

# FlexFunction2Sustain

Project overview & status

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M31 meeting, Athens, October 12th, 2022



This project has received funding from the European Union's Horizon 2020 research and innovation programme under [grant agreement n°862156](#)



A photograph of a beach heavily littered with plastic waste, including numerous discarded plastic bottles, fragments of plastic, and other debris. The waste is scattered across the sand, extending from the foreground towards the water's edge. The water is visible on the right side of the frame.

**FlexFunction2Sustain** boosts innovation for sustainable and smart plastic and paper products

➔ to reduce plastic waste

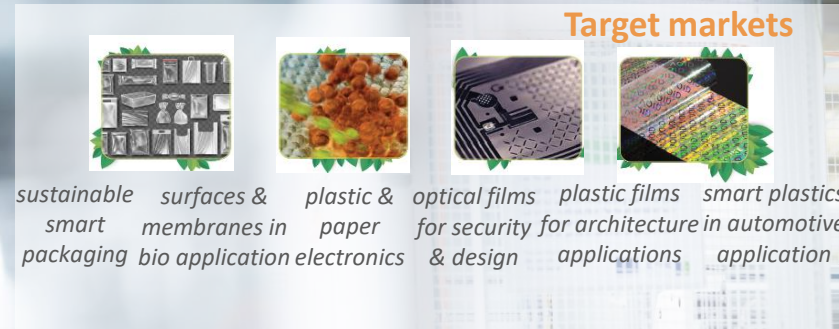
➔ get ready for the digital age

using

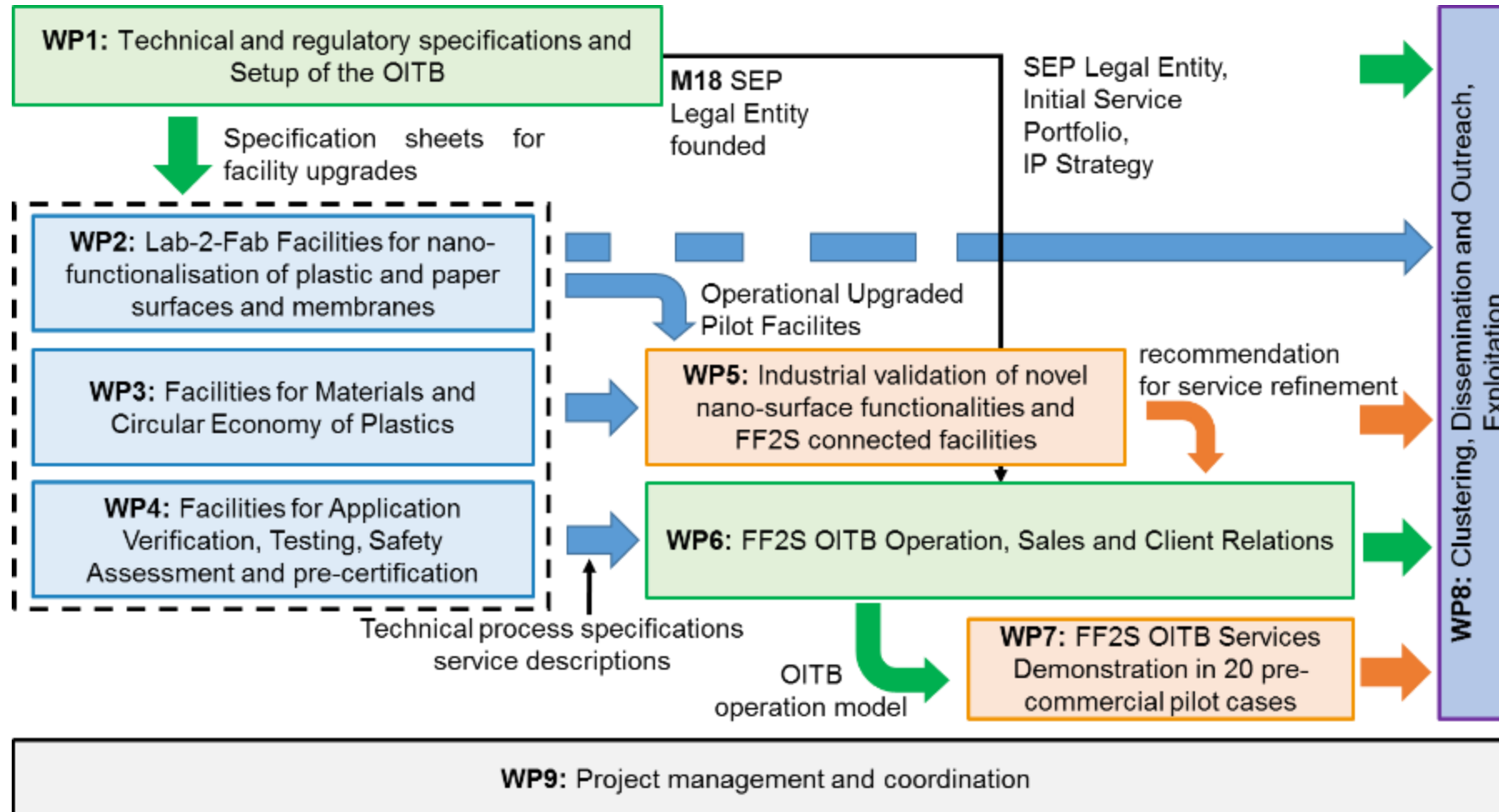
**nano-functionalization of novel plastic and paper surfaces**



- FlexFunction2Sustain project aims at creating an **Open Innovation Test Bed (OITB)** for nano-functionalisation technologies that enable sustainable and smart plastics and paper based products. The ecosystem will support innovative SMEs and industries by drastically reducing the time-to-market for novel concepts, ideas and products.
- Open Call for Pilot Cases — **next and last cut-off: 27 January 2023**
  - Objective: Test Services and Procedures and **Create Success Stories**
  - What you get: Discounted services **up to 100% subsidized support**
  - Available budget:  
**2.25 M€ for approx. 20 projects**



# Our work plan towards a sustainable Open Innovation Ecosystem ...



# Achievements M25 – M31



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# WP2 achievements

**36 machine upgrades** at 8 partner sites

**Objectives:** Enable processing of biopolymers; increase process reliability and productivity; complete process chain

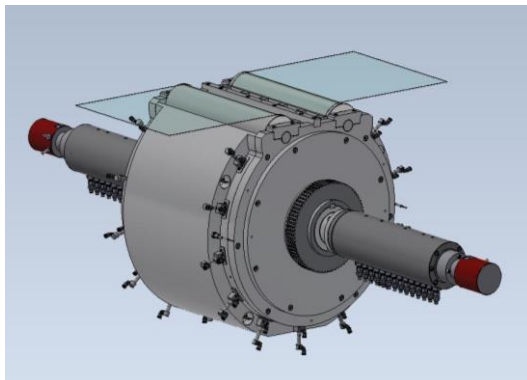
## Achievements:

- Slot-Die at FhG-IVV available, used in use cases P&G, Capri-Sun, SONAE, Pilot Cases Sustainpack, Funflex
- R2R ALD design finished, reviewed and parts ordered
- Trials at Coatema for P&G on the LS29 cluster machine – Validation
- Upgrades at JOA imprint will be integrated by October 2022
- Imprint unit and registration unit installed at AUTH

Slot Die at IVV



Design R2R ALD

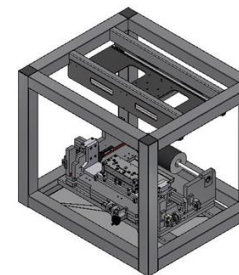


5 Roller coating validated COA



Upgrade JOA

Coating module



Upgrades installed at AUTH



# WP3 achievements

## • Upgrade of the REMIX Pilot line

- Last set-ups of Near Infrared optical sorting machine
- Accreditation of the REMIX line for PP flexible film recyclability evaluation



## • Upgrade of the BIODEGRADIX Pilot line

- Correction of OK COMPOST disintegration test
- Line ready for TUV Austria audit in December 2022



Biodegradation  
respirometers



OK COMPOST  
Disintegration tests (10kg)

# WP4 achievements

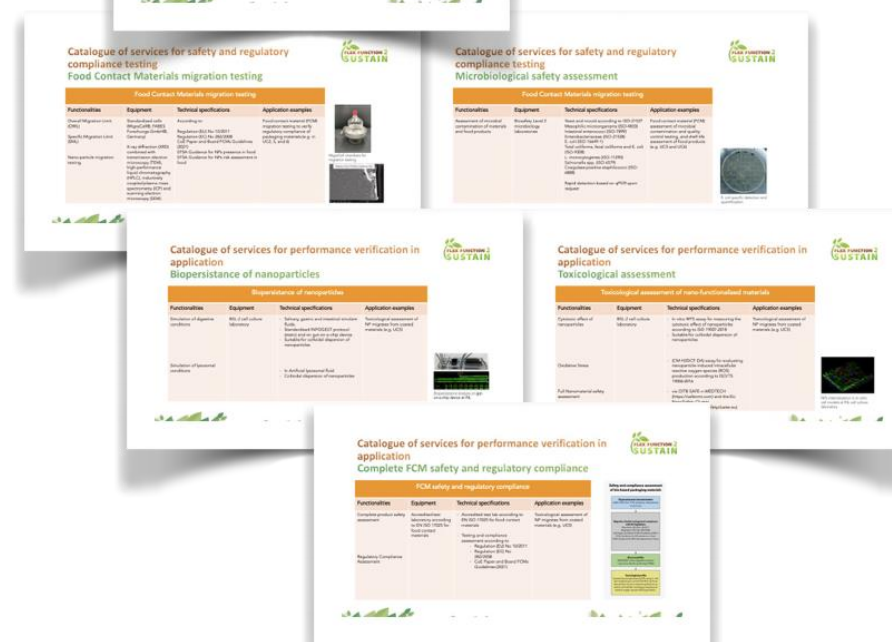
## Catalogue of services for performance verification in application



## The safety and compliance catalogue at a glance



## Catalogue of services for safety and regulatory compliance testing

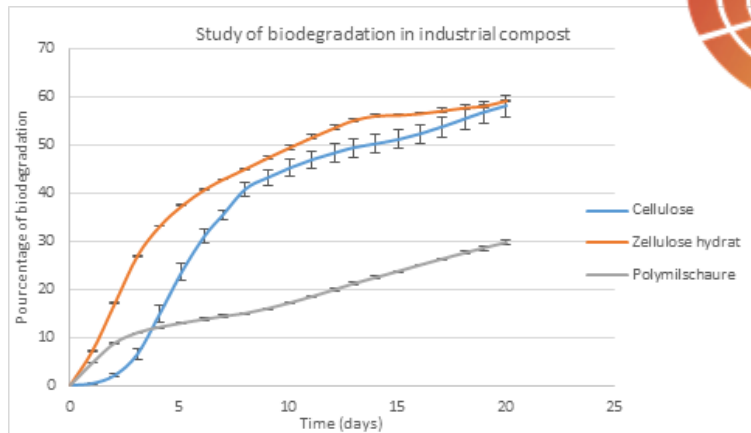


- Implemented testing methodologies and workflows for in-application performance, safety and compliance of novel nano-functionalised materials are translated into new FlexFunction2Sustain services Catalogues



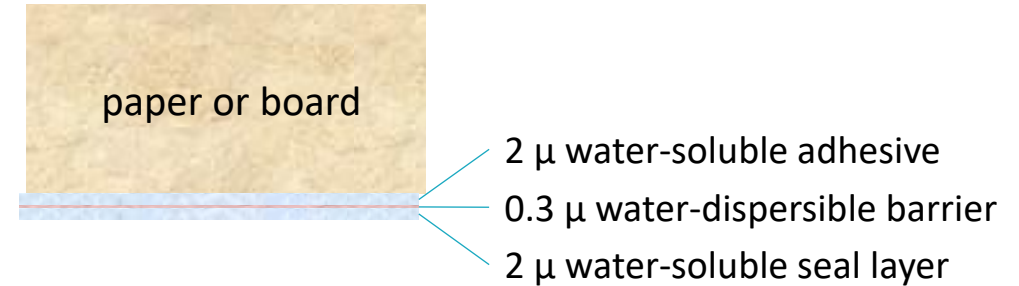
# WP5 achievements

**Task 5.1:** promising results in terms of industrial compostability of the UV curable bio-based resin combined with cellulose substrate. *(submitted to Innovation Radar Prize)*



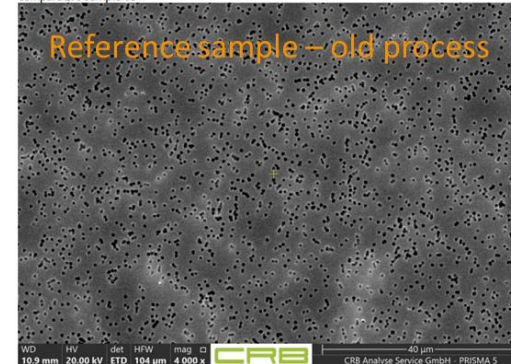
**Task 5.3:** customer feedbacks on the first Au/PC membrane samples *(submitted to Innovation Radar Prize)*

**Task 5.2:** First heat sealable paper barrier roll made

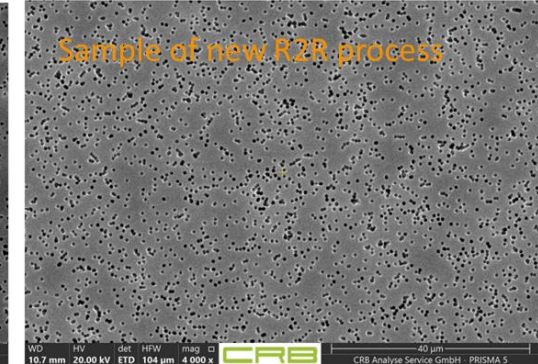


- Recyclable without cellulose fibers loss in industrial capabilities
- Transparent coating materials, leaving no micro-plastics in nature
- Strong barrier mechanical resistance, WVTR flat up to 15% strain

comparative sample 03



New production 01



# WP5 achievements

**Task 5.4:** thermoforming layout defined for the development of the final display demonstrator



**Task 5.5:** Transparent paper packaging with innovative coating successfully developed and tested (*submitted to Innovation Radar Prize*)

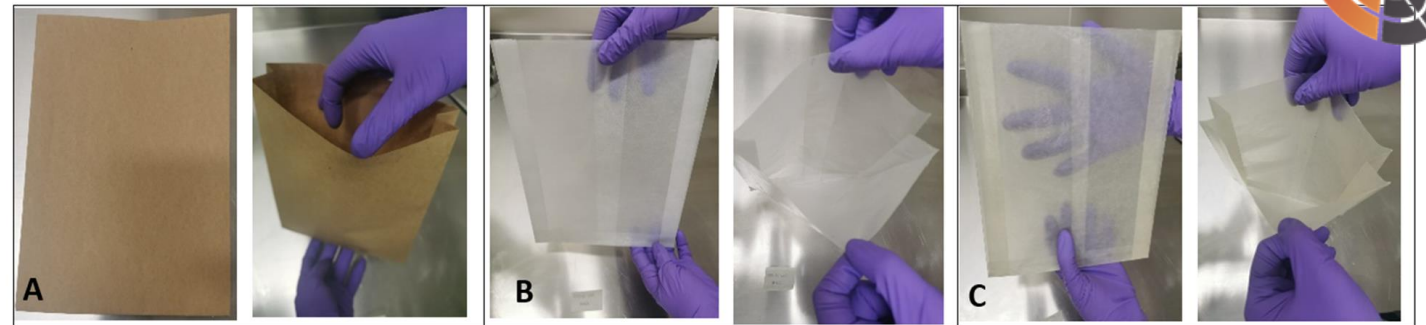


Figure 3 – Bag prototype: kraft paper (a), transparent glassine paper not coated (b), transparent glassine paper coated (c).

**Task 5.6:** mono-polymer cPP based film rolls produced and aligned with the requirements for OTR, WVTR, RecyClass protocols and mechanical properties for stand up pouches

Structure	Oxygen transmission rate 23°C / 50 %RH cm <sup>3</sup> /(m <sup>2</sup> ·d·bar)	Water vapor transmission rate 23°C / 50 %RH g/(m <sup>2</sup> ·d)	Performed recycling test within FF2S (D3.1)	Available at Capri-Sun for pouch production and storage test
35BoPP/16met.BoPP/70cPP	0.192 <sup>1</sup>	0.0192 <sup>1</sup>	Yes	Yes
35BoPP/18met.BoPP/70cPP	0.076 <sup>1</sup>	0.0402 <sup>1</sup>	No	Yes
30BoPP/18met.BoPP/70cPP	0.0538 <sup>1</sup>	0.079 <sup>1</sup>	No	Yes
30BoPP/16met.BoPP/80PP(white)	<0.05 <sup>1</sup>	0.082 <sup>1</sup>	No	Yes
20oPE/20met.oPE/75PE	0.0205 <sup>1</sup>	0.167 <sup>1</sup>	No	Yes
3oOPP/20met.oPP/30oPP	/	/	No	Yes
100PE/5EVOH	/	/	No	Yes
20oPE/20met.oPE/70PE	/	/	No	Yes
30BoPP/16met.BoPP/70PP	0.0497	0.071 <sup>2</sup>	Yes	no
18BoPPSiO <sub>x</sub> /100cPP	0.0699	0.048 <sup>2</sup>	Yes	No
20BoPP/barrier lacquer/100cPP	0.0131	0.374 <sup>2</sup>	Yes	no



# WP1/6 achievements

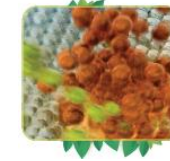
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- ✔ Association Statutes finalised
- ✔ Assessment of Investor relations carried out

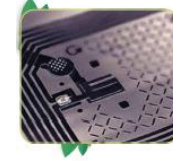
# WP7: Open Call



sustainable  
smart  
packaging

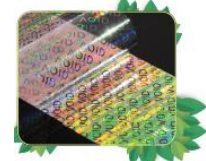


surfaces &  
membranes in  
bio application



plastic &  
paper  
electronics

optical films  
for security &  
design



plastic films for  
architecture  
applications

Target markets

smart plastics  
in automotive  
application

- **Launched:** Sep 2021
- **Up and running:** all systems and processes for the Call opening, evaluation and selection of Pilot Cases  
Helpdesk is now operational and answering requests for information
- **1<sup>st</sup> cut-off results:** 4 Pilot Cases (out of 5 submitted) selected
- **2<sup>nd</sup> cut-off results:** 5 Pilot Cases (out of 8 submitted) selected

## Why:

Access to all major  
nano-  
functionalisation  
techniques for plastic  
and paper surfaces

Customized support  
through a unique and  
complete set of  
services

## Who:

**SMEs & start-ups**  
**Large industries**

**EU Member  
States &  
associated  
countries**

## When:

1st cut-off:  
**28<sup>th</sup> January 2022**

2nd cut-off:  
**29<sup>th</sup> July/12<sup>th</sup> August 2022**

3rd cut-off:  
**27<sup>th</sup> January 2023**

## How much:

**2.25 M €**  
overall budget  
**up to €130K**  
financial support  
per Pilot Case  
**70%**  
covered by FF2S

## How:





# WP7 achievements

1<sup>st</sup> cut-off results: 4 Pilot Cases selected

Proposal number	Acronym	Proposal full name	Company name	Country	Status
20220125-0011	IDOLES	Improvement of durability by optimizing Low Energy Surface	Infrascreen	Switzerland	JIA signature process
20220126-0017	FunFlex	Surface functionalization of Circular flexible food packaging	LEYGATECH	France	JIA signed Kickoff 2022/09/13
20220131-0018	SustainPack	Sustainable Packaging	HPX Polymers	Germany	JIA in preparation
20220128-0016	DCC	Dispersion Coating Compostable	Cartiera Rivignano	Italy	stopped

# WP7 achievements

2<sup>nd</sup> cut-off results: 5 Pilot Cases pre-selected

Proposal number	Acronym	Proposal full name	Company name	Country
20220728-0027	ENLIGHTENMENT	Functionalisation of agricultural films with multi-season fluorescent dye to enhanced plant development	CASCADE	France
20220809-0032	POSIDONIA	Hydrophobic & UV-protective films for Sustainable panels based on natural waste fillers and bio-base	PHEE Private Company	Greece
20220725-0022	POSEIDON	Pouch made of cellulose for liquid container applications	ARJOWIGGINS	France
20220805-0030	BIOESS	Barrier Improved Ovtene for Environmentally Sustainable Strategies	ARCADIA SPA	Italy
20220812-0033	RECYBIB	Fully Recyclable Monomaterial Bag-in-Box	Smurfit Kappa Bag-in-Box	France



# WP8 achievements

- **Visual Identity and Dissemination of the Project and OITB Idea**
  - FF2S in Press and Media announcing the project outcomes → 2<sup>nd</sup> Press Release released
  - Webpage updated & video of the OITB novelty and offering prepared
  - Visibility at F2F events (e.g. SFIP, Hannover Messe, IndTech2022)
- **Clustering with other OITB & NanoSafetyCluster**
  - Regular bilateral exchange: NGM, SNMT, NewSkin, MDOT
  - 2<sup>nd</sup> OITB workshop at INDTech 2022 (Grenoble, France, 30<sup>th</sup> Jun)
- **Interaction with thematic associations and intermediaries**
  - French plastic cluster Polymaris
  - OE-A Working Group Encapsulation
  - EUPC, LINPRA, NanoSafetyCluster → EAB Members
- **Standardisation and Regulation Activities**
  - 4 standards projects on biodegradable plastics with direct FF2S participation
- **Contributions to FlexFunction2Sustain Open Calls**
  - Call promotion by FF2S partners for the local markets
  - Open Call Marketing campaign (LinkedIn, Twitter)

## 2nd Press Release



## Video

<https://www.youtube.com/watch?v=axYoGyHkWOW>



## Participation at IndTech2022

Video (short): <https://www.youtube.com/watch?v=5nx6NlyutIA>

Video (long): <https://www.youtube.com/watch?v=ts40K-cbFJ8>



## IPC booth at Plastic Recycling Conference, (16 Jun, Lyon, France)



**Thank You  
for your  
attention!**



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