International Association of Oil & Gas Producers

POSITION STATEMENT | FEBRUARY 2025

IOGP feedback to the public consultation on the Net-Zero Industry Act Delegated Act on primarily used components

IOGP Europe welcomes the Commission's Delegated Act on primarily used components under the Net-Zero Industry Act (NZIA), as well as the opportunity to collaborate with EU institutions by providing technical input. This is an important step to allow an appropriate implementation of the NZIA Regulation allowing net-zero technologies, key for Europe's decarbonization, to benefit from the Regulation's provisions.

Overly restrictive criteria for "primarily used components"

- We would like to point out that the proposed criteria defining "primarily used components", as included in the Commission Staff Working Document (SWD), are, from our perspective, overly restrictive and inconsistently applied throughout the Annex.

Adoption of pragmatic criteria to include key net-zero components

- One particular concern is the requirement that a specific component's production output must be "always" intended for net-zero purposes. We believe this approach is excessively strict and may lead to the unintended consequence of excluding key components that play a fundamental role in net-zero infrastructure. A strict classification of net-zero technologies could also create a mismatch between net-zero projects and the technologies they rely on. For instance, while certain projects may qualify as net-zero strategic projects, the technologies underpinning their operability may not be explicitly recognized under the current classification. This discrepancy would result in increased costs, limited incentives, and regulatory uncertainty, ultimately slowing down the scaling of net-zero investments, in particular CCS and blue hydrogen projects. Rather than excluding components whose production is not exclusively for net-zero purposes (e.g., CO_2 pipelines, CO_2 compressors, CO_2 ships), we suggest adopting a more pragmatic criteria that includes components that are critical for low-carbon technologies and for the EU's net-zero pathway resilience.
- With regards to hydrogen, we noticed that hydrogen compressors and transport pipelines although not explicitly listed in the Annex, in the SWD they are specifically referred to as components meeting the criteria for primarily used components. This contradicts the exclusion of CO_2 compressors and pipelines as primarily used component under CCS technologies in the Annex.
- Similarly, certain technologies exclusive to the CO_2 domain — such as CO_2 vessels and specific measurement instruments — are absent from the list. A more technology-neutral and forward-looking approach to all net-zero technologies should be applied to ensure that essential CCS-related components are not unduly excluded.

Inclusion of components to the list of final products in the Annex

- Based on the broad definition of "final products" foreseen in the NZIA (Article 2.10), we identified specific types of final products to be included in the list to provide greater clarity and prevent any ambiguity, listed in the table below.

Keep the list adaptable to technological developments

- In accordance with Article 46.7 of the NZIA, which allows for the revision of the list to reflect technological developments, we emphasize the importance of keeping this list adaptable and subject to periodic review.

Please find below concrete proposals for changes to the Delegated Act and its Annex.

Text of the Delegated Act	IOGP proposal for amendment
(Recital 5) To identify specific components considered to be primarily used for the production of net-zero technologies, four criteria were put forward: specific, commercial availability, always primarily used and essential.	(Recital 5) To identify specific components considered to be primarily used for the production of net-zero technologies, four criteria were put forward: specific, commercial availability, ~~always~~ primarily used and essential.

Text of the Annex of the Delegated Act	IOGP proposal for amendment – inclusion of additional items	Justification
List of final products for carbon storage technologies	• Injection wells: wells used to inject compressed carbon dioxide deep into geological formations • MMV (Measurement, Monitoring and Verification) Technologies during and after operations • Low Carbon Offshore Energy generation for platforms • Offshore CO_2 injection units • CO_2 storage through in-situ mineralization • CO_2 well drilling & completion equipment • CO_2 compressors • CO_2 pumps • CO_2 sensors • AI-powered real-time exception diagnostics	• **CO_2 injection systems**: Includes the completions (all subsurface equipment that establishes and controls the CO_2 well, specifically created with materials and controls for CO_2 flow), wellheads (created for CO_2 use with different materials and specifications (e.g., lower temperature requirements), trees (also created specifically for CO_2 flow), controls (adapted to the different conditions that CO_2 induces, such as phase changes and chemical states that need to be avoided in static and dynamic conditions), and valves (capable of taking the extreme low temperatures for the emergency cases in CO_2 flow. All this equipment is very specific to geology, geography, surface or subsea, and the temperature and flow conditions, and there are now similar components. • **CO_2 well drilling equipment**: Certain elements of the well drilling and monitoring equipment are designed and used only for CO_2 wells.
	Subcategorie of net-zero technologies: • Carbon capture and **carbon dioxide removal technologies**	

Text of the Annex of the Delegated Act	IOGP proposal for amendment – inclusion of additional items	Justification
	List of final products for Carbon capture and carbon dioxide removal technologies • Solvent capture • Sorbent capture • Membranes • Cryogenic systems	• **Solvent-based** capture solutions deploy plant schemes that typically include: – Absorption /desorption **columns** that (1) put in contact, thanks to an **internal** contactor, flue gas and solvent to allow CO_2 absorption (2) host the CO_2 regeneration, typically by **steam** from a **reboiler**. Those columns represent a major part of the plant CAPEX and footprint - process intensifications solutions may be adopted (e.g. rotating packing beds) – A main **heat exchanger** is needed to transfer heat from the lean solvent (depleted) to the rich solvent (containing CO_2), heat exchangers are needed to cool-down the stripped CO_2 and condensed the water, heat exchangers are also used to control the temperature of the absorber and remove heat from the exothermic reaction. Heat exchangers might be needed to cool down flue gas at columns inlet temperature, but this is usually done through a direct contact cooler (column), additional ones may be needed depending on specific process. – **Heat pumps** may recover heat from host plant or nearby heat sources to generate steam. – **Compressors/expanders** may be needed depending on process configurations, blowers are required to circulate the flue gas or the air through the capture system. – **Pumps** are needed to circulate the solvent from the absorption to the regeneration sections and vice-versa, and to circulate the water used for refrigeration/heating purposes.

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		– Gas and liquid composition **measurement** devices may be needed to control the process, the emissions and CO_2 product quality, depending on specific process. – **Sorbent-based capture** is typically achieved by adsorbing CO_2 with a solid material (the sorbent) and then regenerating it (typically with steam). This cycle is typically achieved by **specific batch processes**. Sorbent-based capture solutions are currently under development in the market both for direct air capture and point source capture. – **Cryogenic** and **Membranes** based capture are typically achieved by specific processes which deploy flue gas and/or CO_2 **compressors** and **expanders**.
	List of primarily used components for carbon capture and carbon dioxide removal technologies • Columns • Internals (i.e. packing) • Reboilers • Heat exchangers • Blower • Compressors • Expanders • Pumps • Tailored batch processes for sorbents • Gas and liquid composition measurement devices • CO_2 qualified meters	

Text of the Annex of the Delegated Act	IOGP proposal for amendment – inclusion of additional items	Justification
List of final products for CO_2 transport	• CO_2 shipping (high, medium and low pressure; barge, coaster, and long distance) • Liquid CO_2 shipping by different carriers • CO_2 pipelines (onshore and offshore, CO_2 qualified) • CO_2 rail and truck transport (high, medium, and low pressure) • Loading arms	
List of primarily used components for carbon storage technologies	• Compatible material (cement type, metallurgies, ...) given the CO_2 specifications and P&T operational conditions • Completions, wellheads, trees, controls and valves, compressors • Fibre Optics, Advanced CO_2 Detection methodologies • PCP (Progressive Cavity Pumps) Power Generation or equivalent, Hybridization, Cable types, Batteries • Monitoring technologies for CO_2 geological storage • CO_2 well drilling equipment • Induced seismicity monitoring (fibre optic, geophone, AI processing) • Time-lapse seismic monitoring (airgun, vibroseis, explosive, continuous (novel); DAS fibre optic, geophones, streamers, ocean bottom nodes/cables, VSPs, sparse 3D, full 3D) • Time-lapse gravity and electromagnetic techniques (onshore and offshore) • Well-based monitoring (pressure sensing, wireline logging, fibre optic, wireless, wired) • InSAR and other satellite interferometry techniques • LIDAR and vegetation detection technologies • Modelling systems (inversion, geomechanical simulators, geophysical inversion)	

Text of the Annex of the Delegated Act	IOGP proposal for amendment – inclusion of additional items	Justification
	• CO_2 monitoring devices • CO_2 spec/contaminants analysis • CO_2 storage tanks • CO_2 marine offloading systems (hoses, buoys, electrical connections, towers) • CO_2 metering (liquid, supercritical, and gas phases) • Floating Storage & Injection Unit • Well construction equipment (CO_2-qualified casing, tubing, connections, cements, chokes, safety valves, packers, gauges, cabling, wellheads, hydraulic fluids, Christmas trees) • Well intervention equipment (CO_2-qualified intervention vessels, land logging, and workover rigs) • Subsea and land wellheads and manifolds • Pipework and control systems • Control systems for CO_2 management • Subsurface/storage management and development • CO_2 modelling systems • Brine modelling systems • Legacy well databases and assessments • Subsurface risk assessment workflows (Induced Seismicity, Geomechanics, Reactive Transport)	

Text of the Annex of the Delegated Act	IOGP proposal for amendment – inclusion of additional items	Justification
List of primarily used components for CO_2 transport technologies	• CO_2 compressors • CO_2 liquefaction plants/system • MP and LP Ships: metallurgy and joint designs • Cryo Flexible Pipelines • Fluidized bed reactors, Air pollution control components such as Catalytic Oxidiser (RCO), Regentative Thermal Oxidiser (RTO), DeNOX units • CO_2 flow meters • CO_2 conditioning technologies (e.g., compressors, liquefaction units, CO_2 purification units, removal of impurities, disposal thereof) • CO_2 monitoring devices • CO_2 quality monitoring (analysers for impurities, online and batch) • CO_2 booster pumps • CO_2 vaporizers and condensers • CO_2 heat exchange and heating systems • CO_2 qualified pigging and other inspection tools • CO_2 leak detection systems (facilities and pipelines) • CO_2 qualified meters • CO_2 pumps • CO_2 liquefaction plants • Liquid CO_2 Shipping by different carriers • Offshore & onshore loading systems • CO_2 conditioning and treatment • CO_2 tanks	• **CO_2 pipelines** will be necessary to enable the efficient transport of CO_2 from capture facilities to dedicated storage sites, playing a key role in supporting CCS initiatives. • **CO_2 Compression**: CO_2 compression is a vital process in CCS, where captured CO_2 is compressed to high pressure for easier transport through pipelines. Proper compression ensures the CO_2 remains in a dense, supercritical state, which significantly reduces its volume and enhances transport efficiency. Developing reliable compression technologies will be essential to support large-scale CO_2 transportation networks. • **CO_2 Liquefaction**: CO_2 liquefaction involves cooling and pressurizing CO_2 until it transitions into a liquid state for storage or transport. This process is particularly useful for shipping CO_2 over long distances where pipelines are not feasible. Expanding liquefaction capacity at key ports will be crucial to enabling the large-scale transport of CO_2 and supporting global decarbonization goals. • **CO_2 Monitoring Devices**: CO_2 monitoring devices play a crucial role in tracking and ensuring the safe and efficient operation of carbon capture, transport, and storage systems. These devices measure CO_2 levels in real time to detect leaks, monitor pipeline integrity, and verify storage performance. Advanced monitoring technology is essential to meet regulatory standards, enhance safety, and build trust in large-scale CO_2 management projects.

Text of the Annex of the Delegated Act	IOGP proposal for amendment – inclusion of additional items	Justification
List of other hydrogen technologies list of primarily used components	• H2 storage in salt caverns • Technologies/sensors for hydrogen emission monitoring • AI-powered digital solutions for real-time energy system optimization • Technologies to improve energy efficiency in hydrogen carrier systems	
List of other hydrogen technologies list of final products	• Gas turbines for 100% H2 use • Hydrogen turbines • Hydrogen pipelines • Ammonia cracker • Hydrogen liquefaction technologies • Hydrogen refueling technologies • Hydrogen storage (pressurized, cryogenic/liquid) • Hydrogen shipping vessels (barges for inland waterways, large-scale international vessels) • Loading arm for liquid hydrogen terminals • Hydrogen carriers (ammonia, liquid hydrogen, LOHC)	• **Hydrogen Gas turbines** have the same applications as fuel cells and can be operated more flexibly. European companies are leading technology developments and manufacturing of hydrogen-ready turbines. Hydrogen gas turbines will play an important role in providing flexibility for the electricity system in times of low variable renewables supply and high electricity demand. Hydrogen gas turbines will be also used in hydrogen pipelines (H2 backbone) and to decarbonize natural gas production operations. This is recognized by countries like Germany that foresee an important role for hydrogen gas turbines and engines in ensuring reliability in their electricity system. Furthermore, hydrogen turbines will be required by transmission system operators for hydrogen. • **Hydrogen pipelines**: Europe currently has around 206.737km of gas transmission pipelines and 1,600 km of hydrogen pipelines, with 3,300 km being currently developed across Austria, Germany, and Italy. To future-proof these infrastructures, advanced materials specifically designed for CO_2 and hydrogen transport will be essential.

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		• **Ammonia cracking** is a chemical process that breaks ammonia down into nitrogen and hydrogen. Upgrading ports with ammonia crackers will be crucial to supporting future hydrogen imports, facilitating distribution, and making them ready for the evolving energy landscape. • **H2 Liquefaction technologies** are part of a cryogenic process to convert H2 from gaseous to liquid state to facilitate its transportation and storage in larger quantity
	List of primarily used components of CO2 injection technologies • Well construction elements (CO_2-qualified casing, tubing, connections, cements, chokes, safety valves, packers, gauges, cabling, wellheads, hydraulic fluids, Christmas trees) • CO_2 modelling systems • Brine modelling systems • Legacy well databases and assessments • Subsurface risk assessment workflows (Induced Seismicity, Geomechanics, Reactive Transport)	