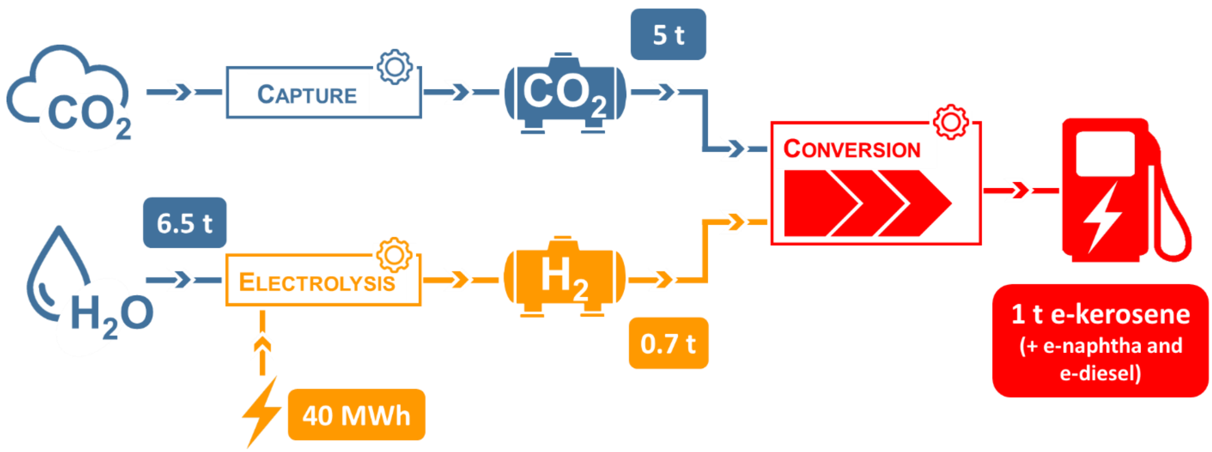
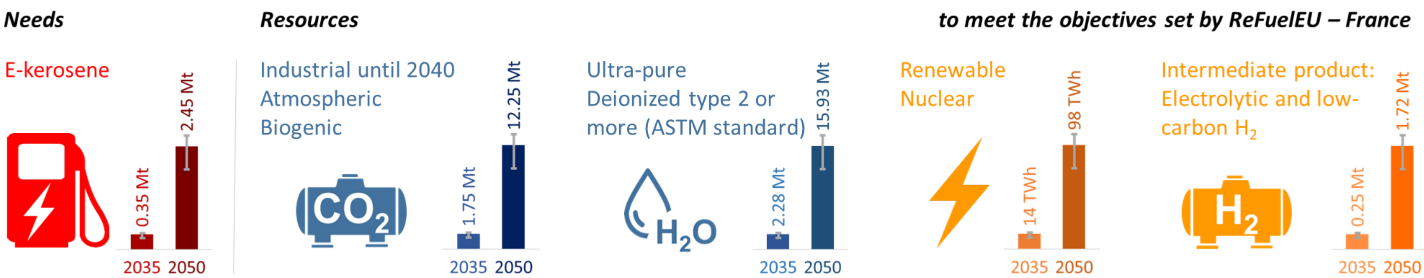
FEEDSTOCKS NEEDS
FOR E-KEROSENE PRODUCTION IN 2035 AND 2050

The e-fuels volumes required to meet the objectives set at the European level (see focus #1) will mobilize a certain quantity of feedstocks: CO_2, low-carbon electricity, and water to produce decarbonized hydrogen. For each of these resources, regulations define eligibility criteria. In the different published scenarios, projections for resource mobilization vary depending on the technologies and volumes of e-fuels considered, and the sectors considered (aviation, maritime, road, chemical, etc.). For aviation, for a given unit producing up to 70% of e-kerosene, other products such as e-diesel and e-naphtha (around 30%) will also be obtained and will be valued. The orders of magnitude observed to produce one ton of e-kerosene by combining CO_2 and hydrogen are shown in the figure below. Based on this and assuming a constant annual consumption of 7 Mt of kerosene for the French aviation sector, resource needs are assessed for 2035 and 2050. It should be noted that since the technology is not yet at commercial scale, there are uncertainties regarding material and energy yields. As an example, if supplying Paris airports requires ~5 Mt of kerosene, at least 1.8 Mt of e-fuel will be needed in 2050, requiring around 9 Mt of CO_2, 90 TWh of electricity, and 12 Mt of water.





Given the feedstocks to be mobilized, **the use of e-fuels will be limited to the necessary amount and to sectors without other decarbonization alternatives**, in accordance with adopted regulations. They will complement the necessary measures of energy sobriety and efficiency. The development of e-fuels value chain will require the establishment of production units as well as dedicated feedstocks collection and supply networks. **It is necessary to anticipate and structure the mobilization of resources in advance, and to measure and limit the environmental impact of deploying this solution performing dedicated life cycle analyses**. Finally, it is essential to continue R&I actions on each step of the process to optimize energy efficiency and inputs consumption, as well as to define integration schemes that will allow, for example reuse of heat, of CO_2, and of water within the process chain. **A hybrid industry, coupling the production of advanced biofuels and e-fuels (e-biofuels), would also help reduce CO_2 consumption while optimizing biomass conversion.**