KARADENİZ İHRACATÇI BİRLİKLERİ
GENEL SEKRETERLİĞİ

Sayı : 35649853-TİM.KİB.GSK.UYG.2025/1027-2179 Giresun, 09/07/2025

Konu : AB Net Sıfır Sanayi Yasası İkincil Mevzuatlar

E-POSTA

KARADENİZ İHRACATÇI BİRLİKLERİ ÜYELERİNE SİRKÜLER
2025/391

Sayın üyemiz,

Ticaret Bakanlığının bir yazısına atfen, Türkiye İhracatçılar Meclisinden alınan 08/07/2025 tarih 101-1721 sayılı yazıda;

Avrupa Komisyonu tarafından 2024/1735/AB sayılı Net Sıfır Sanayi Yasası (Net Zero Industry Act-NZIA) Tüzüğü kapsamında, 23 Mayıs 2025 tarihinde ikincil mevzuat ve bir bildirinin kabul edildiğinin aktarıldığı, bahse konu mevzuatın 18 Haziran 2025 tarihinde AB Resmi Gazetesinde yayınlandıktan 20 gün sonra yürürlüğe gireceği, söz konusu düzenlemeler ile AB sanayisinin daha dayanıklı ve rekabetçi hale getirilmesi, karbon ayak izinin azaltılması, net-sıfır teknolojilerin üretiminin artırılması ve temiz teknoloji alanındaki rekabet avantajının değerlendirilmesinin amaçlandığı bildirilmektedir.

Bu çerçevede, bahse konu ikincil mevzuat aşağıda sıralanmaktadır.

1. **Yenilenebilir Enerji İhalelerinde Fiyat Dışı Kriterlere İlişkin Uygulama Tüzüğü,** AB ülkelerinin yenilenebilir enerji kaynaklarını devreye almak için düzenleyecekleri ihalelere ilişkin kurallar kapsamında, uygulanması gereken fiyat dışı kriterlerin ayrıntılarını belirlemektedir. Bu kapsamda, fiyat haricinde, sorumlu iş uygulamaları, siber güvenlik ve veri güvenliği, projenin tamamen ve zamanında teslim edilme kapasitesi ve ihalenin sürdürülebilirlik ve dayanıklılık katkısı da değerlendirilecektir. Söz konusu kriterler, 30 Aralık 2025 itibarıyla, ülkelerin ihale hacimlerinin %30'una (veya AB ülkesi başına yılda 6 GW'a) uygulanmak zorundadır.

2. **NZIA Kapsamında Kullanılan Nihai Ürün ve Temel Bileşenlerinin Dayanıklılık İlkesine Katkılarına Göre Listelenmesine İlişkin Yetkilendirilmiş Tüzük'te**, net-sıfır teknoloji nihai ürünleri ve bunlara ait temel spesifik bileşenler listelenmektedir. Söz konusu liste ile "dayanıklılık"a ilişkin fiyat dışı kriterin zorunlu olarak uygulanmasını gerektirebilecek ürünler veya bileşenler tanımlanmaktadır.

Sertaç Ş. TORAMANOĞLU tarafından 5070 sayılı kanun gereğince güvenli elektronik imza ile imzalanmıştır.

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KARADENİZ İHRACATÇI BİRLİKLERİ
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3. **Stratejik Proje Seçim Kriterlerine İlişkin Uygulama Yönetmeliği ile** net-sıfır teknoloji üretim projelerinin, belirli avantajlar sağlayan "net-sıfır stratejik proje" statüsü kazanması için AB ülkelerince uygulanacak proje seçim kriterleri belirlenmektedir. Stratejik projelere, ulusal düzeyde 'öncelikli statü' verilerek hızlı idari işlem ve finansal danışmanlık sağlanacaktır. Komisyon, idari yükü azaltmak için üye ülkelere başvuru sürecinde Komisyon'un konuya ilişkin internet sitesini kullanmalarını tavsiye etmektedir. Stratejik projelerin belirlenmesine yönelik olarak, teknoloji ile eklenen üretim kapasitesinin, türünün ilk örneği mi yoksa mevcut en iyi teknoloji üretim kapasitesi mi olduğu ve eklenen üretim kapasitesinin önemli olarak kabul edilip edilemeyeceğine yönelik standartlar belirlenmektedir.

Öte yandan, C/2025/3236 sayılı, nihai ürünlerin ve farklı üçüncü ülkelerden gelen temel bileşenlerinin AB'ye arzındaki paylarını gösteren Komisyon Bildirimi, aynı tarihte yayınlandığının aktarıldığı bildirim ile kamu alımları, yenilenebilir enerji ihaleleri ve diğer kamu müdahalelerinde dayanıklılık odaklı fiyat dışı kriterin uygulanması ve teknoloji kaynaklarının çeşitlendirilmesi amacıyla bilgiler sağlandığı belirtilmekte olup, söz konusu bilgilerin, üye devletlerin stratejik proje statüsüne uygun net-sıfır teknoloji üretim projelerini değerlendirmelerine de yardımcı olmasının öngörüldüğü ifade edilmektedir.

Bilgilerinize sunarız.

e-imzalıdır
Sertaç Ş. TORAMANOĞLU
Genel Sekreter

EKLER:
Ek-I: 2025-3236 Sayılı Tüzük (24 Sayfa)
Ek-II: 2025-1100 Sayılı Tüzük (6 Sayfa)
Ek-III: 2025-1176 Sayılı Tüzük (21 Sayfa)
EK-IV: 2025-1178 Sayılı Tüzük (11 Sayfa)

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COMMUNICATION FROM THE COMMISSION

providing updated information to determine the shares of the European Union supply of final products and their main specific components originating in different third countries under Regulation (EU) 2024/1735 on establishing a framework of measures for strengthening Europe's net-zero technology manufacturing ecosystem (Net-Zero Industry Act)

(C/2025/3236)

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I. **INTRODUCTION**

Regulation (EU) 2024/1735 ('the NZIA Regulation') ([1]) establishes a framework for ensuring that the Union has access to a secure and sustainable supply of net-zero technologies by promoting the diversification of their supply chains and enhancing the domestic manufacturing capacity of net-zero technologies.

Under Articles 25, 26 and 28 of the NZIA Regulation, non-price criteria - including the contribution to resilience - are to be applied in public procurement, renewable energy auctions and other forms of public intervention to develop and maintain an industrial basis for net-zero technologies, to secure the European Union's (EU) energy supply and to avoid dependencies in the supply of these technologies. For the purposes of assessing the contribution to resilience, the Commission adopted, based on Article 29(2) of the NZIA Regulation, the Commission Implementing Regulation (EU) 2025/1178 ([2]).

In this context and on the basis of that Implementing Regulation, as required by the second sentence of Article 29(2) of the NZIA Regulation, this Communication provides updated information on the shares of the Union supply originating in different third countries in the most recent year for which data is available. It covers net-zero technology final products and their main specific components (see Section II) ([3]).

Article 13(1)(a)(i) of the NZIA Regulation requires Member States to recognise as net-zero strategic projects those net-zero technology manufacturing projects that increase the Union's manufacturing capacity for a net-zero technology, for which the Union depends for more than 50 % on imports coming from third countries. In this context, this Communication assists Member States in assessing the eligibility of net-zero technology manufacturing projects for recognition as net-zero strategic projects under that provision. It does so by providing updated information on the shares of the Union supply originating in all third countries in the most recent year for which data is available (see Section III).

It is currently only possible to provide data on the shares of the Union supply for 25 net-zero technology final products and their main specific components. For the remaining net-zero technologies, due to a lack of detailed statistics it is not yet possible to analyse the shares of the Union supply. Consequently, the resilience contribution cannot be applied to those final products and their main specific components for which the shares of the Union supply are unavailable.

The methodology and data sources used for calculating the shares of the Union supply represent the best option available at this time. To overcome the limited statistics, the Commission is in the process of developing the additional Combined Nomenclature (CN) codes specific to net-zero technologies. These new codes will help to identify strategic dependencies in the net-zero technology sector, ultimately contributing to create a more resilient and secure supply chain. As new data becomes available, the Commission will also improve the methodology to calculate the shares of the Union supply.

The Commission will provide annually updated information on the shares of the Union supply originating in different third countries for the most recent year available through a dedicated communication. Preliminary informal data on the shares of the Union supply will be provided in the third quarter. This will be followed in the first quarter of the subsequent year by the adoption of the communication with the official data on the shares of the Union supply originating in different third countries referred to in Article 29(2) of the NZIA Regulation. This communication constitutes the source of official information for the determination of the origin in a third country of a specific net-zero technology or its main specific components as stated in Article 25 of the NZIA Regulation and in Article 7 of Commission Implementing Regulation (EU) 2025/1176 ([4]). Annual updates of the shares of Union supply are needed in order to reflect the dynamic nature of global supply chains and the evolving shares of the Union supply impacted by factors such as changes in manufacturing capacity, shifts in trade patterns, geopolitical developments, and market dynamics.

([1]) Regulation (EU) 2024/1735 of the European Parliament and of the Council of 13 June 2024 on establishing a framework of measures for strengthening Europe's net-zero technology manufacturing ecosystem and amending Regulation (EU) 2018/1724 (OJ L, 2024/1735, 28.6.2024, ELI: http://data.europa.eu/eli/reg/2024/1735/oj).

([2]) Commission Implementing Regulation (EU) 2025/1178 on laying down rules for the application of Regulation (EU) 2024/1735 of the European Parliament and of the Council as regards the list of net-zero technology final products and their main specific components for the purposes of assessing the contribution to resilience (OJ L, 2025/1178, 18.6.2025, ELI: http://data.europa.eu/eli/reg_impl/2025/1178/oj).

([3]) At the date of publication, the latest available year is 2023.

([4]) Commission Implementing Regulation (EU) 2025/1176 specifying the pre-qualification and award criteria for auctions for the deployment of energy from renewable sources (OJ L, 2025/1176, 18.6.2025, ELI: http://data.europa.eu/eli/reg_impl/2025/1176/oj).

This Communication is structured as follows:

— Section II provides the shares of the Union supply originating in different third countries (relevant to Articles 25, 26 and 28 of the NZIA Regulation);

— Section III outlines the shares of the Union supply originating in all third countries (relevant to Article 13(1)(a)(i) of the NZIA Regulation);

— Section IV details the methodology used to calculate the shares of the Union supply.

II. SHARES OF THE UNION SUPPLY ORIGINATING IN DIFFERENT THIRD COUNTRIES

Table 1 details the shares of the Union supply from the three third countries of origin that account for the highest value of imports to the Union. It covers as many net-zero technology final products and their main specific components as possible from those listed in the Commission Implementing Regulation (EU) 2025/1178.

Table 1

Shares of the Union supply from the three third countries of origin with the highest value of imports, 2023

Sub-category of net-zero technology	Final product	Main specific component	Share from top third country supplier [country]	Share from second-largest third country supplier [country]	Share from third-largest third country supplier [country]	Methodology
PV technologies	**Solar PV systems**		**79 % [China]**	1 % [Japan]		**Combination of CN codes**
PV technologies		**PV modules + PV cells or equivalent[4]**	**94 % [China]**			**CN codes**
PV technologies		**PV inverters**	**50 % [China]**	3 % [Japan]	2 % [United Kingdom]	**CN codes**
PV technologies		**PV wafers or equivalent** ([1])	**79 % [China]**	6 % [United States]	6 % [Taiwan]	**TARIC codes**
Solar thermal technologies	Solar thermal systems		2 % [China]			CN codes
Onshore wind technologies, Offshore wind technologies	Onshore wind turbines; Offshore wind turbines ([2])		2 % [India]			CN codes
Onshore wind technologies, Offshore wind technologies		Towers	9 % [Türkiye]			TARIC codes
Onshore wind technologies, Offshore wind technologies		**Permanent magnets of wind turbines**	**93 % [China]**	6 % [Japan]		**ERMA**

Sub-category of net-zero technology	Final product	Main specific component	Share from top third country supplier [country]	Share from second-largest third country supplier [country]	Share from third-largest third country supplier [country]	Methodology
Battery technologies	**Battery packs; battery modules; battery cells**	**Battery packs; battery modules; battery cells**	**50 % [China]**	4 % [Korea]	1 % [Japan]	**CN codes**
Battery technologies		Separators	19 % [Korea]	17 % [China]	10 % [United Kingdom]	CN codes
Battery technologies		**Anode active materials**	**81 % [China]**	18 % [Korea]		**IEA**
Gravitational storage technologies	Pumped hydro storage		1 % [China]			CN codes
Heat pump technologies	Heat pumps		11 % [China]	2 % [Japan]	2 % [Switzerland]	CN codes
Electricity grid technologies	Onshore substations; Offshore substations		31 % [China]	3 % [Türkiye]	2 % [Switzerland]	CN codes
Electricity grid technologies		Cables and lines for electricity transmission and distribution, and cables connecting net-zero technologies to the electricity grid (overhead lines, underground and undersea cables, including HVDC and HVAC) + Electrical conductors (including advanced conductors and high temperature superconductors)	4 % [Türkiye]	3 % [Switzerland]	2 % [China]	CN codes
Electricity grid technologies	Power transfor-mers	Power transformers	9 % [Türkiye]	6 % [China]	2 % [Switzerland]	CN codes

Sub-category of net-zero technology	Final product	Main specific component	Share from top third country supplier [country]	Share from second-largest third country supplier [country]	Share from third-largest third country supplier [country]	Methodology
Electricity grid technologies		Switchgears; Electric cabinets; Busbar systems	5 % [Norway]	5 % [China]	5 % [Türkiye]	CN codes
Electricity grid technologies		Circuit breakers	5 % [Switzerland]	5 % [China]	5 % [United Kingdom]	CN codes
Electricity grid technologies		Insulators	14 % [China]	3 % [Switzerland]	2 % [United States]	CN codes
Electricity grid technologies		Disconnectors	7 % [Switzerland]	2 % [Korea]		CN codes
Nuclear fuel cycle technologies		Centrifuges	2 % [Switzerland]			CN codes
Hydropower technologies	Hydro turbine systems		1 % [China]			CN codes
Hydropower technologies		Hydro turbine runners + Distributors with guide vanes	4 % [Türkiye]	2 % [India]	1 % [Switzerland]	CN codes
Transformative industrial technologies for decarbonisation	Industrial induction heaters / furnaces	Industrial induction heaters / furnaces	4 % [United Kingdom]	2 % [Korea]	1 % [Türkiye]	CN codes
Transformative industrial technologies for decarbonisation		Graphite or carbon electrodes for electric furnaces	15 % [China]	8 % [India]	2 % [Japan]	CN codes

([1]) The term 'equivalent' refers to similar steps or key enabling technologies needed for thin-film, tandem or other PV technologies.
([2]) The current and projected global and Union's supply and demand trends for onshore/offshore technologies, combined with the fact that China's production capacity exceeds 50 % of global production (International Energy Agency, Energy Technology Perspectives 2024) and that China's projected production significantly exceeds its domestic targets and foreseeable demand suggest that for onshore/offshore technologies there is a significant risk of increased dependency on imports from China, although this is not yet reflected in the 2023 shares of the Union supply shown in Table 1.

Notes:

— Columns 4-6 indicate the shares of Union supply. The values indicated are rounded to the nearest integer number.

— Shares below 1 % are not indicated.

— In bold with light orange shading: net-zero technologies with a share of the Union supply of over 50 % or over 40 % and having increased by at least 10 percentage points on average for two consecutive years.

— Net-zero technology final products that are the output of a factory fulfil the criteria to be considered main specific components, thus they are included in both columns.

— When a cell in Table 1 includes multiple net-zero technologies separated by ';' it means that the share applies to each net-zero technology. The '+' symbol indicates that the share applies to all net-zero technologies combined.

— The 'CN codes' methodology refers to the use of the Combined Nomenclature codes as indicated in Section IV '*Main data sources*'.

— The 'TARIC codes' methodology refers to the use of TARIC codes as indicated in Section IV '*Other data sources to use in the absence of specific CN codes*'.

— The 'Combination of CN codes' methodology refers to the combination of multiple CN codes associated with several components, as described in Section IV *'Variations in the calculation of "shares of Union supply"'* subsections (i) and (ii).

— The 'IEA' methodology refers to the use of the results of the International Energy Agency's analysis as indicated in Section IV '*Other data sources to use in the absence of specific CN codes*'.

— The "ERMA" methodology refers to the results of European Raw Materials Alliance analysis as indicated in Section IV "*Other data sources to use in the absence of specific CN codes*'.

— PV = photovoltaic, HVDC = high voltage direct current, HVAC = high voltage alternating current.

— China = People's Republic of China.

III. SHARES OF THE UNION SUPPLY ORIGINATING IN ALL THIRD COUNTRIES

Table 2 provides information on the shares of the Union supply from all third countries of origin of as many net-zero technology final products and main specific components as possible from those listed in the Commission Implementing Regulation (EU) 2025/1178. The purpose is to support Member States in the process of selecting net-zero strategic projects as specified in Article 13(1)(a)(i) of the NZIA Regulation.

Table 2

Shares of the Union supply from all third countries of origin for net-zero technology final products and main specific components, 2023

Sub-category of net-zero technology	Final product	Main specific component	Share of Union supply from third countries	Methodology
PV technologies	**Solar PV systems**		**85 %**	**Combination of CN codes**
PV technologies		**PV modules + PV cells or equivalent[5]**	**96 %**	**CN codes**
PV technologies		**PV inverters**	**62 %**	**CN codes**
PV technologies		**PV wafers or equivalent** ([1])	**100 %**	**TARIC codes**
Solar thermal technologies	Solar thermal systems		2 %	CN codes

Sub-category of net-zero technology	Final product	Main specific component	Share of Union supply from third countries	Methodology
Onshore wind technologies, Offshore wind technologies	Onshore wind turbines; Offshore wind turbines		3 %	CN codes
Onshore wind technologies, Offshore wind technologies		Towers	10 %	TARIC codes
Onshore wind technologies, Offshore wind technologies		**Permanent magnets of wind turbines**	**99 %**	**ERMA**
Battery technologies	**Battery packs; battery modules; battery cells**	**Battery packs; battery modules; battery cells**	**59 %**	**CN codes**
Battery technologies		Separators	46 %	CN codes
Battery technologies		**Anode active materials**	**100 %**	**IEA**
Gravitational storage technologies	Pumped hydro storage		2 %	CN codes
Heat pump technologies	Heat pumps		22 %	CN codes
Electricity grid technologies	**Onshore substations; Offshore substations**		**52 %**	**CN codes**
Electricity grid technologies		Cables and lines for electricity transmission and distribution, and cables connecting net-zero technologies to the electricity grid (overhead lines, underground and undersea cables, including HVDC and HVAC) + Electrical conductors (including advanced conductors and high temperature superconductors)	16 %	CN codes

Sub-category of net-zero technology	Final product	Main specific component	Share of Union supply from third countries	Methodology
Electricity grid technologies	Power transformers	Power transformers	22 %	CN codes
Electricity grid technologies		Switchgears; Electric cabinets; Busbar systems	20 %	CN codes
Electricity grid technologies		Circuit breakers	25 %	CN codes
Electricity grid technologies		Insulators	27 %	CN codes
Electricity grid technologies		Disconnectors	12 %	CN codes
Nuclear fuel cycle technologies		Centrifuges	3 %	CN codes
Hydropower technologies	Hydro turbine systems		2 %	CN codes
Hydropower technologies		Hydro turbine runners + Distributors with guide vanes	10 %	CN codes
Transformative industrial technologies for decarbonisation	Industrial induction heaters / furnaces	Industrial induction heaters / furnaces	11 %	CN codes
Transformative industrial technologies for decarbonisation		Graphite or carbon electrodes for electric furnaces	29 %	CN codes

([1]) The term 'equivalent' refers to similar steps or key enabling technologies needed for thin-film, tandem or other PV technologies.

Notes:

— Columns 4-6 indicate the shares of Union supply. The values indicated are rounded to the nearest integer number.

— Shares below 1 % are not indicated.

— In bold with light orange shading: net-zero technologies with a share of the Union supply of over 50 % or over 40 % and having increased by at least 10 percentage points on average for two consecutive years.

— Net-zero technology final products that are the output of a factory fulfil the criteria to be considered main specific components, thus they are included in both columns.

— When a cell in Table 2 includes multiple net-zero technologies separated by";' it means that the share applies to each net-zero technology. The '+' symbol indicates that the share applies to all net-zero technologies combined.

— The 'CN codes' methodology refers to the use of the Combined Nomenclature codes as indicated in Section IV '*Main data sources*'.

— The 'TARIC codes' methodology refers to the use of TARIC codes as indicated in Section IV '*Other data sources to use in the absence of specific Combined Nomenclature codes*'.

— The 'Combination of CN codes' methodology refers to the combination of multiple CN codes associated with several components, as described in Section IV *'Variations in the calculation of "shares of Union supply"'* subsections (i) and (ii).

— The 'IEA' methodology refers to the use of the results of the International Energy Agency's analysis as indicated in Section IV '*Other data sources to use in the absence of specific CN codes*'.

— The 'ERMA' methodology refers to the results of European Raw Materials Alliance analysis as indicated in Section IV '*Other data sources to use in the absence of specific CN codes*'.

— PV = photovoltaic, HVDC = high voltage direct current, HVAC = high voltage alternating current.

— China = People's Republic of China.

IV. METHODOLOGY FOR EVALUATING THE SHARES OF THE UNION SUPPLY

a. 'Union supply'

To evaluate the shares of the Union supply of net-zero technologies, the 'Union supply' for a given year is calculated as defined in Equation 1:

Equation 1

$$Union\ supply = Production + Imports - Exports$$

where:

— *Production* is the value of production within the Union;

— *Imports* is the value of imports to the Union from all third countries;

— *Exports* is the value of exports from the Union to all third countries.

This approach corresponds to the 'available supply' concept, which takes into account the total value of a product available in the Union, including domestic production and imports and subtracting exports ([5]). This formulation is widely used in economic literature and has been chosen for the purposes of this Communication due to its relevance in the context of long-term contracts, which are common in the industries concerned. Specifically, the assumption underlying this approach is that imports and exports are interdependent, and that any disruption to imports would also impact exports. The Union's role as a transit region, where certain goods are imported and then re-exported to other countries, also explains the decision to include both imports and exports in the calculation of supply. By considering both, this approach provides a more accurate representation of domestic demand.

([5]) Whenever data is available, changes in inventories should also be considered in the calculation of the Union supply.

b. **'Shares of the Union supply'**

To evaluate the shares of the Union supply of net-zero technologies originating in all third countries, the 'share of the Union supply' is generally defined as the ratio between the value imported from all third-country suppliers and the Union supply, as illustrated in Equation 2a:

Equation 2a

$$Share\ of\ the\ Union\ supply_{all} = \frac{Imports}{Union\ supply} * 100$$

where:

— *Share of the Union supply*$_{all}$ is the share of the Union supply from all third countries.

— *Imports* is as defined in Equation 1;

— *Union supply* is as defined in Equation 1.

The shares of the Union supply of net-zero technologies originating in different third countries are generally calculated as the ratio between the value of imports to the Union originating in a specific third country and the Union supply, as illustrated in Equation 2b. In particular, the shares of the Union supply originating in different third countries have been calculated for the three third countries with the highest value of imports to the Union.

Equation 2b

$$Share\ of\ the\ Union\ supply_{n-largest\ third\ country\ supplier} = \frac{Imports_{n-largest\ third\ country\ supplier}}{Union\ supply} * 100$$

where:

— *Share of the Union supply*$_{n-largest\ third\ country\ supplier}$ is the share of the Union supply from the n-largest third country supplier.

— *Imports*$_{n-largest\ third\ country\ supplier}$ is the value of imports to the Union originating in the third country with the n-largest value of imports to the Union;

— *Union supply* is as defined in Equation 1.

However, in some cases it is necessary to apply alternative formulations of Equations 2a,b – please see Section IV.d for alternative equations.

c. **Main data sources**

Article 29(2) of the NZIA Regulation states that for net-zero technology final products and their main specific components the country of origin shall be determined in accordance with Regulation (EU) No 952/2013 ([6]). According to that provision, the shares of the Union supply provided in Sections II and III have been calculated - whenever feasible – based on the following:

— Combined Nomenclature (CN) codes for import and export statistics, using the COMEXT database ([7]), ([8]), ([9]).

— PRODCOM classification for production statistics, using the PRODCOM database ([10]), ([11]).

The COMEXT and PRODCOM databases, which are official, reliable, and publicly available statistical sources, are considered the most suitable tools for calculating the shares of the Union supply originating in third countries. These databases provide a comprehensive and accurate overview of trade flows and production data, ensuring a robust and precise analysis for calculating the shares of the Union supply.

CN codes are the primary method used to calculate the shares of supply and are used as a source of evidence by default. However, not every net-zero technology final product or main specific component has a specific CN and PRODCOM code (see Table 3 for the list of CN and PRODCOM codes that have been used to determine the shares of the Union supply). This limitation is evident when comparing the list of net-zero technologies for which the shares of supply can be identified via CN codes (see Table 1 and Table 2) with the list of net-zero technology final products and main specific components in the Commission Implementing Regulation (EU) 2025/1178. Although this includes a list of 230 net-zero technology final products and main specific components, the shares of the Union supply can be calculated for just 21 net-zero technologies if the calculation is based solely on CN codes. To expand the use of the CN code methodology, the Commission is introducing new CN codes specific to net-zero technologies. The Commission is also increasing the level of detail of PRODCOM codes with the aim of achieving one-to-one correspondence between PRODCOM codes and CN codes for net-zero technologies. While it will take time for these improvements to become operational, they are expected to deliver substantial benefits in the medium and long term.

If the CN code methodology cannot be used for the above reason, other data sources are used to calculate the shares of the Union supply of other net-zero technology final products and main specific components.

d. **Other data sources to use in the absence of specific CN codes**

When the shares of the Union supply of net-zero technology final products and their main specific components cannot be calculated solely by using CN codes, additional reliable data sources are used. For net-zero technologies that lack a specific CN code, the TARIC (Integrated Tariff of the European Union) database is consulted to check whether a specific TARIC code exists. Where available, those TARIC codes may provide valuable data on imports via the Commission's Directorate-General for Taxation and Customs Union's (TAXUD) surveillance database (see Table 4) ([12]).

As TARIC codes focus on import statistics, two considerations need to be borne in mind in using them:

— Exclusion of export statistics: for net-zero technologies that only have associated TARIC code, export statistics are not tracked. This method of calculating the Union supply shares therefore excludes exports, meaning that the calculation gives a more conservative result.

([6]) Regulation (EU) No 952/2013 of the European Parliament and of the Council of 9 October 2013 laying down the Union Customs Code (OJ L 269, 10.10.2013, p. 1, ELI: http://data.europa.eu/eli/reg/2013/952/oj).
([7]) https://taxation-customs.ec.europa.eu/customs-4/calculation-customs-duties/customs-tariff/combined-nomenclature_en.
([8]) https://ec.europa.eu/eurostat/comext/newxtweb/
([9]) Imports and exports statistics used to calculate the shares of the Union supply are based on the 'normal' statistical procedure. This approach excludes inward processing, outward processing, re-exportation of processed goods and re-importation of processed goods, as outlined in the 2020 edition of EUROSTAT's User guide on European statistics on international trade in goods.
([10]) https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Industrial_production_statistics_introduced_-_PRODCOM.
([11]) https://ec.europa.eu/eurostat/web/prodcom/database.
([12]) In the last column of Table 1 and Table 2, 'TARIC codes' indicates when the shares of Union supply are calculated using data associated to the TARIC codes.

— Estimation of production statistics: PRODCOM codes, which provide production statistics, are primarily developed for products with associated CN codes. Therefore, for net-zero technologies that only have an associated TARIC code, production data is estimated based on manufacturing capacities. Manufacturing capacity data collected by the Commission to monitor progress in meeting the benchmarks referred to in Article 5 of the NZIA Regulation (see NZIA Article 42(1)) is used as a proxy for production. Where needed, an appropriate conversion from quantity to value of production can be applied. Since production is lower than full manufacturing capacity, to assume that production equals manufacturing capacity means that this also represents a conservative approach to evaluating the shares of the Union supply.

The resulting equation for the conservative approach to evaluate the shares of the Union supply of net-zero technologies that only have associated TARIC codes is as follows:

Equation 3a,b

$$Share\ of\ the\ Union\ supply_{all} = \frac{Imports}{Manufacturing\ capacity + Imports} * 100$$

$$Share\ of\ the\ Union\ supply_{n-largest\ third\ country\ supplier} = \frac{Imports_{n-largest\ third\ country\ supplier}}{Manufacturing\ capacity + Imports} * 100$$

where:

— *Imports* is as defined in Equation 1;

— *Manufacturing capacity* is the value of manufacturing capacity within the Union;

— $Import_{n-largest\ third\ country\ supplier}$ is as defined in equation 2b.

When the shares of the Union supply of net-zero technology final products and their main specific components could not be calculated using CN codes or TARIC codes, the Commission has temporarily relied on other data sources. In those cases, data from the International Energy Agency's (IEA) *Energy Technology Perspectives 2024* report and the European Raw Materials Alliance's (ERMA) *Rare Earth Magnets and Motors: A European Call for Action* report are key references ([13]), ([14]), ([15]).

The IEA's *Energy Technology Perspectives 2024* report provides 2023 data on Union production, exports and imports from different third countries (i.e. those with the largest values of imports) and from all third countries, which are used to calculate the shares of the Union supply as per Equations 2a and 2b. These figures are underpinned by the IEA's manufacturing and trade (MaT) model, which provides a dynamic picture of global supply chains by offering insights on production levels, manufacturing capacity, and bilateral trade flows for six net-zero technologies' final products and their key components. The MaT model integrates regional demands and applies a least-cost optimization approach to assess the annual cost-optimal balance between domestic manufacturing and imports, considering factors such as manufacturing capacities, production costs, trade costs, regional industrial and trade policies, and investment trends in emerging markets ([16]).

([13]) IEA (2024) Energy Technology Perspectives 2024, https://www.iea.org/reports/energy-technology-perspectives-2024.

([14]) In the last column of Table 1 and Table 2, 'IEA' indicates when the shares of Union supply are determined using the results from IEA's Energy Technology perspectives 2024 report.

([15]) Gauß R., Burkhardt C, Carencotte F, Gasparon M, Gutfleisch O, Higgins I, et al. (2021) Rare Earth Magnets and Motors: A European Call for Action. A report by the Rare Earth Magnets and Motors Cluster of the European Raw Materials Alliance, https://eitrawmaterials.eu/sites/default/files/2024-11/2021_07-13_REE%20Cluster%20Report.pdf.

([16]) IEA (2024) Energy Technology Perspectives 2024 – Annex, https://iea.blob.core.windows.net/assets/168cbd7d-deeb-4678-8578-4f9e0de73b4d/EnergyTechnologyPerspectives2024Annex.pdf.

ERMA's *Rare Earth Magnets and Motors: A European Call for Action* report leverages industry-based data to offer a detailed overview of supply chain dynamics of net-zero technologies. Through collaboration with market actors and stakeholders, ERMA grounds its assessment in direct industry knowledge and market dynamics, ensuring accuracy and reliability. Their comprehensive analytical framework considers sourcing strategies, material substitutions, and technological innovations, providing a thorough overview of supply dependencies. Though the analysis refers to 2021, leading market actors have consistently confirmed that the situation has not changed since then.

Both the IEA's and ERMA's reports are highly credible and robust, based on official data and authoritative sources that have been validated with key market actors in the relevant value chains. Their rigorous methodologies ensure alignment with verified trade and production figures, making them reliable complements to information derived from CN codes and TARIC codes when assessing the shares of the Union supply for net-zero technologies.

e. **Variations in the calculation of 'shares of the Union supply'**

As pointed out in Section IV (a) *'Union supply'*, the calculation of the shares of Union supply may feature minor variations between net-zero technologies due to differences in the availability of statistics and data sources. These slight variations are consistent and underscore the importance of using flexible yet rigorous evaluation methods tailored to the specific availability of CN codes, PRODCOM codes, TARIC codes and additional data sources related to net-zero technology final products and main specific components. In the following cases, the alternative equations below are applicable:

(i) *Final products defined as 'systems'*

When a final product is defined as a 'system' (e.g. *solar photovoltaic systems*), it is not generally possible to identify a CN code associated with it. For these products, the shares of the Union supply must be evaluated on the basis of the statistics for the system's underlying components, which are listed in the annex of the Commission Delegated Regulation (EU) C(2025) 2901 ([17]). For final products defined as 'systems', the shares of the Union supply originating in all third countries must be calculated on the basis of the cumulative value imported to the Union of all the components making up the final product, and the cumulative supply of all the components making up the final product, using Equation 4a. Similarly, the shares of the Union supply originating in the third countries with the highest value of imports to the Union must be calculated on the basis of the total value imported to the Union originating in the third countries with the highest overall import of all the components constituting the final product, and the cumulative supply of all the components constituting the system, using Equation 4b.

Equation 4a,b

$$Share\ of\ the\ Union\ supply_{all} = \frac{\sum_{All\ components} Imports}{\sum_{All\ components} Production + \sum_{All\ components} Imports - \sum_{All\ components} Exports} * 100$$

$$Share\ of\ the\ Union\ supply_{n-largest\ third\ country\ supplier} = \frac{Import_{n-largest\ third\ country\ supplier,\ across\ components}}{\sum_{All\ components} Production + \sum_{All\ components} Imports - \sum_{All\ components} Exports} * 100$$

where:

— $\sum_{All\ components} Imports$ is the cumulative value of the imports to the Union of the components making up the final product defined as a 'system';

([17]) Commission Delegated Regulation (EU) C(2025) 2901 amending Regulation (EU) 2024/1735 of the European Parliament and of the Council as regards the identification of sub-categories within net-zero technologies and the list of specific components used for those technologies (not yet published in the Official Journal).

— $\Sigma_{All\ components}$ *Production* is the cumulative value of the production within the Union of all the components making up the final product defined as a 'system';

— $\Sigma_{All\ components}$ *Exports* is the cumulative value of the exports from the Union to third countries of all the components making up the final product defined as a 'system';

— $Import_{n-largest\ third\ country\ supplier,\ across\ components}$ is the total value imported to the Union from the third country of origin with the n-largest overall import of all the components making up the final product defined as a 'system'.

However, due to the limited availability of CN codes specific to net-zero technologies, ensuring that the results of Equation 4a,b are representative depends on certain conditions. The shares of the Union supply of final products calculated using this approach are only considered valid if specific CN codes are available for the main specific components that, combined, account for more than 50 % of the final product's value, in line with Tables 5-9.

(ii) *Final products that lack specific CN codes*

If a final product is not defined as a 'system' and still lacks a specific CN code, its share of the Union supply can be evaluated by applying Equation 4a,b to the final product's Tier 1 main specific components ([18]). To ensure that the results are representative, this approach can be used provided that the main specific components for which specific CN codes are available account for more than 50 % of the final product's value, in line with Tables 5-9. If specific CN codes are not available for any Tier 1 component, the methodology may be applied to Tier 2 components.

(iii) *Net-zero technologies linked to a PRODCOM code matching multiple CN codes*

The level of granularity differs between PRODCOM codes and CN codes, meaning that a direct one-to-one correspondence between these classifications is not always possible. In some cases, multiple CN codes, each associated with different net-zero technologies, may correspond to the same PRODCOM code. In these cases, the net-zero technology shares of the Union supply must be evaluated as an aggregate of the net-zero technologies associated with the PRODCOM code. This aggregation is necessary because the limited granularity of PRODCOM codes does not allow for differentiation between the individual net-zero technologies they cover.

In these cases, Equation 5 is used to evaluate the shares of the Union supply, which takes account of the fact that the terms related to imports and exports are more than those related to production. Specifically, the shares of the Union supply originating in all third countries must be calculated by taking as the numerator the cumulative value imported to the Union of all net-zero technologies associated with the shared PRODCOM code, and as the denominator the value of production within the Union linked to that single PROCOM code, plus the cumulative value imported to the Union across all net-zero technologies associated with it, minus the cumulative value exported from the Union across all net-zero technologies associated to that PRODCOM code, using Equation 5a.

Similarly, the shares of the Union supply originating in the third country with the highest value of imports to the Union must be calculated by taking as the numerator the total value imported to the Union from the third country of origin with the highest overall value of imports across all net-zero technologies associated with the shared PRODCOM code, and as the denominator the value of production within the Union linked to it, plus the cumulative value imported to the Union across all net-zero technologies associated with that code, minus the cumulative value exported from the Union across all net-zero technologies associated with it, using Equation 5b.

([18]) Tier 1 components are those that assembled make up the final product.

Equation 5a,b

$$Share\ of\ the\ Union\ supply_{all} = \frac{\sum_{All\ components} Imports}{Production + \sum_{All\ components} Imports - \sum_{All\ components} Exports} * 100$$

$$Share\ of\ the\ Union\ supply_{n-largest\ third\ country\ supplier} = \frac{Import_{n-largest\ third\ country\ supplier,\ across\ components}}{Production + \sum_{All\ components} Imports - \sum_{All\ components} Exports} * 100$$

where:

— $\sum_{All\ components} Imports$ is the cumulative value of the imports to the Union of all the net-zero technologies associated with the shared PRODCOM code;

— *Production* is the value of production within the Union associated with the single PRODCOM code;

— $\sum_{All\ components} Exports$ is the cumulative value of the exports from the Union to third countries of all net-zero technologies associated with the shared PRODCOM code;

— $Import_{n-largest\ third\ country\ supplier,\ across\ components}$ is the total value imported to the Union from the third country of origin with the n-largest value of imports to the Union of all the net-zero technologies associated with the shared PRODCOM code.

(iv) *Net-zero technologies linked to a CN code matching multiple PRODCOM codes*

Since the level of granularity between PRODCOM codes and CN codes differs, in some cases multiple PRODCOM codes may correspond to the same CN code. In these cases, the net-zero technology's shares of the Union supply must be evaluated as an aggregate of all the net-zero technologies associated with the 'shared' CN code. This is similar to the approach outlined in subsection (iii). The main difference is that, in this case, the same net-zero technology is associated with more PRODCOM codes than CN codes.

In these cases, Equation 6 is used to evaluate the shares of the Union supply, which takes account of the fact that the terms related to production are more numerous than those related to imports and exports. Specifically, the shares of the Union supply originating in all third countries must be calculated by taking as the numerator the value imported to the Union of the net-zero technology associated with the shared CN code, and as the denominator the cumulative value of production within the Union of all net-zero technologies associated with that CN code, plus the value imported to the Union for the net-zero technology associated with the shared CN code and minus the value exported from the Union for the net-zero technology associated with it, using Equation 6a.

Similarly, the shares of the Union supply originating in the third country with the highest value of imports to the Union must be calculated by taking as the numerator the value imported from the third country of origin with the highest value of imports to the Union for the net-zero technology associated with the shared CN code, and as the denominator the cumulative value of production within the Union across all net-zero technologies associated to it, plus the value imported to the Union for the net-zero technology linked to the shared CN code and minus the value exported from the Union for the net-zero technology linked to it, using Equation 6b.

Equation 6a,b

$$Share\ of\ the\ Union\ supply_{all} = \frac{Imports}{\sum_{All\ components} Production + Imports - Exports} * 100$$

$$Share\ of\ the\ Union\ supply_{n-largest\ third\ country\ supplier} = \frac{Imports_{n-largest\ third\ country\ supplier}}{\sum_{All\ components} Production + Imports - Exports} * 100$$

where:

— *Imports* is the value of imports to the Union from third countries;

— $\sum_{All\ components} Production$ is the cumulative value of production within the Union of all the net-zero technologies associated with the shared CN code;

— *Exports* is the value of exports from the Union to third countries for all net-zero technologies associated with the shared CN code.

— $Imports_{n-largest\ third\ country\ supplier}$ is the value of imports to the Union from the third country of origin with the n-largest value of imports to the Union among all third country suppliers for all the net-zero technologies associated with the shared CN code.

(v) *Net-zero technologies with multiple associated CN codes*

In some cases, multiple CN codes are associated with a single net-zero technology. In these cases, Equation 7a,b is used to evaluate the shares of the Union supply taking into consideration all relevant CN codes.

Specifically, the shares of the Union supply originating in all third countries must be calculated by taking as the numerator the cumulative value imported to the Union across the multiple CN codes associated with the net-zero technology, and as the denominator the cumulative value of production within the Union linked to all the PRODCOM codes associated with the multiple CN codes, plus the cumulative value imported to the Union across the multiple CN codes associated with the net-zero technology, minus the cumulative value exported from the Union across the multiple CN codes associated with the net-zero technology, using Equation 7a.

Similarly, the shares of the Union supply originating in the third country with the highest value of imports to the Union must be calculated by taking as the numerator the total value imported to the Union from the third country of origin with the highest overall import across the multiple CN codes associated with the net-zero technology, and as the denominator the cumulative value of production within the Union linked to all the PRODCOM codes associated with the multiple CN codes, plus the cumulative value imported to the Union across the multiple CN codes associated with the net-zero technology, minus the cumulative value exported from the Union across the multiple CN codes associated with the net-zero technology, using Equation 7b.

Equation 7a,b

$$Share\ of\ the\ Union\ supply_{all} = \frac{\sum_{All\ components} Imports}{\sum_{All\ components} Production + \sum_{All\ components} Imports - \sum_{All\ components} Exports} * 100$$

$$Share\ of\ the\ Union\ supply_{n-largest\ third\ country\ supplier} = \frac{Import_{n-largest\ third\ country\ supplier,\ across\ components}}{\sum_{All\ components} Production + \sum_{All\ components} Imports - \sum_{All\ components} Exports} * 100$$

V. **BACKGROUND TABLES**

Table 3

Table 3 provides an overview of the CN codes and PRODCOM codes specific to net-zero technologies that have been used to calculate the shares of the Union supply originating in the third countries of origin with the highest value of imports to the Union and in all third countries, as indicated in Table 1 and Table 2 respectively.

Table 3

List of CN product description, CN codes and PRODCOM codes specific to net-zero technology final products and their main specific components, 2025

Sub-category of net-zero technology	Final product / main specific component	CN product description	CN code	PRC code
PV technologies	PV modules; PV cells	PV cells not assembled in modules or made up into panels; PV cells assembled in modules or made up into panels	8541 42 00, 8541 43 00	26112240
PV technologies	PV inverters	Inverters having a power handling capacity not exceeding 7,5 kVA and exceeding 7,5 kVA	8504 40 85, 8504 40 86	27904153, 27904155
Solar thermal technologies	Solar thermal systems	Solar water heaters	8419 12 00	27521400
Onshore wind technologies; Offshore wind technologies	Onshore wind turbines; Offshore wind turbines	Wind-powered generating sets	8502 31 00	28112400
Battery technologies	Battery packs; Battery modules; Battery cells	Lithium-ion electric accumulators.	8507 60 00	27202350
Battery technologies	Separators	Separators for electric accumulators, whether or not rectangular (including square)	8507 90 30	27202410
Gravitational storage technologies; Hydropower technologies	Pumped hydro storage; Hydro turbine systems	Hydraulic turbines and water wheels	8410 11 00, 8410 12 00, 8410 13 00	28112200
Heat pump technologies	Heat pumps	Heat pumps other than air conditioning machines of heading 8415	8418 61 00	28251380

Sub-category of net-zero technology	Final product / main specific component	CN product description	CN code	PRC code
Electricity grid technologies	Onshore substations; Offshore substations	Liquid dielectric transformers and other transformers having a power handling capacity exceeding 1 kVA; Inverters and other static converters, excluding accumulator chargers and rectifiers; Fuses and automatic circuit breakers for a voltage exceeding 1 000 V; Isolating switches and make-and-break switches for a voltage exceeding 1 000V; Boards, panels, consoles, desks, cabinets and other bases, for electric control or the distribution of electricity for a voltage exceeding 1 000 V; Insulated wire, cable and other insulated electric conductors, whether or not fitted with connectors for a voltage exceeding 1 000 V, excluding winding wire, coaxial cable, coaxial electric conductors, ignition wiring sets and other wiring sets	8504 21 00, 8504 22 10, 8504 22 90, 8504 23 00, 8504 32 00, 8504 33 00, 8504 34 00, 8504 40 85, 8504 40 86, 8504 40 95, 8535 10 00, 8535 21 00, 8535 29 00, 8535 30 10, 8535 30 90, 8537 20 91, 8537 20 99, 8544 60 10, 8544 60 90	27114120, 27114150, 27114180, 27114260, 27114330, 27114380, 27904153, 27904155, 27904170, 27121010, 27121020, 27121030, 27123203, 27123205, 27321400
Electricity grid technologies	Cables and lines for electricity transmission and distribution, and cables connecting net-zero technologies to the electricity grid (overhead lines, underground and undersea cables, including HVDC and HVAC); Electrical conductors (including advanced conductors and high temperature superconductors)	Insulated wire, cable and other insulated electric conductors, whether or not fitted with connectors for a voltage exceeding 1 000 V, excluding winding wire, coaxial cable, coaxial electric conductors, ignition wiring sets and other wiring sets	8544 60 10, 8544 60 90	27321400

Sub-category of net-zero technology	Final product / main specific component	CN product description	CN code	PRC code
Electricity grid technologies	Power transformers	Liquid dielectric transformers and other transformers having a power handling capacity exceeding 1 kVA	8504 21 00, 8504 22 10, 8504 22 90, 8504 23 00, 8504 32 00, 8504 33 00, 8504 34 00	27114120, 27114150, 27114180, 27114260, 27114330, 27114380
Electricity grid technologies	Switchgears; Electric cabinets; Busbar systems	Boards, panels, consoles, desks, cabinets and other bases, for electric control or the distribution of electricity for a voltage exceeding 1 000 V	8537 20 91, 8537 20 99	27123203, 27123205
Electricity grid technologies	Circuit breakers	Fuses and automatic circuit breakers for a voltage exceeding 1 000 V	8535 10 00, 8535 21 00, 8535 29 00	27121010, 27121020
Electricity grid technologies	Disconnectors	Isolating switches and make-and-break switches for a voltage exceeding 1 000 V	8535 30 10, 8535 30 90	27121030
Electricity grid technologies	Insulators	Electrical insulators of any material	8546 10 00, 8546 20 00, 8546 90 10, 8546 90 90	23192500, 23431030, 27901230
Nuclear fuel cycle technologies	Centrifuges	Machinery and apparatus for isotopic separation and parts thereof	8401 20 00	28993910
Hydropower technologies	Hydro turbine runners; Distributors with guide vanes	Parts of hydraulic turbines and water wheels including regulators	8410 90 00	28113200
Transformative industrial technologies for decarbonisation	Industrial induction heaters / furnaces	Induction furnaces and ovens	8514 20 10	28211353
Transformative industrial technologies for decarbonisation	Graphite or carbon electrodes for electric furnaces	Carbon electrodes, carbon brushes, lamp carbons, battery carbons and other articles of graphite or other carbon with or without metal, of a kind used for furnaces	8545 11 00	27901330

Notes:

CN = Combined Nomenclature ([19]), PRC = PRODCOM ([20]). CN code and its product description refers to the CN 2025 classification ([21]).

([19]) https://taxation-customs.ec.europa.eu/customs-4/calculation-customs-duties/customs-tariff/combined-nomenclature_en.
([20]) https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Industrial_production_statistics_introduced_-_PRODCOM.
([21]) Commission Implementing Regulation (EU) 2024/2522 of 23 September 2024 amending Annex I to Council Regulation (EEC) No 2658/87 on the tariff and statistical nomenclature and on the Common Customs Tariff (OJ L, 2024/2522, 31.10.2024, ELI: http://data.europa.eu/eli/reg_impl/2024/2522/oj), https://taxation-customs.ec.europa.eu/news/customs-commission-publishes-2025-version-combined-nomenclature-2024-10-31_en.

Table 4

Table 4 provides a list of the TARIC codes specific to net-zero technologies used to calculate the shares of the Union supply originating in the third countries of origin with the highest value of imports to the Union and in all third countries, as indicated in Table 1 and Table 2 respectively.

Table 4

List of TARIC product description and TARIC codes specific to net-zero technology main specific components, 2025

Sub-category of net-zero technology	Final product / main specific component	TARIC product description	TARIC code
PV technologies	PV wafers or equivalent	Wafers of the type used in crystalline silicon photovoltaic modules or panels	3818 00 10 11, 3818 00 10 19
Onshore wind technologies; Offshore wind technologies	Towers	Utility scale tubular steel wind towers	7308 20 00 11

Tables 5-9

Tables 5-9 show the shares of the main specific components in the final product's value (i.e. the sum of the value of the underlying components) for the following nine sub-categories of net-zero technologies: photovoltaic (PV) technologies, solar thermal technologies, onshore wind technologies, offshore wind technologies, battery technologies, electrochemical storage technologies, heat pump technologies, electrolysers and hydrogen fuel cells.

These tables serve as a basis for calculating the shares of the Union supply of final products defined as 'systems' and of final products without specific CN codes. This is done by verifying whether CN codes exist for the main specific components that, when combined, account for more than 50 % of the final product's value. Given that the components' contribution to the final product's overall value can vary depending on project-specific factors and market conditions, Tables 5-9 provide approximate reference values for 2023 estimated by the Joint Research Centre ([22]). These figures are intended solely for the purpose outlined above and should not be interpreted as general cost breakdowns.

Each component's share is expressed as a percentage of the total final product's value, reflecting not only the transformation costs from one Tier to the next but also the cumulative value of all underlying components. This means, for instance, that the share of battery cells includes not only the assembly of its underlying components, but also the entire value embedded within cathode active materials, anode active materials, electrolytes, separators and current collectors. Simply summing the shares of all main specific components could lead to a total exceeding 100 % due to overlapping value contributions, whereas the shares of Tier 1 components should always be less than or equal to 100 %. Where the sum of the shares of value totals less than 100 %, the difference represents the value of other components that are not classified as main specific components.

([22]) More details regarding the Union supply of net-zero technologies will be available in the Clean Energy Technology Observatory reports to be issues in the last quarter of 2025.

Table 5

Cost distribution of the main specific components in solar technologies' final products

Sub-categories of net-zero technologies	Final products	Main specific components	Shares of value (%)
Photovoltaic (PV) technologies	Solar PV systems ([1])	PV grade polysilicon	5
		PV grade silicon ingots or equivalent	9
		PV wafers or equivalent	15
		PV cells or equivalent	28
		Solar glass	6
		PV modules	58
		PV inverters	13
		PV trackers and their specific mounting structures	19
Solar thermal technologies	Solar thermal systems	Solar thermal collectors (including flat-plate, evacuated tube, concentrating systems and air collectors)	35
		Solar thermal absorbers	20
		Solar glass	10

([1]) The shares of the final product's value by main specific components refer to a solar PV system with trackers. Where there are no trackers, the shares are as follows: PV grade polysilicon 5 %, PV grade silicon ingots or equivalent 10 %, PV wafers or equivalent 17 %, PV cells or equivalent 32 %, Solar glass 7 %, PV modules 67 %, PV inverters 15 %.

Table 6

Cost distribution of the main specific components in onshore wind and offshore renewable technologies' final products

Sub-categories of net-zero technologies	Final products	Main specific components	Shares of value (%)
Onshore wind technologies	Onshore wind turbines ([1])	Nacelles (assembly)	44
		Rotor hubs	5
		Main, yaw and pitch bearings	5
		Direct drive drivetrains (including generator) and/or gearbox drivetrains (including generator)	25
		Permanent magnets of wind turbines	1
		Gearboxes of wind turbines	7
		Blades	26
		Towers	25

Sub-categories of net-zero technologies	Final products	Main specific components	Shares of value (%)
Offshore wind technologies	Offshore wind turbines ([2])	Nacelles (assembly)	40
		Rotor hubs	6
		Main, yaw and pitch bearings	5
		Direct drive drivetrains (including generator) and/or gearbox drivetrains (including generator)	24
		Permanent magnets of wind turbines	6
		Gearboxes of wind turbines	0
		Blades	13
		Towers	7
		Foundations / floaters	34
		([1]) The cost distribution for onshore wind turbines is based on the assumption that they utilise a gearbox drivetrain. ([2]) The cost distribution for offshore wind turbines assumes a direct drive configuration.	

Table 7

Cost distribution of the main specific components in battery technologies' final products and energy storage technologies' final products

Sub-categories of net-zero technologies	Final products	Main specific components	Shares of value (%)
Battery technologies	Batteries	Battery packs	100
		Battery modules	80
		Battery cells	70
		Cathode active materials	25
		Anode active materials	15
		Electrolytes	10
		Separators	10
		Current collectors (including thin copper, aluminium, nickel and carbon foils)	7
		Battery management systems (BMS)	5
		Battery thermal management systems (BTMS)	5

Sub-categories of net-zero technologies	Final products	Main specific components	Shares of value (%)
Electrochemical storage technologies	Ultracapacitors / supercapacitors	Electrolytes	60
	Redox flow energy storage	Separators	15
		Collectors	15
		Electrode plates	10

Note: the shares of final product's values are expressed relative to the battery pack.

Table 8

Cost distribution of the main specific components in heat pump technologies' final products

Sub-categories of net-zero technologies	Final products	Main specific components	Shares of value (%)
Heat pump technologies	Heat pumps	Heat pumps	100
		Four-way valves	3
		Scroll compressors / heat pump rotary compressors	25

Table 9

Cost distribution of the main specific components in hydrogen technologies' final products

Sub-categories of net-zero technologies	Final products	Main specific components	Shares of value (%)
Electrolysers	Alkaline electrolysers (AEL)	Stacks	43
		Separators (diaphragm or membranes tailored for water electrolysis)	4
		Bipolar plates and end plates	9
		Electrodes	18
	Proton exchange membrane electrolysers (PEMEL)	Stacks	40
		Membrane electrode assemblies (3-layer) / catalyst-coated membranes	14
		Porous transport layers / gas diffusion layers	10
		Bipolar plates and end plates	9
	Solid-oxide electrolysers (SOEL)	Stacks	14
		Electrolytes and electrodes	4
		Interconnectors / meshes and end plates	9

Sub-categories of net-zero technologies	Final products	Main specific components	Shares of value (%)
Hydrogen fuel cells	Proton exchange membrane fuel cells (PEMFC)	Stacks	62
		Membrane electrode assemblies (3-layer) / catalyst-coated membranes	40
		Porous transport layers / gas diffusion layers	6
		Bipolar plates and end plates	6
	Solid-oxide fuel cells (SOFC)	Stacks	21
		Electrolytes and electrodes	4
		Interconnectors / meshes and end plates	8

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COMMISSION IMPLEMENTING DECISION (EU) 2025/1100

of 23 May 2025

adopting guidelines for the implementation of certain selection criteria for net-zero strategic projects laid down in Article 13 of Regulation (EU) 2024/1735 of the European Parliament and of the Council

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EU) 2024/1735 of the European Parliament and of the Council of 13 June 2024 on establishing a framework of measures for strengthening Europe's net-zero technology products manufacturing ecosystem and amending Regulation (EU) 2018/1724 ([1]), and in particular Article 13(2) thereof,

Whereas:

(1) Regulation (EU) 2024/1735 establishes a common legal framework aimed at strengthening the manufacturing ecosystem for net-zero technology products within the Union. As part of that framework, the designation of net-zero strategic projects serves as an important mechanism. The selection criteria for designations are set out in Article 13 of Regulation (EU) 2024/1735, which also requires the Commission to adopt an implementing act setting out guidelines ensuring uniform conditions for implementing those criteria.

(2) The guidelines are at least to provide specific guidance on the criteria set out in Article 13(1), points (a)(ii) and (b) of Regulation (EU) 2024/1735. Those guidelines should facilitate the assessment of whether added manufacturing capacity to a net-zero strategic project concerns first-of-a-kind or best available technology manufacturing capacity; and whether such additional manufacturing capacity can be considered significant.

(3) To provide additional assistance to national authorities, the guidelines also include general considerations to ensure uniform conditions for the implementation of the criteria laid down in Article 13(1) of Regulation (EU) 2024/1735. Those guidelines should also facilitate the assessment of whether a project meets the environmental sustainability criterion referred to in Article 13(1), point (c), of that Regulation. Clarity should also be offered on how the 50 % import dependence threshold referred to in Article 13(1), point (a)(i) of that Regulation can be met, and on the interpretation of 'significant share of world production' referred to in Article 13(1), point (a)(iii), of that Regulation.

(4) The measures in this Decision are in line with the opinion of the Net-Zero Technologies Comitology Committee,

HAS ADOPTED THIS DECISION:

Article 1

The guidelines for the implementation of certain selection criteria for net-zero strategic projects laid down in Article 13(1) of Regulation (EU) 2024/1735 are set out in the Annex to this Decision.

([1]) OJ L, 2024/1735, 28.6.2024, ELI: http://data.europa.eu/eli/reg/2024/1735/oj.

Article 2

This Decision shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

Done at Brussels, 23 May 2025.

For the Commission
The President
Ursula VON DER LEYEN

ANNEX

Guidelines for the implementation of certain selection criteria for net-zero strategic projects laid down in Article 13(1) of Regulation (EU) 2024/1735 ([1])

1. General considerations

Member States shall recognise as net-zero strategic projects, net-zero technology manufacturing projects located within the Union that contribute to the achievement of the objectives set out in Article 1 of Regulation (EU) 2024/1735, and which satisfy at least one of the criteria set out in Article 13(1) of that Regulation.

In assessing whether a project meets the objectives set out in Article 1 of Regulation (EU) 2024/1735, Member States may consider whether the project is able to contribute to the Union's climate and energy goals, including the resilience and sustainability of net-zero supply chains. Member States should take into account the control of the undertakings involved and the relative involvement of each undertaking in the project, especially in view of potential influence by third country actors. Control should be interpreted as defined in Article 3(2) and (3) of Council Regulation (EC) No 139/2004.

To ensure uniform application of the criteria, applications of net-zero technology manufacturing projects to be recognised as net-zero strategic projects shall be submitted to the relevant Member State using the pre-set form provided on the Commission's official website ([2]).

The Commission strongly encourages Member States to follow the application process thereby described. This process is designed to facilitate the preparation, secure submission and review of applications for net-zero strategic project status. Member States are also encouraged to designate one or more authorities a**s** national contact point**s** responsible for processing applications for net-zero strategic project status.

The national contact point is to coordinate the evaluation of the selection criteria set out in Article 13 of Regulation (EU) 2024/1735. They should ensure that the application process follows a coherent and structured approach, while facilitating prompt and accurate communication between national authorities and the Commission. Making the contact point an integral part of the application procedure helps Member States to ensure that the procedure is more streamlined and efficient, improving coordination with the Commission and increasing the transparency of the evaluation process.

2. First-of-a-kind manufacturing facility

The term 'first-of-a-kind' manufacturing facility referred to in Article 13(1), point (b), of Regulation (EU) 2024/1735 is defined in Article 3(32) of that Regulation as 'a new or substantially upgraded net-zero technology facility which provides innovation with regard to the manufacturing process of the net-zero technology that is not yet substantively present or committed to be built within the Union'. Therefore, a first-of-a-kind facility is a facility that (i) is producing net-zero technologies listed in Article 4 of that Regulation and (ii) features an innovation capability with regard to the manufacturing process of net-zero technology that is not yet substantially present or planned to be built in the Union in the sense that a facility capable of producing a comparable product, process or performance should not already exist or be committed to being built in the Union. The innovation capabilities should not include minor changes or improvements.

([1]) Regulation (EU) 2024/1735 of the European Parliament and of the Council of 13 June 2024 on establishing a framework of measures for strengthening Europe's net-zero technology manufacturing ecosystem and amending Regulation (EU) 2018/1724 (OJ L, 2024/1735, 28.6.2024, ELI: http://data.europa.eu/eli/reg/2024/1735/oj).

([2]) https://single-market-economy.ec.europa.eu/industry/sustainability/net-zero-industry-act/strategic-projects-under-nzia/strategic-projects-application-process_en.

The concept of 'innovation' referred to in point (ii) shall be guided by its wider application in the Union legislative framework, including Regulation (EU) 2023/1781 of the European Parliament and of the Council ([3]). Where an innovation is already in use in Research and Development or small-scale production in the Union, new large-scale production of that innovation may still be considered as not yet substantively present within the Union. A facility using an innovative material for the first time in the Union could qualify as first-of-a-kind, even if that material has been tested in pilot facilities within the Union. Parallel projects occurring at the same time may also be recognized under this classification.

3. **Best available net-zero technology**

The term 'best available' in the context of 'net-zero technology' and 'manufacturing capacity' is referred to in Article 13(1), point (b) and in Article 13(2), point (a), of Regulation (EU) 2024/1735. 'Manufacturing capacity' is defined in Article 3(33) as the 'total amount of output capacity of the net-zero technologies produced in a manufacturing project or, where a manufacturing project produces specific components or specific machinery primarily used for the production of such products rather than the final products themselves, the output capacity of the final products for which such components or specific machinery are produced'.

The concept of 'best available' net-zero technology manufacturing capacity shall be interpreted taking into account the broader context of Regulation (EU) 2024/1735 and the Union legislative framework, including Directive (EU) 2024/1785 of the European Parliament and Council ([4]), which defines 'best' and 'available techniques'. While this definition applies to environmental performance, it can be adapted and applied with respect to net-zero technology manufacturing practices. Accordingly, 'best available' technology manufacturing indicates the most effective and advanced activities and operational methods developed, with the emphasis on the technological efficiency and innovation of the manufacturing practices.

'Best available' technology referred to in Article 13 of Regulation (EU) 2024/1735 shall be understood as follows:

(a) 'best' manufacturing capacity is the same as the most effective and advanced stage in the development of manufacturing activities and their methods of operation which demonstrates the practical suitability of particular techniques.

(b) 'available technology' is the same as net-zero technologies that are developed at a scale that allow for their implementation in the relevant industrial sector under economically and technically viable conditions, considering the costs and benefits involved, regardless of whether such technologies are produced or already in use within the Union, provided they are reasonably accessible to operators.

Alternatively, 'best available' net zero technology manufacturing may be interpreted as the project's ability to manufacture the best available net-zero technology products currently available on the internal market. Accordingly, 'best available' technology could consist of products with better performance compared to products currently available on the internal market. Assessments should be based on credible sources such as technical reports and market intelligence.

Where the net-zero technology concerned already fall within the scope of existing Union legislation regarding environmental performance, such as, but not limited to, Directive 2009/125/EC of the European Parliament and of the Council ([5]), Regulation (EU) 2024/1781 of the European Parliament and of the Council ([6]) and Regulation (EU) 2017/1369 of the European Parliament and of the Council ([7]), net-zero technologies in the highest or second-highest energy efficiency class shall be considered the best available if it belongs to the highest or second highest populated class of the applicable performance classes.

([3]) Regulation (EU) 2023/1781 of the European Parliament and of the Council of 13 September 2023 establishing a framework of measures for strengthening Europe's semiconductor ecosystem and amending Regulation (EU) 2021/694 (Chips Act)(OJ L 229, 18.9.2023, p. 1, ELI: http://data.europa.eu/eli/reg/2023/1781/oj).

([4]) Directive (EU) 2024/1785 of the European Parliament and of the Council of 24 April 2024 amending Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions (integrated pollution prevention and control) and Council Directive 1999/31/EC on the landfill of waste (OJ L, 2024/1785, 15.7.2024, ELI: http://data.europa.eu/eli/dir/2024/1785/oj).

([5]) Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (recast) (OJ L 285, 31.10.2009, p. 10, http://data.europa.eu/eli/dir/2009/125/oj).

([6]) Regulation (EU) 2024/1781 of the European Parliament and of the Council of 13 June 2024 establishing a framework for the setting of ecodesign requirements for sustainable products, amending Directive (EU) 2020/1828 and Regulation (EU) 2023/1542 and repealing Directive 2009/125/EC (OJ L, 2024/1781, 28.6.2024, ELI: http://data.europa.eu/eli/reg/2024/1781/oj).

([7]) Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU (OJ L 198, 28.7.2017, p. 1, ELI: http://data.europa.eu/eli/reg/2017/1369/oj).

4. **Significant manufacturing capacity**

At least one of the following methods shall be used to determine whether manufacturing capacity can be considered as 'significant' in accordance with Article 13(1), point (a)(ii), of Regulation (EU) 2024/1735.

(a) Where a net-zero technology manufacturing project's planned production capacity per year can be measured in gigawatt (GW), a capacity equal to 1 GW or more per year for at least one final product, specific component, or specific machinery primarily used for the production of net-zero technologies at a single production site shall be considered significant.

(b) Where a net-zero technology manufacturing project's planned production capacity per year cannot be measured in GW, its planned capacity may be considered significant if it equals or exceeds the production capacity per year of any of the top ten net-zero technology manufacturing projects of the same or equivalent type already operating in the Union, whose yearly production capacity shall be calculated based on market data for the previous year that is derived from credible sources such as technical reports and market intelligence.

(c) Where net-zero technology manufacturing projects are vertically integrated production sites, their capacity may be considered significant if more than one final product, specific component or specific machinery primarily used for the production of net-zero technologies are to be produced at the same site.

(d) Where the Union's current production capacity of a final product, specific component or specific machinery primarily used for the production of net-zero technologies is below the 40 % benchmark set in Article 5(1), point (a), of Regulation (EU) 2024/1735, a lower production capacity than the production capacity established in points (a) and (b) in this section may also be considered 'significant'. The assessment of whether a lower production capacity can be considered significant may be carried out on the basis of the Commission's monitoring of the Union's progress in meeting that benchmark pursuant to Article 42(1), point (b), of that Regulation. In the absence of such relevant information, the applicant for net-zero strategic project status may provide the Member State with credible technical reports and market intelligence.

In determining whether a project provides significant manufacturing capacity in accordance with points (a) to (d), Member States may in addition also consider whether the project is in line with the Union's strategic priorities, supply chain resilience and environmental sustainability.

5. **Guidance on other criteria set out in Article 13 of Regulation (EU) 2024/1735**

(a) Environmental sustainability

To determine if a project meets the criterion under Article 13(1), point (c), of Regulation (EU) 2024/1735, a project should demonstrate that the adopted practices significantly and permanently reduce CO_2-equivalent (CO_2-eq) emissions, whilst optimising environmental co-benefits on emissions of pollutants to air, water and soil as well as on energy, water and material efficiency and on the use of hazardous substances. Those reductions shall be:

(i) based on the estimated tonnes of CO_2-eq avoided, using clearly defined assumptions and methodology;

(ii) a core objective of the project and contribute substantially to lowering emissions in line with the Union's climate and energy goals.

The Member State processing the request for net-zero strategic project status shall ensure that emissions are not simply shifted to another sector but result in an overall reduction of CO_2-eq emissions. Furthermore, any of the practices listed in Article 13(1), point (c), of Regulation (EU) 2024/1735 are required to reduce emission rates of CO_2-eq both significantly and permanently.

(b) The 50 % import dependency threshold

For the purposes of Article 13(1), point (a)(i), of Regulation (EU) 2024/1735, the threshold of 50 % import dependency for a net-zero technology shall be understood as the ratio between the cumulative imports to the Union from all third countries combined and the Union supply in the same year.

The updated information that the Commission is to provide in accordance with Article 29(2), second subparagraph, of Regulation (EU) 2024/1735, can, where available, be used by Member States as a point of reference when determining the import dependency. In the absence of such information, Member States may determine the import dependency on the basis of other credible sources such as technical reports and market intelligence.

(c) Significant share of world production and crucial role in resilience

For the purposes of Article 13(1), point (a)(iii), of Regulation (EU) 2024/1735,

(i) the term 'significant share of world production' shall be understood as the project producing a final product, specific component or specific machinery for which the manufacturing capacity in the Union exceeds 15 % of the global manufacturing capacity, corresponding to the benchmark for global manufacturing set out in Article 5(1), point (b), of Regulation (EU) 2024/1735 and which is to be established on the basis of the Commission's monitoring of the Union's progress in meeting that benchmark pursuant to Article 42(1), point (b), of that Regulation.

In the absence of such relevant information, the applicant for net-zero strategic project status may provide the Member State with credible technical reports and market intelligence.

(ii) Furthermore, the term 'crucial role in the resilience of the Union' in Article 13(1), point (a)(iii), of Regulation (EU) 2024/1735 shall be interpreted as a project's direct impact on the Union's supply chain security, energy independence, or strategic autonomy.

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COMMISSION IMPLEMENTING REGULATION (EU) 2025/1176

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specifying the pre-qualification and award criteria for auctions for the deployment of energy from renewable sources

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EU) 2024/1735 of the European Parliament and of the Council of 13 June 2024 on establishing a framework of measures for strengthening Europe's net-zero technology manufacturing ecosystem and amending Regulation (EU) 2018/1724 ([1]), and in particular Article 26(3) thereof,

Whereas:

(1) Regulation (EU) 2024/1735 lays down measures to scale up the Union's manufacturing capacity for net-zero technologies and their key components. Those measures should increase the competitiveness of the net-zero technology sector, attract investments, and improve market access for clean technologies in the Union. Among those rules, Article 26 of Regulation (EU) 2024/1735 supports the aim of developing and maintaining an industrial basis for the deployment of renewable energy technologies to secure the Union's energy supply and avoid dependencies for the supply of these technologies. To this end, it requires Member States to apply certain non-price criteria to at least 30 % of the volume auctioned per year per Member State or alternatively to at least 6 Gigawatt per year per Member State for the deployment of energy from the renewable sources using the renewable energy technologies listed in Article 4(1), points (a) to (j) of that Regulation ([2]). Article 26 of Regulation (EU) 2024/1735 introduces the requirement to apply certain non-price criteria as pre-qualification criteria, while for other criteria Member States enjoy flexibility to decide in their auction design whether to apply them as pre-qualification or award criteria or as a combination of both type of criteria. Moreover, in accordance with Article 26(2), last subparagraph of Regulation (EU) 2024/1735, Member States are not precluded from using additional non-price criteria beyond those listed in Article 26(2).

(2) The rules specifying the pre-qualification or award criteria that should be included in auctions to deploy energy from certain renewable sources aim to facilitate the design and application of the criteria laid down in Article 26 of Regulation (EU) 2024/1735 and ensure uniformity across the Union, while providing sufficient flexibility to Member States. Harmonised implementation of the criteria should reduce transaction costs for economic operators and Member States and avoid fragmentation of the internal market in accordance with the principle of Union added value. This should be done while allowing for sufficient flexibility for Member States to adapt their application of the pre-qualification or award criteria to the structure and planning of their respective auction systems, their specific characteristics and other considerations linked to the other public policy objectives, in line with the principle of subsidiarity. The application of these criteria in renewable energy auctions should not undermine the core objectives of the auction in terms of rapid, efficient and sustainable renewable energy deployment and should ensure a competitive bidding process and legal certainty. This Regulation specifies the pre-qualification or award criteria that should be included in auctions to deploy energy from certain renewable source to ensure that these criteria are designed and applied in an objective, transparent and non-discriminatory manner without leading to a disproportionate increase in costs.

([1]) OJ L, 2024/1735, 28.6.2024, ELI: http://data.europa.eu/eli/reg/2024/1735/oj.

([2]) The technologies covered are solar technologies, including photovoltaic (PV), solar thermal electric and solar thermal technologies; onshore wind and offshore renewable technologies; heat pumps and geothermal energy technologies; hydrogen technologies, including electrolysers and fuel cells, where used for the production of renewable energy; sustainable biogas and biomethane technologies; sustainable alternative fuels technologies which are renewable fuels technologies.

(3) The criterion related to responsible business conduct should ensure that activities carried out by companies are aligned with the needs of society and nature. Building on the relevant international standards framework, such as the United Nations' Guiding Principles on Business and Human Rights: Implementing the United Nations 'Protect, Respect and Remedy' Framework, the OECD Guidelines for Multinational Enterprises on Responsible Business Conduct, the OECD Due Diligence Guidance for Responsible Business Conduct, the ILO Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy (MNE Declaration) and relevant Union legislation on corporate sustainability due diligence ([3]), in particular Directive (EU) 2024/1760 of the European Parliament and of the Council ([4]) as well as Directive (EU) 2022/2464 of the European Parliament and of the Council ([5]) and Commission Delegated Regulation (EU) 2023/2772 ([6]), the introduction of a pre-qualification criterion on responsible business conduct in renewable energy auctions should go beyond the due diligence requirements in existing Union law by requiring to take action addressing the core elements of due diligence with regard to the general bidder's business activities related to the auction. Bidders should also be required to publicly communicate on the actions taken to do so. To avoid putting an excessive bureaucratic burden, natural persons, companies that are not in the scope of Directive 2013/34/EU of the European Parliament and of the Council ([7]) as defined in its Articles 19a and 29a and their subsequent modifications and renewable energy communities should not be required to comply with this additional obligation and are subject to lighter requirements, while being entirely exempted from the application of the responsible business conduct criterion for projects with capacity below 10 MW. However, Member States should maintain the possibility to extend to natural persons, companies that are not in the scope of Directive 2013/34/EU as defined in its Articles 19a and 29a and their subsequent modifications and renewable energy communities the obligation to take action to address the core elements of due diligence for projects with capacity above 10 MW. The assessment of compliance with the responsible business conduct criterion should be based on the core elements of due diligence, as laid down in Annex I to Delegated Regulation (EU) 2023/2772 ([8]).

(4) Ensuring a high level of cybersecurity and data security in energy generation installations is crucial for maintaining security of energy supply and critical energy infrastructure. Cybersecurity risks in the energy sector may adversely affect the confidentiality of information processed in the construction and operation of renewable energy installations and may impact the ability of the operator to retain operational control of the installation. Renewable energy installations face a large set of potential cybersecurity risks linked to the supply chain, such as severe and unexpected corruption of the supply chain, the unavailability of information and communication technology (ICT) products, services or processes in the supply chain or cyberattacks initiated by actors in the supply chain, including by highly sophisticated and persistent malicious state and criminal actors.

(5) To ensure that all bidders duly address cybersecurity and data security risks, auctions for the deployment of energy from renewable sources should include pre-qualification criteria requiring them to implement cybersecurity risk management measures, reflect them in a cybersecurity plan and ensure those measures are applicable to ICT products or services provided by their suppliers. The storage and processing of data related to the operation of renewable energy installations in jurisdictions outside the European Economic Area can generate threats to the security of the installations and to the overall system. An extra level of data protection is necessary to ensure the security of the installation and of the overall system in cases when the bidder is subject to the jurisdiction of a third

([3]) In particular the Corporate Sustainability Due Diligence Directive, Directive (EU) 2024/1760 on corporate sustainability due diligence, as well as Directive (EU) 2022/2464 on the Corporate Sustainability Reporting Directive, including Delegated Regulation (EU) 2023/2772 as regards sustainability reporting standards, in particular paragraph 61.

([4]) Directive (EU) 2024/1760 of the European Parliament and of the Council of 13 June 2024 on corporate sustainability due diligence and amending Directive (EU) 2019/1937 and Regulation (EU) 2023/2859 (OJ L, 2024/1760, 5.7.2024, ELI: http://data.europa.eu/eli/dir/2024/1760/oj).

([5]) Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022 amending Regulation (EU) No 537/2014, Directive 2004/109/EC, Directive 2006/43/EC and Directive 2013/34/EU, as regards corporate sustainability reporting (OJ L 322, 16.12.2022, p. 15, ELI: http://data.europa.eu/eli/dir/2022/2464/oj).

([6]) Commission Delegated Regulation (EU) 2023/2772 of 31 July 2023 supplementing Directive 2013/34/EU of the European Parliament and of the Council as regards sustainability reporting standards (OJ L, 2023/2772, 22.12.2023, ELI: http://data.europa.eu/eli/reg_del/2023/2772/oj).

([7]) Directive 2013/34/EU of the European Parliament and of the Council of 26 June 2013 on the annual financial statements, consolidated financial statements and related reports of certain types of undertakings, amending Directive 2006/43/EC of the European Parliament and of the Council and repealing Council Directives 78/660/EEC and 83/349/EEC (OJ L 182, 29.6.2013, p. 19, ELI: http://data.europa.eu/eli/dir/2013/34/oj).

([8]) See Delegated Regulation (EU) 2023/2772, Annex I, paragraph 61.

country requiring the bidder to report information on software or hardware vulnerabilities to authorities of that third country prior to those vulnerabilities being known to have been exploited. An extra level of data protection is also necessary where, according to a public statement either on behalf of the Union under the framework for a joint EU diplomatic response to malicious cyber activities ([9]) or on behalf of one or several of its Member States, threat actors operating out of the territory of that third country have carried out malicious cyber activities or campaigns. To that end, Member States should in particular take into account targeted restrictive measures imposed by the Union to deter and respond to cyberattacks which constitute an external threat to the Union or its Member States ([10]). Public statements on behalf of a Member State are particularly relevant for auctions carried out by that Member State. In such cases bidders should provide a substantiated cybersecurity plan outlining the technical, operational and organisational measures to ensure that data used for or generated in their business activities related to the auction are stored and processed in the European Economic Area (EEA) and not transferred outside the EEA. It is important that an operator established in the EEA maintains operational control of the installation to ensure appropriate oversight and enforcement of EU law with a view to guaranteeing the security of the installation and of the overall system.

(6) The inclusion of criteria to ensure the bidder's ability to deliver the project are key to ensuring that bidders and their bids are credible, have the necessary technical knowledge, experience and financial and economic capability, and have a realistic business and technical plan to complete the project fully and on time, respecting the different specifications and non-price criteria requirements included in the auction. It is thus appropriate to require bidders to provide specific documentation and evidence. When designing such criteria, Member States should also take into account the project costs, its risks, the project capacity, the maturity of the technology, the degree of innovation required by the auction and other relevant market conditions. This is particularly relevant as imposing excessive requirements, for instance, for smaller projects may limit artificially competition and exclude smaller players that would otherwise be able to participate in the auction. Furthermore, imposing excessive requirements may limit participation in the auction by new entrants. Instead, for larger projects, which involve higher risks, it may be necessary to impose stricter conditions to ensure that the projects can be delivered fully and on time, while still guaranteeing a competitive bidding process.

(7) In accordance with Article 26(1) of Regulation (EU) 2024/1735 Member States must include pre-qualification criteria or award criteria to assess the auction's sustainability and resilience contribution. Article 25 of Regulation (EU) 2024/1735 requires contracting authorities and contracting entities to apply in certain public procurement procedures minimum mandatory requirements regarding environmental sustainability and certain mandatory requirements to assess the tender's resilience contribution. Both public procurement procedures and auctions for deploying renewable energy sources contribute to the Union's resilience. Public undertakings operating in the energy sector that are contracting entities in accordance with Article 4 of Directive 2014/25/EU of the European Parliament and of the Council ([11]) are subject to Article 25 of Regulation (EU) 2024/1735 when procuring net-zero technologies listed in Article 4(1), points (a) to (k), of Regulation (EU) 2024/1735. At the same time, they may also participate as bidders in renewable energy auctions subject to Article 26 of Regulation (EU) 2024/1735. Recital 81 of Regulation (EU) 2024/1735 recalls the importance of ensuring that the sustainability and resilience requirements are applied in a way that ensures fair and equal competition among market players regardless of their ownership structure. In order to ensure such fair and equal competition, for the purposes of assessing resilience and environmental sustainability requirements, public undertakings participating in renewable energy auctions pursuant to Article 26 should be subject only to the rules laid down in Article 26. The rules set out in Article 25 should apply to the procurement of the net-zero technologies, except where such procurement is used to carry out projects awarded in the context of renewable energy auctions subject to Article 26 ([12]).

([9]) Council Conclusions on a Framework for a Joint EU Diplomatic Response to Malicious Cyber Activities ('Cyber Diplomacy Toolbox'), 19 June 2017.

([10]) Council Regulation (EU) 2019/796 of 17 May 2019 concerning restrictive measures against cyber-attacks threatening the Union or its Member States (OJ L 129 I, 17.5.2019, p. 1, ELI: http://data.europa.eu/eli/reg/2019/796/oj).

([11]) Directive 2014/25/EU of the European Parliament and of the Council of 26 February 2014 on procurement by entities operating in the water, energy, transport and postal services sectors and repealing Directive 2004/17/EC (OJ L 94, 28.3.2014, p. 243, ELI: http://data.europa.eu/eli/dir/2014/25/oj).

([12]) These companies would still be subject to the general public procurement framework applicable to them.

(8) The specific choice of type of criteria to assess the auction's sustainability and resilience contribution (pre-qualification or award criteria) falls within the remit of the relevant authorities designing the specific auction. However, the relevant authorities should ensure that the choice of type of criteria does not undermine the competitive nature of the bidding process and does not unduly slow down the deployment of renewable energy technologies.

(9) The assessment of the auctions' contribution to resilience should aim to ensure Union access to a secure and sustainable energy supply by (i) reducing current dependencies and avoiding new strategic dependencies on single third countries for the supply of net-zero renewable energy technologies and their main specific components; and (ii) enhancing the Union's manufacturing capacity of these technologies and components. This should be done without jeopardising the achievement of the binding Union target on renewable energy for 2030 laid down in Article 3(1) of Directive (EU) 2018/2001 of the European Parliament and of the Council ([13]). When deciding whether to apply resilience as a pre-qualification or award criterion to net-zero technologies or their main specific components, the relevant authorities should take into account the Union's level of dependency on a third country for that net-zero technology or its main specific component, the availability of alternative sources of supply and the impact that applying resilience as a pre-qualification criterion instead of an award criterion could have on the supply of that main specific component. In cases where resilience is used as an award criterion in auctions, the relevant authorities should aim to increase the diversification of the Union's supply away from a country on which the Union is excessively dependent by awarding a higher number of points to bidders that ensure higher diversification of their sources of supply compared to bidders meeting the minimum resilience requirements.

(10) To address dependencies of the Union on a single third country supplying more than 50 % of a specific net-zero technology or its components or at least 40 % in certain circumstances, and to promote supply diversification, Member States' relevant authorities should limit participation to relevant auctions or award points based on requirements linked to the origin of the final product and a certain number of main specific components laid down in Commission Implementing Regulation (EU) 2025/1178 ([14]) that originate in a third country on which the Union is excessively dependent. Furthermore, it is appropriate to limit the origin of certain key strategic components given their technology value and their central role in security of energy supply and in the supply chain of specific net-zero technologies, but for other main specific components bidders should retain flexibility in choosing which components they intend to source from the third country on which the Union is excessively dependent within the limits set in this Regulation. These requirements provide for a practical and objectively verifiable methodology to assess the resilience of net-zero technologies and their main specific components that are part of an auction. It is appropriate to set the specific requirements for the different technologies and their main specific components taking into account their specific circumstances and characteristics, such as the availability of alternative sources of supply, sufficient manufacturing capacity globally, the level of maturity and deployment rate of the technology, the impact of diversification on supply chains and overall costs. In the case of PV technologies final products (solar photovoltaic systems) and PV modules, non-preferential rules of origin laid down in Commission Delegated Regulation (EU) 2015/2446 ([15]) provide that the assembly of PV cells (HS 8541 42), which are classified in the same tariff heading as PV modules (HS 8541 43), or equivalent components into PV modules would not change the origin of the module. For this reason, it is appropriate to refer to the assembly of the solar photovoltaic system and of the PV module, rather than to their origin, as a reference for the contribution to resilience of those specific manufacturing steps.

([13]) Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (OJ L 328, 21.12.2018, p. 82, ELI: http://data.europa.eu/eli/dir/2018/2001/oj), amended by Directive (EU) 2023/2413 of the European Parliament and the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652 (OJ L, 2023/2413, 31.10.2023, ELI: http://data.europa.eu/eli/dir/2023/2413/oj).

([14]) Commission Implementing Regulation (EU) 2025/1178 of 23 May 2025 on laying down rules for the application of Regulation (EU) 2024/1735 of the European Parliament and of the Council as regards the list of net-zero technology final products and their main specific components for the purposes of assessing the contribution to resilience (OJ L, 2025/1178, 18.6.2025, ELI: http://data.europa.eu/eli/reg_impl/2025/1178/oj).

([15]) Commission Delegated Regulation (EU) 2015/2446 of 28 July 2015 supplementing Regulation (EU) No 952/2013 of the European Parliament and of the Council as regards detailed rules concerning certain provisions of the Union Customs Code (OJ L 343, 29.12.2015, p. 1, ELI http://data.europa.eu/eli/reg_del/2015/2446/oj).

(11) For certain main specific components the level of dependency on a single third country may be so high that a strict application of the resilience criterion would endanger the security of supply of that component. In such cases it is appropriate that the relevant authorities retain some flexibility to increase the threshold of main specific components which may originate from that third country on which there is excessive dependency.

(12) When carrying out the assessment required in Article 26(8) of Regulation (EU) 2024/1735 on the resilience and sustainability criteria for auctions for the deployment of energy from renewable sources and their effect on the accelerated deployment of renewable energy technologies, the Commission should duly consider the effectiveness of the resilience criterion and whether such effectiveness is undermined by practices aiming at altering the origin or place of assembling of net-zero technologies final products or main specific components.

(13) Member States' relevant authorities should also assess the resilience contribution of auctions for onshore wind technologies, offshore wind technologies and electrolysers, even in the absence of a single third country supplying more than 50 % of these technologies or their components or at least 40 % in certain circumstances, given that for these technologies there is a significant risk of increased dependency on imports from the People's Republic of China, which may threaten the Union's security of supply. This is so given the current and projected global and the Union's supply and demand trends for these technologies, and the fact that the People's Republic of China's production capacity exceeds 50 % of global production ([16]) and its projected production significantly exceeds its domestic targets and foreseeable demand.

(14) Article 26(2) of Regulation (EU) 2024/1735 indicates that the auction's sustainability contribution can be assessed by introducing criteria related to environmental sustainability going beyond the minimum requirements in applicable law, innovation or energy system integration.

(15) Regulation (EU) 2024/1735 provides for the inclusion of considerations related to environmental sustainability both in certain public procurement procedures and in certain auctions to deploy renewable energy sources. The Regulation gives the Commission implementing powers to specify minimum requirements related to environmental sustainability for public contracts and to further specify the environmental sustainability criteria that may be used in auctions to deploy renewable energy sources. The former will be laid down in an implementing regulation to be adopted pursuant to Article 25, paragraph 5 of Regulation (EU) 2024/1735, while the latter were established in the present Regulation. The two acts aim to achieve the same goal to increase the environmental sustainability of net-zero technologies and reducing their impact on the environment. However, the approach of the two Regulations and their content differ in order to take into account the different specific legal empowerments, the difference in the procedures pertaining to public procurement and auctions to deploy renewable energy sources, the different scope in terms of net-zero technologies covered and the difference in the type of authorities that are in charge of these different procedures and in the volumes that are deployed through them.

(16) When choosing to set environmental sustainability criteria, the relevant authorities should set criteria assessing impacts on the climate and the environment. When doing so, they should apply one or more of the environmental sustainability criteria set in this Implementing Regulation or other criteria they consider relevant.

(17) The carbon footprint of renewable energy technologies is one of the relevant criteria that Member States' relevant authorities can introduce in auctions to assess their contribution to environmental sustainability. For this criterion to be objective, transparent and non-discriminatory, the carbon footprint of the net-zero technology should be measured and assessed on a life cycle basis. It is also appropriate to harmonise the methods for assessing life cycle carbon footprints in order to reduce margins for assumptions and improve the comparability of results, which is necessary to enable an effective contribution to environmental sustainability. Further harmonisation in this area is expected as part of the Clean Industrial Deal ([17]).When Union law provides a method for assessing the carbon footprint of a given net-zero technology, Member States should use it in their national auctions for the deployment of energy from renewable sources using that technology.

([16]) IEA, Energy Technology Perspectives 2024.
([17]) COM(2025) 85 final.

(18) In the absence of Union law providing a specific method or a method indicating that it is suitable to be used as a proxy for assessing the carbon footprint of a given renewable energy technology, in order to improve the comparability of results when using carbon footprint as a criterion in auctions, it is necessary to further specify design parameters for that criterion, notably in terms of methodology and quality requirements of data.

(19) Transitioning to a circular economy is a key element of the European Green Deal, as set out in the circular economy action plan ([18]).

(20) Auctions for net-zero technologies can contribute to this transition by setting pre-qualification criteria or award criteria related to circularity. If authorities decide to do so, they should set criteria on recyclability, ease of repair and maintenance or ease of upgrading, reuse, remanufacturing and refurbishment of products, or on the use or content of recycled materials, including critical raw materials, referring to one or more relevant product parameters set out in Annex I to Regulation (EU) 2024/1781 of the European Parliament and of the Council ([19]).

(21) Biodiversity loss and ecosystem collapse are among the biggest threats facing humanity. The Union has put in place legal frameworks, strategies and action plans to protect nature and restore habitats and species, such as the Biodiversity Strategy for 2030 ([20]) and Regulation (EU) 2024/1991 of the European Parliament and of the Council ([21]). Climate breakdown induces the loss of biodiversity globally and biodiversity loss aggravates climate change, they are thus inextricably linked, as recent studies have confirmed. Biodiversity and healthy ecosystems are fundamental to climate-resilient development.

(22) Net-zero technologies can have negative and positive impacts on biodiversity. It is appropriate to design criteria in auctions that help maintain the diversity of species, ecosystems and their reproductive capacity. Negative impacts are mostly local and can include habitat loss or deterioration as well as disturbance of species, including through noise and collisions. Positive impacts can include climate change mitigation, reductions in air pollution and landscape interventions that benefit wildlife. Pre-qualification or award criteria, or both, that address biodiversity impact have the potential to promote synergies between net-zero technologies and biodiversity. Transparent monitoring of the impact of projects on biodiversity should be done throughout the lifetime of a project and adaptive measures be taken where necessary.

(23) Where the relevant authorities include the biodiversity impact of net-zero technologies as an award criterion, the criterion should require net-positive contributions to biodiversity. Examples of measures that address net-positive contributions to biodiversity could include restoration or re-establishment of habitats, measures to improve the habitats of species and increase their populations or measures to reduce pressure from other activities on the environment. Rewarding net-positive contributions to biodiversity beyond offsetting measures ensures a level-playing field among competing bidders whose projects have divergent impacts and provides an incentive to avoid or minimize negative impacts.

(24) Energy efficiency is crucial for the achievement of the Union's ambitious goals for the reduction of greenhouse gas emissions by at least 55 % by 2030 compared to 1990, as set out in the Fit for 55 package. In addition, energy efficiency also constitutes a key factor in decreasing energy prices and improving the resilience of the Union's supply of energy, thereby enabling both a just and safe green transition.

([18]) Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – A new Circular Economy Action Plan For a cleaner and more competitive Europe, COM/2020/98 final.

([19]) Regulation (EU) 2024/1781 of the European Parliament and of the Council of 13 June 2024 establishing a framework for the setting of ecodesign requirements for sustainable products, amending Directive (EU) 2020/1828 and Regulation (EU) 2023/1542 and repealing Directive 2009/125/EC (OJ L, 2024/1781, 28.6.2024, ELI: http://data.europa.eu/eli/reg/2024/1781/oj).

([20]) Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – EU Biodiversity Strategy for 2030, Bringing nature back into our lives, COM(2020) 380 final.

([21]) Regulation (EU) 2024/1991 of the European Parliament and of the Council of 24 June 2024 on nature restoration and amending Regulation (EU) 2022/869 (OJ L, 2024/1991, 29.7.2024, ELI: http://data.europa.eu/eli/reg/2024/1991/oj).

(25) Auctions can contribute towards energy efficiency by including, at the stage of assessment of the sustainability contribution, pre-qualification or award criteria that identify the products whose energy efficiency will be assessed and, for each product, the applicable assessment methodology. The criteria should be set, where applicable, in accordance with Article 7(2) of Regulation (EU) 2017/1369 of the European Parliament and of the Council ([22]) or the energy efficiency benchmarks specified in the implementing measures adopted under Directive 2009/125/EC of the European Parliament and of the Council ([23]).

(26) Sustainable water management is important for the Union's resilience, and structural mismanagement of water has resulted in the degradation and pollution of this finite resource and of water-related ecosystems. Directive 2000/60/EC of the European Parliament and of the Council ([24]) established an integrated model for water quality management, and the Union's water policy aims to provide Europeans with access to good quality and sufficient water, guarantee the good status of all water bodies across Europe as well as secure sufficient, balanced and equitable water availability for all water using sectors, including industry. Some net-zero technologies have an impact on water during their use phase by using water or discharging waste water into water bodies. It may therefore be relevant to design water-related non-price environmental sustainability criteria in auctions for such technologies.

(27) The reduction of pollution is another key element of the European Green Deal, as set out in the Zero Pollution Action Plan. The plan sets out the target of reducing air, water and soil pollution to levels no longer considered harmful to health and natural ecosystems and that respect the boundaries our planet can cope with. Auctions for net-zero technologies can help reduce pollutants by setting pre-qualification criteria or award criteria on pollution levels. If the relevant authorities decide to use such criteria, relevant methodologies, thresholds and compliance mechanisms should be defined in accordance with and based on Union law, where available, and taking into account as applicable the criteria laid down in Appendix C to Commission Delegated Regulation (EU) 2023/2486 ([25]).

(28) Innovation is key to competitiveness, economic growth and the fast deployment of renewable energy. Directive (EU) 2018/2001 seeks to promote innovation in renewable energy deployment by setting an indicative target for innovative renewable energy technology of at least 5 % of newly installed renewable energy capacity by 2030. The integration of innovation criteria into auction design should promote the development of entirely new solutions or the improvement of solutions that go beyond the state-of-the-art. This will create a robust framework that drives the adoption of cutting-edge technologies, ensuring a sustainable and competitive path towards climate neutrality.

(29) When using innovation as a pre-qualification or award criterion in auctions, it is appropriate to distinguish between two types of auctions. First, the most common types of auctions are those that do not specifically focus on innovation as the main driver for the auction, but whose main objective is the deployment of renewable energy sources. While these auctions do not aim to promote innovation per se, certain elements that reward innovation can be added in the auction design as award or pre-qualification criteria. A second smaller subset of auctions can be referred to as pure innovation auctions, whose main objective is the promotion of innovation linked to the future deployment of renewable energy sources, such as wave, tidal energy projects or kite-borne wind turbine projects.

([22]) Regulation (EU) 2017/1369 of the European Parliament and of the Council of 4 July 2017 setting a framework for energy labelling and repealing Directive 2010/30/EU (OJ L 198, 28.7.2017, p. 1, ELI: http://data.europa.eu/eli/reg/2017/1369/oj).

([23]) Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (recast) (OJ L 285, 31.10.2009, p. 10, ELI: http://data.europa.eu/eli/dir/2009/125/oj).

([24]) Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (OJ L 327, 22.12.2000, p. 1, ELI: http://data.europa.eu/eli/dir/2000/60/oj)

([25]) Commission Delegated Regulation (EU) 2023/2486 of 27 June 2023 supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council by establishing the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to the sustainable use and protection of water and marine resources, to the transition to a circular economy, to pollution prevention and control, or to the protection and restoration of biodiversity and ecosystems and for determining whether that economic activity causes no significant harm to any of the other environmental objectives and amending Commission Delegated Regulation (EU) 2021/2178 as regards specific public disclosures for those economic activities (OJ L, 2023/2486, 21.11.2023, ELI: http://data.europa.eu/eli/reg_del/2023/2486/oj).

(30) In both types of auctions where innovation is included as pre-qualification or award criterion, the relevant authorities should always assess the candidate projects contribution to a minimum level of improvement in key performance indicators to ensure that the project delivers solutions, technologies or improvements that go beyond the state of the art already available on the market and relative to the subject of the auction. The choice of the key performance indicators against which innovation will be compared to state-of-the-art solutions and technologies depends on the public policy objective pursued by Member States. This can include, for example, key performance indicators measuring improvements in the energy generation efficiency of the technology, recyclability, flexibility of the solution or technology to promote energy system integration, lower dependency on raw materials, longevity of the technology, lower environmental impact or other key performance indicators depending on the specific public objective pursued by the inclusion of the innovation non-price criterion.

(31) In pure innovation auctions, the introduction of pre-qualification criteria to assess innovation should also take into account the maturity of the proposed solutions or technologies in order to guarantee that the candidate project meets the tender objectives and the proposed innovations are not at such an early stage of development that they will not materialise. For auctions that do not focus specifically on innovation, the relevant authorities should also be allowed to require a certain level of maturity of the bidding projects in order to avoid receiving offers at very early stages of development that are unlikely to fulfil the objectives of the auction.

(32) Knowledge dissemination of the latest innovative developments is essential to further spur innovation, in particular for pure innovation auctions ([26]). Member States' relevant authorities should include as a pre-qualification or award criteria the need to disseminate the results of the winning project through conferences, publication, open access repositories or free/open-source software and, whenever relevant, operational data, provided adequate confidentiality measures are put in place. Similarly, they should require the winning bid to commit to, on a timely basis, making available licences for research results of aided research and development projects, which are protected by intellectual property rights, at a market price and on a non-exclusive and non-discriminatory basis for use by interested parties in the EEA. For auctions that do not focus specifically on innovation, Member States' relevant authorities should be allowed to include as pre-qualification or award criteria this type of knowledge dissemination requirements.

(33) With the introduction of new variable renewable energy installations, the electricity system faces specific challenges such as the need to address grid congestion issues while maintaining grid stability. These needs are typically addressed through redispatching and other solutions that entail a cost for the system. The introduction of energy system integration as a non-price criterion in renewable energy auctions can alleviate these system costs by addressing the impact on the system of operating the renewable energy project. Nevertheless, energy system needs cannot be addressed only through non-price criteria in renewable energy auctions and require systemic solutions, including network planning, regulatory aspects, market signals or network tariffs.

(34) Non-price criteria for energy system integration should be designed in a way that allows all technologies and solutions that can help address the identified system needs to participate. If duly justified on the basis of the identified system needs or allowed in Union law, auctions should also focus on one or more technologies or solutions. These technologies or solutions could be included in the investments envisaged in the bidding project or sourced through a contract with a third party as long as they constitute a new investment. This possibility will allow bidders to select the most cost-effective solutions. Assessing the contribution to a system need of different technologies and solutions may require modelling tools that allow authorities to estimate the impact on the energy system of scenarios with and without the bidding project in an objective and non-discriminatory manner. Alternative approaches could focus either on objective and verifiable variables that serve as proxies for general system needs or as proxies for the contribution of specific technologies, taking into account in particular network planning. However, these alternative approaches run the risk of underestimating the potential impact of the candidate project on the system.

([26]) Promoting knowledge dissemination may also be pertinent for other type of renewable auctions beyond those that reward innovation.

(35) When including energy system integration as a criterion in their auction design, the relevant authorities should take into account the contribution of bidding projects to addressing system needs, based on the following three key parameters: the contribution of bidding projects to electricity system needs from a temporal perspective; their contribution to establishing connections across energy carriers; and their contribution to electricity system needs from a locational perspective.

(36) Where the contribution of bidding projects to addressing electricity system needs from a temporal perspective is assessed, the wide range of solutions, including energy storage and demand response, that can contribute to address imbalances created by variations in renewable generation and electricity demand should be taken into account. In the framework of auctions for the deployment of energy from renewable sources, the use of assets that allow modulating generation, grid feed-in or consumption of the bidding projects contributes to addressing system needs by providing temporal flexibility. This can be achieved for instance through the combination of several renewable generation technologies, the combination of generation assets and electricity storage assets or the combination of generation assets and demand assets or solutions that can increase or reduce electricity demand when required.

(37) Where the contribution of the bidding project to establishing connections across energy carriers is assessed, the capacity to transfer renewable energy from one energy carrier to another through energy conversion assets should be taken into account. Connections across energy carriers refer in particular to the conversion of renewable electricity into a different energy carrier, such as heat or hydrogen, for consumption in a demand sector that does not directly consume electricity. In this way, the gradual decarbonisation of the electricity system to which the bidding project contributes can enable the decarbonisation of demand sectors that do not use electricity, such as heat in some residential or industrial buildings or hydrogen in some industrial processes. Connections across energy carriers therefore contribute to the energy system's needs for achieving decarbonisation when it is the most cost-efficient pathway. In addition, energy conversion assets that establish these connections across energy carriers, such as electrolysers or heat generation and storage facilities, also help address temporal flexibility needs in the electricity sector.

(38) Where the bidding project's contribution to electricity system needs from a locational perspective is assessed, the focus should be on the interaction between grid topology and the location of generation and consumption assets, which can lead to grid congestion issues and lower use of renewable energy. An optimal location of new renewable energy generation projects and of the grid connection point can therefore help alleviate grid congestion issues and is of crucial importance for electricity system needs. Auctions can therefore limit participation to projects located in predefined areas where they can help reduce grid congestion or attribute points to bidding projects on the basis of their locational impact.

(39) To ensure the effectiveness of the criteria specified in this Regulation in renewable energy auctions, Member States' relevant authorities should lay down a methodology for assessing the non-price criteria specified in this Regulation, introduce appropriate monitoring mechanisms and guarantees to ensure compliance with such criteria and appropriate penalties in case of non-compliance. These guarantees and penalties should be set at a level that balances the need to ensure competitive bidding while dissuading companies from bidding without a firm intention of realising the project and meeting the project specifications. The level of guarantees and penalties should be designed in such a way that it will be more costly for the bidders not to meet the auction specifications than to bear the cost and meet them.

(40) For some criteria, it may be necessary to demonstrate compliance throughout the lifetime of the project, for instance the contribution to energy system integration, cybersecurity or environmental sustainability may require permanent monitoring. It is appropriate to introduce harmonised rules on the timing of the verification of such compliance. All bidders in an auction should commit themselves to complying with all auction requirements and specifications included in their offer when they submit their bid. Demonstration of actual compliance with the requirements resulting from the different non-price criteria and other auction requirements can take place at different points in time, which should be defined by Member States' relevant authorities where relevant.

(41) Bidders should provide specific documentation to prove compliance with certain non-price criteria. To prove compliance with the pre-qualification criteria on responsible business conduct in auctions for renewable energy sources, Member States' relevant authorities should require third-party assured statements on due diligence. To demonstrate effective implementation of cybersecurity risk management measures, the bidder should submit a cybersecurity plan and update it on a regular basis. Where relevant, authorities may require bidders and their suppliers to undergo regular security audits carried out by independent third parties and present the results of these audits on a regular basis.

(42) This Regulation is without prejudice to Article 4 of Directive (EU) 2018/2001 and Articles 107 and 108 Treaty on the Functioning of the European Union, and to the Union's international obligations. Member States' relevant authorities should introduce pre-qualification or award criteria in auctions for the deployment of energy from renewable sources in accordance with the Union's international obligations and in compliance with the relevant requirement for the imposition of restrictive measures on grounds of security and public order. Such criteria should also comply with and not go beyond Union law and be consistent with commitments made under trade and investment agreements to which the Union or Member States are parties and trade and investment arrangements to which the Union or Member State adhere.

(43) The measures provided for in this Regulation are in accordance with the opinion of the Energy Union Committee,

HAS ADOPTED THIS REGULATION:

CHAPTER I

SUBJECT MATTER, DEFINITIONS AND GENERAL PRINCIPLES

Article 1

Subject matter

This Regulation lays down specifications for the criteria laid down in Article 26 of Regulation (EU) 2024/1735.

Article 2

Definitions

For the purposes of this Regulation, the following definitions shall apply:

(1) 'renewable energy community' means a renewable energy community as defined in Article 2(16) of Directive (EU) 2018/2001;

(2) 'due diligence' means a process whereby companies identify, prevent, mitigate and account for how they address the environmental and social negative impacts resulting from their business activities related to the auction; these include negative impacts connected with the company's own operations and its upstream and downstream value chain, including through its products or services, as well as through its business relationships;

(3) 'network and information system' means network and information systems as defined in Article 6, point 1 of Directive (EU) 2022/2555 of the European Parliament and of the Council ([27]);

([27]) Directive (EU) 2022/2555 of the European Parliament and of the Council of 14 December 2022 on measures for a high common level of cybersecurity across the Union, amending Regulation (EU) No 910/2014 and Directive (EU) 2018/1972, and repealing Directive (EU) 2016/1148 (OJ L 333, 27.12.2022, p. 80, ELI: http://data.europa.eu/eli/dir/2022/2555/oj).

(4) ‘security of network and information systems’ means security of network and information systems as defined in Article 6, point (2) of Directive (EU) 2022/2555;

(5) ‘operational control’ means the authority to introduce and implement operating policies that govern day-to-day activities, processes and resources to ensure the smooth functioning of an installation, and in particular of its network and information systems;

(6) ‘assembling’ of a PV module means the integration and interconnection of a series of PV cells or equivalent components as listed in Implementing Regulation (EU) 2025/1178 into a single unit;

(7) ‘carbon footprint’ means the sum of greenhouse gas emissions and greenhouse gas removals in a product system, considering all relevant activities within the spatial and temporal boundary of the system, expressed as carbon dioxide equivalents assessed based on 100-year time horizon global warming potentials and calculated based on a life cycle assessment study using the single impact category of climate change;

(8) ‘circular economy’ means an economic system whereby the value of products, materials and other resources in the economy is maintained for as long as possible, enhancing their efficient use in production and consumption, thereby reducing the environmental impact of their use, minimising waste and the release of hazardous substances at all stages of their life cycle, including through the application of the waste hierarchy;

(9) ‘biodiversity impact’ means any change in biodiversity such as in the abundance or distribution of species or distribution, structure and functions of habitats and ecosystems as a direct or indirect effect of net-zero technologies along their life cycle;

(10) ‘energy efficiency’ means the ratio of output of energy to the input of energy in the case of energy-generating products or the conversion efficiency, i.e. the ratio of the output of energy to the input of energy in the case of energy-converting and energy storage products;

(11) ‘pollution’ means pollution as defined in Article 3, point (2) of Directive 2010/75/EU of the European Parliament and of the Council ([28]) and, for water-related pollution, as defined in Article 2(33) of Directive 2000/60/EC;

(12) ‘temporal flexibility’ means the ability of market participants to adapt generation, grid feed-in and consumption patterns to contribute to system needs across the relevant time frames, generally by reacting to market signals, in particular in the electricity sector;

(13) ‘locational impact’ means the ability of market participants to help address the needs of the electricity system based on the selection of the site and the grid connection point;

(14) ‘connection across energy carriers’ means the ability of market participants to transfer energy from one energy carrier to another through energy conversion assets.

Article 3

General principles

Non-price criteria in auctions pursuant to Article 26(1) of Regulation (EU) 2024/1735 shall comply with the following general principles:

(a) they shall be defined and evaluated in an objective, transparent and non-discriminatory manner, taking into account the policy objectives of the auction and the potential contribution of each technology to those objectives;

([28]) Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) (OJ L 334, 17.12.2010, p. 17, ELI: http://data.europa.eu/eli/dir/2010/75/oj).

(b) they shall reflect the market maturity of the technologies addressed and may be designed by involving relevant interested market participants, including developers, manufacturers, civil society and experts, in the different non-price criteria included in the auction;

(c) they shall contribute to the rapid, efficient and sustainable deployment of renewable energy in a competitive manner, attract private investment and provide benefits such as investment certainty;

(d) they shall ensure a competitive bidding process and avoid creating insurmountable and unjustified entry barriers and disproportionate costs, while dissuading companies without a firm intention of realising the project and meeting the project specifications from bidding;

(e) they shall be applied in accordance with Union law and the commitments of the Union pursuant to international trade and investment agreements;

(f) they shall use assessment methods provided for in Union legislation for that net-zero technology, where available;

(g) where delegated acts under Article 4 of Regulation (EU) 2024/1781 set classes of performance in relation to net-zero technologies, the relevant criteria of the auction for the deployment of such net-zero technology shall be based on those classes of performance.

CHAPTER II

MANDATORY PRE-QUALIFICATION CRITERIA

Article 4

Responsible business conduct

1. Pre-qualification criteria related to responsible business conduct shall require bidders, except if they are natural persons, companies that are not in the scope of Directive 2013/34/EU as defined in its Articles 19a and 29a and their subsequent modifications or renewable energy communities, to take action to address, in their business activities related to the auction, the core elements of due diligence set out in Article 5(1) points (a) to (g) of Directive (EU) 2024/1760 on Corporate Sustainability Due Diligence.

2. The relevant authorities shall require bidders, except if they are natural persons, companies that are not in the scope of Directive 2013/34/EU as defined in its Articles 19a and 29a and their subsequent modifications or renewable energy communities, to publicly communicate on their responsible business conduct by means of a public statement that covers at least the core elements listed under point 61(a) to (e) of Annex I to Delegated Regulation (EU) 2023/2772.

3. The relevant authorities shall require natural persons, companies that are not in the scope of Directive 2013/34/EU as defined in its Articles 19a and 29a and their subsequent modifications and renewable energy communities that present a bid concerning projects with a capacity above 10 MW to report, in their business activities related to the auction, on the core elements of due diligence set out in point 61(c) and (d) of Annex I to Delegated Regulation (EU) 2023/2772 or by using sustainability reporting standards for voluntary use recommended at Union level, where available.

4. The relevant authorities may apply paragraphs 1 and 2 to natural persons, companies that are not in the scope of Directive 2013/34/EU as defined in its Articles 19a and 29a and their subsequent modifications and renewable energy communities that present a bid concerning projects with a capacity above 10 MW. If they apply those paragraphs to those bidders, paragraph 3 shall not apply.

Article 5

Cybersecurity and data security (pre-qualification criteria)

Pre-qualification criteria related to cybersecurity and data security shall require bidders to:

(a) take appropriate and proportionate technical, operational and organisational measures that reflect the principles of security by design and by default to ensure the security of the renewable energy installation's network and information systems including, where relevant, measures listed in Article 21(2) of Directive (EU) 2022/2555;

(b) where, 9 months or more before the publication of an auction within the scope of Article 26 of Regulation (EU) 2024/1735, the bidder is subject to the jurisdiction of a third country requiring the bidder to report information on software or hardware vulnerabilities to authorities of that third country prior to those vulnerabilities being known to have been exploited or there is a public statement on behalf of the Union or the Member State carrying out the auction that threat actors operating out of the territory of that third country have carried out malicious cyber activities or campaigns, present a cybersecurity plan outlining how the bidder guarantees the security of the installation and of the overall system and more specifically take the necessary technical, operational and organisational measures to ensure that data used for or generated in their business activities related to the auction are stored in and not transferred outside the European Economic Area;

(c) ensure and demonstrate, where the bidder relies on suppliers for the supply of ICT products used in the renewable energy installation or ICT services related to its operation, that the suppliers take the measures referred to in point (a) and where those suppliers meet any of the two conditions set in point (b) for bidders, that those suppliers also take the measures referred to in point (b);

(d) ensure that an operator established in the European Economic Area maintains operational control of the installation.

Article 6

Ability to deliver the project fully and on time

1. Pre-qualification criteria related to the ability to deliver the project fully and on time shall require bidders to provide two or more of the following documents:

(a) documentation to identify the bidder or bidders in the case of a bidding consortium;

(b) documentation showing compliance with the applicable laws, including any relevant permits that are required to build and operate the project or documentation demonstrating eligibility to obtain such permits;

(c) documentation on the company's financial and economic situation proving their financial capability to complete the project and face potential liabilities rather than filing for bankruptcy or avoiding facing these liabilities through other means, such as requirements on minimum net worth, profits or long-term debt ratings;

(d) a description of the project in accordance with the requirements included in the auction specifications;

(e) evidence of the technical feasibility, knowledge and experience to complete the project, including evidence of past experience in completing similar projects;

(f) a timetable for the construction and operation of the project, including the dates of all relevant intermediate steps leading to project completion.

2. The requirements in paragraph 1 of this article shall be modulated depending on the project costs, the project risks, the project capacity, the maturity of the technology, the degree of innovation required by the auction and other relevant market conditions.

CHAPTER III

RESILIENCE CONTRIBUTION

Article 7

Resilience contribution

1. Where, 9 months or more before the day of the publication of an auction within the scope of Article 26 of Regulation (EU) 2024/1735, the Commission has determined in accordance with Article 29(2) of that Regulation that more than 50 % of the supply within the Union of the net-zero technologies final products referred to in points (a) to (f) of this subparagraph originates in a single third country, or that the supply within the Union of the net-zero technologies final products referred to in points (a) to (f) of this subparagraph originating in a single third country has increased by at least 10 percentage points on average for two consecutive years and reaches at least 40 % of the supply within the Union, the relevant authorities shall allow participation in the auction or award points only to bids that fulfil the following requirements concerning the final products and main specific components listed in Implementing Regulation (EU) 2025/1178 that are part of the bid:

(a) For PV technologies, the final products are not assembled in that third country and at least four main specific components used do not originate in that third country. The PV inverters and the PV cells or equivalent do not originate and the PV modules are not assembled in that third country.

(b) For onshore wind technologies, the final products do not originate in that third country and no more than three main specific components originate in that third country. Direct drive drivetrains (including generator) and/or gearbox drivetrains (including generator) do not originate in that third country.

(c) For offshore wind technologies, the final products do not originate in that third country and no more than four main specific components originate in that third country. Direct drive drivetrains (including generator) and/or gearbox drivetrains (including generator) do not originate in that third country.

(d) For electrolysers, the final products do not originate in that third country and no more than two main specific components originate in that third country. The stack does not originate in that third country.

(e) For heat pump technologies, the final products do not originate in that third country and no more than one main specific component originates in that third country.

(f) For all the net-zero technologies falling under the scope of Article 26 of Regulation (EU) 2024/1735 other than those listed in points (a) to (e), the final products do not originate in that third country.

Where, 9 months or more before the day of the publication of the relevant auction, the Commission has determined in accordance with Article 29(2) of Regulation (EU) 2024/1735 that, in addition to the conditions mentioned in the first subparagraph, more than 85 % of the supply within the Union of one or more main specific components originate in a single third country, Member States shall allow participation in the auction or award points only to bids in which, for at least one of those main specific components, the quantity of that component originating in that third country does not exceed 85 %.

Where auctions are published less than 9 months after the day on which the Commission has most recently determined the share of the Union supply originating in a single third country referred to in the first and second subparagraphs, the relevant authorities shall apply this paragraph on the basis of that latest determination or the previous one. If there is no previous one, the relevant authorities may apply this paragraph on the basis of the latest determination.

2. Where the conditions set out in paragraph 1 are not met but 9 months or more before the day of the publication of an auction within the scope of Article 26 of Regulation (EU) 2024/1735 the Commission has determined that more than 50 % of the supply of one or more main specific components of a specific net-zero technology within the Union originates in a single third country or the supply within the Union of one or more main specific components of that net-zero technology originating in a single third country has increased by at least 10 percentage points on average for two consecutive years and reaches at least 40 % of the supply within the Union, the relevant authorities shall allow participation in the auction or award points only to bids in which the quantity of each of those main specific components originating in that third country does not exceed 50 %. When applying this obligation, the relevant authorities may combine the application of pre-qualification and award criteria for the different main specific components.

Where the share of supply within the Union originating in a single third country referred to in the first subparagraph is above 85 %, the relevant authorities may increase the limit on the maximum quantity of components of the first subparagraph from 50 % to up to 85 %.

Where auctions are published less than 9 months after the day on which the Commission has most recently determined the share of the Union supply originating in a single third country referred to in the first and second subparagraphs, the relevant authorities shall apply this paragraph on the basis of that latest determination or the previous one. If there is no previous one, the relevant authorities may apply this paragraph on the basis of the latest determination.

3. For onshore wind technologies, offshore wind technologies and electrolysers, where the Commission, at the time of the publication of the auctions, has not determined in accordance with Article 29(2) of Regulation (EU) 2024/1735 that more than 50 % of the supply within the Union of a specific net-zero technology final product, or more than 40 % with two consecutive years of increase by at least 10 percentage points on average, originates in a single third country, the relevant authorities shall apply the resilience criterion by allowing participation in the auction or award points only to bids for which at least 75 % of the final products that are part of the bid fulfil the requirements set in paragraph 1, with respect to final products and main specific components originating or assembled in the People's Republic of China.

CHAPTER IV

SUSTAINABILITY CONTRIBUTION

Article 8

Environmental sustainability – carbon footprint

1. When choosing to assess the auction's sustainability contribution referred to in Article 26(1), point (b), of Regulation (EU) 2024/1735 by means of a carbon footprint criterion, the relevant authorities shall include a pre-qualification or award criterion or a combination of both and indicate the net-zero technologies, among the ones falling under the scope of Article 26 of Regulation (EU) 2024/1735, whose carbon footprint has to be assessed at project level or component level, and, for each net-zero technology, the applicable objective, transparent and non-discriminatory carbon footprint assessment methodology.

2. Bidders shall be required to measure and communicate the carbon footprint using life cycle assessment methods provided for in binding Union law that specifically addresses the renewable energy technologies at stake in the auction, where available. Where there is no binding Union methodology to measure and communicate the carbon footprint of a specific net-zero technology, but there is a binding Union methodology to calculate the carbon footprint of a product and the act establishing that methodology indicates that it can be used as guidance for calculating the carbon footprint of a certain net-zero technology, bidders shall be required to measure and communicate the carbon footprint for that net-zero technology using that methodology.

3. If not specified in the methodology used, the relevant authorities shall define and publish functional units, system boundaries and assumptions used to measure the carbon footprint and oblige the bidders to report their calculations in a transparent manner. If not specified in the methodology used, national authorities shall define and disclose modelling and data quality requirements for primary data, secondary data and databases used. The relevant authorities shall require the use of consistent and representative data.

4. For carbon footprint methodologies not covered by paragraph 2 of this article, the carbon footprint assessment shall at least cover greenhouse gas emissions due to the following life cycle phases of the relevant net-zero technologies:

(i) extracting, producing, processing and transporting resources;

(ii) manufacturing processes;

(iii) electricity/energy used for those processes;

(iv) transport of the components and final product;

(v) installation, operation and maintenance;

(vi) decommissioning and end of life.

Article 9

Environmental sustainability – circular economy

1. When choosing to assess the auction's sustainability contribution referred to in Article 26(1), point (b), of Regulation (EU) 2024/1735 by means of circular economy criteria, as pre-qualification criteria or award criteria or a combination of both, the relevant authorities shall take into account the contribution of the projects participating in the auction to one or more of the following parameters, provided they constitute a substantial part of the environmental impact of the product:

— recyclability of products, referring to one or more relevant product parameters as set out in point (d) of Annex I to Regulation (EU) 2024/1781,

— ease of repair and maintenance or ease of upgrading, reuse, remanufacturing and refurbishment of products, referring to one or more relevant product parameters as set out in points (b), (c) and (e) of Annex I to Regulation (EU) 2024/1781,

— use or content of recycled materials in products, including critical raw materials.

2. In defining circular economy criteria referred to in paragraph 1, the relevant authorities shall make use of methods provided for in Union legislation specifically addressing the net-zero technologies in the scope of this implementing regulation, where available. If no such methods are provided or referred to in Union legislation, the relevant authorities shall use methods set out in international standards, where available.

Article 10

Environmental sustainability – biodiversity impact

1. When choosing to assess the auction's sustainability contribution referred to in Article 26(1), point (b), of Regulation (EU) 2024/1735 by means of criteria related to the biodiversity impact of the operation of the net-zero technologies, the relevant authorities shall include pre-qualification criteria or award criteria or a combination of both to assess the project's contribution to improving the biodiversity impact of net-zero technologies during their installation, operation and decommissioning phases as laid down in paragraphs 2 and 3.

2. Where the relevant authorities include the biodiversity impact of net-zero technologies as a pre-qualification criterion, the criterion shall include the following elements:

(a) the presence of a system to monitor the positive and negative biodiversity impacts of the installation during the installation, operation and decommissioning phase;

(b) a commitment to implement adaptative solutions to mitigate potential negative impacts on biodiversity as identified under environmental assessments performed if relevant pursuant to Directive 2011/92/EU of the European Parliament and of the Council ([29]) and/ or Council Directive 92/43/EEC ([30]) and under point (a) of this paragraph and ensure the effectiveness of solutions to contribute positively to biodiversity if such solutions are deployed.

The system referred to in point (a) of the first subparagraph shall monitor the impacts on land, above land, in soils, in water, at the sea floor, above the sea floor, above the sea surface, including noise and pollution, as relevant with a view to the technology at stake.

The data and information collected by the system referred to in point (a) of the first subparagraph shall be shared at least with the scientific community and public authorities unless it is commercially sensitive information.

3. Where the relevant authorities include the biodiversity impact of net-zero technologies as an award criterion, the criterion shall require net-positive contributions to biodiversity ([31]), when identified as relevant by the public authority, in one or several of the following areas:

(a) the conservation of habitats or species, or both, under Directive 92/43/EEC;

(b) the conservation of wild birds, including their habitats, under Directive 2009/147/EC of the European Parliament and of the Council ([32]);

(c) the restoration of ecosystems under Regulation (EU) 2024/1991;

(d) for offshore installations, the achievement of good environmental status under Directive 2008/56/EC of the European Parliament and of the Council ([33]);

(e) the achievement of good water status under Directive 2000/60/EC.

The measures to fulfil this criterion may take place onsite or offsite.

Article 11

Environmental sustainability – energy efficiency

1. When choosing to assess the auction's sustainability contribution referred to in Article 26(1), point (b), of Regulation (EU) 2024/1735 by means of energy efficiency criteria, the relevant authorities shall include a pre-qualification or award criterion or a combination of both that identifies the products whose energy efficiency is assessed and, for each product, the applicable assessment methodology. Energy efficiency shall be measured and assessed based on the methods for the product concerned provided for in Union legislation, where available.

2. Where a product is covered by a delegated act adopted under Regulation (EU) 2017/1369, Directive 2010/30/EU of the European Parliament and of the Council ([34]) or by a related Commission implementing act, the criterion referred to in paragraph 1 shall comply with the criterion laid down in Article 7(2) of that Regulation (EU) 2017/1369.

([29]) Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (OJ L 26, 28.1.2012, p. 1, ELI: http://data.europa.eu/eli/dir/2011/92/oj).

([30]) Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.7.1992, p. 7, ELI: http://data.europa.eu/eli/dir/1992/43/oj).

([31]) Net-positive contributions to biodiversity are additional conservation/restoration outcomes beyond offsetting measures, i.e. measures designed to compensate for residual, unavoidable, adverse biodiversity impacts arising from the project after appropriate prevention and mitigation measures have been taken.

([32]) Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26.1.2010, p. 7, ELI: http://data.europa.eu/eli/dir/2009/147/oj).

([33]) Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy (Marine Strategy Framework Directive) (OJ L 164, 25.6.2008, p. 19, ELI: http://data.europa.eu/eli/dir/2008/56/oj).

([34]) Directive 2010/30/EU of the European Parliament and of the Council of 19 May 2010 on the indication by labelling and standard product information of the consumption of energy and other resources by energy-related products (OJ L 153, 18.6.2010, p. 1, ELI: http://data.europa.eu/eli/dir/2010/30/oj).

3. Where a product not covered under paragraph 2 is covered by an implementing measure under Directive 2009/125/EC, the criterion shall refer to products that comply with energy efficiency benchmarks specified in that implementing measure.

4. Where a product is not covered under paragraph 2 or 3, energy efficiency shall be measured and assessed based on other methods provided for in Union legislation, where available.

5. Where Union legislation does not provide for relevant methods and paragraph 4 does not apply, energy efficiency shall be measured and assessed based on international standards.

Article 12

Environmental sustainability – efficient water use and solutions avoiding water pollution

1. When choosing to assess the auction's sustainability contribution referred to in Article 26(1), point (b), of Regulation (EU) 2024/1735 by means of water-related criteria, the relevant authorities shall include pre-qualification criteria or award criteria or a combination of both to assess the project operation's contribution to preserving and, where applicable, improving the status of water bodies.

2. Where the relevant authorities include the water-related impact of net-zero technologies as a pre-qualification criterion, the criterion shall include the following elements:

(a) the presence of a system to monitor the positive and negative impacts on water of the installation during all relevant life-cycle stages;

(b) the commitment to implementing adaptative solutions to avoid negative impacts on water status and ensure the effectiveness of solutions to generate positive impacts, where applicable, and contribute to preserve or achieve good water status as demonstrated by the monitoring system referred to in point (a);

3. Where the relevant authorities include the water-related impact of net-zero technologies as an award criterion, the criterion shall require positive contributions to achieve or maintain good water quality and quantity under Directive 2000/60/EC.

Article 13

Environmental sustainability – pollution

When choosing to assess the auction's sustainability contribution referred to in Article 26(1), point (b), of Regulation (EU) 2024/1735 by means of pollution-related criteria, the relevant authorities shall include pre-qualification criteria or award criteria or a combination of both to assess the project's contribution to reducing pollution, other than from greenhouse gases, during installation, operation and decommissioning. Relevant methodologies, thresholds and compliance mechanisms shall be defined in accordance with and based on Union law, if available, and taking into account as applicable the criteria laid down in Appendix C to Delegated Regulation (EU) 2023/2486.

Article 14

Sustainability contribution: innovation

1. When choosing to assess the auction's sustainability contribution referred to in Article 26(1), point (b), of Regulation (EU) 2024/1735 by means of innovation criteria, the relevant authorities shall distinguish, where relevant, between:

(a) pure innovation auctions specifically focused on the promotion of new technologies or solutions; and

(b) auctions that do not specifically focus on innovation as the main driver for the auction.

In both types of auctions, the use of innovation pre-qualification or award criteria shall introduce a requirement for all projects to meet a minimum level of improvement in key performance indicators which goes beyond the state of the art of technologies and solutions that are already on the market and relative to the subject matter of the auction they are participating in.

2. In addition to the requirements in paragraph 1, second subparagraph, the contribution of auctions referred to in point (a) of paragraph 1 to innovation by means of pre-qualification criteria shall be assessed by introducing a requirement for all projects to have a certain level of maturity. For this type of auctions, the relevant authorities shall include additional requirements obliging the winning bidder to disseminate knowledge on the innovative project results or to offer licenses for research results and development projects which are protected by intellectual property rights, at a market price and on non-exclusive and non-discriminatory basis for use by interested parties in the EEA.

3. In addition to the requirements in paragraph 1, second subparagraph, the contribution of auctions referred to in point (b) of paragraph 1 to innovation by means of pre-qualification may be assessed by introducing a requirement for all projects to have a certain level of maturity. For this type of auctions, the relevant authorities may also include additional requirements pertaining to knowledge dissemination practices of innovative project results or licensing practices for further research results and developments projects, which are protected by intellectual property rights at a market price and on non-exclusive and non-discriminatory basis for use by interested parties in the EEA.

4. The level of maturity of the innovation proposed in the auction referred to in paragraphs 2 and 3 shall be assessed, where relevant, by means of credible and established methods such as the reference to a technology readiness level.

Article 15

Sustainability contribution: Energy system integration

1. When choosing to assess the auction's sustainability contribution referred to in Article 26(1), point (b), of Regulation (EU) 2024/1735 by means of energy system integration criteria, the relevant authorities shall take into account the contribution of the participating projects to addressing system needs resulting from their operation, based on temporal flexibility, locational impact and connections across energy carriers, under the conditions laid down in paragraphs 2, 3 and 4.

2. The participating project's temporal flexibility shall be assessed with regard to the solutions proposed, either as new investments or procured through third parties, in particular in the form of a combination of several renewable generation technologies, a combination of generation assets and electricity storage assets, or a combination of generation assets and demand assets or solutions. Unless duly justified, this assessment shall not exclude any technology that can contribute to address the identified system needs.

3. The participating project's locational impact on system needs shall be assessed with regard to the combination of their relevant features, including their temporal generation profile or their generation capacity, and the selection of the site and of the grid connection point, while taking into account network planning.

4. The participating project's ability to creating connections across energy carriers shall be assessed with regard to their capacity to transfer renewable energy from one energy carrier to another, and in particular whether they include a combination of generation assets and energy conversion assets.

CHAPTER V

ASSESSMENT AND COMPLIANCE WITH THE CRITERIA

Article 16

Assessment of the auctions' pre-qualification or award criteria and compliance aspects

1. The relevant authorities shall lay down a transparent, objective and non-discriminatory methodology to assess bids against the selected non-price criteria, in particular through a quantitative assessment of the criteria based on a scoring method set up and published in advance of the bidding process. Where a quantitative assessment is not possible, a qualitative assessment of non-price criteria may be provided for if justified by the public policy objectives pursued and if it is designed in a way that mitigates both the administrative burden and the risk of legal challenges. The methodology for the assessment of the bids shall be designed following consultation and collaboration with stakeholders and experts. When the relevant authorities do not have sufficient information to set up the scoring method in advance, the scoring for a given aspect may also be set by reference to the highest bidder for that particular non-price criterion. In that case, measures shall be put in place to limit strategic bidding.

2. All bidders to the auction shall, at the moment of the bid or earlier, commit to comply with the auction requirements and specifications included in their offer. The relevant authorities shall decide at which point in time bidders are required to demonstrate compliance with the non-price criteria, which may take place at different points in time throughout the lifetime of the project, as relevant.

3. With the exception of bidders that qualify as natural persons, companies that are not in the scope of Directive 2013/34/EU as defined in its Articles 19a and 29a and their subsequent modifications and renewable energy communities as defined in Article 2(16) of Directive (EU) 2018/2001, compliance with the criteria referred to in Article 4 shall be assessed against relevant supporting statements assured by independent third parties. Bidders subject to sustainability reporting under Directive 2013/34/EU may present relevant information on how they comply with the requirements of Article 4 by using the format provided therein.

4. Compliance with the criteria referred to in Article 5 shall be assessed by requiring bidders to present a cybersecurity plan of the bidding project and update it on a regular basis during the implementation of the project.

5. Compliance with the criteria referred to in Article 7 shall be assessed by requiring bidders to provide customs documentation in accordance with Regulation (EU) No 952/2013 of the European Parliament and of the Council ([35]), where available, and other relevant documents demonstrating the origin or place of assembly of the net-zero technology or its main specific components, including invoices or any other means.

6. The relevant authorities using non-price criteria shall ensure they are complied with.

7. The relevant authorities shall require bidders to submit appropriate guarantees to ensure compliance with the criteria covered by this Regulation set in the auction specifications, such as bid bonds, completion bonds and performance bonds.

8. In setting the level of guarantees referred to in paragraph 7, the relevant authorities shall also take into account considerations such as the project costs, the project risks, the project capacity, the value of this capacity for the energy system, the maturity of the technology, the degree of innovation required by the auction, other relevant market conditions and the nature of the infringement. The level of guarantees shall be sufficiently high to deter bidding strategies from pursuing the non-respect of non-price criteria.

([35]) Regulation (EU) No 952/2013 of the European Parliament and of the Council of 9 October 2013 laying down the Union Customs Code (OJ L 269, 10.10.2013, p. 1, ELI: http://data.europa.eu/eli/reg/2013/952/oj).

Article 17

Penalties

1. The relevant authorities shall establish penalties for non-compliance with the criteria covered by this Regulation. Those penalties may take different forms, such as lump sum penalties, daily penalties, reductions or the removal of support, or exclusion from participating in future auction rounds.

2. In setting the level of penalties referred to in paragraphs 1, the relevant authorities shall also take into account considerations such as the project costs, the project risks, the project capacity, the value of this capacity for the energy system, the maturity of the technology, the degree of innovation required by the auction, other relevant market conditions and the nature of the infringement. The level of penalties shall be sufficiently high to deter bidding strategies from pursuing the non-respect of non-price criteria.

CHAPTER VI

FINAL PROVISIONS

Article 18

Entry into force and application

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 23 May 2025.

For the Commission
The President
Ursula VON DER LEYEN

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of the European Union

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2025/1178

18.6.2025

COMMISSION IMPLEMENTING REGULATION (EU) 2025/1178

of 23 May 2025

on laying down rules for the application of Regulation (EU) 2024/1735 of the European Parliament and of the Council as regards the list of net-zero technology final products and their main specific components for the purposes of assessing the contribution to resilience

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Regulation (EU) 2024/1735 ([1]) of the European Parliament and of the Council of 13 June 2024 on establishing a framework of measures for strengthening Europe's net-zero technology manufacturing ecosystem and amending Regulation (EU) 2018/1724, and in particular Article 29(2), first subparagraph, thereof,

Whereas:

(1) Regulation (EU) 2024/1735 establishes a common legal framework aimed at strengthening the Union's resilience and security of supply of net-zero technologies, by promoting diversification of their supply chains and enhancing the domestic manufacturing capacity of net-zero technologies.

(2) In accordance with Articles 25, 26 and 28 of Regulation (EU) 2024/1735, where there is evidence of a significant dependency on third countries with regard to the Union's supply of net-zero technologies, non-price criteria, such as the contribution to resilience, are to be applied in public procurement, renewable energy auctions or other forms of public intervention. For the purposes of assessing the contribution to resilience, the Commission is to adopt an implementing act providing a list of the net-zero technology final products and their main specific components. The list serves to assess the contribution to resilience.

(3) The Annex to Regulation (EU) 2024/1735 includes a list of net-zero technology final products and specific components primarily used for the production of net-zero technologies.

(4) The main specific components included in the list provided in the Annex to this Regulation should include only those specific components primarily used for the production of net-zero technologies that are essential to ensure the Union's resilience, in line with the provisions on access to markets set out in Articles 25 to 28 of Regulation (EU) 2024/1735.

(5) Specific components primarily used for the production of net-zero technologies should be considered as essential to ensure the effective implementation of the resilience contribution in public procurement, renewable energy auctions and other forms of public intervention if they contribute significantly to the final product's value, or if they are critical in supporting the resilience of the overall supply chain.

(6) In order to give Member States sufficient time to prepare for the requirements relating to the resilience contribution, the application of this Regulation should be deferred.

(7) In accordance with Article 29(2), second subparagraph, of Regulation (EU) 2024/1735, the Commission is to provide updated information on the shares of the Union supply originating in different third countries for net-zero technologies and their main specific components.

(8) The measures provided for in this Regulation are in accordance with the opinion of the committee established by Article 45(1) of Regulation (EU) 2024/1735,

([1]) OJ L, 2024/1735, 28.6.2024, ELI: http://data.europa.eu/eli/reg/2024/1735/oj.

HAS ADOPTED THIS REGULATION:

Article 1

The list of net-zero technology final products and their main specific components to assess the contribution to resilience is set out in the Annex.

Article 2

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

It shall apply from 30 December 2025.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 23 May 2025.

For the Commission
The President
Ursula VON DER LEYEN

ANNEX

List of net-zero technology final products and their main specific components for the purposes of assessing the contribution to resilience

	Sub-categories of net-zero technologies	Final products	Main specific components
Solar technologies	Photovoltaic (PV) technologies	— Solar PV systems	— PV grade polysilicon — PV grade silicon ingots or equivalent ([1]) — PV wafers or equivalent ([1]) — PV cells or equivalent ([1]) — Solar glass — PV modules — PV inverters — PV trackers and their specific mounting structures
	Solar thermal electric technologies	— Concentrated solar power (CSP) plants	— CSP reflectors — CSP trackers and their specific mounting structures — CSP receivers (point or line)
	Solar thermal technologies	— Solar thermal systems	— Solar thermal collectors (including flat-plate, evacuated tube, concentrating systems and air collectors) — Solar thermal absorbers — Solar glass — Solar thermal trackers and their specific mounting structures
	Other solar technologies	— PV-thermal collectors (PVT)	
Onshore wind and offshore renewable technologies	Onshore wind technologies	— Onshore wind turbines	— Nacelles (assembly) — Rotor hubs — Main, yaw and pitch bearings — Direct drive drivetrains (including generator) and/or gearbox drivetrains (including generator) — Permanent magnets of wind turbines — Gearboxes of wind turbines — Blades — Towers

	Sub-categories of net-zero technologies	Final products	Main specific components
	Offshore wind technologies	— Offshore wind turbines	— Nacelles (assembly) — Rotor hubs — Main, yaw and pitch bearings — Direct drive drivetrains (including generator) and/or gearbox drivetrains (including generator) — Permanent magnets of wind turbines — Gearboxes of wind turbines — Blades — Towers — Foundations/floaters
	Other offshore renewable technologies	— Tidal stream energy technologies — Wave energy technologies	
Battery and energy storage technologies	Battery technologies	— Batteries ([2])	— Battery packs — Battery modules — Battery cells — Cathode active materials — Anode active materials — Electrolytes — Separators — Current collectors (including thin copper, aluminium, nickel and carbon foils) — Battery management systems (BMS) — Battery thermal management systems (BTMS)
	Electrochemical storage technologies	— Ultracapacitors/supercapacitors — Redox flow energy storage	— Electrolytes — Separators — Collectors — Electrode plates
	Gravitational storage technologies	— Pumped hydro storage	— Reversible hydro turbines and pump runners — Distributors with guide vanes
	Thermal energy storage technologies	— Thermal energy storage systems	— Sensible heat storage and latent heat storage mediums (including phase change materials and molten salts) — Thermochemical storage materials

	Sub-categories of net-zero technologies	Final products	Main specific components
	Compressed/liquefied gas energy storage technologies	— Compressed air energy storage — Liquid air energy storage	
	Other energy storage technologies	— Flywheel energy storage	— Flywheel rotors
Heat pumps and geothermal energy technologies	Heat pump technologies	— Heat pumps	— Heat pumps — Four-way valves — Scroll compressors/heat pump rotary compressors
	Geothermal energy technologies	— Geothermal power plants — Geothermal direct use systems	— Heat exchangers resistant to geothermal corrosive operating conditions — Submersible pumps resistant to geothermal corrosive operating conditions
Hydrogen technologies	Electrolysers	— Alkaline electrolysers (AEL)	— Stacks — Separators (diaphragm or membranes tailored for water electrolysis) — Bipolar plates and end plates — Electrodes
		— Proton exchange membrane electrolysers (PEMEL)	— Stacks — Membrane electrode assemblies (3-layer)/ catalyst-coated membranes — Porous transport layers/gas diffusion layers — Bipolar plates and end plates
		— Anion exchange membrane electrolysers (AEMEL)	— Stacks — Membrane electrode assemblies (3-layer)/ catalyst-coated membranes — Porous transport layers/gas diffusion layers — Bipolar plates and end plates
		— Solid-oxide electrolysers (SOEL)	— Stacks — Electrolyte and electrodes — High-temperature gaskets/ sealings — Interconnectors/meshes and end plates

	Sub-categories of net-zero technologies	Final products	Main specific components
	Hydrogen fuel cells	— Proton exchange membrane fuel cells (PEMFC)	— Stacks — Membrane electrode assemblies (3-layer)/ catalyst-coated membranes — Porous transport layers/gas diffusion layers — Bipolar plates and end plates
		— Solid-oxide fuel cells (SOFC)	— Stacks — Electrolytes and electrodes — High-temperature gaskets/ sealants — Interconnectors/meshes and end plates
	Other hydrogen technologies	— Hydrogen transmission and distribution networks	— Hydrogen compressors — Hydrogen refuelling stations — Pipelines for hydrogen transmission and distribution
		— Hydrogen storage facilities	— Onboard hydrogen storage tanks — Hydrogen stationary storage tanks
		— Plants for the conversion and extraction of hydrogen into and from ammonia	— Ammonia crackers
Sustainable biogas and biomethane technologies	Sustainable biogas technologies	— Sustainable biogas plants	— Anaerobic digesters/ fermentation tanks
	Sustainable biomethane technologies	— Sustainable biomethane plants	— Anaerobic digesters/ fermentation tanks — Biomethane upgrading units
CCS technologies	Carbon capture technologies	— Absorption capture — Adsorption capture — Membranes capture — Solid cycles capture — Cryogenics capture — Direct air capture	— CO_2 compressors
	Carbon storage technologies		

	Sub-categories of net-zero technologies	Final products	Main specific components
Electricity grid technologies	Electricity grid technologies	— Onshore substations — Offshore substations	— Cables and lines for electricity transmission and distribution, and cables connecting net-zero technologies to the electricity grid (overhead lines, underground and undersea cables, including HVDC and HVAC) — Switchgears — Circuit breakers — Protection relays — Power transformers — Disconnectors — Busbar systems — Electric cabinets — Offshore substations — Inverters — Converters
		— Electricity transmission and distribution towers	— Electricity transmission and distribution towers — Electrical conductors (including advanced conductors and high-temperature superconductors) — Insulators
		— Cables, lines and associated accessories for electricity transmission and distribution, and cables connecting net-zero technologies to the electricity grid (overhead lines, underground and undersea cables, including HVDC and HVAC)	— Cables and lines for electricity transmission and distribution, and cables connecting net-zero technologies to the electricity grid (overhead lines, underground and undersea cables, including HVDC and HVAC) — Electrical conductors (including advanced conductors and high-temperature superconductors) — Insulators
		— Power transformers	— Power transformers — Transformer cores — Transformer windings — Transformer tap changers
	Electric charging technologies for transport	— Electric vehicle supply equipment — Electric road systems ([3]) — Shore-side electricity supply equipment — Overhead contact lines — Electric air transport supply equipment	— Electric vehicle supply equipment — Shore-side electricity supply equipment — Electric air transport supply equipment

	Sub-categories of net-zero technologies	Final products	Main specific components
	Technologies to digitalise the grid and other electricity grid technologies	— High- and medium-voltage power electronics equipment and components (including DC technology) — Flexible alternating current transmission system (FACTS) technologies — Smart meters/ advanced metering and control infrastructures	— High- and medium-voltage power electronics equipment and components (including DC technology) — Flexible alternating current transmission system (FACTS) technologies — Smart meters/advanced metering and control infrastructures
Nuclear fission energy technologies	Nuclear fission energy technologies	— Nuclear fission power plants	— Fuel elements — Reactor vessels — Primary piping and valves — Steam turbines — Steam generators — Safety systems — Monitoring, instrumentation and control systems
	Nuclear fuel cycle technologies	— Nuclear fuel cycles	— Centrifuges — Gas handling and flow control systems — Chemical processing equipment — Waste vitrification equipment — Transportation, storage and disposal cylinders, containers and casks — Heavy water — Safety systems — Monitoring, instrumentation and control systems
Sustainable alternative fuels technologies	Sustainable alternative fuels technologies	— Sustainable alternative fuels plants	— Thermochemical, electrochemical, chemical and biochemical/biological reactors to convert biomass, recycled carbon fuels into bio-intermediates and/or syngas — Reactors and post-treatment units to convert bio-intermediates and/or syngas and recycled carbon fuels into sustainable alternative fuels

	Sub-categories of net-zero technologies	Final products	Main specific components
Hydropower technologies	Hydropower technologies	— Hydro turbine systems	— Hydro turbine runners — Distributors with guide vanes
Other renewable energy technologies	Osmotic energy technologies		
	Ambient energy technologies, other than heat pumps		
	Biomass technologies	— Pellet mills — Briquetting presses	— Pellet dies — Briquetting compaction chambers
	Landfill gas technologies		
	Sewage treatment plant gas technologies		
	Other renewable energy technologies		
Energy system-related energy efficiency technologies	Energy system-related energy efficiency technologies	— Energy management systems (EMS) — Building automation systems (BAS) — Automated demand response (ADR) — Variable speed drives — Organic Rankine cycle (ORC) power systems	— EMS — BAS — ADR — Variable speed drives — ORC turbines
	Heat and cold grid technologies	— Heating and cooling distribution system pipework	
	Other energy system-related energy efficiency technologies		
Renewable fuels of non-biological origin	Renewable fuels of non-biological origin (RFNBO) technologies	— RFNBO plants	— Reactors to convert H_2 and CO_2 or N_2 into syngas or alcohols — Reactors to convert syngas or alcohols into RFNBOs

	Sub-categories of net-zero technologies	Final products	Main specific components
Biotech climate and energy solutions	Biotech climate and energy solutions	— Microorganisms and microbial strains (including but not limited to bacteria, yeasts, microalgae, fungi and archaea) that are used to pretreat and convert feedstock into biofuels, recycled carbon fuels and renewable fuels, bio-based and recycled carbon chemicals, biopolymers, bio-based materials and bio-based products — Enzymes (including but not limited to amylase and cellulase) that are used to pretreat and convert feedstock into biofuels, bio-based chemicals, bio-based materials and bio-based products, or that are used to catalyse reactions in chemical processes — Biopolymers	— Microorganisms and microbial strains (including but not limited to bacteria, yeasts, microalgae, fungi and archaea) that are used to pretreat and convert feedstock into biofuels, recycled carbon fuels and renewable fuels, bio-based and recycled carbon chemicals, biopolymers, bio-based materials and bio-based products — Enzymes (including but not limited to amylase and cellulase) that are used to pretreat and convert feedstock into biofuels, bio-based chemicals, bio-based materials and bio-based products, or that are used to catalyse reactions in chemical processes — Biopolymers
Transformative industrial technologies for decarbonisation	Transformative industrial technologies for decarbonisation	— Electric arc furnaces — Hydrogen-ready direct-reduced iron reactors — Submerged arc furnaces — Open slag bath furnaces — Flash calciners — Industrial electric boilers — Industrial induction heaters/furnaces ([4]) — Industrial infrared heaters/furnaces — Industrial microwave heaters/furnaces — Industrial radio-wave heaters/furnaces — Industrial resistive heaters/furnaces	— Graphite or carbon electrodes for electric furnaces — Flash calciners — Industrial electric boilers — Industrial induction heaters/furnaces — Industrial induction coils — Industrial infrared heaters/furnaces — Industrial infrared emitters — Industrial microwave heaters/furnaces — Industrial magnetrons — Industrial radio-wave heaters/furnaces — Radio frequency generators — Industrial resistive heaters/furnaces — Molybdenum electrodes for electric furnaces
CO_2 transport and utilisation technologies	CO_2 transport technologies	— CO_2 transport infrastructure	— CO_2 compressors

	Sub-categories of net-zero technologies	Final products	Main specific components
	CO_2 utilisation technologies	— Thermochemical utilisation — Electrochemical utilisation	— CO_2 electrolysers
Wind and electric propulsion technologies for transport	Wind propulsion technologies	— Flettner rotors — Suction wing sails — Towing kites — Rigid and semi-rigid wing sails	
	Electric propulsion technologies	— Electric propulsion systems for road and off-road transport — Electric propulsion systems for rail transport — Electric propulsion systems for waterborne transport — Electric propulsion systems for air transport	— Transport propulsion electric motors — Permanent magnets of transport electric motors — Transport battery packs — Transport fuel cells — Transport inverters — Electric propulsion high voltage power distribution units — Onboard chargers — Onboard hydrogen storage tanks
Other nuclear technologies	Other nuclear technologies (such as nuclear fusion technologies)		

([1]) The term 'equivalent' refers to similar steps or key enabling technologies needed for thin-film, organic, tandem or other PV technologies.

([2]) Batteries as defined in Article 3(13), (14) and (15) of Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries.

([3]) The term 'electric road systems' (also known as dynamic charging) refers to equipment along the road that supplies power to vehicles while they are in motion. This final product includes both conductive and inductive charging.

([4]) The term 'heater' refers to low (up to 200 °C) and medium (200 to 500 °C) temperature applications. The term 'furnace' refers to high (500 to 1 000 °C) and very high (above 1 000 °C) temperature applications.