Comparative LCA Environmental benefits of sustainable yarns

ANTEX

Scop of the study

The purpose of this study is to compare three products with identical manufacturing processes but different sources of raw material. An analysis will be conducted on 1 kg (functional unit) each of:

- Virgin PET
- Post-consumer recycled PET
- Pre-consumer recycled PET

System Boundaries

A comparative Life Cycle Assessment (LCA) has been performed evaluating all the life cycle stages of each product before reaching the Antex plant gate: from raw material procurement to the factory gate, ready for distribution, also known as a cradle-to-gate assessment.

STAGES INCLUDED

UPSTREAM

Production of raw materials, auxiliary materials, chemicals and packaging materials used to obtain the product.

The recycling process includes the transportation of PET bales from waste selection until the pellets are obtained.

Transportation from sorting plants to flakes processing plant to pellet processing plant.

PRODUCTION STAGE

Transportation of raw materials, auxiliary materials, chemicals and packaging materials from supplier to the production plant.

Water consumption from production processes.

Consumption of natural gas and diesel in the steaming process.

Electricity consumption from production processes.

Yarn production processes: spinning and texturing.

Wastewater treatment at own plant.

Life Cycle Assessment LCA

The environmental behaviour analysis of the four yarns options produced by Antex has been performed using the life cycle assessment methodology in accordance with ISO 14040 and ISO 14044, using the software Simapro v 9.1.

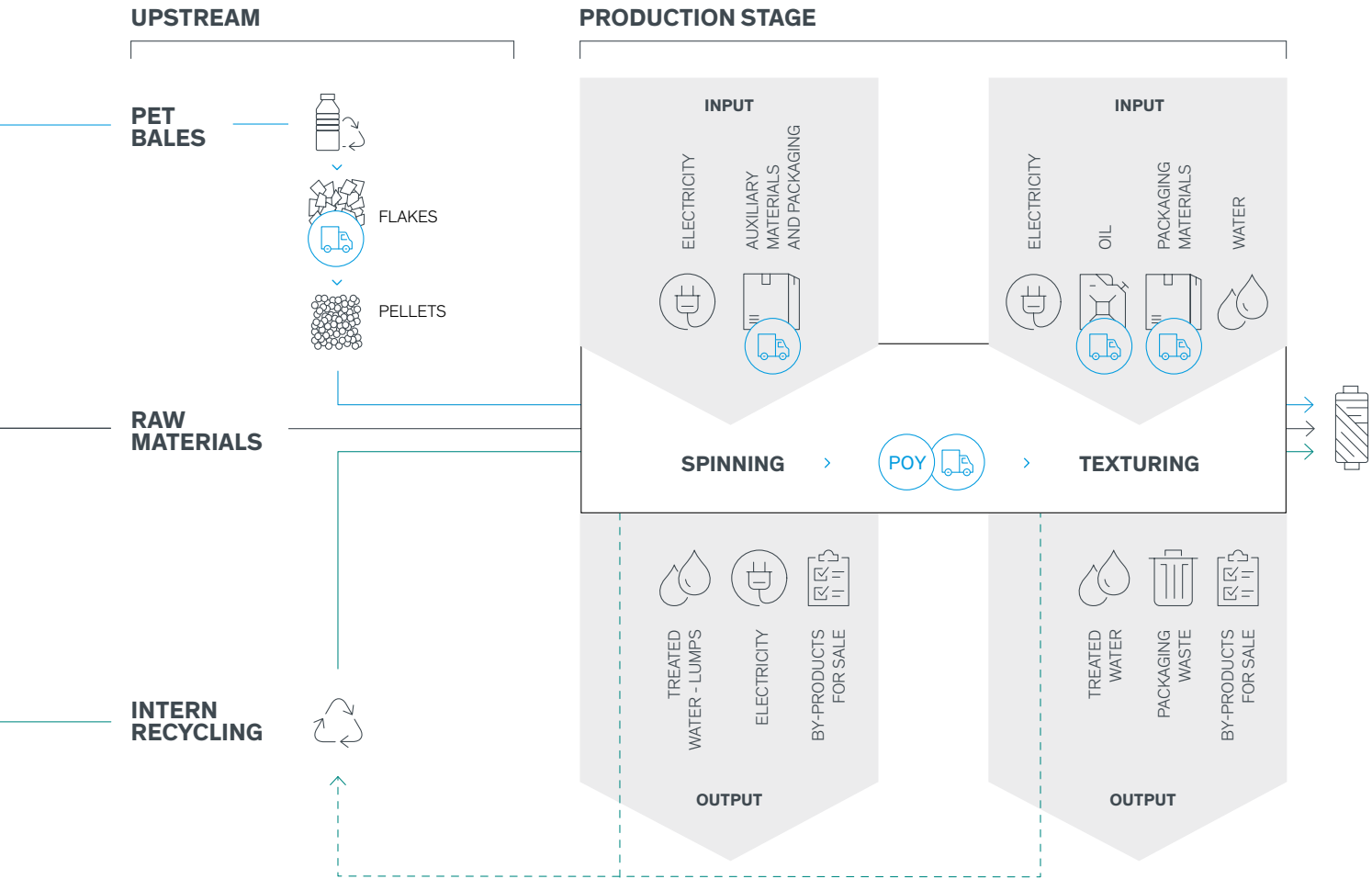
Post-consumer recycled
PET textured yarn

YNVIRON™ SEAQUAL INITIATIVE

Virgin PET
textured yarn

Pre-consumer textile recycled
PET textured yarn

YARN BACK™


UPSTREAM
PRODUCTION STAGE
PET BALES
FLAKES
PELLETS
RAW MATERIALS
INTERN RECYCLING
INPUT
ELECTRICITY
AUXILIARY MATERIALS AND PACKAGING
INPUT
ELECTRICITY
OIL
PACKAGING MATERIALS
WATER
SPINNING
POY
TEXTURING
TREATED WATER - LUMPS
ELECTRICITY
BY-PRODUCTS FOR SALE
OUTPUT
TREATED WATER
PACKAGING WASTE
BY-PRODUCTS FOR SALE
OUTPUT

Methodology and results

Another life-cycle analysis performed by Antex shows a reduction in the GHG emissions and water consumption of mass solution dyed yarn (YNMAS) versus yarn dyed with traditional methods.

Categories and indicators	Units	Virgin PET yarn	YNVIRON SEAQUAL	YARNBACK
Global warming	kg CO_2 eq	**6,09**	3,84	2,87
Water consumption	m^3	**9,37E-02**	6,22E-2	5,48E-2
Total energy consumption	MJ	**164,15**	98,58	83,56

YNVIRON: Post-consumer recycled PET yarn.
SEAQUAL: Post-consumer recycled PET yarn containing sea plastic waste.
YARNBACK: Pre-consumer textile recycled PET yarn.

Benefits of our sustainable products

Post-consumer recycled yarns
YNVIRON, SEAQUAL

Reduction % vs virgin polymer

37 %
CO_2 emissions
(Global warming)

34 %
Water consumption

40 %
Electricity consumption

Pre-consumer textile recycled yarns
YARNBACK

Reduction % vs virgin polymer

53 %
CO_2 emissions
(Global warming)

42 %
Water consumption

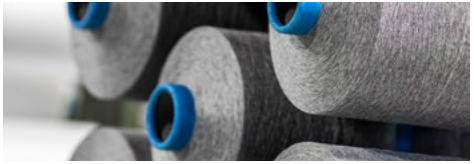
49 %
Electricity consumption

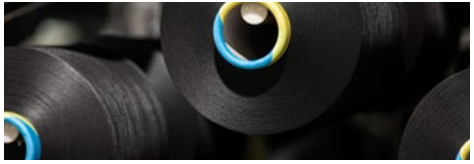
Solution dyed yarn
YNMAS

Reduction % vs package dyed

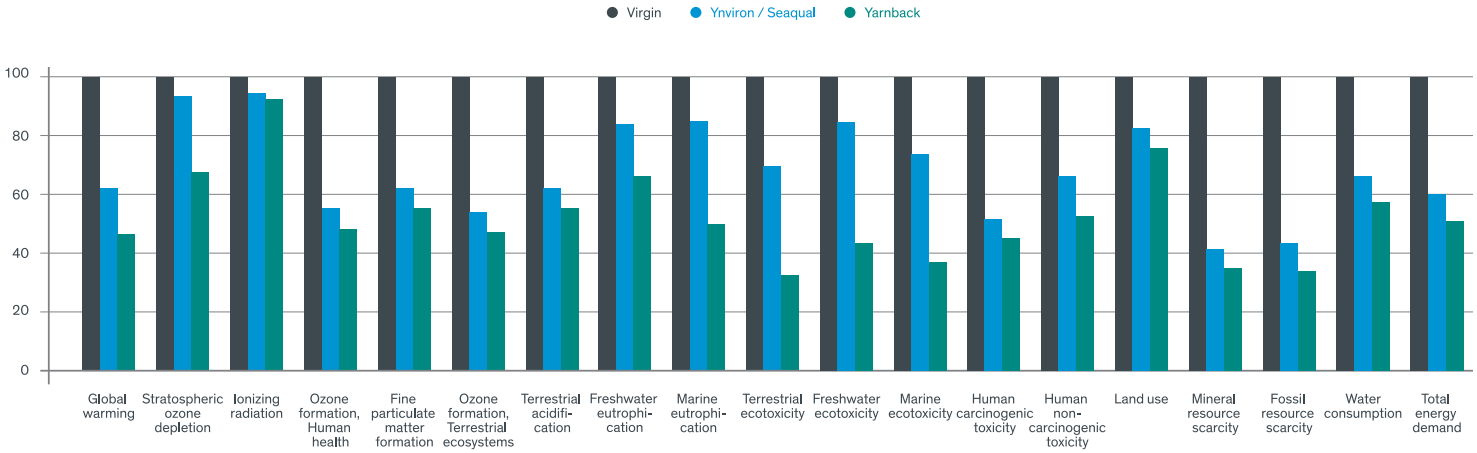
31 %
CO_2 emissions
(Global warming)

88 %
Water consumption
(Values according to Antex internal processes)





LCA relative values
Antex sustainable yarns



The Antex production was analysed to calculate the environmental impacts "craddle to gate"
References : International standards ISO 14040 :2006 ISO 14044 :2006 for life cycle assessment
Method: ReCiPe 2016 Midpoint (H) V1.04 / World (2010) H software Simapro v9.1

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