Emerging technologies for a climate neutral Europe

Scope
Proposals are expected to address at least one of the following bullet points.

- Decarbonised, efficient, effective, and safe Transport;
- Fuel cells;
- Efficient energy generators;
- Energy distribution;
- Energy storage;
- Negative GHG emissions.

excluding material research, renewable energy technologies (including hydrogen) and batteries as they are covered in other actions. Applicants could consider in particular these applications:

- Technologies providing the possibility of multi-fuel integration and/or the potential for the transversal intersectorial decarbonization;
- Hard-to-decarbonize and energy-intensive applications, such as road/rail/maritime transport or energy generation through thermal power generators;
- Flexibility in terms of its scalability to different power/energy demands;
- Compatibility with local or distributed energy production layouts;
- Use of already available industrial processes and raw materials for easy TRL upgrading and final transfer to mass production.
Expected outcome

- Available high-risk/high return technologies for a transition to a net climate neutral EU economy by 2050.
- Knowledge and scientific proofs of the technological feasibility of new concepts
- Environmental, social and economic benefits to contribute to R&I strategy and policy forecast.
- Establishing a solid long term dependable European innovation base.
- Lower environmental impact (e.g. on climate change, pollution and biodiversity) based on an Life Cycle Assessment (data compatible with the low TRL level) base, with better resource efficiency (materials, water, etc…) than current commercial technologies;
- Considering barriers to the deployment of such technologies, including social acceptance or resistance to new energy technologies and related socioeconomic and livelihood issues globally
HORIZON-CL5-2021-D2-01-08:
Emerging technologies for a climate neutral Europe

Type of action: Research and Innovation Action (RIA)

EU contribution: 20 M€, EU contr. 2.5M€ per project

Deadline: 19 October 2021

Special topic conditions: Final TRL 4
Methane cracking to usable hydrogen and carbon

Scope

• Development of processes allowing the use of available fossil and renewable methane to generate hydrogen without releasing CO\textsubscript{2} or other GHGs (provided that the used methane is supplied by a chain with low upstream leakage) by directly splitting the molecule in its components.
• Proposals are expected to demonstrate significant advances with respect to already achieved results in Europe and outside, delivering a minimum of 50% efficiency (i.e. energy from hydrogen recovery vs energy from original methane, for instance by reducing reaction temperatures and improving catalysts).
• Demonstrate the potential to achieve mass production and a competitive hydrogen cost and an improved climate performance with respect to current methane based, CO\textsubscript{2} releasing hydrogen production methods including CCS.
• Due consideration should be given to the management of impurities in the source stream.
• Development of the economic potential of the carbon particles delivered by the specific technology (e.g. synthetic graphite or carbon black) or the development of side-streams of other carbon-rich chemical compounds (excluding uses which would re-release the carbon as CO\textsubscript{2}).
• Technology assessment to consider environmental, resource and economic aspects of the deployment of the technology.

Proposals are expected to address all the bullet points.
Expected outcome

Project results are expected to contribute to the following expected outcomes:

• Replacement of the unabated use of natural gas by climate-neutral (or negative, in case of cracking of biogenic methane) hydrogen.
• Reduction of emissions by hard to decarbonise sectors, also considering the use of eventual by-products.
• Faster reduction of GHG emissions by economies heavily relying on natural gas export or use (provided they reduce their upstream emissions).
• Production of economically usable by-product solid carbon (in tires, batteries, etc.).
HORIZON-CL5-2021-D2-01-09:

Methane cracking to usable hydrogen and carbon

Type of action: Research and Innovation Action (RIA)

EU contribution: 15 M€ (shared with topic 10, HORIZON-CL5-2021-D2-01-11), EU contr. 2-3 M€ per project

Deadline: 19 October 2021

Special topic conditions: start TRL 3, final TRL 5
Scope

- Development of technologies for removing non-CO2 greenhouse gases, i.e. CH4, N2O and fluorinated gases.
- Capture, concentration, use and/or disposal of emissions, either from natural sources (if more concentrated) or in the atmosphere.
- Carbon dioxide (covered in the following topic) may be considered if any synergy can be found with processing it in combination with other greenhouse gas(es).
- Clearly define the state-of-the-art of technology, the global potential for emission reductions, cost figures and versatility and economic viability of use where appropriate.
- Methane emissions stemming from the supply chain of fossil fuels are excluded. Other emissions with a methane concentration higher than 1% are also excluded, considering that economic interests should drive their mitigation.
Expected outcome

Proposals are expected to contribute to the following outcomes:

• Increase knowledge on the plausibility of removing non-CO2 greenhouse gases from the atmosphere.
• Raise awareness on the effects of non-CO2 greenhouse gases on earth warming.
• Develop technologies for addressing the effects of non-CO2 greenhouse gas emissions.
• Investigate techno-economic aspects of technologies and physical properties of emissions striving to match both into market-ready solutions.
HORIZON-CL5-2021-D2-01-10:

Technologies for non-CO2 greenhouse gases removal

Type of action: Research and Innovation Action (RIA)

EU contribution: 15 M€ (shared with topics HORIZON-CL5-2021-D2-01-9, HORIZON-CL5-2021-D2-01-11), EU contr. 2-3 M€ per project

Deadline: 19 October 2021

Special topic conditions: Starting TRL <=3
Thank you!

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