

# Circular Backsheets

Protecting PV panels AND the planet

SUNDAY zonne-energiecongres  
19 April 2023, Ede (NL)  
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# Welcome to Endurans™ Solar

A global solar materials solution provider



Since June 2021



Since February 2023

We believe that the solar industry has a huge role to play in creating a better, more sustainable future for our planet.

And we are making this a reality by boosting the performance of PV modules and developing solutions that are circular by design.



# Endurans™ Solar in a nut shell

Innovative PV material solutions for solar panel manufacturers

**Experts**  
in polymer  
science, co-  
extrusion, solar  
technology

**Local  
production**  
facilities across  
Asia, Europe &  
America

Market leader  
in co-extruded  
backsheets.  
**Endurans™ HP**  
*All-purpose  
Sustainable*

Market leader  
in conductive  
backsheets.  
**Endurans™ CB**  
*For high-end  
aesthetics &  
output*

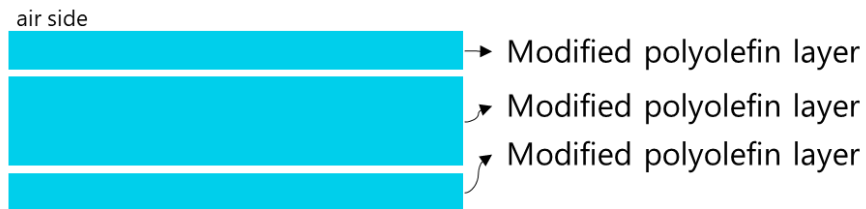
Pipeline of new  
solar films:  
Encapsulants  
Flex frontsheets  
Rear Perforated  
Insulators



# Endurans™ HP: future-proof

Excellent performance AND cost solution

- Co-extruded polyolefin based backsheets.
- >8yrs of flawless operation (~20 million modules).
- Intrinsic properties of polyolefins secure **safe and reliable** operation in the most harsh environments.
- The single-step manufacturing process and in-house formulation provide an **affordable** solution.
- A **sustainable** solution through elimination of fluoro-polymers and adhesives and mono-material design.



Endurans™ HP backsheet

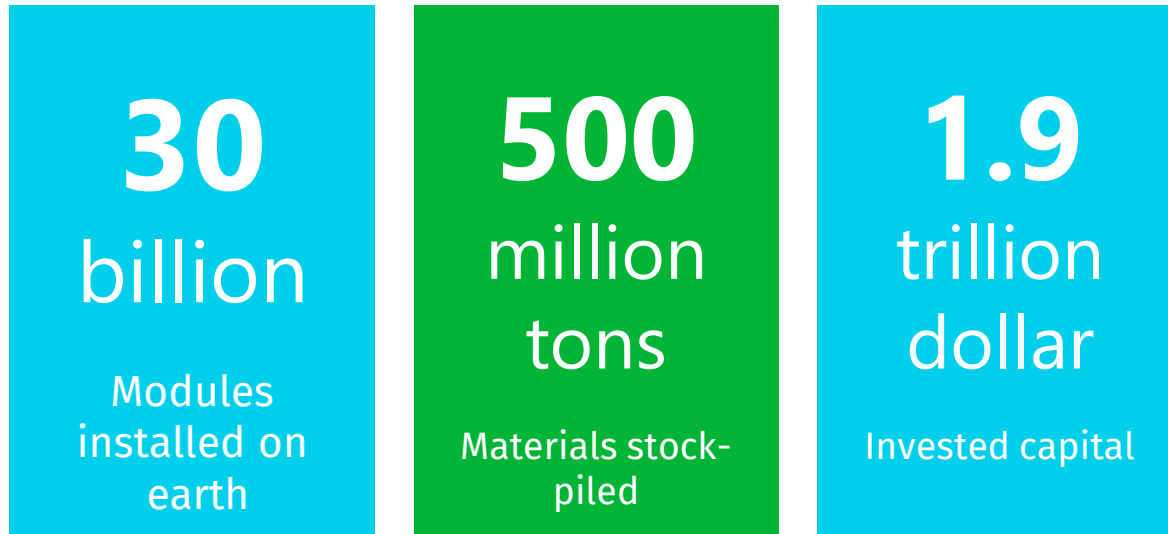
# It is time for change ....

... we should start thinking  
in circular solutions!



# The industry challenge

By 2050\* there will be enough solar panels installed on earth to stack a stairway to the moon and back.



***How to turn waste into value?***

# Basics of waste management



**REDUCE**

**EXTEND**

**RECYCLE**

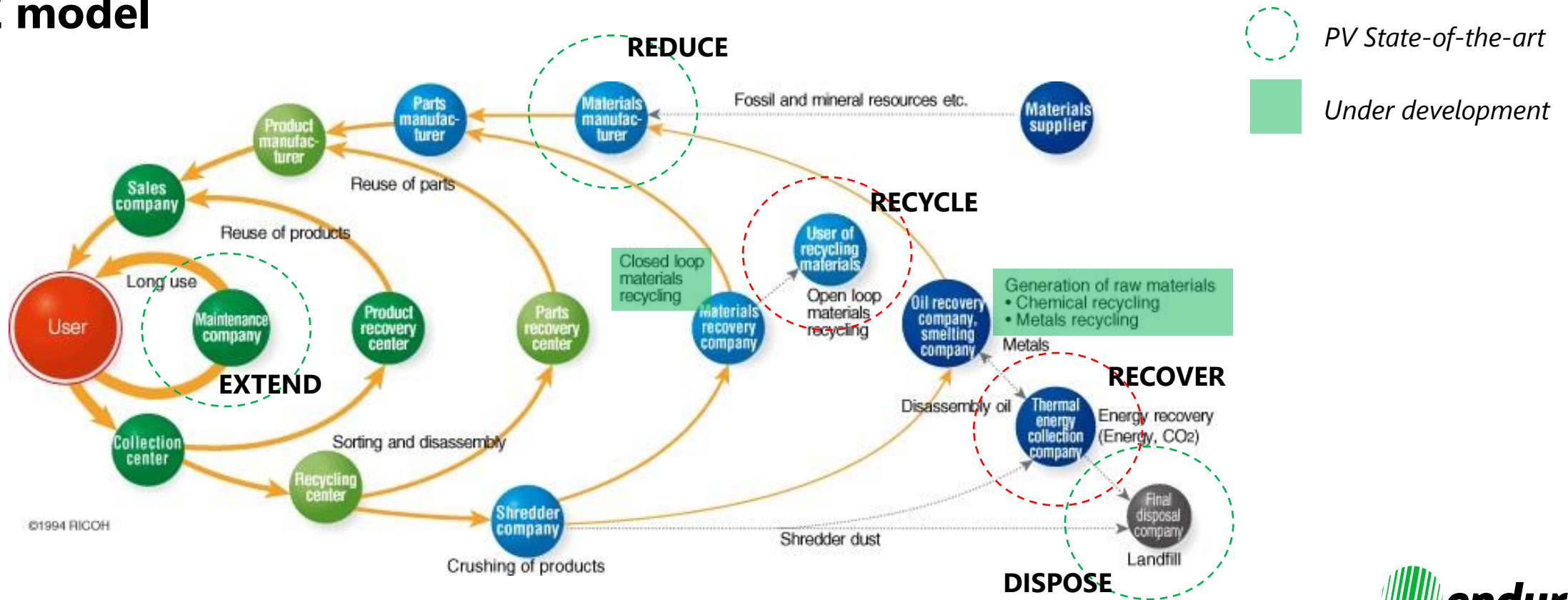
**RECOVER**

**DISPOSE**

# The PV industry is still far from circular

It has a strong track record in material reduction (REDUCE) and long lifetime use (EXTEND), but there is enormous end-of-use value leakage (RECYCLE)

## CE model

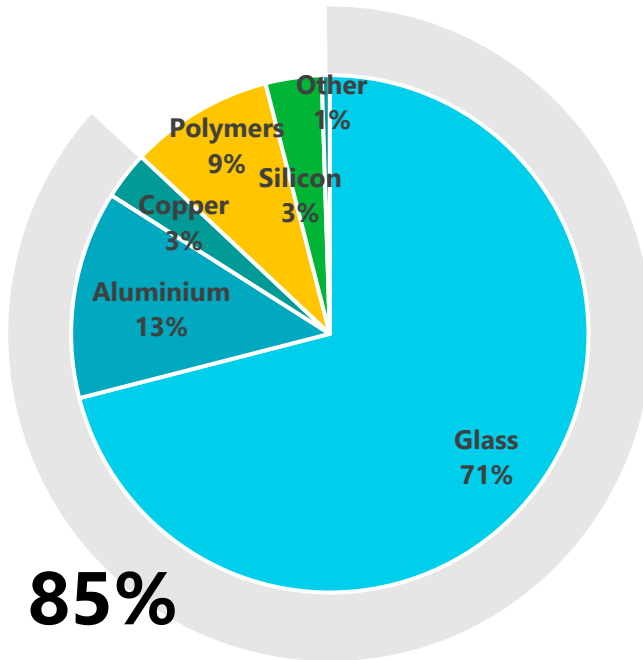




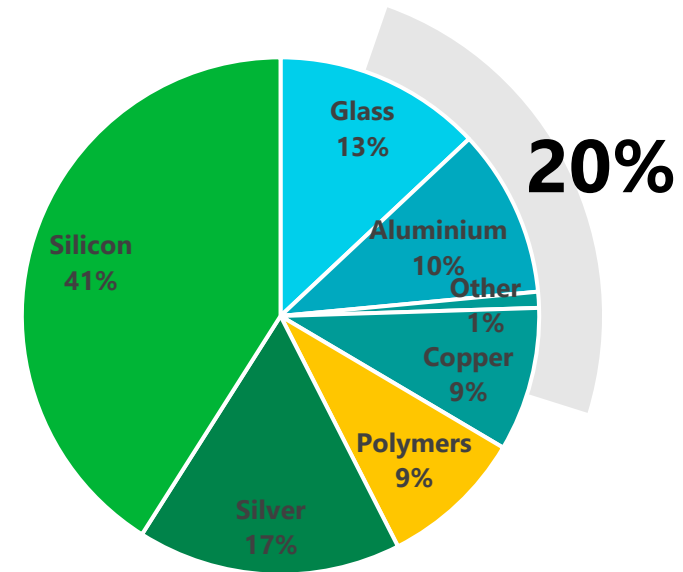
# 2022: downcycling and leaking valuable materials

A shift from weight to value driven recovery technologies is needed

## by weight



## by value



Actual 2022, Source: 2022 IEA special report on Solar PV global supply chains

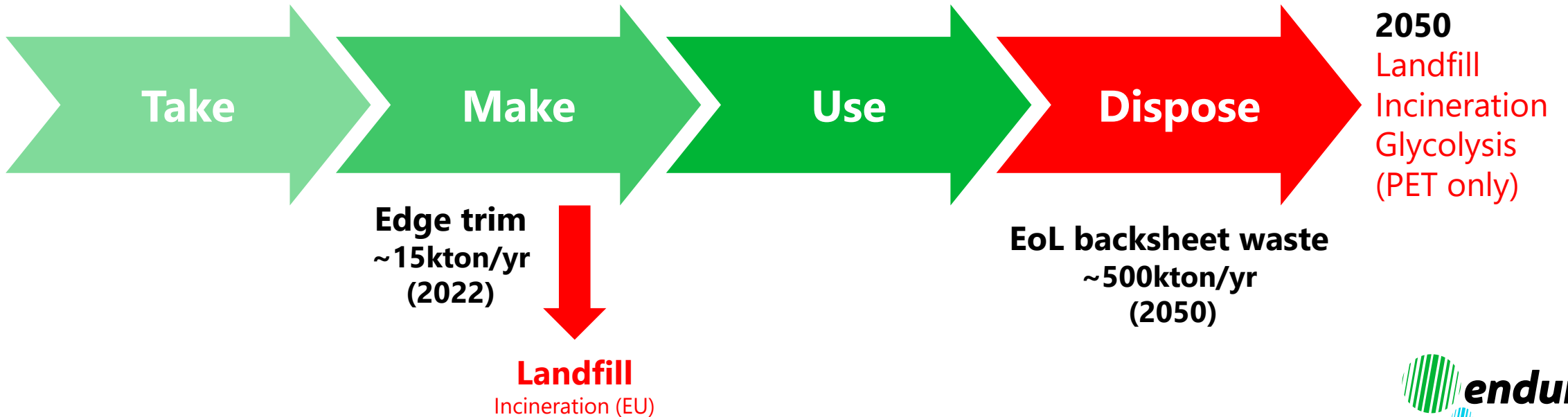
# Traditional backsheets follow a linear model

Backsheet material choices made today will have big impact in 30 years



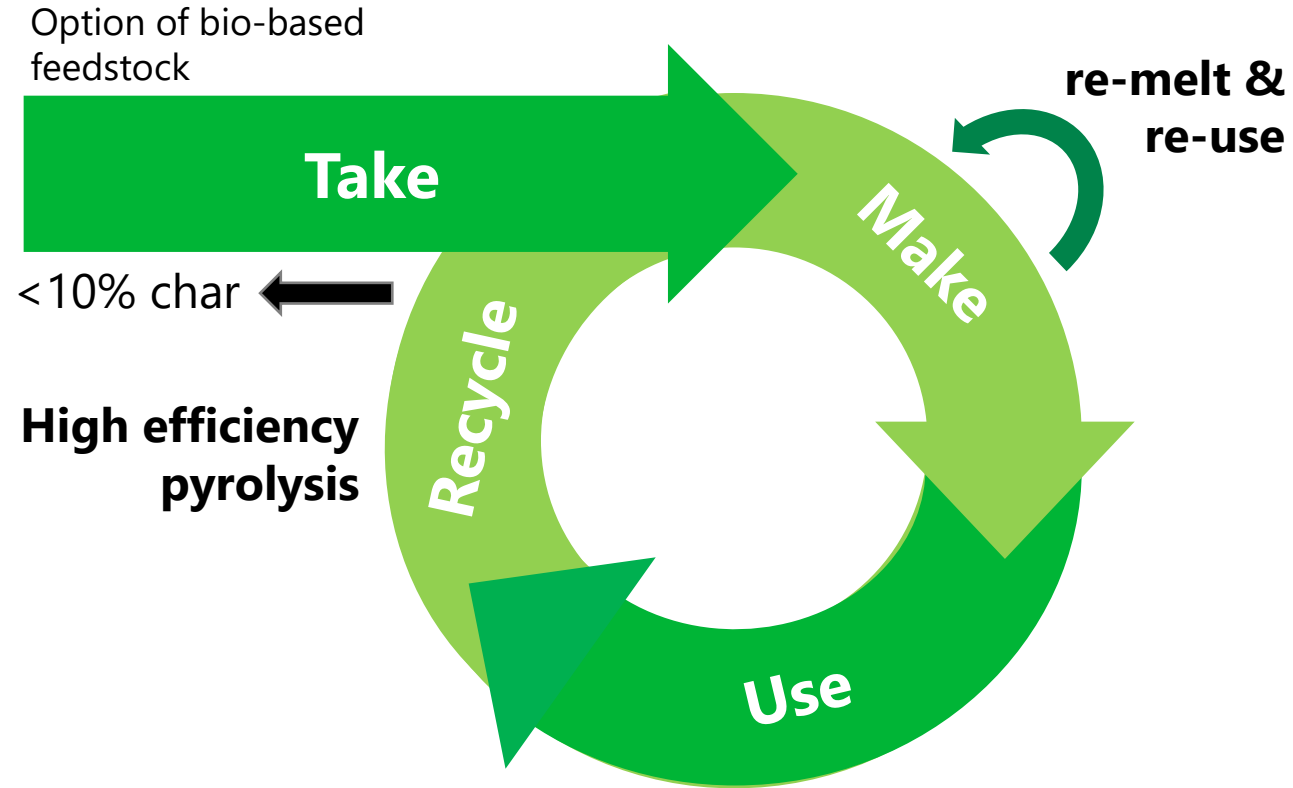
Traditional PET backsheet

- No option of low-cost mechanical recycling (re-melting)
- Tripling of incineration cost (fluorinated waste)
- Complex chemical recycling (multi-material film)



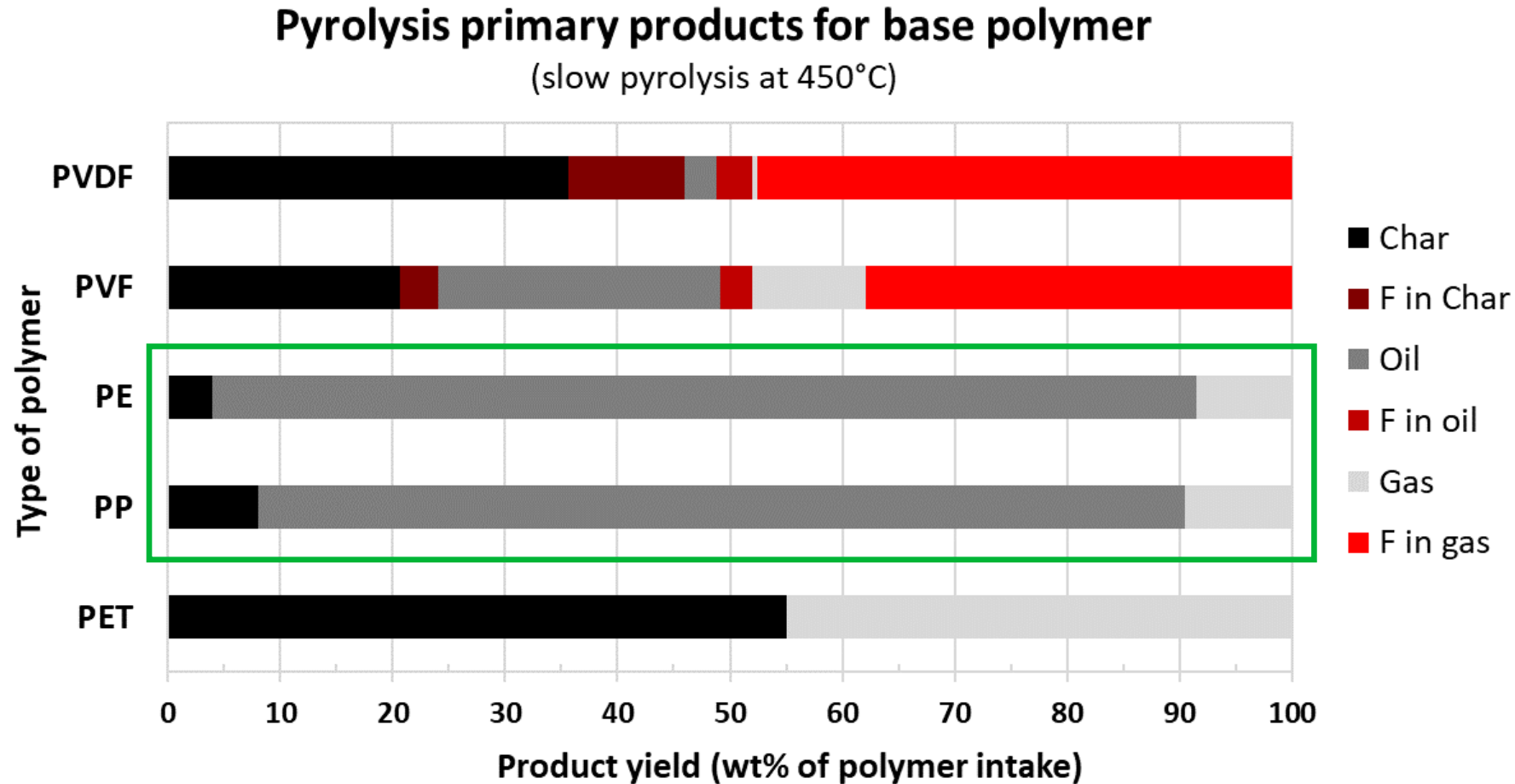
# Endurans™ HP circular backsheets

The thermoplastic nature and mono-material design enable a “closed-loop”



# High recycling yields in polyolefin pyrolysis

Pyrolysis of fluoropolymers is a challenge due to toxicity & low yield



# What about carbon emissions?

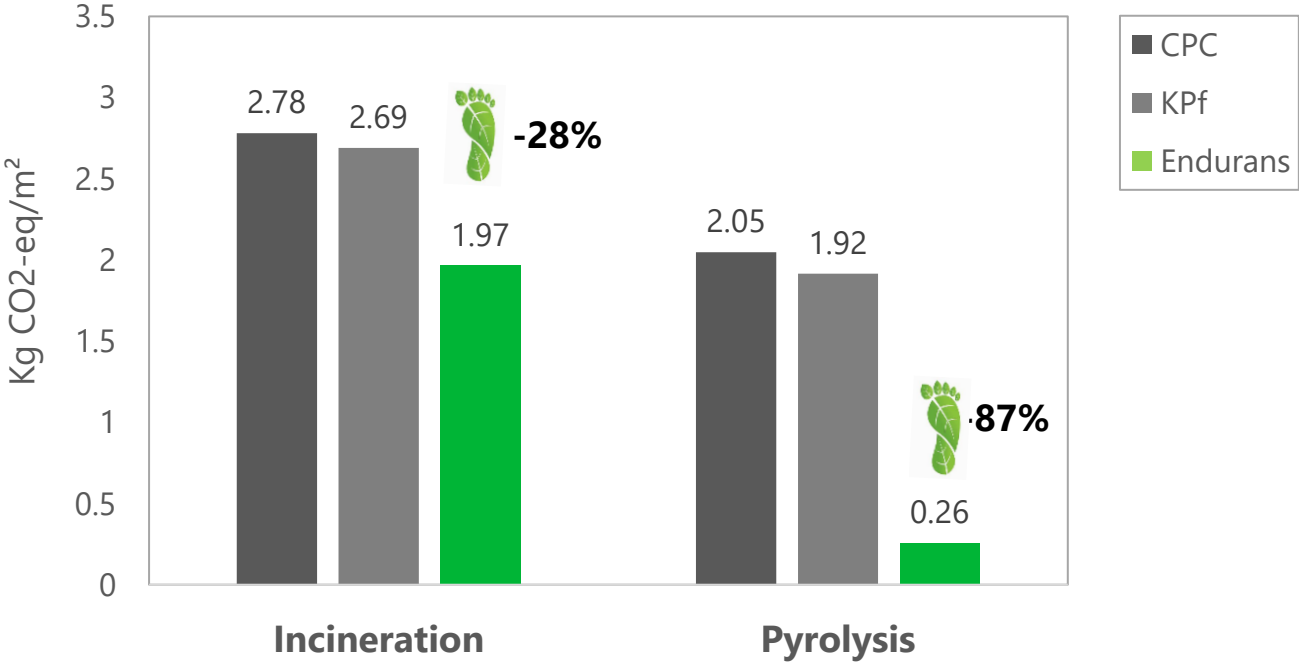
Legislation emerging.....



# Near-zero carbon emission

Turning waste into value with Endurans™ HP.

**carbon emissions**  
(production + end-of-life treatment)



# Endurans™ HP backsheets



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AND the planet

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# Same sun. More power.™

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