Environmental Defense Fund feedback to the Sector Integration consultation

What would be the main features of a truly integrated energy system to enable a climate neutral future? Where do you see benefits or synergies? Where do you see the biggest energy efficiency and cost-efficiency potential through system integration?

Reverse engineering from a climate neutral future, the most important fact to be aware of is that in 2040, 50% of the warming caused by this year's GHG emissions will come from anthropogenic methane, a powerful climate forcer, 84-87 times more potent than CO2 in the first twenty years after it has been emitted. In other words, the impact of GHGs emitted this year over the next 20 years will be dominated by methane. Around 12% of the warming experienced in 2040 will come from the oil and gas industry. Fixing this problem is the lowest hanging fruit for the O&G industry.

This implies that a climate neutral future across GHGs requires a focus on cleaning up both CO2 and methane emissions in the EU's energy system today while building the low-carbon energy system of tomorrow. Failure to clean up methane and CO2 emissions in the energy system today will risk tomorrow's low carbon businesses being built on sand.

According to the Commission's own modelling natural gas use will continue well into 2050, albeit in a reduced role. Considering how cheap gas is, we believe that the biggest cost-efficiency potential lies in internalising the environmental externalities of gas, notably methane emissions, in the gas price to level the playing field with low-carbon electricity. A core feature of the gas market reform should be a mandatory methane performance standard consistent with what the industry considers feasible: 0,2% methane intensity by 2025.

The oil and gas sector accounts for about 25% of total methane emissions. Since molecules account for about 70% of the EU's final energy use and the EU imports about 50% of internationally traded gas, the EU has both the leverage and the opportunity to affect change in the global O&G industry and on the rate of global warming by requiring that anyone selling gas in the premium EU internal gas market should be able to credibly demonstrate that they have managed methane emissions.

In terms of market design, a truly integrated energy system should effectively enable a broader construct of the merit order, ranking energy sources not only according to their short-term marginal costs but also according to their CO2 and methane footprint. This market design should deliver both lower energy production costs and CO2 and methane footprint by making it easy for market participants to prioritise:

1. Energy efficiency
2. Reduction in CO2 and methane emissions along the EU's energy supply chains
3. Clear and stable investment signals ensuring higher take-up rate of innovative, future-proof technologies and a faster track to industrialisation for promising technologies that deliver CO2 and methane reductions.

What are the main barriers to energy system integration that would require to be addressed in your view?

1. The dominant role of gas molecules, mostly fossil, in the EU's energy mix and lack of alternatives for industrial processes and heating is a significant market and technological barrier.
    a. In market terms, gas is cheaper than electricity and this makes it difficult for both households and industrial energy systems to switch to electricity.
    b. In technology and physical system terms, lack of availability of Large Scale Power Storage means that direct electrification will not necessarily act as an enabler for building more renewable capacity which is intermittent.
2. Infrastructure costs - building cables is more expensive than building pipelines. Infrastructure lock- in effects and general difficulty of making binary infrastructure choices in an uncertain environment are an additional market and physical system barrier.
3. Structure of energy and market system which currently prioritises security of supply and affordability over sustainability, volume over value. This represents an enormous market risk for new, lower carbon technologies.
4. Lack of level playing field – decarbonisation has thus far focused on the power sector while the gas sector continues to operate with no sustainability requirements in terms of either CO2 or methane emissions.
5. Geopolitics – gas dependence makes Europe interdependent with Russia but renewables and electrification are likely to still keep Europe dependent but this time on China, Africa and the Middle East.

What role should renewable gases play in the integrated energy system?

First and foremost, we are not aware of any credible study demonstrating a big role for gases of non-fossil origin in a 2030 context in a way that does not increase inequality or create new, third-country dependencies. While it is important to continue R&D and innovation activities, the EU should not lose focus from the importance of reducing methane emissions in the EU's gas supply chain, including from imports, biogas, biomethane and blue hydrogen nor should the importance of energy efficiency be underestimated. The reason is that there is currently no pathway to net zero that is both technologically feasible and does not increase inequality.

Second, we believe that the liberal use of the definition "renewable" is misleading. There is nothing magical about methane produced from organic material gas – it too can cause net radiative forcing. The key is carbon neutrality of any gas that is used, which means net carbon dioxide and methane emissions profile. Since anthropogenic methane produces >25% of current net radiative forcing reducing these emissions becomes a key tool in stabilising the climate. This means there is no free pass for anthropogenic biogenic methane that is diverted to the energy system – let alone new methane produced from organic material. We believe that the proposed taxonomy of the Florence School of Regulation, which speaks of "new gases", offers more promise as it recognises the issues of methane emissions and CO2 footprint of gases.

Specifically regarding biomethane, there are additional considerations to take into account:

- What feedstocks will be used for biomethane production? Biomethane production from dedicated energy crops have significant carbon opportunity costs because the feedstock production competes with available land that can be used for food production and

carbon sequestration. Additionally, for certain feedstocks where methanation would be required to convert syngas (or hydrogen) to biomethane, there are significant efficiency losses and added costs that need to be considered, not to mention additional drawbacks associated with the large amounts of CO_2 required for methanation and the potential for new methane leakages.

- Would the biomethane at the farm be produced anyway (and is now used on the farm to reduce other energy use), or do the incentives trigger the production, again adding emissions?
- Will the additional biomethane directly replace natural gas, or will it add to the natural gas already produced? What effect will this have on demand? If blending triggers increased demand because of a perception that gas is "renewable", more CO_2 emissions are generated from combustion even if methane leakage is zero.

Definitions matter. Calling biomethane "100% renewable" gives the impression of zero CO_2 emissions (irrespective of methane leakage) even though this is hard to predict. This is quite different from wind and solar (power peak issues aside).

- **What role should hydrogen play and how its development and deployment could be supported by the EU?**

We see an important role for hydrogen in shipping. The shipping industry will have to move to alternative fuels, such as ammonia and hydrogen produced from renewables. It is very important to consider the shipping sector in any economy wide electrification plans. Including shipping in the EU ETS would drive the shipping sector toward these alternative fuels and promote investment in the necessary fuel supply lanes across Europe. Any fuels used in the shipping sector (and other sectors) must be evaluated on a lifecycle basis to ensure that only fuels that truly reduce emissions are incentivised.

Specifically regarding blue hydrogen, our understanding from conversations with industry is that blue hydrogen will be the dominant technology during the testing and scale-up phase which is expected to last well into 2035 . It is crucial that strict CO2 and methane emissions requirements apply as they should for natural gas.

- **How can energy markets contribute to a more integrated energy system?**

Assuming that the integrated system will be developed in the service of achieving the net-zero vision, it is important that the gas market is reformed to ensure:

1. That the gas sector delivers on sustainability as it does on security of supply and affordability. This implies that both methane and CO2 emissions should be integral market performance indicators, on a par with price, as suggested by ACER in their Bridge beyond 2025 report.
2. A level playing field through integrating environmental externalities in the gas price
3. The creation of a merit order, as described at the start of our response, where energy efficiency is prioritised as the first fuel with brown gas as the last fuel.

1. **What policy actions and legislative measures could the Commission take to foster an integration of the energy system?**

1. The first priority should be to update the EU's gas package with a methane performance standard of 0,2% by 2025 to be met by all gas sold in the EU's gas market, including from imports. This should further inform the mandatory sustainability requirements as proposed in ACER's Bridge Beyond 2025 as well as the TEN-E Regulation reform to make sure that public funding does not support projects unable to demonstrate CO2 and methane emissions reductions. A methane fee to effectively address upstream as well as downstream leakage and internalise externalities should be considered as suggested in our response to the EU Methane Strategy consultation enclosed with this response.
2. If all this fails, standalone methane legislation on an internal energy market legal basis should be developed in a way which internalises methane and CO2 externalities in the gas price.
3. Complementing all of the above, a suite of instruments could be considered including:
    a. Energy taxation to include both CO2 and methane emissions in the tax base of natural gas;
    b. A CO2 and methane border tax for all natural gas sold in the EU market;
    c. A clear reference to a methane performance standard in the reform of the non-financial disclosure directive;
    d. A methane target in both the 2030 and 2050 climate law;
    e. Space policy and innovation support to boost earth monitoring capability and information services regarding CO2 and methane emissions.