

The (Dutch) situation

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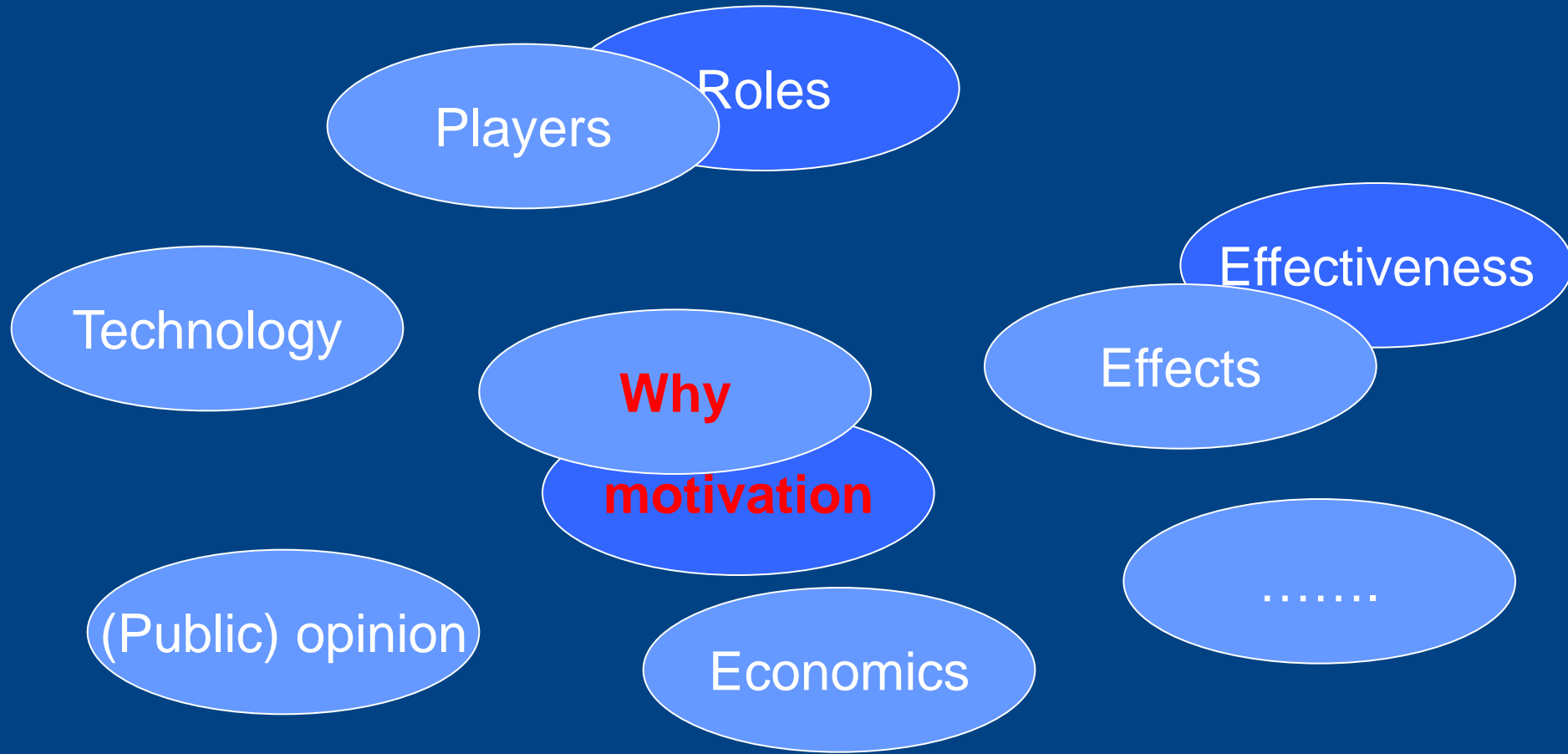
Warm Mix Asphalt

- Many techniques available
- Quite a few trials - mainly at “lower” organisations
- Several meetings
- Lots of discussion
- Quite some promotion
- No widespread application
- Experiments with durability in contracts
- Energy or CO₂



Present status

Understanding the status & future of warm mix asphalt

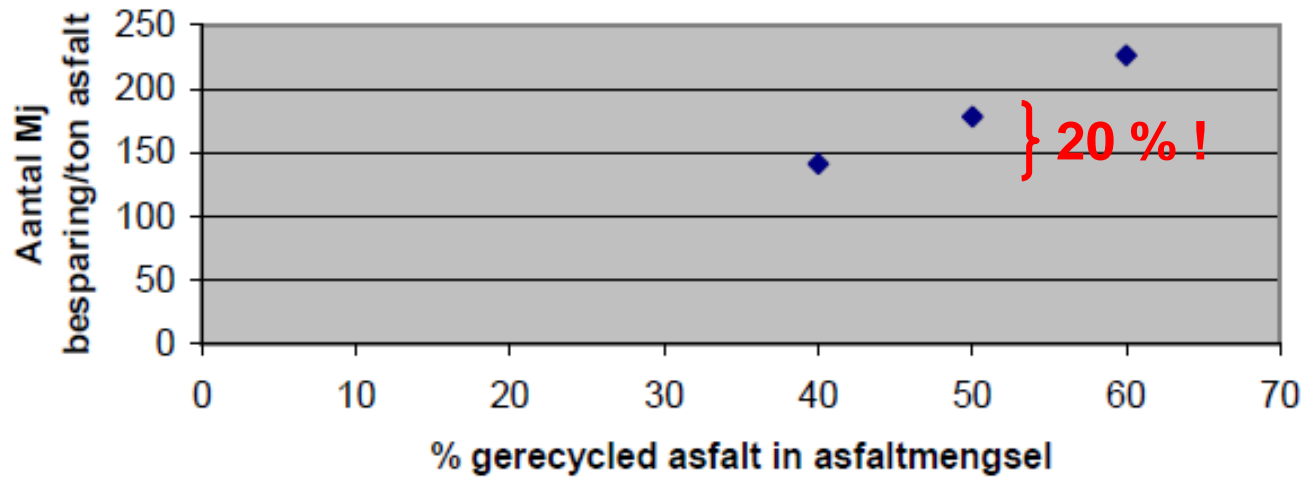


Things to talk about

- Additives: waxes, zeolith, surface-active chemicals: 110 – 150 °C
- Foamed bitumen: LT Asphalt, LEAB 90 – 110 °C
Shell WAM process 130 °C
- Emulsion: KonwEco² 15 °C
Finfalt (tar free RAP recycling) 80 °C
- Partial drying 80 - 90 °C
- Biobitumen 150 - 165 °C
- Higher RAP content 170 °C

Techniques: Energy = CO₂ = odour =?

Aantal MJ besparing/ton asfalt als functie van % gerecycled asfalt in asfaltmengsel

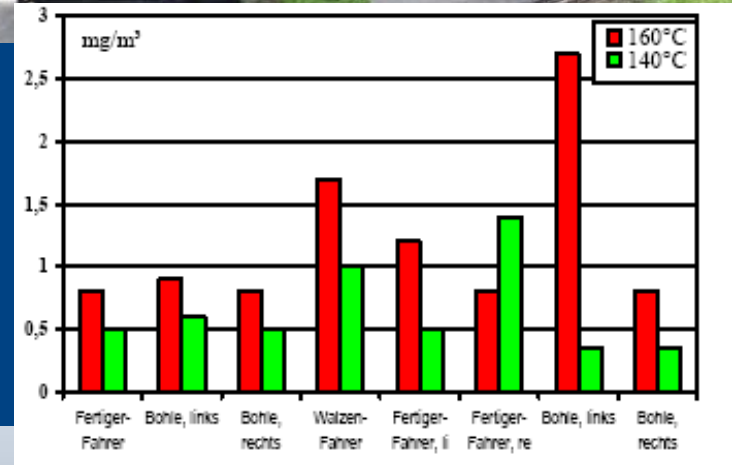


Effect RAP on energy → CO₂

- Lower temperature
- Less energy
- Less CO₂
- Less odour

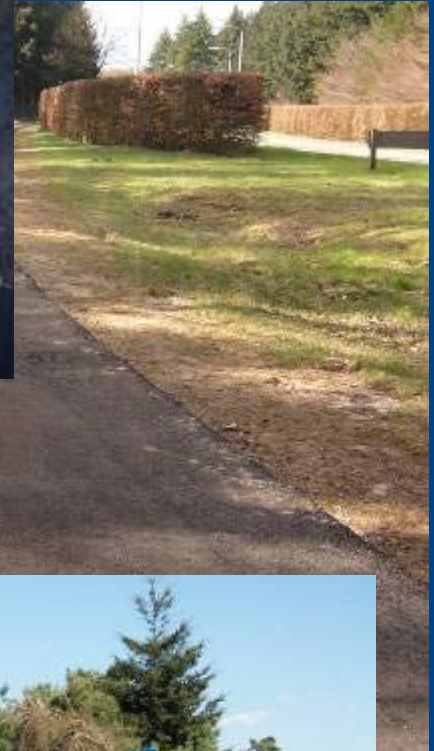
But also :

- Same durability
- Higher stability
- Faster opening of road
- Less compaction effort
- Winter options



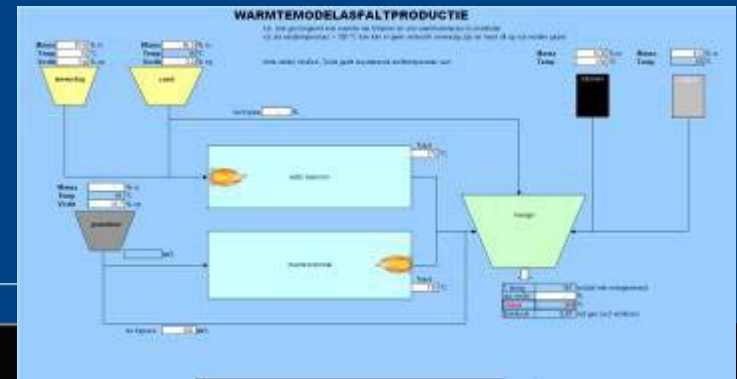
Waxes

- Room temperature
- HMA quality
- Maximum energy saving



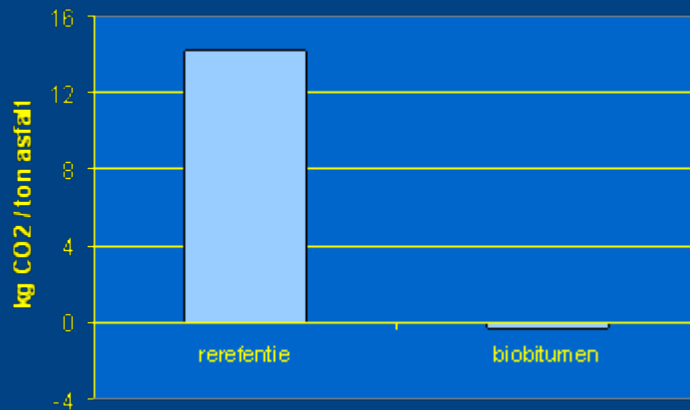
KonwEco2

- Dry coarse minerals to 140 °C
- Dry (part of) sand to 140 °C
- Mix with bitumen → temperature ca. 140 °C
- Add wet sand + RAP → temperature ca 85 °C
- Foaming of bitumen due to water in sand & RAP
- Energy saving related to water content



Partial drying

- Rapeseed needs 9 t CO₂/ha
- 1 ha yields 1,5 ton of oil
- Oil partially replaces bitumen



- CO₂ compensation: 15 kg/ton asphalt
- Lower production temperature
- Fewer emissions
- Less alteration

Biobitumen – CO₂ neutral asphalt production

- Energy savings: 20 – 40% ; 80 – 100% (depending on reference)
- Reduction in emissions (present focus CO₂): idem
- Less ageing → potential lifetime increase
- Easier compaction → less fuel asphalt set
- Additional (non durability) effects

Effects

- The impact of RAP on CO₂
 - > Energy-reduction covenant
 - > CO₂ emission trading system
 - > Higher Recycling rates
- Asphalt production is only part of the total chain
 - > Pre-production: 40%
 - > Production: 25%
 - > Hauling & laying : 16%
 - > Removal: 19%
- Bad weather ? → more heat !
- Energy in production vs other durability items

Effectiveness: the bigger picture



What do we want ?

- Contractor (production + placement)
- Government (legislation + ambition)
- Government (client)
- Private client
- Public



Stakeholders: who wants what at what cost?

- Drivers
 - > Reduction in CO₂: 20 – 50%
 - > Prescribed in contracts
 - > Odour & other emissions
 - > promotion / imago / policy / HSE
 - > Additional benefits
- Stoppers
 - > Extra cost 2 – 3 euro / ton
 - > Uncertainty long term behaviour ?
 - > Extra guarantees asked
 - > Relativity of measures
 - > Investments
 - > RAP

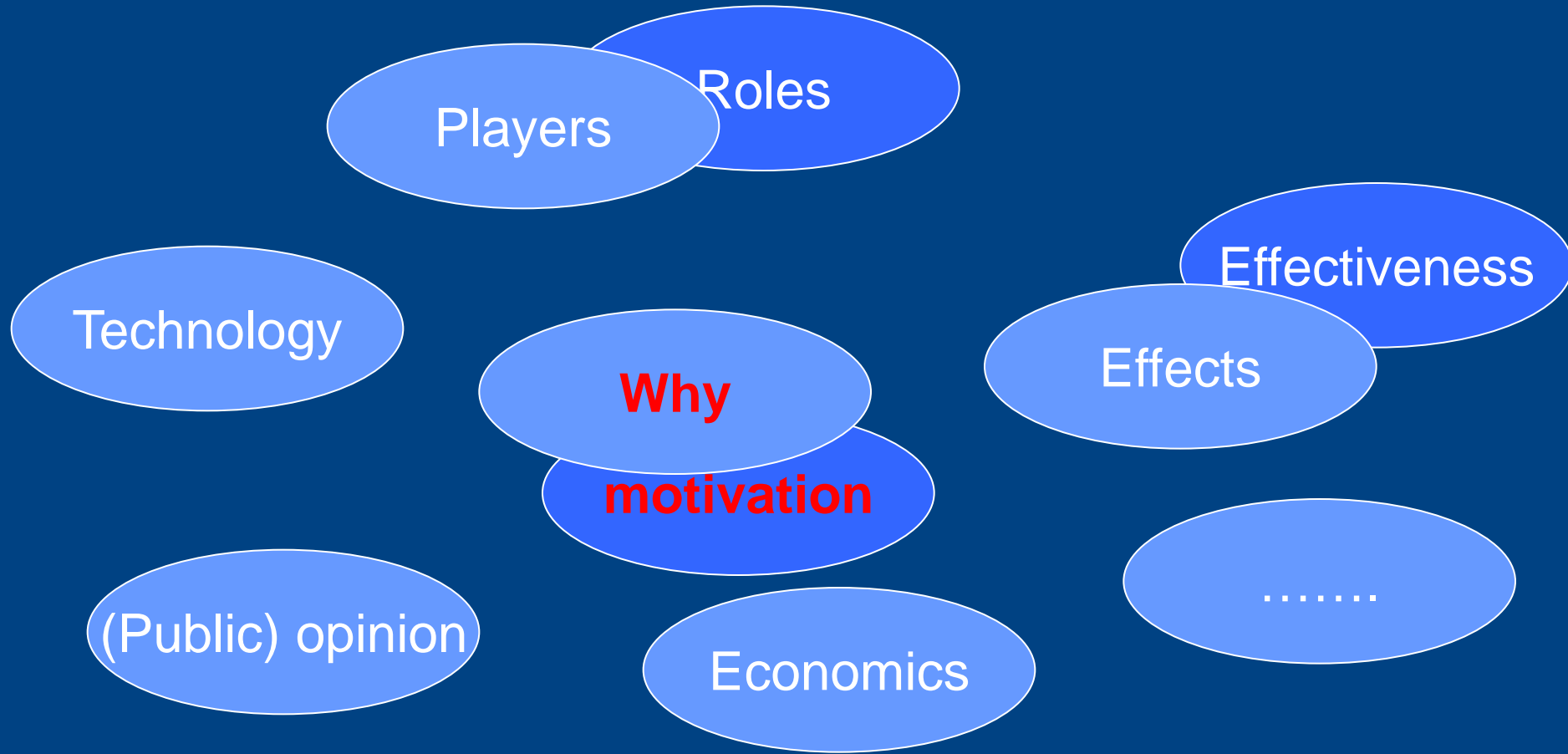
Drivers & stoppers

- Technology is not the issue
- Effectiveness is an excuse to discard
- What do we (the world) think is important ?
- The real stakeholder has not yet been born

- Forget the sheep with 5 legs
- Grab what you can get

statements

Understanding the status & future of warm mix asphalt



Things to talk about