GIE Flexibility and Remuneration Draft Note

Energy molecules constitute the basis of the energy system. Molecules bring flexibility since they are storable and can be easily transported. Since their transcontinental high-volume transport is technically feasible and economically viable, molecules allow for energy transfers from producing to consuming regions. As such, molecule infrastructure can be seen as the backbone of global energy trade, with domestic energy balances across seasons at an affordable cost (see Figure 1).[1]

All energy carriers can and should be decarbonised. Energy molecules are naturally stable and possess a high energy density, allowing for affordable long-term storage of large volumes. Existing storage facilities of molecules can cover months of regional consumption (structural shocks can be effectively mitigated) with little dependence on critical raw materials or additional investments. In the case of pipeline systems, energy molecules can be transported and distributed very efficiently with low marginal losses and low operational costs. This minimises space and size/investment costs requirements for infrastructure. Gaseous pipelines, terminals, and storage are key flexibility assets for the European energy system of today.

Today, molecules are being decarbonised successfully and economically. Biogas, biomethane, and clean hydrogen constitute promising paths for footprint abatement, infrastructure reuse, cost-savings, predictability, security of supply, higher energy system efficiency, and flexibility. All prior are supportive of the energy transition and, as such, should be adequately encouraged and remunerated.

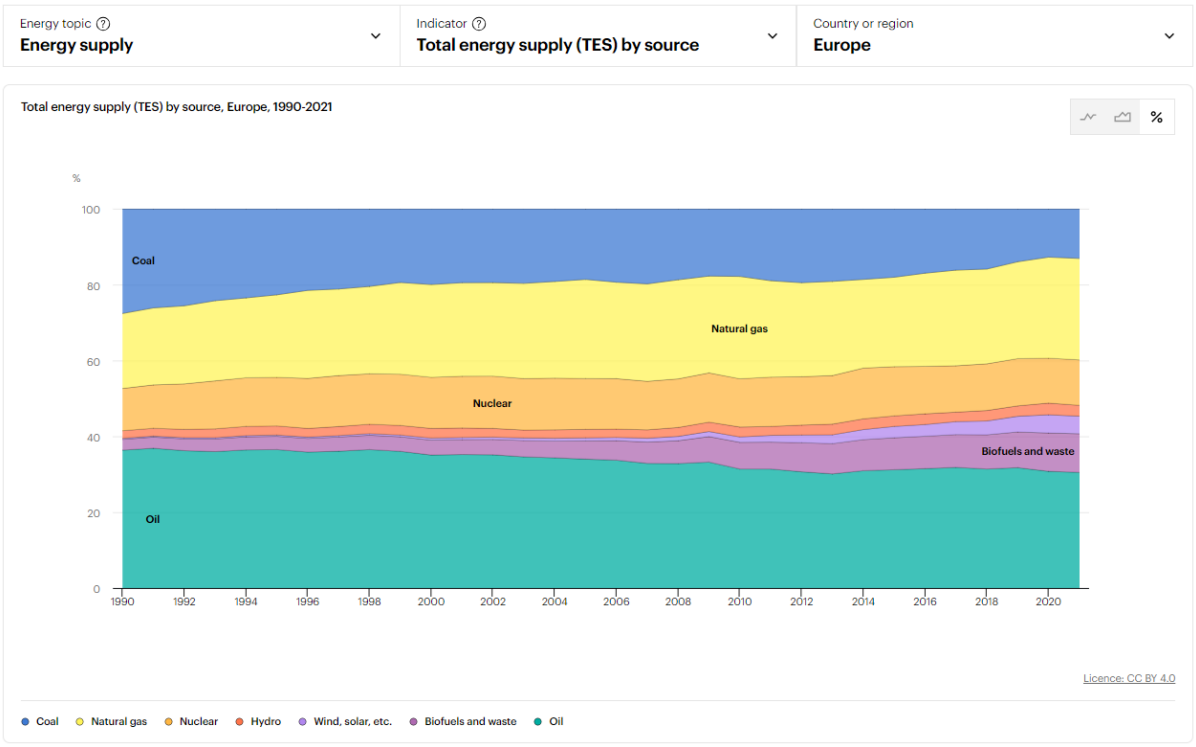
The energy system of the future needs to maximise synergies between the different available energy carriers to cope with high shares of intermittent renewable energy resources by adequately using all available flexibility. Hence, a diversified energy mix is key for a resilient energy system.

The following three targets are currently being addressed by the EC (ongoing process): (i) a more holistic view of energy systems, including all clean carriers in a level playing field, (ii) more coordination across carriers for infrastructure planning and operation, (notably via sector coupling), (iii) more complete environmental footprint accountancy for all carriers and systems.

The above is a strategic need. In the absence of a level playing field for all energy carriers, our energy system would face increasing obstacles in delivering a sustainable, affordable, and secure supply (energy trilemma). The lack of adequate flexibility and carrier options leads to a need for equipment overinvestment due to weather variability. As a consequence, oversized generation and transmission infrastructure needed to cope with high and low volumes of renewables to meet demand would lead to higher energy costs for the final consumer. Energy users can offer some flexibility to help restore system balance, but this has its costs. In the case of industry curtailment of energy consumption might directly affect the production output and, hence, process optimisation and costs. For residential consumers, increased flexibility can negatively impact comfort levels by constraining usage patterns or imply additional investment needs in systems that, with a more diverse and robust (secure), clean ecosystem of systems would be partially unnecessary. Today, clean molecules can offer a cost and energy-efficient solution in providing flexibility.

[1] The equivalent Chart for the World can be found at IEA via this link: https://shorturl.at/nqrZ9 (since 1990), a historical comparison (to 1971) is also available at IEA via this ink: https://shorturl.at/lzAKN. These are relative values. Absolute values are accessible via the same tools. It can be observed that: (i) energy consumption is still increasing rather than stabilizing, (ii) the weight of electricity renewables was and remains very limited, (iii) any decarbonization efforts will require the decarbonization of molecules, and affordability for implementation in the developing World (and in Europe).

Figure 1 - IEA, Total primary energy supply by fuel, 1971 and 2019



Source: IEA