



Tenagreen Series

Range of binders/plasticizers for ceramic
body composition

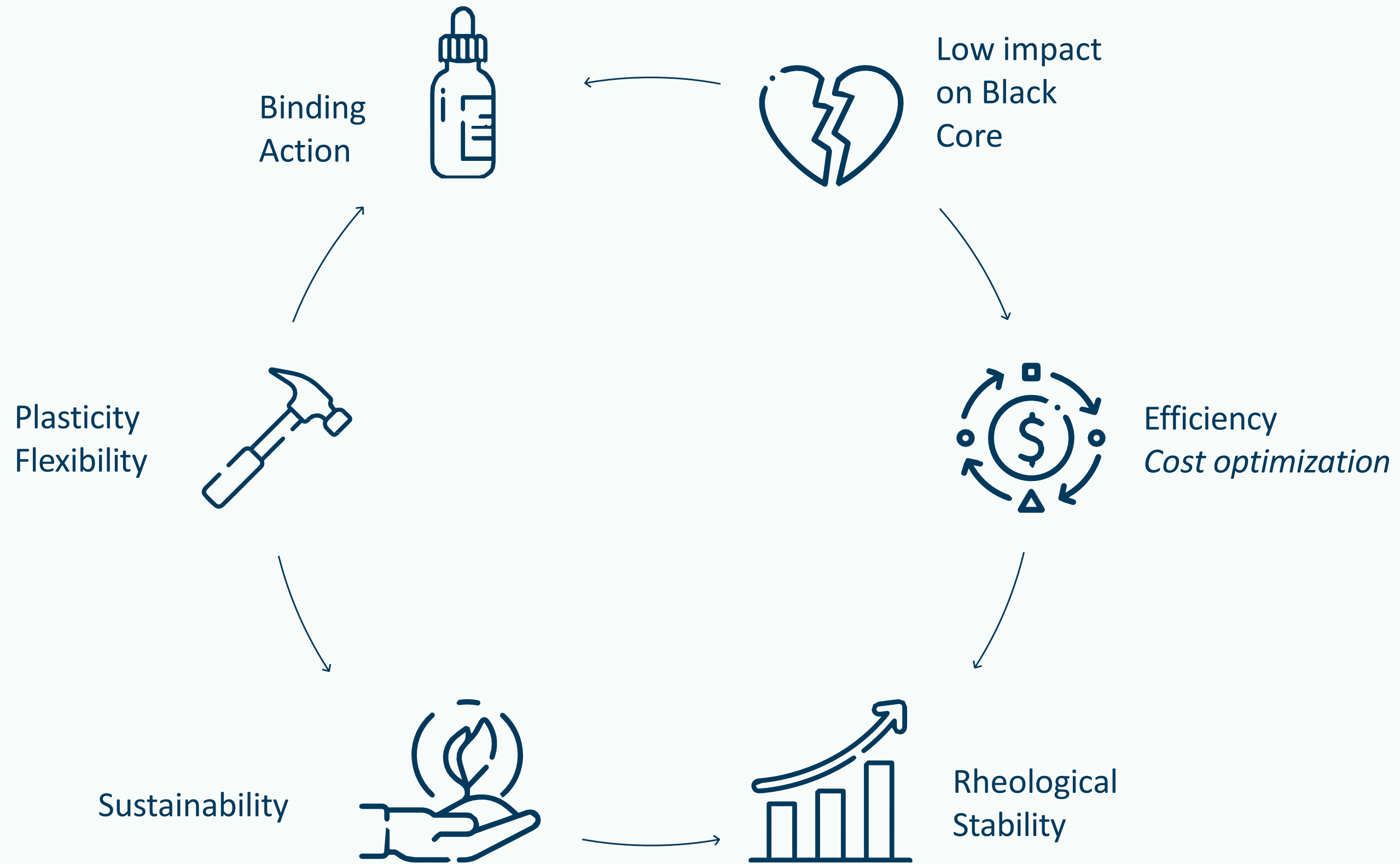


Tenagreen. What is it?

It's a combination of inorganic materials and new generation polymers (Lamberti technology) able to ensure the right technical characteristics of the ceramic body.



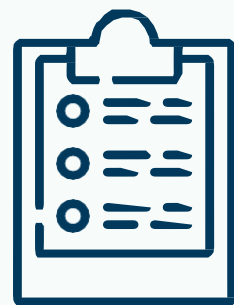
Tenagreen Action Areas





But let me take a step back How does Tenagreen work?

This group of additives designed to improve some important technological characteristics brings benefits and opportunities :



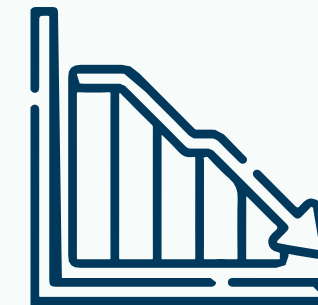
Body reformulations



Green and dry strength enhancement



No influence on the body slip rheology



Low content of Sulfur and Carbon



Low environmental impact



One Tenagreen for each use

Tenagreen FL

Blend of liquid binders
and deflocculants

Tenagreen P

Binders/Plasticizers
in powder

Tenagreen N

Liquid Binders/Plasticizers

Tenagreen S

Liquid Binders/Plasticizers
for particular production
necessities and for high frit
content body

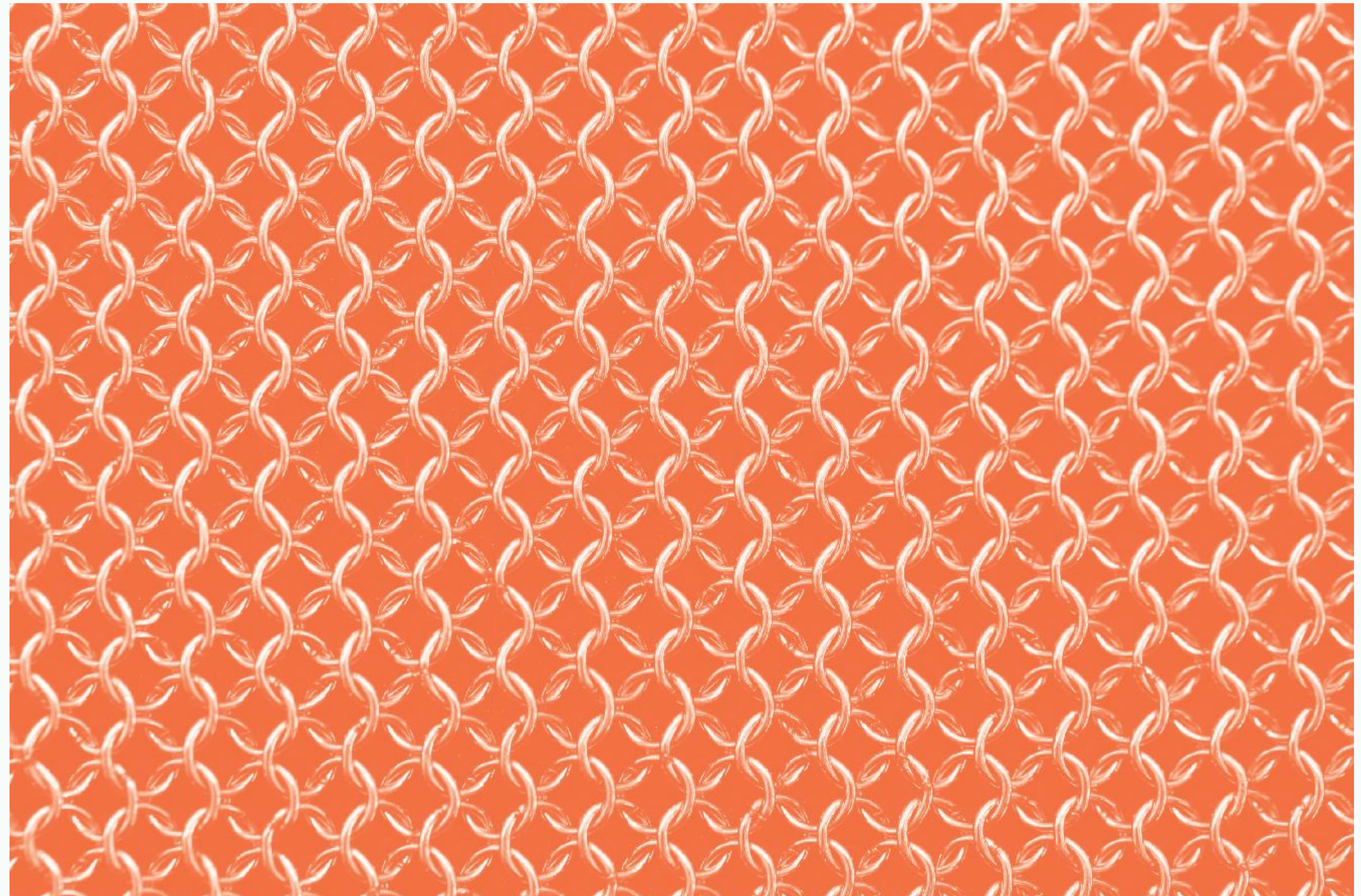


Tenagreen S

Key actions

Mechanical Strength

*Ability of a body to withstand
the stress of physical forces.*





TENAGREEN SERIES

Range of binders / plasticizers for ceramic body composition

Tenagreen S

Key actions

Plasticity

Property of a material to be molded or worked to change its shape.





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Key actions

Flexibility

Ability of a body to bend without danger of breaking.





Tenagreen S

Effect on Flexibility - Deformation before breakage

How can we do it?

We take measurements of plasticity, strength and flexibility by means of testing machine.

By universal testig machine (picture on the right) it's possible to collect data on deformation before breakage and strength of samples, and convert graphically .



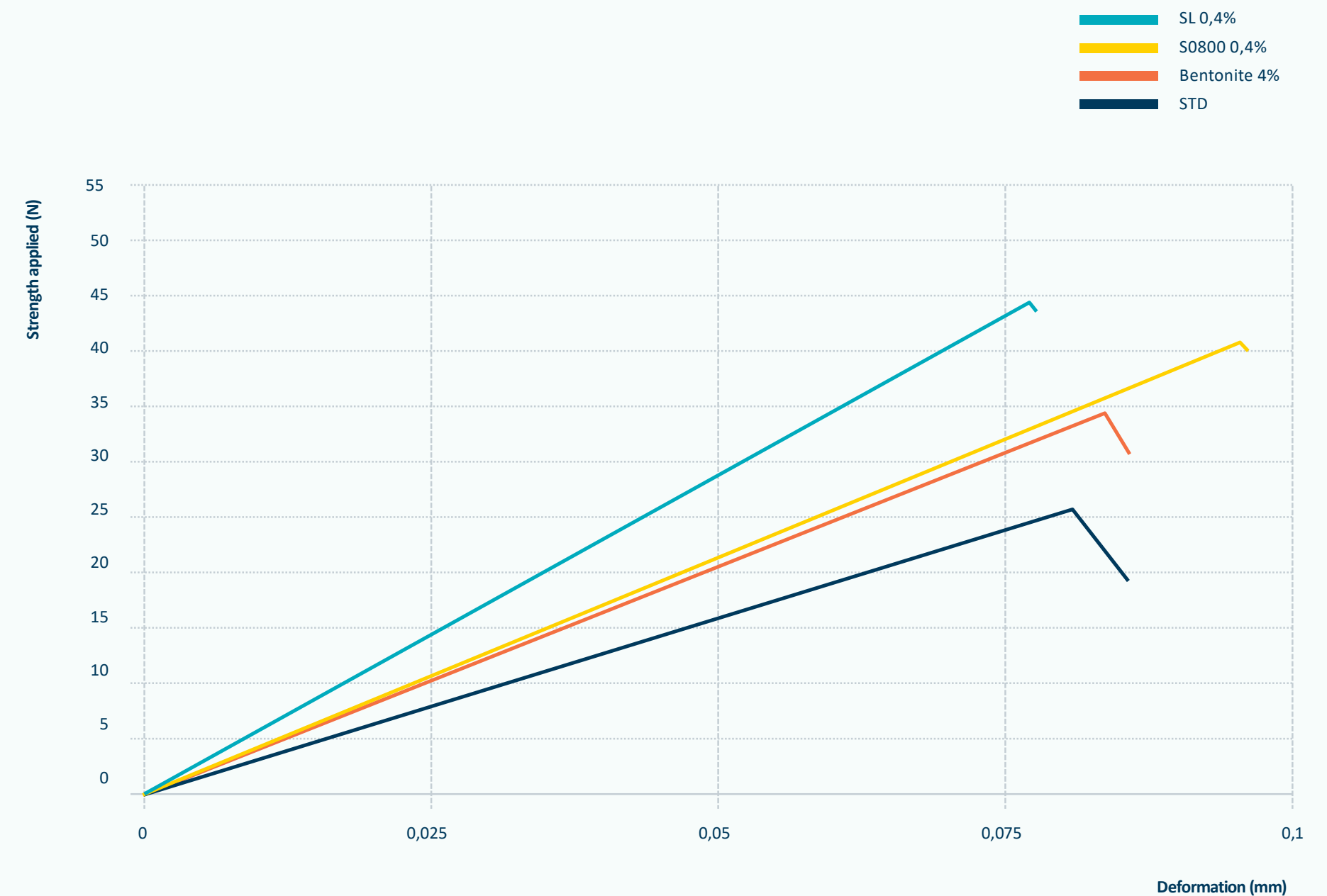


Tenagreen S

Effect on Flexibility - Deformation before breakage

Tiles more flexible accept a bigger deformation before breaking, avoiding defects as ruptures and cracks.

	STD	Bentonite 4%	Sulfonates 0,4%	Tenagreen S 0800 0,4%
Strength applied (N)	26,17	36,49	43,91	40,54
Deformation before breakage (%)	1,02	1,13 (+11%)	1,04 (+2%)	1,37 (+34%)

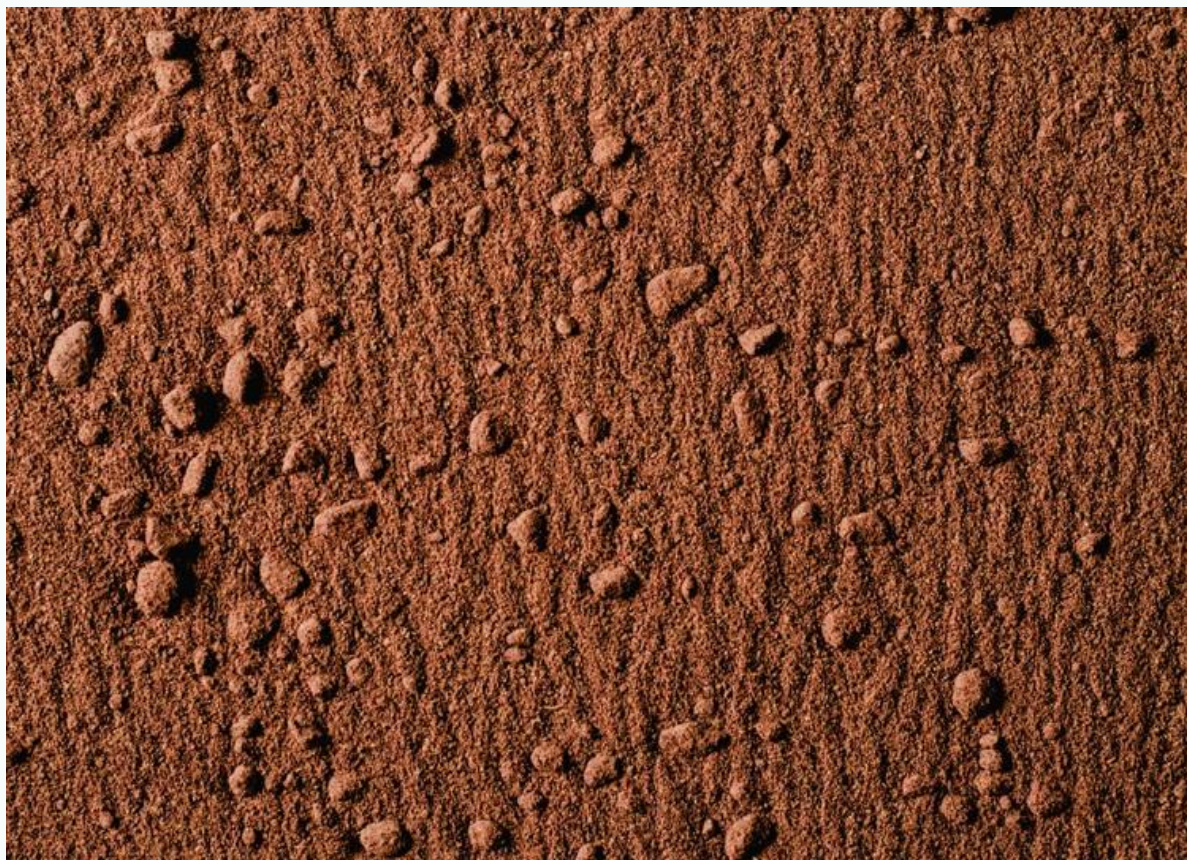




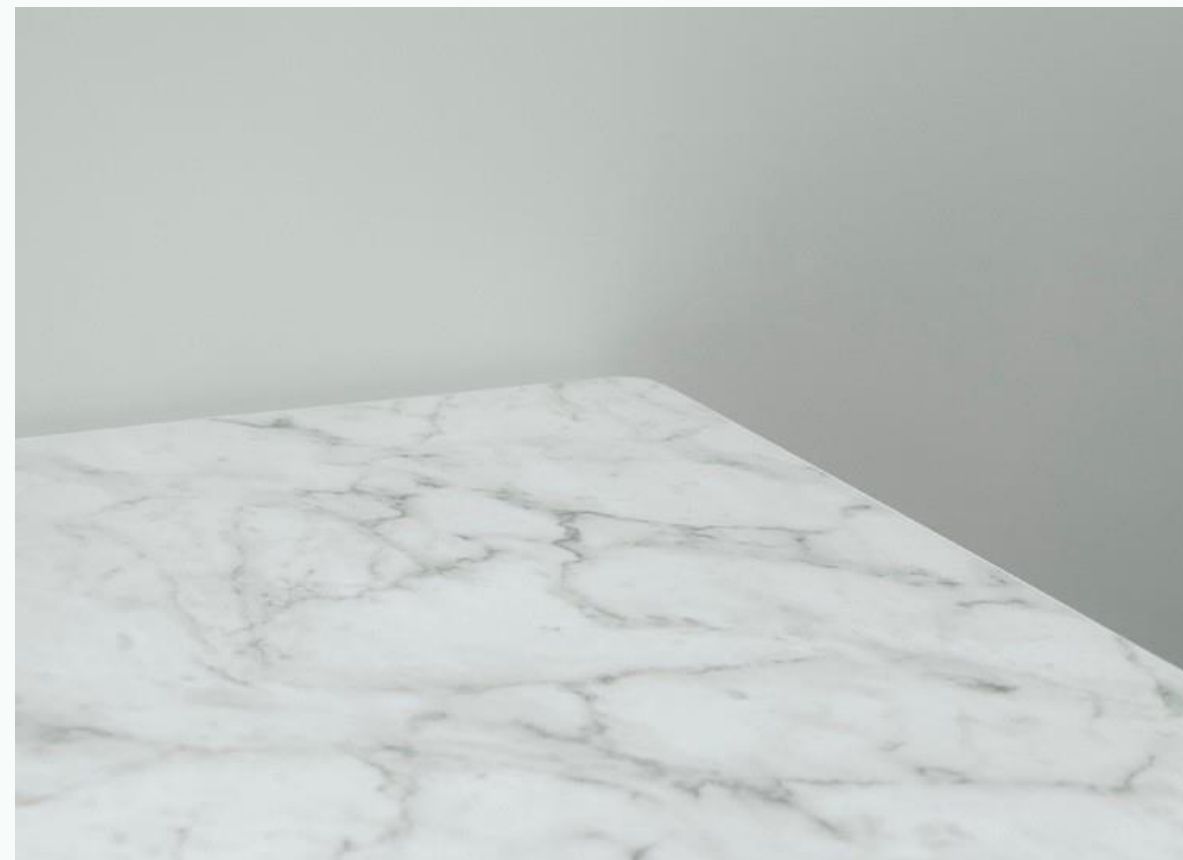
Tenagreen S

Effect on Flexibility What can we do?

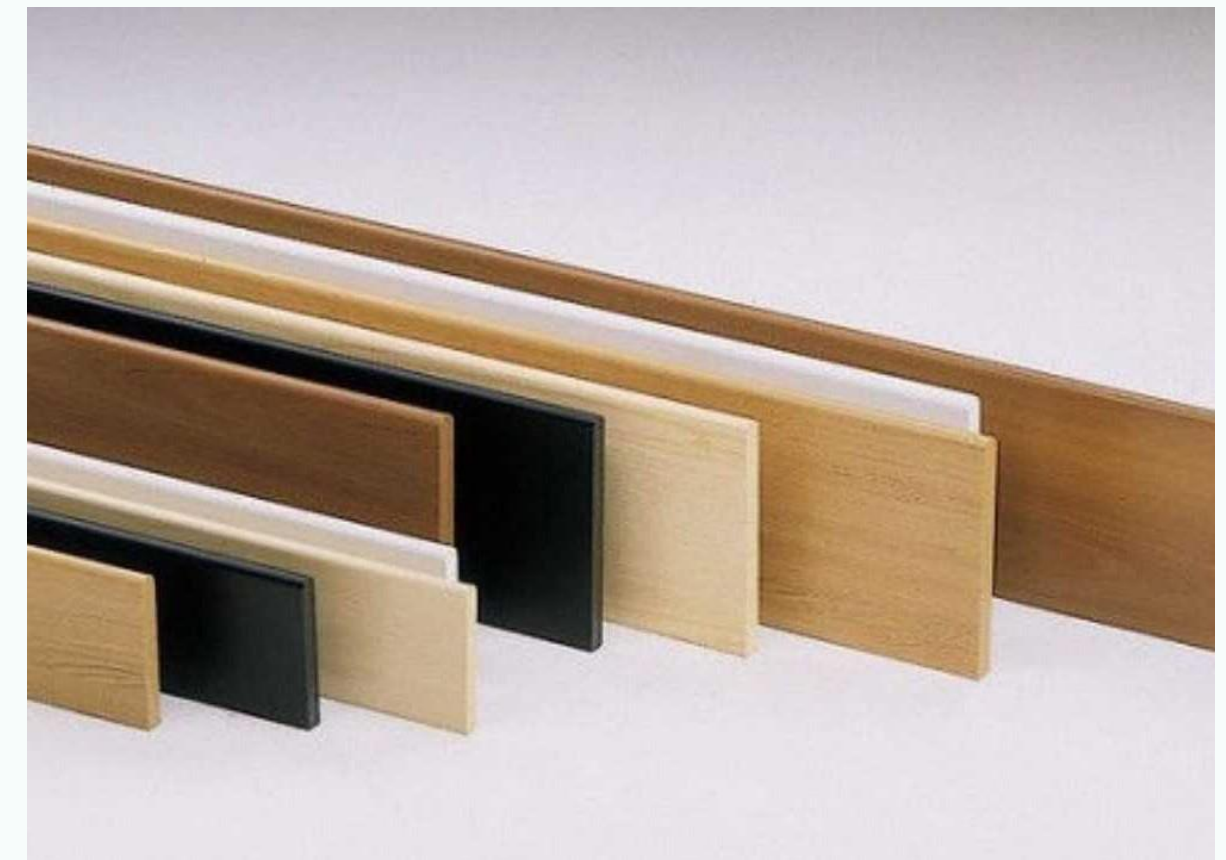
Replacing partially plastic clays



Produce Slabs



Reduce thickness

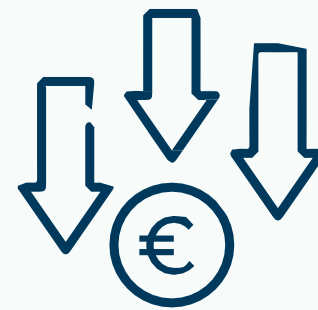




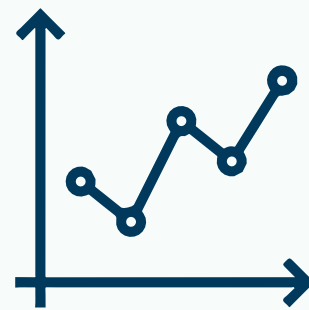
Tenagreen S

Efficiency and environmental impact

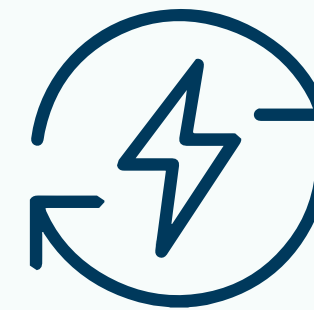
Tenagreen S, replacing part of the plastic component of the body formulation, acts on the efficiency of the process and achieves several targets:



The cost of raw materials is reduced



Working density is raised



Energy costs are reduced

by using less methane for the water evaporation in the atomization phase



CO₂ emissions are reduced

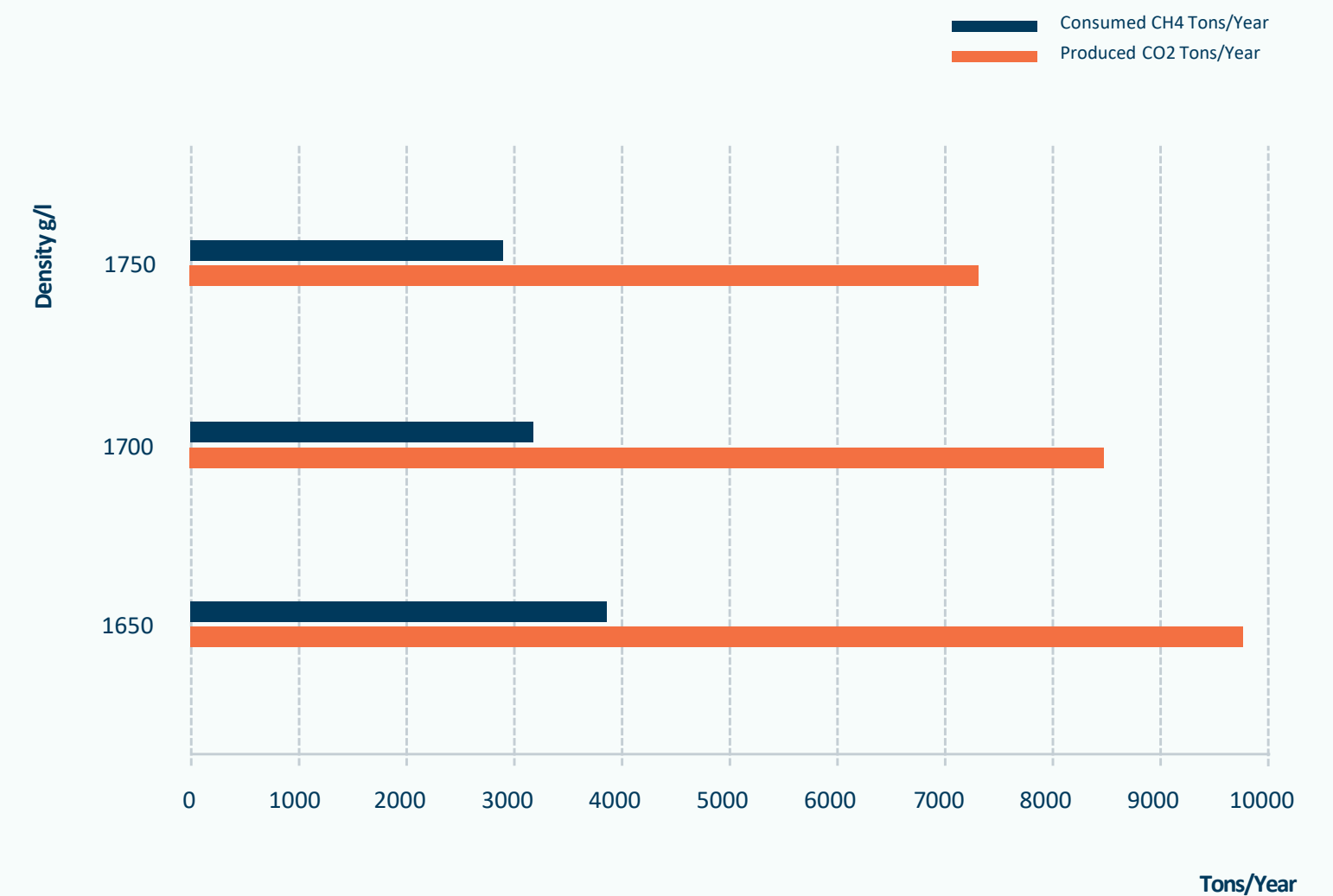


Tenagreen S

Efficiency and environmental impact Density variation effect

	STD	MOD1	MOD2
Plastic clay (%)	24	8	8
Other clays (%)	16	31	31
Tenagreen (%)	-	-	0,6
Body Cost (€/t)	58	51	54
Density (gr/l)	1710	1750	1750
Spray dryer CH4 saving (ton/year)			-360 ton/year
Spray dryer CO2 saving (ton/year)			-905 ton/year
Viscosity (FC4mm)	22 sec	22 sec	22 sec
Green Mor (kg/cm ²)	8,2	7,6	8,5
Dry Mor (kg/cm ²)	35,0	20,0	35,0

How density variation affects CH₄ consumption and CO₂ production



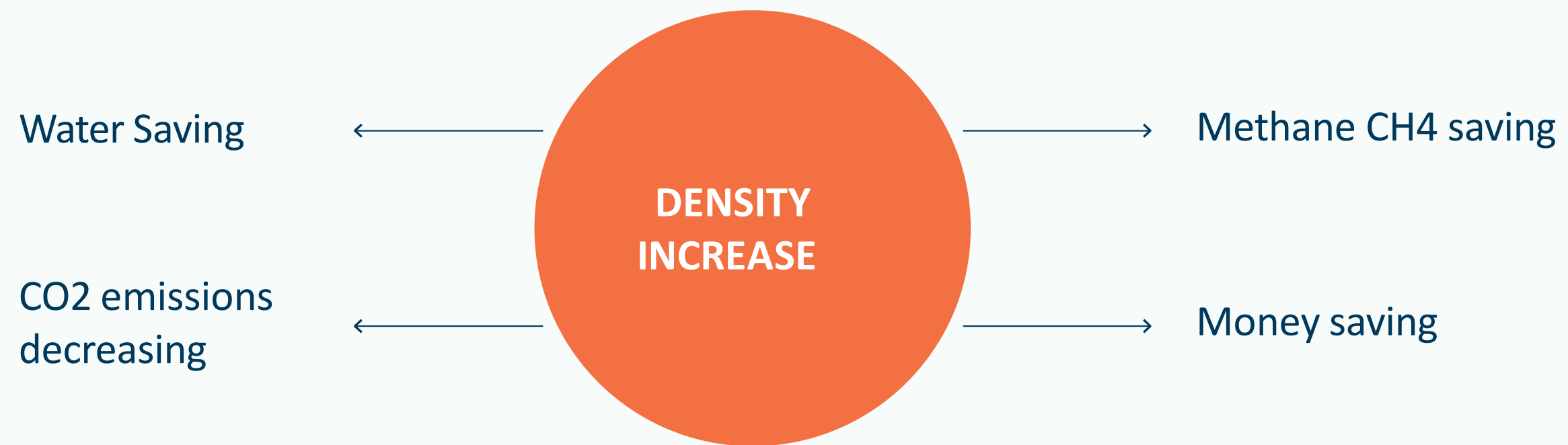


Tenagreen S

Efficiency and environmental impact

The choice of the right plasticizer involves the opportunity to use raw materials from quarries close to the factories reducing the environmental impact associated with their transport.

In fact, it is known that 1 km traveled by a truck produces about 1 kg of CO₂ in atmosphere.



**Thanks
for your attention**



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