

Clean Future – Project Introduction

For over a century, the world has developed driven by fossil carbon, raising living standards and life expectancy. But now the threat of climate change has made the transition to net zero carbon intensity an imperative. Today, fuels and chemicals all come from a refinery. All that will change. But how can we maintain the supply and the functionality of the everyday essentials for our lifestyle, as many of these are based on carbon, carbon that until now has had overwhelmingly fossil origin? Where will all these carbon atoms come from, and how will we assemble them into the molecules that we need?

We must now re-imagine the manufacture of many if not all of the consumer goods that we rely on, in order to reduce reliance on carbon from fossil sources.

To achieve this, we need to transform our capability to use carbon from renewable sources, such as waste carbon dioxide streams and sustainable biomass, without over-reliance on non-sustainable components. This in turn requires entirely new chemistry to convert this new carbon feedstock, replacing fossil carbon, into valuable chemicals and polymers: we do not currently understand how to achieve these transformations with the efficiency needed to build the industrial base for a sustainable net-zero future.

As the problems are new, the solutions must be too, requiring breakthroughs in basic scientific knowledge connected to identified commercial need, exploiting digital and automated tools to accelerate progress. And for these solutions to be enduring, proof against supply chain shocks and strategic alignments, they must be firmly based on scientific understanding to enable the readjustments that are certain to be need in the future to be made.

This Prosperity Partnership targets that understanding by bringing together commercial and academic researchers and innovators to create the science required for the path to the consumer goods of the net-zero future, aiming for example to harness the chemistry of new raw materials to build biodegradability into products. This science will enable the creation of a diverse and outperforming product set from the richer blend of feedstocks for chemical manufacturing that will emerge on the path to net zero.