



SOLAR ENERGY FOR CARBON-FREE LIQUID FUEL

www.sun-to-x.eu



The Sun-To-X project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 883264.



The project will contribute to the European Commission's targets for clean energy for all and circular economy by developing a system for the conversion of solar energy into a **carbon-free, non-toxic, energy-dense, liquid fuel - HydroSil** that will be used in the energy and transport sectors.



9 partners



6 countries



42 months



43 deliverables

How will we do it?



Use solar energy to produce hydrogen as chemical intermediate through a photoelectrochemical device.



Convert hydrogen to HydroSil through a thermochemical reaction using concentrated sunlight.



Waste plastic valorisation by conversion to hydrocarbons using HydroSil.

Expected Impacts



Work towards mitigating climate change through the production of storable chemical energy from the sun: zero emission HydroSil fuel for use in fuel cell applications.



Contribute towards establishing a solid European innovation base and building a sustainable renewable energy system.



Enhance energy security. It is possible to produce the yearly EU energy demand through solar energy with chemical energy storage.



Deepen the international collaboration in clean energy to achieve Mission Innovation aims.



Create opportunities for economic development across the globe. By using humidity in place of liquid water, we expand the technology even to deserts.

The Sun-To-X project works towards a decarbonisation of the fuel chain.



Follow the Sun-To-X project
and discover the benefits of converting sunlight
into storable chemical energy in a context of energy
demand growth and mitigation of climate change



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What's new about our proposal?



Key Aspect 1

We will overcome known challenges of photoelectrochemical fuel production by using electrolysis-inspired membrane photoelectrode assemblies which are scalable and can operate using humidity as a water feedstock.



Key Aspect 2

We will demonstrate the production of HydroSil, an energy-dense, liquid fuel, using renewable energies such as concentrated solar light.

We will demonstrate a completely decarbonised energy cycle with liquid fuels.

We will also use HydroSil for the valorisation of waste plastics and demonstrate its applicability towards a circular economy.

Sun-To-X is a consortium led by **Toyota Motor Europe** in collaboration with leading industry and academia in the solar fuel sector.



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