assomac

NATIONAL ASSOCIATION MANUFACTURERS
OF FOOTWEAR, LEATHERWOODS
AND TANNERY TECHNOLOGIES

Best practices towards a sustainable tannery sector in Arequipa

treedom

UNIDO
UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION

ITPO
ROME, ITALY

UNIC
CONCERIE ITALIANE

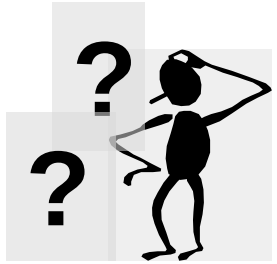
CITEccal
Arequipa

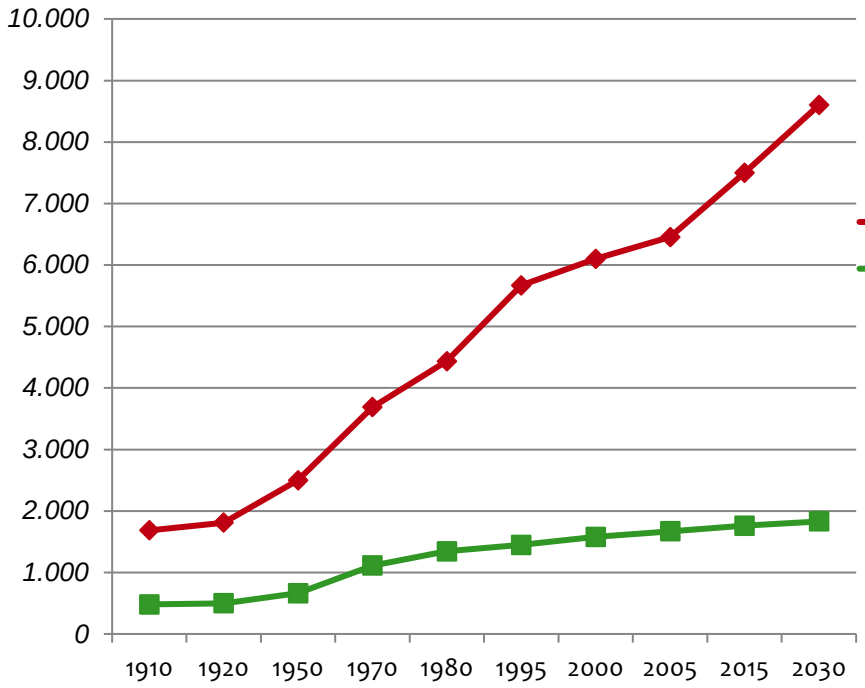
SUPPLIER OF SUSTAINABLE TECHNOLOGIES

GLOBAL TREND OF MEAT CONSUMPTION

…TANNING…
historically oldest recycling process

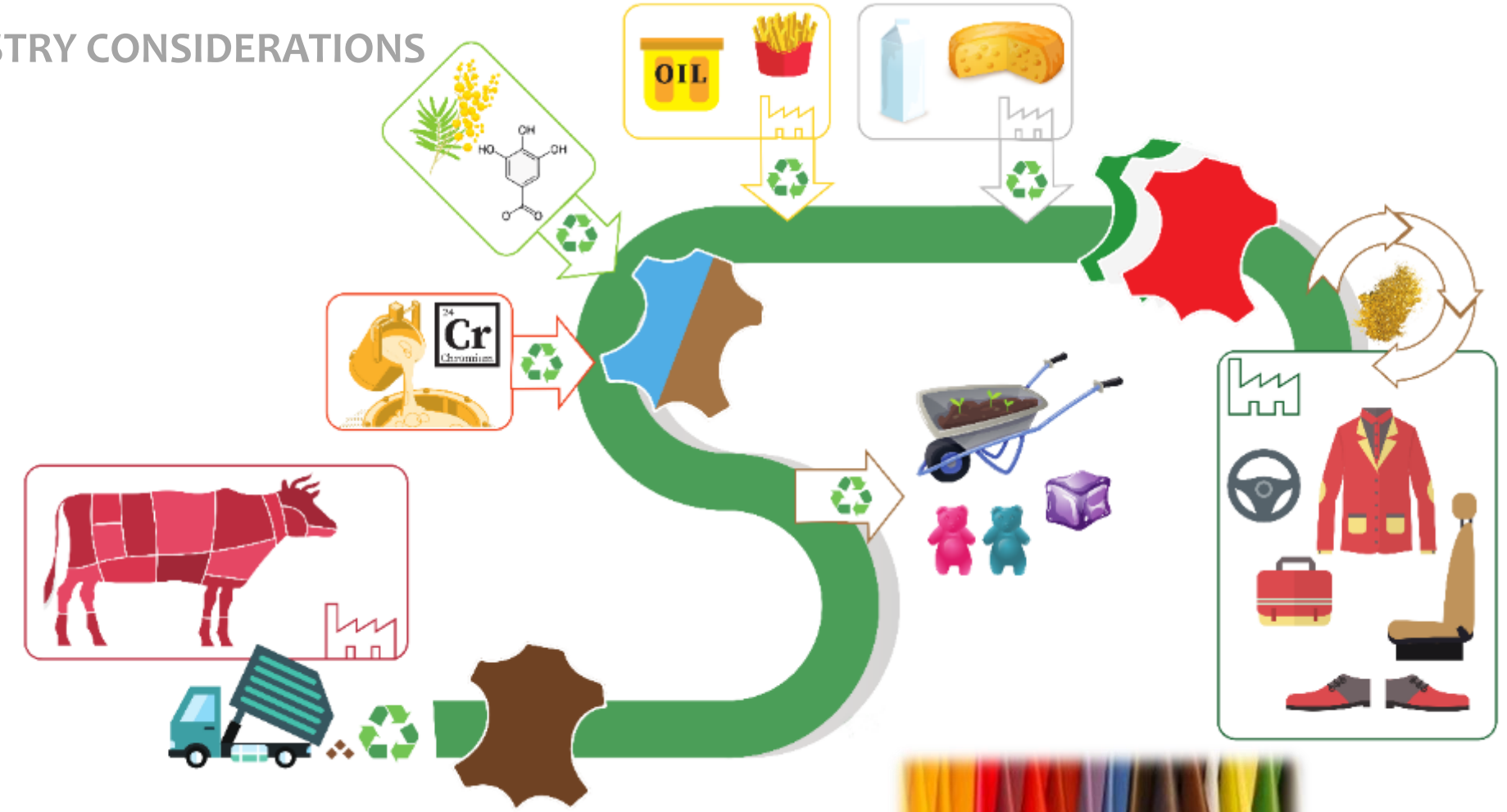
TANNERY INDUSTRY CONSIDERATIONS





raw hide represents something between ***6-10%*** *(bovine) of the market value of an animal.*

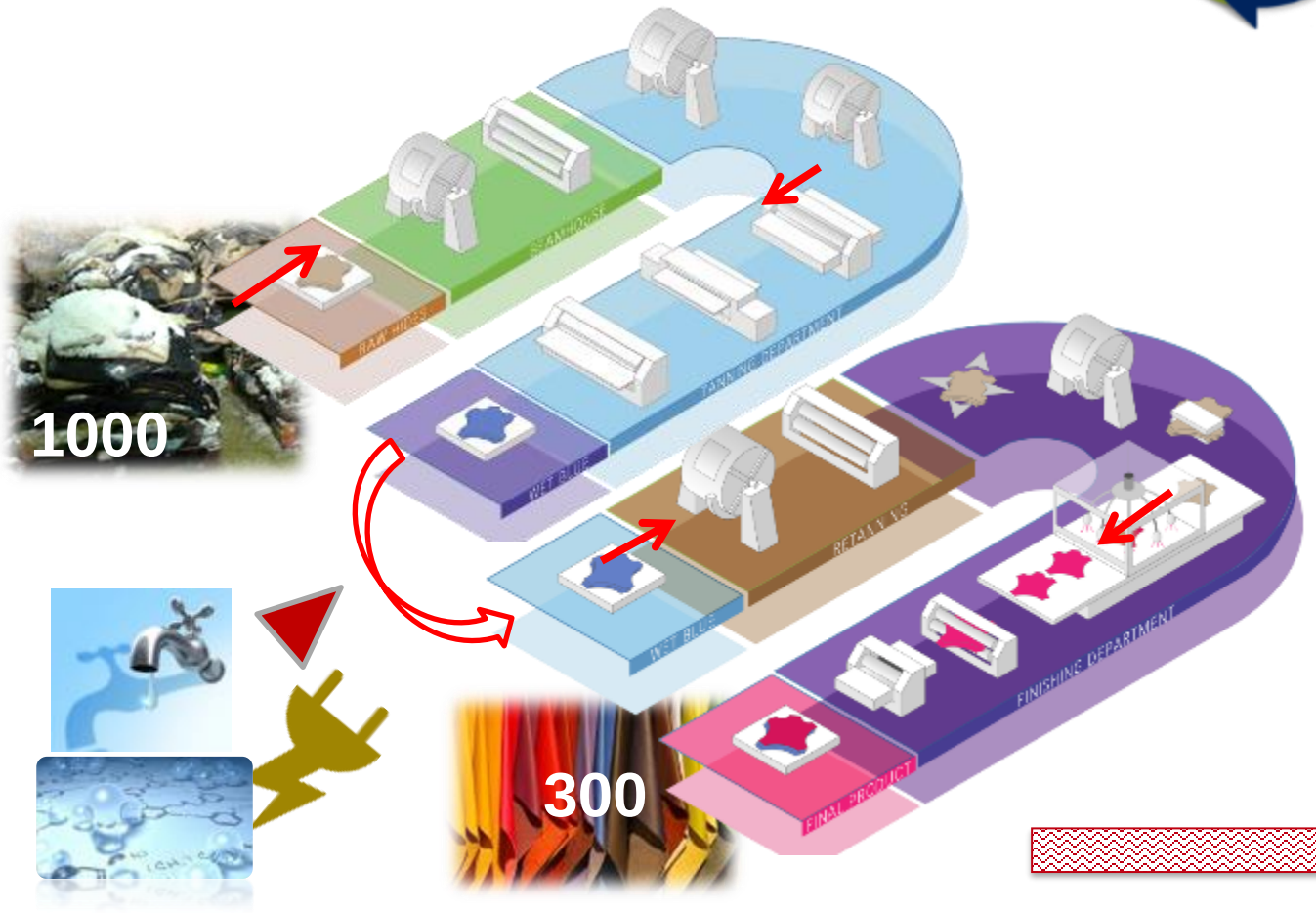
TANNERY INDUSTRY CONSIDERATIONS



GOOD MANUFACTURING PRACTICE

Established procedures:

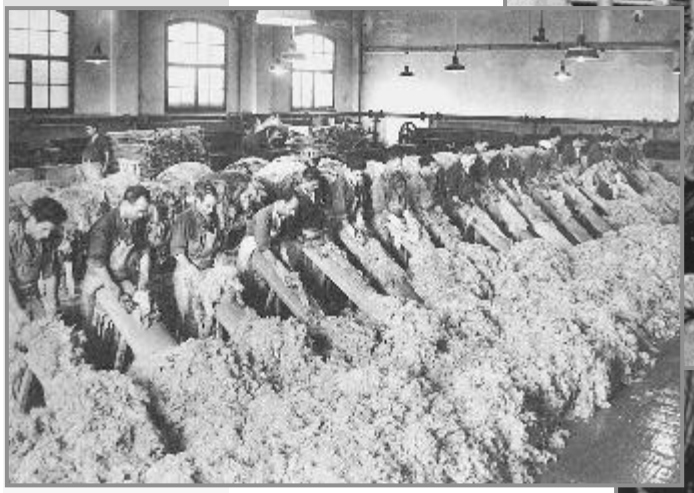
- Instruction to personal
- Traceability of production
- Hygiene in Production
- Complains and Recall
- Sustainable facilities



30-40 m3 waste water
450-550 Kg solid waste
200 – 250 kg COD
80-100 kg BOD

FROM HISTORY…

Italy 1950



… TO REALITY

TECHNOLOGY and INNOVATION:

- Performance
- Reliability
- Sustainability

RAW HIDES

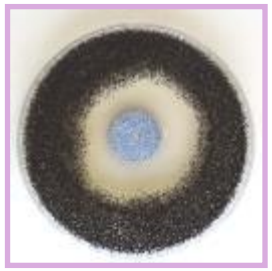
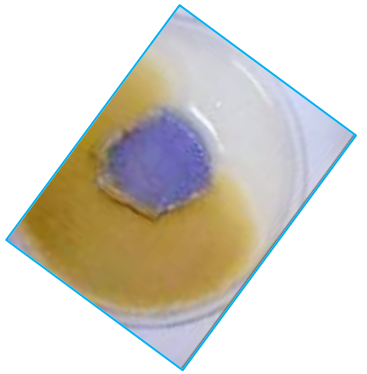
slaughtering

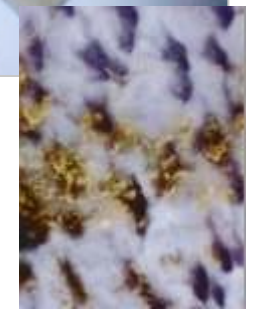






conservation

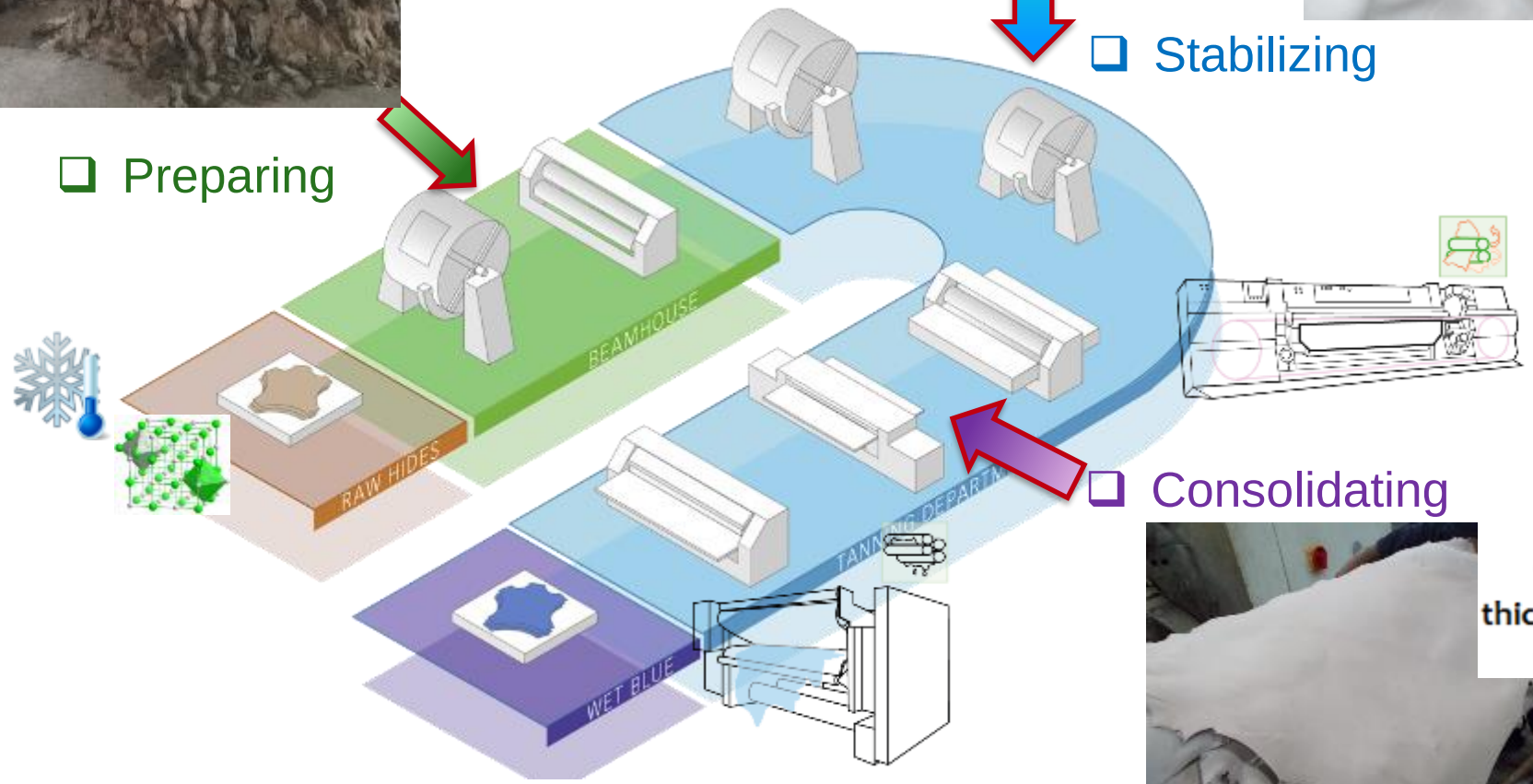





WET PHASE: Key Points

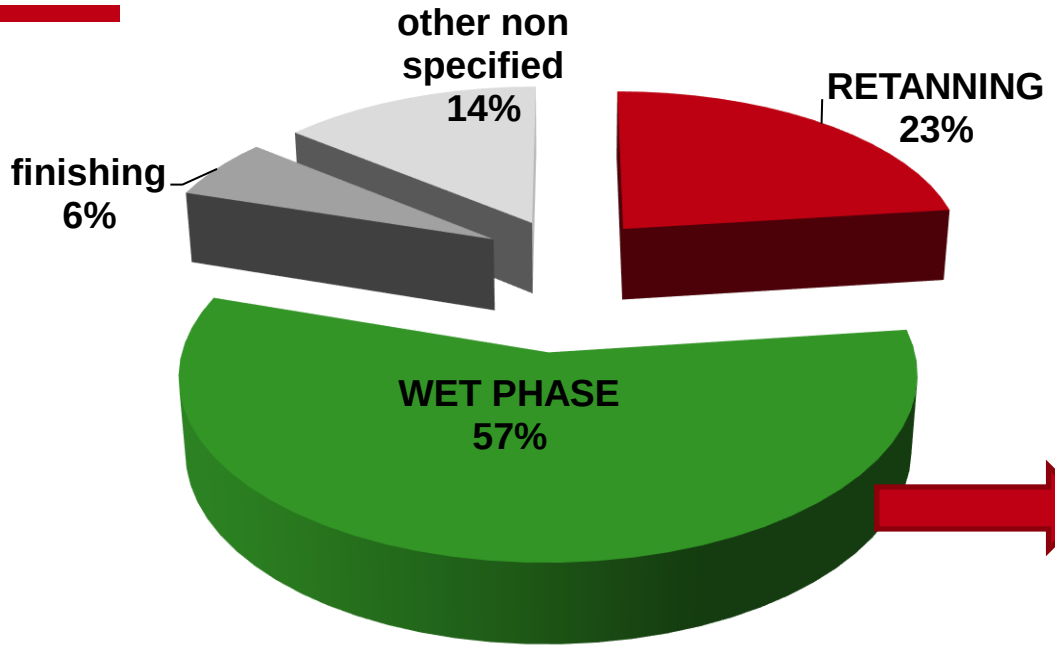
❑ Stabilizing

❑ Preparing

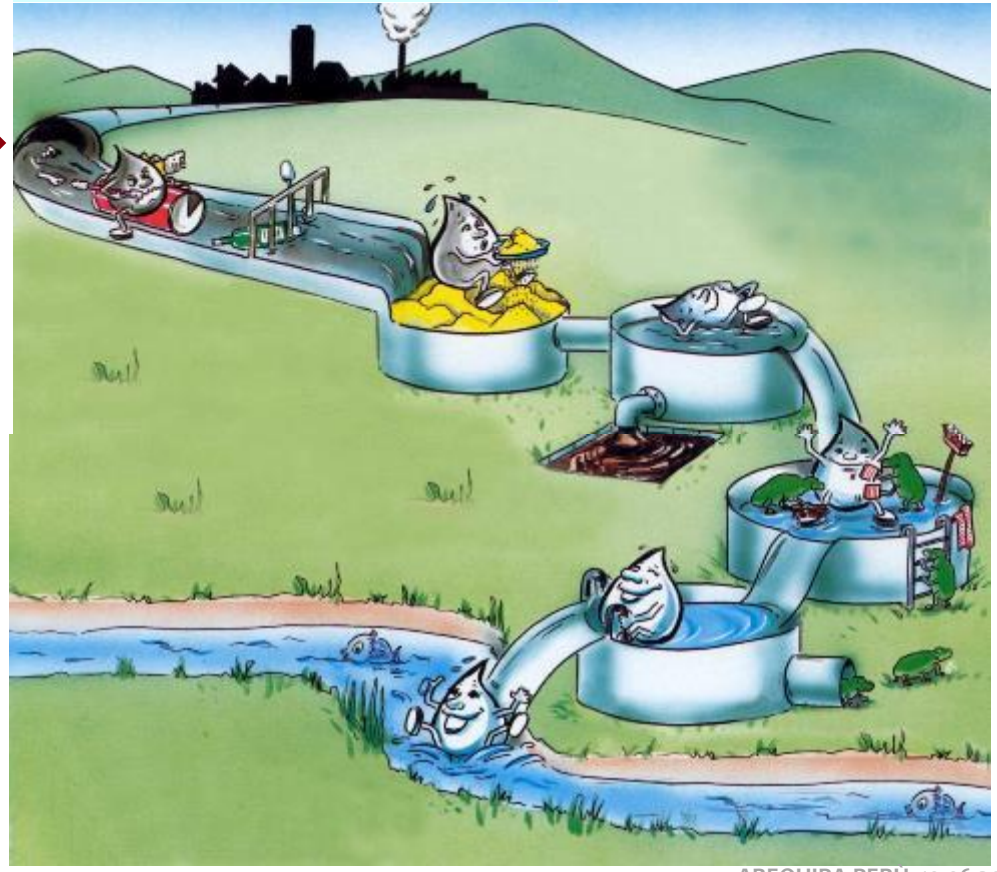


❑ Consolidating

WATER CONSUMPTION



TREATMENT

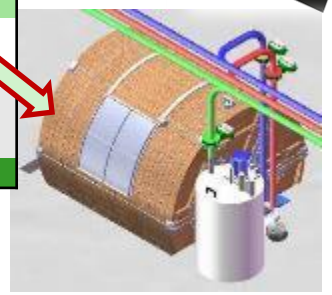


….RECYCLING….

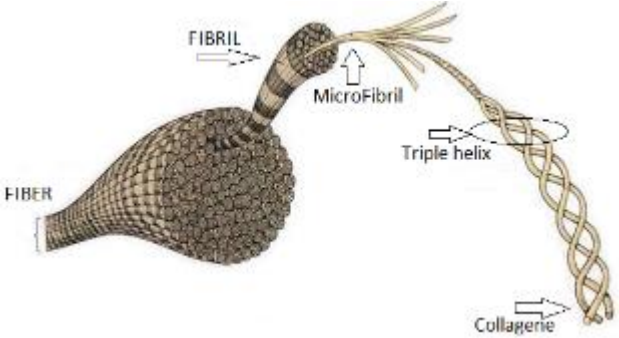
DRUM EVOLUTIONS…

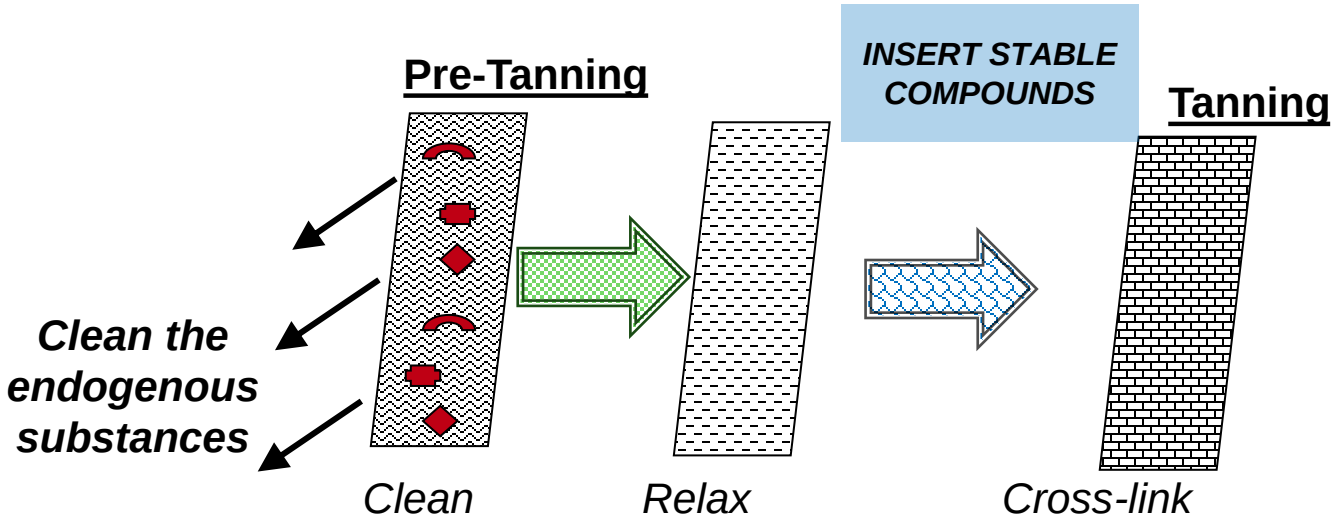
R…otating
B…iochemical
R…eactor

FEATURE	BENEFIT
INVERTER	ENERGY
	ROTATION
MATERIAL	GEOMETRY
	SURFACE
CONTROL	PARAMETERS
	REPEATIBILITY
TOOLS	MIXING
	RECYCLING

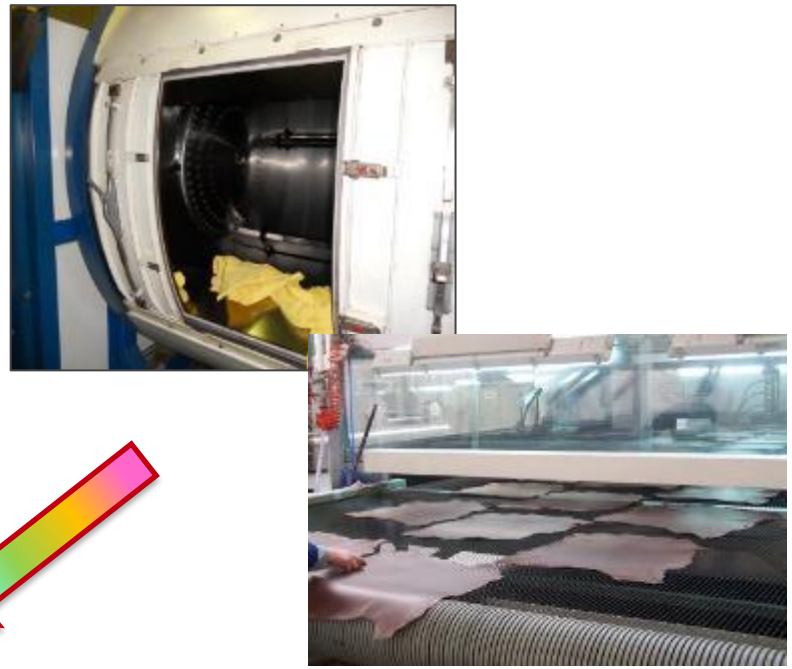


Tanning process is …“puzzle di competenze”



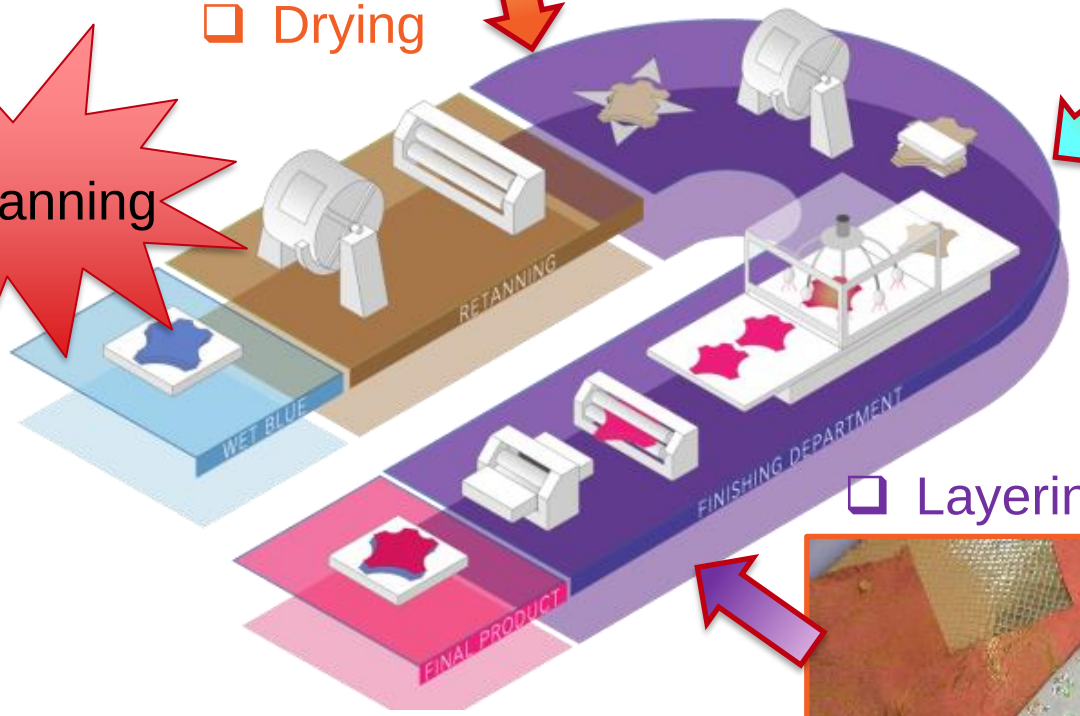


FINISHING, Key points



❑ Drying

❑ Retanning



❑ Coating

❑ Layering

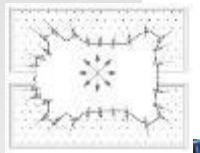
DRY TECHNOLOGIES GUIDELINE

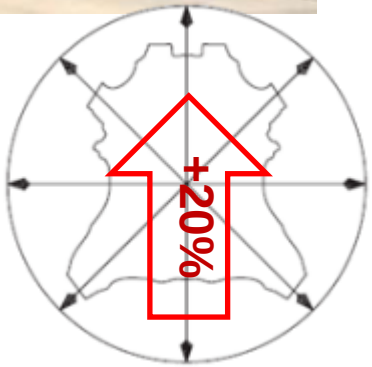
Temperature

Humidity

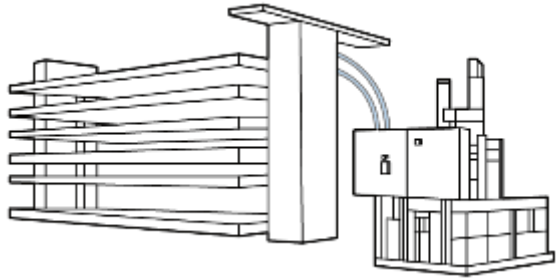
Cooler

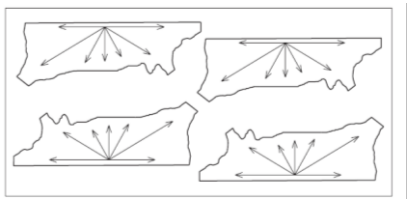
❖ TOGGLING



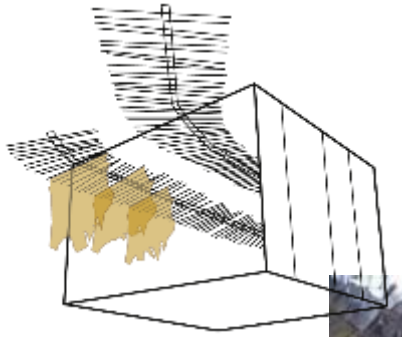


❖ VACUUM DRYER

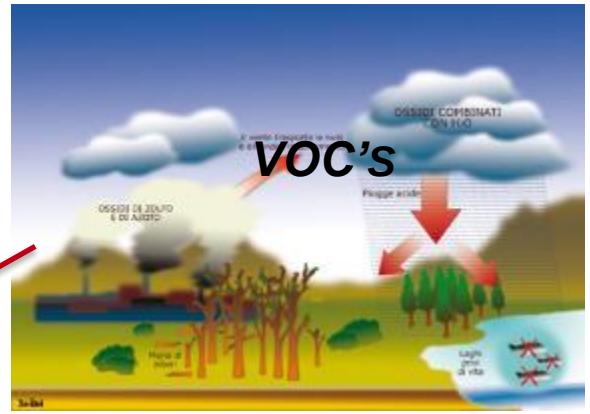




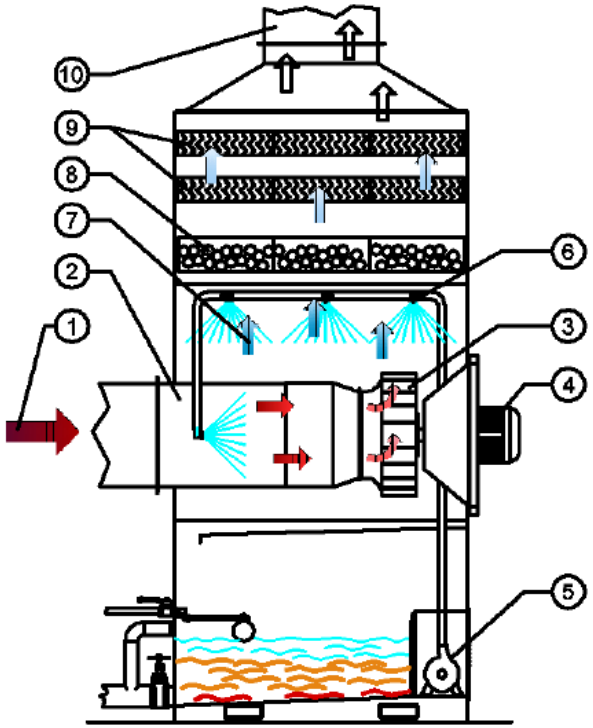
❖ OVERHAED TUNNEL



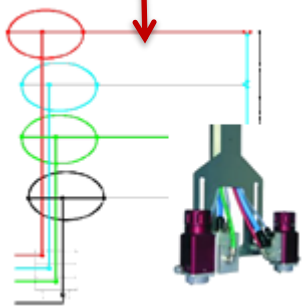
FINISHING TECHNOLOGY

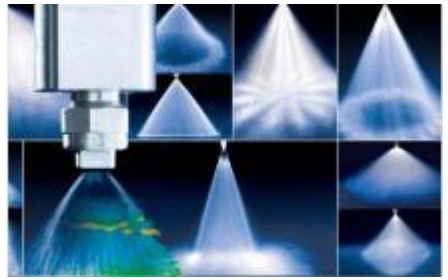


❖ **EMMISSION, *control***

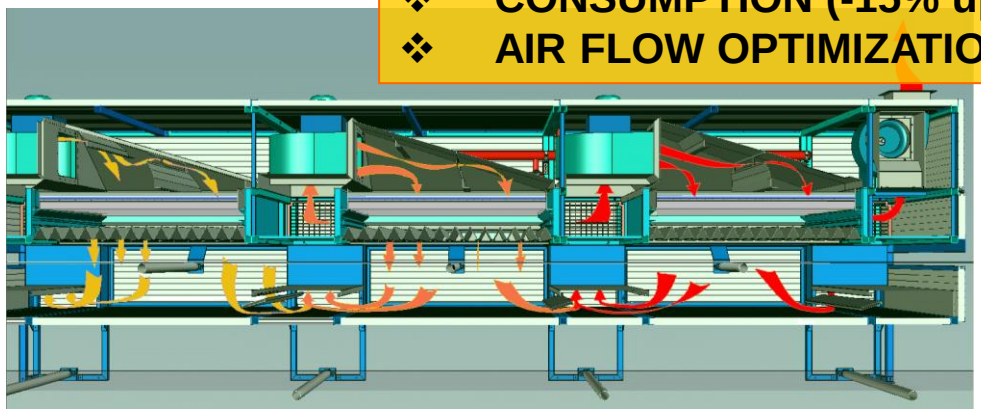


❖ **FLEXIBILITY (white to black)**
❖ **UNIFORMITY (coverage)**





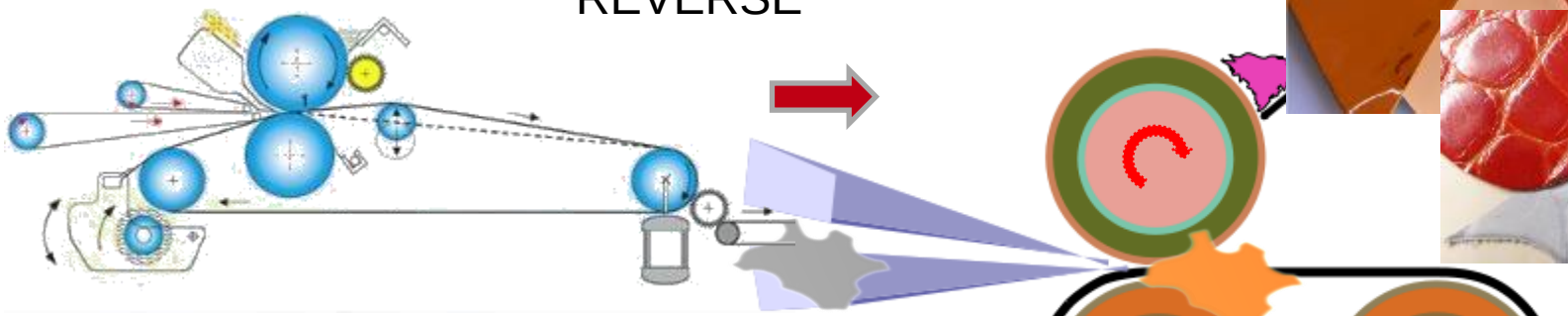
❖ **CONSUMPTION (-15% up to 50%)**
❖ **AIR FLOW OPTIMIZATION**



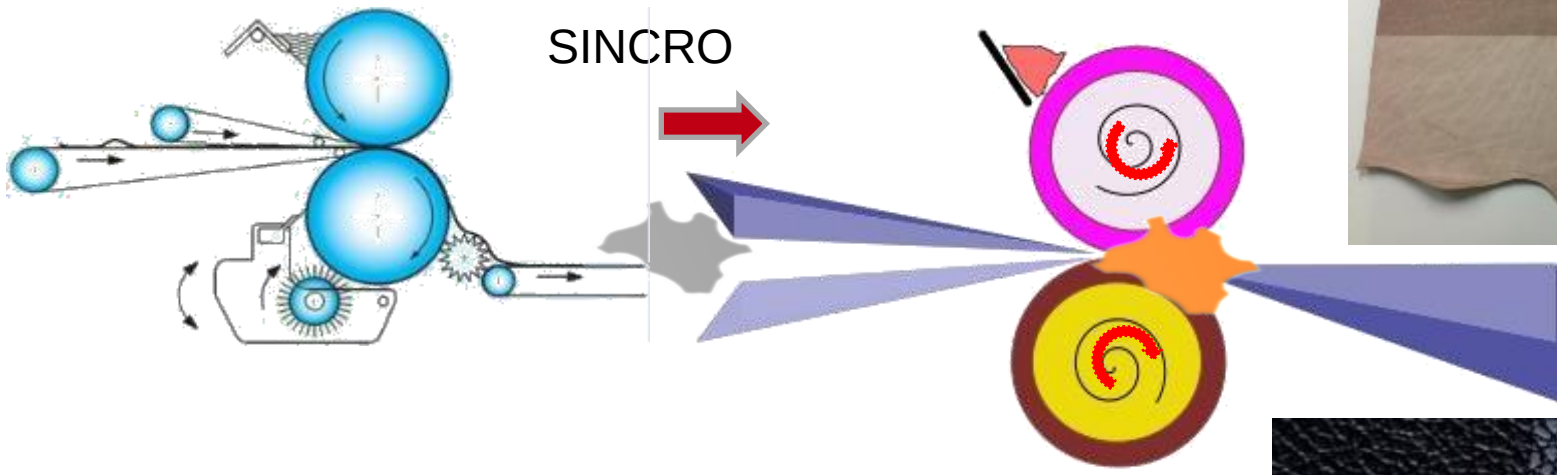

Erretre
Chemical Milling
Erretre
Chemical Milling

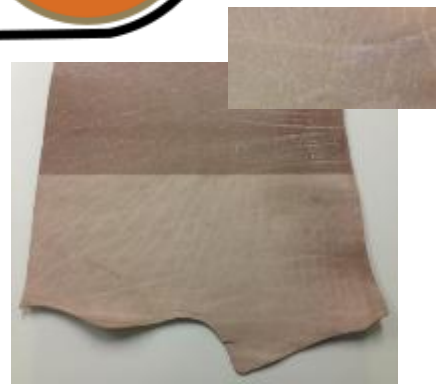
FINISHING TECHNOLOGY

REVERSE

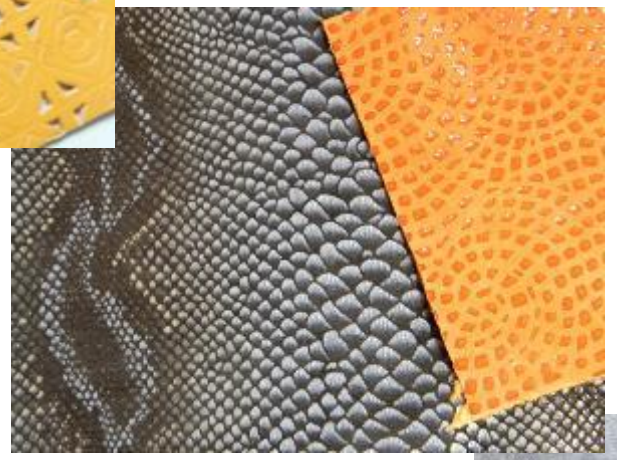


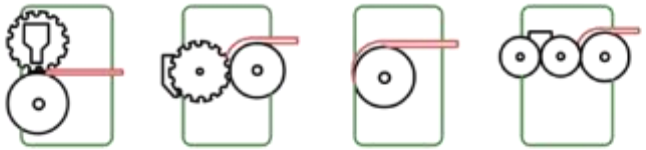
SINCRO

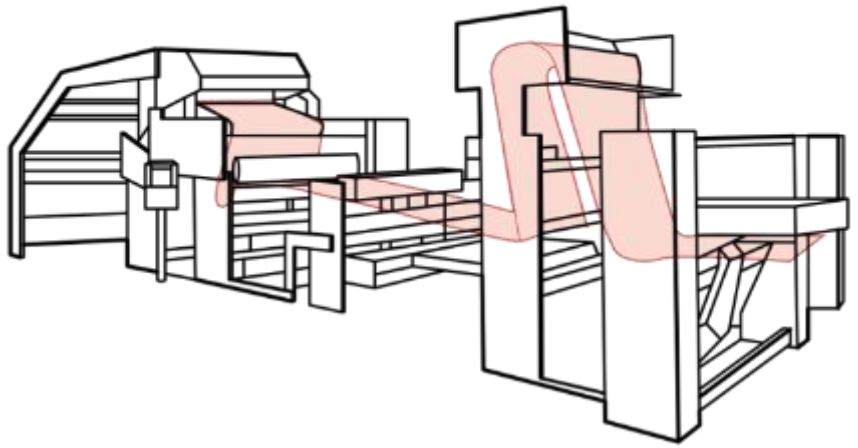


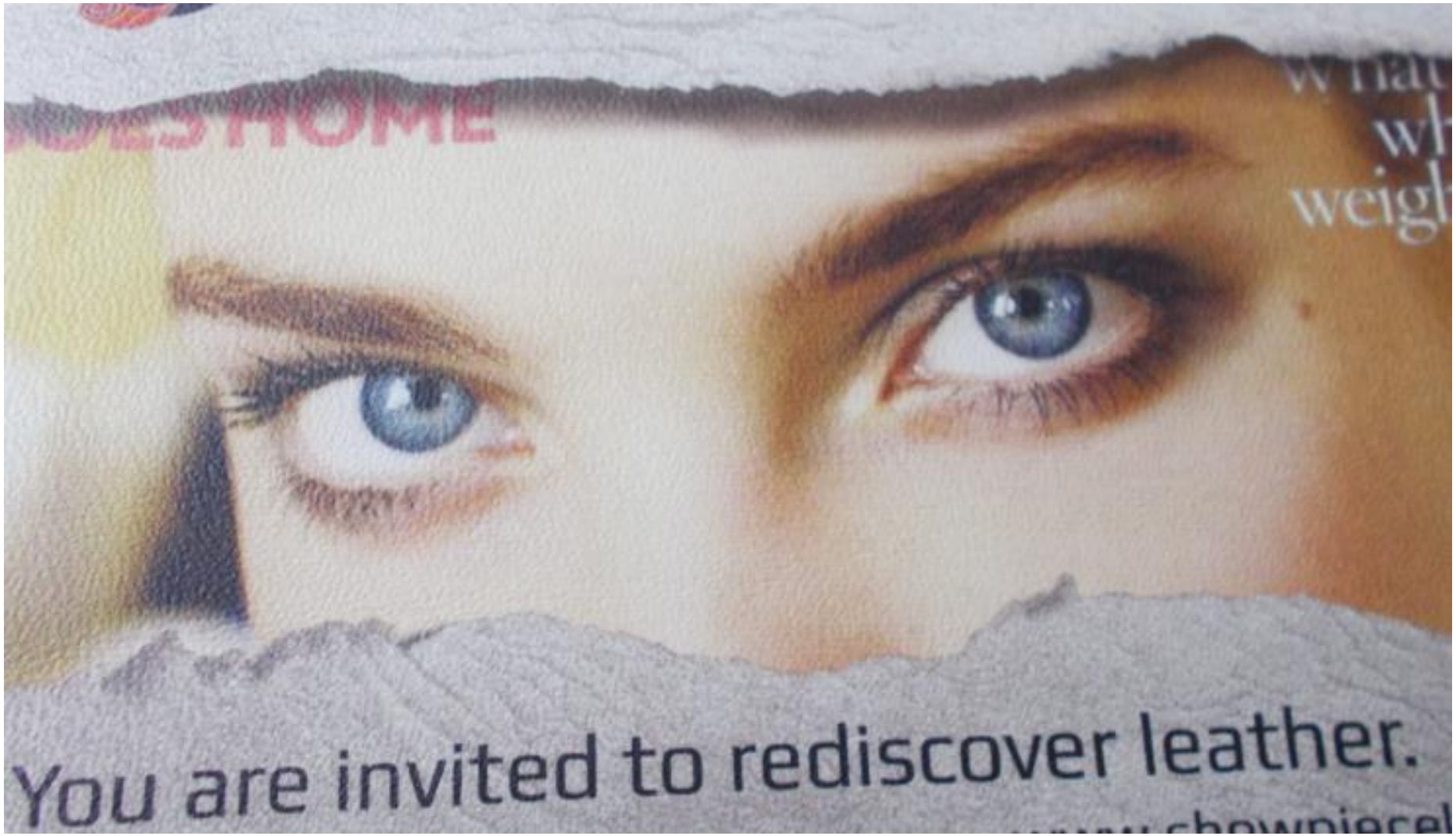


FINISHING TECHNOLOGY








You are invited to rediscover leather.

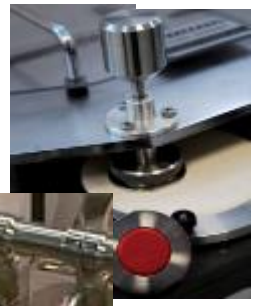
Q.C.

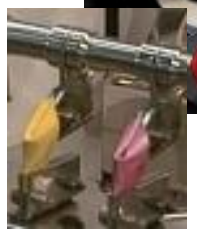
REACH

Cr 6+

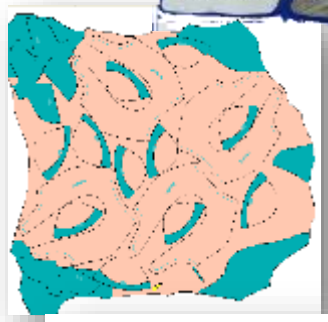
2015 MANUFACTURING RESTRICTED SUBSTANCES LIST VERSION 1.1

Ø ZDHC ZERO DISCHARGE OF HAZARDOUS CHEMICALS PROGRAMME



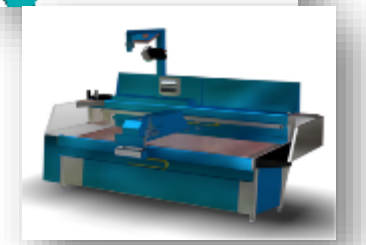


OEKO-TEX®
CONFIDENCE IN LEATHER
LEATHER STANDARD

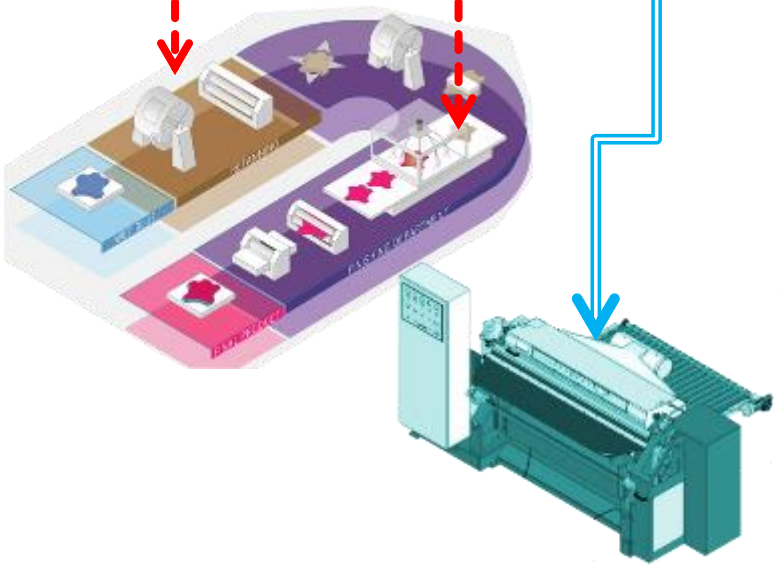


Voluntary Label

Only this certificate guarantees products made in Genuine Italian Vegetable-Tanned Leather.



Good Manufacturing Practice Certification
GMP Quality



EVOLUTION…

INDUSTRY 4.0

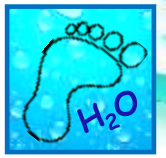
I ntuitive interface
N etworking into process chain
D ata exchange/communication
U ser friendly, reproducible
S erviceable, predictive maintenance
T raceability of productions
R eal time management
Y ield/performance and quality

SUSTAINABLE

INFORMATIONS

CONSTRAINTS:
- Restriction; regulations (REACH)
- Product requirements; (BRAND/OEM)

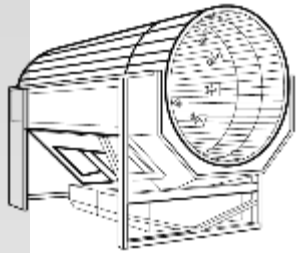
CLIMATE CHANGE :
- Process efficiency
- Carbon footprint



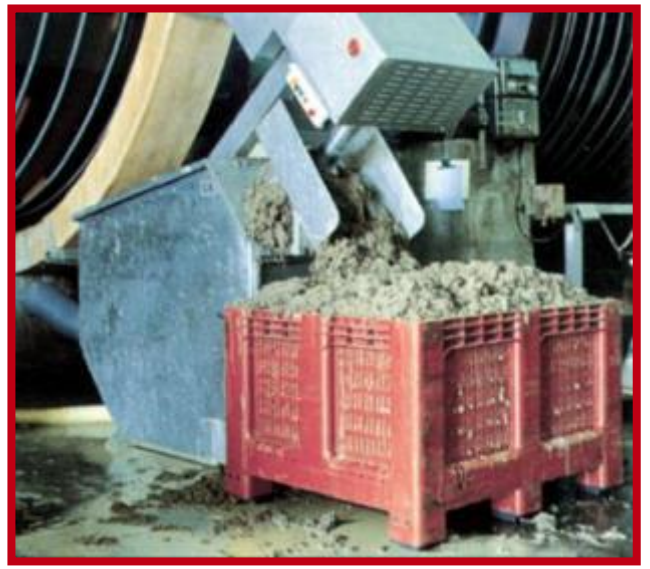
CONSUMES:
- Water preservation
- Treatment and recycling

COMMUNITY:
- *Labor (risk assessment)*
- *Social (Circular Economy)*

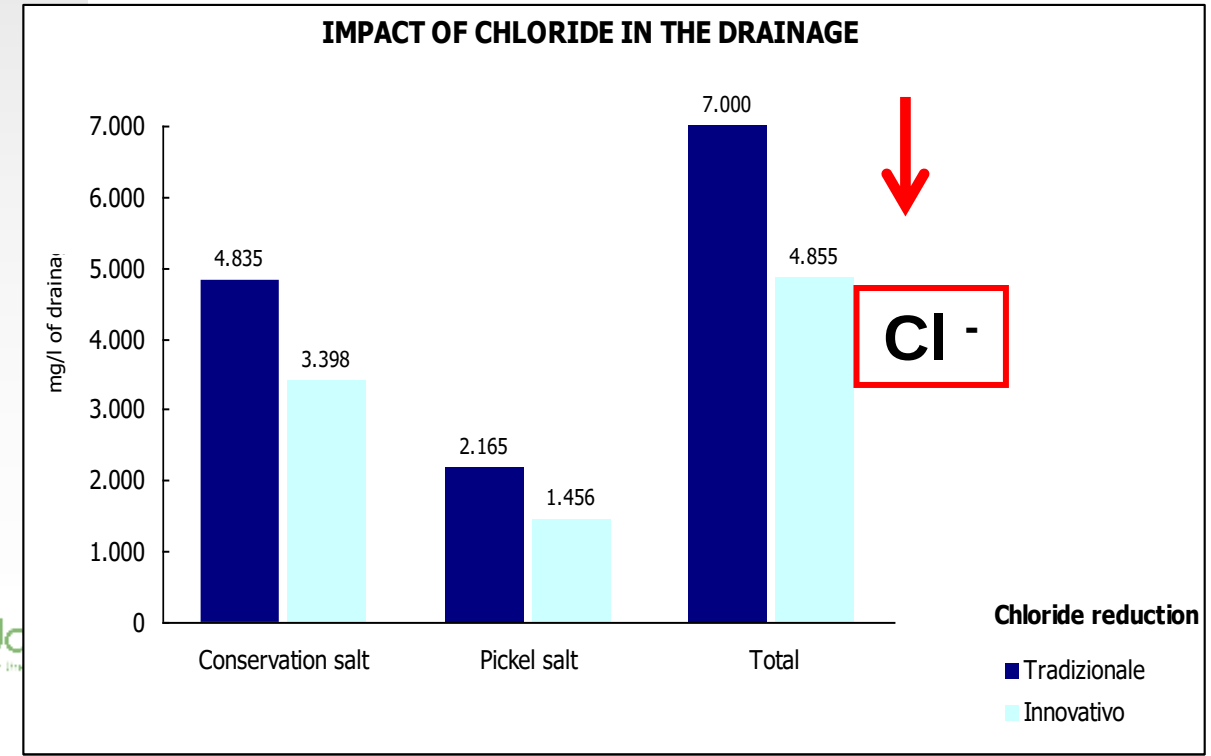
GUIDELINE IN BEAMHOUSE

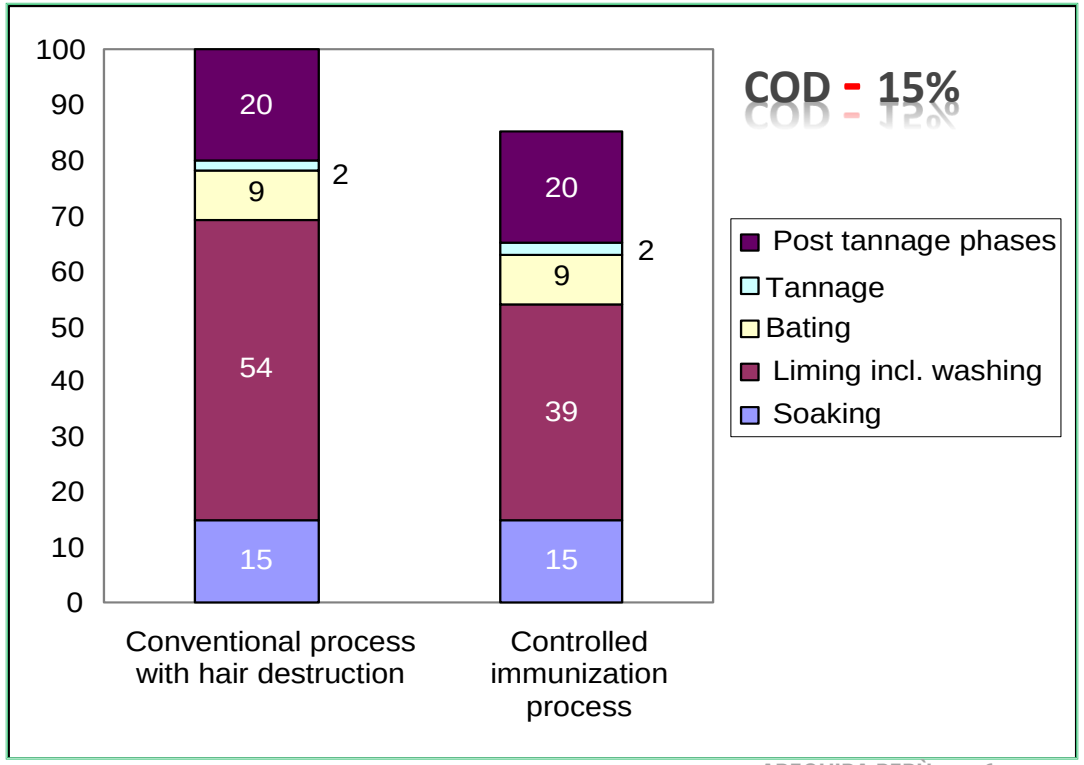


Pretreatment



Hair Recovery





RECYCLING IN WET PHASE

LIMING BATH

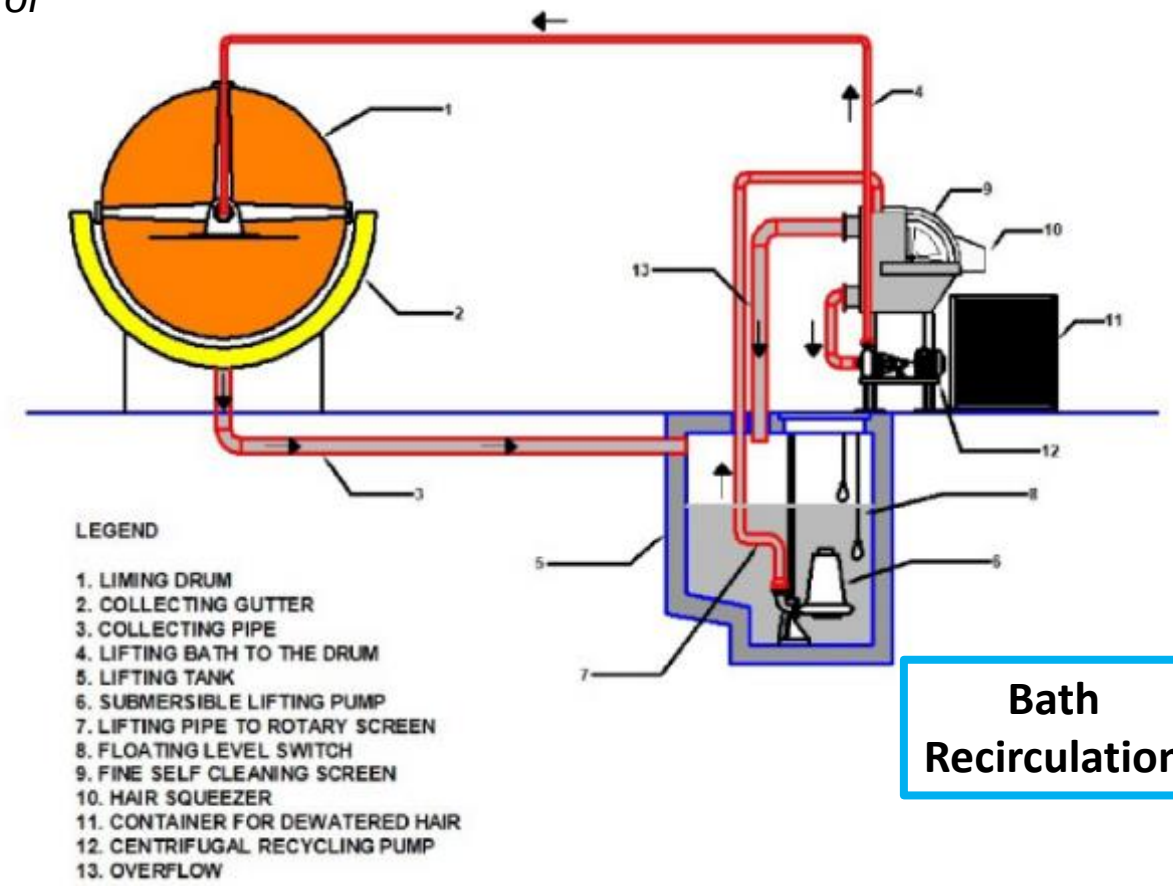
- The recycling of the bath further cuts down the pollution coming from liming
- It is possible to save lime and sulphide.
- By combining recycling and hair recovery, *drastic reduction for COD, BOD, SS and quantities of sulphide in the waste water.*

Some study indicates that the quantity of water used for leather processing can be reduced

from 40-50m³ 1/ton to 12 30 m³ 1/ton

Green Hides
Liming
Pre-Deliming
Pre-Deliming Washing
Deliming/Bating
1st Bating Washing
2th Bating Washing
Tanning
Wet Blue

(pub. IDC Leder&Haute Markt 12-2007)
The implementation was realized in drum:
Step A in pilot plant scale (with half-hides)
Step B in industrial scale (4200kg of hides)



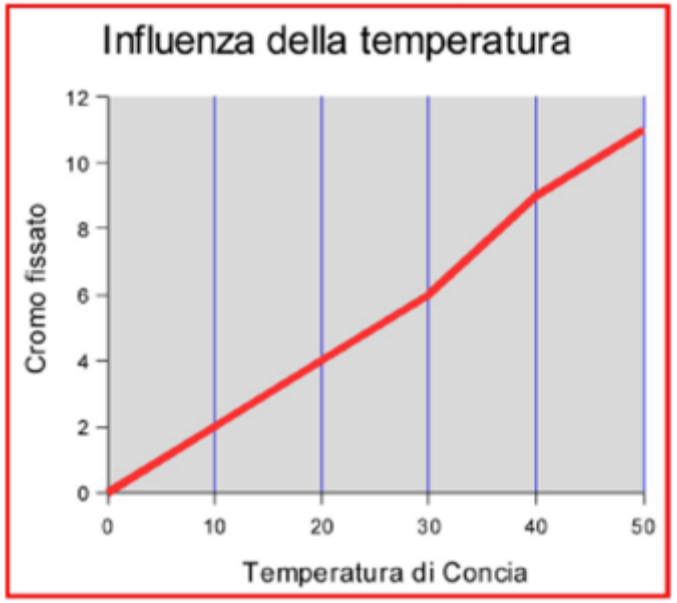
Bath Recirculation

CHROME GUIDELINE MANAGEMENT

Leather Cluster

➢**IN TANNERY** *improve Cr fixation:*

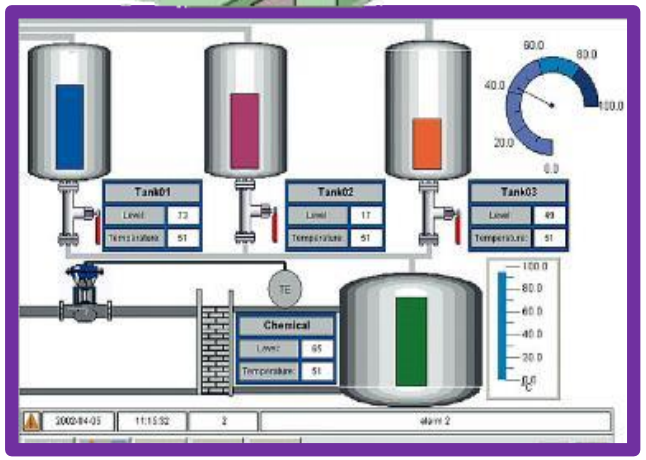
- Offered Cr (in Cr2O3)
- Length of the bath
- Final temperature of tanning
- Duration of tanning
- pH end tanning
- masking.



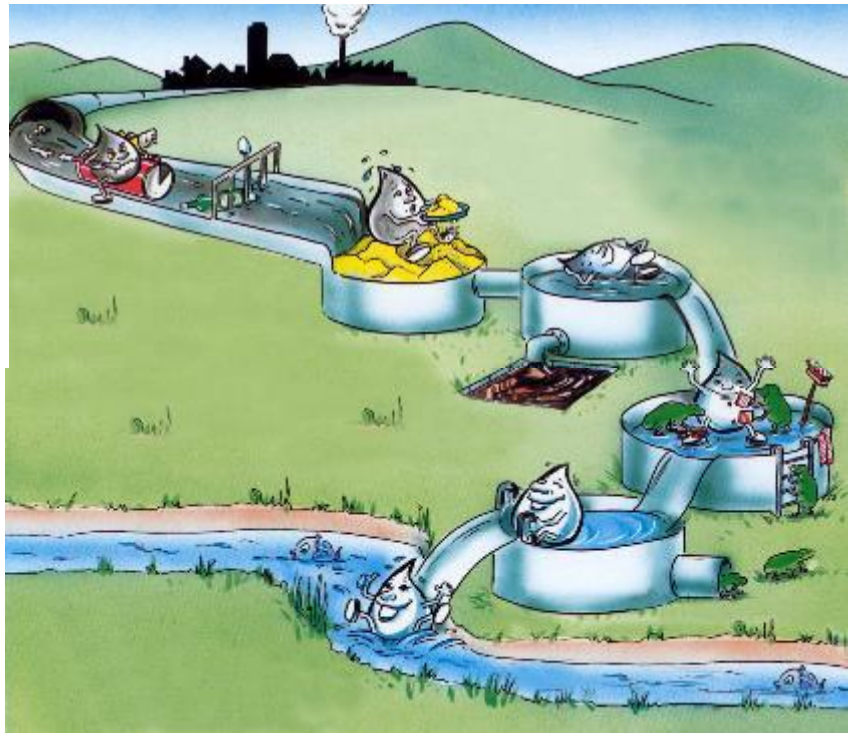
Total volume of Cr-effluents (m3/day)	80
Mean Cr III content (1) (g/L as Cr2O3)	3.25
Max. recoverable chrome (kg Cr2O3/year)	65,000
Plant working hours (2)	16 (one shift per day)
Efficiency of recovery %	**99 ca.**
Residual Cr III in the filtration waters (mg/L as Cr)	5-10

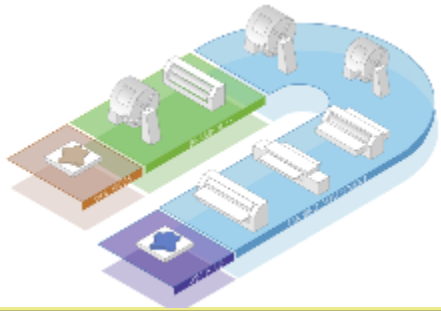
Wireless system for temperature monitoring

Steam injection system

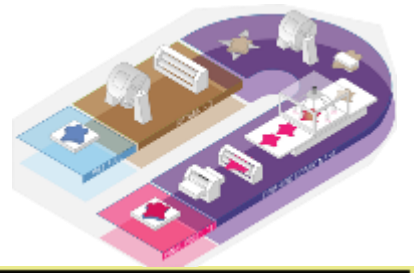


BASIC CRITERIA, for planning





From Raw to WB (value after Screening)	
CODunfiltr	8500 mg/lt
CODfiltr	5000 mg/lt
Settleable Solids	20ml/lt
SS	4000 mg/lt
Sulphides	250 mg/lt
CrIII	120 mg/lt
N-NH3	100 mg/lt
TDS	6500 mg/lt

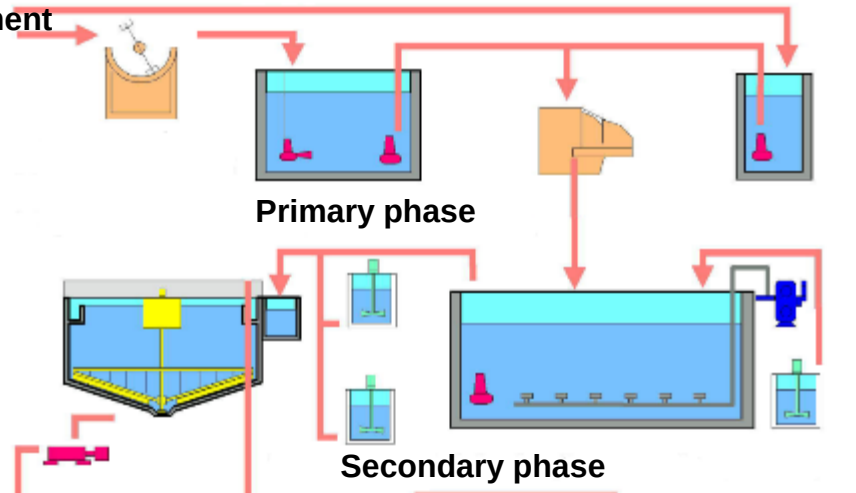


From WB to Finish (value after Screening)	
CODunfiltr.	3500 mg/lt
CODfiltr.	2500 mg/lt
Settleable Solids	20 ml/lt
SS	900 mg/lt
Sulphides	nil
CrIII	45 mg/lt
N-NH3	60 mg/lt
TDS	6500 mg/lt

Upstream …provide a good “SELECTION" for ensuring effective waste management …*Downstream*

Q.t	waste contribution			
%	Cycle	LIQUID	SOLID	GAS
	SOAKING	▲	–	–
	UNHAIRING	▲	▲	▲
	FLESHING	▲	▲	–
	LIMING	▲	–	▲
	PICHEL TANNING	▲	–	–
	SAMMYING SPLITTING	▲	▲	–
	RETANNING DEGREASING	▲	–	–
	SHAVING	–	▲	–
	BUFFING	–	▲	▲
	SPRAYING	▲	–	▲

pretretment



Sludge recovery

BIOGAS
alternative Energien

CASE OF STUDY

Tanneries Connected	130	
Capacity	1.500.00	eq. Inh
Employees	60	
Electrical power	6.500	Kw
Area covered	50.000	sq/mt

ETP ARZIGNANO
LEATHER CLUSTER

pH	**8**	
Sulphide ($S^{=}$)	**63**	**mg/l**
Chrome (Cr^{3+})	**79**	**mg/l**
COD	**5439**	**mg/l**
BOD_5	**2241**	**mg/l**
TKN	**439**	**mg/l**
TSS	**2112**	**mg/l**
Surfactants	**104**	**mg/l**
Chloride	**2278**	**mg/l**
Sulphate	**1592**	**mg/l**

Waste water (average ….)from tanneries to ETP ,*year 2010.*

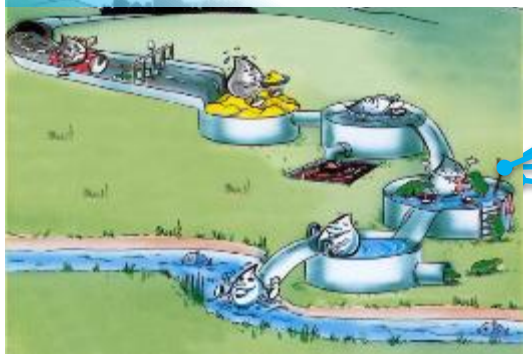
IN ≅ flow rate of industrial wastewater (by a specific sewer):
30.000 m^3/d

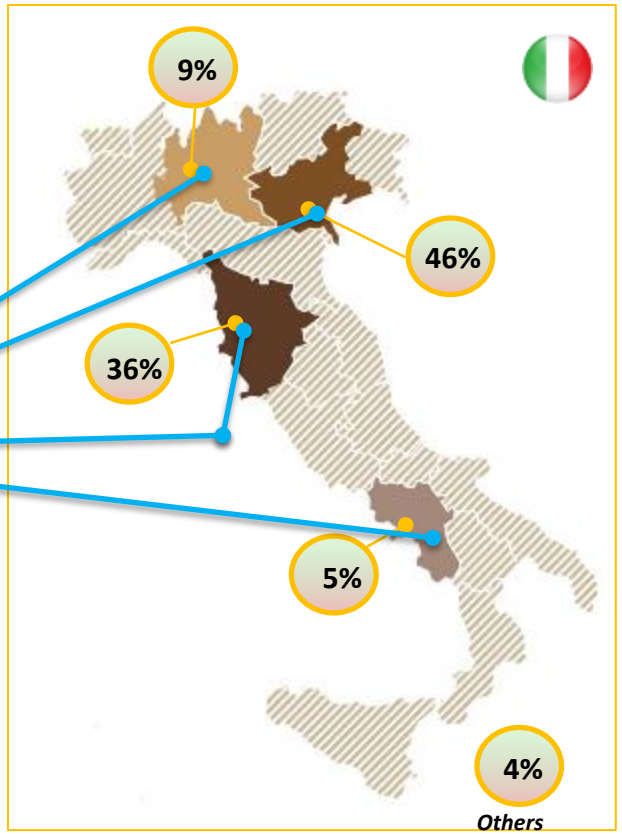
IN ≅ flow rate of municipal wastewater (by separated sewer):
10.000 m3/d

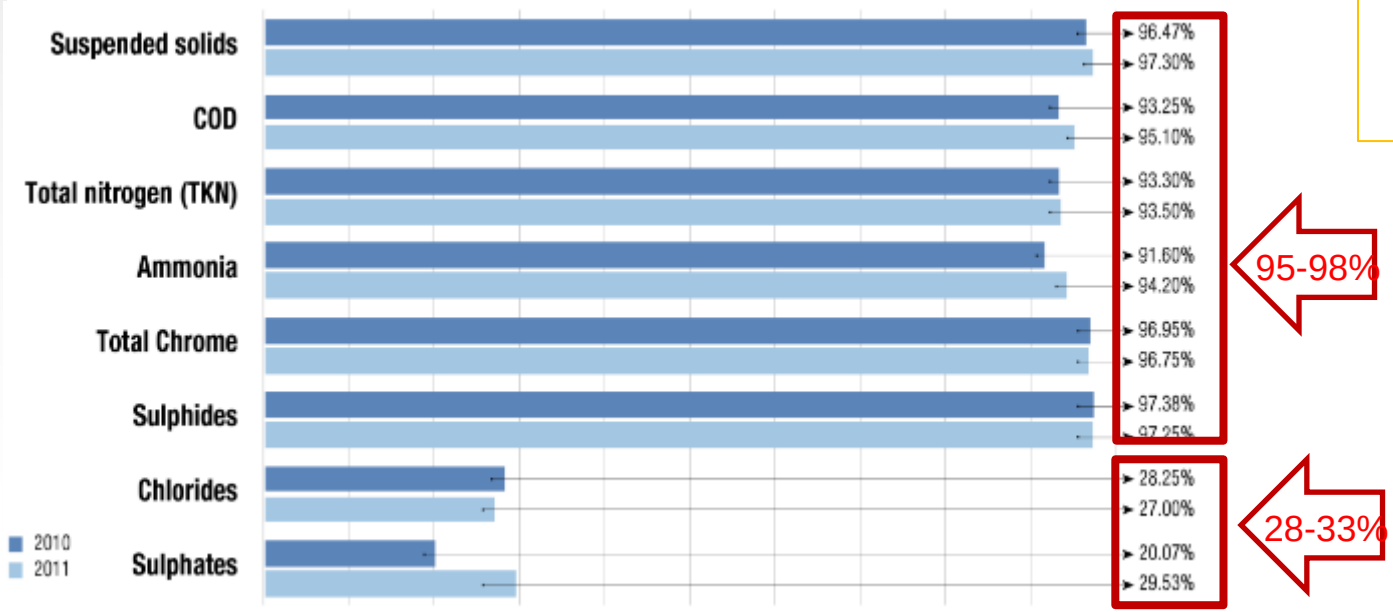
CLUSTER

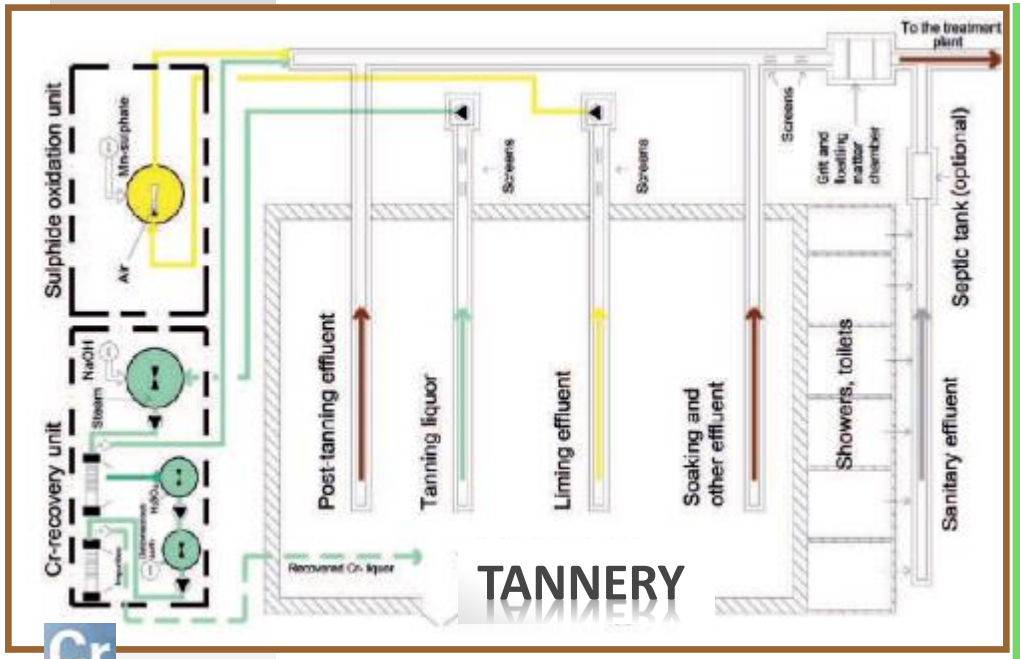
Tannery Supplier

Tannery Waste Management









Cr

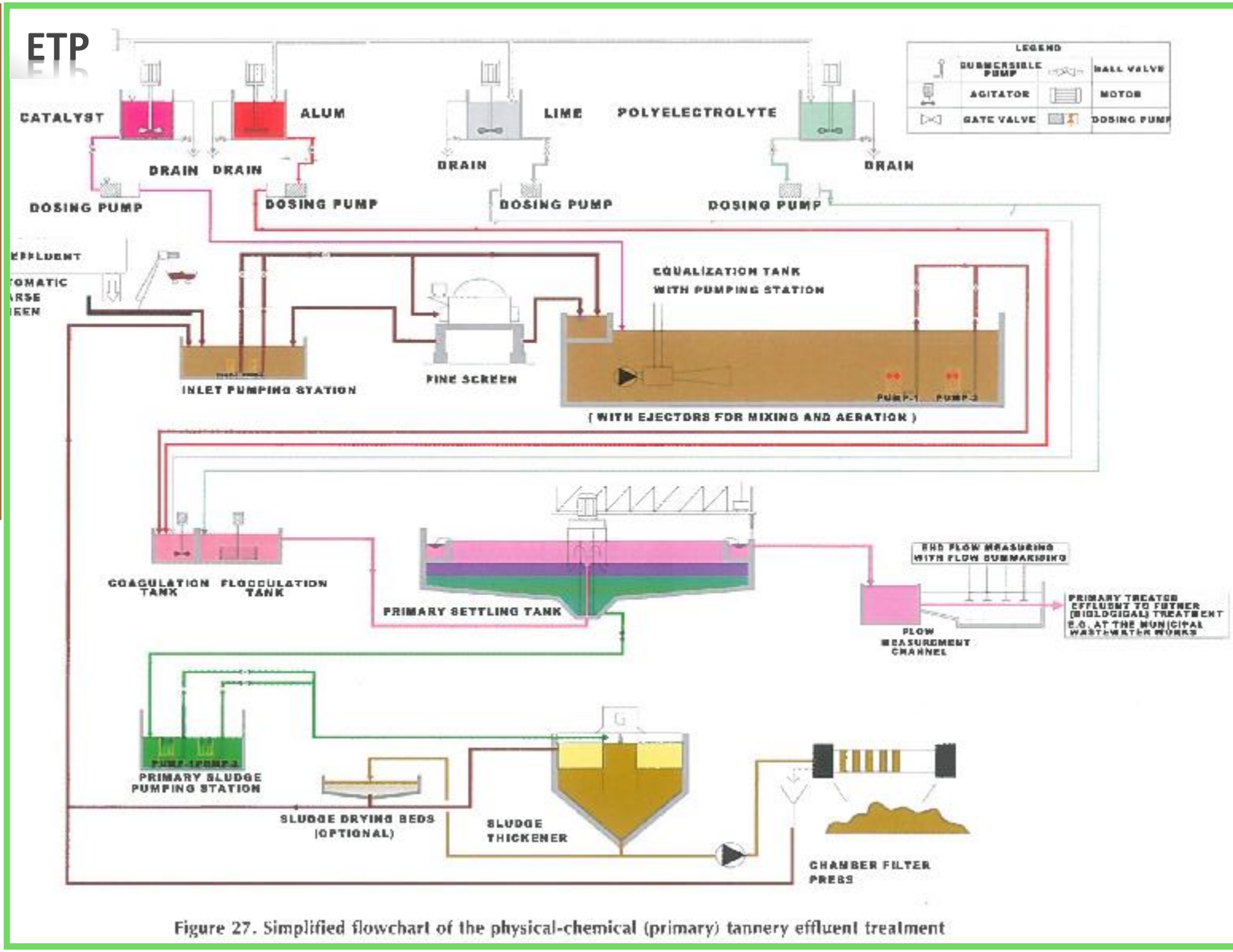
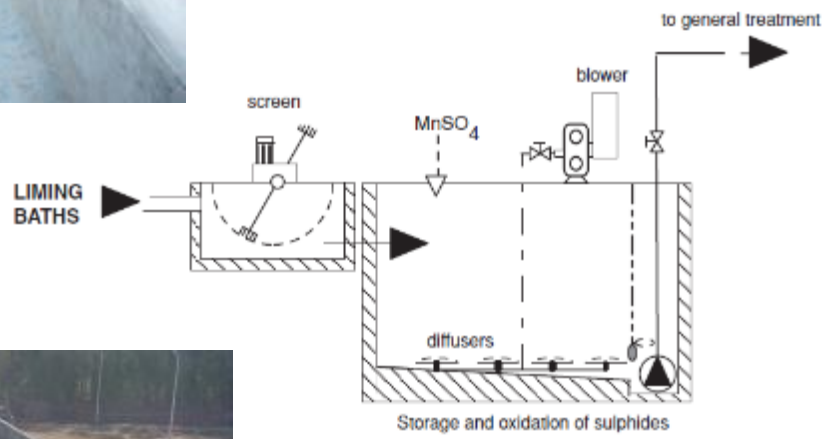


Figure 27. Simplified flowchart of the physical-chemical (primary) tannery effluent treatment

Screening…

PRELIMINARY AND CHEMICAL TREATMENT

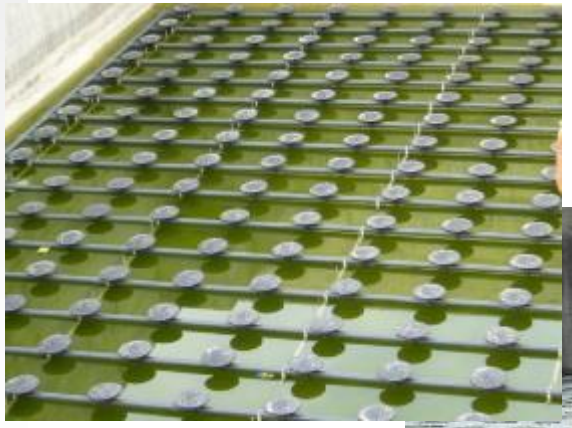


Storage and oxidation of sulphides

Equalization…

SLUDGE TREATMENT (MANUAL FILTER-PRESS)

AIR DIFFUSION SYSTEM DURING START-UP



opportunities

Renewable Resource:

The enzyme-catalyzed reactions take place under mild conditions of temperature (30-70°C), pH (between pH 4.5 and 9), pressure (atmospheric), etc., and are to be viewed as eco-compatible, as they do not generate polluting residues or toxic by-products.

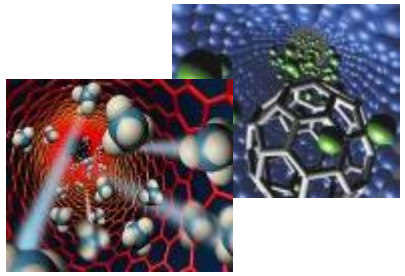
APPLICATON:

Proteases in beamhouse, Lipases for degreasing.

"Green" solvents from Biofermentation

APPLICATON:

Ethyl lactate is produced from biological sources; is also produced industrially from petrochemical stocks



The Nanotechnologies

APPLICATON:

Biocide, Dyes and Agent for finishing

GELATINE APPLICATIONS

Fertilizer

HEALTHCARE

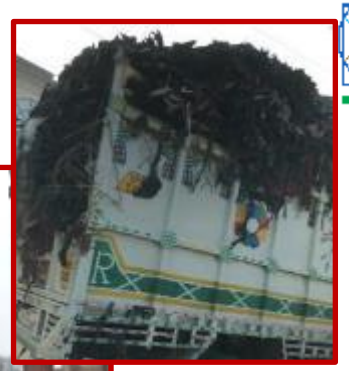
FOODS PREPARATION

INDUSTRY

PROCESS WASTE

I°	**Conventional processes:** *maintain physical mechanical specs, of the origin materials*
II°	**Processes adaptation:** *reduced physical mechanical specs, of the origin materials*
III°	**Chemical processes:** *reconversion in a new entities*
IV°	**Combustions**

holistic approach



ASSOMAC impegno per la Sostenibilità

SUPPLIER OF SUSTAINABLE TECHNOLOGIES

SOSTENIBILITA' lungo il PROCESSO PRODUTTIVO


GREEN LABEL OF

Commercial name:
Product type:

WORK CYCLE
Short process description:

Processed material :

ENERGY/ENVIRONMENTAL PERFORMANCES
Installed power:
Electrical nergy consumption:
Thermal energy consumption:
Compressed air consumption:
Sound emissions:

BOUNDARY CONDITIONS
Location country:
Up-to-date date collection (year):

CARBON FOOTPRINT
kg xxxxx of CO_2 eq./kg of output material

The Carbon Footprint value refers only to the real use of the machine/plant (production and end-of-life phases of the machine/plant are not considered) and measured thought the Life Cycle Assessment methodology

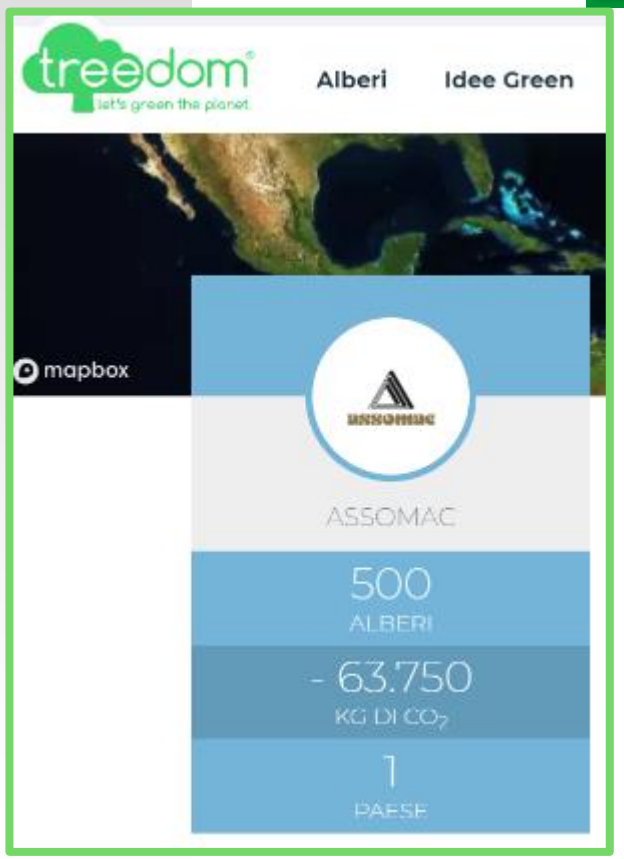
codice identificativo Targa

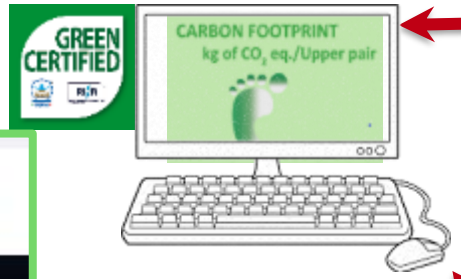
KEY INDICATORS…CO2

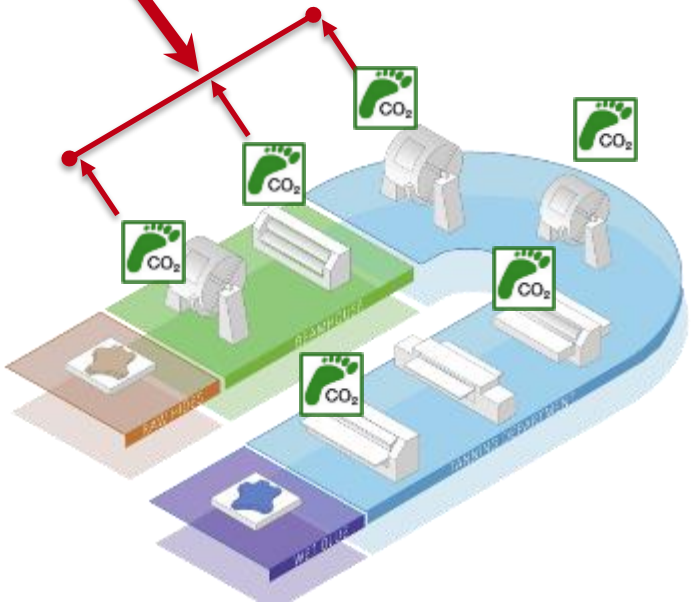
Control Dashboard Supply Chain in real time

Mulberry asks “can a bag save the world” with a new sustainable manifesto

has identified six key actions for change, including achieving net-zero carbon emissions by 2035, pioneering a “hyper-local, hyper-transparent” ‘farm to finished product’ supply chain model, and creating a network of environmentally conscious or regenerative farms to develop “the world’s lowest carbon leather”.







assomac

Thanks for your attention

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