



Possible ways to reduce climate impact from the paving industry

- Möjliga vägar för att minska klimatpåverkan från asfaltbeläggningar

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Presentation outline

Overview of emissions in the paving value chain

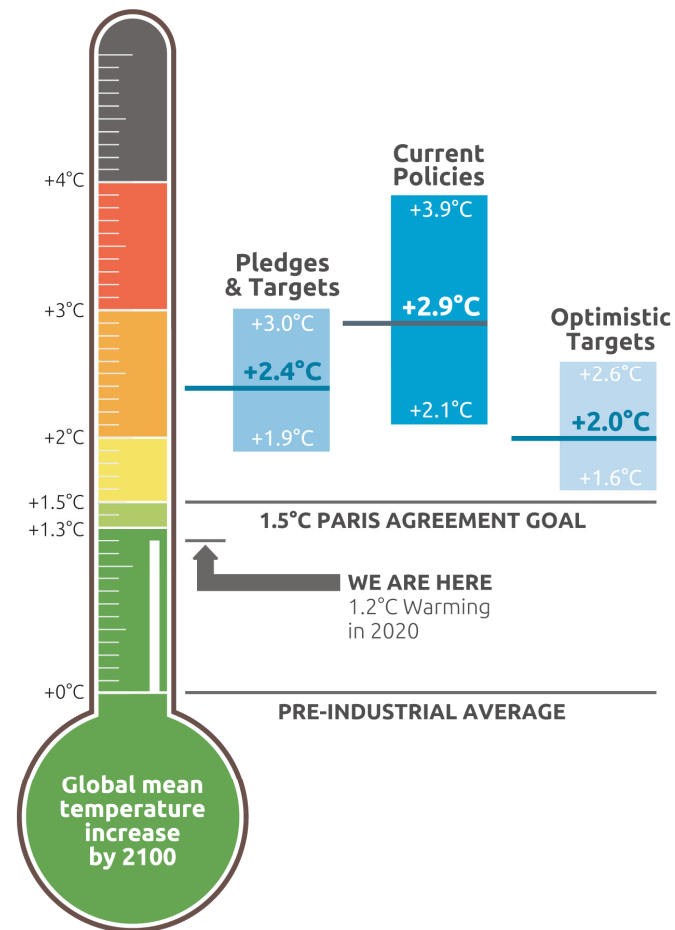
Reuse of asphalt

Performance and technical lifetime of pavements

Partly replacement of bitumen - trials and potential

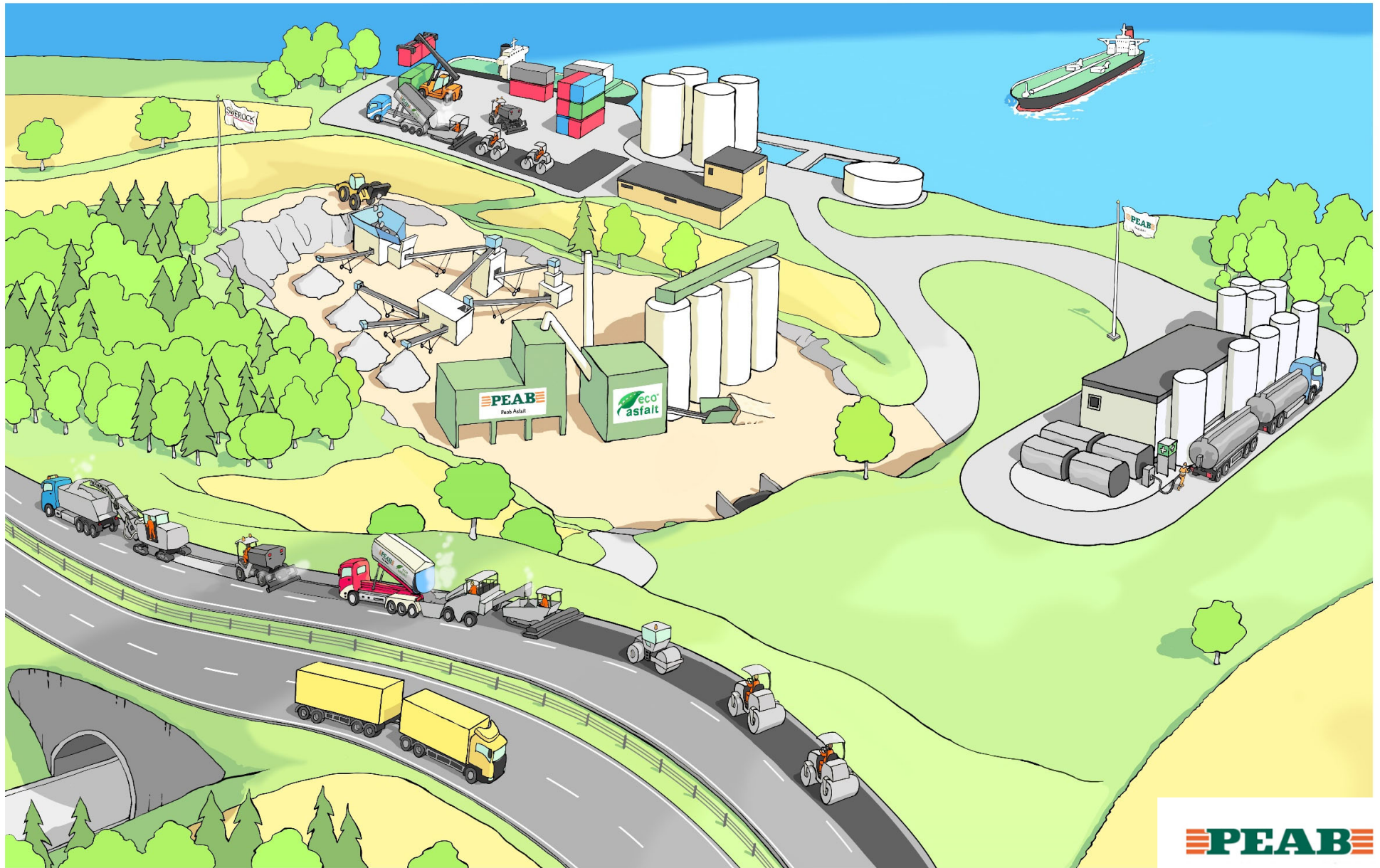
Missing pieces (legislation, incentives, EPD:s, road maps)

Conclusions



CAT warming projections
Global temperature increase by 2100

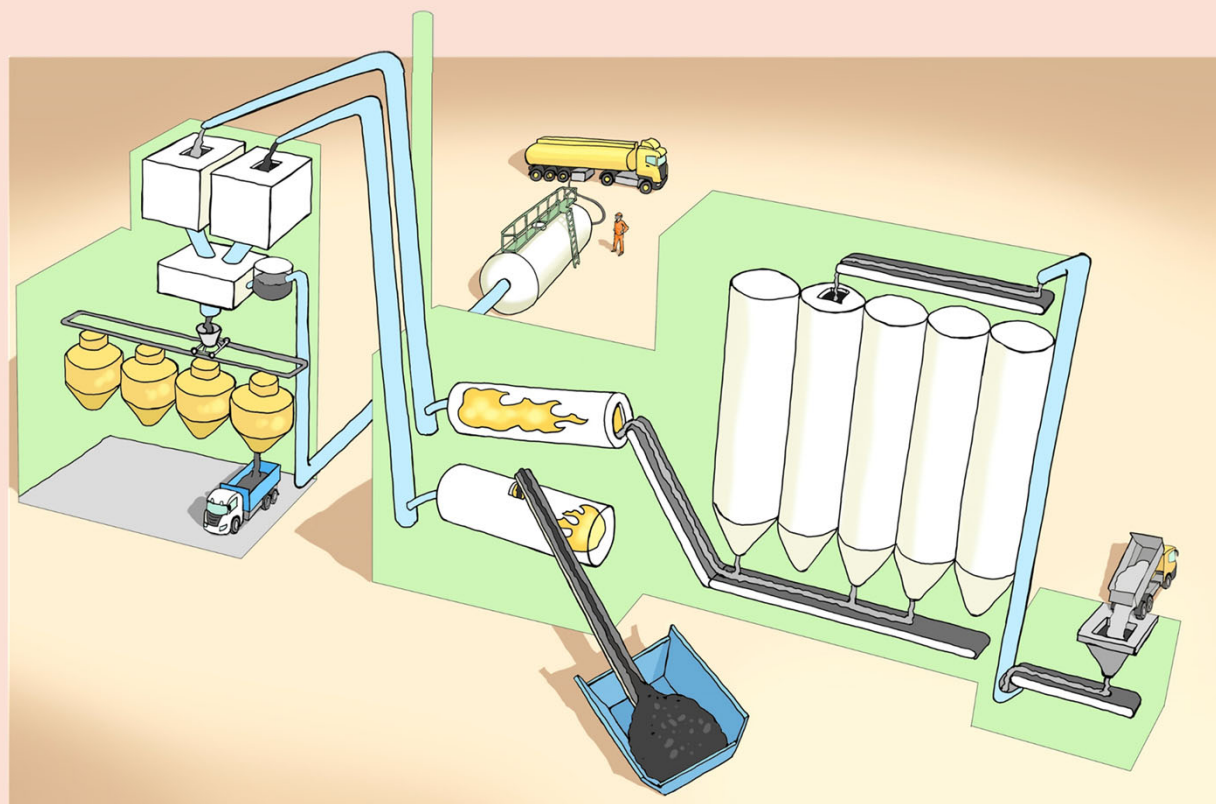
May 2021 Update



The dominant energy consumer in an asphalt plant, is the drying and heating process.

In Peab Asphalt's ECO-Asfalt, the traditional burner oil is replaced with a heavy vegetable based bio-oil.

Other contractors in Sweden have used either wood pellets or light bio-oil.

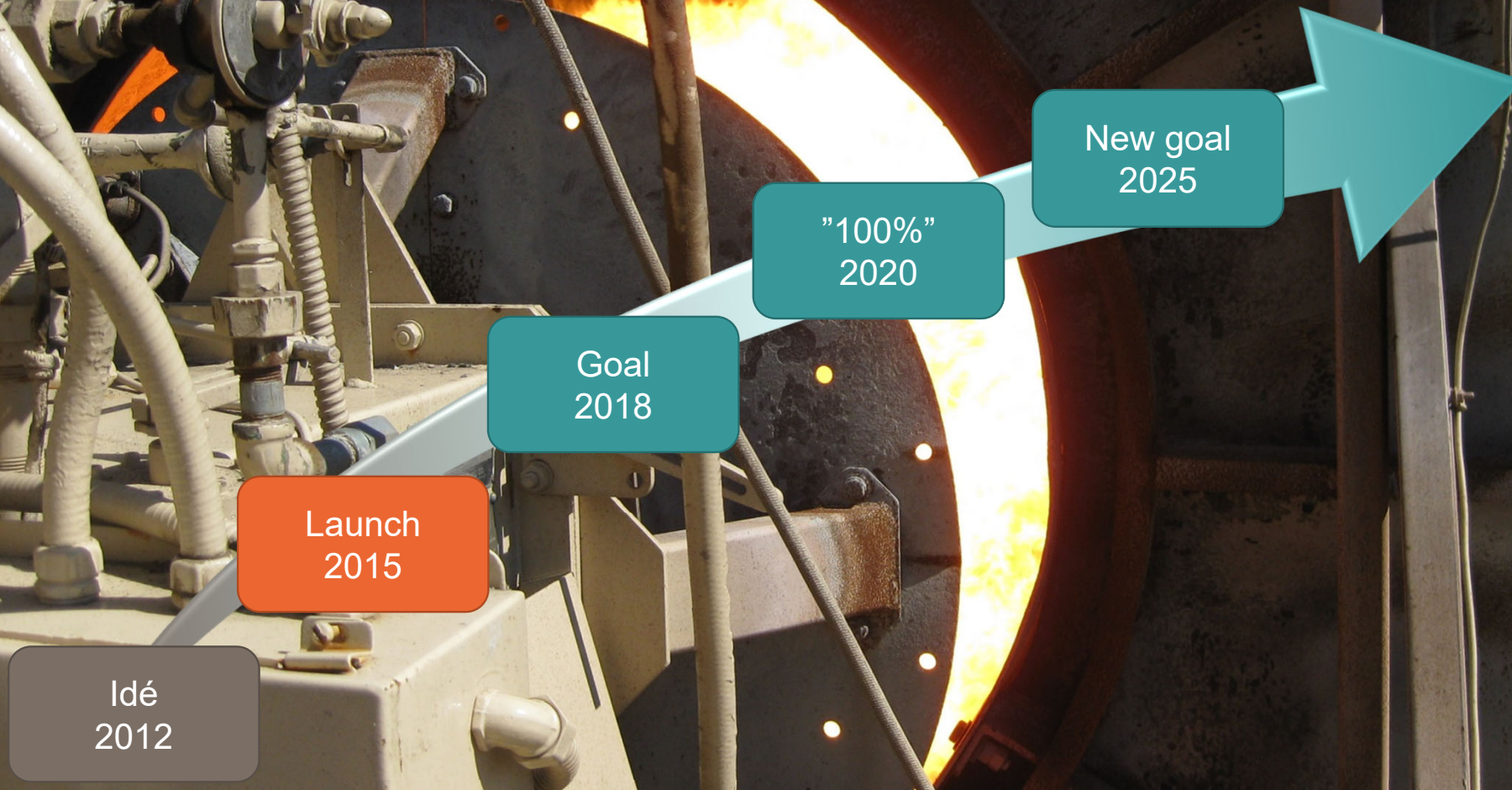


RAP* – the greatest source of reused material for asphalt!

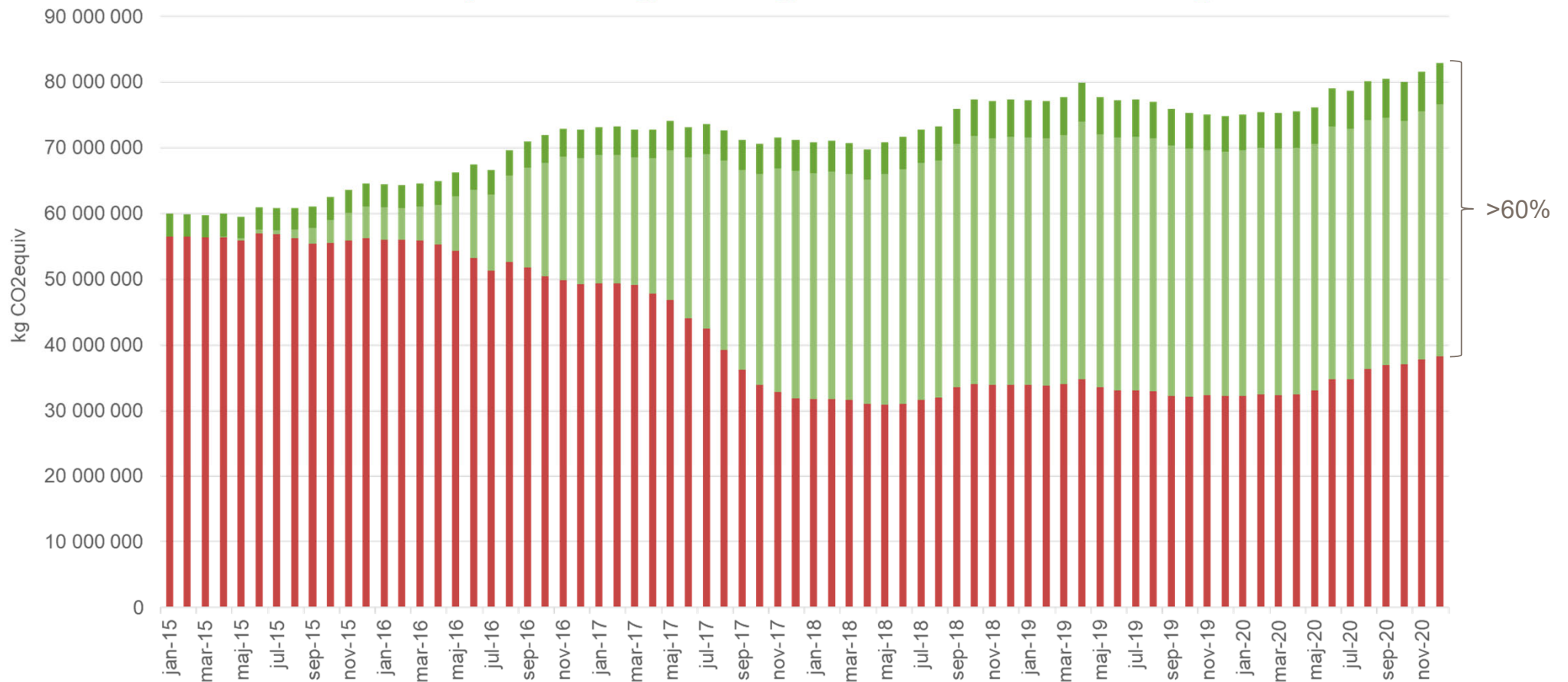
- The Industry needs to be careful of what to put into asphalt pavements
 - To ensure future reuse
 - Not harm the environment or workers
- New and recycled materials, additives etc has to be carefully designed with special consideration to workers health, safety, and future reuse of the material.
- Important to pay attention to technical lifetime and examine all possible aspects. Shortened life would be an issue!
- Reuse of old asphalt gives a better performing new asphalt when new technologies are used!

*RAP = Reclaimed Asphalt pavement i.e. milled or removed old asphalt.

Switching to renewable fuel - Sweden



Climate impact* regarding Peab Asphalt Sverige



* Annual rolling 12 months average in chart, calculated according to bookkeeping LCA from cradle to gate using the EKA-tool from Trafikverket



■ Climate impact

■ CO2-savings due to biofuel

■ CO2 savings from RAP usage



Climate impact – comparison

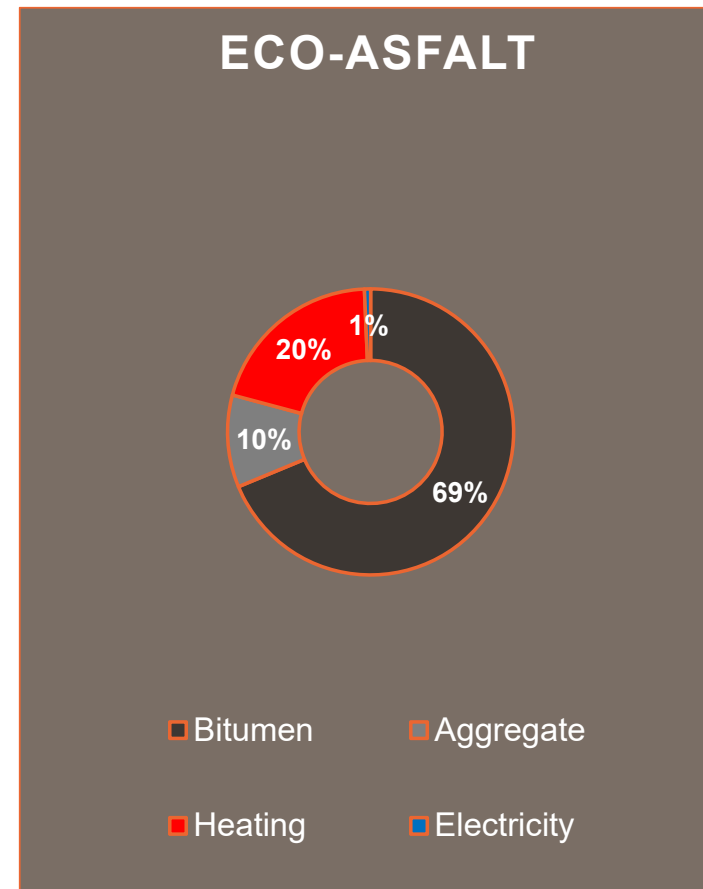
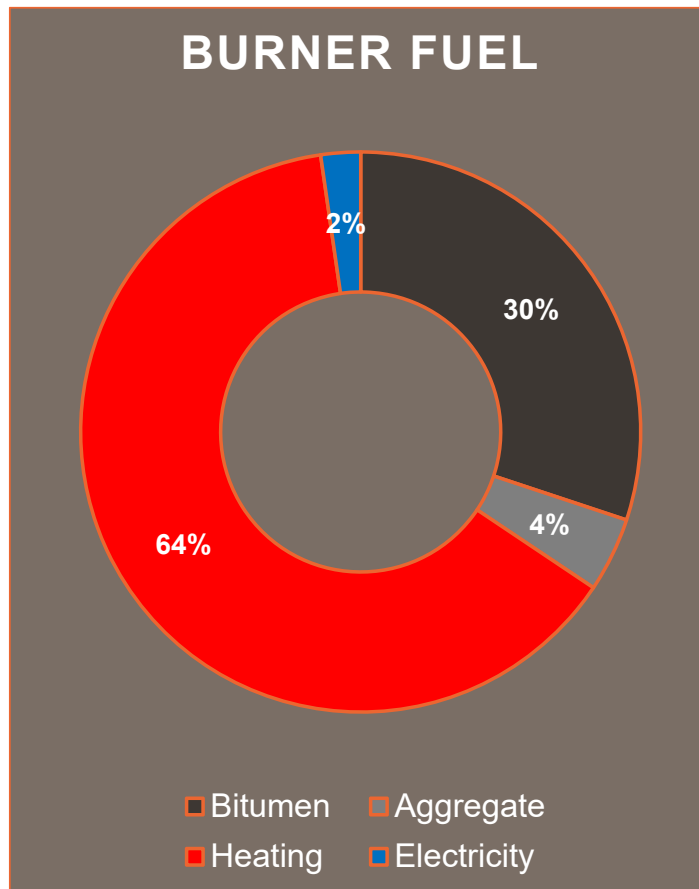


Illustration based on Swedish circumstances

Performance and technical lifetime of pavements

- Knowledge, skilled personnel and right conditions when paving is key.
- The road owners knowledge about proper asset management and their possibilities to do maintenance at the right time is equally important.
- Although lowering emissions is important, loosing technical lifetime can jeopardize even much more.
- Climate impact from paving operations are only a part of the emissions from transportation.
- Modified binders have a positive performance in field, justification is in the asset management program.



**Alternative to bitumen in Nordic countries
or partly substitution of bitumen**

Bio-binders

In Sweden, so far

- Skanska, NCC, Peab Asphalt and Svevia have projects communicated
- Nynas (bitumen supplier) announced a product line with less climate impact.

Mainly, it's a partly substitution of bitumen so far

- Probably in the range of 5-25% of bio product replacing bitumen in mix
 - Attention: climate calculation of substitution impacts
-
- Peab Asphalt work with lignin.

Location of test sites

1. Sundsvall, 2020
2. Järfälla, 2021
3. Loka Brunn, 2021
4. Örnsköldsvik, 2021
5. Forshaga, 2021
6. Jyväskylä Finland, 2021

More sections in planning process.





Lignin in asphalt, SMA 11 70/100

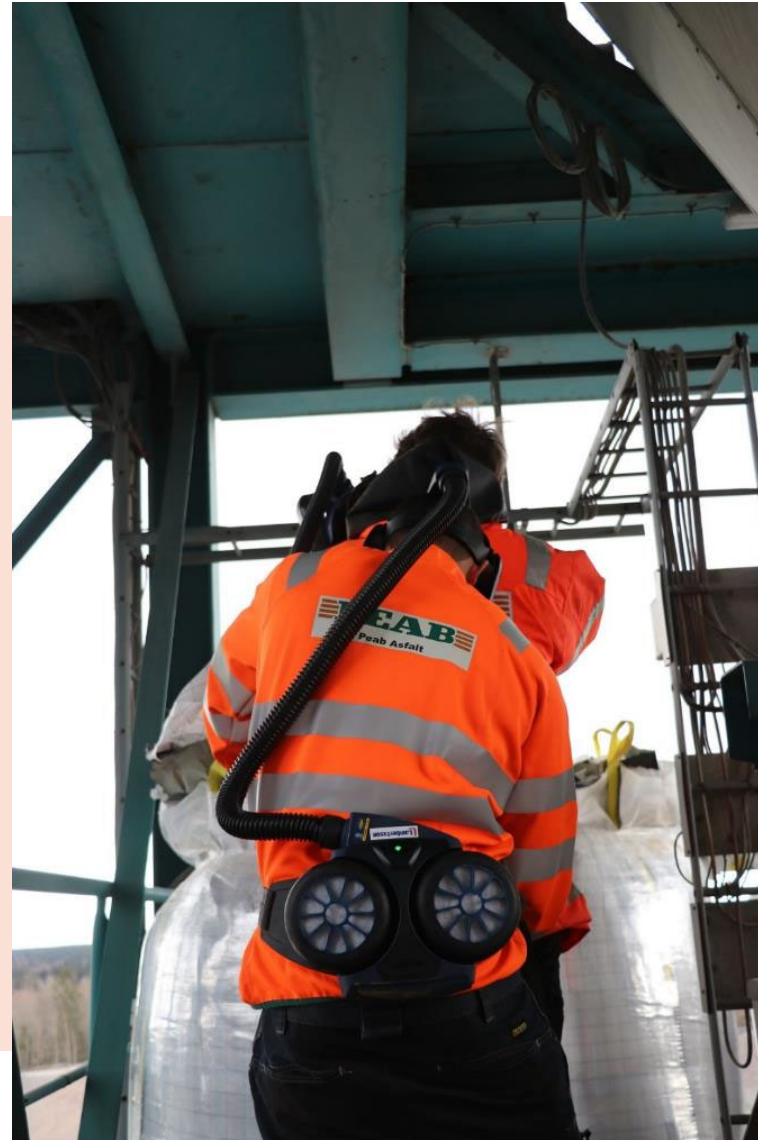
Järfälla 2021-04-29

Lignin



Dust







Järfälla





Lignin in semi-warm asphalt

Loka Brunn and Lekhyttan 2021-06-30



Steam heated plant





PEAB



Lignin in ABT 16 100/150

Örnsköldsvik 2021-08-09



Missing pieces

- Together, we create prerequisites for a transition to net zero emissions.
- Climate calculation must follow a standard, be transparent and traceable.
- Climate calculations will not become better by more details or resolution. Average data from a primary source is good.
- Different asphalt designs have different climate emissions, but so have use and technical lifetime.
- Asphalt mix designs can be evaluated and compared.
- Fossil emissions must be reduced first, you cannot compensate these.
- Biogenic coal or carbon sinks, CCS/CCU also needed but in separate handling.
- Models for evaluating GHG emissions needs to be worked out together in the value chain.

”Requirements or incentive models need to be sound, simple, traceable and fair for everyone!”

Conclusions:

Towards net zero emission for road pavements

1. Replacing the fuel source to a renewable one in asphalt production.
2. Increase the reuse of asphalt.
3. Other known solutions
 - a) Phase out fossil fuels in transportation and paving.
 - b) Use green electricity
 - c) RAP shelters, dry material.
 - d) Lower production temperature (WMA).
 - e) Electrification of quarries and recycled aggregate.
4. Reduce impact from bitumen, by responsible use of bio-products.

WMA should be used, but for other reasons than lowering GHG emissions.

Please note that extended pavement technical lifetime is part of a scenario analysis, needed for proper road owner asset management, towards net zero emission road pavements.



We need to work together to be part of the climate crises solution, not the problem.

Thank you for listening!