# HelioRec
## THE FLOATING SOLAR POWER PLANT

## Introduction

HelioRec is a clean energy company providing a double-solution for solar-based power generation and domestic plastic recycling.

With commitment and passion, the company is developing a floating solar power plant which can be successfully implemented in the countries with:

- Large amount of mismanaged plastic wastes;
- High density of population and consequently lack of land space;
- High concentration of $CO_2$ emissions.

HelioRec's team believes that all the efforts should be more focused on the Asian countries since they are the biggest players and contributors to the global ecological problems, such as $CO_2$ emissions and mismanaged plastic wastes. According to sources [1] and [2], Asia produces 57.5% of total $CO_2$ emissions and 67.7% of total mismanaged plastic waste.

Together with the help of international partners, we are developing innovative solutions to restore our harmony with the Planet.

## Purpose

- Producing green electricity from the mature technology - solar energy;
- Managing plastic waste by using recycled plastic for the floating structures;
- Saving land space by deploying the power plant on the sea.

## Method

- Construction of floating structures from recycled plastic, high-density polyethylene (HDPE);
- Installation of solar-panels on the floating structures; and
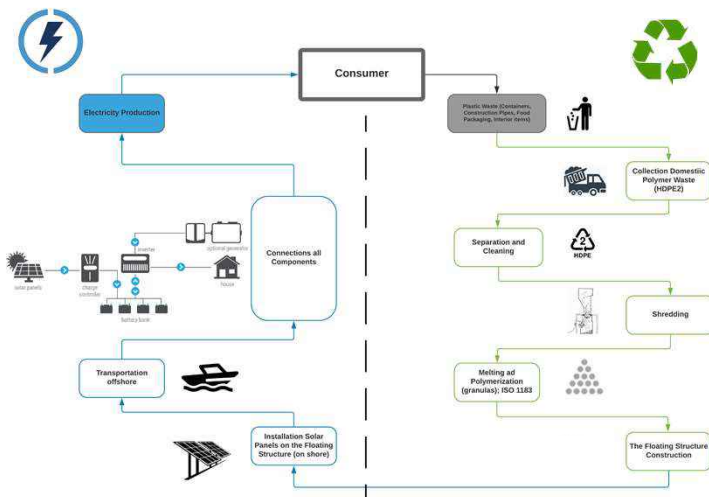- Deployment of the power plant on the sea (Fig.1).



**Fig. 1.** The schematic of the whole process

## Recycled HDPE

- HDPE is a light material. For example, the densities of steel and aluminium are 7850 kg/m$^3$ and 2700 kg/m$^3$ respectively in contrast to 960 kg/m$^3$ for HDPE;
- HDPE is an indestructible material. Its product life cycle is much longer than other materials and it is completely recyclable after use;
- HDPE has carbon footprint five times lower than traditional building materials;
- It is considerably cheaper (0.7 €/kg) than the virgin material (1.5 €/kg) [3].

## The floating structure

Preliminary design of floating structures was made. That will be modular design for each individual PV panels, the interior of which contain a high ratio HDPE. The special cooling system was implemented for the PV panels and it can improve performance. The innovative concept was used to achieve high stack ability ratio and consequently reduce a transportation cost.
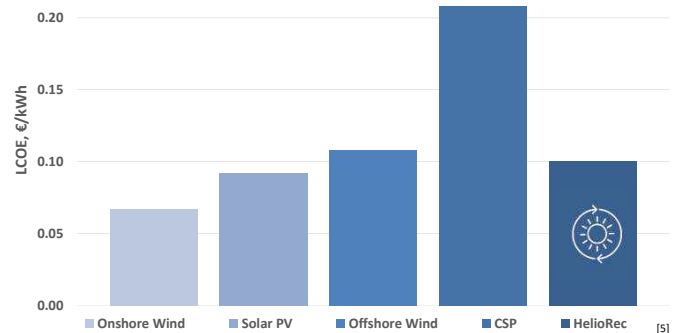
The power plant will be able to move with the waves and reduce mechanical stresses on the whole structures

This concept was proposed by WavEC company (Fig.2) [4].



**Fig. 2.** The floating design

## LCOE



## Sub-Activity

- Increase awareness about the plastic pollution;
- Change people mentality and consumption behavior (goods and energy);
- Encouraging laws about plastic recycling and green electricity production etc.

## Conclusions

- This innovative technology can be widely applicable (marine ports and farms, remote locations and islands etc.) in countries with high density of population and lack of renewables;
- The floating solar power plant does not occupy space on the land;
- The floating platform (with nominal power 4.0 MW) can reduce the amount of domestic plastic waste (10.2 M plastic bottles);
- Solar technology produces green electricity and this technology already proved its potential (6.3 GWh/year for 31 500 people in India);
- Reduce $CO_2$ emissions (NET 8200 t$CO_2$/year); and
- LCOE (0.1 €/kWh) can compete with other renewable energy technologies.

## References

[1] Enerdata. $CO_2$ emissions. www.yearbook.enerdata.net. 2018.
[2] Jenna R. Jambeck. Plastic waste inputs from land into the ocean. RESEARCH|REPORTS. www.sciencemag.org. 2015.
[3] Department of Engineering at the University of Cambridge. Recycling of Plastics. 2005.
[4] WavEC. The floater design. www.wavec.org. 2018.
[5] Irena. Renewable Power Generation Costs in 2017. www.irena.org. 2018

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