



Overview of the current trends in the European Asphalt Industry

Breixo Gomez

Technical Director- European Asphalt Pavement Association

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Current trends in European Asphalt Industry

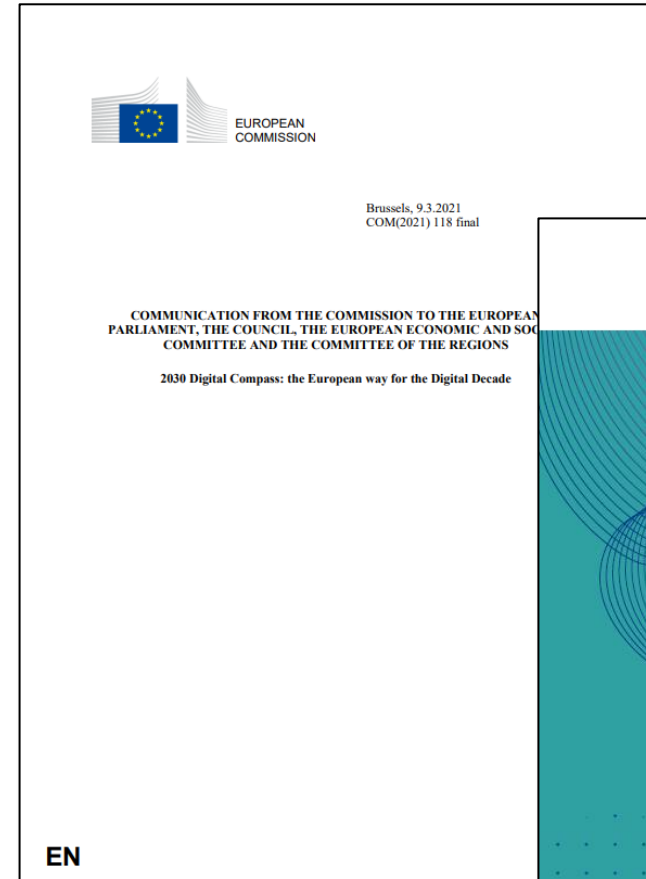
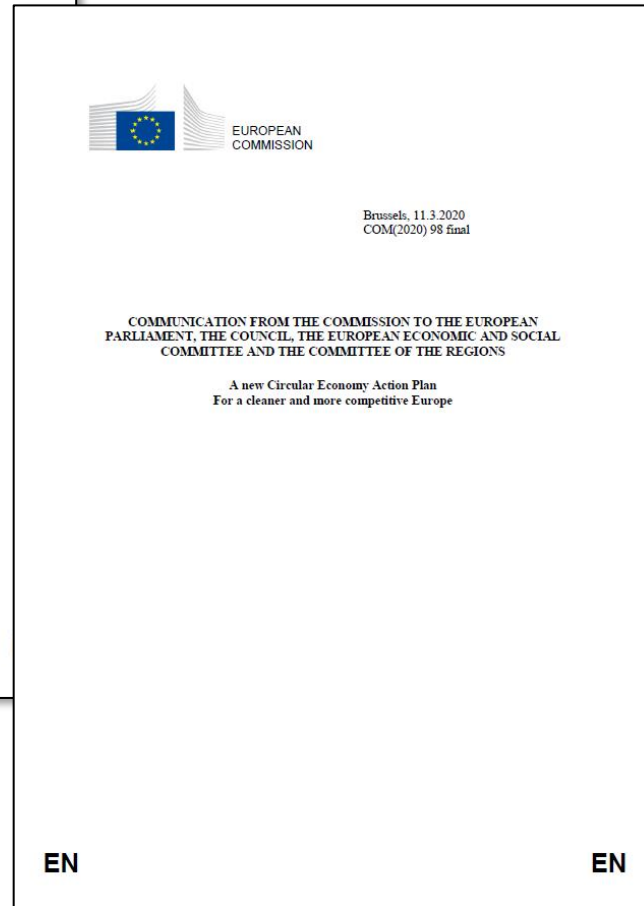
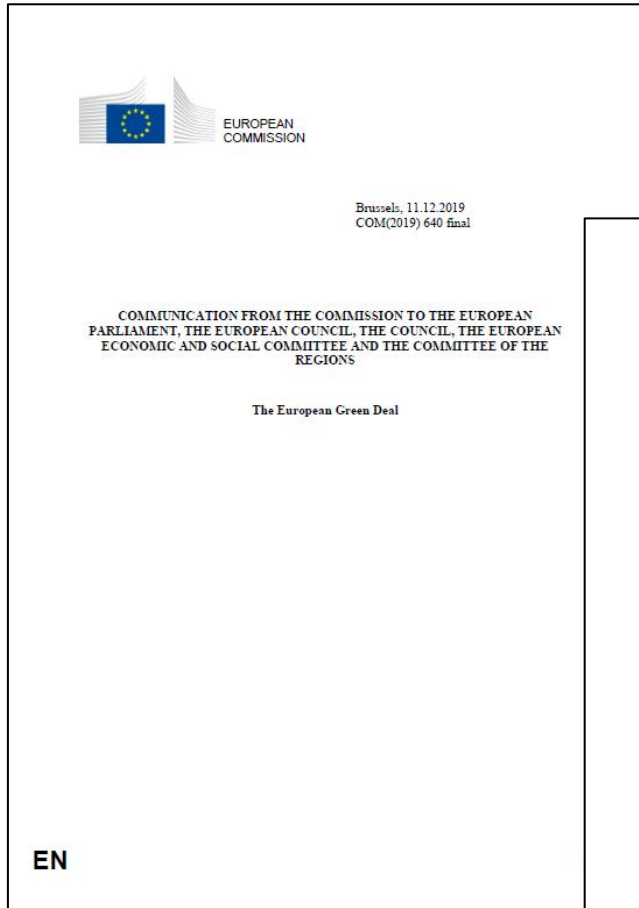
Sustainability



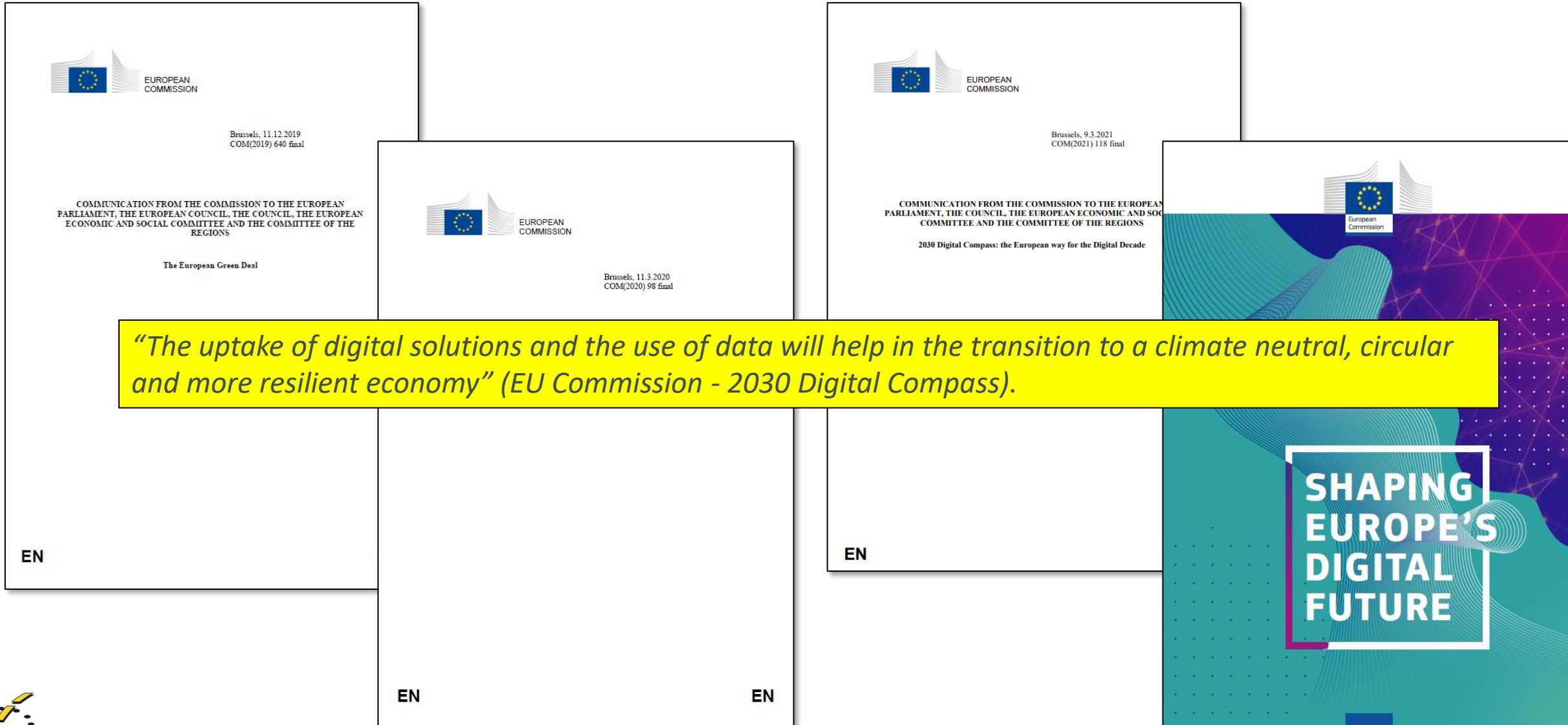
Digitalisation



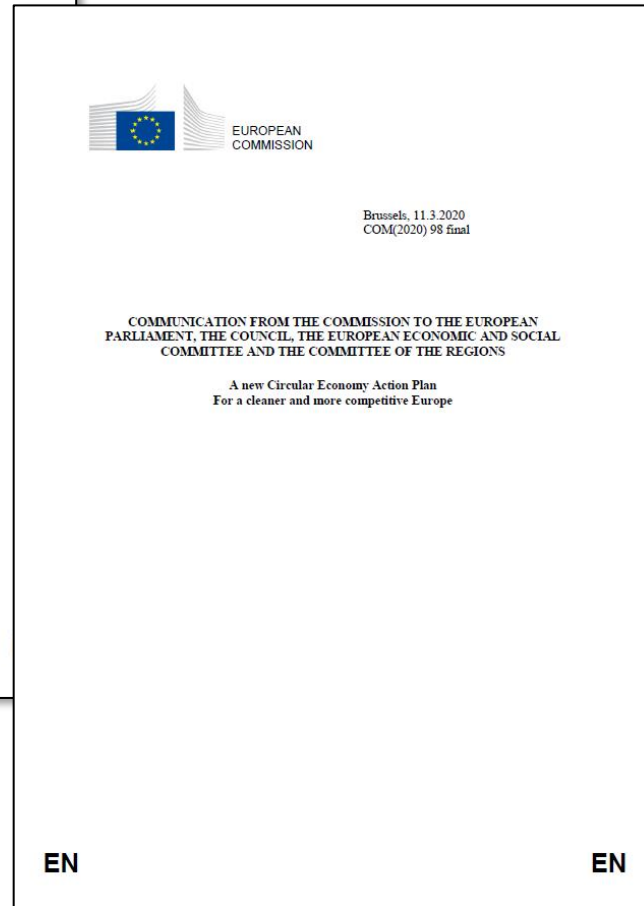
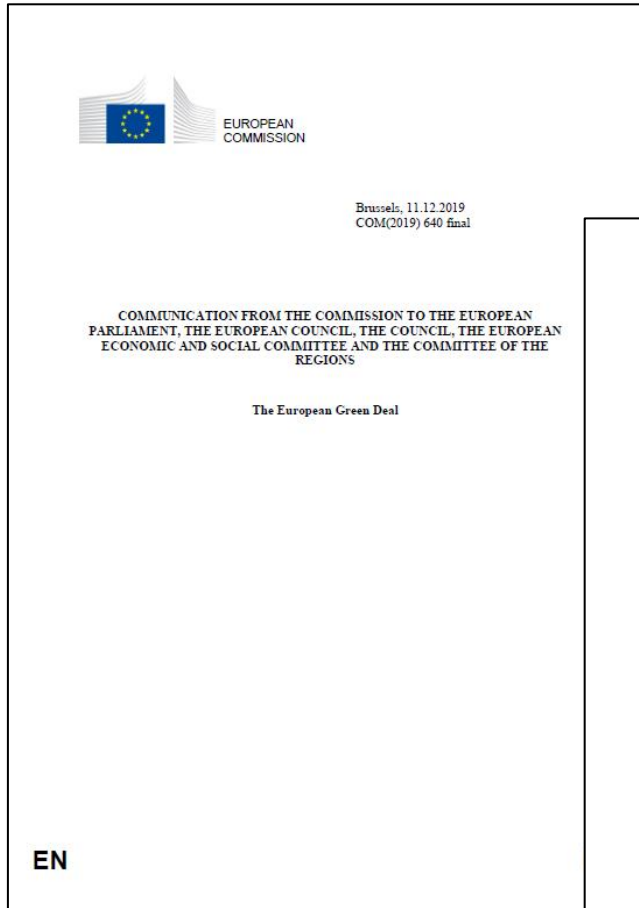
Current trends in European Asphalt Industry



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Current trends in European Asphalt Industry



- EU's greenhouse gas emission reductions target for 2030 to at least 50%.
- Includes a circular economy action plan and a 'sustainable products' policy to support the circular design and **prioritising reducing and reusing materials before recycling** them.
- It will also include measures to encourage businesses to offer, and to allow consumers to choose, **reusable**, **durable** and **repairable** products.
- A sustainable product policy also has the potential to **reduce waste** significantly.

Current trends in European Asphalt Industry



- Vision 2030 based on 4 pillars:
 - A digitally skilled population and highly skilled digital professionals.
 - Secure and performant sustainable digital infrastructures (e.g.5G).
 - Digital transformation of businesses.
“Construction: the lowest productivity development from all major sectors in the last 20 years. 70% of construction executives mentioned new production technologies and digitalisation as the drivers of change in the sector”.
 - Digitalisation of public services.

Current trends in European Asphalt Industry

Sustainability



- Circular Economy (re-use vs. recycling)
- Low temperature asphalt
- Extended durability
- Emissions under the action of traffic
- Decarbonisation
- Environmental Product Declarations

Reduction of CO₂ – Low temperature asphalt

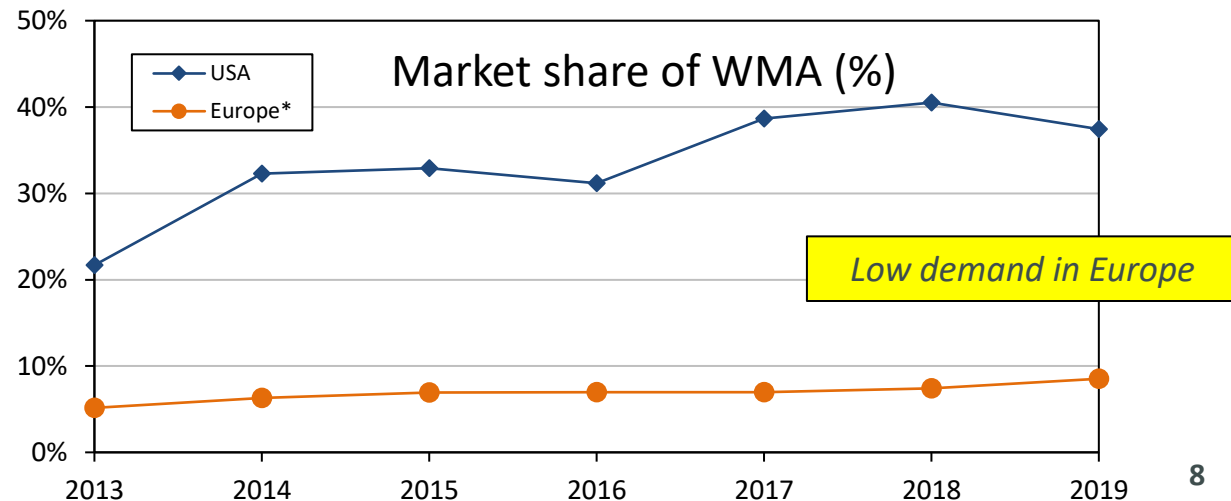
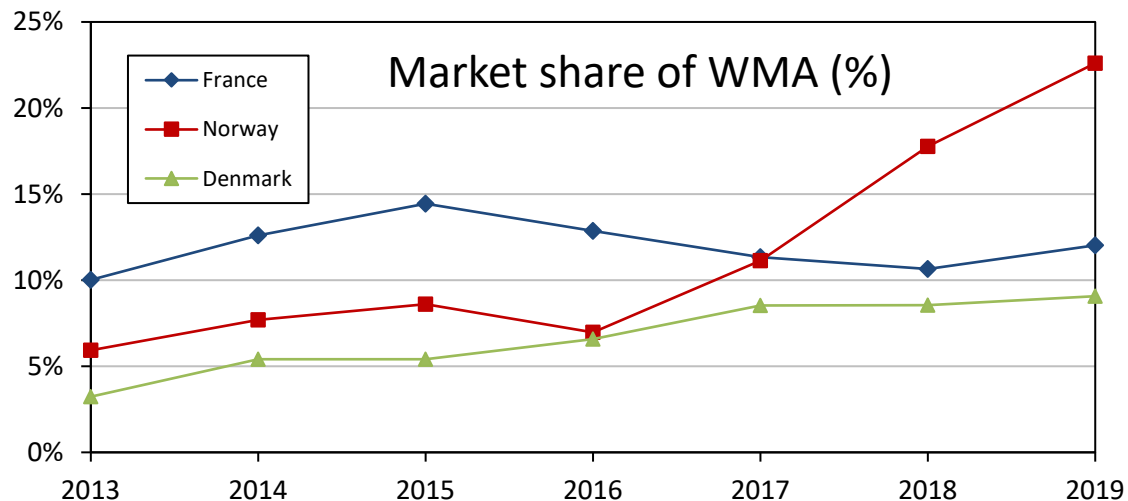
- **Warm Mix Asphalt (WMA):** bituminous mixture, as defined in Standard Series EN 13108, manufactured by using a series of technologies, which allow a significant reduction of production and installation temperatures, compared to the equivalent hot mix asphalt.

Note 1: this definition excludes asphalt mixes manufactured with bituminous emulsion.

Note 2: normally temperature reductions are of at least 20 K.

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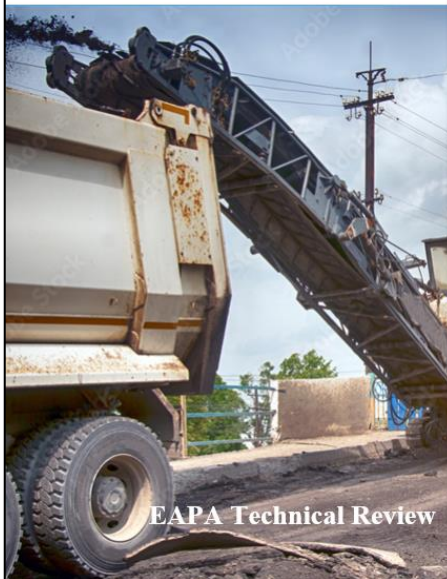
- Advantages of WMA:
 - Health of asphalt workers: reduced exposure to fumes and odours and a cooler working environment.
 - Environmental impact: reduced energy consumption and emissions.
 - Paving operations: better workability, extending the construction season and earlier opening of the road, reduced ageing of the bitumen during the production stage.





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The Circular Economy of Asphalt



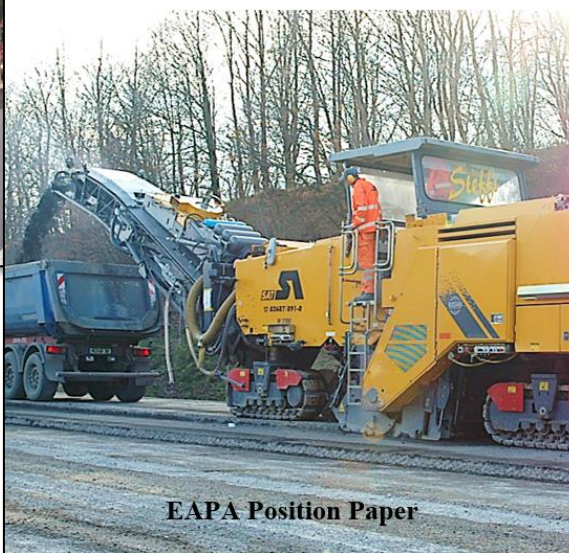
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Recommendations for Road Authorities to achieve circular economy goals through the maintenance, re-use and recycling of asphalt



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Asphalt – A Key Construction Product for the European Circular Economy



EAPA Position Paper

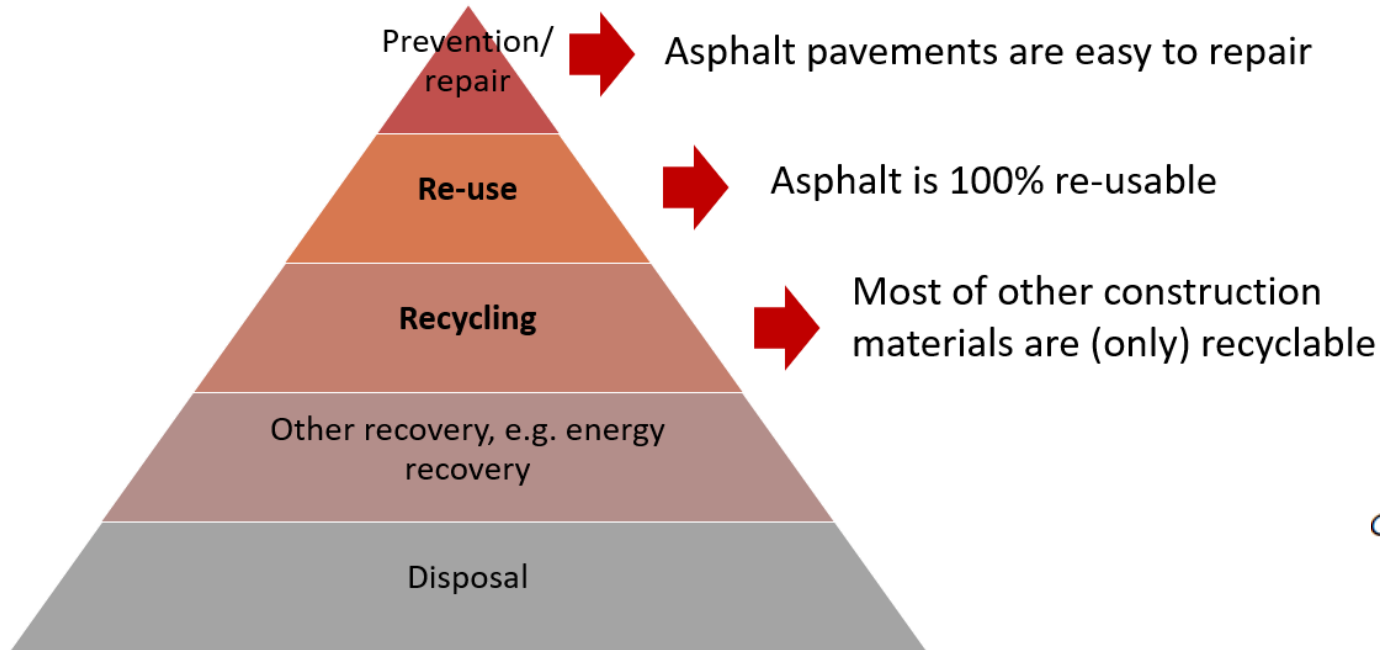
Circular Economy of asphalt



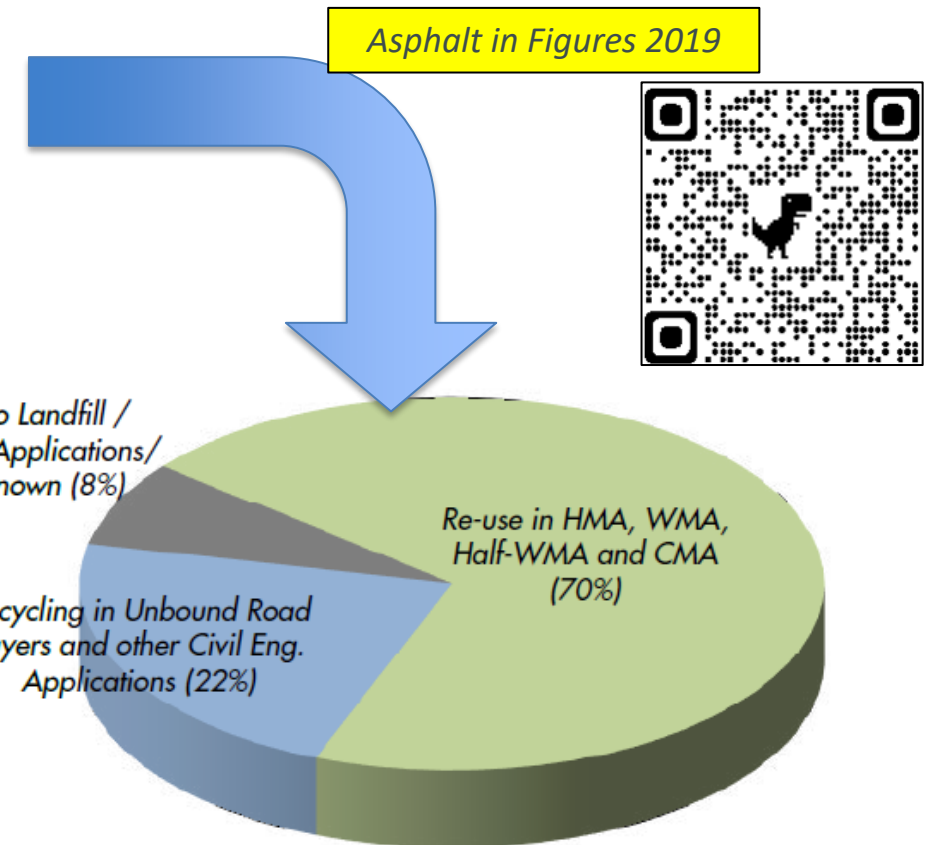
RECOMMENDATIONS FOR THE USE OF REJUVENATORS IN HOT AND WARM ASPHALT PRODUCTION



Circular Economy of asphalt



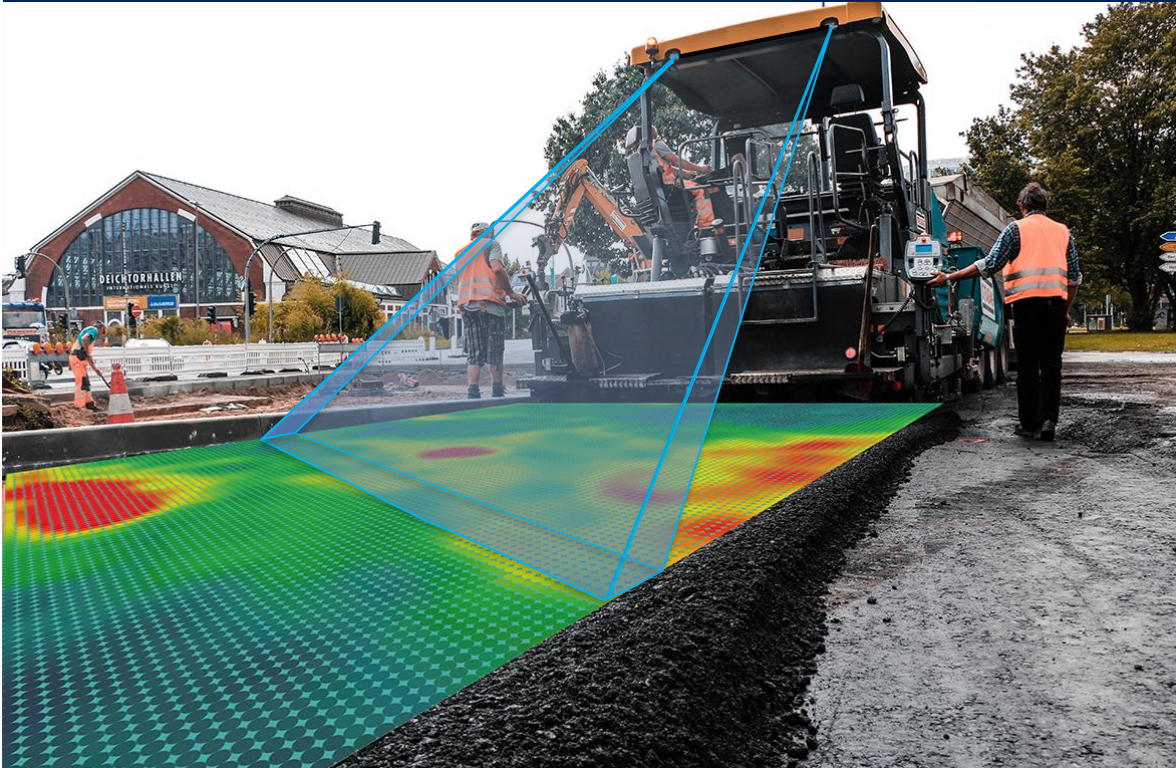
Waste hierarchy established by the Directive 2008/98/EC



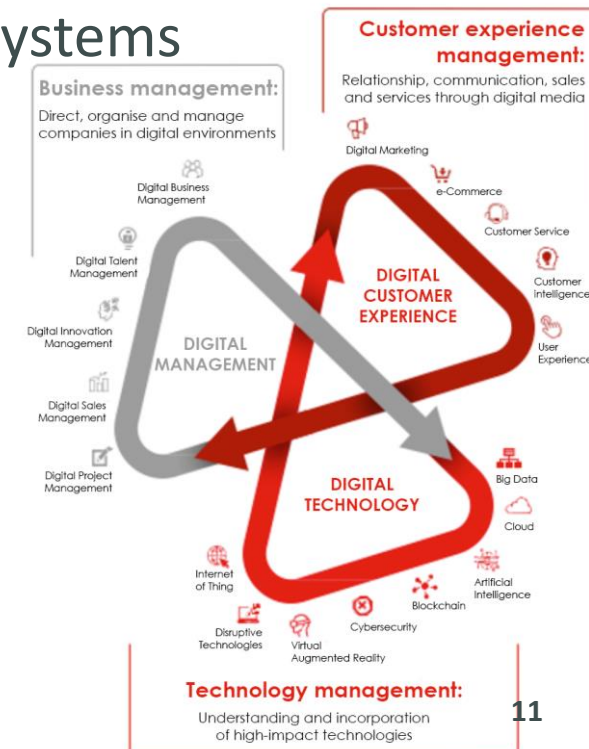
Uses of reclaimed asphalt from existing roads after the end of service life in 2019

Current trends in European Asphalt Industry

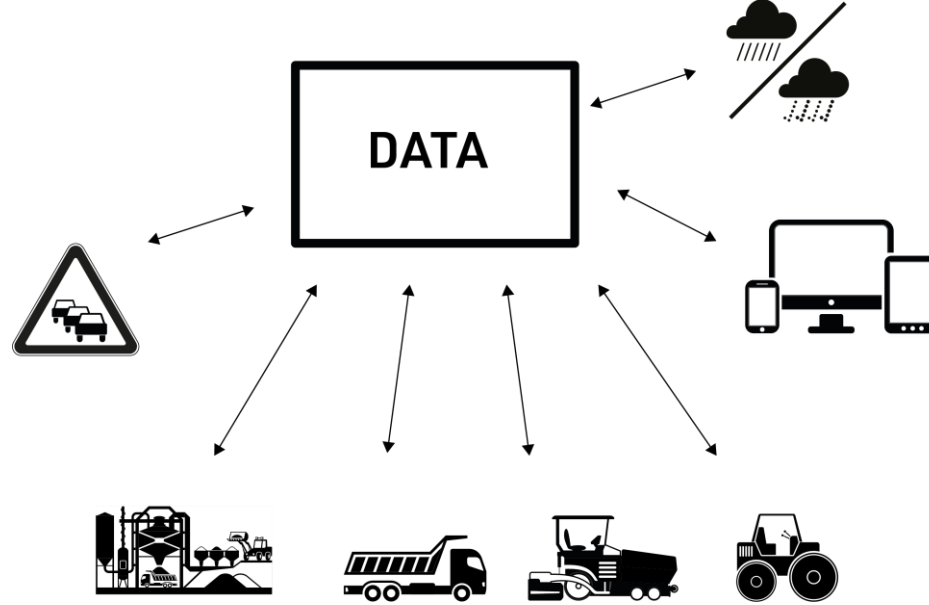
Digitalisation



- Asphalt 4.0
- Digital technologies and tools
- Smart management systems
- Customer experience
- Connected mobility
- Electric mobility



Asphalt 4.0







High-performance Asphalt Pavements adapting for future road networks



EAPA Technical Briefing



[Draft July 2021]

High-performance Asphalt Pavements – adapting for future road networks

EAPA Technical Review



Increasingly challenging traffic

To give and answer to the current climate and mental-related challenges, the European Union included in The European Green Deal [1] the strategy that aims to transform the EU into a prosperous society, with a modern, resource-efficient and competitive economy, where there are no net emissions of greenhouse gases in 2050 and where economic activity is decoupled from resource use. For this, European Union forecast a future transport system that is resilient, efficient, climate- and environmentally friendly, and seamless for the benefit of all citizens, the economy and society.

However, the bad state of road surfaces leads to higher energy consumption, vehicles and road damage costs, delays in travel time, and, in order to meet EU requirements, roads must be able to require minimum maintenance operations and avoid disruptions. All this, while ensuring that the materials, which guarantee the re-use and at the end of the road's service life, are used.

Moreover, numerous emerging factors are hindering these efforts. For example, extreme events, such as floods or breaking temperatures, are more and more frequent every year due to Climate Change. Hence, over the decades, a great deal of European surface transport infrastructures has experienced an anomalously fast rate of deterioration, bringing them close to the end of their service life.

Moreover, the traffic demands keep increasing. According to Eurostat [2], the European road freight transport grew by 11.8% from 2013 to 2017, 4.5% only in the last five years of the years of EU economic crisis, a rising trend has been present for decades.



Figure 1. Quarterly road freight transport by type of transport, EU-28, 2013-2017 [2]

In this unfavourable scenario, road transport is also nowadays experiencing one of the greatest revolutions of its history, with the arrival of new types of vehicles, such as the autonomous, electric and high-capacity vehicles. Such vehicles, expected to be among the main tools of humanity to reduce transport emissions and increase road safety, might also worsen the distress produced on our road infrastructures accelerating the road pavement deterioration over time, requiring specific designs and solutions, when a significant number of these is expected on a given road. For this reason, they can be named Vehicles with Enhanced Road Requirements (VERRs).

As approximately 90% of European road network is made of asphalt, the sector has assumed the responsibility of developing high-performance asphalt solutions especially designed to deliver safe and durable roads in the above-mentioned scenarios. This document provides an overview of some of these solutions and shows that the sector is ready for the new challenges, and with the aim promoting the correct use of these technologies among Road Authorities and the rest of involved stakeholders.



Vehicles (road drivers)	6	4	3
Vehicle length	16.5 m	25.25 m	32 m
Load per vehicle	100 m³	150 m³	200 m³
Fuel consumption	3.5 ml/m³km	3 ml/m³km	2.5 ml/m³km
CO2 emissions	100%	85% -15%	73% -27%
Road use	499 m	368 m	296 m

Source: Cider L, Larsson L, HCT DUO2-project Gothenburg-Malmö in Sweden, 2019

Asphalt 4.0



Potential risks of new road users on the durability of pavements



Heavy vehicles. Improvements in transport efficiency and technical developments in the automotive industry have also contributed to increase axle loading as well as higher tyre pressures. Greater use of high pressure super single tyres is getting more and more usual, while the total weight of trucks keeps growing. This has potential to increase rutting and fatigue cracking.



Electric vehicles following a catenary (overhead system) or a conductive rail embedded in the pavement (in-road system) to charge batteries on-the-fly tend to "hit" always the same spots of the road cross section. This produces a concentration of stresses in these spots, reducing service life.



High-capacity vehicles (HCV) are vehicles especially designed to carry more freight than a standard vehicle. Depending on the configuration and usage, these vehicles have potential to reduce carbon emissions at the individual vehicle level in the range of 15%-40%. However, these vehicles will need to increase either the axle load or the number of axles, potentially leading to either higher pavement stresses or shorter recovering time between loads, increasing fatigue and/or rutting in the pavement.



Autonomous vehicles. The development of autonomous vehicles and the formation of groups of vehicles driving in line, at the same speed and at a very reduced distances between them (system also known as Platooning) is especially beneficial for the aerodynamics of large vehicles. Consequently, it has potential to reduce fuel/electricity consumption. However, these vehicles tend to self-position in the centre of the lane (spots of the cross section receiving most impacts) and reduce the recovering time between loads, which increases the risk of premature rutting and/or fatigue damage.

2. Market-ready asphalt solutions for upcoming challenges

Asphalt industry has developed over decades, specific solutions for pavements specially stressed, such as pavements in ports and airfields or highways supporting heavy-duty traffic. With the arrival of new challenges, it can be expected that future road designs progressively shift towards these kinds of solutions.

High-performance surface courses: The highest stability and durability in surface courses are obtained when Stone Mastic Asphalt (SMA) is used. This type of asphalt mix is composed of a strong coarse aggregate skeleton, which gives the high stability and resistance to permanent deformation, and stiff and elastic mastic, which provides an outstanding durability. More information about it can be found in the EAPA Position Paper on this topic [3].

High-modulus base courses are bituminous layers with a balanced combination of closed structure and hard bitumen, which increase the mix stiffness and resistance to rutting, and an increased bitumen content, which ensure workability, water resistance and fatigue durability. Traditionally used as base courses in long-life roads, with design periods of 40 or 50 years, they can become more and more frequent, especially for heavier traffic and VERRs circulate throughout our road networks.

New concepts for pavement structures: Combinations of SMA wearing course followed by a thick high-modulus binder course and a 75-100 mm anti-fatigue layer made of asphalt concrete with highly polymer-modified bitumen PMB 45/80-70, or even the replacement of the traditional 3-layers structure by a triple-SMA have proven to be resistant to even extremely heavy and slow traffic in ports and industrial areas.

Advanced pavement execution: The use of smart asphalt plants fully equipped with automatic production and control systems, which help to deliver the mix with homogeneous temperature.

- Smart asphalt plants fully equipped with automatic production and control systems.
- Advanced transport vehicles, such as push-off trailers and advanced isolating materials, which help to deliver the mix with homogeneous temperature.
- Smart paving and compaction equipment with continuous and autonomous temperature and density monitoring.



Generation α sphalt – Re-use

<https://www.youtube.com/watch?v=AEC7vQR-oaw&t>



EAPA YouTube channel



Generation α sphalt – Asphalt 4.0

<https://www.youtube.com/watch?v=pxzNTGP8hsc>





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breixo@eapa.org



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