LOW CARBON FOOTPRINT

OPTICAL CABLING SOLUTION

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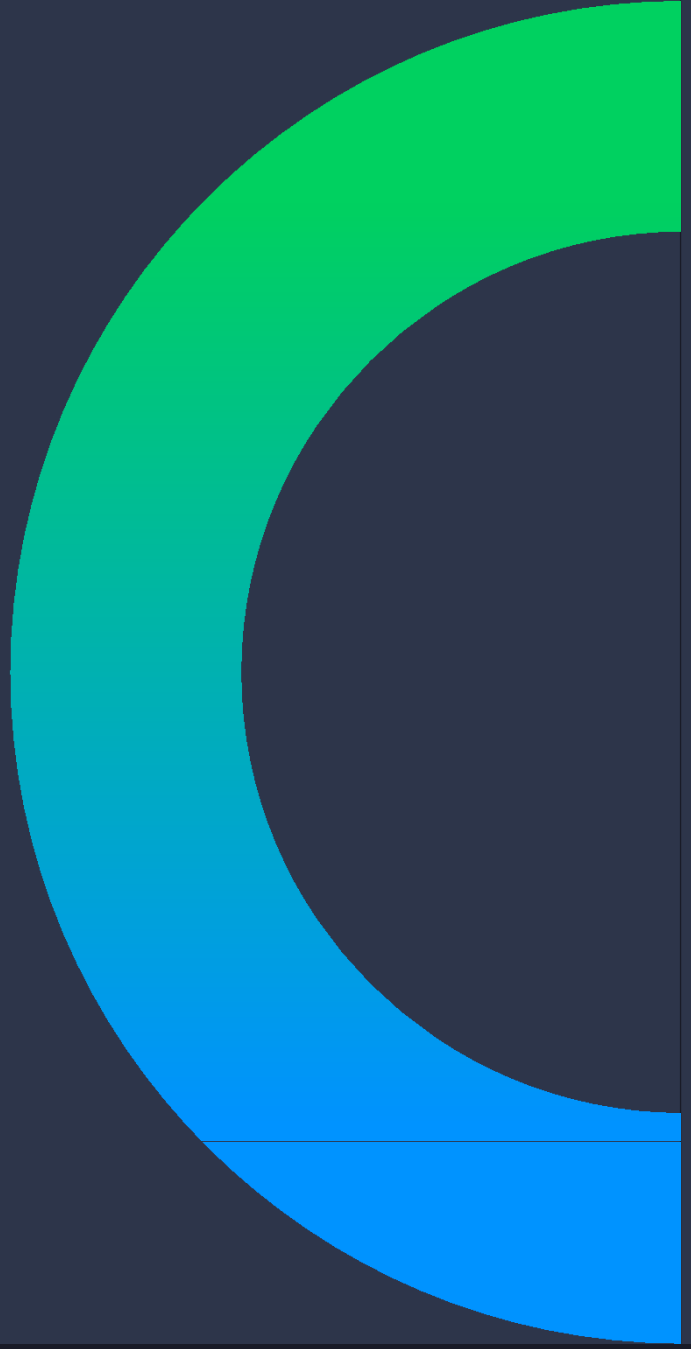


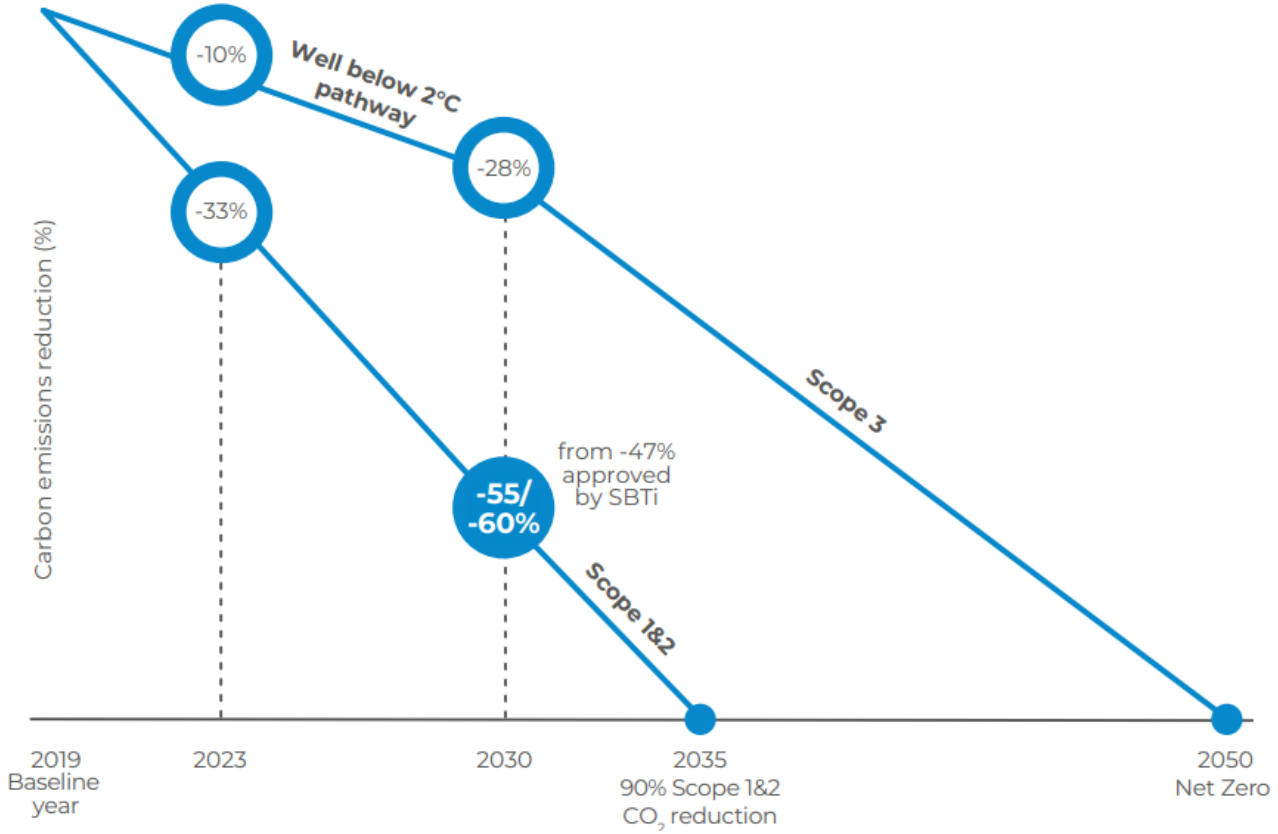
01 INTRODUCTION
02 CFP REDUCTION
03 CABLE DESIGN
04 RESULTS
05 CONCLUSION

INTRODUCTION

Impact of Optical Solutions in 17 SDGs

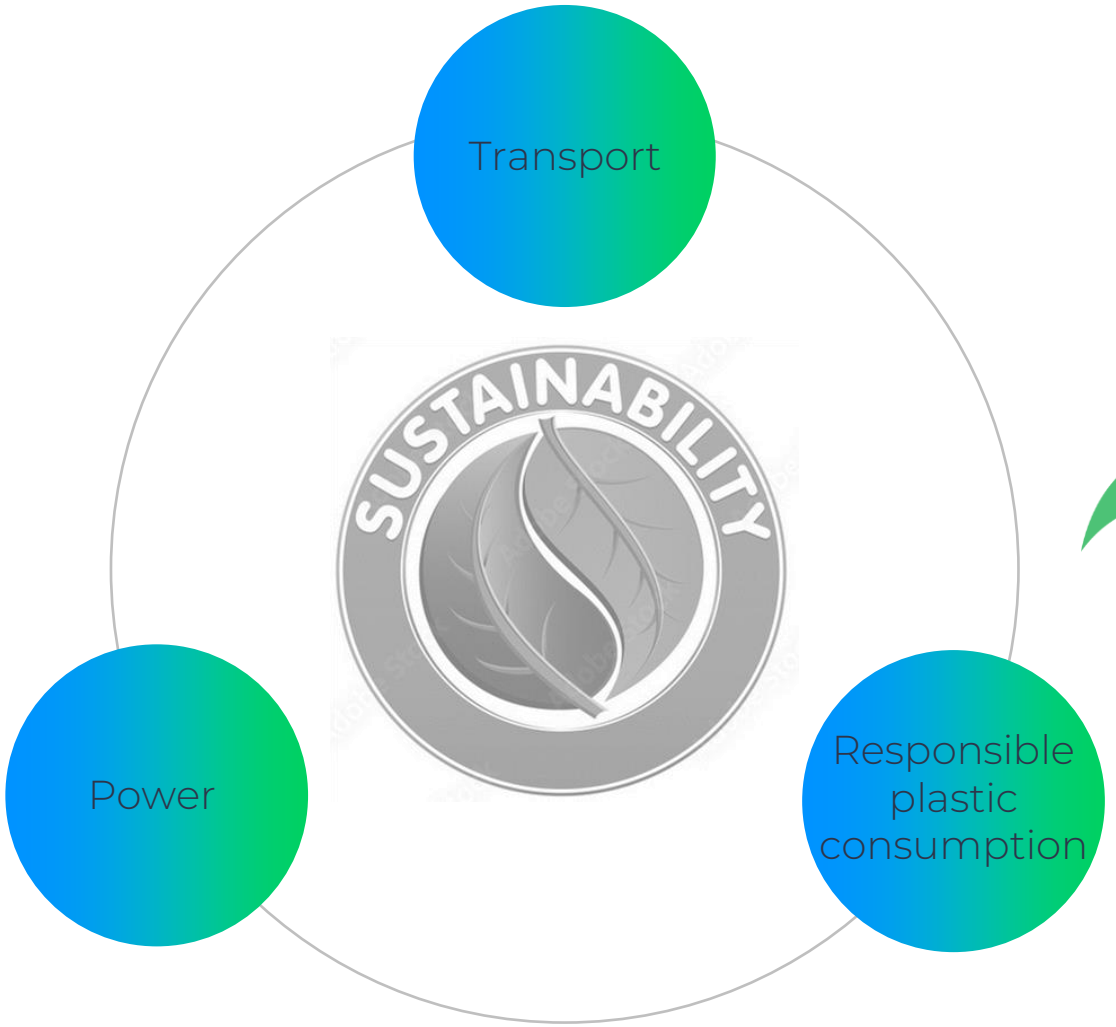
- ✓ Access to Information & Education
- ✓ Industry Innovation
- ✓ Energy Saving & Clean Energy
- ✓ Responsible consumption
- ✓ Climate action
- ✓ Sustainable cities

Climate Change Ambition



INTRODUCTION

Old vision as Sustainability



New vision as Sustainability

INTRODUCTION

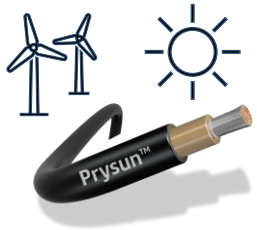
Prysmian Roadmap Strategy

- ✓ Main goals:
  - Reduce plastic usage and Increase usage of eco-friendly materials
  - Achieve most part of costumers & markets
  - Use green materials (PIR / PCR / Bio-Based)
  - Net-Zero Carbon Footprint
- ✓ Brazilian market backgrond
  - Typical fiber-count up to 36F No Flame Retardant
  - 60%: ADSS up to 12F single tube (ASU)
  - 20%: Dielectric Anti-Rodent up to 24F
  - 20%: Diverse (ADSS Long-Span, Blowing, ADSS/Duct up to 144F, Indoor)

Afumex Green


Multiplex Green


Ecoplus

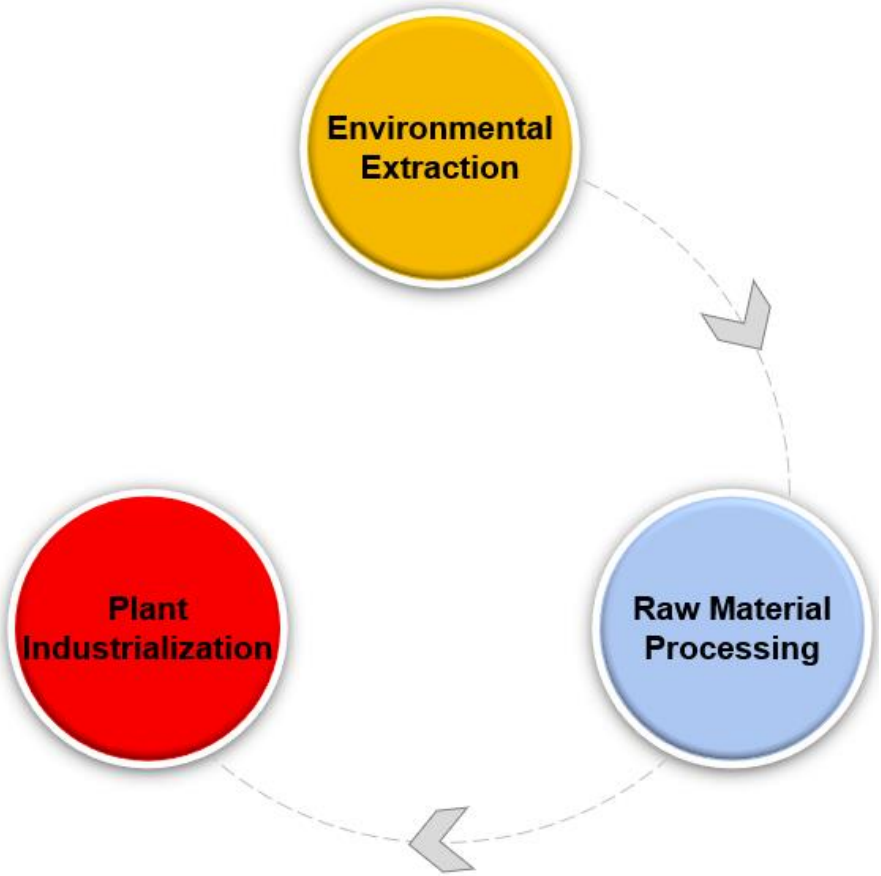


Prysun


Digital Green

CFP REDUCTION TECHNIQUES

Carbon footprint life-cycle gate-to-gate schematic



Where can we act?

Transportation

Origin

Energy & Water saving

Design

CFP REDUCTION TECHNIQUES

Recycled Polyethylene

- How can be ensured the recycled plastic performance?
- Is there anything in process that can be done to mitigate contaminations?

Polyethylene material		Physical performance by jacket type		
Property	Method	L2	M	H
Unaged Requirements				
Yield Strength (Min) - MPa (psi)	7.9	8.3 (1200)	11.0 (1600)	19.3 (2800)
Ultimate Elongation (min) - Unaged %	7.8	400	400	400
Aged Requirements				
Yield Stregth (Min) - MPa (psi)	7.9	≥ 75% of the unaged yield strength		
Ultimate Elongation (min) - Unaged %	7.8	≥ 75% of the unaged yield strength		

CFP REDUCTION TECHNIQUES

Carbon footprint comparison

Carbon footprint equation

$$C_m = T.d.\alpha + E.\beta + \sum_{i=1}^{k} C_i.p_i$$

C_m: CFP of m-material, in CO_2 issued per kg of material usage;

T: Total of Tons transportated per freight gate-to-gate;

d: Total distance per freight gate-to-gate;

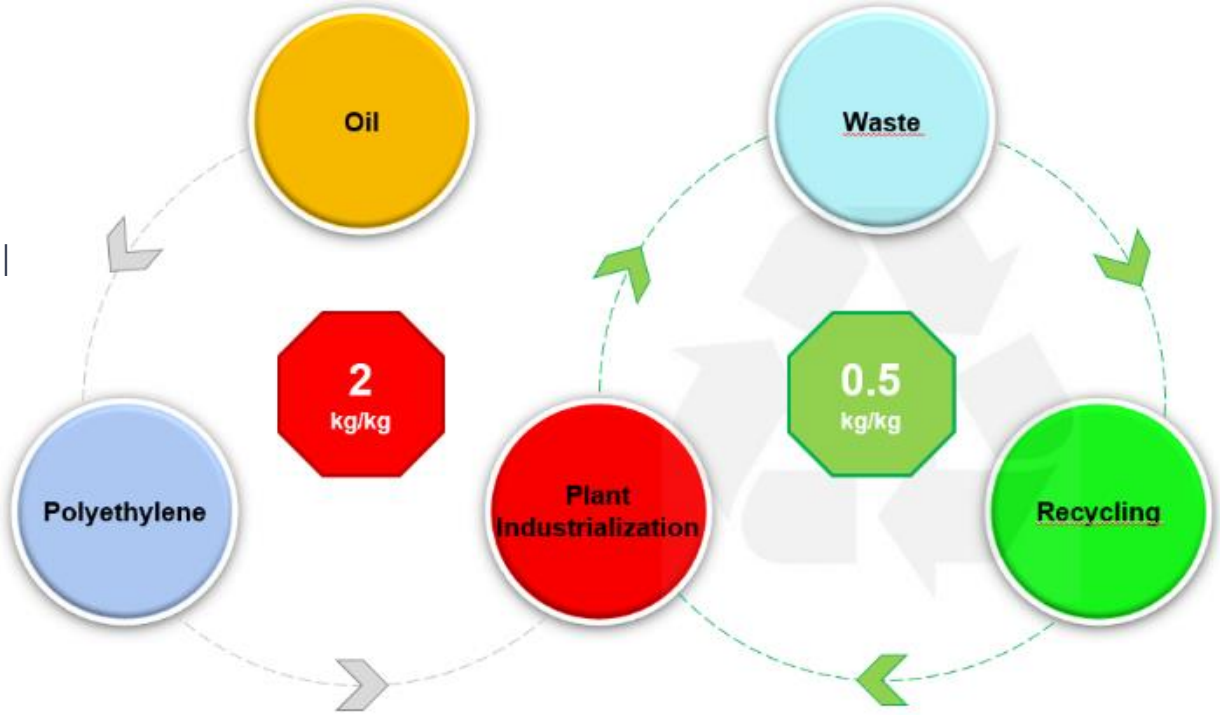
α: Local rate of CO_2 issue in freight;

E: Power consumption to recycle;

β: Local rate of CO_2 issue by kWh;

C_i: CFP of i-material consumed in recycling process;

p_i: Usage of i-material in recycling process;



CFP REDUCTION TECHNIQUES

Recycled Polyethylene

Step 1: Washing & Gross Grinding



Step 2: Pulverization



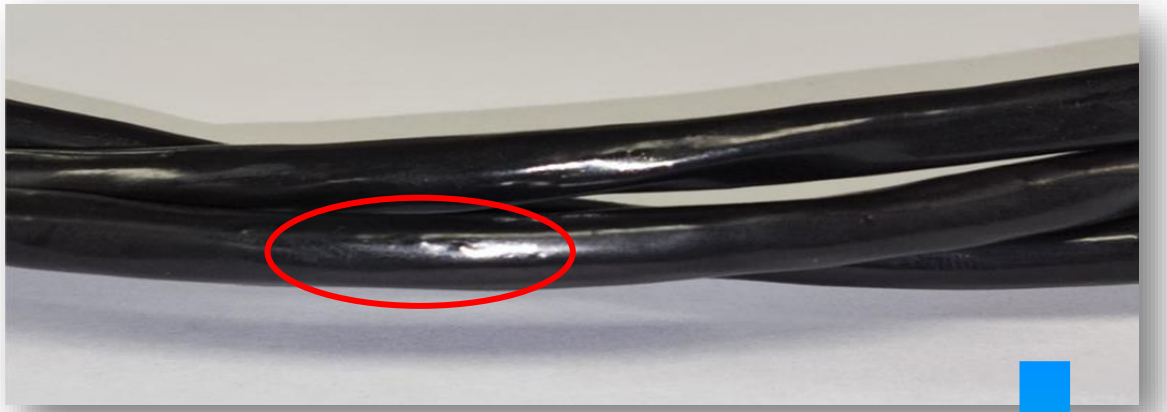
Step 3: Mixing & Extrusion


Step 4: Testing


CFP REDUCTION TECHNIQUES

Recycled Polyethylene

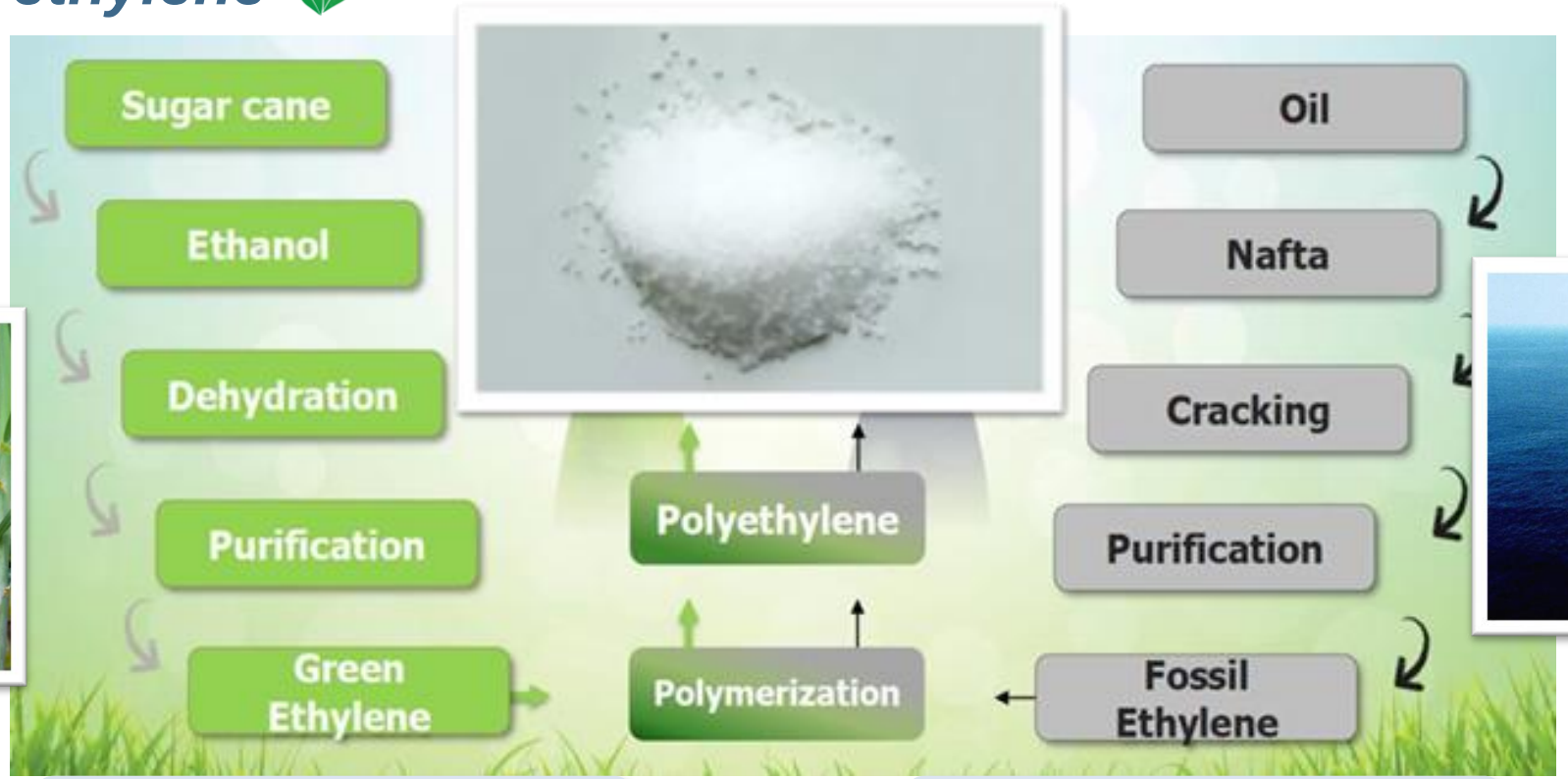
Before process enhancements



After process enhancements

CFP REDUCTION TECHNIQUES

Bio-Based Polyethylene



CO_2

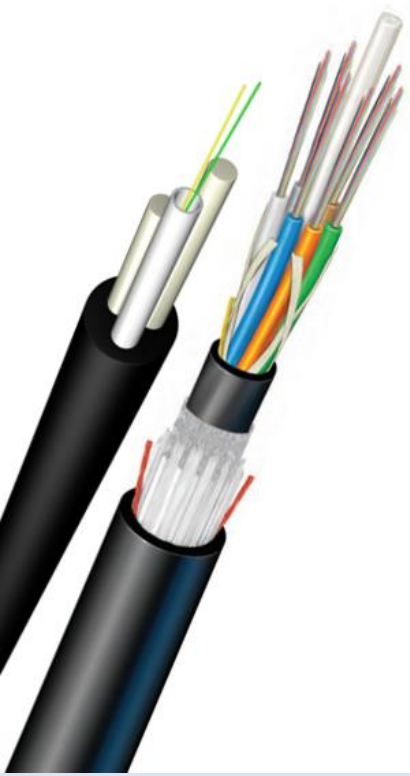
- 5 kg of CO_2 per kg of PE

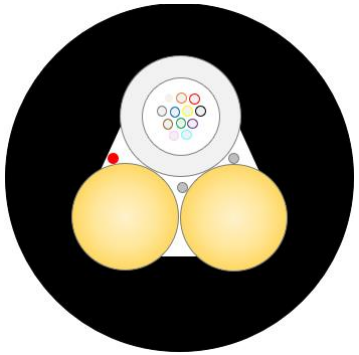
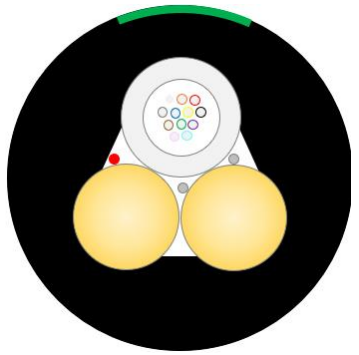
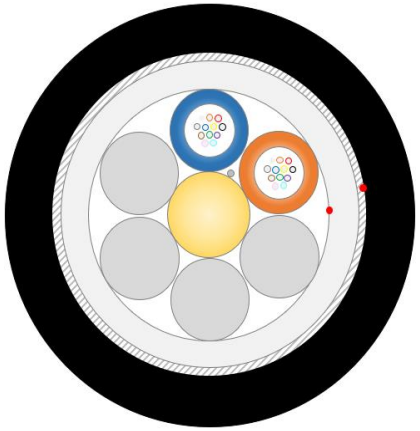
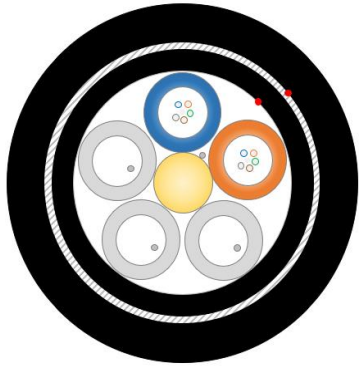
Sustainable

Not Sustainable

Identically in its Chemical, physical and mechanical Properties

CABLE DESIGN

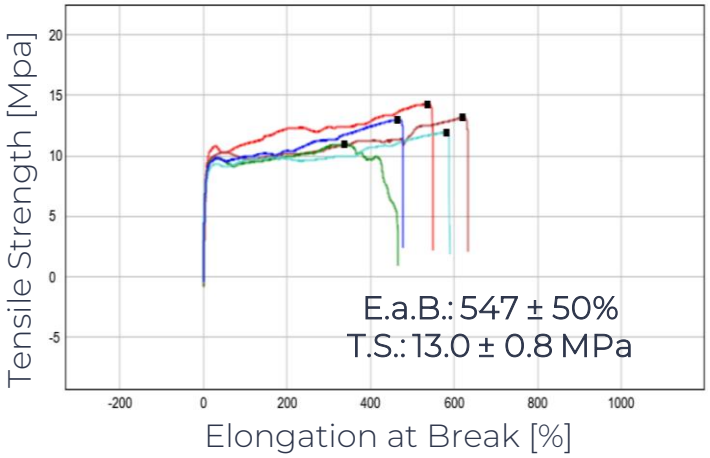


Cable Family	Standard design	Green design	Green features
ASU 80/120/200M SPAN 02 – 24 Fibers			50% Ecologic PE -10% Material usage CO_2 -20% 4/Reel
DUCT ANTI-RODENT NR & LS0H 02 – 288 Fibers			30% Green PE -12% Material usage -15% Diameter CO_2 -35% 18/Reel

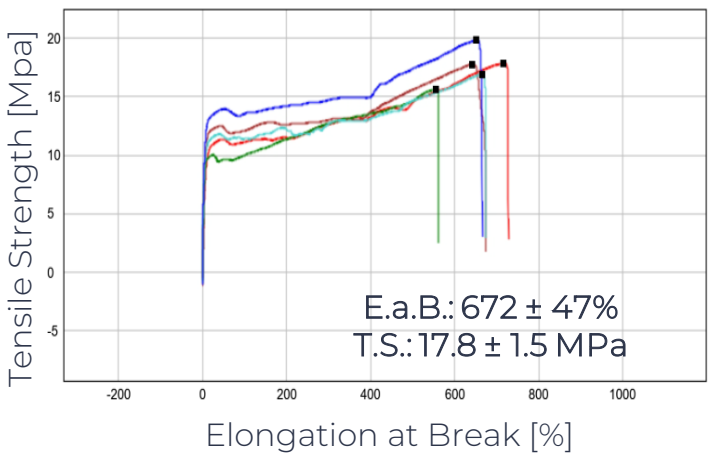
RESULTS

Material performance

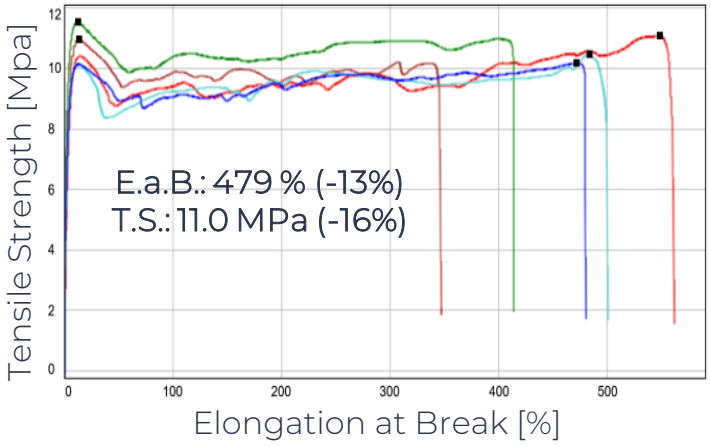
ADSS 12F – Before aging



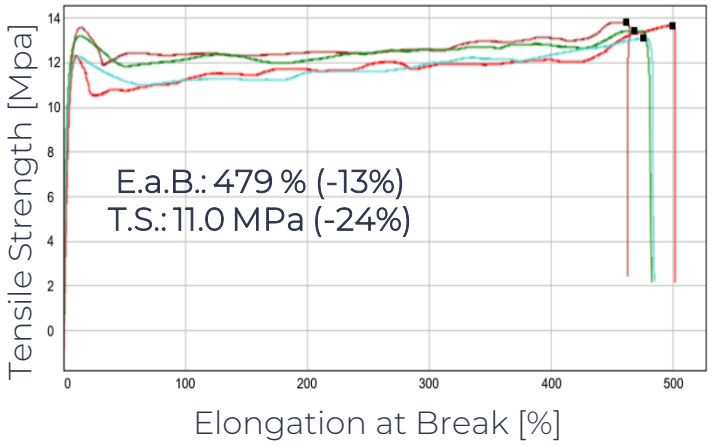
ADSS 24F – Before aging



ADSS 12F – After aging



ADSS 24F – After aging



Test	Method	Requirements	12F	24F
Density	ASTM D 792	0.919 – 0.925	0.919	0.920
Cold Bend	IEC 60811-1-4	R = 6x Ø 5 turns x 360° T = -20 °C x 24h	No crack	No crack
Crack Resistance	ASTM D 1693	R = 6x Ø 1 turn x 180° T = 50 °C x 48h	No crack	No crack
Shrinkback	ASTM D 4565	≤ 5%	1.08%	0.33%
Absorption Coefficient	ASTM D 3349	Min 4 abs/cm	-	4.073
Tensile	60794-1-21 E1	T = 1.5x W	ΔL = 0.02% Δ = 0.01 dB	ΔL = 0.00% Δ = 0.02 dB
Impact	60794-1-21 E4	E = 10 J N = 3	Δ = 0.02 dB	Δ = 0.04 dB
Crush	60794-1-21 E3	220 N/cm 10 min	Δ = 0.01 dB	Δ = 0.01 dB
Bend	60794-1-21 E11	R = 6x Ø 5 turns	Δ = 0.02 dB	Δ = 0.03 dB
Thermal cycling	60794-1-22 F1	-40/+70 °C 24h	Δα < 0.05 dB/km	

CONCLUSIONS

I **INCREASE** in green iniciatives in clabling industry

II **FESEABILITY** to recover plastics and reusing in optical cable jacket

III **RECYCLED & BIO-BASED PE** perform similar

IV **CARBON FOOTPRINT** reduction up to 35%

V **RECYCLED XLPE** is still under evaluation

CONCLUSIONS

Eco packing
-40T CO_2

R-XLPE/ PIR / PCR
-160T CO_2

Bio-Based PE
-400T CO_2

R-Al
-600T CO_2

R-Cu
-1500T CO_2

CO² FOOTPRINT

CO_2

-2700 T/year

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