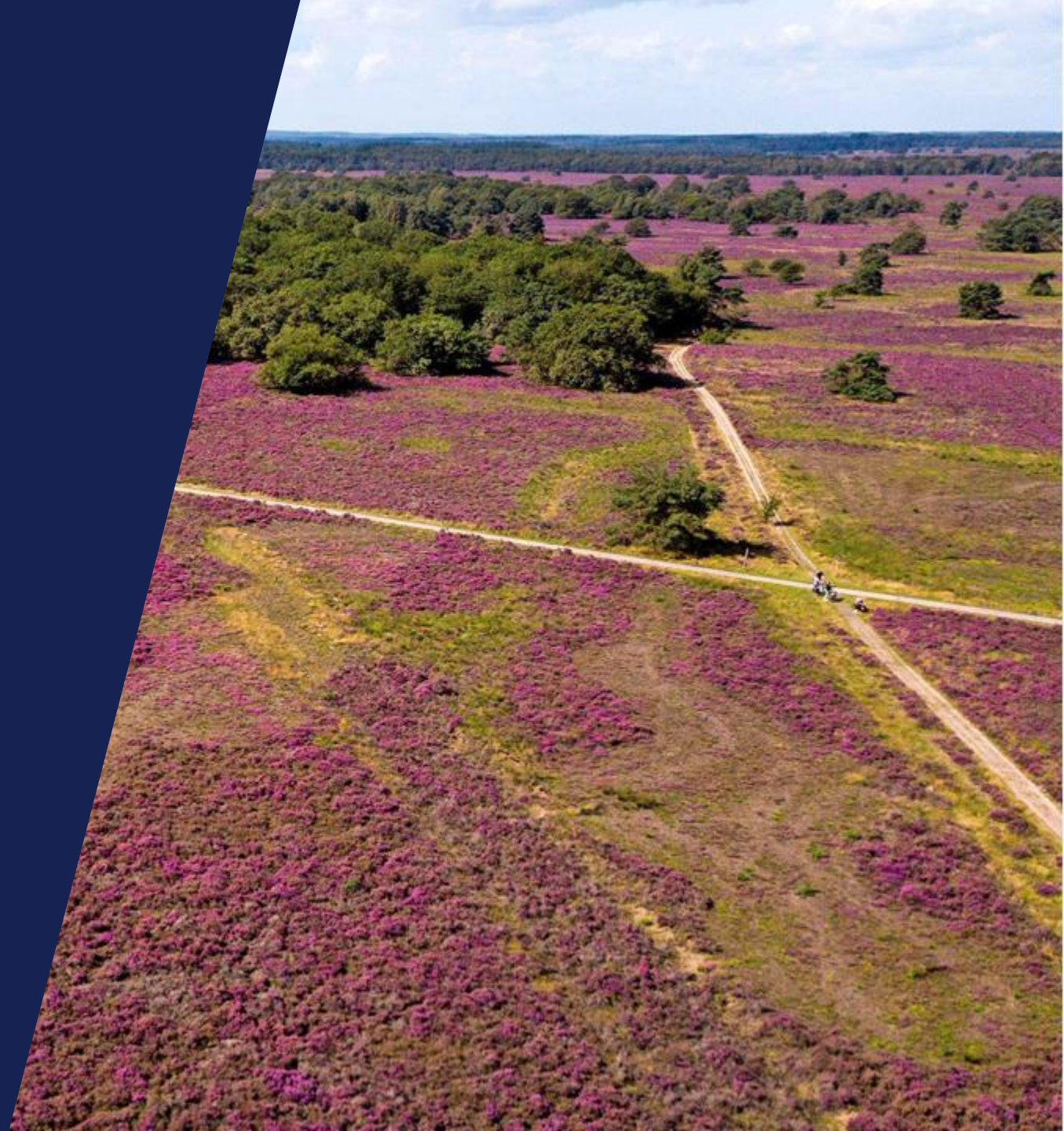


# Environmental performance of construction

The Netherlands (2010–2020)

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# Grenzen aan de groei (1972)

Nederland is op 4 na dichtstbevolkte land van de wereld (met >10 M inwoners). Van de top 5 zijn wij het rijkste land.



Nederland is de 2<sup>e</sup> exporteur ter wereld van land- en tuinbouwproducten

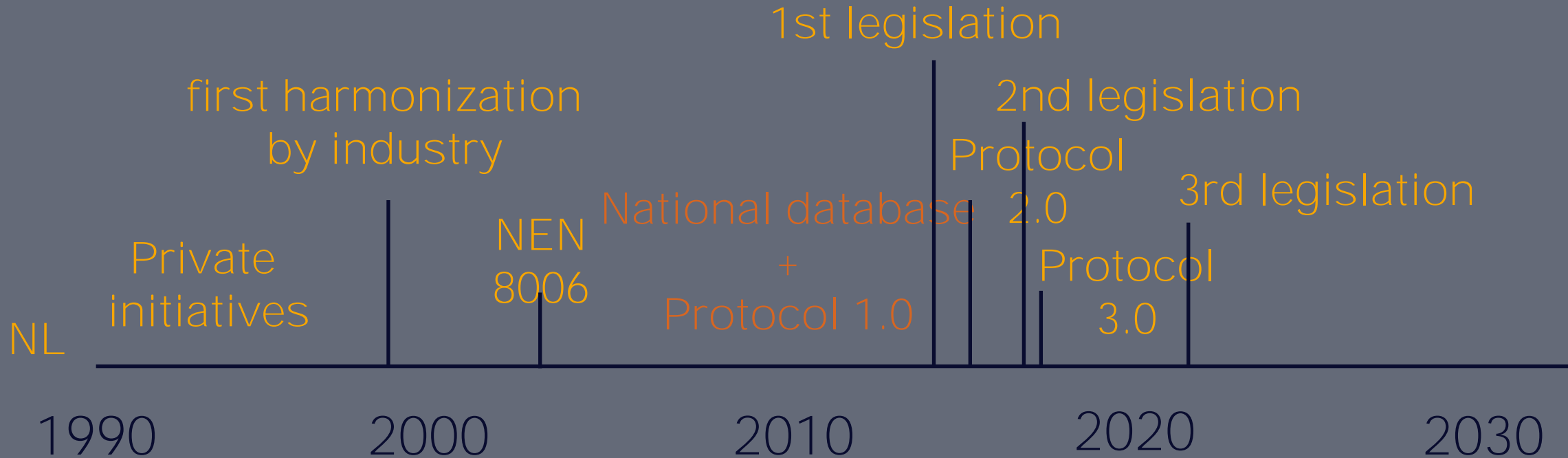
# Niet alles kan (2019)

Nederland is 6<sup>e</sup> op ranglijst van BBP per hoofd van de bevolking



Nederland staat 5<sup>e</sup> op de World Competitiveness Index (WEF)

# History of environmental legislation Netherlands



- 2012 Environmental Performance of Building taken into Building code for requesting a Building Permit (making the calculation is required, no threshold value)
- 2018 Maximum allowable environmental impact taken up in the legislation (1.0 €/m<sup>2</sup>)
- 2021 Max. allowable impact will be reduced from 1.0 to 0.8 (€/m<sup>2</sup>)
- 2030 Has been announced that max allowable impact will then be 0.5 (€/m<sup>2</sup>)

# Dutch system



Design



Environmental  
Cost Indicator  
0,87 €/m2/jaar

## NATIONAL DATABASE

~350 cat 1

**Specific  
products**

~250 cat 2

**Branche  
averaged**

~800 cat 3  
Generic products

**+30%**



NOT in NMD?



## ADD

When a product you need is not available in the database, but there is a valid EPD, this can be used in some situations

# The system

- National method for full life cycle LCA for Constructions (Bepalingsmethode milieuprestatie bouwwerken\*), that is based on the EN 15804.
- Use of a single point method to express the result, called the Environmental Cost Indicator (ECI), with unit in Euro.
- Legislation setting maximum value of the ECI per m<sup>2</sup> per year for buildings
- The ECI is used in public tenders as criterium, today in the following way: the offer with the lowest [price + X\*ECI] wins the contract.
- With X being set depending on the nature of the contract and the product that is tendered. X typically is between [1-10].

\* The method is available in English on [www.milieudatabase.nl](http://www.milieudatabase.nl)

# Personal Observation

- In those sectors where the legal maximum value applies, we see little or no improvement in environmental performance of products and constructions.
- In those sectors where the formula in tendering is used to give out-performers a better chance of winning the contract we significant improvement (10–40%) sector wide.
- We see also an upward effect on prices between 0–5%

# The database

- We have one DATABASE, that contains both the generic data set, as well as specific data from producers (when intended to make the data public).
- That database connects to approved software instruments that can be used to calculate infrastructural works or buildings.
- The user is (for tendering) allowed to add company specific LCA data to the calculation, when compliant with the method and third party verified.

# The system

- Recently we have added **factory inspection** to the system.
- It was found that having a third party verified EPD is not enough, it was deemed necessary to verify that production is compliant with the EPD.
- For this an inspection protocol (scheme) was developed and producer can certificate EPD's of their products under this Protocol (BRL K11002 and BRL K11004).

<https://www.kiwa.nl/upload/BRL/K11002.pdf>

- See my previous presentation for more details on the Dutch system:  
<https://screencast-o-matic.com/channels/cYfDIrWEQ>

# Concrete

Like Denmark we have made a roadmap for concrete with all parties concerned.

Set in a national accord: Het Betonakkoord

Aims to reduce carbon footprint of the concrete sector by 30–49% in 2030

Two mechanism:

1. Maximum ECI values as requirement in public tendering for RMX and concrete products
2. Bonus in tendering with the earlier shown formula

# Betonakkoord

experts in  
sustainability  
**nibe**

[Home - Beton Akkoord \(www.betonakkoord.nl\)](http://www.betonakkoord.nl)



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**Het Betonakkoord**



Wat houdt het Betonakkoord in? Wat zijn de doelen?

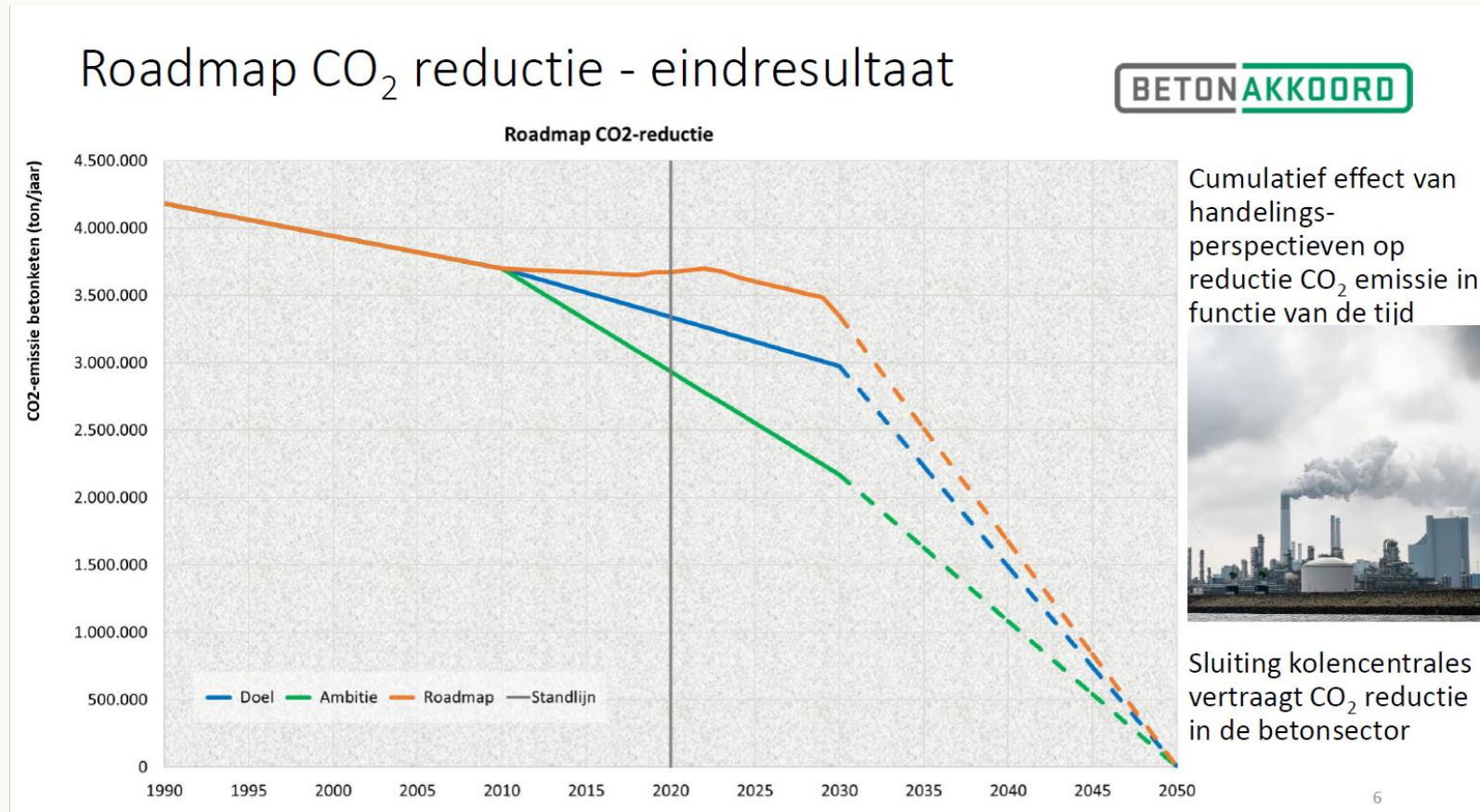
**Ondertekenaars**



**Organisatie**



# Betonakkoord



Sector feels target can not be reached with current roadmap. Closing of coal fired power plants limits supply of fly ash, this sets us back significantly from current threshold

Study by NIBE towards effective maximum ECI values for RMX products 2018–2020:

1. Maximum values set per strength class for most challenging environmental class. This way we have one maximum value per strength class to begin with.
2. Excluded reinforcement, since the variation in quantity fluctuates strongly and depends on local conditions.
3. We have set the maximum value at 80% percentile of market performance data, so 20% is expected to not reach the target (if they do not improve).

## Maximum values for the Environmental Cost Indicator

Ready Mix concrete per m<sup>3</sup>

	Infra	Buildings
strength class		
C12/15	16	16
C20/25	20,4	16.2
C30/37	20,5	16.5
C35/45	21,2	19.3
C45/55	21,6	20.4

# Two reduction scenario's

**Tabel 1.** Voorgestelde reductie percentages per jaar voor de MKI plafondwaarde en de cumulatieve reductie ten opzichte van 2018 voor het scenario gericht op realiseren van de ambitie (49% tov 1990, hetgeen zich vertaalt in 41% reductie tov 2018).

periode	Reductie per jaar	Cumulatieve reductie ten opzichte van 2018
2020	0%	0 %
2021-2022	1,5%	3%
2023-2024	4%	11%
2025-2030	5%	41%

Start gently to give parties time to adjust to this new system

# Two reduction scenario's

Tabel 2. Voorgestelde reductie percentages per jaar voor de MKI plafondwaarde en de cumulatieve reductie ten opzichte van 2019 voor het scenario gericht op realistische urgentie.

periode	Reductie per jaar	Cumulatieve reductie ten opzichte van 2018
2020	0%	0 %
2021-2024	5%	20%
2025-2029	5%	45%

Accelerate quickly to reflect the urgency we feel for this transition. Quick wins first and measures that require significant investment ready for the market within 5 years.

# Additional perspective

In September NIBE performed a study to look for additional perspective for the concrete sector for carbon reduction.

The Danish report taken as inspiration:

**BÆREDYGTIG BETON**  **initiativ**  
SUSTAINABLE CONCRETE INITIATIVE

6 additional measure were advised, resulting in potentially additional 30% reduction in carbon footprint, including:

- Sustainable transport of concrete and raw materials
- Re-use of precast elements
- Avoidance of over specifying strength
- Slower de-molding of precast products

# Personal observations

The concrete sector in The Netherlands is responsible for ~2% of the total carbon emission, due to relatively low clinker/cement ratio. Lower clinker ratio is not possible, more realistic is that due to falling supply of fly ash and possibly GGBS we will see an increase.

Innovation will come from reducing CO<sub>2</sub> emission in clinker production (CCS, new clinker types, sustainable fuels) and from using less cement for concrete tuned to required performance.

Concrete production and transport can be done with sustainable energy, reducing about 25% of the footprint.

Reduction of carbon footprint of concrete with 45% from today's level is very well possible within 10 years.