

## **3rd Gen Semi-Transparent Flexible Photovoltaics: A Game Changer for Green Industry & Green Energy (Agrivoltaics, Buildings, Smart Cities, Mobility, ..)**

Contributing to the Energy & Food Crisis, and to a Climate - Neutral Economy



### **Prof. Stergios Logothetidis**

*President & Founder of OET Energy Technologies  
Director and Founder of Nanotechnology Lab LTFN  
President and Founder of HOPE-A*

[slogot@oe-technologies.com](mailto:slogot@oe-technologies.com)

sustainable  
solutions

**COPE-Nano**



# Outline

- Towards a Climate - Neutral Economy: Complexity, Opportunities, Solution
- Semi-Transparent Flexible Organic PVs
- World 1<sup>st</sup> Automated (Nano)Manufacturing Line for OPVs, in Thessaloniki, Greece
- OPV Installations in AgriVoltaics, BIPVs, VIPVs, .....
- Looking for Collaborators/Investors to Boost our Global Strategy

# Towards a Climate - Neutral Economy and Future: Complexity, Opportunities, the Solution

reduce Energy Poverty, grow Economies and Urban Population, protect Natural Systems & the Planet



**Food** Increases >7.5%



**Water** Scarcity



**Cities** Increase ~5% Population, Globe 10 Billion People in 2050



**Energy** Increases >10%



**Climate** Net Zero Emissions by 2050



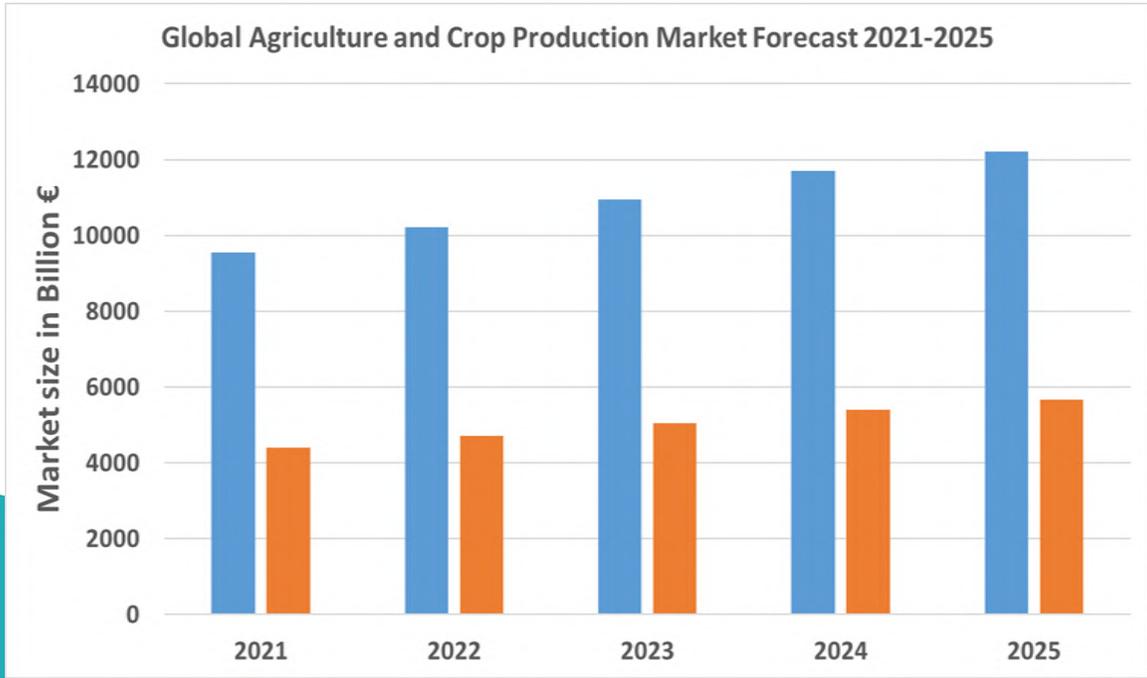
**To a Climate - Neutral Economy and Future**

**Agriculture & Crop Production Markets increase >7.5%**

**GreenHouses Market increase >11,3%**



**GH Market  
50,6 B€  
by 2025  
with a CAGR  
11,3%**

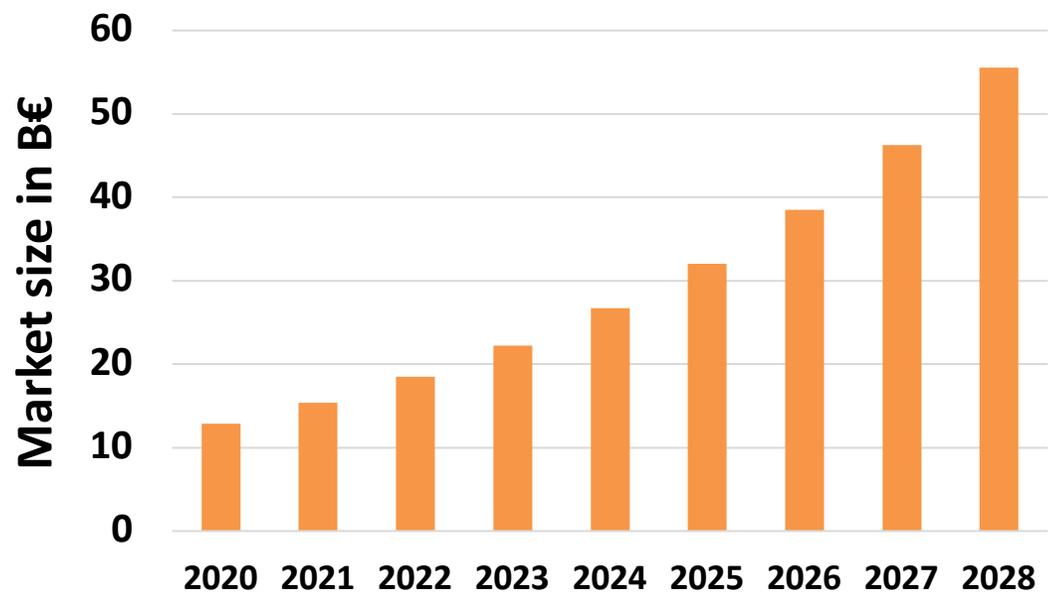


**BIPV Market increases > 20,1%**

**55,5 B€  
by 2028  
with a CAGR  
20,1%**



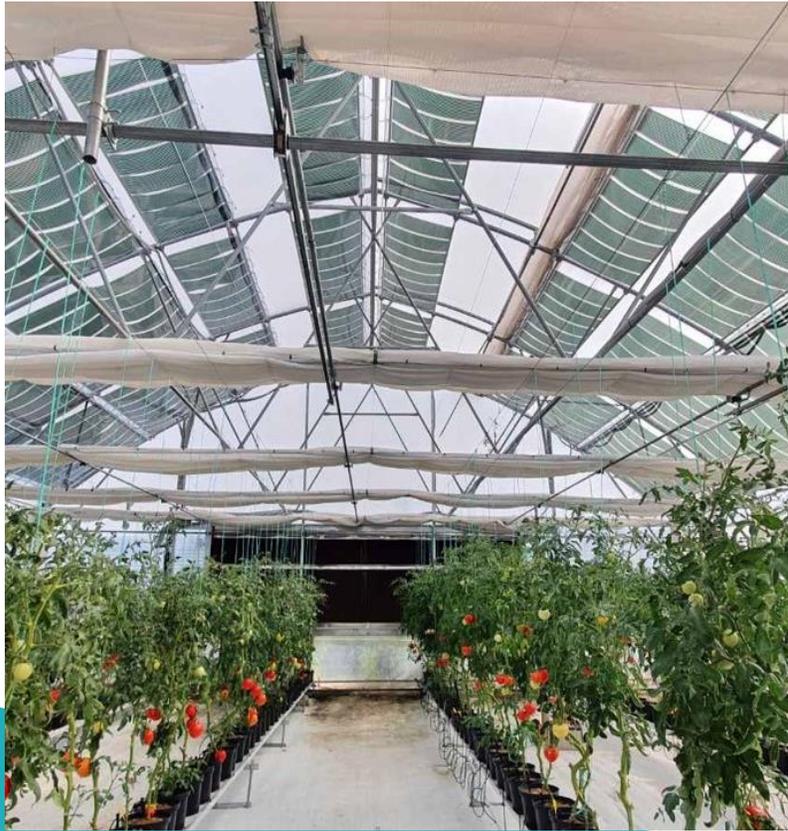
**BIPV Market Forecast 2020-2028 in Facades**



# Semi-Transparent Flexible OPVs: Markets

## Agri(O)PVs

### OPVs for Agriculture



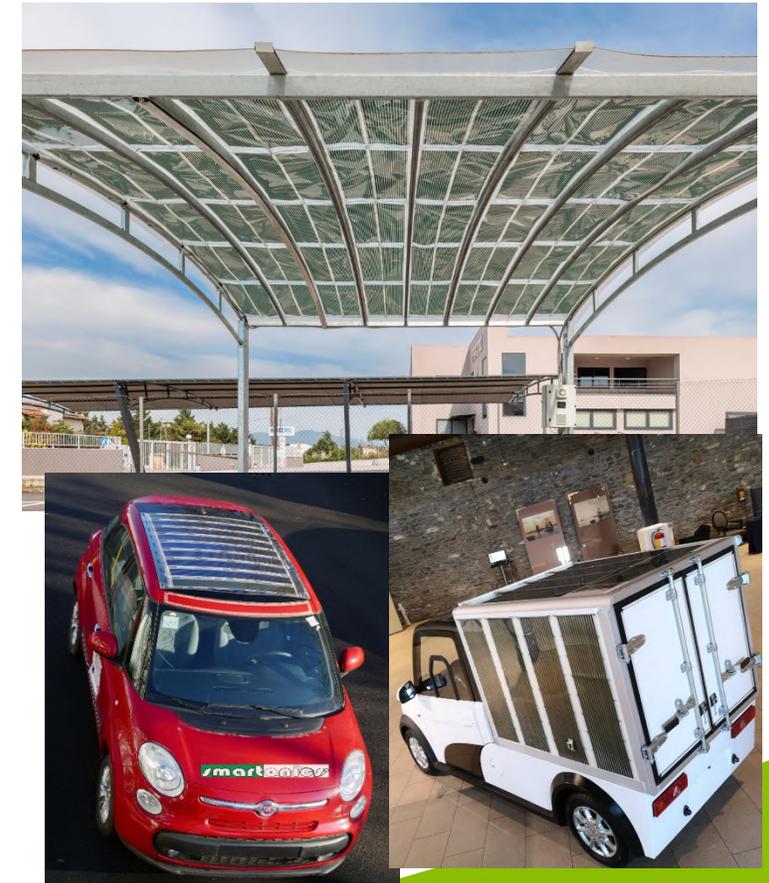
## BI(O)PV

### Building Integrated OPVs



## VI(O)PV

### Vehicle Integrated OPVs



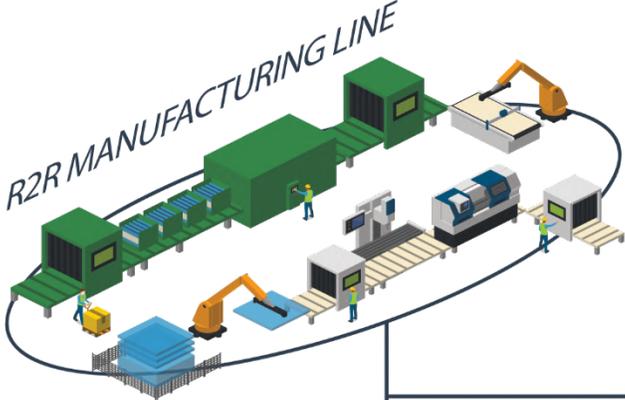
# Why OPVs?

- Large Scale (**Nano**)Manufacturing R2R Printing **in Air**
- Low Cost Production
- PCE of OPVs Close to 20% [NREL]
- **Semi- Transparent**
- **Freeform Design**
- **Variety of Colour**
- Thin & Flexible
- Applied in any Surface
- **Demand for Clean Energy Solutions**
- **Recyclable**
- **Minimal CO<sub>2</sub> Footprint**

# First Mass Production Line, 21.2M€ Investment from EU



**World's 1<sup>st</sup>**  
**R2R Automated**  
**(Nano)Manufacturing**  
**Line**



**Annual Capacity**  
**>1.000.000 m<sup>2</sup>**  
**100 MW**



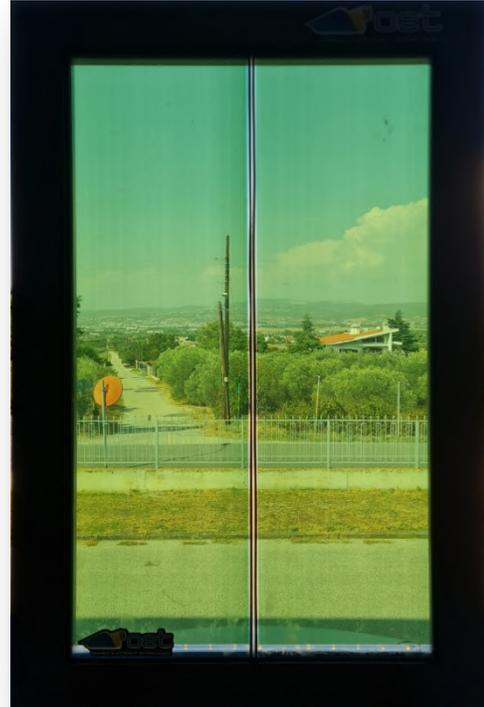
# OET's OPV Case Projects

## 1. OPV Retrofitted



## BIOPVs and Smart Cities

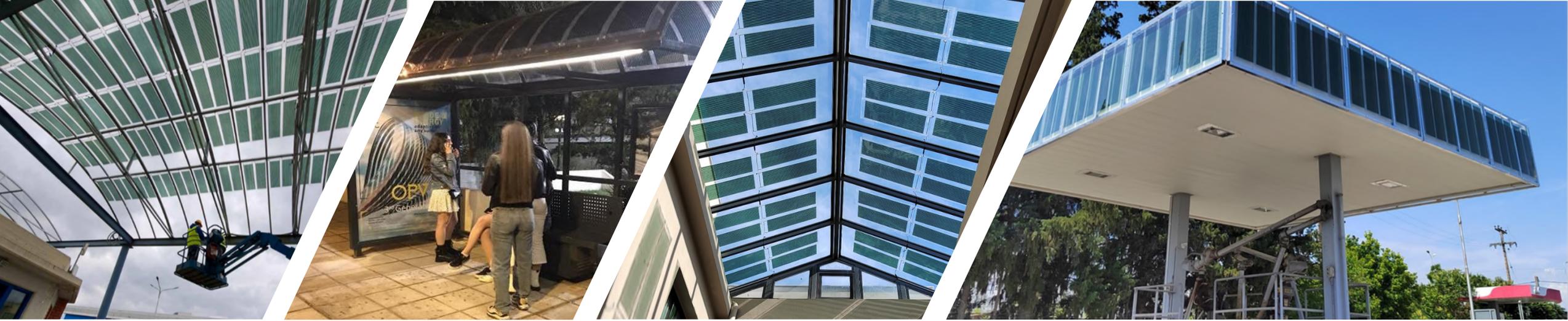
Is a Market able to provide an Aesthetic Window Film and Designs for Energy Positive Buildings and Cities with less Energy Usage



## 2. Solar Energy Window

Embedded Final Solution with High Transparency

## 3. Solar Curtain



# BI(O)PV

Building Integrated Organic Photovoltaics

## Energy System

Providing Energy, Shadow, high Aesthetics  
and Zero Landscape Impact

We are looking for Collaborators in  
Architectural Engineering, Construction, Glass  
and BIPV Companies

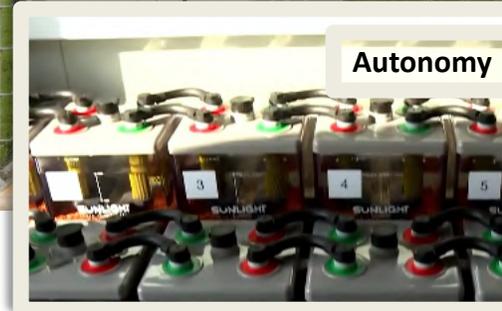
# OPVs in GreenHouses

(Mediterranean & Glass)

## Triple Use of Land

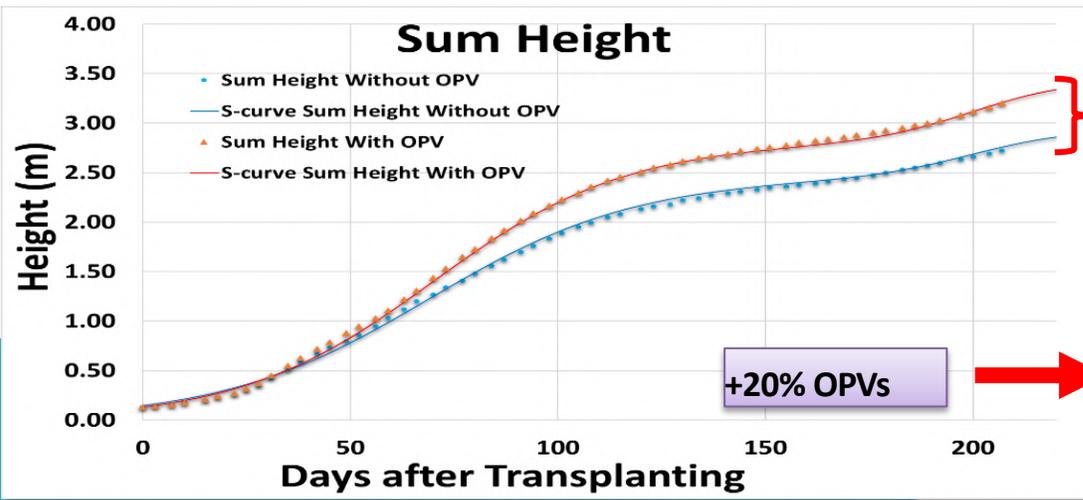
- Semi-Transparent OPVs
- UV Filter & Shading
  - Increased Crop Production
  - Energy Generation, Energy Autonomy
  - Reduce Water Use

Easy Installation without Metal Brackets/Supports



# OPVs Enhance Crop Yields by Up to 30%

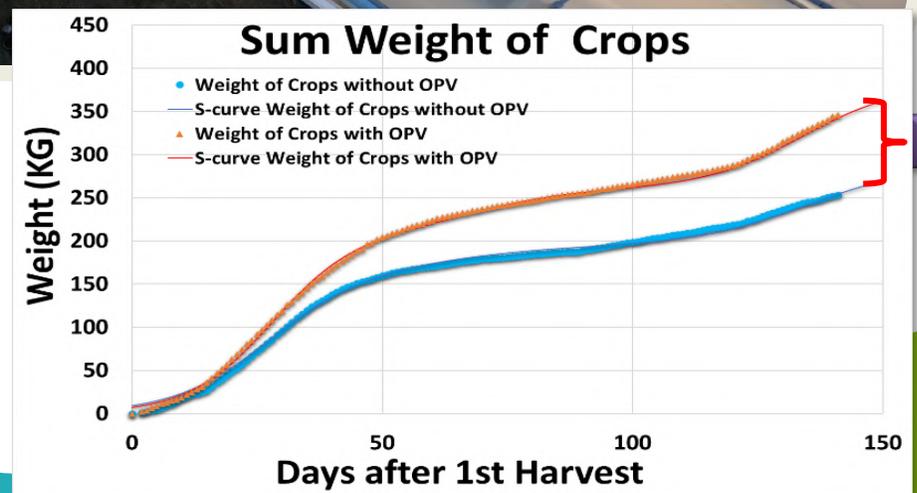
- ✓ Shading- Reduction of Indoor T °C in Summer Months
- ✓ Blocking UV Radiation
- ✓ Reduce Water Use - Reduction of Evapotranspiration



Rate 15%

+20% OPVs

Increasing OPV Coverage from 60% to 80% Optimized Crop Development



Rate 26%

# GHs and Open Field Cultivations: OPV Installations

## Triple Use of Land

- 30% Increase Crop Production
- Energy Generation
- Reduce Water Use

Creating the Value Chain for OPV  
in Agriculture Installations



## Agrivoltaics Installations



We are looking for Collaborators in  
OPV Installations

# VIPV

## Vehicle Integrated OPVs & Automotive applications



# IIPV

## Infrastructure Integrated OPVs in Tourism Sector

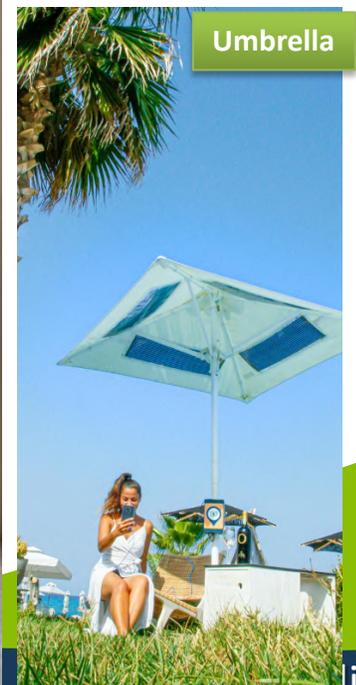
We are looking for Collaborators in  
Tourism Sector Installations



Solar Pergolas



Sunbed



Umbrella

# Upcoming Events:...4-6 November Athens

## 14<sup>TH</sup>

INTERNATIONAL  
CONFERENCE  
& EXHIBITION

## on Green Flexible Printed Electronics Industry (ICEFPE24) and AGRIVOLTAICS 2024

[www.icefpe.com](http://www.icefpe.com)

Organized by:

COPE-Nano

4-6 Nov 2024

Crowne Plaza Hotel  
Athens, Greece

FPEs bring the Digital Era and create the New Green Industry and revolutionize Green Energy, Hybrid Renewable Energy Sources, Agrivoltaics, Integrated Flexible Sensors & Batteries, Lighting, Electronics and Communications, AI, Automotive, Electrical Vehicle, Fuel Cells, Green Hydrogen, Buildings, Smart Cities, Agriculture, Intelligent Packaging and Security, Health Care, Wearables, IoT, etc.  
Creating a several 100B€ Market and contributing to a Green, Digital, Decarbonized and Circular Economy, Industry, Society and Planet

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Info | tel. 2310998091 | email: info@icefpe.com / info@agrivoltaics-conf.com  
[www.icefpe.com](http://www.icefpe.com) | [www.agrivoltaics-conf.com](http://www.agrivoltaics-conf.com)

## AGRIVOLTAICS 2024

## together with 14<sup>th</sup> International C&E on Green Flexible Printed Electronics Industry (ICEFPE24)

[www.agrivoltaics-conf.com](http://www.agrivoltaics-conf.com)

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Given global population growth, there's an increasing need to enhance food and energy generation. However, meeting increased food demand may raise fossil fuel usage and greenhouse gas emissions. REPowerEU seeks to achieve 45% renewable energy in the EU at 2030 mix and expedite PV energy adoption through an EU solar energy strategy.

Agrivoltaics is an emerging technology field that combines the most innovative Renewable Energy solution based on Flexible Semitransparent Organic Photovoltaics (OPV) and the other FPE devices with Agriculture to lead a sustainable farming process and crop growth. Implementing OPV-based energy systems avoids impacting arable land, addressing limited agricultural space and promoting sustainable land management.

Agrivoltaics, especially with OPVs can contribute not only to the 1 Twp solar target by 2030 and 50 Twp solar target by 2050, but also to increase dramatically the food production and water management. Soon, Greenhouse and open cultivations will be fully transformed into sustainable food production units and power plants for self-consumption, electricity trade and grid connection, creating wealth, employment, and prosperity in local communities and countries.

# Thank you

## We are looking for Collaborators in

- Agrivoltaics Installations
- Architectural Engineering, Construction, Glass and BIPV Companies

## We are looking for Investors to accelerate

- OPV Manufacturing Plants
- Installation Hubs & Plans
- Growth Strategy

Join Us to Establish the New Green Industry & the European PV Value Chain,  
towards a Climate – Neutral Economy and Future



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*Director of Nanotechnology Lab LTFN  
President and Founder of HOPE-A  
President & Founder of OET*



[slogot@oe-technologies.com](mailto:slogot@oe-technologies.com)  
[logot@auth.gr](mailto:logot@auth.gr)  
Thessaloniki, Greece

OUR HEADQUARTERS:  
20th km Thessaloniki - Tagarades Road  
57001 Thermi, Thessaloniki, Greece

[info@oe-technologies.com](mailto:info@oe-technologies.com)  
(+30) 2312 134876  
(+30) 2312 134877

[www.oe-technologies.com](http://www.oe-technologies.com)

sustainable  
solutions

S. Logothetidis

# The Fastest Energy Change and PV Installation in history for an Electrified Economy by 2050

- Solar PV is Growing to dominate Electricity Production
- Solar will Provide ~60% of Total Energy (120 KTW), ~ 75 TW

**Problems:** Where to Install >100X PV? How to Recycle the Panels? How will be the Cost? Who will Pay?

