

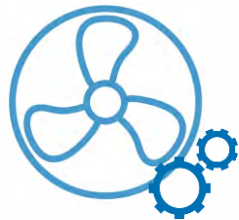
Circular HVAC – What 'R' we doing?!

Walid Atmar
Consultant for Built
Environment
FME



Introduction

Binnenklimaat Nederland is an ambitious and active association committed to achieving a healthy indoor climate in buildings. The (60+) affiliated members are manufacturers, suppliers and service organizations in the field of ventilation, air handling, heating and airconditioning.



Together we are committed to a healthy indoor climate everywhere, always and for everyone.

Introduction

- The Environmental Performance of Buildings has been part of the Dutch Buildings Codes and there is increasing attention for circularity
- The Dutch experience: pioneering ambition... but also fragmentation and uncertainty.
- For manufacturers, the reality is a maze of rules, tools, and definitions.

What can we learn from the Dutch experience and what we need at European level?

Dutch Building Codes



- Energy Performance of Building (Near Zero Energy)
- 'MPG': Environmental Performance of Buildings
(Sum of the environmental costs of all building materials.)
 - The MPG was introduced in the building codes in 2013, with a numeric value in 2018.
 - The current requirement is $MPG \leq 0.8$

'MPG': Environmental Performance of Buildings



- Sum of the environmental costs of all building materials, expressed in 'shadow costs': €0,80 per m² gross floor area per year.
- Data source: National Environment Database with 'Environmental Profiles' for buildings materials and products, in three categories:



- +30%
 - CAT3: Generic profile
 - CAT2: Association aggregate profile (LCA Required)
 - CAT1: Manufacturer specific profile (LCA Required)

The CAT3 profile values are imported from a background database (EcoInvent), with a 30% additional penalty.

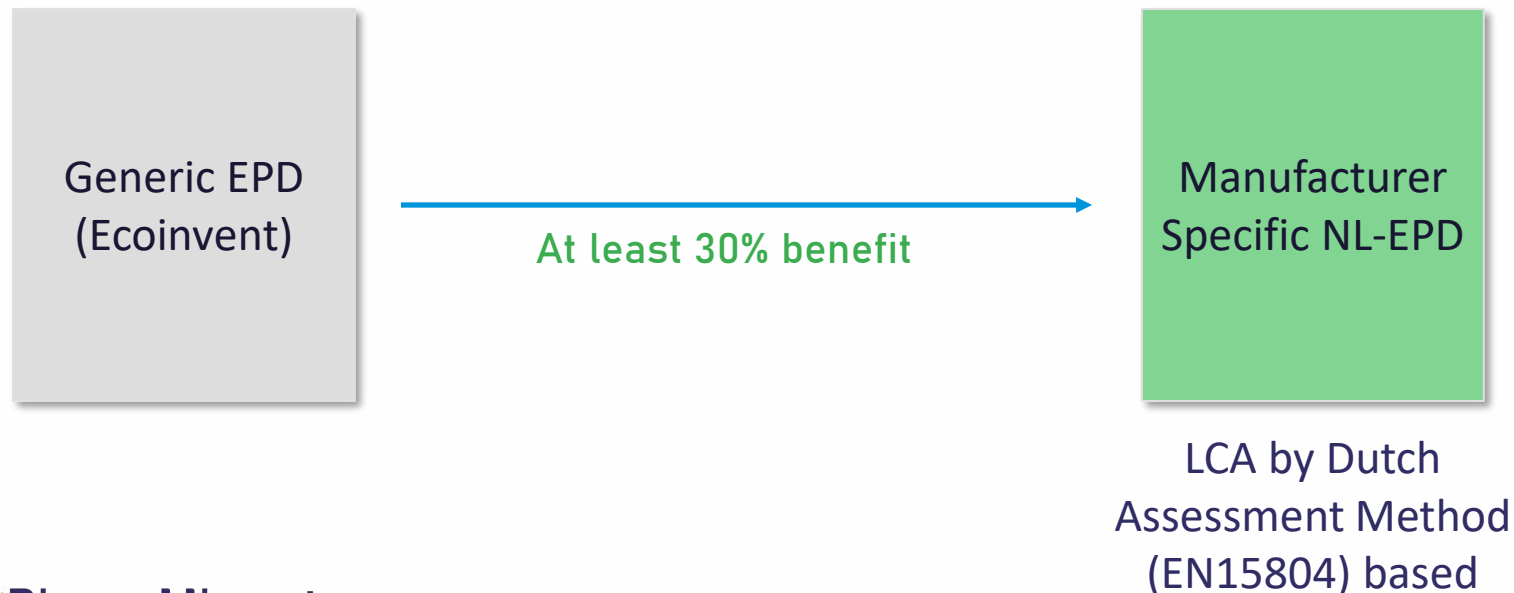
'MPG': Environmental Performance of Buildings



- Based on EN15804
- Basically: Methodology for Building level Environmental Performance and Product/Material Level NL-EPD
- Meeting value of $MPG \leq 0.8$ is possible with only generic data, no incentive to develop an NL-EPD and get rid of 30% penalty.

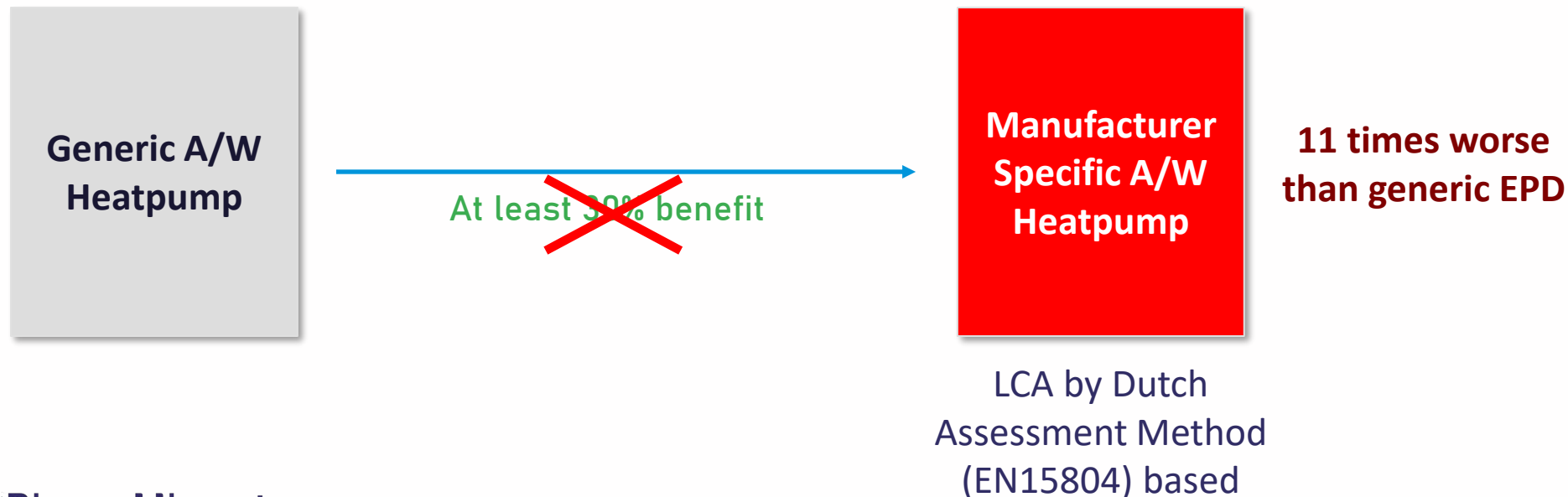
NL-EPD's | Assessment Method for Environmental Performance of Construction Works

- CAT3: Generic profile
- CAT2: Association aggregate profile (LCA Required)
- CAT1: Manufacturer specific profile (LCA Required)

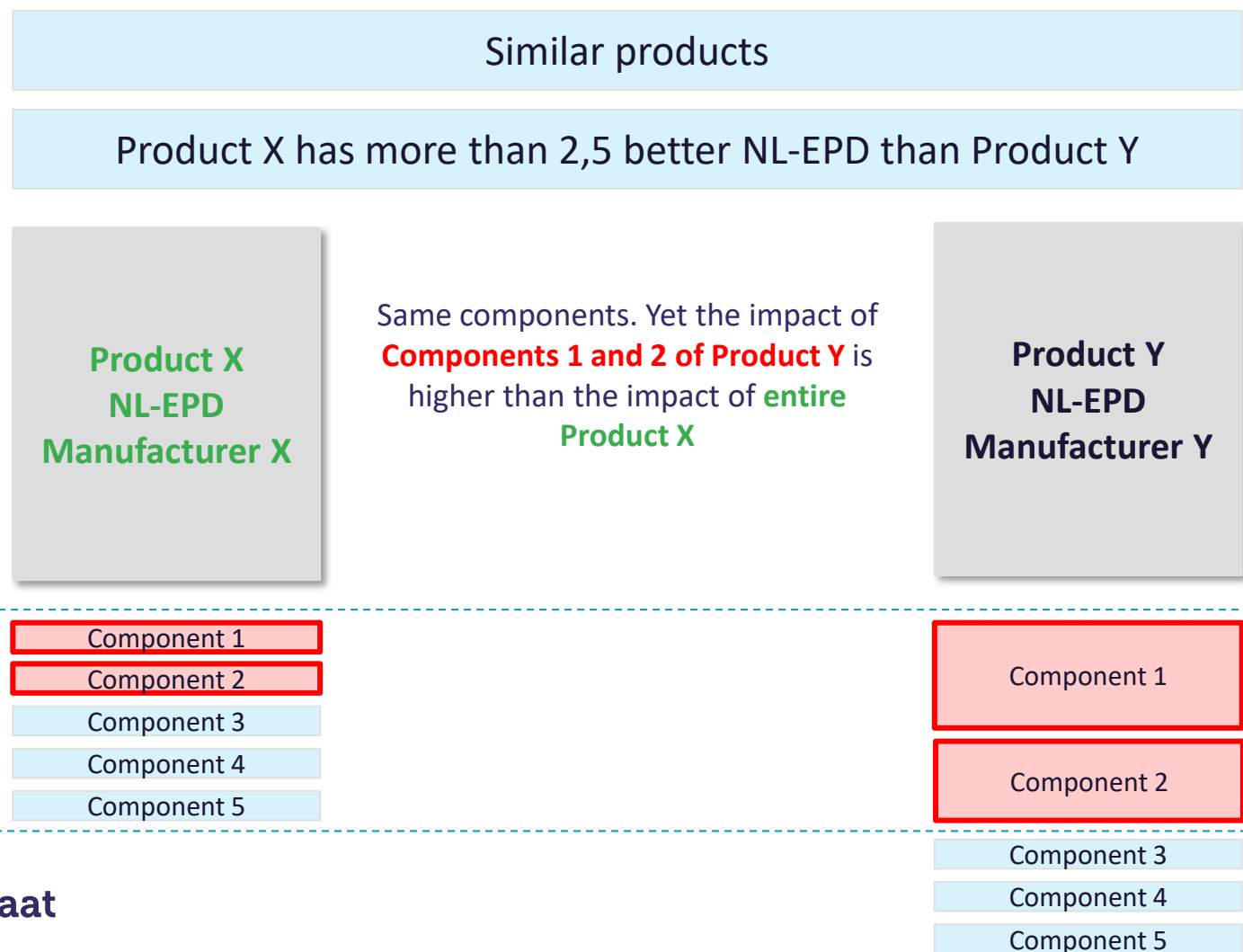


NL-EPD's | Assessment Method for Environmental Performance of Construction Works: Problem 1

- CAT3: Generic profile
- CAT2: Association aggregate profile (LCA Required)
- CAT1: Manufacturer specific profile (LCA Required)



NL-EPD's | Assessment Method for Environmental Performance of Construction Works: Problem 2



CIRCULAR

ECONOMY

Circular Economy

- EU Circular Economy Action Plan (2020, part of the Green Deal)
- Renovation Wave (2020): strong focus on sustainable and circular renovation of the existing stock

- Dutch National Circular Economy Programme
 - 2050: Fully circular economy.
 - 2030: 50% reduction in the use of primary abiotic raw materials (minerals, metals, fossil).

From Zero Energy Buildings to Zero Emission Buildings

CSRD (Corporate Sustainability Reporting Directive)

Circular Economy

- EU Circular Economy Action Plan (2020, part of the Green Deal)
- Renovation Wave (2020): strong focus on sustainable and circular renovation of the existing stock

- Dutch National Circular Economy Programme
- 2050: Fully circular economy.
- 2030: 50% reduction in the use of primary abiotic raw materials (minerals, metals, fossil).

From Zero Energy Buildings to Zero Emission Buildings

CSRD (Corporate Sustainability Reporting Directive)

→ Circularity becoming requirement in procurement. Governmental and private.

- While the Dutch Environmental Performance of Buildings indicator is not strict enough for incentivize manufacturers to draft NL-EPD's;
- Clients increasingly demand NL-EPD's as part of their sustainability efforts and circularity goals. This forces manufacturers to perform LCA's and draft NL-EPD's.

What is Circularity in HVAC?

How does the NL-EPD function?

Circular Economy

What is Circularity in HVAC?

- No definition
- No agreement on scope

How does the NL-EPD function?

- High risk of manufacturer LCA's being worse than generic data
- Inexplicable difference in embodied carbon of different products with same components

- Mentioned in various policies, but not defined

- No harmonized and designated method for HVAC
- No reliable background database for HVAC

Circular Economy

What is Circularity in HVAC?

How does the NL EPD function?

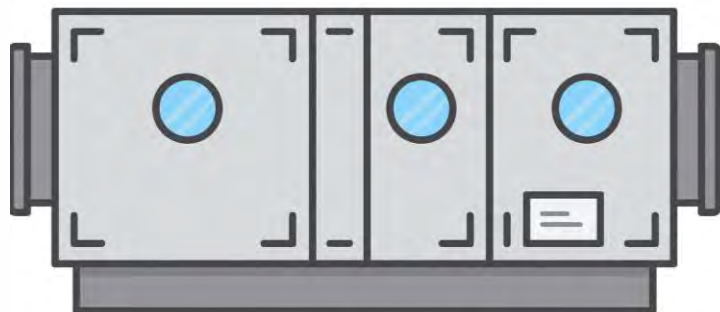
All the while:

- Whole-Life-Carbon Global Warming Potential (WLC-GWP) needs to be implemented in 2028
- No definition
- No agreement on scope
- Clients increasingly procure based on arbitrary circularity criteria
- Clients increasingly ask for EPD's and base their procurement decision on it
- Manufacturers are forced into uncertainty

WHAT 'R' WE DOING?!

- Mentioned in various policies, but not defined
- No harmonized and designated method for HVAC
- No reliable background database for HVAC

Approaching EPD's in HVAC on EU-level



FUNCTION: Delivering healthy indoor climate

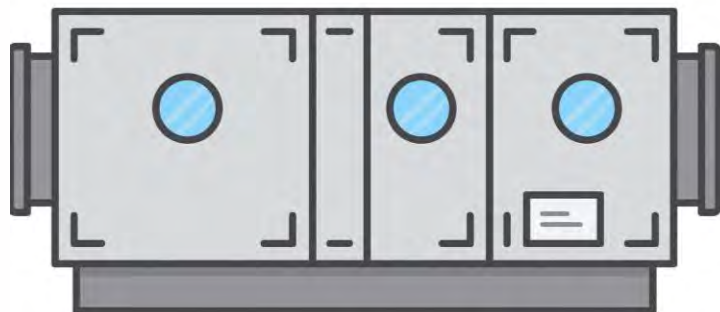
Efficient use of energy



Efficient use of materials



Approaching EPD's in HVAC on EU-level



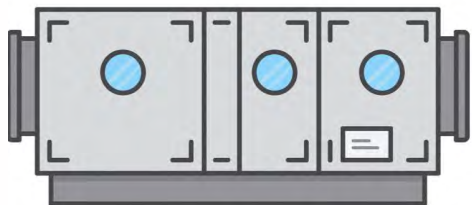
FUNCTION: Delivering healthy indoor climate

Efficient use of energy

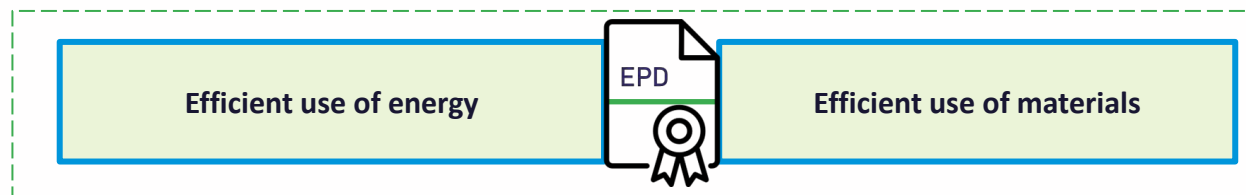


Efficient use of materials

Approaching EPD's in HVAC on EU-level



- Same product, different emissions depending on building
- The higher the energy use, the higher impact of energy efficiency relative to material efficiency -> discourages embodied carbon emission improvements



Materials
and
production

Energy

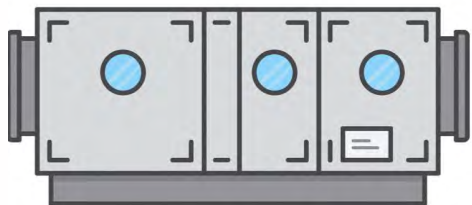


Materials
and
production

Energy

It is illogical to include emissions a manufacturer has no control over (use-phase) into a single declaration with emissions that a manufacturer does have control over (the product). Keep the EPD pure with embodied carbon of material and production.

Approaching EPD's in HVAC on EU-level



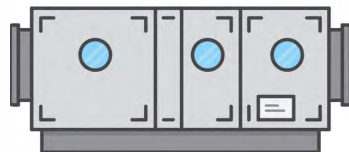
- Keep EPD focused on materials and production, exclude operational energy use
- Pick a methodology suitable for assembly products that use energy. Make a choice!
- Harmonize EPD's across member states.
- Develop and maintain reliable and representative material databases
- Consider separate material databases for different product groups (i.e., separate databases for construction products and technical building systems)

Approaching Circularity in HVAC on EU-level

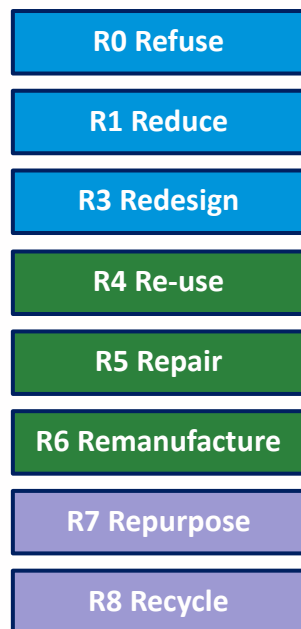


While there is discussion and differences in definition of circularity, there seems to be acceptance on the concepts that support circularity: an R-ladder.

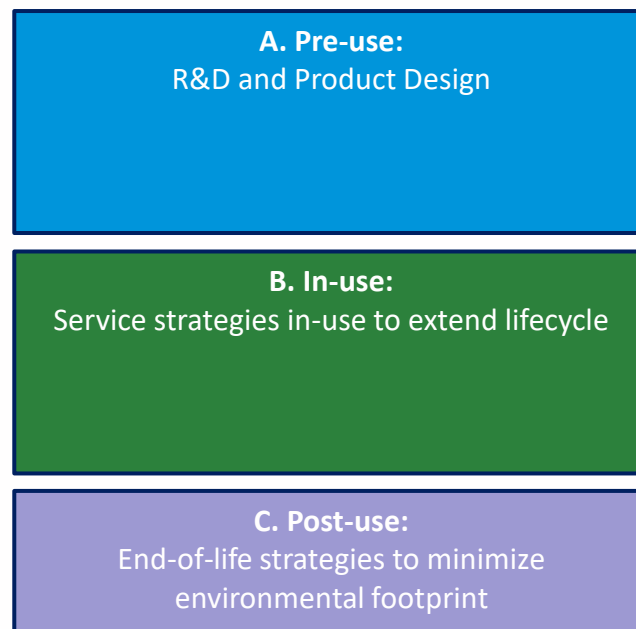
Approaching Circularity in HVAC on EU-level



Step 1: Pick common R-ladder



Step 2: Map R's to product phases



Step 3: Develop framework

Develop a framework of methods and design principles (A) that facilitate life cycle extension (B) strategies and minimized waste in end-of-life (C).

The goal of this is to make products comparable on design and the degree to which they are “fit for circularity”.



Thank you for your attention!

Eurovent Summit 2025