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The European Union's Green Industry
Promotion Policy:
Green Deal Industrial Plan and Net-Zero
Industry Act

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Summary

- After the implementation of the US Inflation Reduction Act (2022.8.16.), the European Union announced the draft “Green Deal Industrial Plan” and “Net Zero Industry Act” as a response measure.
- The Green Deal Industrial Plan (2023.2.1.) represents the EU’s strong commitment to strengthening the competitiveness of the clean tech industry to achieve the net-zero goal and will be promoted through four means: improving the regulatory environment, facilitating financing, capacity building, and open education.
- The Net-Zero Industry Act draft (2023.3.16.), the plan’s legal basis, aims to strengthen industrial competitiveness in the EU for eight* strategic net-zero technologies.

* ① Solar and solar heat technology, ② Onshore wind and offshore renewable technology, ③ Batteries and storage technology, ④ Heat pump and geothermal energy technology, ⑤ Water electrolysis and fuel cells, ⑥ Biogas and biomethane technology, ⑦ Carbon dioxide capture and storage technology, and ⑧ Grid technology

- In order to maintain and strengthen the competitiveness of the Korean green industry under the new economic order, Korea needs to actively respond to the new system of each country, refer to the series of responses and policies announced by the EU, and establish policies suitable for Korean industrial conditions.

★ **Keywords:** European Union, Green Deal Industrial Plan, Net-Zero Industry Act, Climate Change, Carbon Neutral

1 Introduction

- ◆ Recently, the European Commission published the “Green Deal Industrial Plan” and the “Net-Zero Industry Act” drafts, outlining the EU’s policy to foster green industries to achieve carbon neutrality by 2050.
 - The Green Deal Industrial Plan, announced on February 1, 2023, aims to create a foundation for the development of green industries in the EU, including wind and solar power,
 - and the Net-Zero Industry Act, which was released the following month on March 16, is one of the legal bases to support this.
- ◆ The EU’s policy as described above is aimed at a rapid transition to green industries in response to the climate crisis and is also understood as a response to the US Inflation Reduction Act (IRA).
 - In a plenary session of the European Parliament on December 14, 2022, Ursula von der Leyen, the president of the European Commission, pointed to the unfair competition that IRA can cause and called for a “European IRA.”*1)
 - * In the same speech, von der Leyen remarked, “We need to address these issues. We need to give our answer, our European IRA.”
- ◆ As Korea emphasizes the development of net-zero key industries in its major national policies* and the EU is a major trading partner**, it is necessary to understand the EU’s recently announced green industry promotion policy.
 - * In the Carbon Neutral Green Growth Promotion Strategy (2022.10) and the National Basic Plan for Carbon Neutrality and Green Growth (Proposal) (2023.3), the development of key industries related to carbon neutrality is specified as a major task.
 - ** The EU is Korea’s top three export markets, accounting for 10% of Korea’s total exports (as of 2022).2)
- ◆ Therefore, this insight focuses on the EU’s response to the US IRA, examines the background of the EU’s green industry promotion policy, summarizes the main contents of the Green Deal Industrial Plan and the Net-Zero Industry Act, and suggests implications for Korean policies.

1) European Commission, 2022a, Speech by President von der Leyen at the European Parliament Plenary on the preparation of the European Council meeting of 15 December 2022, European Commission Press, Dec. Feb. 14, 2022, https://ec.europa.eu/commission/presscorner/detail/en/speech_22_7727 (accessed on 2023.4.10.)

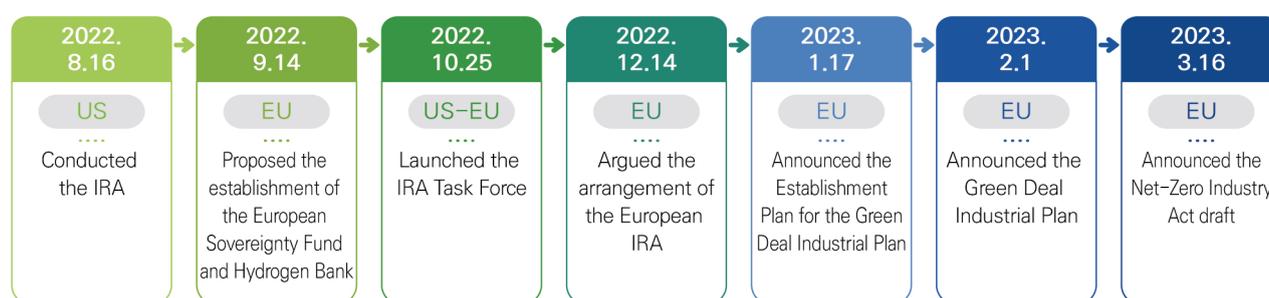
2) Delegation of the European Union to the Republic of Korea, 2023, 2023 Korea-EU Trade and Investment Relations

2 The EU's Response to the US IRA³⁾

» Implementation of the US IRA and the EU's Reaction

- ◆ The IRA, signed by US President Biden on August 16, 2022, is considered one of the most important pieces of legislation in recent US history.³⁾
 - The IRA is a \$737 billion bill that envisions significant spending on energy security and climate change response (\$369 billion), extending the Affordable Care Act (\$64 billion), drought recovery in the western US (\$4 billion), and deficit reduction (\$300 billion).⁴⁾
 - With over 80% of its spending focused on energy security and climate change response, the IRA can be basically viewed as one of the domestic green industry promotion policies for climate change response, providing tax incentives, grants, and loans for clean tech investments in the US.
- ◆ The EU welcomes increased US investment in clean technology but is concerned that key provisions of the IRA discriminate against European exporters by privileging US manufacturers.³⁾
 - For example, IRA Section 13401 (Clean Vehicle Credit), which is the article on the electric vehicle tax credit, included the so-called North American final assembly requirement, critical minerals for battery requirement, and battery component requirement through the amendment of the US Internal Revenue Code.⁵⁾⁶⁾
 - Apparently, the amendment of the Internal Revenue Code that includes these requirements is discriminatory and unfair to European electric vehicle producers exporting to the US.

Figure1 The Announcement of the US IRA and the EU's Response Results



Data: Organized by the authors based on Boehm and Scalamandrè (2023)

3) Boehm, L. and Scalamandrè, C., 2023, EU-US climate and energy relations in light of the inflation Reduction Act, BRIEFING, European Parliamentary Research Service

4) U.S. Senator Chris Van Hollen of Maryland, 2022, Summary: The Inflation Reduction Act of 2022, Updated: August 11th, 2022, <https://www.vanhollen.senate.gov/imo/media/doc/One-Page%20Summary-%20Nationally.pdf> (accessed on 2023.4.14.)

5) Public Law 117-169, An act to provide for reconciliation pursuant to title II of S. Con. Res. 14 (Aug. 16, 2022), Sec. 13401. Clean Vehicle Credit

6) 26 U.S.C. Sec. 30D

- ◆ On September 14, the month after the IRA was implemented in the United States, the EU Commission President von der Leyen presented a response to the US IRA in her regular State of the Union Address*, announcing the creation of the new European Sovereignty Fund and the European Hydrogen Bank.⁷⁾

* Every September, the president of the European Commission presents to the European Parliament an assessment of the past year's achievements, sets out policy priorities hereafter, outlines solutions to the most pressing challenges facing the EU, and envisions its future.⁸⁾

- The European Sovereignty Fund is a fund to strengthen industrial competitiveness, and the European Hydrogen Bank is an institution to support the expansion of the hydrogen economy, and the creation of a subsidy fund for green industries in the European region is seen as a means of response to the large-scale subsidization of green industries evident in the US IRA.
- The day after von der Leyen's State of the Union Address, Thierry Breton, the European Commission's Internal Market Commissioner, endorsed von der Leyen's speech⁹⁾, and on November 29 at the Industriekonferenz 2022 held in Berlin, Germany, he pointed to the negative impact of US IRA and highlighted the European Sovereignty Fund as one of the measures to strengthen European industrial competitiveness.¹⁰⁾

» Launch of the US-EU Task Force in the IRA

- ◆ In 2022, in response to growing concerns from EU member states, Bjoern Seibert, head of the European Commission's von der Leyen cabinet, and Mike Pyle, US Deputy National Security Advisor, launched the "US-EU Task Force on the Inflation Reduction Act (hereinafter, Task Force)" at a meeting (Oct. 25, 2022) to discuss issues such as Ukraine reconstruction.¹¹⁾
 - Both sides agreed on the importance of closer coordination to support sustainable and resilient supply chains across the Atlantic, including building a clean energy economy, and indicated that a high-level task force will address the issues raised by the EU on the IRA.¹¹⁾
 - On December 5, 2022, the US-EU Trade and Technology Council reviewed the work of the Task Force, checked its progress, and issued a joint statement acknowledging the EU's concerns and committing to address them constructively.¹²⁾

7) European Commission, 2022b, 2022 State of the Union Address by President von der Leyen, European Commission Press, Sep. Feb. 14, 2022, https://ec.europa.eu/commission/presscorner/detail/en/speech_22_5493 (accessed on 2023.4.14.)

8) European Commission, State of the Union addresses, https://state-of-the-union.ec.europa.eu/in dex_en (accessed on 2023.4.14.)

9) European Commission, 2022c, A European Sovereignty Fund for an industry "Made in Europe" – Blog of Commissioner Thierry Breton, European Commission Press, Sep. Feb. 15, 2022, https://ec.europa.eu/commission/presscorner/detail/en/STATEMENT_22_5543 (accessed on 2023.4.14.)

10) European Commission, 2022d, Industriekonferenz 2022 – Transformation and the future of industry – Speech by Commissioner Thierry Breton, European Commission Press, Nov. Jan. 29, 2022, https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_22_7276 (accessed on 2023.4.14.)

11) European Commission, 2022e, Launch of the US-EU Task Force on the Inflation Reduction Act, European Commission Press, Oct. 26, 2022, https://ec.europa.eu/commission/presscorner/detail/en/statement_22_6402 (accessed on 2023.4.14.)

12) European Commission, 2022f, EU-US Joint Statement of the Trade and Technology Council, European Commission Press, Dec. 5, 2022, https://ec.europa.eu/commission/presscorner/detail/en/statement_22_7516 (accessed on 2023.4.14.)

- On December 29, 2022, the US Department of the Treasury issued a new guideline on the IRA's clean vehicle tax credit, allowing existing EU companies to take advantage of it without changing their business models.¹³⁾
- The EU welcomed the Task Force's constructive collaboration on the new guideline but stated that it would continue to engage in discussions with the Task Force to address the EU's concerns.¹³⁾

» The EU announces plans to establish the Green Deal Industrial Plan

- ◆ Despite the consultations through the Task Force, as described in the introduction, European Commission President von der Leyen emphasized the need for an EU solution to unfair competition in a plenary session of the European Parliament on December 14, 2022.¹⁾ About a month later, on January 17, 2023, at the Davos Forum, she announced that the EU would develop a Green Deal Industrial Plan, directly referring to the US IRA.¹⁴⁾
 - However, von der Leyen said at the Davos Forum that the goal of cooperation* between the EU and the US should be to avoid disruption of Atlantic trade and investment and that efforts should be made to ensure that their respective incentive programs are fair and mutually reinforcing.¹⁴⁾
 - * While there was no direct reference to the Task Force in the speech, it is believed that the cooperation between the EU and the US refers to the Task Force launched on October 25, 2022.
 - She stated that there will be open investigation if procurement or other markets are distorted due to EU subsidies¹⁴⁾ and emphasized fairness as a key value over increased competition for green industry leadership.

» Opposition to the EU's response to the IRA

- ◆ There also have been negative comments from within the EU concerning the EU's response to IRA as described above that they should not compete for subsidies.
 - Professor Holger Görg of Germany's Kiel Institute for the World Economy stated the IRA's scale is not dramatically large, and warned that increased EU subsidies would be wasted and could lead to a trade war.¹⁵⁾

13) European Commission, 2022g, EU welcomes access to US subsidy scheme for commercial vehicles, European Commission Press, Dec. 29, 2022, https://ec.europa.eu/commission/press-corner/detail/en/IP_22_7869 (accessed on 2023.4.14.)

14) European Commission, 2023a, Special Address by President von der Leyen at the World Economic Forum, European Commission Press, Jan. 17, 2023, https://ec.europa.eu/commission/press-corner/detail/en/speech_23_232 (accessed on 2023.4.14.)

15) Kiel institute for the World Economy, 2022, Statement – Subventionspaket IRA der USA: Furcht vor Abwanderung von Firmen aus EU übertrieben, Kiel institute for the World Economy Media Information, Dec. May 5, 2022, <https://www.ifw-kiel.de/de/publikationen/medieninformationen/2022/subventionspaket-ira-der-usa-furcht-vor-abwanderung-von-firmen-aus-eu-uebertrieben/> (accessed on 2023.4.16.)

– Milan Elkerbout, Head of the Climate Policy Program at the Centre for European Policy Studies*, stated the IRA should not be emulated to increase competition for subsidies, and methods of collaboration should be sought rather than competition.¹⁶⁾

* The Centre for European Policy Studies is an independent policy research think tank founded in 1983 in Brussels, Belgium, comprised of approximately 60 researchers who conduct research on a wide range of EU policy areas, including economics, finance, energy, climate, and education.¹⁷⁾

3 The EU’s Green Deal Industrial Plan

» Overview of the EU’s Green Deal Industrial Plan

- ◆ In February 2023, the European Commission published the Green Deal Industrial Plan for the Net-Zero Age, which aims to strengthen the competitiveness of the clean tech industry to achieve the net-zero goal.
- ◆ The Green Deal Industrial Plan is part of the “EU Green Deal Plan” announced in December 2019, with the main objective of unlocking economic growth potential and job creation through preoccupying the clean tech market.

Table 1 Green Deal Promotion Progress in Europe

Period	Details
'19. December	Announcement of the European Green Deal
'20. January	Announcement of the European Green Deal Investment Plan and the Just Transition Mechanism
'21. July	Announcing a 'Fit-for-55' Policy Package aimed at carbon reduction
'22. May	Announcement of REPowerEU to address economic security and response to energy crisis
'23. February	Proposal of the Green Deal Industrial Plan
'23. March	Announcement of the Net-Zero Industry Act and Critical Raw Material Act

Data: European Commission (2023b), KDB Report (2023)

16) Milan Elkerbout, 2022, Opinion – In green subsidy race, EU should not imitate US, euobserver, Dec. 1, 2022, <https://euobserver.com/opinion/156488> (accessed on 2023.4.16.)

17) Centre for European Policy Studies homepage, <https://www.ceps.eu/about-ceps/> (accessed on 2023.4.28.)

- ◆ The war between Russia and Ukraine has increased the cost of using fossil fuels, and the expansion of renewable energy was proposed in May 2022 as a way to solve the energy crisis caused by the war, and the Green Deal Industrial Plan was also proposed as a policy instrument to achieve this goal.

» Highlights of the EU's Green Deal Industrial Plan¹⁸⁾

- ◆ The Green Deal Industrial Plan is largely divided into four pillars: ① improving the regulatory environment, ② facilitating financing, ③ capacity building, and ④ open trade.
 - ① Improving the regulatory environment: Setting up a predictable, fast-track, streamlined regulatory environment that supports rapid implementation of net-zero manufacturing capabilities
 - ② Facilitating financing: Expanding the cohesion of the single market, boosting investment for sufficient financing opportunities and reinforced access
 - ③ Capacity building: Helping the securement of skills and job abilities for green transition
 - ④ Open trade: Building a resilient supply chain

〈Details of the Four Pillars of the EU's Green Deal Industrial Plan〉

- ◆ ① (Improving the regulatory environment) To support industrial manufacturing of key technologies in the EU, a “Net-Zero Industry Act” has been proposed to provide a streamlined regulatory framework for the production capacity of carbon-neutral technologies, such as batteries and wind power, with specific details as follows.
 - * See Chapter 4 of this article for details on the Net-Zero Industry Act.
 - First, to ensure that reliance on offshoring does not jeopardize the green transition, the EU will identify targets for industrial capacity needed by 2030 and consider the entire supply chain and value chain across borders to avoid bottlenecks in supply.
 - In addition, it will set an upper limit for the turnaround time of the permit for each permit stage to shorten the duration of the procedure and improve its predictability (e.g., capacity building of the member states through introducing a “one-stop shop,” a single point of contact for investors and industry stakeholders during the entire process).
 - In terms of innovation in science and technology, to promote innovation, the plan will assess the feasibility of establishing regulatory sandboxes to allow for rapid experimentation and innovation to test new technologies, which will streamline the approval and certification process for products to enter the market.

18) European Commission, 2023b, Communication from the Commission to the European Parliament, The European Council, The Council, The European Economic and Social Committee and The Committee of the Regions – A Green Deal Industrial Plan for the Net-Zero Age, COM(2023) 62 Final, Brussels, Feb. 1, 2023.

- The EU plans to introduce various forms of benefits, such as public procurement and incentives, for companies and end users of net-zero technologies to generate demand for carbon-neutral products on a large scale,
- And will diversify procurement sources so that carbon neutral products can be manufactured seamlessly within the EU and recycle raw materials to reduce their dependence on third country supply and will propose the “Critical Raw Material Act” to this end.
 - * Critical Raw Material Act includes ensuring high environmental standards, such as recycling, for guaranteeing supply in Europe and strengthening international engagement while driving ongoing research and innovation.
- Regarding energy imports, the EU will continue to implement the REPowerEU plan to reduce their dependence on Russia, while addressing high energy costs and replacing fossil fuels with cheaper renewables, and in March, it has submitted a legislative bill on electricity market reform.
- The EU will seek to green the Trans-European Transport Network (TEN-T) by enhancing the deployment of charging & refueling and hydrogen infrastructure and expanding and strengthening the smart electricity grid.
 - The European Commission stresses the need for completing a future-oriented fueling deployment network via the rapid adoption of the Alternative Fuels Infrastructure Regulation (AFIR).
 - It will further investigate the financing requirements of the Connecting Europe Facility to develop and enhance hydrogen and power infrastructure and utilize the full scope of the revised Trans-European Integrated Energy Grid Regulation to accelerate cross-border infrastructure planning, financing, and deployment.
- The establishment of the Clean Tech Europe Platform and the Clean Energy Industrial Forum will bring together relevant stakeholders to support planning, facilitate activities to achieve investment and manufacturing targets, and provide future matchmaking opportunities.
- ◆ ② (Facilitating financing) The EU’s carbon-neutral industry is competitive in some sectors, such as wind power and heat pumps, but relatively limited in others, such as solar panels; thus, the EU will promote the expansion and acceleration of financing for the carbon-neutral industry by facilitating financing, which is broadly categorized into national support, support by the EU, and private financing.
- ◆ ②-i (National support) To overcome the war in Ukraine in March 2022 and the energy crisis, Member States will introduce a “Temporary Crisis Framework” and provide tools to mitigate the economic damage of the war and facilitate structural adjustment to better respond to the economic situation.

- The framework has been revised twice and includes streamlining support for renewable energy and decarbonization technologies and energy efficiency.
- The Commission will allow flexibility to temporarily amend the State aid rules until the end of 2025 to encourage the member states to be supported through simplified procedures and faster approvals, which will also aid certain projects included in national recovery plans.
- In particular, the Commission will adopt State aid rules organized around five axes*, four of which will be implemented through an amendment to the Temporary Crisis Framework and later transitioned into a “Temporary Crisis and Transition Framework (TCTF),” based on the conditions necessary to limit the distortion of the EU single market by state aid, narrow regional disparities, and comply with international obligations.
 - * ① Streamlining the subsidy procedure for promoting renewable energy deployment; ② Streamlining the subsidy procedure for decarbonizing industrial processes; ③ Improving the support system for investment in manufacturing of strategic carbon neutral technologies; ④ Supporting subsidies for major new product development projects in the strategic carbon-neutral value chain; and ⑤ Increasing the threshold for state support
 - ※ The fifth axis will be adopted through a revision of the “Green Deal General Block Exemption Regulation” (GBER).
- Meanwhile, the EU will streamline the approval of innovative projects* involving “Important Projects of Common European Interest (IPCEI),” which are large-scale development projects.
 - * The EU currently has five IPCEI projects underway, which are large-scale developments that many member nations are pursuing around new technologies in strategic areas. These projects include one project on microelectronics, two on batteries, and two on hydrogen.
- ◆ ②-ii (EU support) Investment in green technologies will be strengthened by improving access to REPowerEU, InvestEU, and innovation funds operated by the EU
 - The Commission has established a “Recovery and Resilience Facility (RRF)” and “Guidance on Recovery and Resilience Plans” for the member states to implement REPowerEU and is seeking to ensure a flexible application of REPowerEU, including the establishment of a single point of contact for rapid support to businesses and to improve competitiveness, tax benefits and capacity building investments in the workforce for industrial transition.
 - The InvestEU Program to boost private investment in priority sectors in Europe will support public and private investment in net-zero technologies and industrial innovation and will streamline the application process to meet Green Deal project plan targets.
 - The Innovation Fund will support technologies and solutions that promote decarbonized industrialization, renewable energy and energy storage (including batteries and hydrogen), and strengthen net-zero supply chains by supporting key product manufacturing.

- Meanwhile, the Commission has proposed the establishment of a European Sovereignty Fund this year to invest in emerging technologies over the long term; however, the Czech Republic, Denmark, Finland, Austria, Ireland, Estonia, and Slovakia have publicly opposed it in an official letter, calling for the use of existing EU funds, such as the already approved RRF funds, rather than establishing a new fund.
- ◆ ②–iii (Private Financing) The establishment of the “Capital Markets Union” will be promoted to expand private investment and support investors and companies through a sustainable financial framework.
 - The Capital Markets Union aims to improve financing and investment opportunities for individuals and companies in the clean tech sector by increasing the size of individual capital markets and integrating them across nations.
- ◆ ③ (Capacity building) As the green transition must be workforce-centered and at the same time create quality jobs in Europe, the EU will promote the capacity building of the workforce.
 - As 35–40% of all jobs could be affected by the green transition, there should be efforts to expand and strengthen technical education and build technical partnerships with the goal of creating quality jobs.
 - The certification of technical qualifications will be facilitated through “Net-Zero Industry Academies” to implement skill enhancement and retraining programs in strategic industries, and the combination of the existing qualification-based system with a skills-first approach based on actual on-the-job skills will be promoted.
 - In addition, securing EU professionals will be improved by enabling third-country nationals to obtain local technology qualifications and facilitate their access to the EU labor market in key areas.
 - Public and private sector investment will be supported for skills development and enhancement, promotion of investment in education and training will be supported, and the cap on state aid for small and medium-sized enterprises (SMEs) education and training will be elevated under the “Green Deal General Block Exemption Regulation” to classify companies’ education expenditure as an investment rather than an expense.
- ◆ ④ (Open trade) Global cooperation and seamless trade will be promoted so that the provision of benefits for net-zero technologies is driven by the principles of fair competition and open trade.
 - The network of free trade agreements for the green transition and cooperation with partner countries will be continually built and expanded, and the establishment of a trade framework for the green transition based on these agreements will be promoted.

- In addition, through establishing the “Critical Raw Materials Club”* with third countries, the EU aims to secure sustainable and affordable supply chains for key minerals essential to the green transition and contribute to building a net-zero environment globally.
 - * The Critical Raw Materials Club was designed to reduce reliance on specific countries, such as China, and bring together raw material-consuming and resource-rich countries, including the US, to strengthen and diversify supply chains.
- Moreover, the EU will also expand the “Clean Tech/Net-Zero Industrial Partnership” and develop an Export Credit Strategy to support the EU industry’s participation in the global clean energy transition and investment in infrastructure.
- In response to concerns that foreign subsidies undermine the competitiveness of local industries, the “Regulation on Foreign Subsidies” will be used to examine the impact of subsidies from third countries in the EU region.
- In particular, the EU’s “Public Procurement Regulation” (2022. 8. 29), “Foreign Direct Investment Review System” (enforced on 2020. 10. 11.), “Trade Threats Countermeasures”, and other existing EU-level measures against unfair trade and investment practices were mentioned, and it was emphasized that appropriate measures will be taken against practices that threaten the economic security of the region.

4 The EU’s Net Zero Industry Act

» Overview of the EU’s Net-Zero Industry Act

- ◆ On March 16, 2023, the European Commission published the draft of the “Net-Zero Industry Act”; the Commission had previously stated in its Green Deal Industrial Plan that it would enact the act to improve the regulatory environment for green industries in the EU.
- ◆ The purpose of the Net-Zero Industry Act is to establish a legal framework to support the development of the manufacturing of carbon neutral energy technologies in order to assist the achievement of the EU’s 2030 decarbonization goal and 2050 climate neutrality goal, and to ensure the stable procurement of net-zero technology supply.¹⁹⁾
 - The general objectives of the Net-Zero Industry Act, as described above, are divided into detailed objectives for each of the seven pillars: ① investment promotion, ② reduction of carbon dioxide emission, ③ enhancement of market access, ④ skill improvement for job creation, ⑤ innovation support, ⑥ establishment of a governance system, and ⑦ establishment of a monitoring system.

¹⁹⁾ European Commission, 2023c, Proposal for a Regulation of the Framework of Measures for Strengthening Europe’s Net-zero Technology Products Manufacturing Ecosystem(Net Zero Industry Act), COM(2023) 161 Final, Brussels, Mar. 16, 2023.

Table 2 Objective and Detailed Objectives of the EU Net-Zero Industry Act

Objective: Establish a legal framework to support the development of net-zero energy technology manufacturing to achieve 2030 decarbonization and 2050 climate neutrality goals						
Detailed Objective 1	Detailed Objective 2	Detailed Objective 3	Detailed Objective 4	Detailed Objective 5	Detailed Objective 6	Detailed Objective 7
Promote investment for net-zero technologies	Reduce carbon dioxide emissions	Strengthen market access	Improve capabilities to create jobs	Support innovation	Build a governance system	Build a monitoring system

Data: Organized by the authors based on the European Commission (2023c)

- ◆ While the Act acknowledges that the benefits of the Act will be available to a wide range of net-zero technologies, it seeks to highlight eight key technologies that are likely to make a significant contribution to achieving the 2030 climate and energy goals.¹⁸⁾
 - The eight key technologies emphasized by the Act are defined as “Strategic Net-Zero Technology” and listed in the Annex to the Act and include: ① solar and solar heat, ② onshore wind and offshore renewable technology, ③ batteries and storage, ④ heat pumps and geothermal energy, ⑤ water electrolysis and fuel cells, ⑥ biogas and biomethane, ⑦ carbon dioxide capture and storage, and ⑧ grid technologies.²⁰⁾

Table 3 Strategic Net-Zero Technologies in the EU’s Net-Zero Industry Act

Strategic Net-Zero Technology 1	Strategic Net-Zero Technology 2	Strategic Net-Zero Technology 3	Strategic Net-Zero Technology 4
Solar and solar heat technology	Onshore wind and offshore renewable technology	Battery and storage technology	Heat pump and geothermal energy technology
Strategic Net-Zero Technology 5	Strategic Net-Zero Technology 6	Strategic Net-Zero Technology 7	Strategic Net-Zero Technology 8
Water electrolysis and fuel cells	Biogas and biomethane technology	Carbon dioxide capture and storage technology	Grid technology

Data: Organized by the authors based on the European Commission (2023d)

» **Highlights of the EU’s Net-Zero Industry Act¹⁹⁾**

- ◆ The Net-Zero Industry Act consists of 9 Chapters and 38 Articles, and except for Chapters 1 and 9, the 7 chapters of Chapters 2 through 8 are organized to correspond to the 7 detailed objectives of the Net-Zero Industry Act

²⁰⁾ European Commission, 2023d, Annexes to the Proposal for a Regulation of the Framework of Measures for Strengthening Europe’s Net-zero Technology Products Manufacturing Ecosystem(Net Zero Industry Act), COM(2023) 161 Final, Brussels, Mar. 16, 2023.

Table 4 Composition of the EU's Net-Zero Industry Act

Chapter	Article	Details
Chapter 1: Subject matter, scope and definitions	Article 1	Subject matter
	Article 2	Scope
	Article 3	Definitions
Chapter 2: Enabling conditions for net-zero technology manufacturing	Section 1: Streamlining Administrative and Permitting-Granting Progresses	
	Article 4	One Stop Shop
	Article 5	Online accessibility of information
	Article 6	Duration of the permit-granting process
	Article 7	Environmental assessments and authorisations
	Article 8	Planning
	Article 9	Applicability of the UNECE Conventions
	Section 2: Net-Zero Strategic Projects	
	Article 10	Selection criteria
	Article 11	Application and recognition
	Article 12	Priority status of net-zero strategic projects
	Article 13	Duration of the permit-granting process for net-zero strategic projects
	Article 14	Accelerating implementation
	Article 15	Coordination of financing
	Chapter 3: CO2 injection capacity	Article 16
Article 17		Transparency of CO2 storage capacity data
Article 18		Contribution of authorized oil gas producers
Chapter 4: Access to markets	Article 19	Sustainability and resilience contribution in public procurement procedures
	Article 20	Auctions to deploy renewable energy sources
	Article 21	Other forms of public intervention
	Article 22	Coordination of access to markets initiatives
Chapter 5: Enhancing skills for quality job creation	Article 23	European Net Zero Industry Academies
	Article 24	Regulated professions in Net Zero Industries and recognition of professional qualifications
	Article 25	Net-Zero Europe Platform and skills
Chapter 6: Innovation	Article 26	Net-Zero regulatory sandboxes
	Article 27	Measures for small and medium enterprises
Chapter 7: Governance	Article 28	Establishment and tasks of the Net-Zero Europe Platform
	Article 29	Structure and functioning of the Net-Zero Europe Platform
	Article 30	Articulation with National Energy and Climate Plans
Chapter 8: Monitoring	Article 31	Monitoring
	Article 32	Delegation of power
	Article 33	Exercising of the delegation
	Article 34	Committee procedure
Chapter 9: Final provisions	Article 35	Evaluation
	Article 36	Treatment of confidential information
	Article 37	Amendment to the Regulation (EU) 2018/1724
	Article 38	Entry into force and application

Data: Organized by the authors based on the European Commission (2023b)

⟨Details of the EU's Net-Zero Industry Act⟩

- ◆ (Chapter 1) Chapter 1 consists of provisions on the subject matter and scope of the Net-Zero Industrial Act and definitions of terms used in the Act and sets out quantitative targets to be achieved by strategic net-zero technologies as defined in the Act.
 - The quantitative goals set out in Chapter 1 is to increase the manufacturing capacity (total production capacity) of strategic net-zero technologies to 40% of the annual deployment level required in the EU by 2030.
- ◆ (Chapter 2) Chapter 2 consists of provisions to create conditions for the promotion of net-zero technology manufacturing and is divided into two sections: Section1, consisting of provisions to improve the administrative burden required to carry out “net-zero technology manufacturing projects*,” and Section2, consisting of provisions on the selection of “net-zero strategy projects**” among net-zero technology manufacturing projects.
 - * Net-Zero Technology Manufacturing Project is defined under Section 3 of the Act as “a planned industrial facility or expansion or repurposing of an existing industrial facility that produces net-zero technologies.”
 - ** A Net-Zero Strategic Project is defined under Article 10 of the Act as a net-zero technology manufacturing project that either ▲ contributes to the technological and industrial resilience of the EU due to its high dependence on imports from third countries, or ▲ can contribute to the creation of net-zero competitiveness and quality jobs by having a positive impact on the supply chain or downstream sector of a net-zero industry in the EU.
- ※ With respect to net-zero strategy projects, there are separate criteria for carbon dioxide storage projects, which can be designated as “net-zero strategy projects” only if the storage site is located within the territory of the EU, its exclusive economic zone, or continental shelf, ▲ contributes to the objectives under Article 18 of the Act, and ▲ has applied for a permit for the safe and permanent geological storage of carbon dioxide in accordance with the Directive on the Geological Storage of Carbon Dioxide (2009/31/EC).
 - Chapter 2, Section 1 of the Act aims to streamline the administrative and permitting procedures for “net-zero technology manufacturing projects.”
 - Chapter 2, Section 2 of the Act contains provisions on the administrative benefits to be granted to “carbon-neutral strategic projects”; for instance, to ensure the fastest permitting procedures in accordance with the laws of the member states and the EU.
- ◆ (Chapter 3) Chapter 3 is on carbon dioxide capture and storage and includes provisions on carbon dioxide injection targets up to 2030 (Article 16), information on carbon dioxide storage that the member states must disclose (Article 17), and specifying contributions for oil and gas producers (Article 18).

- According to Article 16 of the Act, the EU aims to inject at least 50 million tons of carbon dioxide by 2030.
 - ※ In Korea's Nationally Determined Contributions (NDC) amendment (2023.3), the GHG reduction target for 2030 by carbon dioxide capture, storage, and utilization is about 11.2 million tons.²¹⁾
- To achieve this goal, the EU member states are required to publish information on carbon dioxide storage regions that may be authorized within their territory, and entities authorized under the Hydrocarbons Licensing Directive (94/22/EC) are required to publish geological information on hydrocarbon production sites (Article 17).
- In addition, entities licensed under the Hydrocarbons Licensing Directive (94/22/EC) must contribute to the carbon dioxide injection target in proportion to their share of crude oil and natural gas production for the period of January 1, 2020 to December 31, 2023 (Article 18).
- ◆ (Chapter 4) Chapter 4 provides for strengthening public procurement (Article 19), ranking bids in renewable energy auction systems that take into account sustainability and resilience (Article 20), expanding private consumption through public intervention (Article 21), and establishing guidelines for assessing sustainability and resilience contributions (Article 22), as a means to create stable demand for net-zero technology products and strengthen market access for related manufacturing industries.
- ◆ (Chapter 5) Chapter 5 is devoted to workforce development and consists of provisions to train professionals with the capabilities required by the industry in preparation for possible mismatches in labor supply and demand in the future of net-zero technology manufacturing.
 - Article 23 of the Act provides for the establishment of "Net-Zero Industry Academies" for the purpose of developing learning programs, promoting the use of learning programs, developing credentials, etc.
 - Article 24 stipulates that if the learning programs of the Net-Zero Industry Academy are equivalent to qualifications required by a particular industry, each member state must recognize them.
 - Article 25 requires the Net-Zero Europe Platform to increase the availability and utilization of capabilities in net-zero technologies.
- ◆ (Chapter 6) Chapter 6 outlines that the member states should actively utilize the Net-Zero Regulatory Sandbox for technological innovation when requested by companies developing net-zero technologies and includes general rules and procedures for the operation of the Regulatory Sandbox (Article 26) and prioritized access to the Regulatory Sandbox for SMEs (Article 27).

21) Joint ministries concerned, 2023, National Basic Plan for Carbon Neutrality and Green Growth (Proposal), 2023.3.

- ◆ (Chapter 7) Chapter 7 provides for the establishment of a “Net-Zero Europe Platform” as the body responsible for carrying out the matters provided for in the Net-Zero Industry Act and states that each member state should take account of the Act when formulating its national energy and climate plans.
 - The Net-Zero Europe Platform will be headed by a representative of the European Commission and composed of high-level representatives appointed by each member state (Article 29).
 - In addition, the Net Zero Europe Platform will periodically discuss cooperation between the EU and third countries, prioritization of third countries*, etc. (Article 30).
 - * In determining the prioritization of third countries, consideration will be given to the extent to which they contribute to security of supply (Article 30(4)(c)(i)) and whether there is an existing agreement (Article 30(4)(c)(ii)), taking into account their capacity to manufacture net-zero technologies under the Act.
- ◆ (Chapter 8) Chapter 8 sets out specifically what needs to be monitored and what information the member states must submit on the matters promoted by the Act.
 - The European Commission should monitor the progress of the EU in achieving the objectives of Article 1 of the Act, the impact of the Act, and the progress of carbon dioxide injection (Article 31).
 - Furthermore, for this monitoring, each member state is required to collect and report annually to the Commission data* on net-zero developments and market trends.
 - * ▲ Carbon-neutral development and market trends, including average investment, production costs, and market prices; ▲ Net-zero technology manufacturing capacity and related activities; ▲ Domestic and international net-zero technology exports and their value; ▲ Average time it takes to obtain permits; ▲ Number and type of permits granted in 12 months; ▲ Number and type of permits completed, suspended, or revoked in 12 months and obstacles faced in suspension or revocation; ▲ Number of regulatory sandboxes approved in 12 months; ▲ Volume of carbon dioxide permanently stored
- ◆ (Chapter 9) Chapter 9 is the final provision and includes delegations of authority, triennial assessment reporting obligations under the Net-Zero Industry Act, etc.

5 Implications

- ◆ (Fair Green Industrial Policy) Korea also needs to establish active policies to maintain and strengthen its industrial competitiveness in the new economic order. In particular, as announced by EU Commission President Ursula von der Leyen, it is necessary to establish policies in a way that strengthens Korea’s industrial competitiveness but does not cause unfair competition in the international community.
- ◆ (Establishing a sustainable strategy) The EU has established its own green industrial strategy, the “Green Deal Industrial Plan,” in Europe, to lay the foundation for responding to the green industrial development policies of major countries such as the IRA in the US, the Green Growth Strategy in Japan, and the Production Linkage Incentive in India. The EU has proposed four green industrial strategies, and since Korea also has a manufacturing-oriented economy, it is necessary to establish a sustainable green industrial strategy to respond to it
 - It is necessary to establish a sustainable green industrial strategy at the pan-ministerial level and consider it from the first stage of the value chain through national support such as R&D planning for carbon neutralization of major manufacturing technologies.
- ◆ (Setting specific targets) Considering that the EU’s Net-Zero Industry Act clarifies the objectives of the Act and the matters that need to be checked of their implementation by presenting quantitative targets and specific monitoring items, Korea also needs to set targets suitable for domestic conditions and specifically identify matters that need to be monitored over a long period of time.
 - ※ In Korea, the “Act on the Special Measures for the Protection and Competitiveness of Net-Zero Industries” was proposed on March 15, 2023 and is currently under committee review. Article 5 of the Act specifies the obligation to establish and implement the “Basic Plan for the Development of Net-Zero Industries” and the goal setting and implementation checks to be included in the basic plan in each subparagraph.²²⁾
- ◆ (Utilization as Korea’s related laws and policies) The selection criteria for carbon dioxide storage projects and the three provisions on carbon dioxide capture and storage established in the Net-Zero Industry Act can be used as references for the preparation of related legislative bill and the establishment of policies to promote Korean carbon dioxide capture, transportation, storage, and utilization projects.
 - ※ According to the “Carbon Dioxide Capture, Transportation, Storage, and Utilization Act” proposed on February 22, 2023, the Joint Ordinance seeks to establish matters related to permits for storage projects (Article 18) and matters related to public monitoring and reporting (Articles 48, 49, 50) by presidential decree;²³⁾ If the bill is finally passed, it is necessary to prepare specific regulations on the matters delegated by the Act.

22) Chief author: Yang Yiwonyoung, member of the National Assembly, Act on the Special Measures for the Protection and Competitiveness of Net-Zero Industries, No. 20675, 2023.3.15.

23) Representative Lee Chul-kyu, Bill on Carbon Dioxide Capture, Transport, Storage and Utilization, No. 20183, 2023.2.22.

- However, the conditions in the EU, which has a large number of oil fields and oil and gas producers, are different from those in Korea, so the project selection criteria and related provisions of the Net-Zero Industry Act need to be fully reviewed and adjusted to meet Korean conditions.
- ◆ (International cooperation strategy) Meanwhile, the EU is expected to discuss ways to cooperate with third countries outside Europe via the Net-Zero Europe Platform, whose basis for establishment was stated in the Act, and if cooperation between Korea and the EU is necessary, it may be a good strategy to promote cooperation by keeping in mind the prioritization criteria specified in the Act (Chapter 8, Article 30, paragraph 4, item C).

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