















Sustainable Packaging Solutions Examples from Tetra Pak

We are a world leading food processing and packaging solutions company.

Working closely with our customers and suppliers, we provide safe, innovative and environmentally sound products that each day meet the needs of hundreds of millions of people in more than 160 countries.

Processing.

Solutions and equipment for dairy, plant-based, cheese, powder, ice cream, beverages and prepared food

Services.

Helps you improve your performance, optimise costs and ensure food safety throughout the lifecycle of your operations

Packaging.

A complete carton packaging range for consuming food products offering convenience, easy opening, optimal shelf life and the ability to give maximum brand exposure

Our purpose:

We commit to making food **safe** and **available, everywhere** and we promise to protect what's good: **food, people** and the **planet.**

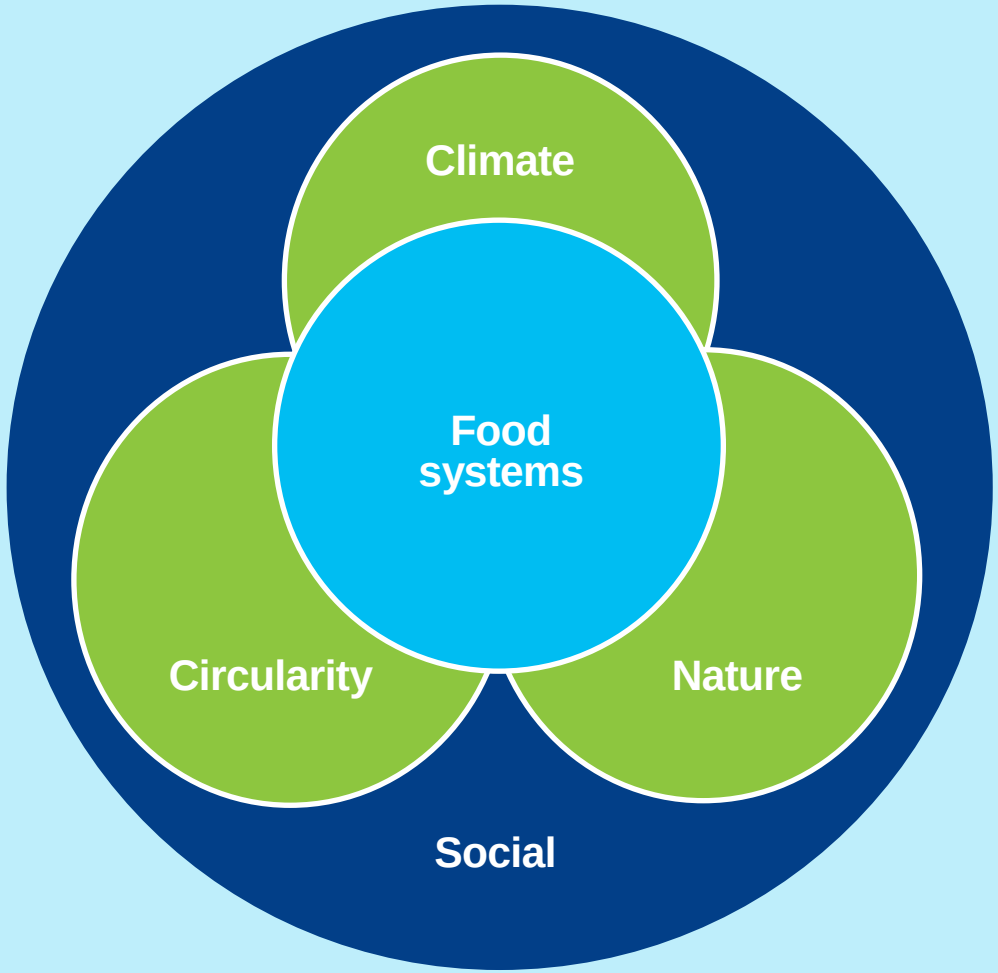
The life of a paper-based Tetra Pak® carton

Go nature. Go carton.

Our sustainability agenda

With clear ambitions & plans

Food.
People.
Planet.



SUSTAINABILITY REPORT 2023

Go nature. Go carton.

Tetra Pak goes for net zero impact

Our ambitions

Short term / 2030:

- Science Based Target to reduce Greenhouse Gas (GHG) emissions by 46% across value chain from 2019 baseline
- Net Zero GHG impact in our operations
- Source 100% renewable electricity (scope 2) in our operations. *RE100*
- Reduce GHG emissions by 50% of our processing best practice processing lines

Long term / 2050:

- Net Zero Science Based Targets across the value chain by 2050

https://www.tetrapak.com/about/newsarchive/tetra-pak-commits-to-net-zero-emissions

Internationally standardised method of work

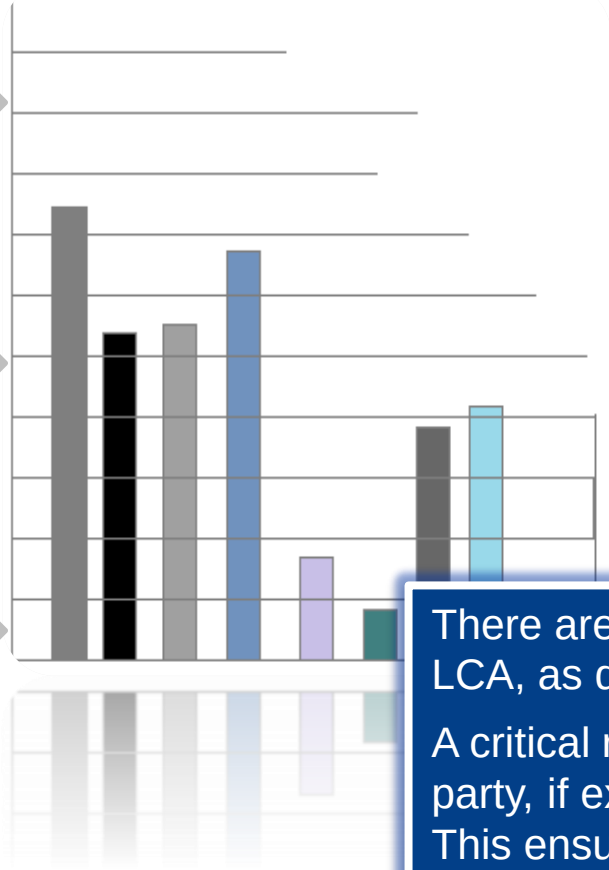
LCA agreed in the ISO 14040-series

1. Goal and scope

2. Inventory phase

3. Environmental impact assessment

4. Results & Interpretation



Critical review

Publication of LCA

There are four main phases to complete an LCA, as distinguished in the ISO standards.

A critical review must be performed by a third party, if external public claims are to be made. This ensures credibility of the LCA results.

Our 2022 value chain emissions

Breakdown of value chain impact

Raw materials and transportation

Purchased materials for packaging & transportation

Scope 3 of the GHG Protocol

Impact of sold equipment

Use of sold products – life-time impact

Processing equipment

Packaging equipment

Scope 3 of the GHG Protocol

Tetra Pak operations

Production sites, offices & business travel

Scope 1, 2, 3 of the GHG Protocol

Waste

Post-consumer cartons not recycled or recovered for energy

Scope 3 of the GHG Protocol

Accounting based on GHG Protocol standards and guidelines for corporate and value chain climate accounting

Carbon footprint of a beverage carton

Example full life cycle results for a carton

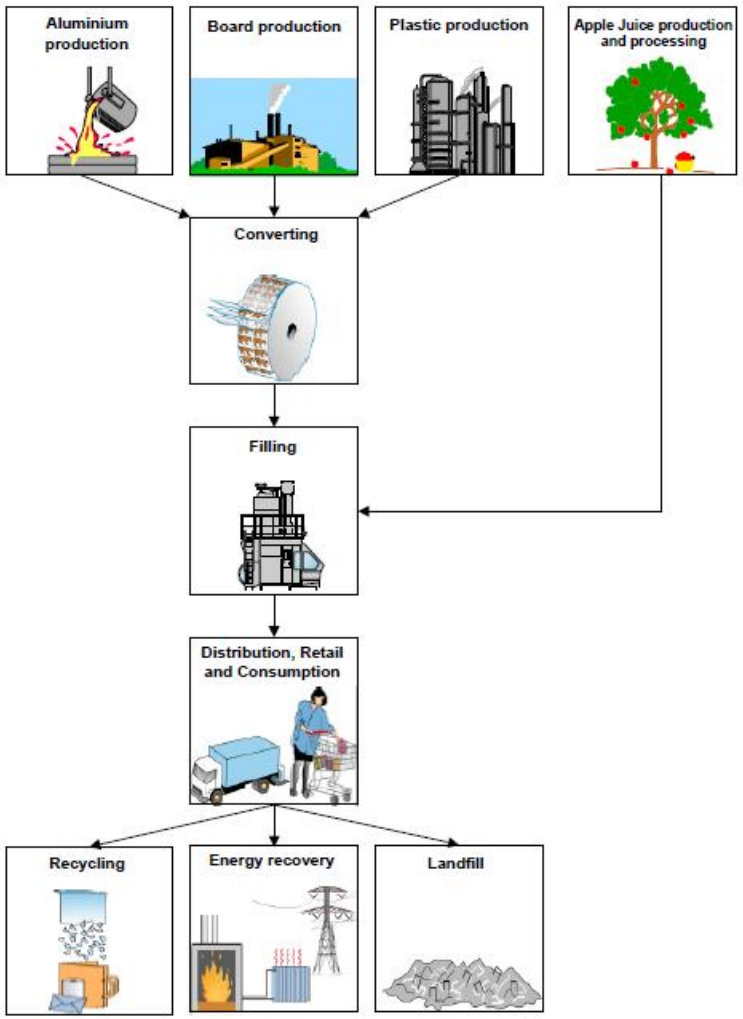
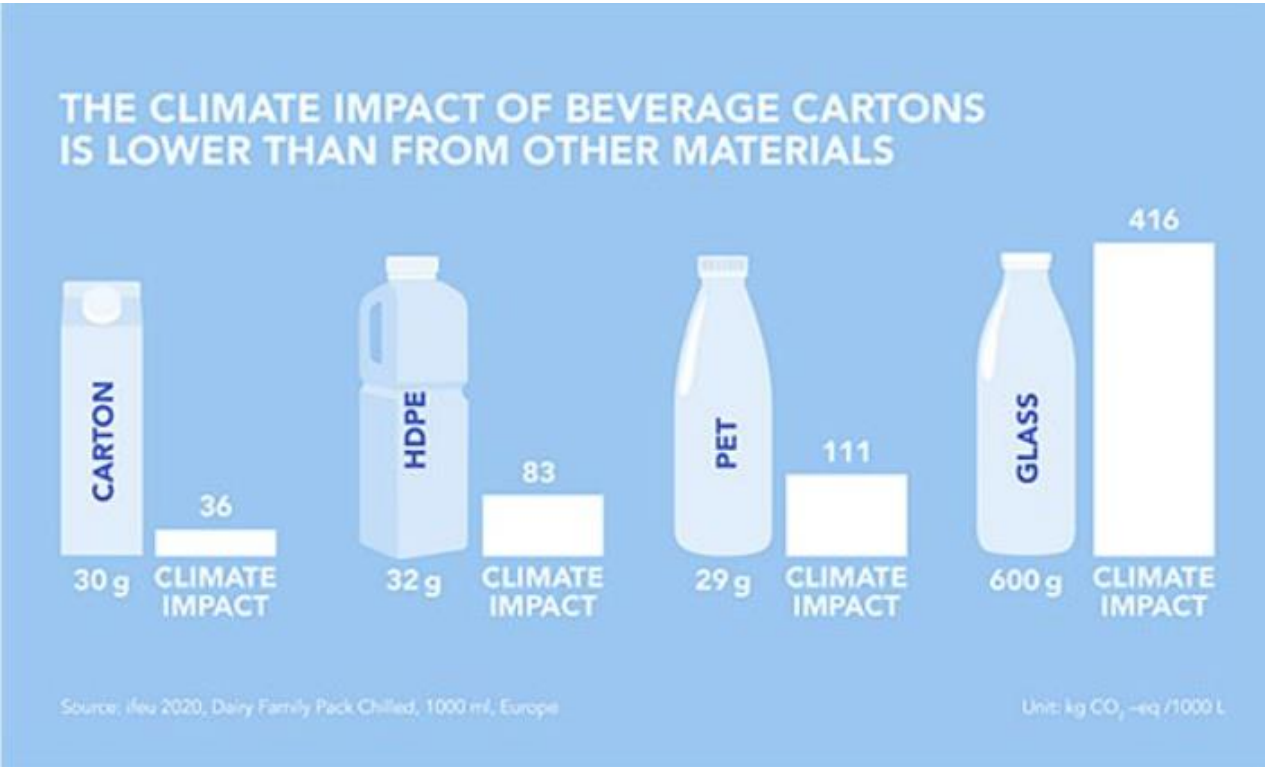


Figure 2: Main process steps of the TBA/juice system. Transport steps are not displayed.

Description of the assessed system:

- Cradle-to-grave
- Functional unit: one package
- Forming and filling included, food processing excluded
- Geographic scope: Europe
- Average European waste management
- Biogenic carbon assumed to have net impact 0
- Allocation method: 50/50
- Sensitivity: impact of waste mangament

Beverage carton is a low carbon material



Container	Carbon footprint (gCO2e-/Kg)	
	Raw material	Recycled Material
Paper	892	439
Ambient carton	892	429
Iron	2710	556
PET	2890	618
PE	1987	725

Source: A Review of Institutional Regulations and Environmentalizing Extension for Designated Wasted Containers (EPA, 2013)

















Tetra Pak's Sustainable Solutions

Our journey towards the world's most sustainable food package*.

2011

1st plant-based caps

2014

1st LEED "Platinum" certification

All sites FSC™ CoC certified

2015

Launch of world's 1st fully renewable package

2016

Reached 200 billion FSC™ labelled packages

Joined RE100

2017

Climate targets approved by SBTi

2018

½ billion Tetra Rex® plant-based packages sold

Received EcoVadis Gold rating

Became ASI certified

2019

Became members of Bonsucro + CoC Certified

Signatory of the New Plastics Economy Global commitment

Paper straws released in Europe

2020

Achieved our 2020 climate goal

In CDP leadership band for fifth consecutive year

Double "A" for climate and forest

1st to offer carbon neutral label (Carbon Trust)

Launched low-energy processing line for juices & still drinks

2021*

Introduced certified recycled polymers

Developed tethered cap solutions

Ongoing

Increasing share of paper, plant-based plastics and recycled polymers

Exploring the use of recycled fibres

Tetra Pak and Lactogal launched in 2023 an aseptic beverage carton featuring a paper-based barrier

Continue the deployment of certified recycled polymers to achieve a minimum of 10% recycled plastics in packages sold in Europe by 2030.**

*This means creating cartons that are fully made of renewable or recycled materials, that are responsibly sourced, thereby helping to protect and restore our planet's climate, resources and biodiversity; contributing towards carbon-neutral production and distribution; are convenient and safe, therefore helping to enable a resilient food system; and are fully recyclable.

**In 2023, we saw an increase of 144% in certified recycled packaging material and a 95% increase in certified recycled caps sold, compared to 2022.

Tetra Pak (FSC™ C014047)

Tetra Pak Packaging portfolio strategic objectives

Secure solutions to address regulations & climate change

Sustainable openings

- Paper straws
- Tethered caps

Renewable package

- Expand deployment of plant-based products

Secure "**circularity**" in portfolio

Recycled content

- Use of recycled polymers and paper in primary/secondary packaging and additional materials

Enable recycling by design

- Explore new pack mat structures

Our ambition to deliver the world's most sustainable food package, made solely of responsibly sourced renewable or recycled materials, fully recyclable and carbon-neutral.

Sustainable and responsible sourcing certifications

Traceability and transparency, certified chains of custody and voluntary sustainability standards

First in our industry to have our packages **FSC™-certified since 2007***

Certified to the ASI's Performance Standard since 2018

First in food packaging to achieve **full traceability for sustainably sourced plant-based plastic** certified to Bonsucro standards

www.bonsucro.com

First company in food packaging to be awarded the Roundtable on Sustainable Biomaterials (RSB) Advanced Products certification

ISCC PLUS certification ensures **full traceability of certified materials along the supply chain,** which follows different chain of custody options

Certified materials can be traced back throughout the supply chain, resulting in **more credible and trustworthy claims** on end products

* The FSC license code for Tetra Pak is FSC™ C014047

Plant-based plastics from sugarcane

The use of polymer derived from sugarcane, instead of fossil virgin sources, **increase the renewable content** of the package and **reduces** the package's **environmental impact.**

1. **Straw made from polymers derived from sugarcane**
2. **Lamination layer made from polymers derived from sugarcane**
3. **External layer made from polymers derived from sugarcane**
4. **Caps made from polymers derived from sugarcane**

BON SUCRO
The global sugarcane platform
Certified Bonsucro Member

In 2023, we sold **10,4* billion plant-based packages** and **12,6 billion plant-based caps**, made from segregated plant-based polymers, fully traceable to their sugarcane origins.

Bonsucro website: www.bonsucro.com
*Volumes exclude Blend in BIO (BiB) sold in Brazil. BiB is a mix of 75% LDPE and 25% plant-based LDPE.

An example of CO_2 reduction derived from the conversion to plant-based polymers

Example

Plant-based renewable content increase by 12%; reduction Co2 by 21%

Standard package → Plant-based Straw → Plant-based polymers + Optional Tetra Pak® Craft for lower weight & visual distinction

71%* plant-based materials

22% fossil-based polymers

19g CO_2 footprint cradle-to-grave

83%* plant-based materials

only 10% fossil-based polymers

-21% CO_2 **reduction** vs. fossil version

Tetra Brik® Aseptic 200 Slim (fossil-based)

Tetra Brik® Aseptic 200 Slim (plant-based)

Source: Packaging specification for share of plant-based material and fossil-based polymers. Carbon Trust™-certified Tetra Pak internal 'Carton CO_2 Calculator' model version 10 (valid from April 2024), Geography: Tetra Pak Rest-of-the-World Average, for carbon footprint and reduction.
*The total share of plant-based material in the package is based on the sum of paperboard and plant-based polymers, based on weight.

Two portfolio offers to address different customer needs

Allocation to either 100% or 30% of the total package polymers' weight

Solution	**30% certified recycled polymers**	**100% certified recycled polymers**
Customer need	► 1st step into Circular Economy ► Aligning with potential upcoming legislative targets	► Lead on Circular Economy ► Strongly enhance brand sustainability profile

Please note: certified recycled polymers are today available only for polypropylene and polyethylene, therefore excluding other plastics, e.g. polyamide in Tetra Recart®, EVOH in Tetra Top® /pbl specification. LS strip is also excluded.

Our packaging material sustainability roadmap

Steps towards maximising paper content

Higher paper content and simpler material structure

Step 1:
Replace aluminium foil layer

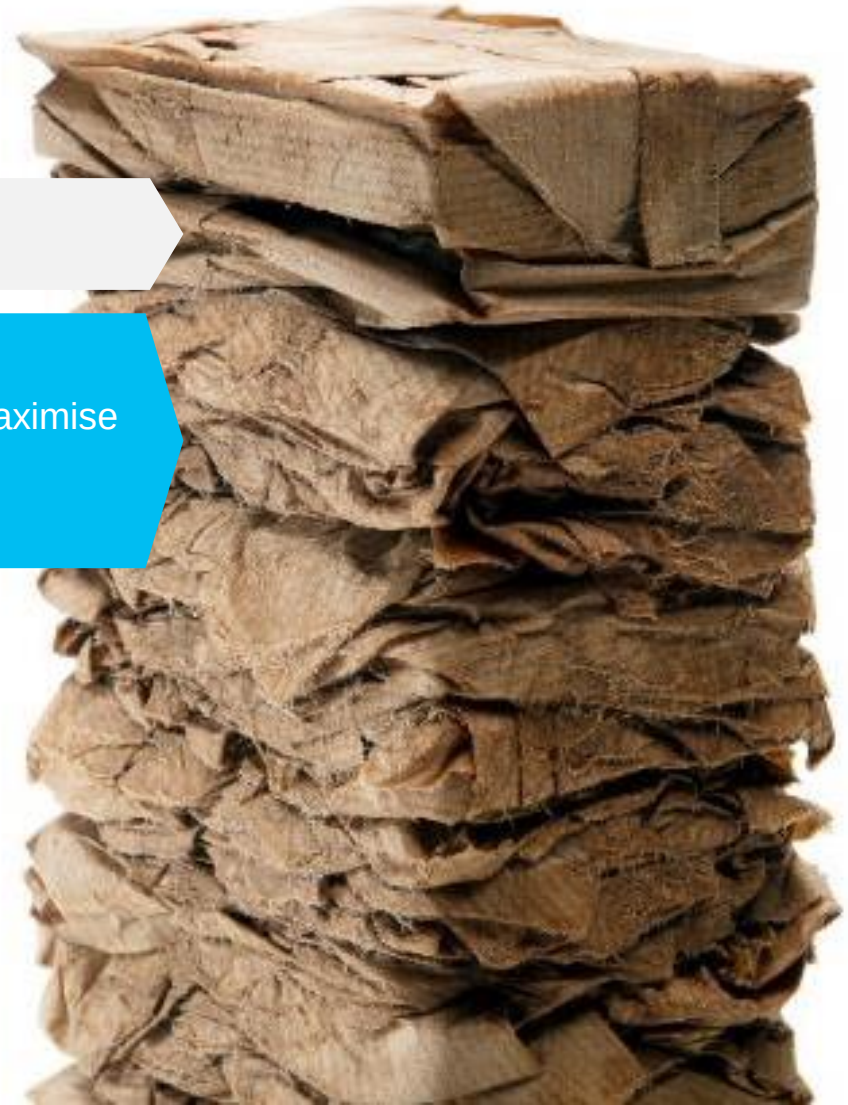
Step 2:
Fibre based barrier plus one type of polymer

Step 3:
Increase and maximise fibre content

2020
commercial technology validation of a polymer-based barrier

2022
consumer testing of a paper-based barrier

2023
Launch the Tetra Brik® Aseptic 200 Slim Leaf carton with a paper-based barrier



The achievements so far

November 2023: **world first aseptic beverage carton with paper-based barrier on shelf with Lactogal, Portugal**

The paper-based barrier increases the renewable content of the package to 90%

Made of approximately 80% paperboard

Reduces its carbon footprint by one-third (33%*)

*Source: Carbon Trust™-certified Tetra Pak 'Carton CO2 Calculator' model version 9 (valid from 2023-01-01). Scope: cradle-to-grave measurement of a Tetra Brik® Aseptic 200 Slim Leaf carton with plant-based polymers in coating and paper-based barrier compared to a standard Tetra Brik® Aseptic 200 Slim Leaf package. Geography: EU Industry data.

How to contribute to sustainability in plant operations?

Solutions to reduce environmental footprint will also reduce operational cost

CLIMATE

Energy reduction

Product loss reduction

Freight and travel reduction

WATER

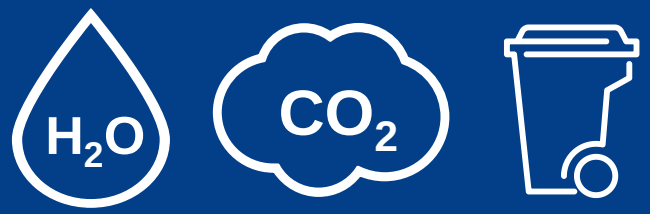
Water reduction

WASTE

Product loss reduction

Detergent recycling

Other material waste reduction



Assessments to understand performance and identify gaps
CIP improvement
High quality components
Plan maintenance to avoid waste
Go digital/virtual
Capable workforce

Introducing our sustainability heroes

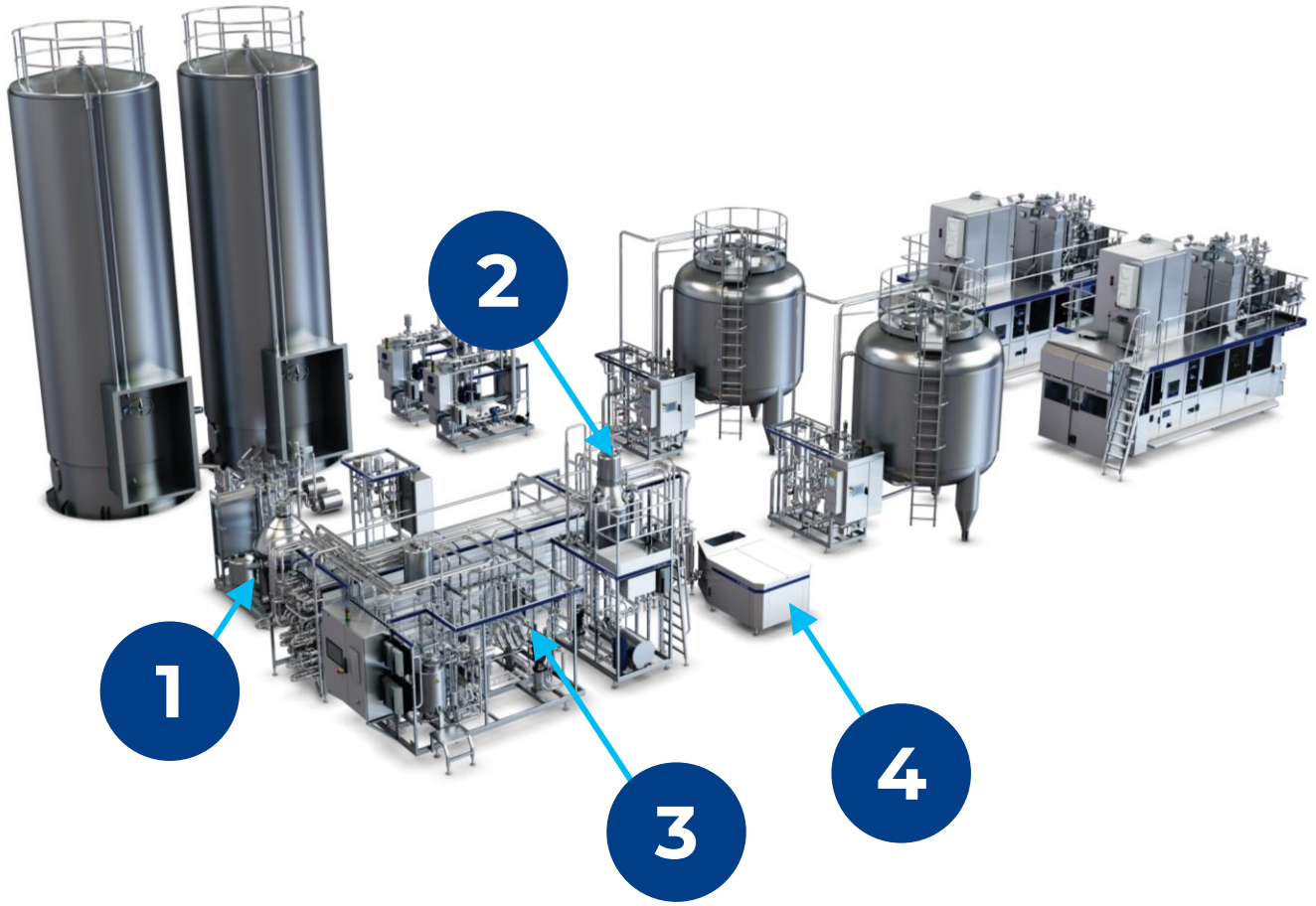
Increase your productivity
and reduce energy consumption

CAN YOU FIND KEY COMPONENTS IN THIS PROCESSING SOLUTION

How many units of key components?

A typical Processing Dairy UHT solution can have up to 4 key components as part of the line:

- Separator
- High Shear Mixer
- Tubular Heat Exchanger
- Homogenizer



KEY BENEFIT:

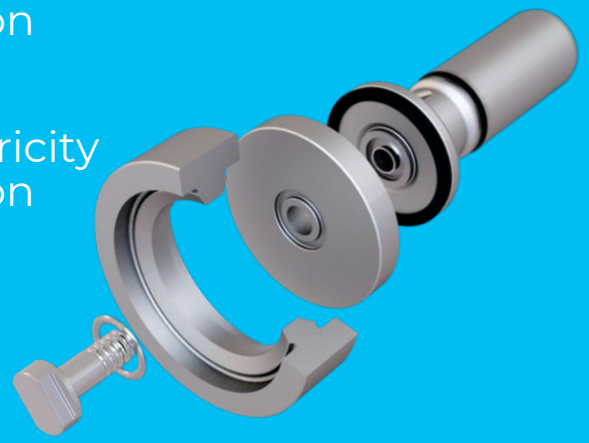
- Plug and play units
- Flexibility and high efficiency
- Easy to operate, integrate with any line solution

Homogenizer

Turnable part, doubles spare part lifetime, reduces energy consumption

Up to 30% lower energy consumption

- Lower water consumption
- Lower electricity consumption
- Double lifetime



Tetra Pak® Homogenizer 500
with the highest capacity in our portfolio

Energy reduction up to

30%

Cuts cooling water by

80%

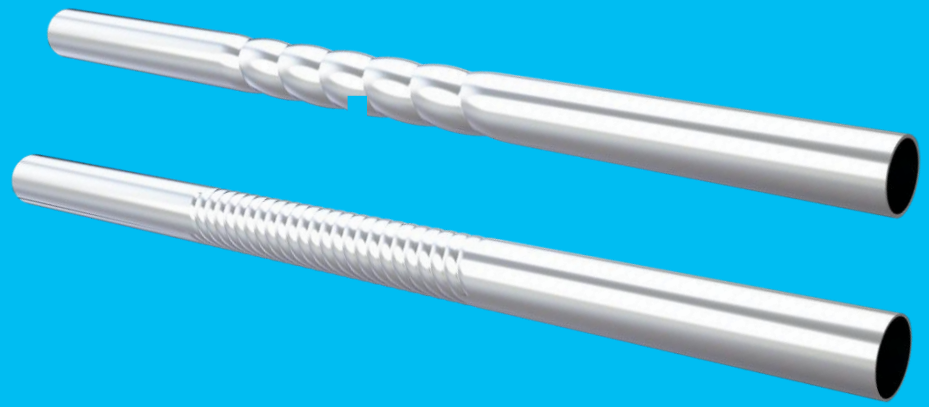
Vs. Tetra Pak Homogenizer 400

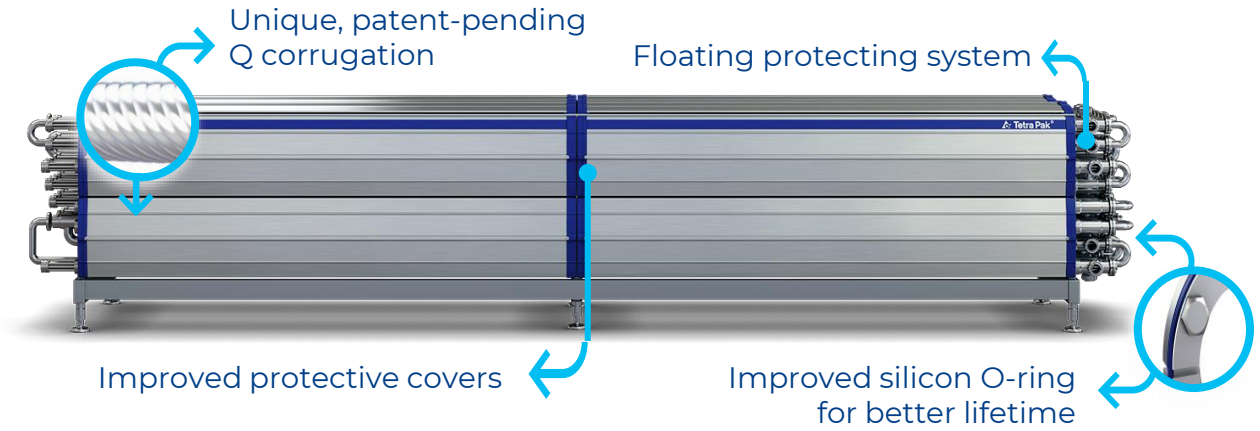
Heat Exchanger

Unique, patent-pending
Q corrugation, less consumption

Less pressure drop

Smaller pump lowers
electricity costs by up to 40%





Energy reduction up to

40%

IMPROVED SUSTAINABILITY & COST EFFICIENCY

40% reduction

GREATER ROBUSTNESS, RELIABILITY & FLEXIBILITY

Durable design, easy inspection
and exchange of parts.

BEST-IN-CLASS FOOD HYGIENE/SAFETY

The only tubular heat exchanger
with EHEDG certification.

Separator

AirTight Technology, no air
in the system, more productivity

LESS AIR FRICTION, LESS SEPARATION FORCE IS NEEDED

Saving energy, up to 40%

MINIMAL USE OF WATER

Saving water, 20% less

NO OVERFLOW AND ACCURATE DISCHARGES

Less waste

Saving water by

20%

Energy reduction up to

40%

Module on skid mount

easy to move
and install

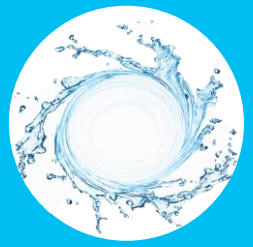
Double operational lifetime with Duplex material for Bowl

Filtration

White water recovery

WHITE WATER (3/3)

is a flush water that can collect from tanks, silos, pipes and process module.
Normally consider as waste and goes to drain

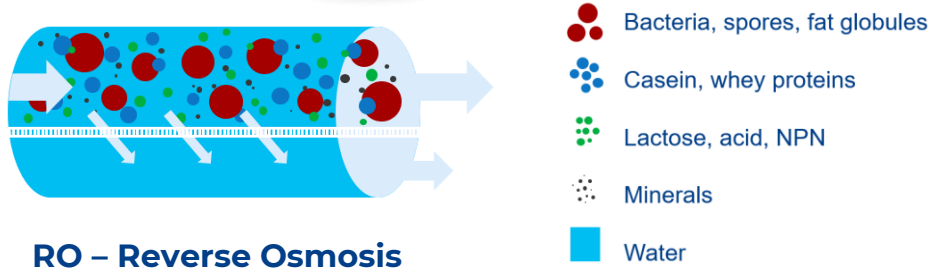


RECOVERED WATER (2/3)

Recovered water can be used for steam boiler and cooling water, flushing, CIP and cleaning

RECOVERED MILK (1/3)

Recovered milk solids can be used for any Dairy products subject to local legislation



RO – Reverse Osmosis

LESS WASTE, PRODUCT LOSS, EFFLUENT LOAD AND ENVIRONMENTAL FOOTPRINT

REDUCES WATER CONSUMPTION AND OPERATING COST

INCREASE PROFITABILITY

Liquid Food Line Sustainability Upgrades

Energy
Water
Chemicals
Product & Material Waste

Tetra Pak® CIP unit

Tetra Pak® Aseptic Tank

Packaging Upgrades

Plant level upgrades

Automation upgrades

Tetra Pak® Homogenizer

Tetra Therm® Aseptic VTIS

Four Steps to support our customer with a Sustainable Food Production

- **AVOID** unnecessary resource use via a sustainable portfolio
- **RECOVER** the resources via recovery solutions on a plant-wide scale
- **OPTIMISE** for an optimal efficiency & environmental performance via service solutions
- **NEUTRALISE** the remaining emissions/losses to achieve a sustainable food production

Questions?


Be:
natural
Be:
natural
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natural
Be:
kind
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circular
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circular

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www.tetrapak.com