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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.