dependence and directing public support to "European" technologies through procurement and state-aid rules.[143] It is noted that, although the NZIA does not explicitly exclude non-EU firms, the emphasis on resilient supply chains and domestic manufacturing benchmarks can, in practice, disadvantage external suppliers and give rise to concerns regarding consistency with WTO non-discrimination obligations.[144] These concerns intersect with broader Chinese critiques of an EU policy shift from a primary focus on climate ambition and market integration towards an agenda that places greater emphasis on "competitiveness", "de-risking" and the protection of strategic industries.[145]

On the European side, domestic political and socio-economic constraints have also become more salient. Discussions of the perceived slowdown in the EU's "green agenda" point to the combined effects of higher energy prices following the conflict in Ukraine, inflationary pressures and political backlash in sensitive sectors such as agriculture, which have made the pursuit of ambitious climate measures more contentious.[146] In this context, measures that are associated with increased reliance on external suppliers, including imports of solar panels or electric vehicles, risk feeding protectionist narratives and weakening public support for

[141] Ibid.
[142] He, Jing and Hongyuan Yu. "Photovoltaic Industry Cooperation: How Can China and Europe Avoid a Lose-Lose Situation? " [光伏产业合作: 中欧如何避免双输局面?]. *Energies* 7, 2024.
[143] Li, Siqi and Yangkai Jin. "The Impact of the EU Net Zero Industry Act on China and Countermeasures for China." [欧盟《净零工业法案》对中国的影响及应对]. *China Business Update* 10 (2023): 35-44.
[144] Ibid.
[145] Fu (2024), supra note 72.
[146] Ibid; *Between Competition and Co-operation* (2024), supra note 68.

openness in climate-related trade and investment.[147]

At the same time, both sides continue to recognise the strategic value of renewable energy cooperation for energy security. Analyses of EU–China energy security underline that renewables can function as a "positive-sum" solution, reducing dependence on fossil-fuel imports, diversifying supply and lowering exposure to price shocks for both parties.[148] In contrast to traditional hydrocarbons, where producer–consumer relations tend to be more zero-sum, renewable energy technologies offer considerable scope for joint investment, co-development and mutual learning.[149] Recent work on China–EU clean-energy investment supports this assessment, noting that, despite geopolitical headwinds, green trade and investment flows have remained relatively resilient and that both sides continue to be important partners for each other in renewable energy and green goods.[150]

These opportunities, however, are conditional on how competition is governed. Studies of the EU–China energy partnership indicate that movement towards a more reciprocal relationship depends on the extent to which market access, investment screening and state-aid control are organised through transparent and predictable rules that apply in a non-discriminatory fashion.[151] Review work on renewable energy cooperation reaches a similar conclusion, namely that de-risking strategies need to be designed in a way that avoids drifting into de-facto decoupling, and that greater clarity is required regarding the boundary between legitimate security-motivated measures and disguised protectionism.[152] From a legal perspective, this implies that trade, investment and industrial-policy instruments in the renewable sector must be calibrated so that they respect core principles of non-discrimination and proportionality while still allowing space for climate-consistent support schemes, questions that are examined in more detail in Section 3.4.

[147] San Martín (2024), supra note 101.
[148] Garlick (2019), supra note 139.
[149] Ibid.
[150] *The Race and Cooperation in China–EU Clean Energy Investment* (2023), supra note 65.
[151] Zhang (2021), supra note 111.
[152] Šekarić Stojanović (2024), supra note 105.

3.4 WTO Rules and Renewable Energy Subsidies

Renewable energy subsidies sit at the intersection of climate ambition, industrial policy and trade law. For both China and the EU, public support measures – from feed-in tariffs and premiums to tax incentives, grants and concessional finance – have been indispensable in scaling up wind, solar and other renewables.[153] Yet, specialised scholarship on renewable-energy subsidies under Chinese law emphasises that precisely these instruments have generated a disproportionate number of trade disputes compared with far larger fossil-fuel subsidies, exposing a "compliance dilemma" between climate objectives and the disciplines of the WTO Agreement on Subsidies and Countervailing Measures (SCM Agreement).[154] UNCTAD statistics cited in that scholarship show that, between the 2008 global financial crisis and 2014, at least forty-one trade-remedy cases (anti-dumping and countervailing measures) were initiated against renewable-energy products, the majority targeting solar, wind and biofuel sectors.[155] This section uses that broader WTO context to examine how subsidy rules shape – and at times constrain – China–EU renewable energy cooperation.

(a) The SCM Agreement and the "structural mismatch" with climate policy

Under the SCM Agreement, a measure qualifies as a subsidy if there is (i) a "financial contribution" by a government or public body, (ii) a "benefit" conferred and (iii) "specificity" to an enterprise, industry or group of industries.[156] Where a subsidy is contingent on export performance or on the use of domestic over imported goods, it is prohibited; otherwise, it is "actionable" if it causes adverse effects – such as injury to a domestic industry or serious prejudice – and may be challenged through multilateral dispute settlement or countervailing duties.[157]

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[153] Liu (2020), supra note 115.
[154] Ibid.
[155] *Trade Remedies: Targeting the Renewable Energy Sector*. 2014. UN Trade and Development, UNCTAD/DITC/TED/2014/3,
[156] Jackson, John H. *The World Trade Organization: Constitution and Jurisprudence*. Cambridge University Press, 2002; Wang (2013), supra note 20.
[157] Madrid (2007), supra note 10.

Most descriptions of renewable-energy support schemes emphasise that they easily meet these criteria: feed-in tariffs and tax credits involve governmental financial contributions, while the difficulty lies in identifying an appropriate market benchmark to determine "benefit" and in assessing whether support targeted at the renewable sector is "specific".[158] Analysis of the Canada–Renewable Energy and Canada–Feed-in Tariff cases highlights that existing jurisprudence has struggled to accommodate electricity markets characterised by heavy regulation and environmental policy objectives.[159] In those disputes, the Appellate Body had to consider whether administratively-set feed-in tariffs could be treated as market benchmarks, and whether the renewable-energy generators receiving guaranteed prices obtained a "benefit" relative to an undefined but hypothetical competitive market.[160]

Commentary on these cases points out that WTO case-law on renewables reveals a tension between the formal neutrality of the SCM Agreement and the substantive asymmetry it creates: while climate-motivated subsidies are disciplined in the same way as traditional industrial subsidies, the Agreement does not distinguish between measures that accelerate decarbonisation and those that perpetuate fossil-fuel dependence.[161] In this literature, the multilateral subsidies regime is described as exhibiting a "structural lag": its rules were designed for a trade-liberalisation paradigm and have not been updated to reflect the centrality of climate mitigation and energy transition.[162]

The problem is compounded by the disappearance of the non-actionable subsidy category (the "green light" of SCM Article 8), which once covered certain environmental subsidies but lapsed without renewal.[163] It is frequently noted that, in the absence of such a safe space, renewable-energy support must either be designed to fall outside the definition of "specific subsidy" or justified indirectly via other WTO provisions, such as the general exceptions in

[158] Liu (2020), supra note 115.
[159] Espa and Marín Durán (2018), supra note 87.
[160] Ibid; Farah and Cima (2015), supra note 10.
[161] Farah and Cima (2015), supra note 10.
[162] Liu (2020), supra note 115.
[163] Espa and Marín Durán (2018), supra note 87.

GATT Article XX.[164] For China and the EU, this creates legal uncertainty: measures that are economically and environmentally justified may nonetheless trigger litigation or countervailing actions from trading partners.

(b) Trade-remedy practice and the EU–China solar dispute

In practice, renewable-energy conflicts have more often arisen through trade-remedy investigations than through state-to-state SCM litigation. A survey of WTO and domestic cases shows that almost 70 per cent of recorded renewable-energy disputes involve anti-dumping or countervailing measures, with solar PV products particularly affected.[165] Trade-remedy authorities examine whether alleged subsidies (for example, preferential loans from state-owned banks or tax rebates) cause injury to domestic industries and may impose duties without a prior multilateral ruling on subsidy legality.[166]

The EU–China solar panel dispute illustrates how such instruments can both manage and aggravate tensions in renewable-energy cooperation. A detailed working paper on the dispute recalls that, in 2012–2013, the European Commission initiated anti-dumping and anti-subsidy investigations against Chinese crystalline silicon PV modules, alleging that a combination of export-oriented industrial policy and subsidised credit allowed Chinese producers to sell at unfairly low prices in the EU market.[167] China, for its part, initiated trade-remedy actions against imports of EU polysilicon and launched a WTO dispute concerning certain EU and Member State measures affecting renewable-energy generation, although that case remained at the consultations stage.[168]

The solar conflict was ultimately defused through a price-undertaking agreement rather than full WTO adjudication: Chinese exporters accepted minimum import prices and volume limits, and the EU refrained from imposing higher duties.[169] Analyses of the episode

[164] Ibid; Liu (2020), supra note 115.
[165] Liu (2020), supra note 115.
[166] Ibid.
[167] Plasschaert (2016), supra note 137.
[168] Ibid; Holzer and Zhang (2008), supra note 63.
[169] Plasschaert (2016), supra note 137.

underline that, while the settlement preserved short-term market access and avoided an open trade war, it also exposed the fragility of the climate–trade nexus: a dispute over technologies central to the low-carbon transition risked undermining both sides' climate leadership narratives and fed into broader debates about "overcapacity" and industrial over-reliance.[170] Subsequent review articles on EU–China renewable energy cooperation identify the solar dispute as a turning point, after which both sides became more sensitive to the trade-law implications of their support schemes and more cautious in framing industrial policies.[171]

(c) Towards WTO-compatible renewable energy support

Against this background, recent Chinese legal analysis increasingly focuses on how to design renewable-energy subsidies that both deliver climate objectives and comply with WTO rules. One study offers a systematic analysis of compliance pathways at three levels: conceptual clarification of "renewable energy subsidy"; interpretation and application of SCM provisions; and domestic reform of China's subsidy framework.

First, on the conceptual plane, this strand of research emphasises that neither WTO law nor most domestic systems provide a clear legal definition of "renewable energy subsidy". It therefore suggests understanding such subsidies as a subset of energy subsidies characterised by their environmental and climate-protection purpose, which justifies differentiated treatment in law. This conceptual move underpins arguments for re-introducing a "green" non-actionable category under the SCM Agreement or, at least, interpreting existing rules with greater sensitivity to climate objectives.

Second, at the WTO level, doctrinal proposals put forward in the literature suggest several interpretive and reform options. One strand, also reflected in international writing on renewable-energy subsidies, is to relax the "specificity" test for broadly-based schemes that are open to all generation technologies but in practice favour low-carbon options, such as

[170] Markard (2018), supra note 7; Šekarić Stojanović (2024), supra note 105.
[171] Šekarić Stojanović (2024), supra note 105; Zhou and Song (2017), supra note 74.

technology-neutral auctions with carbon-based selection criteria.[172] Another is to clarify that certain forms of support – for example, carbon pricing combined with revenue recycling or performance-based premiums – do not confer a "benefit" in the SCM sense if they merely internalise environmental externalities and correct market failures.[173] More ambitiously, some authors argue for revisiting the general exceptions in GATT Article XX to allow climate-related subsidies, which might otherwise breach non-discrimination disciplines, to be justified where they are necessary to protect human, animal or plant life or conserve exhaustible natural resources, provided they are not applied in a manner constituting arbitrary or unjustifiable discrimination.

Third, at the domestic level, Chinese scholarship generally notes that the renewable-energy subsidy regime remains fragmented and heavily policy-based, with key rules dispersed across laws, regulations and planning documents and relatively few provisions embedded in binding legislation. The lack of a systematic legal framework complicates compliance assessment and makes it harder to demonstrate, in trade-remedy investigations, that support measures are transparent, objective and non-discriminatory. Accordingly, these analyses advocate a gradual transition from predominantly government-directed subsidies to a "dual-track" model in which market-based instruments (such as green certificates, quota obligations and competitive allocation of support) play a greater role, while policy design is aligned ex ante with WTO requirements.

For the EU, parallel debates – discussed in international literature on renewable-energy subsidies and EU state aids – emphasise the move from administratively-set feed-in tariffs to auction-based schemes, the progressive integration of renewables into the internal energy market and the use of state-aid guidelines to steer Member State support towards more market-conforming instruments.[174] Comparative work on EU and Chinese approaches suggests that both sides are converging, at least on paper, towards more competitive, technology-open and cost-efficient support mechanisms, even if implementation challenges

[172] Espa and Marín Durán (2018), supra note 87.
[173] Von Moltke et al. (2017), supra note 10.
[174] Peeters and Schomerus (2014), supra note 19.

remain.[175]

(d) Implications for China–EU cooperation and WTO reform

The legal tensions outlined above have direct implications for China–EU renewable energy cooperation. Review studies and policy reports stress that, while both sides recognise the necessity of substantial public support to achieve their respective climate-neutrality and "dual-carbon" goals, they also share concerns about maintaining a "level playing field" and avoiding new waves of trade conflict.[176] Reports on Sino-European cooperation in renewable energy point out that, in addition to bilateral political trust, a stable multilateral rules-based environment is a precondition for long-term investment and technology partnerships.[177]

Chinese work on climate-related trade measures emphasises the risk that climate-motivated instruments – such as carbon border adjustments or stringent sustainability standards – can function as de facto trade restrictions if not carefully designed, potentially provoking retaliation and undermining cooperation.[178] In this context, subsidy disciplines and trade-remedy practices form part of a broader web of legal constraints that shape the strategic space for China–EU renewable energy cooperation.

From a normative perspective, several contributions converge on the view that incremental reform of WTO subsidy rules is necessary to reconcile climate and trade objectives. One influential proposal is to re-establish a non-actionable ("green light") category for certain environmental subsidies, coupled with enhanced notification and transparency requirements.[179] Another proposal sets out a twin-track reform agenda: on the one hand, updating multilateral rules to recognise the legitimacy of climate-oriented subsidies under specified conditions; on the other, strengthening domestic legal frameworks – including China's Anti-Subsidy Regulations and sectoral energy laws – to ensure that support measures

[175] Markard (2018), supra note 7; Zhang (2021), supra note 111.
[176] Markard (2018), supra note 7; Šekarić Stojanović (2024), supra note 105.
[177] Zhou and Song (2017), supra note 74.
[178] Wang, Hui. *Legal Countermeasures of China in Response to Climate Trade Barriers* [我国应对气候贸易壁垒的法律对策研究]. China University of Political Science and Law Press, 2014.
[179] Espa and Marín Durán (2018), supra note 87.

are designed with WTO compliance in mind.[180]

For China and the EU, this suggests two concrete avenues. First, at the multilateral level, they could use their shared identity as major renewable-energy producers and consumers – and as self-professed leaders in global climate governance – to promote discussions on "climate-friendly" subsidy reform, drawing on their own experiences of legal and political frictions.[181] Second, at the bilateral level, they can embed subsidy-related dialogue in existing mechanisms (HECD, Energy Dialogue, ECECP), using technical exchanges to compare support schemes, share best practices on WTO-compatible designs and develop early-warning channels for potential trade-remedy disputes.[182] In this sense, WTO rules on renewable-energy subsidies are not merely external constraints but form part of the legal field in which China–EU cooperation is negotiated, contested and potentially transformed.

3.5 The Future of Renewable Energy Cooperation: Strategic and Legal Prospects

The preceding sections have shown that China and the EU are simultaneously indispensable partners in the global energy transition and increasingly wary competitors in clean-tech industries. Looking ahead, the prospects for renewable energy cooperation will depend on whether the two sides can harness their converging climate and energy objectives while managing geopolitical rivalry and legal frictions in trade and industrial policy. Recent policy reports and academic studies are cautiously optimistic: they underline that, despite mounting tensions, China–EU green cooperation remains one of the few areas where strategic interests and long-term normative commitments still overlap.[183]

(a) Strategic trajectories: from "green partnership" to structured co-leadership

On the strategic plane, both sides have signalled that the "green partnership" is intended to

[180] Liu (2020), supra note 115.
[181] Liu, Wu and Wan (2019), supra note 62.
[182] ECECP. *Energy Security in the Context of the Energy Transition* (2023), supra note 17; Zhou and Song (2017), supra note 74.
[183] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24; *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4; Šekarić Stojanović (2024), supra note 105.

remain a central pillar of the comprehensive strategic relationship. Recent joint policy analysis on China–EU environment and climate cooperation stresses that environment and climate have been elevated to a "fifth pillar" of the partnership and that "green" should become the most distinctive colour of China–EU relations.[184] More recent joint work on climate cooperation goes further, framing China and the EU as "twin engines" of global climate governance whose combined action is indispensable for achieving the goals of the Paris Agreement. It argues that, on the fiftieth anniversary of diplomatic relations, the two actors should deepen cooperation on carbon markets, green finance and clean energy deployment in order to sustain momentum in the UNFCCC process and support more ambitious global targets.[185]

In the narrower field of renewables, recent review work on EU–China renewable energy cooperation similarly concludes that the greatest prospects lie in the "normative" dimension: there is a high degree of alignment between EU and Chinese energy- and climate-related strategies, including shared long-term neutrality goals (2050 for the EU, 2060 for China) and the centrality of renewables in decarbonisation pathways. At the same time, it warns that economic and (geo)political divergences – over market access, technology leadership and human-rights concerns – will continue to complicate cooperation.[186]

Chinese policy analyses likewise emphasise that, as the world's two largest clean-energy investors, China and the EU have both the capacity and responsibility to treat clean-energy cooperation as a new "growth pole" of their relationship. One major Chinese–European assessment of clean-energy investment highlights that between 2019 and 2022 China and the EU accounted for the largest increases in global clean-energy investment and that their green trade has grown to fourteen times its 2000 level. It calls for building joint supply chains for clean energy, co-constructing new-type power systems based on high shares of renewables and jointly safeguarding the resilience of resource and technology value chains.[187]

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[184] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24.
[185] *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4.
[186] Šekarić Stojanović (2024), supra note 105.
[187] *The Race and Cooperation in China–EU Clean Energy Investment* (2023), supra note 65.

An additional academic contribution on clean-energy technology cooperation within the framework of the Global Clean Energy Partnership proposes a granular cooperation matrix: based on countries' technological strengths and mutual trust levels, it identifies scenarios such as "maintain cooperation", "enhance trust" and "tap potential", and suggests that offshore wind, photovoltaic-based hydrogen and new-energy vehicles offer particularly large room for China–EU collaboration.[188] These analyses collectively point towards a strategic future in which renewable energy is not an isolated sectoral dossier, but a core arena where broader questions of interdependence, competitiveness and strategic autonomy are worked out.

(b) Domestic legal convergence and opportunities for regulatory dialogue

Prospects for deeper cooperation are closely tied to the evolution of domestic legal frameworks. Within the EU, the current climate–energy acquis shows that European Climate Law, the "Fit for 55" package and successive Renewable Energy Directives have "hard-wired" climate objectives into the internal energy market. Renewable energy is no longer treated as a marginal or temporary support sector but has become central to market design, infrastructure planning and state-aid control.[189] This structural integration creates a dense acquis that shapes how third-country investors and suppliers – including Chinese companies – can participate in EU energy markets.

In China, recent analyses of the country's energy and climate governance document a shift from fragmented, policy-driven regulation to a more integrated legislative framework. The adoption of the Energy Law of the People's Republic of China is widely described as establishing a foundational legal basis for the energy sector, embedding the "dual-carbon" goals, the principle of green and low-carbon development and the transition from dual control of energy consumption to dual control of carbon emissions. Commentaries underline that the Energy Law links and coordinates sectoral laws – such as the Renewable Energy Law, the

[188] Yu, Hao, and Sun (2023), supra note 105.
[189] Romppanen and Huhta (2023), supra note 11.

Electricity Law and the Mineral Resources Law – and provides a framework for reforming subsidy mechanisms, grid access and marketisation of renewables. Parallel policy documents and academic discussions emphasise that the forthcoming revisions of the Renewable Energy Law and Electricity Law are intended to accelerate market-oriented reform, strengthen grid integration of renewables and clarify support mechanisms in line with the new Energy Law.

From a cooperative perspective, this emerging convergence – a more integrated EU climate–energy acquis and a more systematic Chinese energy-transition framework – creates an opportunity for structured regulatory dialogue. Reports on EU–China cooperation on green recovery and on environment and climate already identify mutual learning on ETS design, renewable-support schemes, green taxonomy and circular-economy legislation as priority areas.[190] Recent work on renewable energy cooperation argues that, given the high degree of normative alignment, deepening exchanges on regulatory design and implementation could be a low-hanging fruit even when political relations are strained.[191]

(c) Multilateral and bilateral legal pathways: managing competition, reforming rules

At the multilateral level, the future of renewable energy cooperation will be influenced by the ability of China and the EU to navigate – and possibly reform – WTO disciplines on subsidies, trade remedies and climate-related measures such as carbon border adjustments. As discussed in Section 3.4, scholarship on renewable energy subsidies highlights the "structural mismatch" between existing subsidy rules and the needs of the energy transition.[192] One study of renewable-energy subsidy law argues that both China and the EU face a "compliance dilemma": climate-motivated support measures are essential to scale up renewables but are increasingly exposed to litigation and countervailing duties. The same work proposes re-introducing a non-actionable category for certain environmental subsidies and strengthening domestic legal frameworks to ensure support schemes are transparent,

[190] *EU–China Cooperation on Green Recovery and Green Stimulus* (EU Report, 2020), supra note 53; *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24.
[191] Šekarić Stojanović (2024), supra note 105.
[192] Espa and Marín Durán (2018), supra note 87.

objective and non-discriminatory.[193]

European and Chinese authors alike point out that, as major renewable-energy powers and direct participants in previous disputes (notably the solar panel case), China and the EU are well placed to promote incremental reform of WTO rules.[194] Proposals include clarifying the treatment of carbon-pricing and revenue-recycling schemes, adopting interpretative understandings that recognise climate-justified subsidies under specified conditions and enhancing notification and peer review of green support measures.[195] If pursued jointly, such initiatives could both reduce litigation risk and strengthen the multilateral framework within which their bilateral cooperation takes place.

Bilateral legal pathways will remain equally important. Analyses of the EU–China energy partnership underscore that, while the relationship is increasingly framed by notions of "reciprocity" and "level playing field," there is still considerable scope for using soft-law instruments – joint roadmaps, technical protocols, standard-setting dialogues – to manage competitive tensions.[196] A 2024 policy study on how to engage with China on climate argues that European policy-makers must combine targeted cooperation (for example, on standards and taxonomies) with "climate competition" that spurs domestic decarbonisation and industrial innovation, avoiding both overly uncritical confidence in the relationship and indiscriminate decoupling.[197]

That study, together with recent commentary on EU climate concerns, stresses that de-risking strategies should be made concrete and transparent: rather than treating all dependencies on Chinese green technologies as problematic, the EU needs a nuanced debate about which dependencies are acceptable and what conditions – such as joint ventures, technology-transfer safeguards or supply-chain diversification – are needed for others.[198] For their part, Chinese

[193] Liu (2020), supra note 115.
[194] Espa and Marín Durán (2018), supra note 87; Farah and Cima (2015), supra note 10.
[195] Espa and Marín Durán (2018), supra note 87; Liu (2020), supra note 115.
[196] Zhang (2021), supra note 111.
[197] *Between Competition and Co-operation* (2024), supra note 68.
[198] Ibid; San Martín (2024), supra note 101.

commentaries warn against securitising clean-energy trade under the label of "overcapacity" and call for both sides to resist zero-sum narratives that could lead to a "lose–lose" outcome in the photovoltaic sector.[199]

If these insights are taken seriously, the legal future of renewable cooperation will likely involve a mix of instruments: carefully calibrated trade-defence and screening rules; enhanced transparency about subsidies and industrial policy; and stronger channels within the HECD and Energy Dialogue to discuss emerging measures – such as the EU's CBAM, NZIA or critical-raw-materials regulations – before they trigger disputes.[200]

(d) Scenario logic and normative implications

The materials reviewed suggest at least two contrasting scenarios. In a pessimistic scenario, the logic of strategic rivalry dominates: de-risking drifts into de-facto decoupling; trade-defence actions proliferate in solar, batteries and electric vehicles; and climate-related instruments such as CBAM are perceived primarily as protectionist tools. In such a setting, soft-law cooperative frameworks risk hollowing out, and renewable energy becomes yet another field of contested industrial policy rather than a shared project.

In a more optimistic scenario, the parties recognise their mutual dependence on a stable, rules-based environment for the green transition. The 2023 clean-energy investment report explicitly frames China–EU relations in renewables as a mixture of "race" and "cooperation," but stresses that only by "jointly building" green supply chains and power systems can the two sides reconcile energy security with decarbonisation.[201] The 2024 review paper similarly concludes that, given their shared long-term goals and the sheer scale of the climate challenge, the normative alignment between China and the EU should be treated as the foundation for deepening cooperation, notwithstanding persistent economic and geopolitical frictions.[202]

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[199] Zhao and Li (2024), supra note 68; He and Yu (2024), supra note 142.
[200] *Between Competition and Co-operation* (2024), supra note 68; San Martín (2024), supra note 101; Wang (2014), supra note 178.
[201] *The Race and Cooperation in China–EU Clean Energy Investment* (2023), supra note 65.
[202] Šekarić Stojanović (2024), supra note 105.

Legally, this more positive trajectory would require at least three elements. First, continued consolidation and mutual opening of domestic legal frameworks for renewables, with attention to non-discrimination, transparency and environmental effectiveness. Second, deliberate use of bilateral mechanisms – HECD, Energy Dialogue, ECECP and specialised working groups – to anticipate conflicts over subsidies, standards and security-driven measures, and where possible to embed understandings in soft-law instruments such as joint guidelines or roadmaps. Third, joint engagement in multilateral forums to promote incremental reform of WTO subsidy rules and to shape emerging regimes on climate-related trade measures in a manner consistent with Paris-aligned decarbonisation.

Ultimately, the future of China–EU renewable energy cooperation will not be determined solely by technical complementarities or abstract legal doctrines. It will depend on whether both sides can accept a form of "regulated interdependence" in which competition over green technologies co-exists with shared commitments to climate mitigation, and in which legal frameworks – domestic, bilateral and multilateral – are used not only to defend narrow interests but to structure a more stable and predictable environment for the global energy transition. The sources surveyed here suggest that this path remains open, but also that it will require sustained political will and careful legal craftsmanship on both sides.

4. Conclusion

4.1 Summary of Key Findings

This study has examined China–EU energy transition and renewable energy cooperation through a multi-layered lens that combines strategic, geopolitical and legal perspectives. The analysis has been structured around the interaction between international climate law, domestic climate and energy regimes, and bilateral cooperation mechanisms, with particular attention to the dynamic interface between climate, energy and international economic law. Across the chapters, four main sets of findings emerge, corresponding broadly to the guiding research questions.

First, with regard to the influence of the global energy transition on the China–EU strategic partnership, the study shows that both actors have internalised the transition as a core dimension of their long-term development strategies and external relations. Long-term climate neutrality commitments (carbon neutrality by 2060 for China, climate neutrality by 2050 for the EU) and Paris-aligned decarbonisation pathways have recast energy policy as an instrument of climate governance rather than a purely economic or security domain.[203] At the same time, evolving understandings of energy security—centred on secure access to clean energy, resilient infrastructures and diversified supply chains for critical energy transition technologies—have re-defined strategic interdependence between the two sides.[204] The decision to build a "Green Partnership" and to establish the High-Level Environment and Climate Dialogue has elevated environment, climate and the low-carbon transition to a "fifth pillar" of the comprehensive strategic partnership, while recent joint assessments portray China and the EU as potential "twin engines" of global climate governance and green transformation.[205]

Second, concerning the legal frameworks governing energy transition and their implications

[203] *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4.
[204] ECECP. *Energy Security in the Context of the Energy Transition* (2023), supra note 17.
[205] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24.

for cooperation, the analysis reveals a complex pattern of partial convergence. On the EU side, climate and energy law have been progressively integrated into a dense climate–energy acquis, with binding greenhouse-gas reduction targets, renewable-energy and energy-efficiency objectives, and internal-market rules increasingly "hard-wiring" climate considerations into energy regulation. On the Chinese side, the evolution from policy-driven regulation to more systematic legislation has culminated in the adoption of the Energy Law of the People's Republic of China which embeds dual-carbon goals, green and low-carbon development and the shift from dual control of energy consumption to dual control of carbon emissions, and coordinates sectoral laws such as the Renewable Energy Law and the Electricity Law. International climate law (UNFCCC/Paris) functions as a dynamic driver of domestic reform for both parties, while international economic law—especially WTO subsidies disciplines and trade-remedy rules—constitutes a relatively static framework that channels and constrains industrial policy, including renewable energy subsidies. Bilaterally, cooperation has been structured primarily through soft-law instruments—joint statements, roadmaps, memoranda of understanding and dialogue mechanisms—which articulate shared principles and priorities but stop short of binding energy-transition treaties.[206]

Third, in relation to the strategic and legal challenges specific to renewable energy cooperation, the study shows that renewables have become both the most promising and the most politically sensitive layer of the partnership. Economic interdependence in clean-energy value chains is deep: the EU has relied heavily on Chinese solar PV components, while Chinese firms have invested in European renewable projects and drawn on EU expertise in regulation, offshore wind and system integration. Yet this interdependence is embedded in an environment of "competition within cooperation", marked by strategic distrust, economic-security concerns and distributional conflicts over value creation in green supply chains.[207] The legacy of the EU–China solar panel dispute illustrates how renewable energy can become a flashpoint where climate and trade objectives collide, leaving a lasting "scar"

[206] *China–EU Cooperation on Environment and Climate: Progress and Prospects* (2024), supra note 24; *Powering the Twin Engines: Navigating China–EU Climate Cooperation* (2025), supra note 4.
[207] Šekarić Stojanović (2024), supra note 105.

in the relationship.[208] Current debates on "overcapacity", fair competition and "de-risking" echo these tensions and interact with domestic industrial policies, EU instruments such as CBAM, NZIA and the Critical Raw Materials Act, and Chinese concerns about securitisation of clean-energy trade.[209] At the legal level, WTO subsidy rules and trade-remedy practices create a "compliance dilemma" for both parties: climate-motivated support schemes for renewables are essential to meet dual-carbon and climate-neutrality goals but are increasingly exposed to litigation and countervailing duties.

Fourth, regarding the future prospects for deepening renewable energy cooperation and adapting legal frameworks, the analysis indicates that a path towards "regulated interdependence" remains open but is far from automatic. On the one hand, there is a high degree of normative alignment between Chinese and EU climate and energy strategies: both sides place renewables at the centre of their decarbonisation pathways, treat green development as a driver of economic modernisation and recognise the need to reconcile climate objectives with energy security and social stability. Domestic legal developments—particularly the consolidation of China's energy-transition framework and the further integration of EU climate and energy law—create opportunities for more structured regulatory dialogue. On the other hand, geopolitical rivalry, industrial competition and legal uncertainty in areas such as subsidies and climate-related trade measures (including carbon border adjustments) represent enduring obstacles. The overall conclusion is that future cooperation will depend on whether China and the EU can manage this tension by strengthening domestic legal coherence, using bilateral mechanisms to anticipate and mitigate conflicts, and pursuing incremental reforms of multilateral trade rules that better reflect the needs of the global energy transition.[210]

4.2 The Future Legal and Strategic Framework for China–EU Energy Cooperation

[208] Plasschaert (2016), supra note 137.
[209] *Between Competition and Co-operation* (2024), supra note 68; Zhao and Li (2024), supra note 68.
[210] Espa and Marín Durán (2018), supra note 87; Wang (2014), supra note 178; Liu, Wu and Wan (2019), supra note 62; Zhang (2021), supra note 111.

4.2.1 Prospects for a More Integrated Energy Cooperation Framework

The analysis in previous chapters suggests that the existing China–EU framework for environment, climate and energy cooperation is both dense and fragmented. It is dense in the sense that there is a wide array of political declarations, soft-law instruments and dialogue mechanisms—HECD, the Energy Dialogue, ECECP and related programmes—that collectively articulate a sophisticated agenda on climate, green development and energy transition. At the same time, it is fragmented because responsibilities are dispersed across multiple tracks, legal commitments remain largely non-binding at the bilateral level, and linkages between climate, energy and economic instruments are not always transparent. The question for the future is therefore not whether a legal and strategic framework exists, but how far it can be made more integrated, predictable and resilient.

A first dimension of integration concerns the vertical alignment between international climate obligations, bilateral commitments and domestic law. Both China and the EU have anchored their energy transitions in the UNFCCC and the Paris Agreement, translating these into nationally determined contributions and long-term strategies that rely heavily on renewables and energy efficiency. The EU has further crystallised its trajectory in the European Climate Law and the "Fit for 55" legislative package, while China has consolidated its dual-carbon objectives and ecological-civilisation principles in the Energy Law and related sectoral reforms. A more integrated cooperation framework would explicitly connect these layers by framing bilateral energy cooperation as a vehicle for the joint implementation of Paris commitments and domestic neutrality targets. This could be achieved, for example, by revising or updating existing roadmaps—such as the 2016–2020 Energy Cooperation Roadmap and subsequent joint statements—so that they expressly link cooperative projects in renewables, grids, storage and efficiency to quantified climate goals and implementation milestones.[211]

A second dimension concerns horizontal integration across policy domains. To date, China–

[211] *EU-China Roadmap on Energy Cooperation* (2016-2020); *EU–China Leaders' Statement on Climate Change and Clean Energy* (2018).

EU cooperation has largely been organised along separate tracks: environment and climate (HECD), energy (Energy Dialogue), trade and investment (under broader economic dialogues), and sectoral initiatives on issues such as circular economy and emissions trading. However, as Chapters 2 and 3 have shown, renewable energy sits precisely at the intersection of these domains: it is simultaneously a climate instrument, an energy-security asset and a driver of trade and industrial policy. A more integrated framework would therefore seek to systematise the treatment of renewables across these tracks. One option would be to develop a comprehensive "Green and Energy Transition Cooperation Framework" under the Green Partnership umbrella, structured around core themes—such as carbon markets, renewable deployment, energy-system flexibility, green finance and just transition—that cut across ministerial portfolios. Within each theme, the framework could identify joint objectives, indicative timelines and the relevant dialogue mechanisms, reducing duplication and clarifying how climate, energy and economic instruments interact.

A third element relates to institutional coherence and procedural guarantees. The HECD and the Energy Dialogue already provide regular high-level platforms, but their legal-procedural functions remain under-specified. Recent joint reports underline that these dialogues are increasingly called upon to address issues—critical raw materials, supply-chain resilience, industrial competitiveness—that go beyond traditional environmental or energy topics. To support a more integrated framework, both dialogues could be endowed, through updated terms of reference or joint guidelines, with clearer mandates to (i) exchange information on forthcoming regulatory measures with significant cross-border effects (for example, major subsidy reforms, carbon-pricing initiatives, or screening and trade-defence instruments affecting renewables); (ii) conduct structured impact assessments on the implications for climate and energy cooperation; and (iii) formulate joint recommendations or agreed "good practices" for aligning such measures with Paris goals and with basic principles of non-discrimination and proportionality. While such arrangements would remain soft law, they would create expectations of prior consultation and transparency, enhancing legal predictability for public and private actors.

A fourth and closely related dimension concerns normative principles. Existing documents already articulate shared commitments to sustainable development, green and low-carbon transition, circular economy and just transition. Building on this, a more integrated framework could codify a limited set of guiding principles for energy cooperation—for example: (i) Paris-alignment and contribution to 1.5°C-compatible pathways; (ii) mutual benefit and fair sharing of gains in green value chains; (iii) non-discrimination and avoidance of disguised restrictions on trade and investment in climate-relevant sectors; and (iv) support for a just and orderly transition, including attention to affordability and social impacts. Such principles would not displace existing treaty obligations but would provide interpretive guidance for the design of subsidies, standards, screening mechanisms and other measures affecting renewable energy cooperation.

Finally, an integrated framework would need to embed epistemic and technical cooperation more systematically. Experience with ETS cooperation, green-recovery programmes and ECECP studies shows that joint analytical work can influence domestic regulatory debates and foster gradual convergence of approaches. Extending this model, the parties could institutionalise joint expert groups on topics such as renewable-support design, grid integration, storage regulation and climate-compatible subsidy reform, tasked with preparing non-binding technical guidelines or model provisions for consideration by domestic authorities. This type of "soft codification" would operationalise the dynamic/static interaction highlighted in the study: dynamic learning processes in soft-law and expert settings progressively feeding into more stable domestic legal structures.

4.2.2 Overcoming Obstacles in China–EU Energy Cooperation

If a more integrated framework is to be meaningful, it must address the obstacles identified throughout the report rather than merely restate high-level aspirations. These obstacles are not only political but also legal and structural. They relate to asymmetries in domestic legal systems, tensions between climate-oriented subsidies and trade law, divergent approaches to economic security and "de-risking", and the inherent fragility of soft-law cooperation in an environment of geopolitical rivalry.

A first cluster of obstacles arises from asymmetries in domestic legal frameworks and regulatory philosophies. EU climate and energy law is highly codified, anchored in binding quantitative targets, internal-market rules, state-aid control and judicial review. China's system, by contrast, has historically relied more on planning instruments, administrative guidance and policy-based subsidies, although this is now changing with the adoption of the Energy Law and the prospective revision of the Renewable Energy Law and Electricity Law. These differences affect how each side understands the role of law in steering the energy transition, and they can generate misunderstandings in areas such as market access, grid connection, transparency of subsidies and treatment of foreign investors. Overcoming this type of obstacle does not require homogenisation of legal systems, but it does require sustained regulatory dialogue focused on concrete issues—such as curtailment, priority dispatch, cost-recovery mechanisms and the legal status of green certificates—so that both parties can identify functionally equivalent solutions and reduce perceived legal uncertainty for cross-border actors.

A second, and closely related, obstacle concerns the interaction between renewable-energy subsidies and WTO rules. As the analysis in Chapter 3 highlighted, the current multilateral subsidies regime inadequately reflects the centrality of climate mitigation and just transition, while the lapse of the SCM Agreement's non-actionable category has removed an important "safe space" for environmental subsidies. This situation generates a compliance dilemma: climate-motivated support schemes that are economically and environmentally justified risk being challenged as "specific" subsidies causing adverse effects, especially where trade-remedy authorities scrutinise support to renewable manufacturers. For China–EU cooperation, this translates into a persistent background risk that disputes—similar to the earlier solar panel case—could recur in other segments of the clean-tech value chain. Addressing this obstacle demands a twin-track approach. At the multilateral level, both sides would benefit from jointly exploring incremental reforms, such as clarifying the treatment of carbon-pricing and revenue-recycling schemes, improving notification practices for climate-oriented subsidies, and revisiting the idea of a "green light" category under specified

conditions. At the domestic level, further codification and rationalisation of Chinese subsidy frameworks and continued refinement of EU state-aid rules for climate, environmental protection and energy can help ensure that support schemes are transparent, objective and less vulnerable to allegations of discrimination.

A third set of obstacles relates to economic-security narratives and de-risking strategies. European debates following the Russia–Ukraine conflict have intensified concerns about strategic dependencies in critical supply chains, including solar PV, batteries and other clean-energy technologies where China plays a dominant manufacturing role. Chinese analyses, in turn, view certain EU measures—such as industrial-policy initiatives favouring domestic manufacturing and increased use of trade-defence instruments—as signs of a broader shift towards securitisation of the green transition. If left unmanaged, these narratives can harden into mutually reinforcing perceptions of "weaponised interdependence", undermining trust and constraining political space for cooperation. From a legal perspective, the challenge is to design screening, trade-defence and industrial-policy measures in a manner that is consistent with non-discrimination and proportionality, aligned with Paris objectives and transparent to partners. One pragmatic step would be to establish, within existing dialogues, structured exchanges on the design and implementation of de-risking strategies, focusing on criteria for identifying "critical" dependencies, safeguards against disguised protectionism and mechanisms for recognising mutually acceptable forms of interdependence.[212]

A fourth obstacle concerns the fragility of soft-law cooperation in times of geopolitical stress. The HECD, Energy Dialogue and related platforms are central to the China–EU green partnership, yet their outputs—joint statements, press communiqués, roadmaps—are formally non-binding and vulnerable to political downgrading or interruption. While this flexibility has advantages, it also raises questions about durability and enforcement, particularly when cooperative commitments intersect with contentious issues such as CBAM, overcapacity

[212] ECECP. *Energy Security in the Context of the Energy Transition* (2023), supra note 17; Šekarić Stojanović (2024), supra note 105; *Between Competition and Co-operation* (2024), supra note 68.

narratives or new industrial policies. One way to mitigate this fragility is to complement soft-law instruments with more formalised procedural obligations, such as agreed timelines for consultation on major regulatory initiatives with cross-border effects, or mutual commitments to publish detailed explanations of climate-related measures that may affect the other party's exporters. Even if such obligations remain relatively light, they can contribute to building a culture of predictable interaction and reduce the likelihood of surprise measures.

Finally, there are distributional and just-transition concerns that, while often framed as domestic issues, have transboundary implications. Rapid decarbonisation and structural change in energy systems can generate sectoral and regional winners and losers, affecting social acceptance of both climate policies and open trade in clean-energy goods.[213] If affected communities in either jurisdiction come to associate the energy transition with job losses and perceived unfair competition, political support for cooperative approaches may erode. Existing EU and Chinese documents already emphasise notions of "just transition", ecological civilisation and people-centred development. Integrating these concepts more explicitly into bilateral energy cooperation—through, for example, joint research on employment and social impacts of green value chains, exchange on just-transition policies, or inclusion of labour- and community-related considerations in joint guidelines on renewable projects—can help align domestic legitimacy with international cooperation.

In sum, overcoming obstacles in China–EU energy cooperation is less about identifying entirely new instruments than about recalibrating existing ones. Greater symmetry and transparency in domestic legal frameworks, careful alignment of subsidies and trade rules with climate imperatives, nuanced and legally grounded approaches to economic security, and modest hardening of soft-law procedures can collectively reduce the gap between strategic narratives of "twin engines" and the day-to-day legal reality of renewable energy cooperation. Whether this potential is realised will depend on sustained political commitment and the willingness of both sides to treat legal frameworks not only as tools of defence in an era of competition, but also as shared infrastructure for managing an inevitably

[213] *EU–China Cooperation on Green Recovery and Green Stimulus* (EU Report, 2020), supra note 53.

interdependent energy transition.

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