MISSION INNOVATION

Accelerating the Clean Energy Revolution

Converting Sunlight Innovation Challenge – Progress Summary

Issue

Enough energy strikes the earth in the form of sunlight to fulfill all of mankind's energy needs. However, the transition from fossil fuels to cleaner solar fuels has been hindered by low maturity and the high cost of conversion technologies. Research and innovation is needed to bring solar fuel technologies from infancy to maturity. Producing carbon-neutral clean fuels and developing breakthrough energy storage chemicals will not only contribute to mitigating climate change, they will also serve to enhance energy security and will provide opportunities for economic development across the globe.

Objective

The objective of the Converting Sunlight Innovation Challenge is to stimulate international cooperation and exchange in this area, with the ultimate goal of discovering affordable ways to convert sunlight into storable solar fuels.

Organization

The Converting Sunlight Innovation Challenge is co-led by the European Commission and Germany.

Other participating countries include: Australia, Brazil, Canada, Chile, China, Denmark, Finland, France, India, Italy, Japan, Mexico, Norway, Saudi Arabia, Sweden, the Netherlands, the United Arab Emirates, the United Kingdom, and the United States.

Approach

Presently, there are few international organizations and initiatives concerned with research in the area of the Converting Sunlight Innovation Challenge. Therefore, there is a significant opportunity to enhance international collaboration and help this topic get the attention it deserves and the resources it needs.

The Converting Sunlight Innovation Challenge intends focus efforts on:

1. Coordinating and working with existing relevant organizations and international initiatives;
2. Identifying and developing measures to promote collaboration;
3. Implementing research and exchange collaborations; and
4. Evaluating the success of these measures, developing new measures based on lessons learned.

Much of the scientific work addressed within the Converting Sunlight Innovation Challenge is still basic science and technology development, which makes enhancing scientific collaboration the top priority. However, in certain areas, work has already progressed towards technology prototype experiments.

Progress

The Challenge has established an international experts group (up to two experts per country), in order to help with the definition of the scope of the Challenge. The group is composed of 18 experts from 12 countries. Based on the input from these experts we have identified areas of particular interest and some guiding principles. These are: catalysts for water splitting and CO_2 reduction, light harvesting, micro-algae, photo-electrochemical cells, concentrated solar light to energy rich chemicals and engineering of production devices.

Within these areas, key knowledge and technology gaps and break-through opportunities have been identified and will be further refined. To cover a current key gap, work within the Converting Sunlight Innovation Challenge will consider the guiding principle of a plausible pathway to scale the technology to the terawatt scale until 2050. This includes scalable, non-toxic materials and processes, full recyclability and potential for a high-energy return on investment.

We have already identified and contacted organizations working with international collaboration between researchers, industry and policy makers in the area and will coordinate our work to obtain maximum leverage. These include International Energy Agency Technology Collaboration programmes (TCP), such as SolarPACES and Bio Energy, the Joint Center for Artificial Photosynthesis (JCAP), the Solar Fuels Institute (SOFI) and the Solar Fuels Network and International Partnership for Hydrogen Economy (IPHE). The jointly funded collaborative projects will also increase collaboration between governments and governmental agencies.

Next Steps

The Converting Sunlight Innovation Challenge will continue consultations with international experts through presentations at international scientific conferences. This Challenge also intends to conduct a country survey on past/present/future activities and organize a dedicated webinar to further develop the steps in each of the presently identified areas and possible technology targets.

Moving forward, the Converting Sunlight Innovation Challenge intends to explore and discuss the feasibility of a number of activities to strengthen and expand collaboration within the countries participating in the Challenge.

Some possible activities include: setting up a scholarship exchange programme for Post-Docs to enhance international collaboration and exchange of best practices; designing and launching inducement prizes to stimulate development in this Challenge area; the development of joint tasks between the Challenge and international organizations; establishing an online platform to facilitate the sharing of data, materials or research infrastructure; creating bi-/multi-lateral research programmes; and publishing outcomes like roadmaps, benchmarking, and TRL guidance.