

INDU-ZERO

Ulla-Britt Krämer

08 & 10-10-2019



**Smart
Renovation
Factory**

Interreg
North Sea Region
INDU-ZERO

European Regional Development Fund



EUROPEAN UNION

Inhoud

- **Het INDU-ZERO project (Interreg North Sea Region project)**
- **Hoofdstappen in het project**
- **Take home message**

Problem



Sustainable housing
too slow, too expensive

THE SOLUTION WITH INDU-ZERO

Problem



Sustainable housing too slow, too expensive



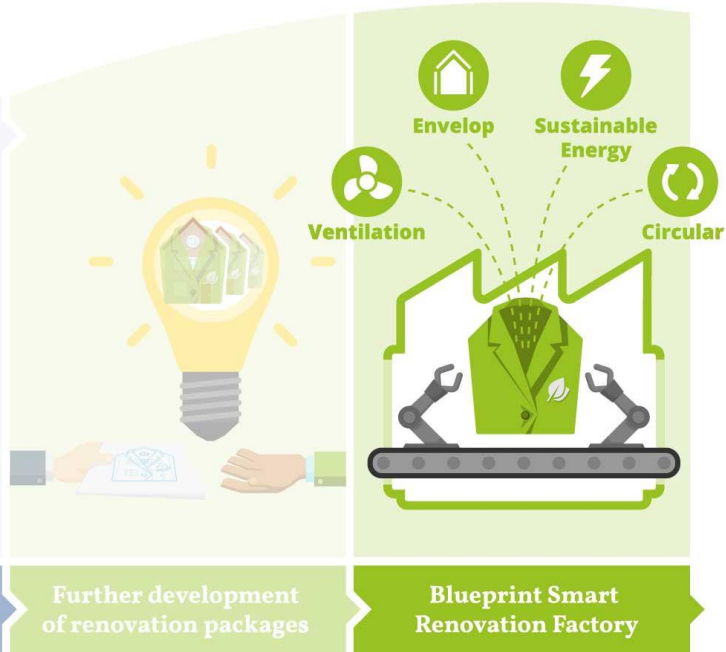
Further development of renovation packages

THE SOLUTION WITH INDU-ZERO

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Further development
of renovation packages

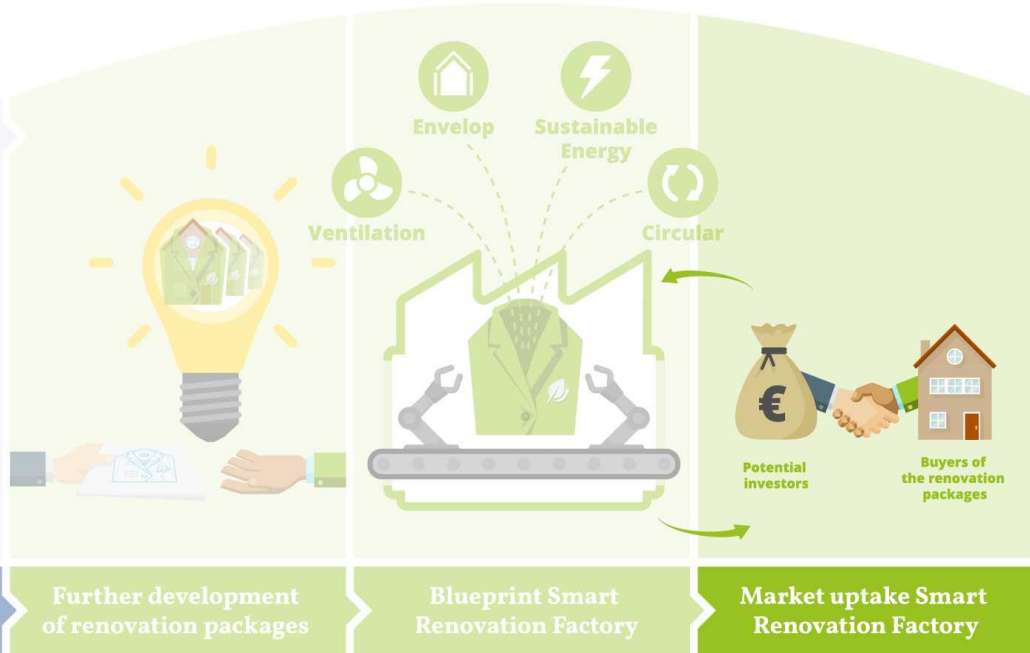
Blueprint Smart
Renovation Factory

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Blueprint Smart
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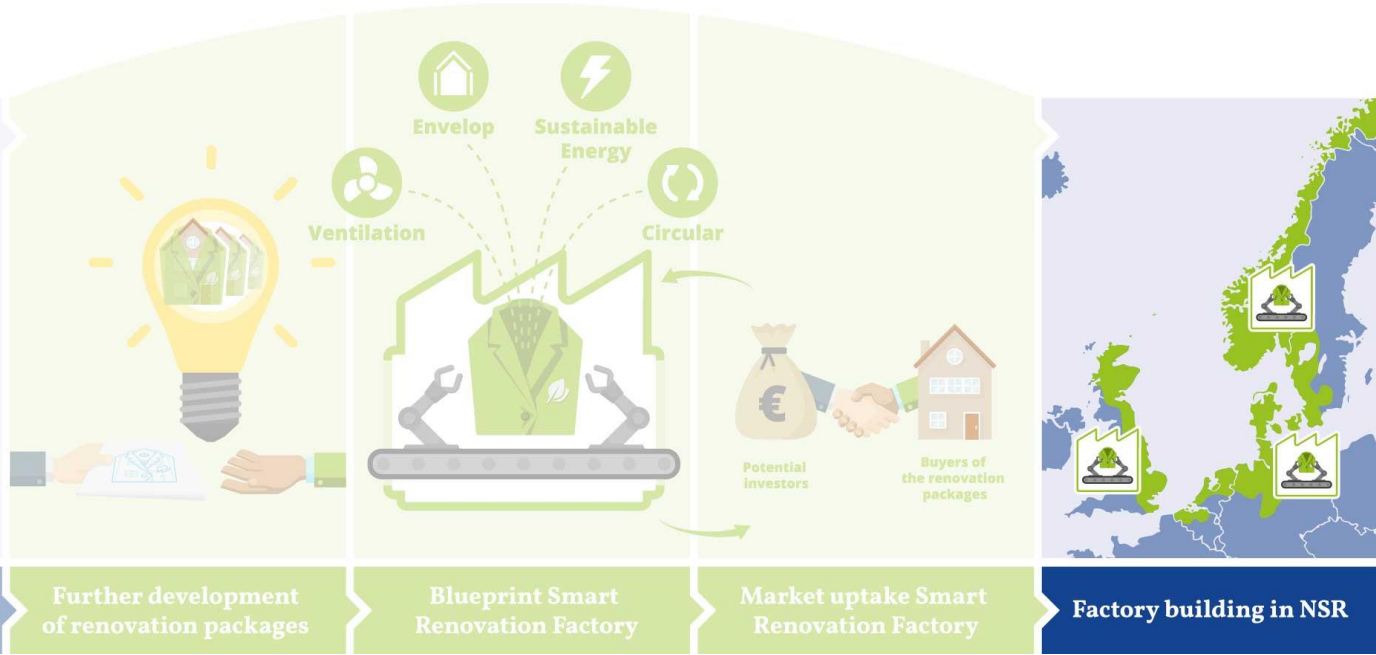
Market uptake Smart
Renovation Factory

THE SOLUTION WITH INDU-ZERO

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Future perspective



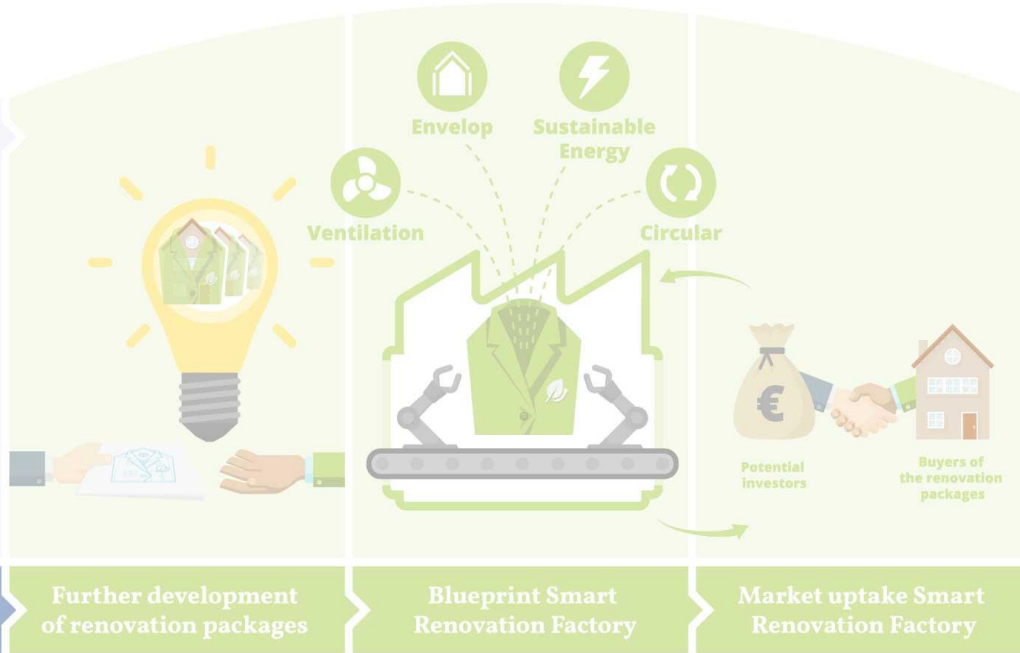
Factory building in NSR

THE SOLUTION WITH INDU-ZERO

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Factory building in NSR



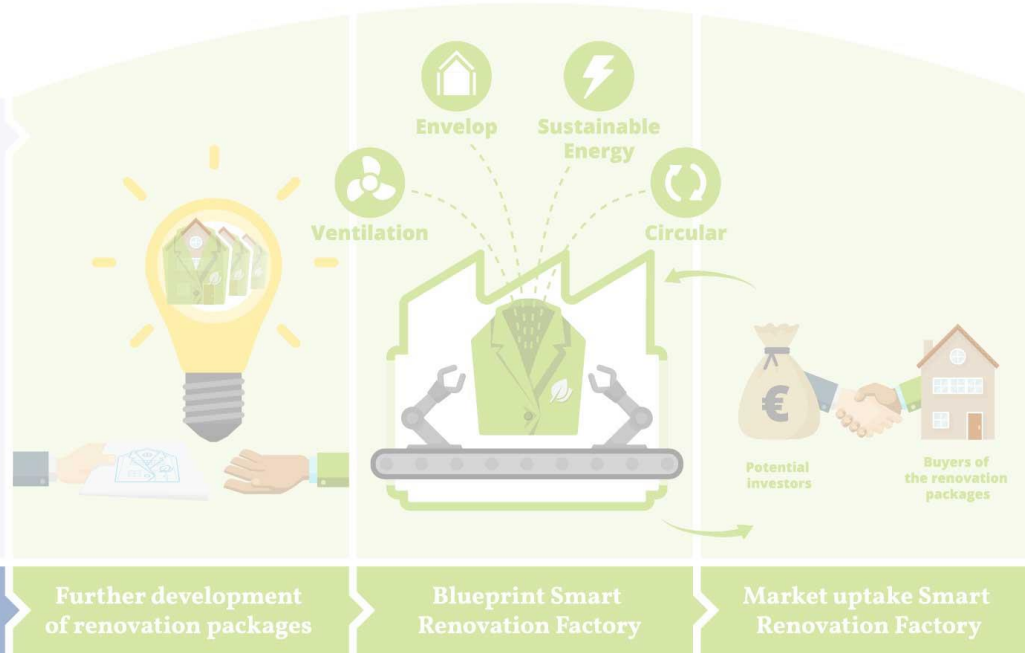
Renovation houses

THE SOLUTION WITH INDU-ZERO

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Factory building in NSR



Renovation houses



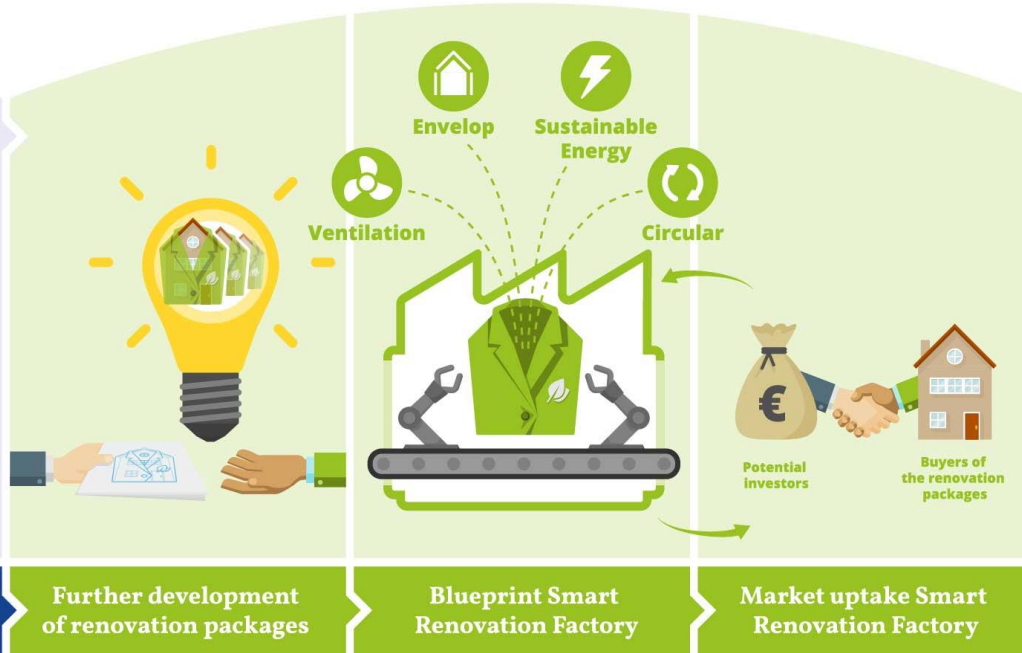
Future proof houses

THE SOLUTION WITH INDU-ZERO

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Market uptake Smart
Renovation Factory

Future perspective



Factory building in NSR



Renovation houses



Future proof houses

Achtergrond

- **Interreg NSR (Noordzee regio) project**
- **Totaal budget 4,4 Miljoen**
- **Start project juli 2018 - Duur 3 jaar tot juli 2021**
- **15 projectpartners in totaal 30 personen**
- **6 landen uit Noord Europa**
- **5 leden adviesraad**

Partners en adviesraad



Hoofdstappen in het project

Hoofdstappen in het project

- Rapportage woningvoorraad op website - **gereed**
- Ontwikkeling renovatie pakketten - **lopend**
- Ontwikkeling productie proces en fabriek - **lopend**
- VR en AR van de fabriek en de woningen- **lopend**
- Showcases renovaties in 6 landen - **lopend**

Woningvoorraad

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Onderzoek woningvoorraad

3 archetype huizen tussen 1965 - 1975



Rijtjeshuis 2-onder 1 kap

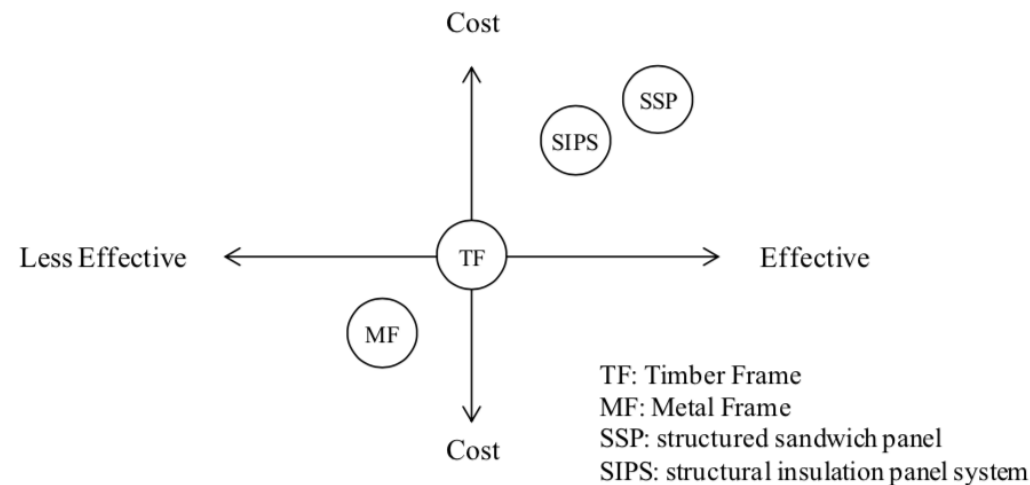
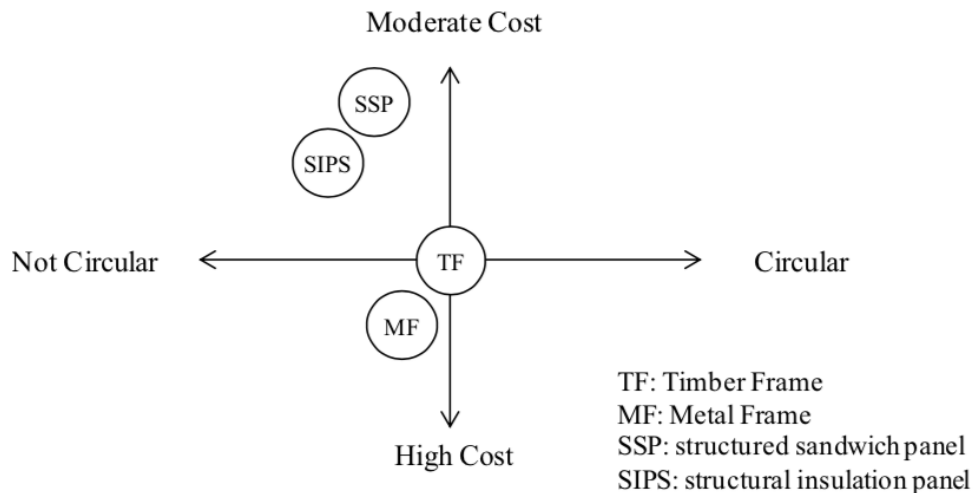


Portiekflats

Ontwikkeling van de renovatie pakketten

Ontwikkeling van de renovatiepakketten

- **SSP (Sandwichpanelen): Beste voor wat betreft kosten en effectiviteit**
- **Houtskelet en Sandwichpanelen scoren gelijk op circulariteit (uitkomst korte Life cycle analyse)**



Ontwikkeling van de renovatie pakketten

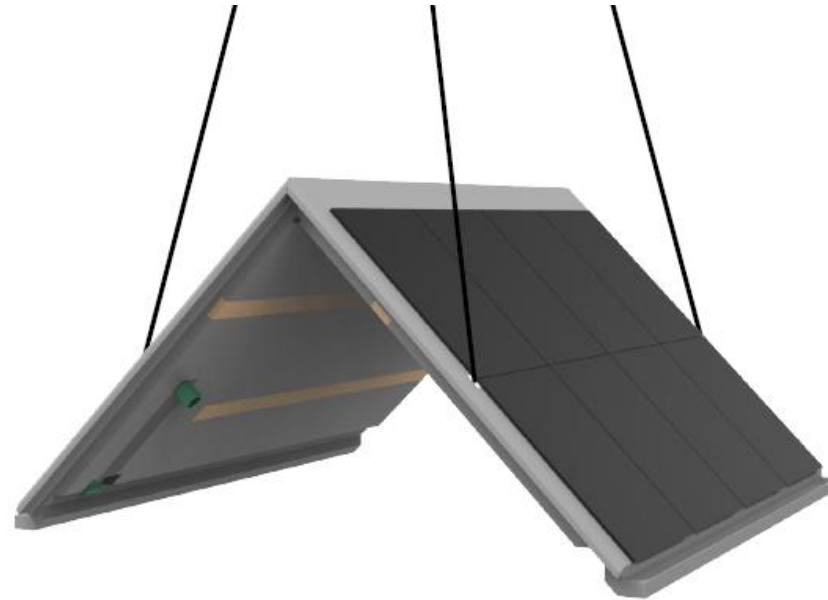
Façade

(Sandwichpaneel met EPS)

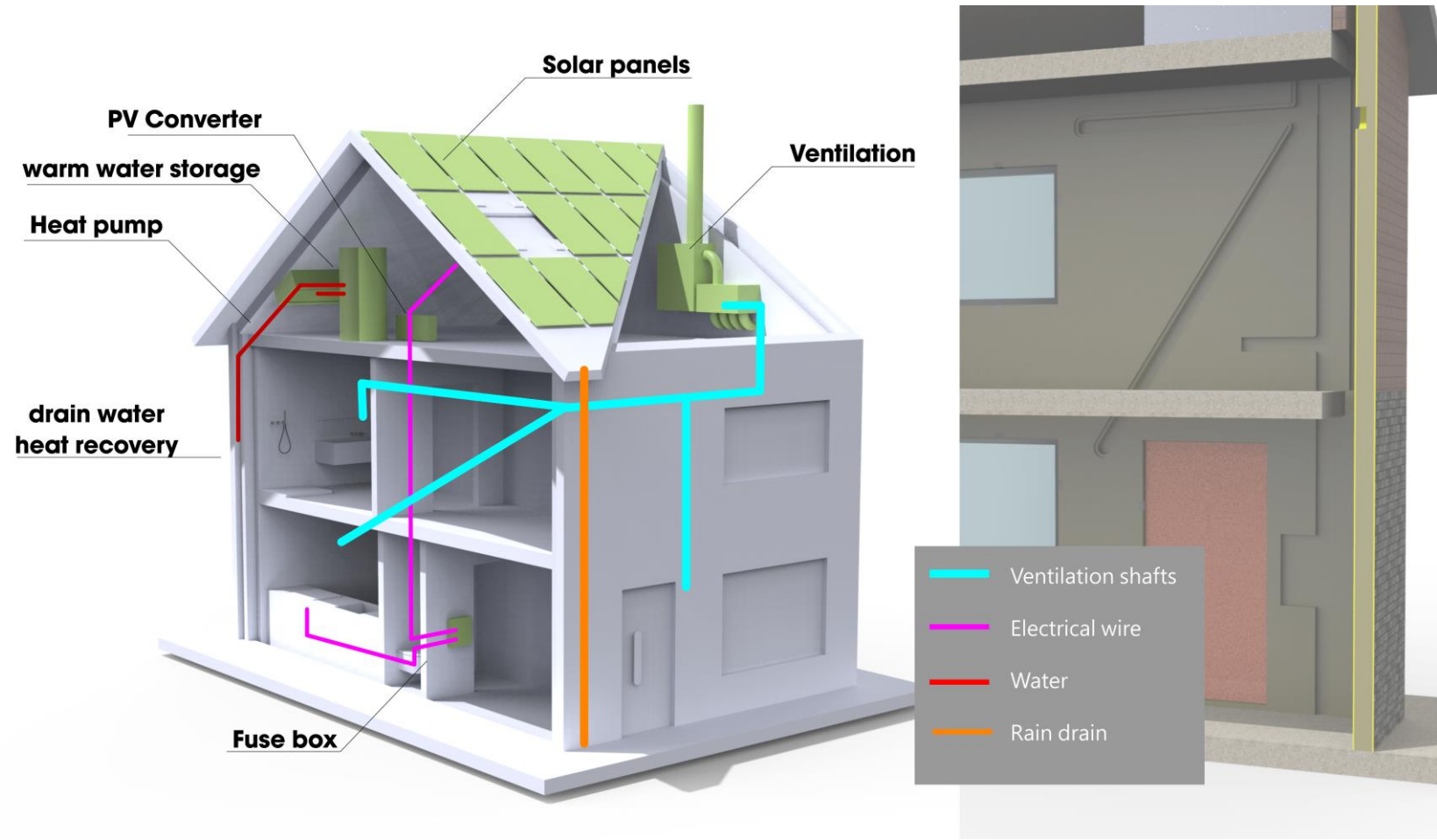


Dak

(Sandwichpaneel)

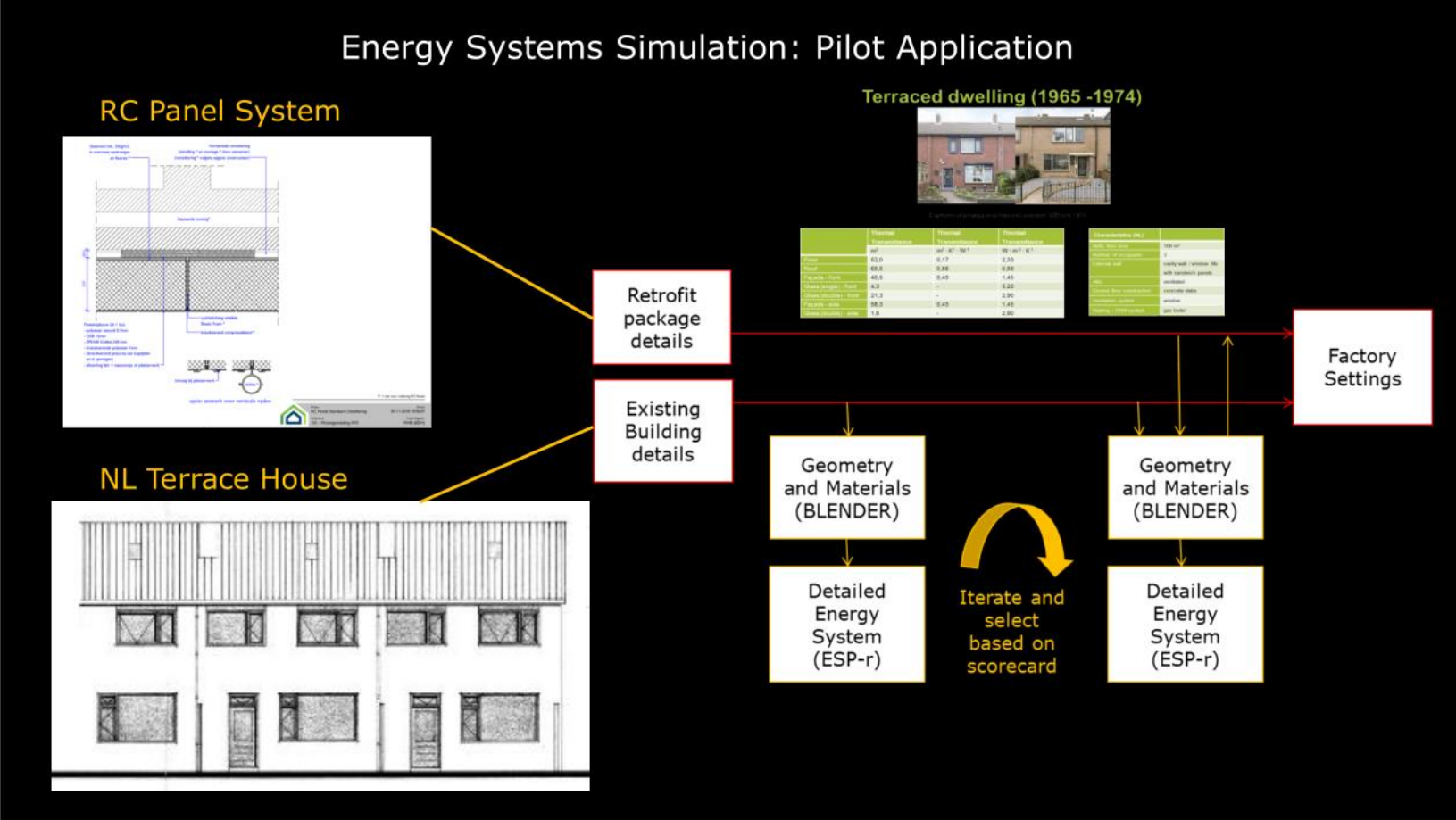


Ontwikkeling van de renovatie pakketten



Strathclyde university

Blender model and ESP-r model



Ontwikkeling van de fabriek

Ontwikkeling van de fabriek

Uitdaging: aantallen

Doel: 15.000 huizen per jaar

250 dagen/jaar

60 huizen/dag

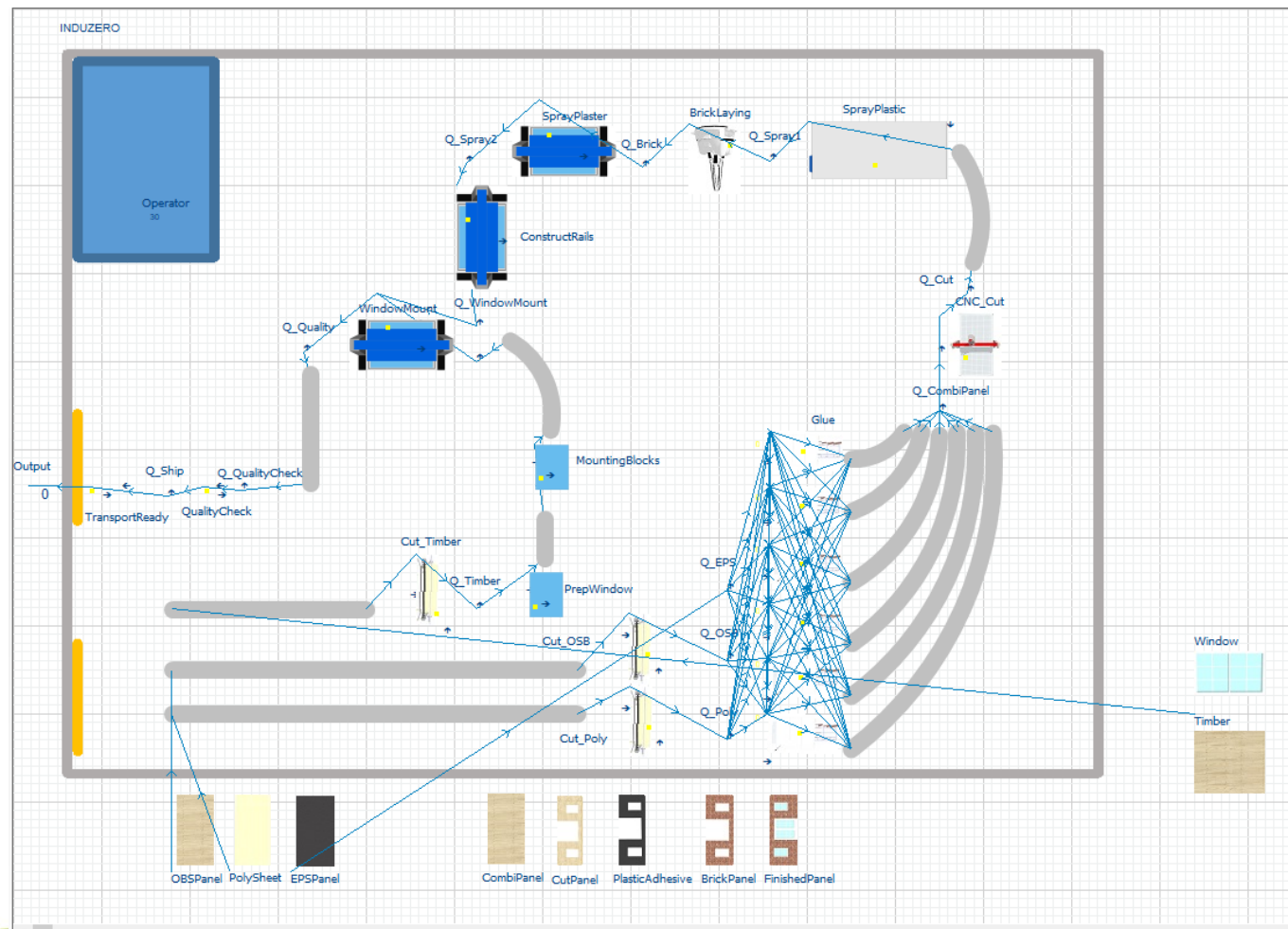
1 huis = 9 elementen

540 elementen per dag !



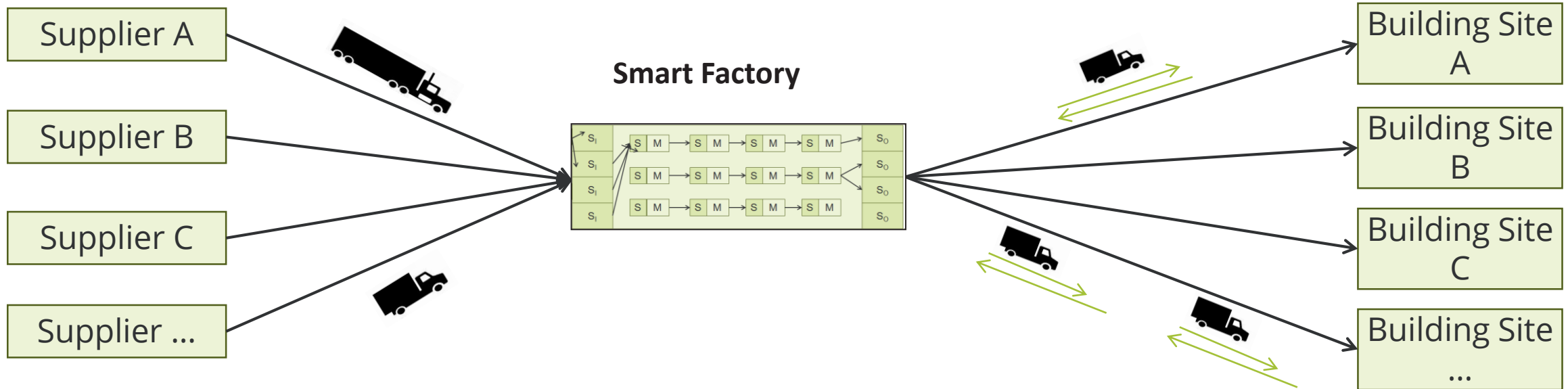
Strathclyde university

Fabriekssimulatie (blauwdruk)



Jade university of applied science

Logistieke processen (Inbound/Outbound)



Berekening:

- *O.a. Hoeveel vrachtwagens?*
- Afstanden
- Vertragingen

Showcases

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Tijdspad

6 showcases huizen van de archetypes

Groep 1 – Nederland / België / Duitsland

- Gereed in het 4^{de} kwartaal 2020

Groep 2 – Groot-Britannië / Zweden / Noorwegen

- Gereed in het 1st kwartaal 2021

Take home message

Take home message

Geïndustrialiseerde NOM renovaties voor de helft van de huidige prijs!

- <https://northsearegion.eu/indu-zero/>
- *INDU-ZERO newsletter*
- *Webinars*
- *Reports*



Ulla-Britt Krämer