Dé weg naar
fossielvrij asfalt.

CIRCUROAD
Thé way to fossil-free binders

Dineke van der Burg

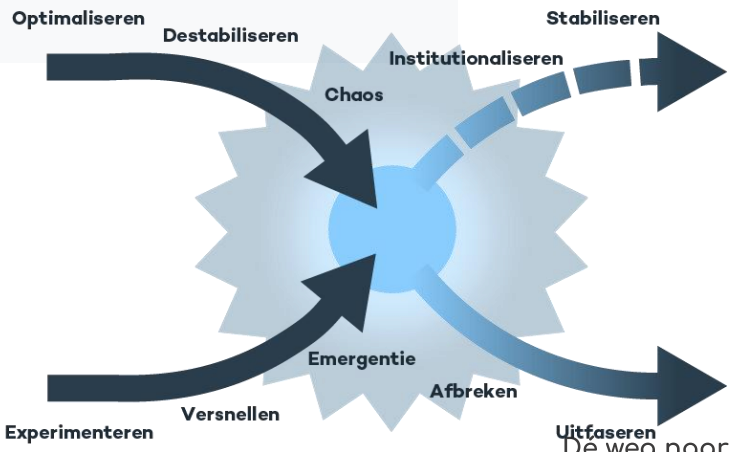
03-10-2026, Miljødagen, Oslo,

Context of CIRCUROAD: ambition on road sustainablity

Strategy of the Ministry of Infrastructure and Watermanagement:

In 2030: 55% CO2 redution in 2030 and 100 % CO2 reduction in 2050 in the entire asphalt chain (extraction, production, road constrution)

In 2030: Have high quality of circularity of all materials and reducing the use of raw materials to a 50%. In 2050 we will be 100 % circular.



De weg naar fossielvrij asfalt.

Innovations to reduce CO2

roadmap Rijkswaterstaat 2022

Preventive maintenance



Recycling



Increase durability



Low emission Asphalt plant



Equipment



Biobased asphalt



Dé weg naar fossielvrij asfalt.

CIRCUROAD: a strong collaboration

PRIVATE COMPANIES

DURA VERMEER
KWS
BituNed bv
Boskalis
VENTRACO Innovation Centre
Esha
LATEXFALT
Joss Elastomers & Chemicals
KRATON
ASFALTNU VOOR MORGEN

KNOWLEDGE INSTITUTES

Universiteit Utrecht
TU Delft
TNO innovation for life
KOAC

CIRCU ROAD

The road to fossil-free asphalt

ROAD OWNERS

Rijkswaterstaat Ministerie van Infrastructuur en Waterstaat
PROVINCIAAL VBB VAKBERAAD BEHEER EN BOUW
ip Interprovinciaal Overleg van, voor en door provincies
North Sea Port
bouw circulair BEWEGING IN KETENS
provinsje fryslân provincie fryslân
provincie groningen
provincie Drenthe
provincie overijssel
provincie :: Utrecht
Provincie Noord-Holland
provincie Zuid-Holland
provincie Limburg
Provincie Zeeland
provincie Gelderland
PROVINCIE FLEVOLAND
Provincie Noord-Brabant

On your own you will start faster,

together you will go further.



Dé weg naar fossielvrij asfalt.

CIRCUROAD: Biobased Bitumen

Our mission:

A 30 % biobased binder in 2030 and (via an ingrowth model) a 100 % b-binder in 2050 that:

Compared to bitumen:

- positive effects on occupational health and safety, on environment and climate
- the same/better functional properties (in production, processing, use phase)
- reusable and scalable
- compatibility with fossil bitumen (due to mixing with RAP and ingrowth model)
- suitable for various asphalt mixtures (SMA, AC, PA)
- open source (freely available on the market and distributed on TRL9)



Dé weg naar fossielvrij asfalt.

CIRCUROAD-BBM project

WP1: Drawing up a program of binder requirements

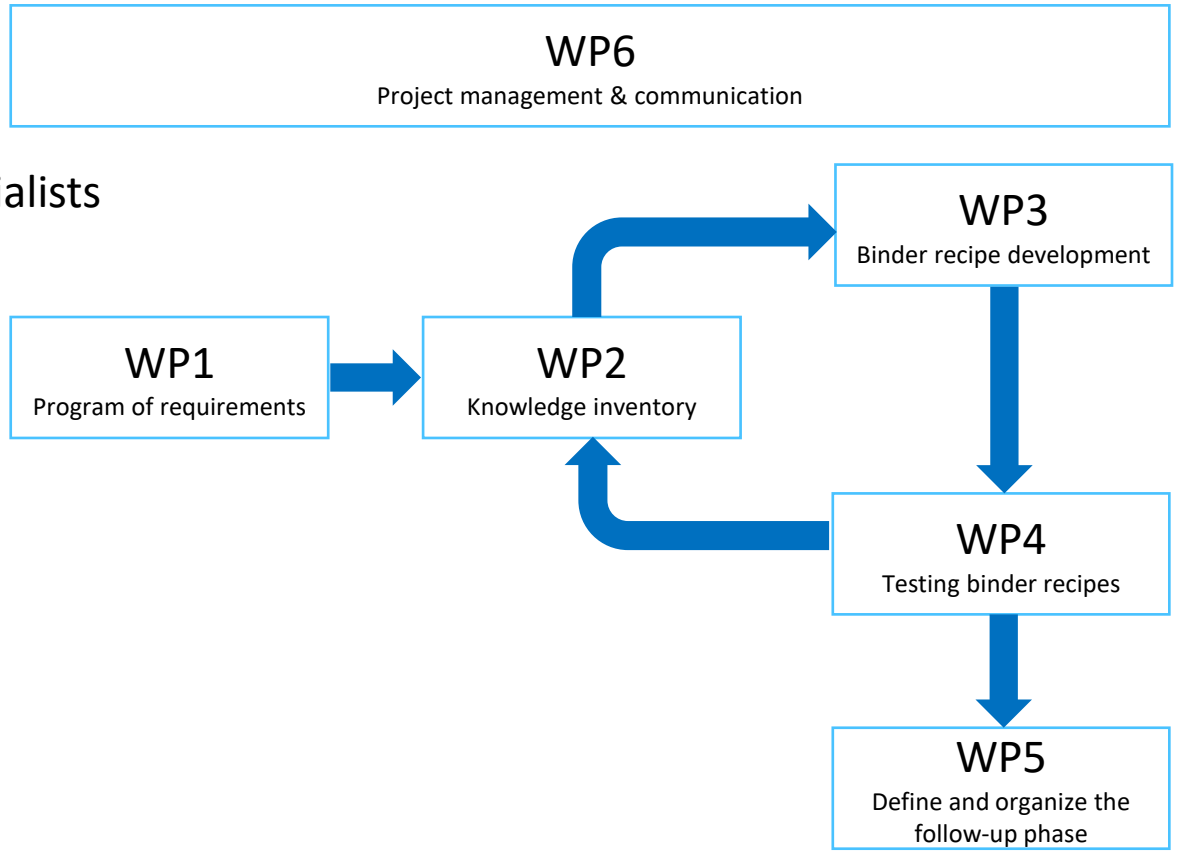
WP2: Knowledge inventory
- literature research and interviewing knowledge provider/specialists

WP3: Binder recipe development (binder characterization)

WP4: Testing binder recipes on a lab scale
- lab scale production and testing of asphalt mixtures-TRL4
- optionally construct a test section on your own property-TRL6

WP5: Define and organize the follow-up phase
- what is still needed to achieve TRL8?
- construction and monitoring of test sections of public space

WP6: Project management & communication



Dé weg naar fossielvrij asfalt.

CIRCUROAD-BBM project



Vegetable oils (Linseed, Soybean, Rapeseed, …)



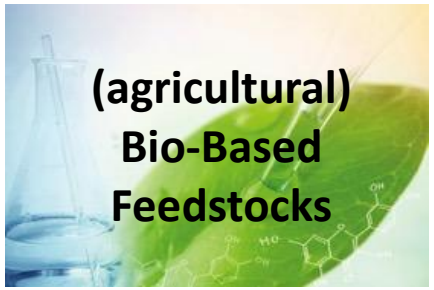
Guayule, natural rubber (cis-1,4 polyisoprene)



Cashew Nut Shell Liquid (CSNL)

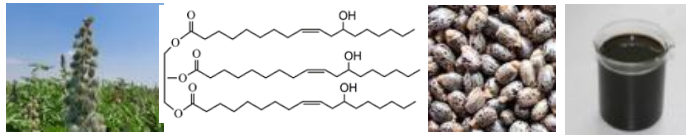


Cobaiba (petroleum tree, terpenes)





Pinetree (Wood) Rosin



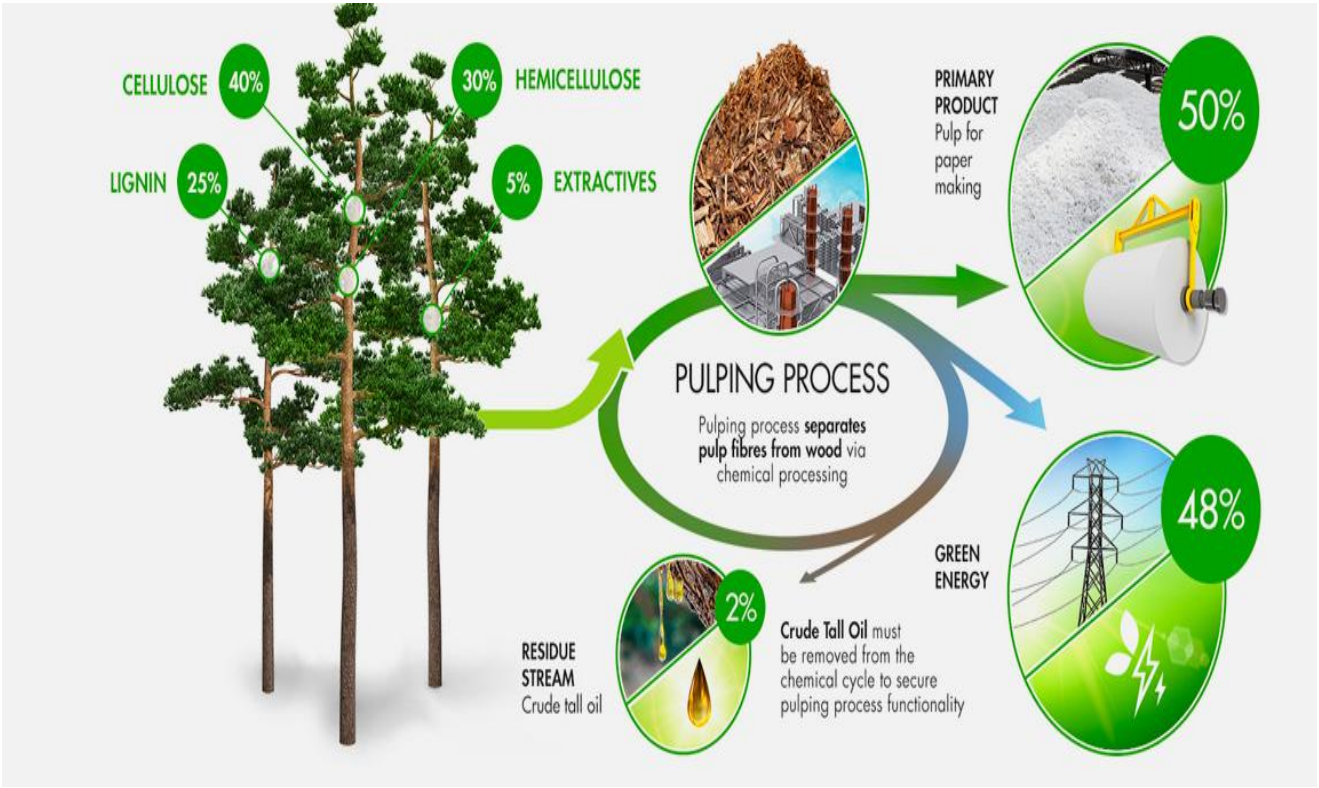
Castor (or Ricinus) oil

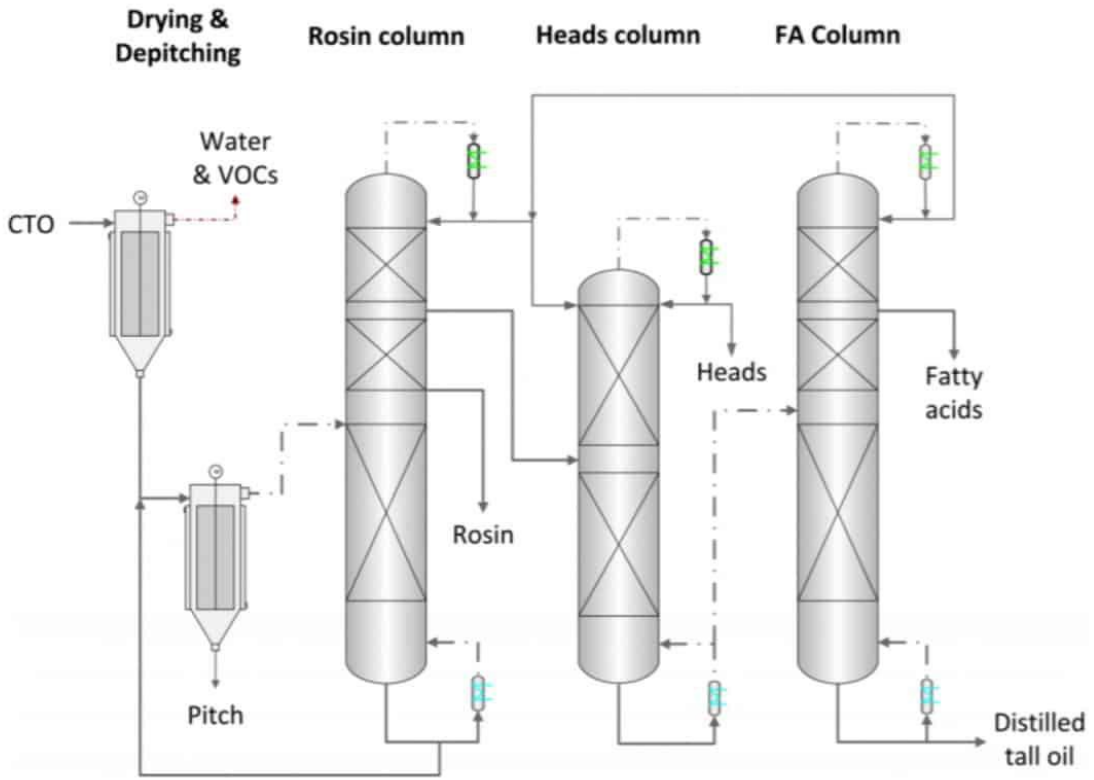


Jatropha Curcas (non-edible) oil

Dé weg naar
fossielvrij asfalt.

WASTE STREAMS PULPING PROCESS





The pulping process (including the waste streams) and the CTO refinery process

Testsections (SMA) on InnovA58

- An efficient validationprogram: different solutions in one (longer) testsection (in total 1,2 km)
- A test section (‘zebra testsection’) consists out of 1 reference section and 3 sections representing 3 different solutions.
- A validation program for all the asphaltmixtures in the Netherlands (ZOAB, SMA, AC Bin/Base)





Group validation program for 11 test sections



		SMA-NL 8B				DZOAB				AC 16 bin/base				AC 11 surf			
vak	PR	BBM #1	BBM #2	BBM #3	ref	BBM #1	BBM #2	BBM #3	ref	BBM #1	BBM #2	BBM #3	ref	BBM #1	BBM #2	BBM #3	ref
#1	60%									300 m	300 m	300 m	300 m				
#2	60%									300 m	300 m	300 m	300 m				
#3	30%	300 m	300 m	300 m	300 m												
#4	30%	300 m	300 m	300 m	300 m												
#5	45%					300 m	300 m	300 m	300 m								
#6	45%					300 m	300 m	300 m	300 m								
#7	30%													300 m	300 m	300 m	300 m
#8	30%													300 m	300 m	300 m	300 m
#9	0%	300 m	300 m	300 m	300 m												
#10	0%					300 m	300 m	300 m	300 m								
#11	0%													300 m	300 m	300 m	300 m

- Group Validation Plan Framework
- In collaboration with AKL and ITC (validating bodies in road infrastructure)
- A thorough and efficiently developed validation program

Progress in the Netherlands:

A validation program for all the asphaltmixtures in the Netherlands (ZOAB, SMA, AC Bin/Base):

2024: InnovA58 (TRL6) = basis

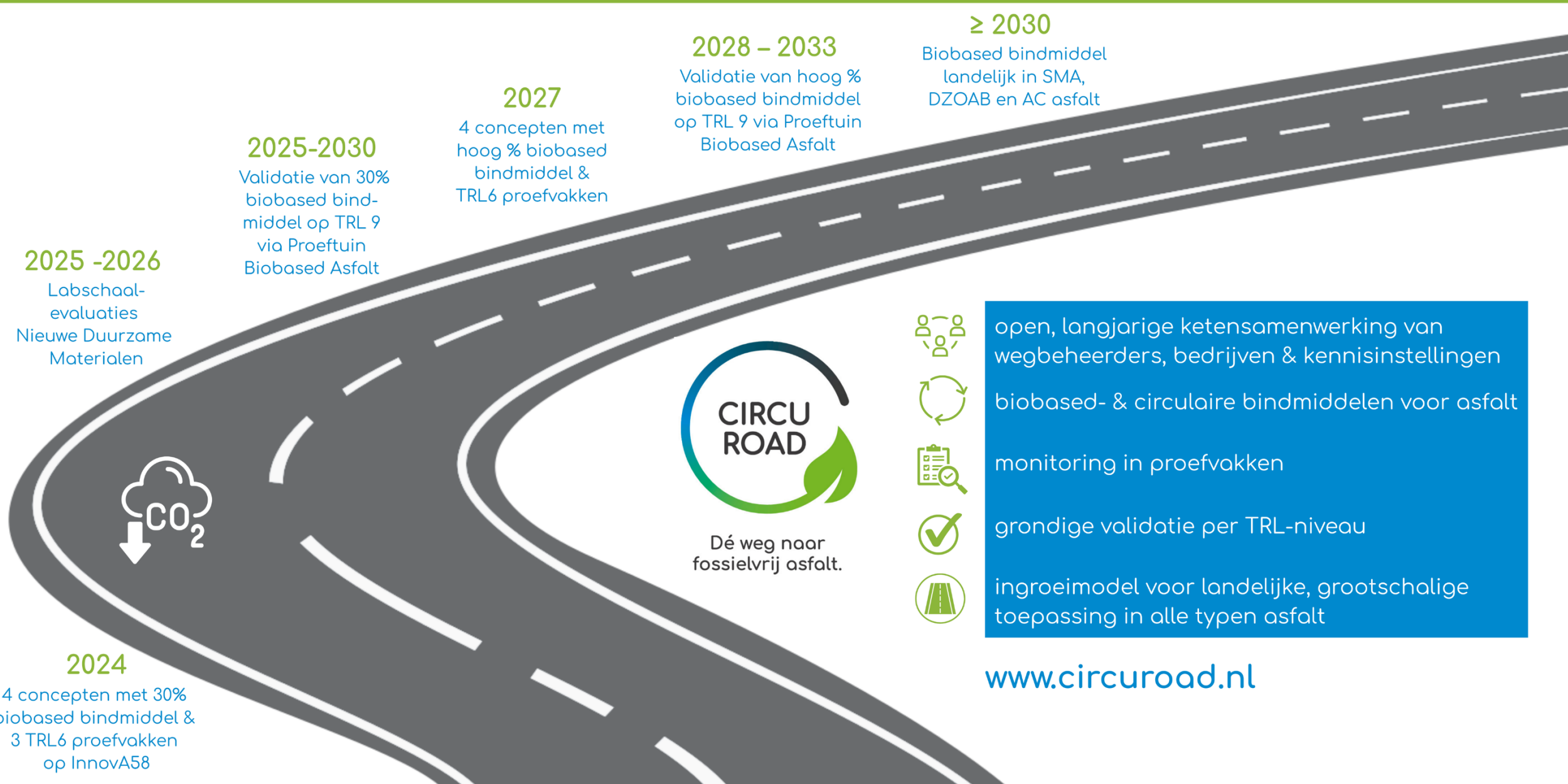
2025: 2 zebra testsections in the provinces of Utrecht and Drenthe
2026: 1 zebra testsection in the city of Helmond
2026: 1 zebratestsection on the highway (close to Rotterdam)
2026: Research into emissions and exposure measurements



2027: progress on the construction of additional (7) 'zebra' test sections
1 under provincial authority, 2 under municipalities,
2 under Rijkswaterstaat (RWS), 2 using asphalt concrete bin/base

2026: initial monitoring phase in Utrecht and Drenthe
visual inspection and materials research regarding expected service life

DÉ WEG NAAR FOSSIELVRIJ ASFALT



2024
4 concepten met 30% biobased bindmiddel & 3 TRL6 proefvakken op InnovA58

2025 -2026
Labschaal-evaluaties Nieuwe Duurzame Materialen

2025-2030
Validatie van 30% biobased bind-middel op TRL 9 via Proeftuin Biobased Asfalt

2027
4 concepten met hoog % biobased bindmiddel & TRL6 proefvakken

2028 – 2033
Validatie van hoog % biobased bindmiddel op TRL 9 via Proeftuin Biobased Asfalt

≥ 2030
Biobased bindmiddel landelijk in SMA, DZOAB en AC asfalt

CIRCU ROAD

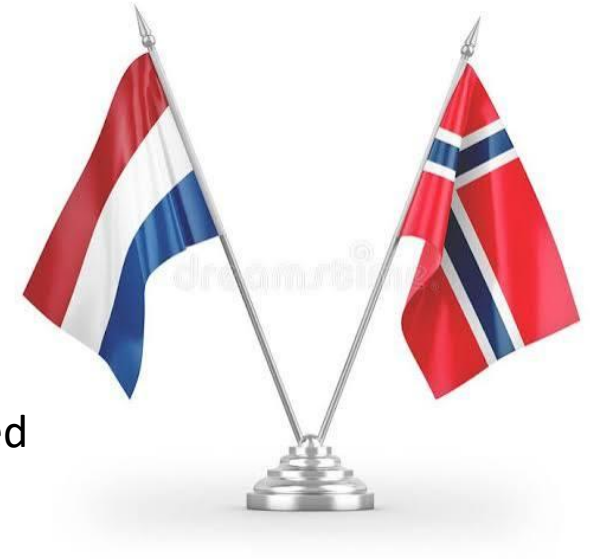
Dé weg naar fossielvrij asfalt.

- open, langjarige ketensamenwerking van wegbeheerders, bedrijven & kennisinstellingen
- biobased- & circulaire bindmiddelen voor asfalt
- monitoring in proefvakken
- grondige validatie per TRL-niveau
- ingroeimodel voor landelijke, grootschalige toepassing in alle typen asfalt

www.circuroad.nl

Questions concerning the Norwegian experiences on biobased binders:

- What is your experience concerning lifespan of the biobinders, comparable to fossil bitumen, and how did you measure this (accelerated lifespan determinations)?
- Have you done research on the emission and exposure measurements of the biobased binders (especially concerning the Tall Oil Pitch binders) and can you tell some about the results?
- What options do you see for fossil-free asphalt (recycling, used cooking oil, bio-based materials—and if so, which ones—recycled plastics, etc.)?
- Do you also have milestones set over time (e.g., 50% fossil-free by, say, 2040 – etc.)?





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