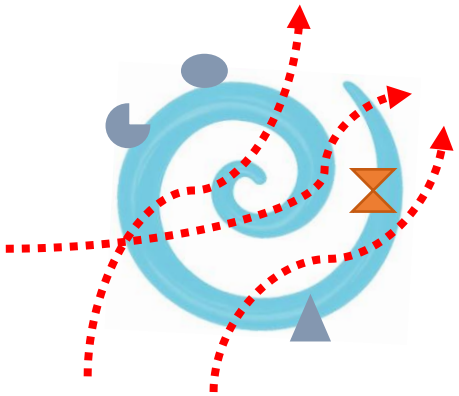
Cold Blending – impact on Sustainability and CO_2 emission

How can we improve energy efficiency in blending?

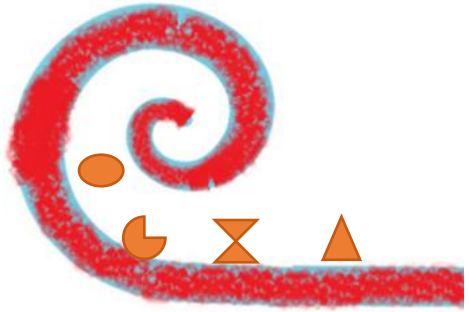
Blending, what for heating is?

1. It reduces additive drop-out and ensures a longer life for lubricants.
2. Lack of heating can make lubricants chemically deteriorate, additive drop out, and stratification of int phases.

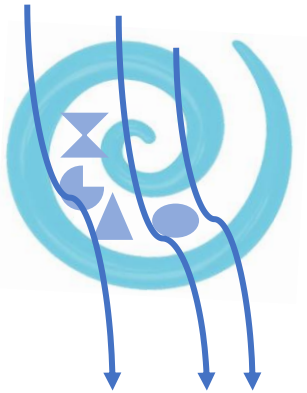
heating



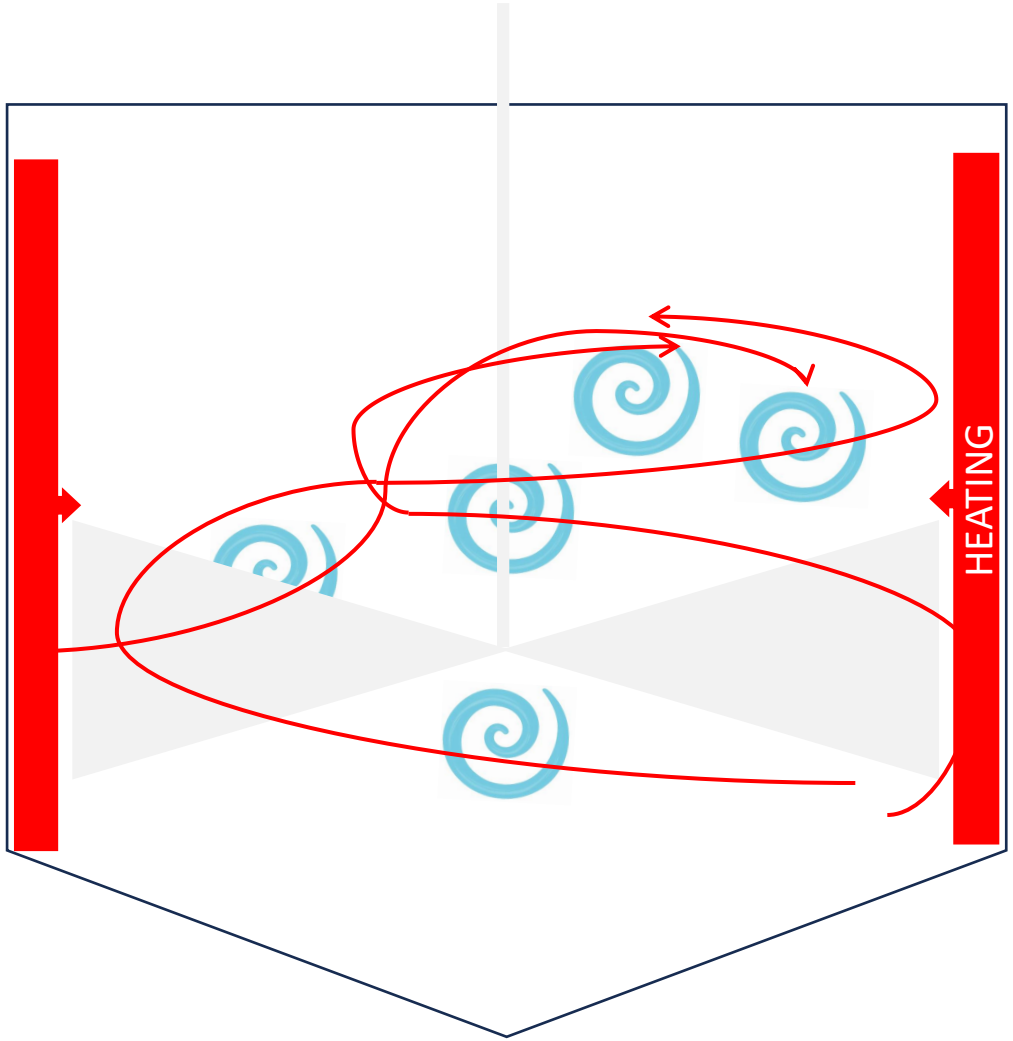
heating + mixing



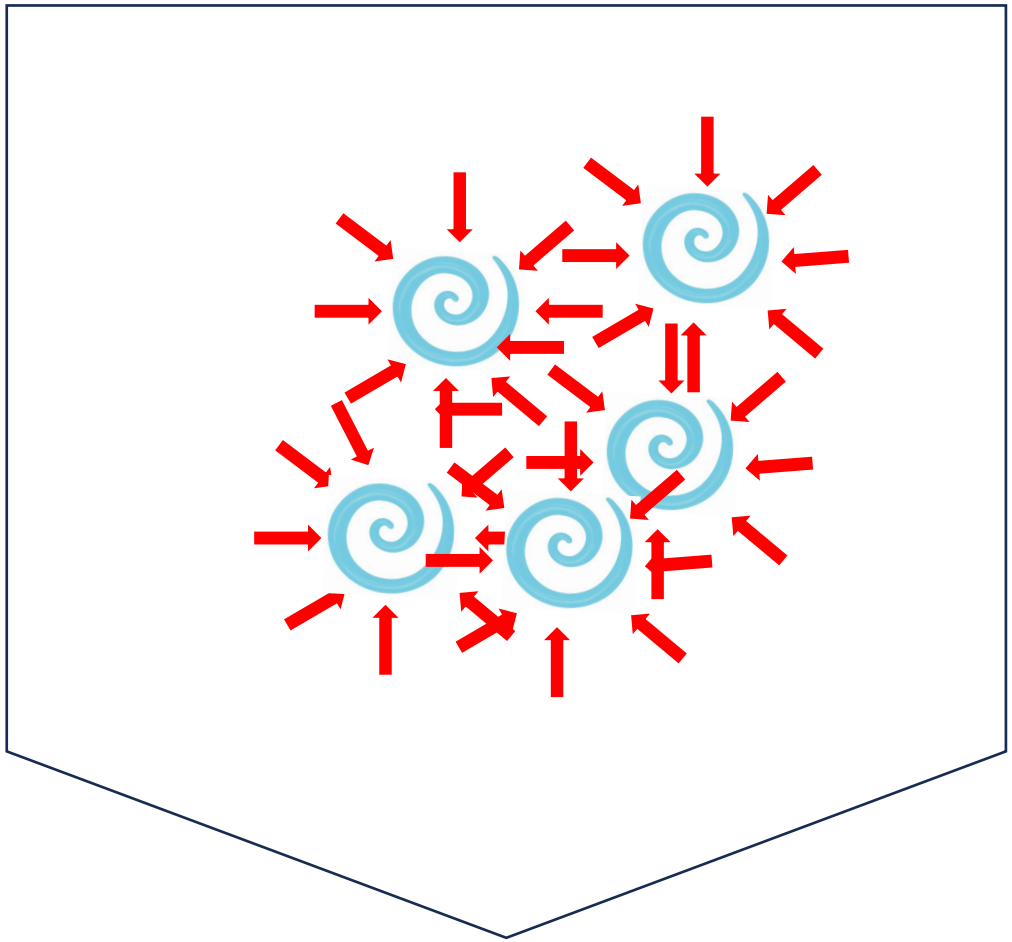
cool down



Blending, how classic option works?

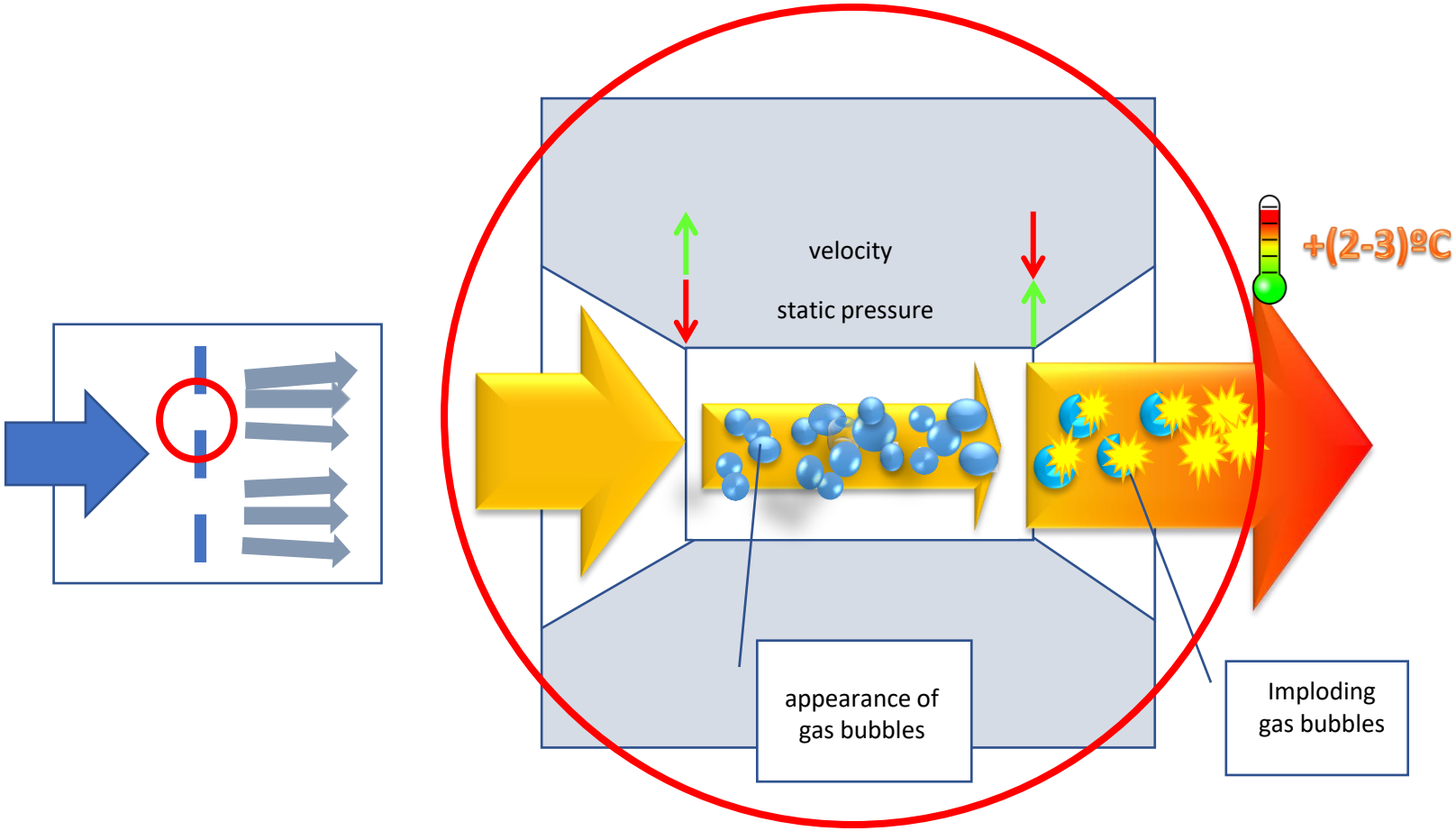


What will happen if we change heating system?

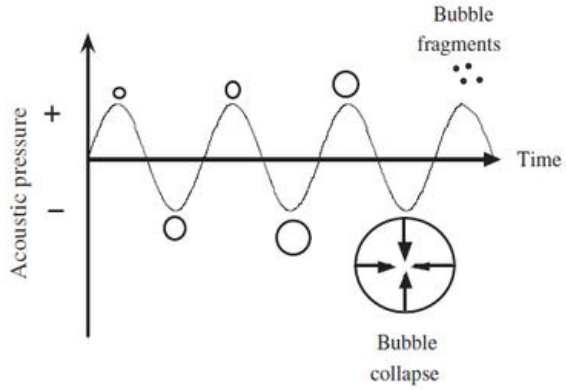


Hydrodynamic cavitation

How to do it?

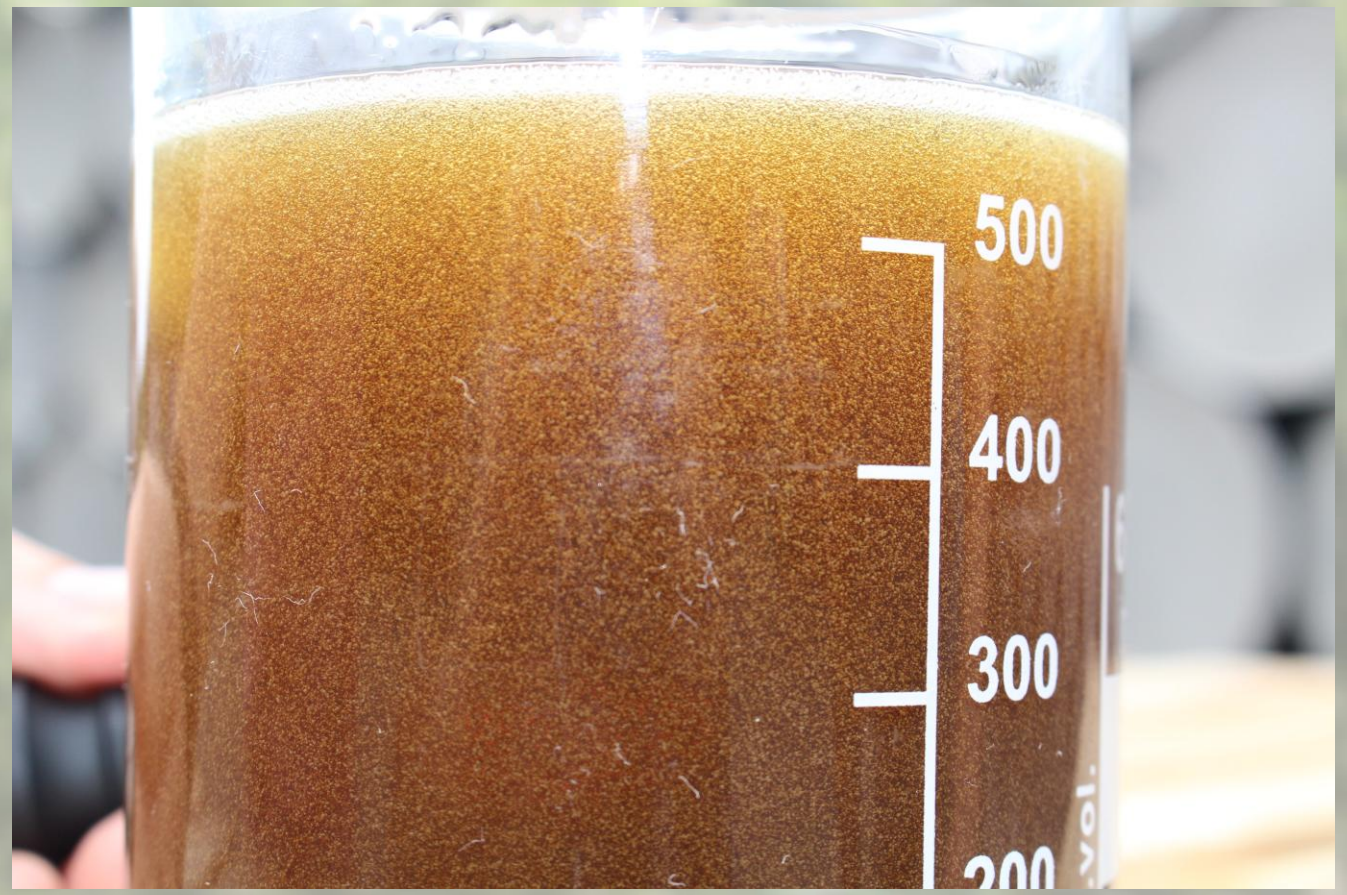


…and ultrasonic cavitation



Appears during a pressure decreasing involving by spreading acoustic wave, made by vibrated liquid or its surround.

…and finishing by non imploded bubbles



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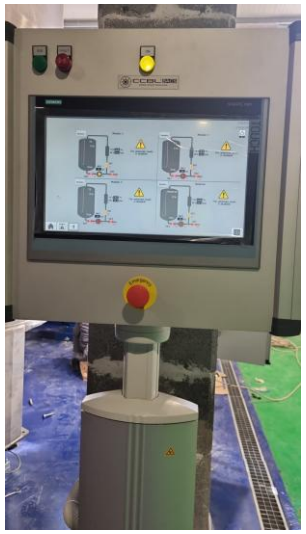
C❄ld Blending Solution

How we have pushed cavitation to work for blending?

We have prototyped, constructed, tested and patented Cold Blending Device:

- Capacity 20-60 m³/h.
- Ability to work with different volumes of tanks.
- Easy for revamping of exiting blenders.
- Process fully controlled by PLC.



INFLUENCING FACTOR	CONVENTIONAL	Cold Blending
• Heating during blending process	YES	NO
• Time	100%	50%
• Minimum process temperature	+(50-60) °C	+(20-ambient) °C
• Cooling time before filling	100%	0%
• Minimum batch on the same mixer	30% of mixer	1 MT

Cold Blending Solution

CCBL® - Cold Cavitation Blending of Lubricants

Estimated advantages on efficiency (300 w/days)

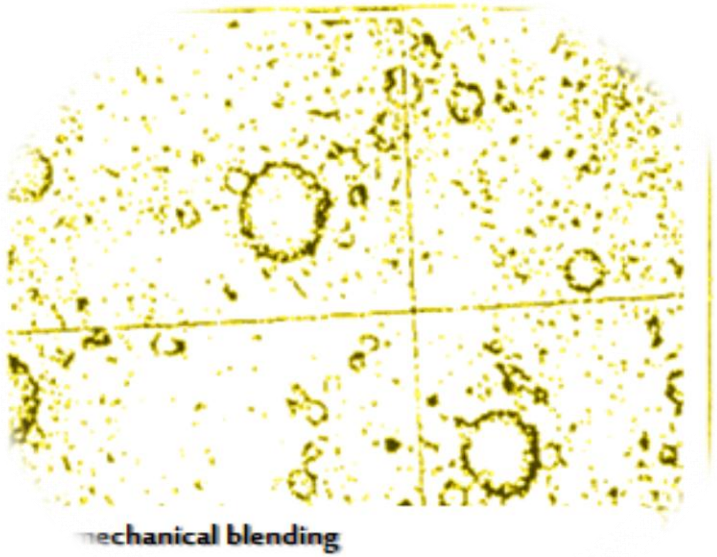
	Conventional Blender	Tank with Cold Blending Device 30 MT/h
Shift, h	8	
Vessel, MT	5	
filling time (h)	0,5	
discharge time (h)	0,5	
blending time (h)	2	0,17
hours per batch	3	1,17
Batches/shift	2	6
Production, MT/shift	10	30
Annual cap. (MT)	3 000	9 000

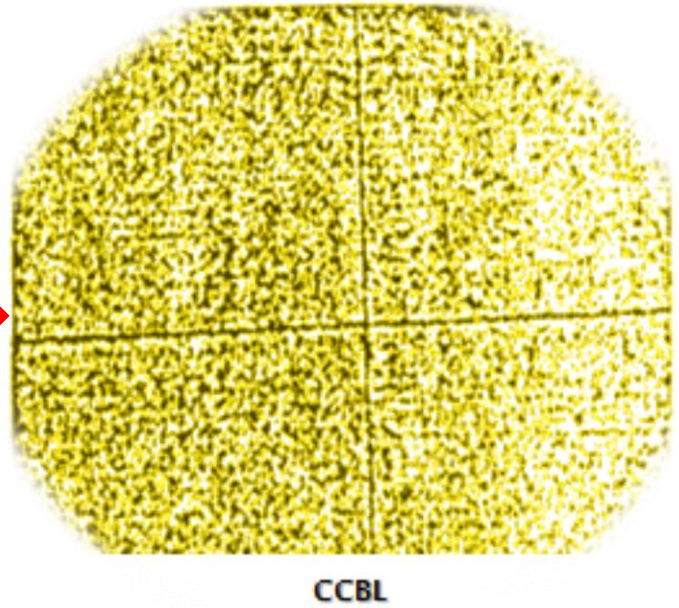
Estimated energy (heating+electricity) savings
(CEE zone, av. ambient temperature 15-20 C, 300 w/d)

Analyzed parameter	CBB	Tank with Cold Blending Device
Vessel, MT	5	
Electricity costs ($/batch)	$3,71	$1,48
Steam costs ($/batch)	$17,59	$0,00
Total savings ($/batch)	$19,82	
Production plan (MT/Year)	5 000	
Annual energy savings	$19 820	

Cold Blending Solution

Cold Blending means better quality also





If better homogenization, maybe less addditives then?

Convetionally blended oil 10W40 processed by Cold Blending Device
zoom x45

Cold Blending Solution

Case study
blending station with Cold Blending technology

Business initiatives for SUTAINABILITY:

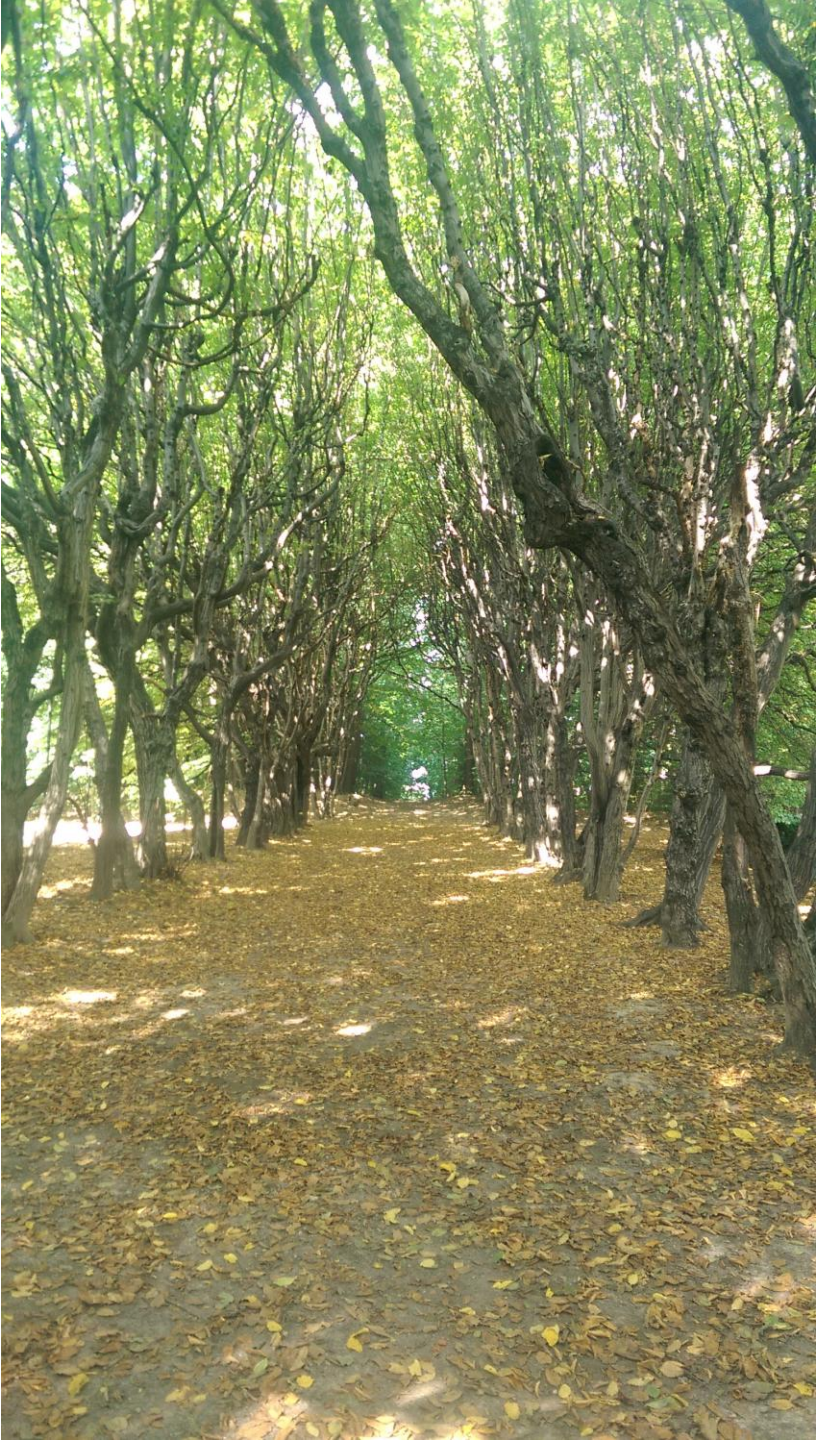
Strategy goals seek to:

- minimize waste;
- conserve resources and;
- reduce emissions.

Reduce emissions:

1. Reduction of Natural gas consumption up to 50 %.
   - ✓ Further implementation of “cold blending” technology – because no heating during the mixing.
2. Operational data:
   - ✓ Customer uses 5 m3 of Natural Gas for production of 1mt of lubricants.
   - ✓ During year 2022, 3000 mt were produced in Cold Blending unit.
   - ✓ Saving on Natural gas – 15000 m3
   - ✓ 1m3 Natural Gas = 1,9 kg of CO_2
   - ✓ Less emissions of CO_2 – ***28500*** kg
3. Improvement of burning process and active stop and go management of the boilers

Cold Blending Solution



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Cold Blending technology and reduction of CO_2 emission aspect.

COMBUSTION of:

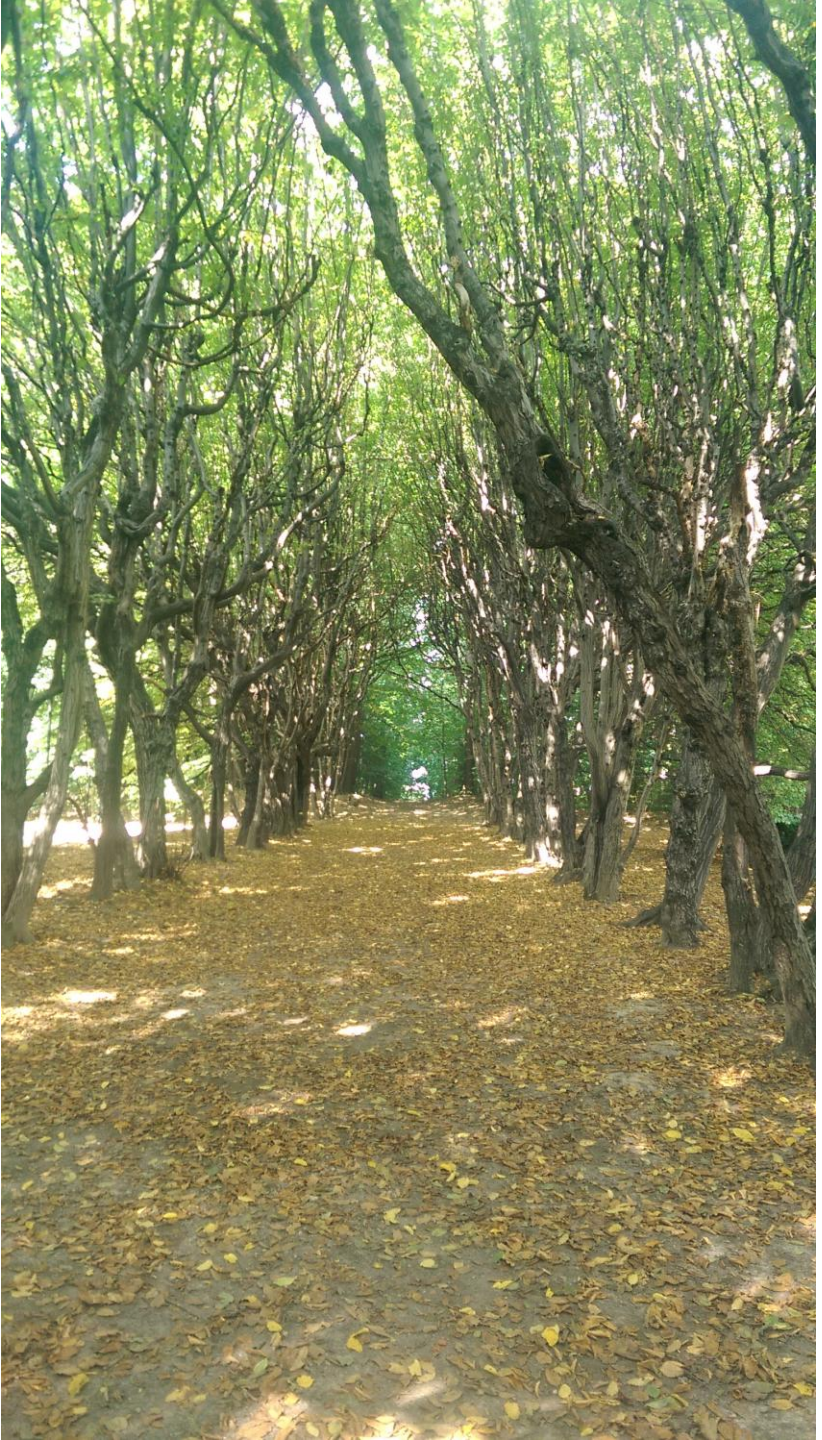
- Natural gas = 450 kg CO2 per MWh.
- Petroleum-based = 779 kg CO2 per MWh.
- Coal/peat emissions = 971 kg CO2 per MWh.
- world average for all generation methods: 573 kgCO2/MWh(*)

(*) According to IEA's 2012 report, *CO2 Emissions from Fuel Combustion - Highlights*, for electricity generation with fossil fuels, and averaging worldwide for 2008–2010

Process data:

- Working volume of CCBL®Jet – 210L approx.
- Capacity – 20-120 m³/h
- Process temperature – min. +23˚C
- Energy consumption: 0.0013 MWh/Mt @ c= 25 m³/h
- CO_2-e emission: 573kgCO_2-e/MWh * 0.0013 MWh/Mt = 0.7449 kgCO_2-e/Mt

Cold Blending Solution



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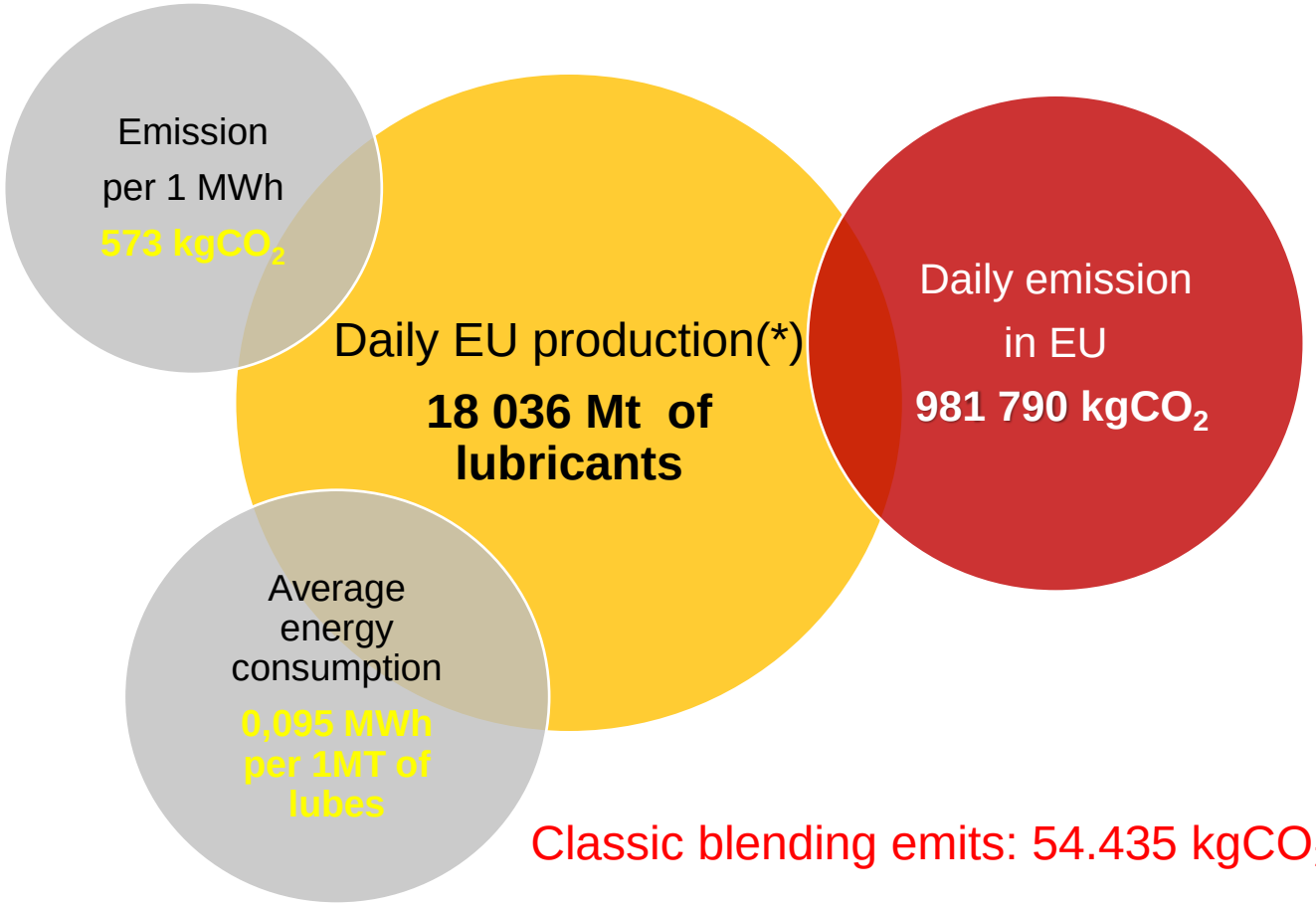
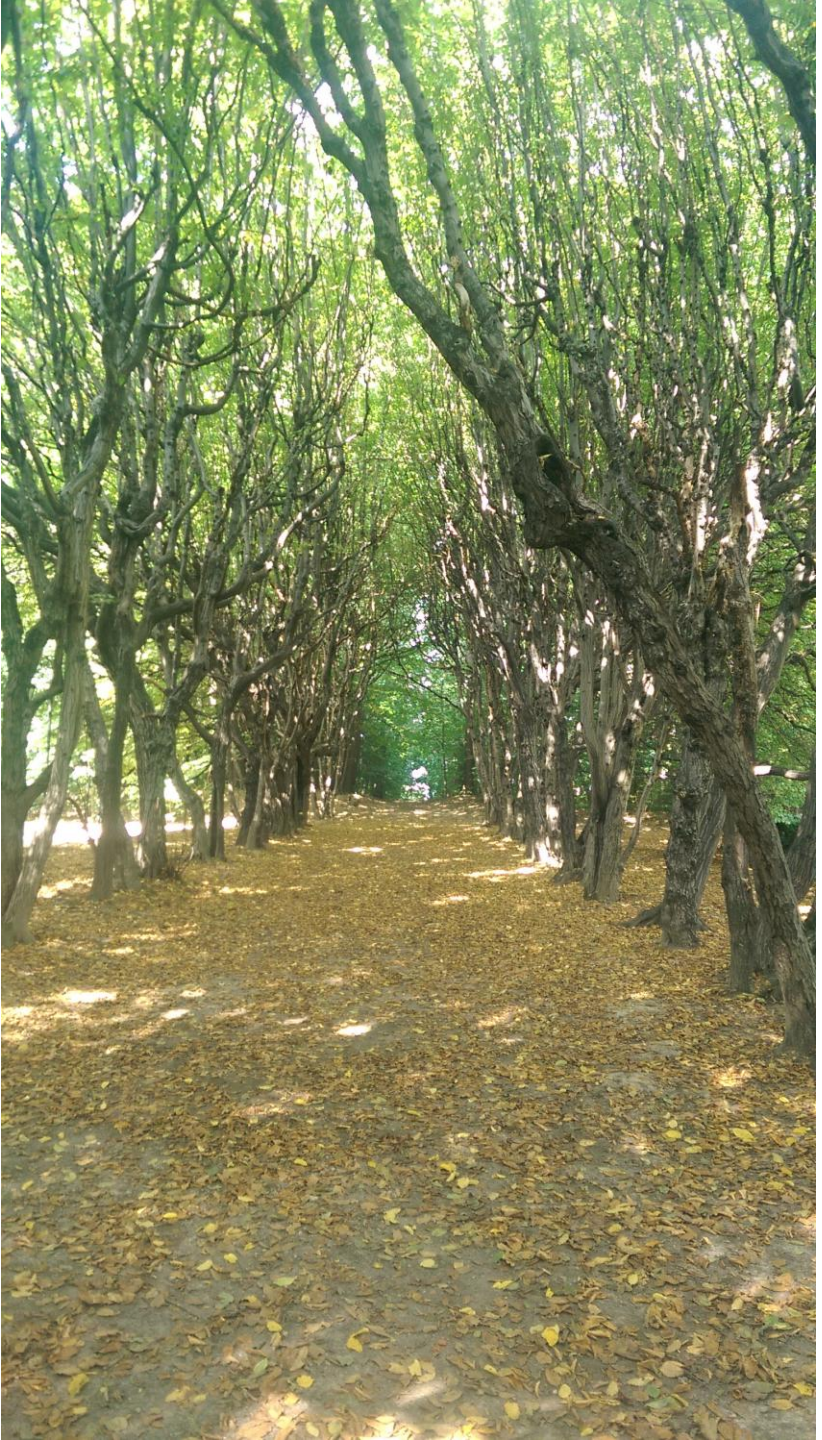
Estimated CO_2 emission in Europe



Classic blending emits: 54.435 $kgCO_2$-e/Mt

(*)Consumption of refined petroleum products
CIA the World Fact Book, 2015/2016 data

Cold Blending Solution



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Possible CO_2 emission in Europe

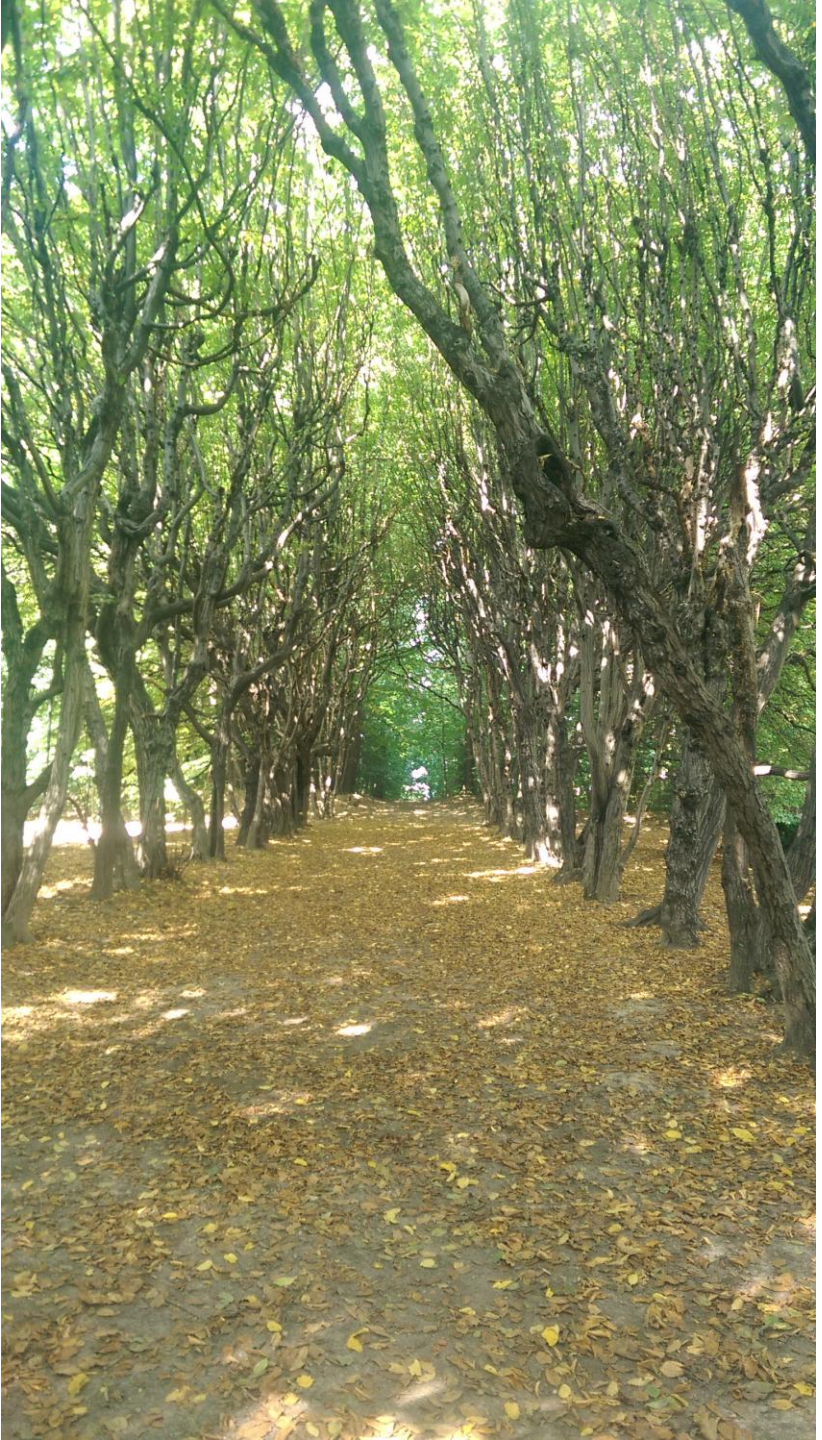
Classic blending emits:
54,435 $kgCO_2$-e/Mt

Daily EU emission

981 790 $kgCO_2$

Could be 13 440 $kgCO_2$ with CCBL® system, emitting 0.7449 $kgCO_2$-e/Mt

Cold Blending Solution



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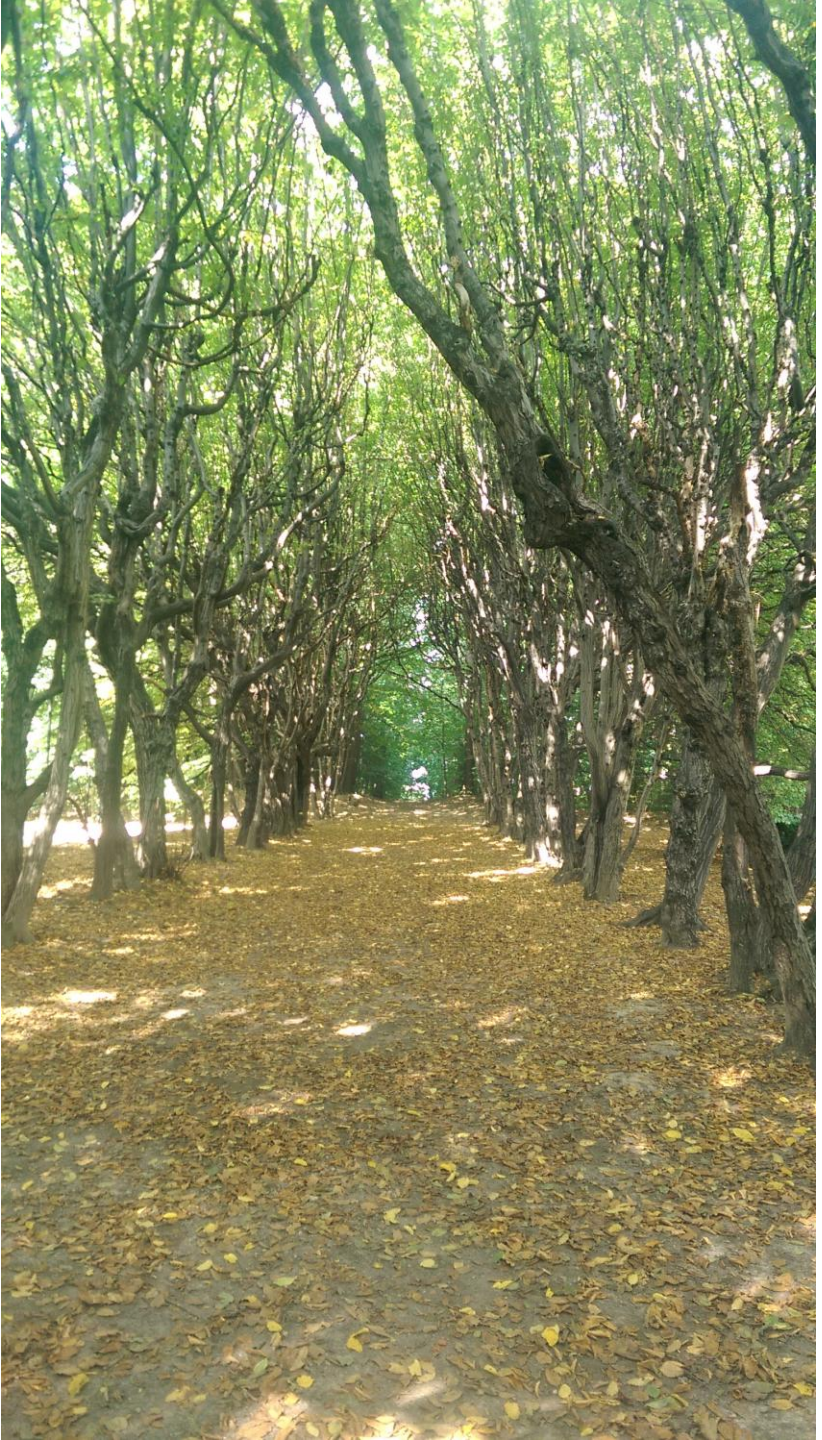
Real installations – 9 pcs of Automated Batch Mixers

Cold Blending Solution



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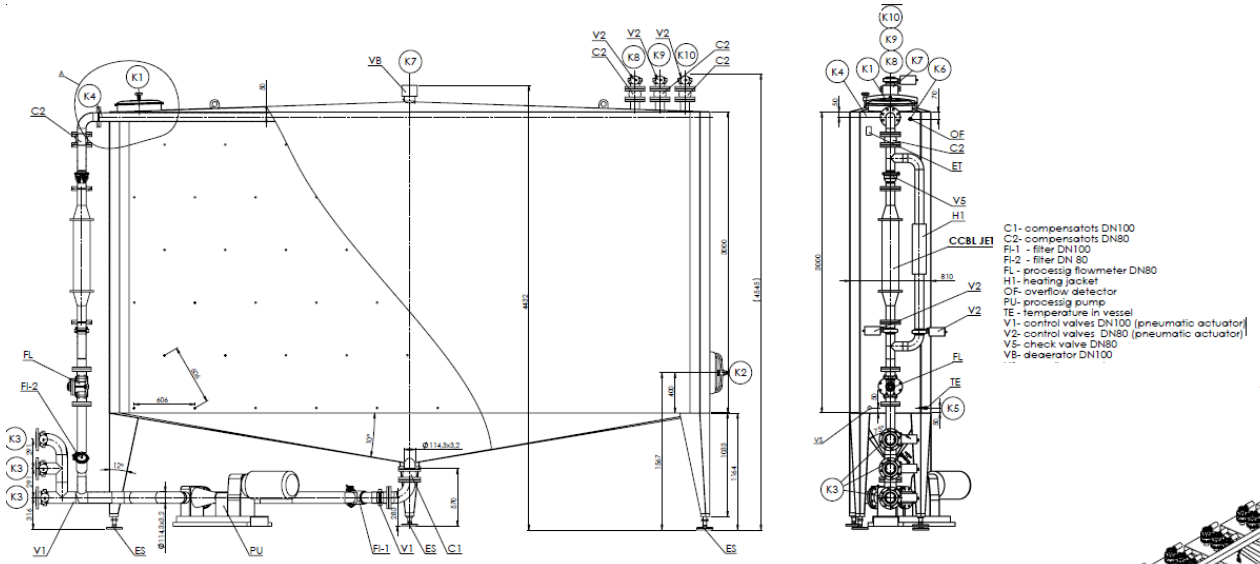
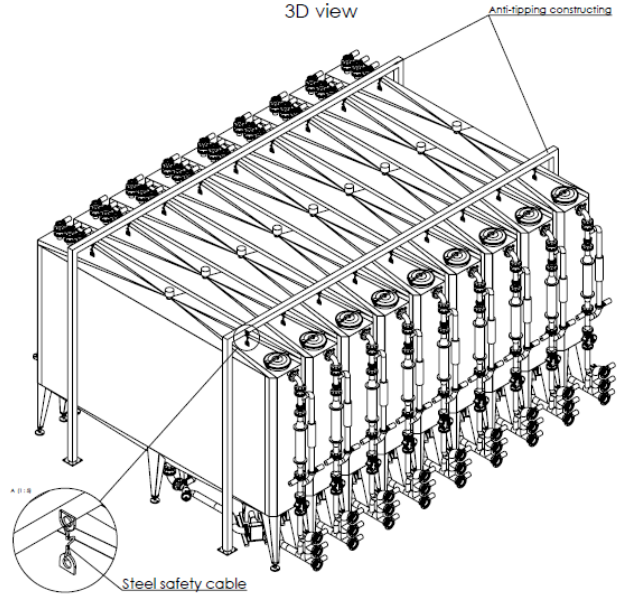
Cold Blending technology – we have no limits



C1- compensatots DN100
C2- compensatots DN80
FI-1 - filter DN100
FI-2 - filter DN 80
FL - processig flowmeter DN80
H1- heating jacket
OF- overflow detector
PU- processig pump
TE - temperature in vessel
V1- control valves DN100 (pneumatic actuator)
V2- control valves DN80 (pneumatic actuator)
V5- check valve DN80
V8- degerator DN100

A set of vessel
3D view



EU located inwestor – blending station 6x9 sq.m.

- 9 pcs of Automated Cold Blenders 30 m3/h, V=15 m3

Cold Blending Solution

driven by CCBL®

GOOIL INNOVATION | YOUR INNOVATION PARTNER

REDUCE
energy & recourses consumption

REUSE
reduce recourses consumption

REPLACE
by renewable substitutes

RECYCLE
wasted products

C❄ld Blending Solution

driven by CCBL®

GQOIL INNOVATION | YOUR INNOVATION PARTNER

Be more

***Green** in terms of CO_2 emission*

***Efficient** in terms of energy consumption*

***Responsible** for future*

Thank you for attention

Cold Blending Solution

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