



RECYCLING MANAGEMENT FOR HOT MIX ASPHALT

Christian Bode

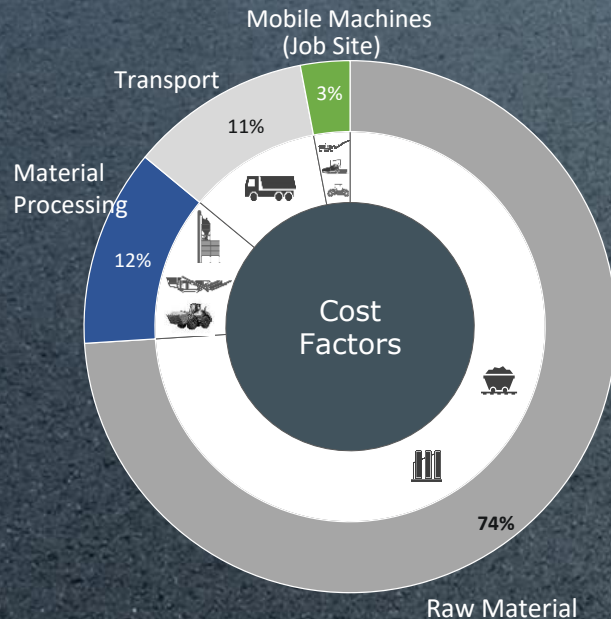
Baseline

Expenditure and Emissions Road Construction Project



WIRTGEN GROUP

Costs factors of conventional road rehabilitation

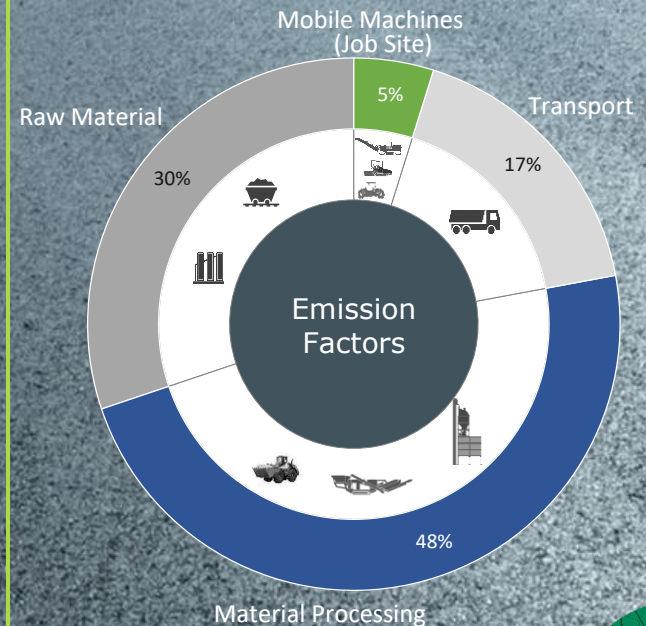


CO₂e intensive and expensive **raw materials**

High energy required for **asphalt mixing**

Many **transports**

CO₂e factors of conventional road rehabilitation



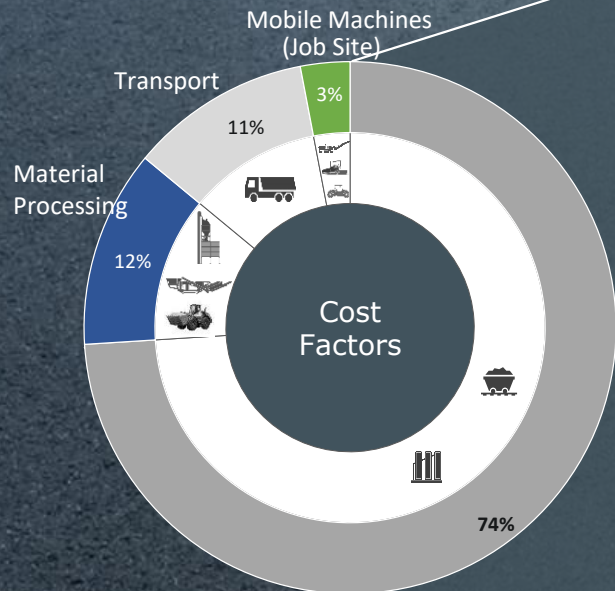
Baseline

Expenditure and Emissions Road Construction Project



WIRTGEN GROUP

Costs factors of conventional road rehabilitation



Raw Material



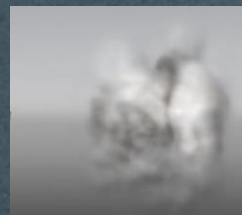
Minerals

25%



Bitumen

47%



Filler

2%

Baseline

Expenditure and Emissions Road Construction Project



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Raw Material



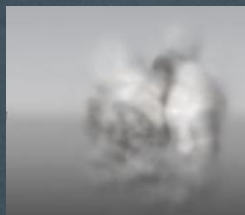
Minerals

4%



Bitumen

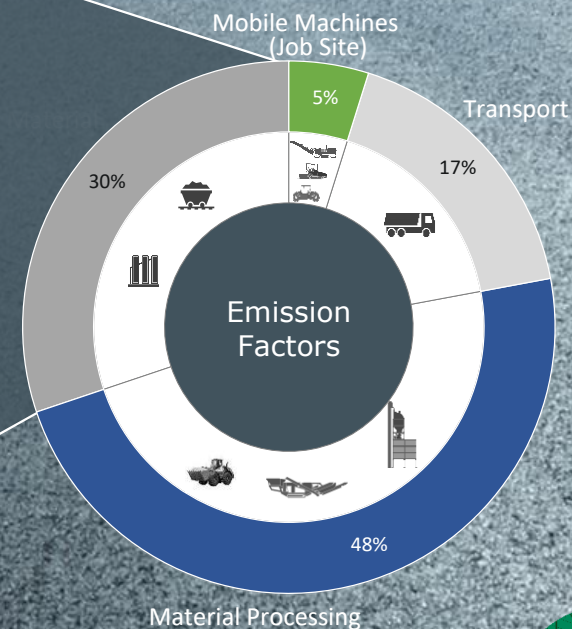
26%



Filler

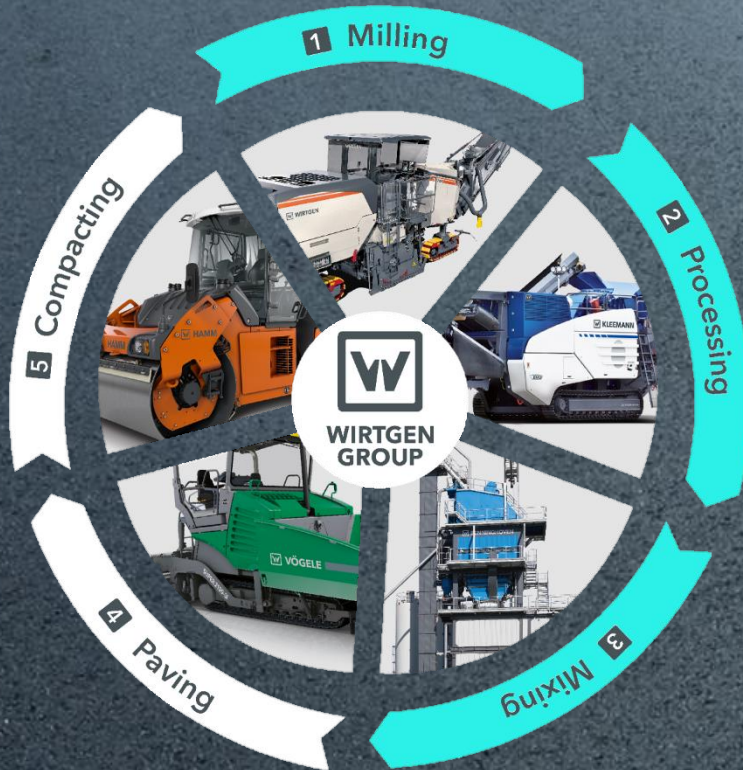
0%

CO₂e factors of conventional road rehabilitation



Recycling Management for Hot Mix Asphalt

More than machine Technology



One Team



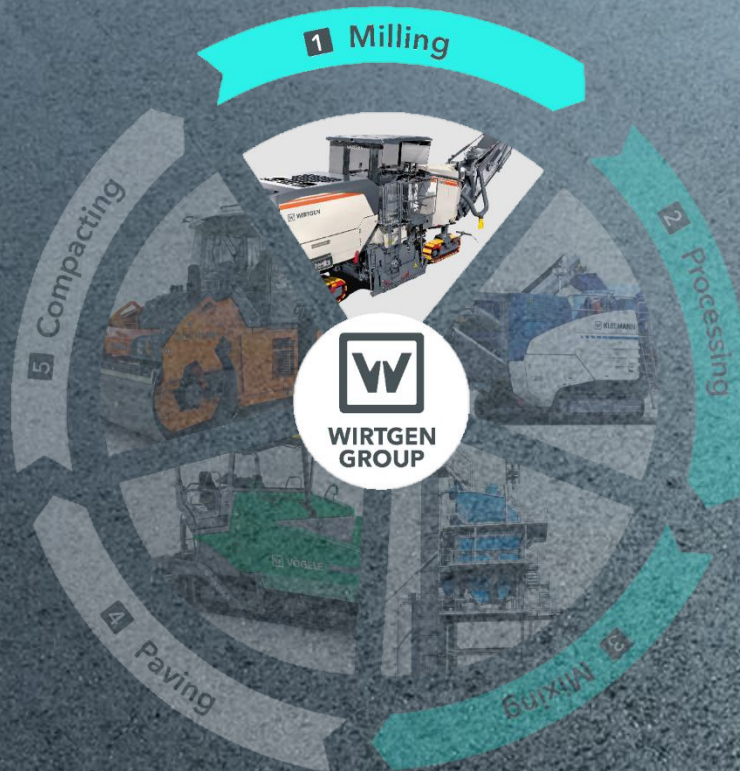
WIRTGEN



KLEEMANN



BENNINGHOVEN



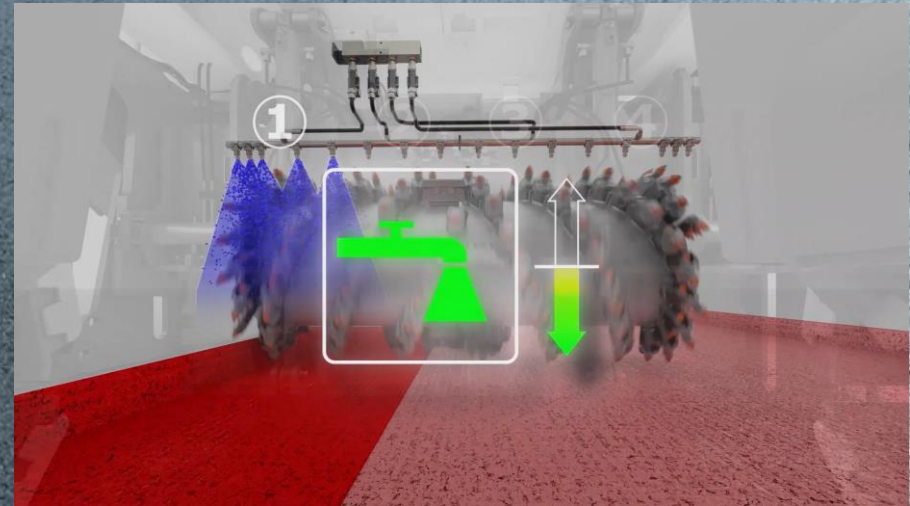
Milling layer by layer

- Milling layer by layer on suitable sites
- Produce clean RAP out of **Top-, Binder-, Base layer** to keep high quality material
- To reuse these in highest RAP rates
- Core samples help with the decision



Water Management

- To reduce water consumption and keep moisture content in the RAP on a low level
- Automatic water flow addition depending on RAP flow during milling and section control on spray bar for overlaps





- 1 % MORE moisture \triangleq 1 l MORE oil per 1 t of asphalt
- Approx. \sim 2,2 kg CO₂ per 1 % moisture per 1 t asphalt

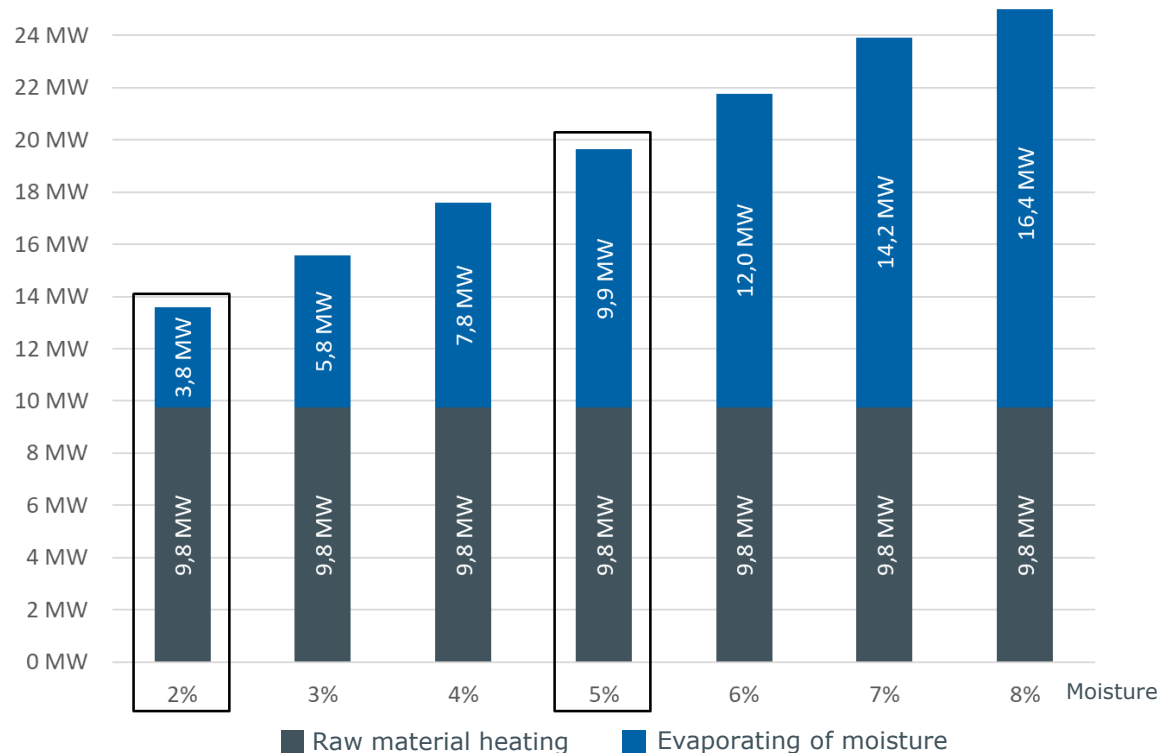
Example:

- Annual production of 100,000 t
- 100,000 l MORE heating oil
- AND
- \sim 220 t MORE CO₂



Material Moisture

Energy consumption for Asphalt production of 240t/h



Hot RAP addition

Moisture 2% 8%



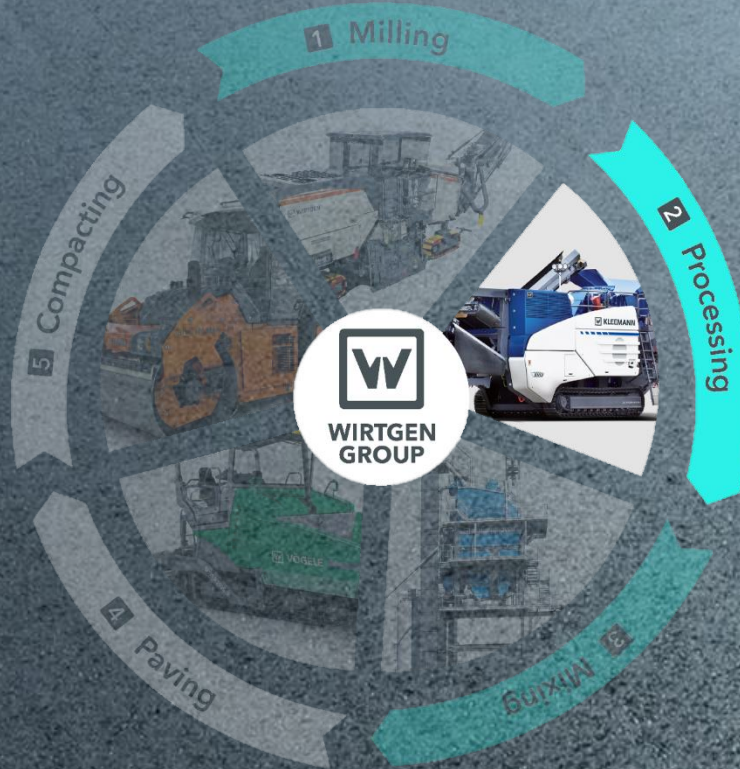
Performance 180 t/h 90 t/h

Cold RAP addition

Moisture 2% 8%



Addition 50% 20%





Do



Don't



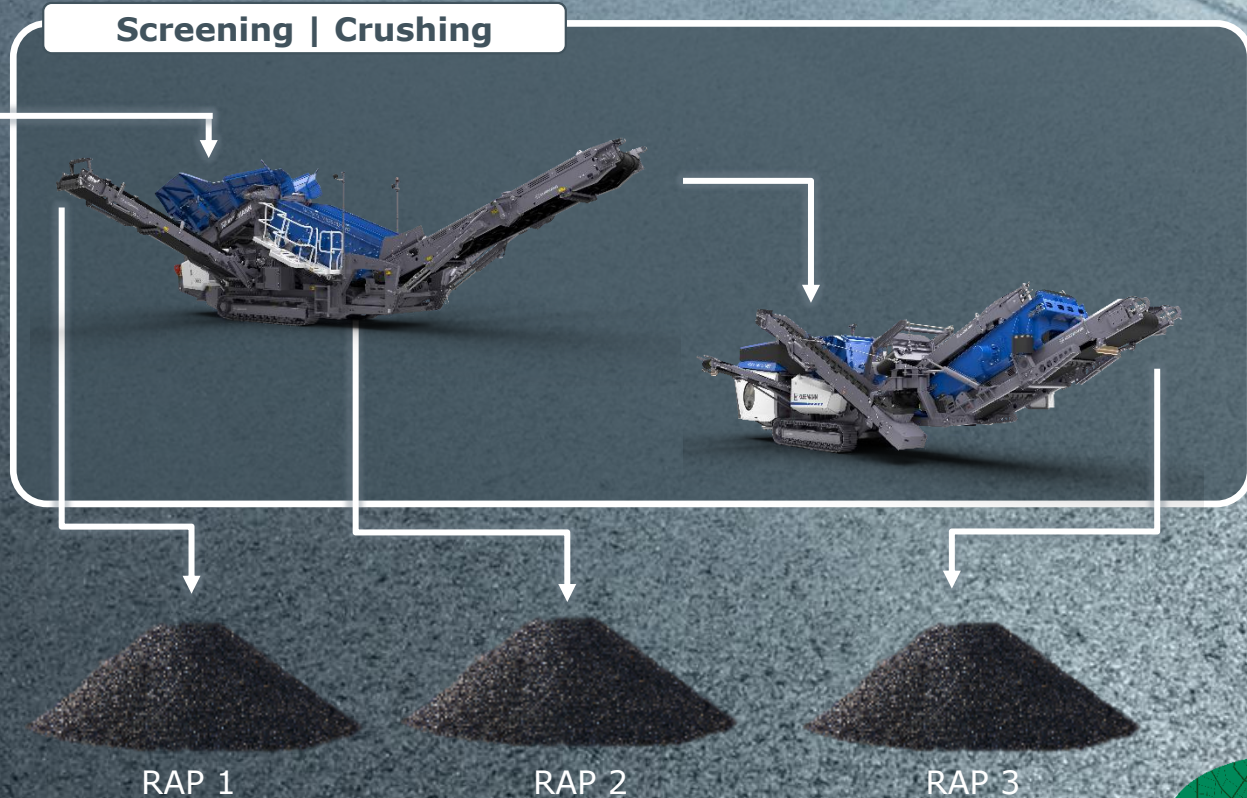
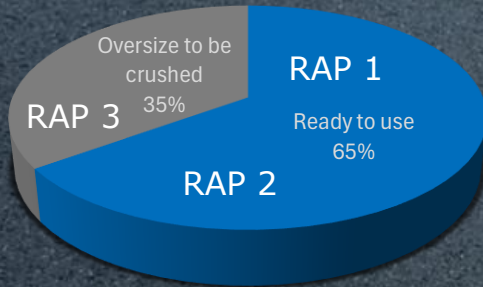
- Use of gentle processing methods
- Keep original grading curve
- Crushing stones produces fines
- Fines limiting RAP Addition

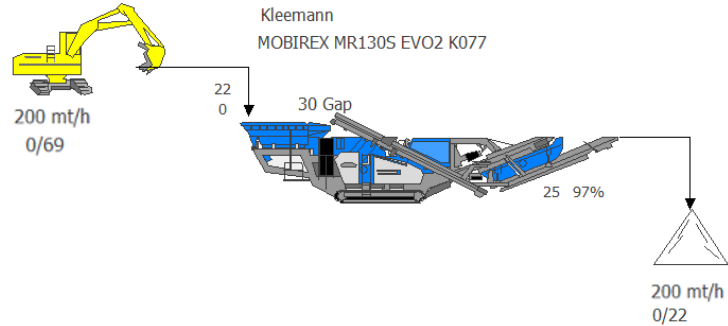
Processing

Screening | Crushing



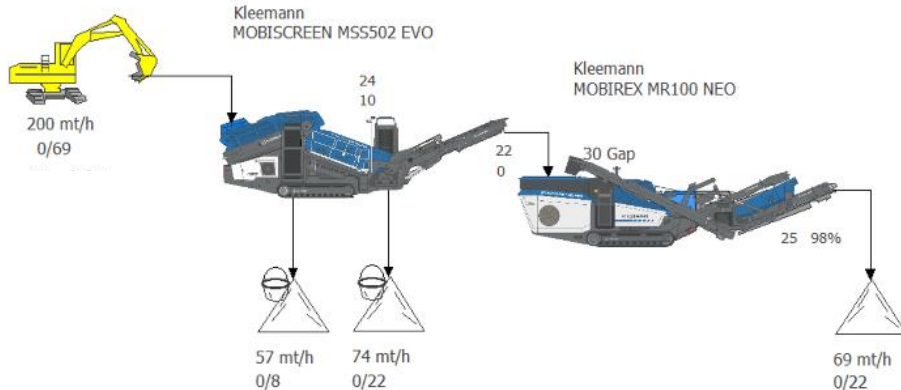
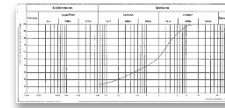
Typical size distribution
- Milled asphalt





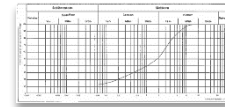
Asphalt SPEC A

20%



Asphalt SPEC A

80%

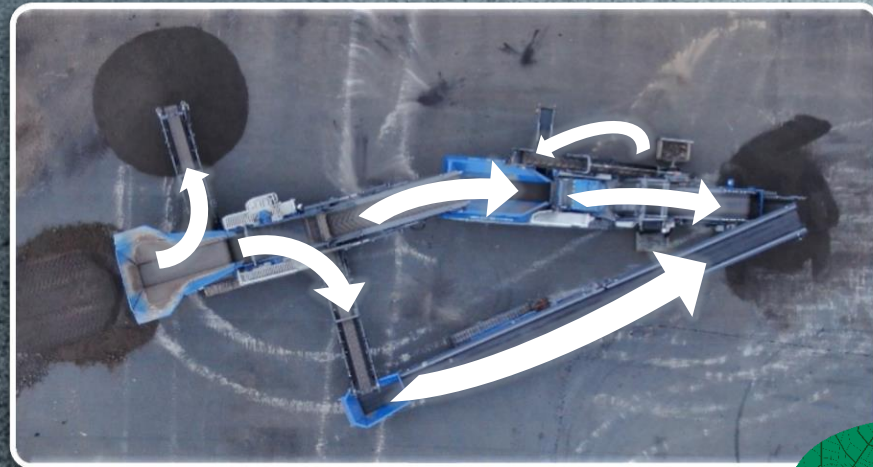


Processing Homogeneity – Accumulated piles

- Homogeneity is important for a stable asphalt production
- Try to feed the processing set-up with a mix of layers



- Material flow inside processing set up helps to homogenize
- Regular Sampling is mandatory







Thermal stress on Bitumen

Hot RAP Addition

Recycling drum with hot gas generator



Hot RAP Addition

Recycling drum with hot gas generator

- Up to 180 – 220t/h RAP
- Reclaimed granulates heated up to optimum processing temperature of 160°C
- Bitumen heating in RAP:
 - > without flame contact
 - > without heat radiation
 - > exclusively by hot gas
- VOC emission values below 50mg/m³

100%

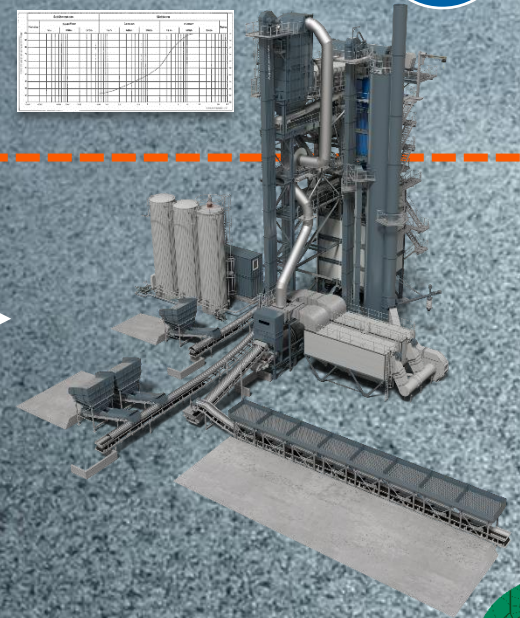
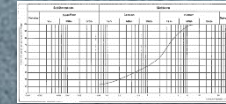


RAP 1 RAP 2 RAP 3



Recipe generator

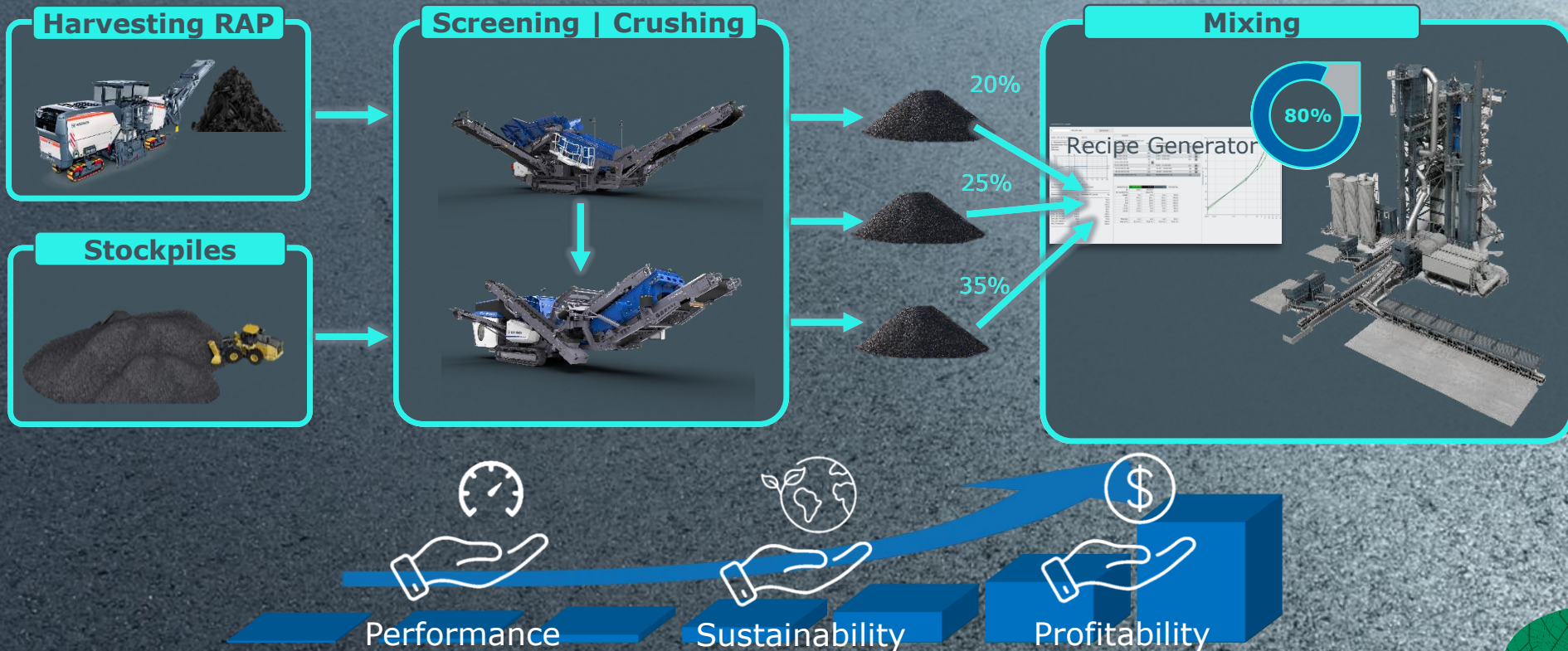
Asphalt
SPEC A





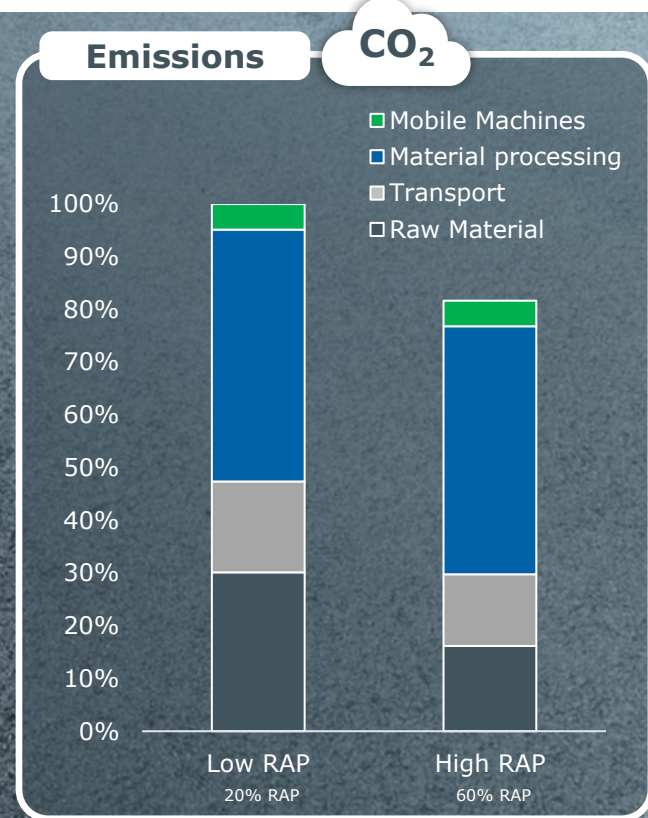
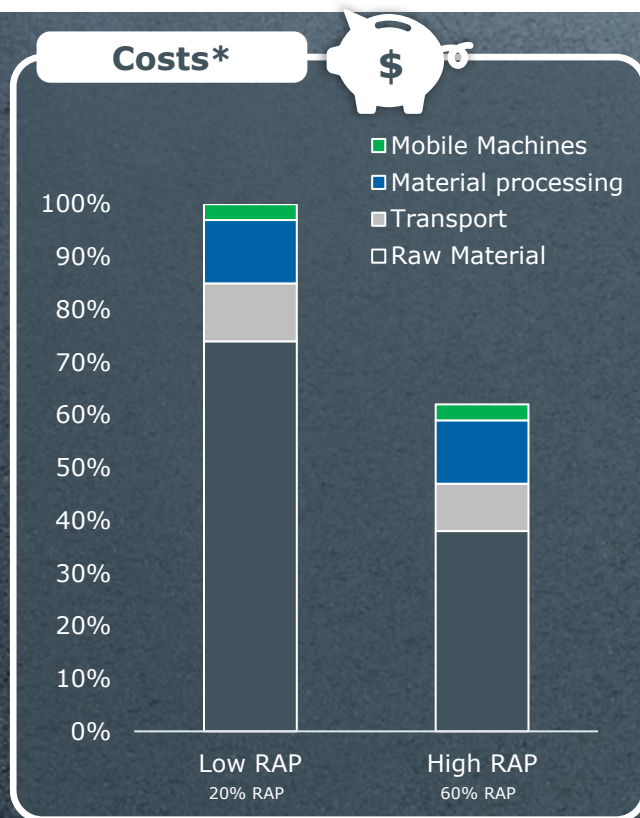
Production System Solution

Recycling Management for Hot Mix Asphalt



Production System Solution

Recycling Management for Hot Mix Asphalt



*for Mobile Machines and Material Processing only fuel considered

Production System Solution

Recycling Management for Hot Mix Asphalt



Let us discuss your situation
many parameters = many solutions





THANK YOU

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