



Sustainability
in Public Works
Conference
14-15 MAY SYDNEY

Resilience for
our Communities



Future Decision Making for Sustainable Asphalt

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Australian Asphalt Pavement Association



**Crumb Rubber Modified Asphalt
laid as warm Mix by Downer Group**

The asphalt industry is fiercely competitive and sustainable alternatives are recognized as meeting customer goals and, when developed, bring operational and cost saving advantages.

Asphalt sustainability

From waste to increased durability and lower costs

1. Bitumen – bottom of the barrel – waste in 1890's
2. Recycling – up-cycling used asphalt
3. Lowering energy – “warm mix”
4. Renewable energy – wood chips, solar power
5. Using less – EME2, perpetual pavements
6. Durability – no cracks from the bottom – “perpetual”
7. Removing waste – vehicle tyres, glass, toner ink, plastics too

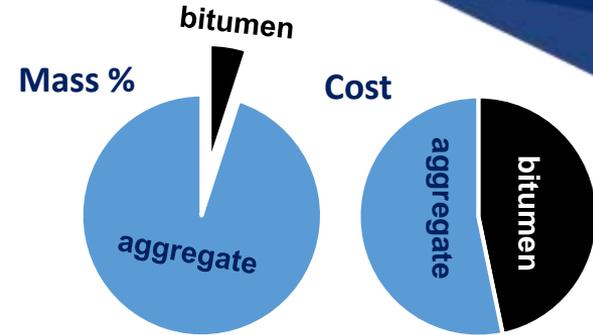


Asphalt recycling – RAP

Benefits

Across Australia 15% RAP on average will save annually

- 1 400 000 t aggregate
(1% of annual aggregate production in Australia)
- 4 000 t pa bitumen
(Equivalent to 175 road tanker loads)



Asphalt sustainability

How to measure it?

- Environmental Product Declaration (EPD)
- Based on International calculator and local & international accredited data

| Environmental Facts | |
|--|----------------------|
| Functional Unit: 1 U.S. short ton of Asphalt Mixture | |
| Primary Energy, Materials (MJ) | 6.0x10 ³ |
| <i>Non-Renewable Energy (MJ)</i> | 4.9x10 ³ |
| <i>Renewable Energy (MJ)</i> | 1.5x10 ³ |
| Primary Energy, Energy (MJ) | 4.0x10 ³ |
| <i>Non-Renewable Energy (MJ)</i> | 3.9x10 ³ |
| <i>Renewable Energy (MJ)</i> | 5.5x10 ¹ |
| Water Use (Gal.) | 2.5 |
| Global Warming Potential (kg CO₂ eq) | 55 |
| Acidification Potential (kg SO₂ eq) | 0.233 |
| Eutrophication Potential (kg N eq) | 0.007 |
| Ozone Depletion Potential (kg CFC-11 eq) | 7.3x10 ⁻⁹ |
| Smog Potential (kg O₃ eq) | 4.4 |
| Boundaries: Cradle-to-Gate | |
| Company: XYZ Asphalt | |
| RAP: 10% | |



EUROPEAN ASPHALT PAVEMENT ASSOCIATION

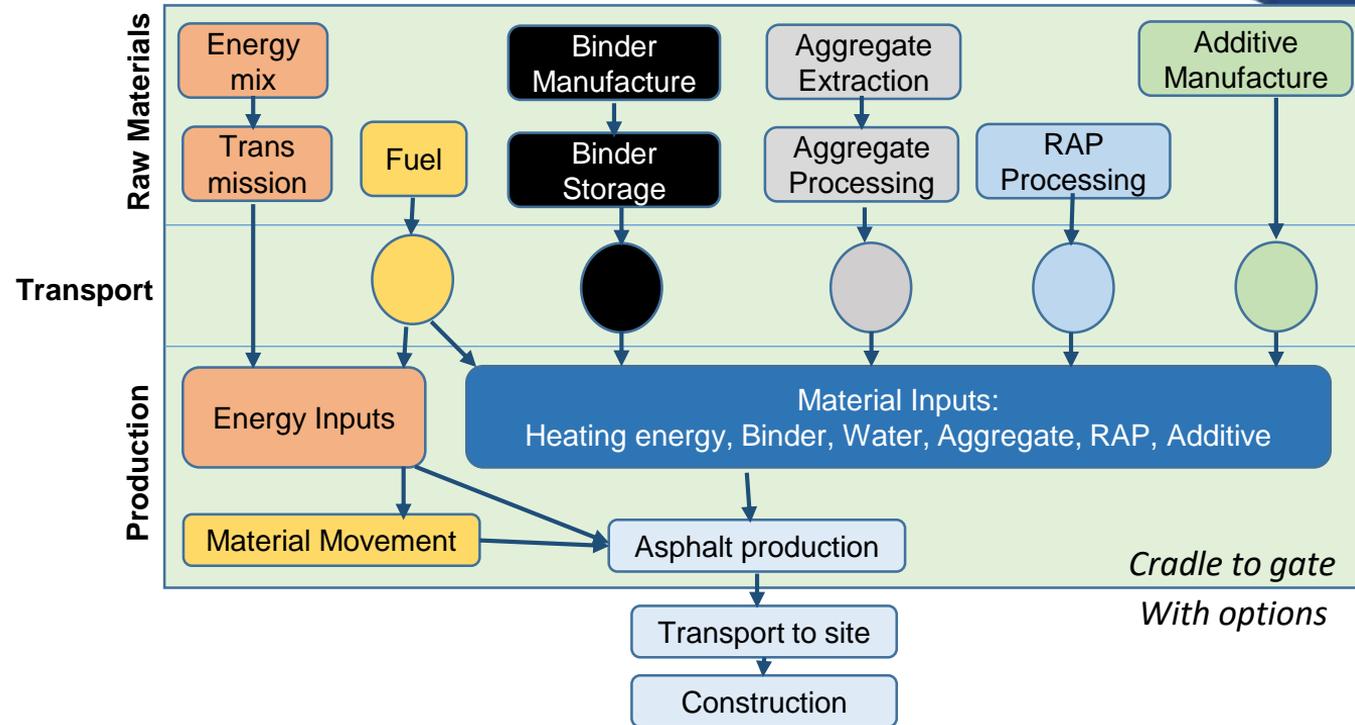


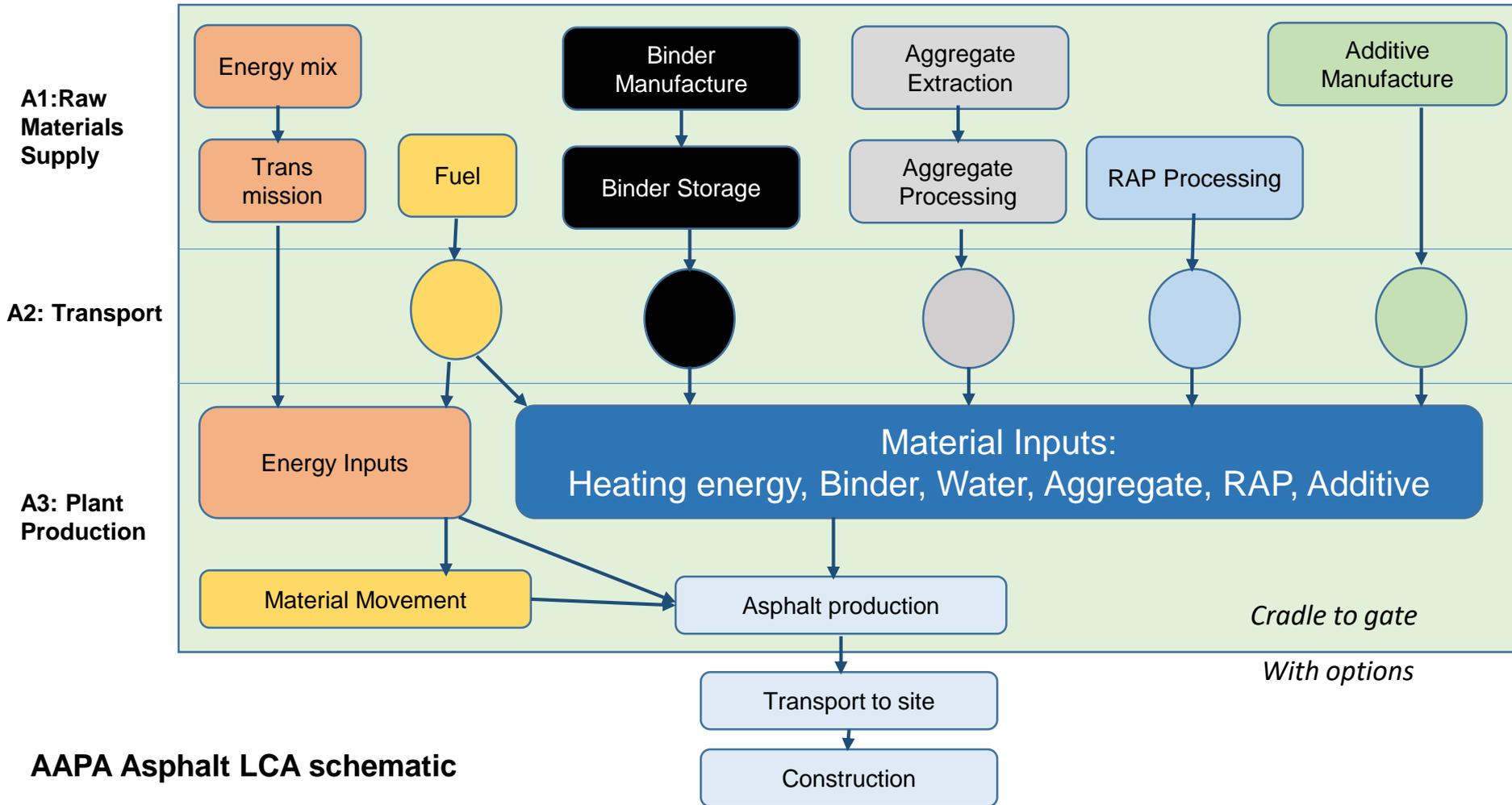
Asphalt sustainability

The calculator – Product Category Rules (PCR)

PCR sets the rules to follow for EPD

- Scope
- Unit
- Boundaries
- System Diagram
- Cut-off criteria
- Exclusions
- LCA & Data





Asphalt sustainability

Environmental Product Declarations

Required to cover USA

- Climate Change, kg CO₂-Equiv
- Stratospheric Ozone Depletion, kg CFC11-Equiv
- Eutrophication, kg N-Equis
- Smog, kg O₃-Equiv
- Acidification, kg SO₂-Equiv
- Water Use, Gallons or M³
- Fossil Fuel Depletion, MJ
- Hazardous Waste, kg

| Impact category | Unit |
|--|----------------------------|
| Global Warming Potential (excluding biogenic CO ₂) | kg CO ₂ -Equiv. |
| Acidification Potential | kg SO ₂ -Equiv. |
| Eutrophication Potential | kg Phosphate-Equiv. |
| Ozone Layer Depletion | kg R11-Equiv. |
| Photochem, Ozone Creation Potential | kg Ethene-Equiv. |
| Abiotic Depletion (elements) | kg Sb-Equiv. |
| Abiotic Depletion (fossil) | MJ |

PCR for Asphalt v1.1
4 November 2017

PRODUCT CATEGORY RULES

EN 15804
NPCR 025 version 1.1
Issue date: 07.04.2017
Revised date: 04.12.2017
Valid to: 07.04.2022

PCR – Part B for Asphalt



Product Category Rules (PCR)
For Asphalt Mixtures



Version 1.0
January 31, 2017
Validity Period: Through January 2022



NCC 20206 ASPHALT

Environmental Product Declaration
for NCC Green Asphalt[®] from
Arlanda asphalt plant



According to EN 15804:2014+2017, ISO 14025, ISO 14040 and ISO 14067
Program specific: International EPD[®] System
Declaration number: 1432, version: 01

Reg. no. 3-7-00002 479 CPO 12336 Enev 2017 01.08 1984 vevt 000221.08
ICCD Platform v1.1.0 (2000001)

The verifier and the program operator do not make any claim over their any responsibility of the results of the product, its production process or its quality claim.

This is a "ready to go" certificate" (EPD) issued as EPD would normally be a background report (see background EPD) that requires further production of EPD (background report) prior to being used. The geographical coverage of the data represented in the EPD is limited to the declared plant. The intended use of the EPD is for business to business communication.

Owner of product:
The asphalt plant declared on 31.01.2017, 1481 14 76 500, 467 11 000 0170, 16 16 151 494 02 11, 16 16 16 02 11 70 200 0100 which are to be used in the Regional project (owner handle) Trondheim, Akershus. The asphalt is produced into the ISO 22060 Asphalt 1 content.

EPD NUMBER 1432
Declaration: 1 year validity in specific aspect (see also: see EPD)
Title: Green asphalt production and construction material
Scope: ISO 14025, version: 01, 01.01.2017
System: The International EPD System, version: 2.0
EPD number: 1432
ISO 14025 (2006):
Declaration number: 1432
www.epd-norge.no



Environmental Product Declaration – EPD

ECO-ASFALT[®]

ENVIRONMENTAL PRODUCT DECLARATION IN ACCORDANCE WITH EN ISO 14025 AND EN 15804

EPD registration number: 1432-01-01
Declaration number: 1432-01-01
Declaration validity: 2017-01-01



Asphalt sustainability

EPD in Australia

- International EPD with Australian addendum available from mid 2018 – developed through START2SEE
- Expect first use by end 2018 making use of Australasia EPD
- Engagement with State and Local Road Authorities to fast track sustainability assessment at project tender evaluations.



**Crumb Rubber Modified Asphalt
laid as Warm Mix by Fulton Hogan**



Asphalt sustainability

More buyer benefits and opportunities to come

Is the EPD enough? What else can industry do?

- AAPA Sustainability Framework – rating for products & plants
- Improved environmental outcomes
 - Resilience & durability - WOLC = fuel & noise reduction,
 - Reduced maintenance downtime = less congestion
- Wider inclusion of waste products
 - CRM in noise reducing porous asphalt
 - Gap Graded CRM asphalt for cracked pavements
 - Up-scaling plastic waste
- Bio binders as bitumen extenders
- Incentives for environmental sustainability improvements

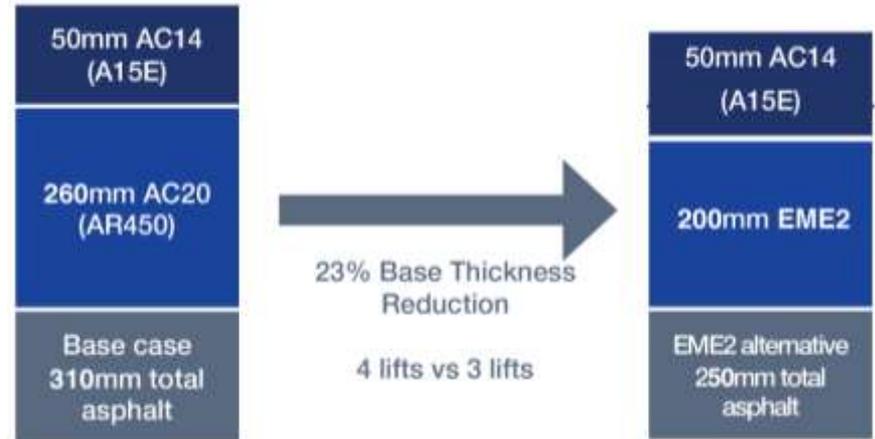


Asphalt sustainability

EME2 High Modulus Asphalt



- Strictly performance based design
- Now fully implemented in Australia
- 20-25% reduction of pavement thickness
- Significant cost reductions and sustainability benefits



Asphalt sustainability

Future decision making – made simpler

- Credible internationally linked tools and benchmarks for Australia
- Whole of Life Cost (WOLC) models will increasing value long life, smooth road pavements supported by EME2 and CRM seals and asphalt
- AAPA Sustainability Framework will provide a path for progress in our everlasting asphalt pavements
- Industry keenly aware of the role they can and must play to service our community with more durable, resilient and cost saving options





AUSTRALIAN ASPHALT
PAVEMENT ASSOCIATION



Resilience for
our Communities
Novotel Sydney Brighton Beach