INDU-ZERO

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Smart Renovation Factory

Interreg
North Sea Region
INDU-ZERO

European Regional Development Fund

EUROPEAN UNION

Content

- **The project INDU-ZERO (Interreg North Sea Region project)**

- **Main steps in the project**

- **Take home message**

Video

Background

- **Interreg NSR (North Sea Region) project**

- **Total budget 4,4 Million €**

- **Start project July 2018 - Duration 3 year unit July 2021**

- **15 project partners in total 30 persons**

- **6 countries from Northern Europe**

- **5 members advisory board**

Partners and advisory board

Main steps in the project

1. **Assessment of the housing stock**

2. **Development of the renovation packages**

3. **Development of the factory blueprint**

4. VR and AR visualization

5. Showcases

1. Assessment of the housing stock

Reference dwellings: 3 arche types from 1965 - 1975
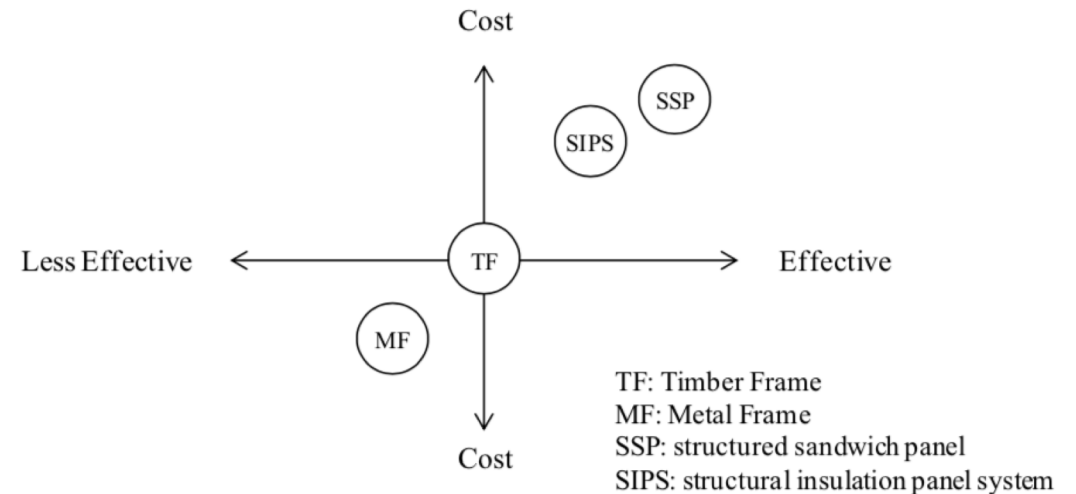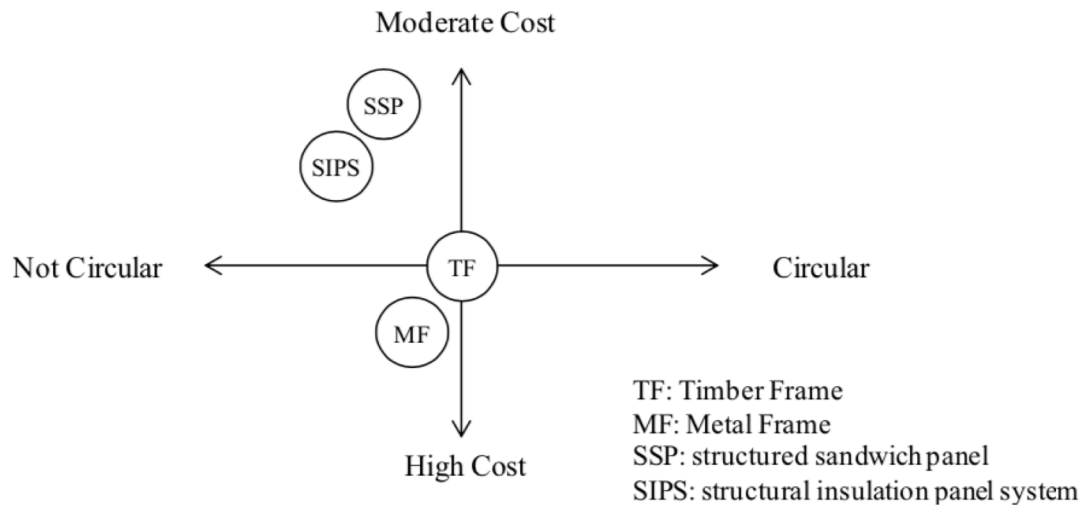

Terraced   **Semi-detached**   **Appartement**

Development of the renovation packages

2. Development of renovation packages

- **Combination of findings**
- **SSP: Best according costs and effectiveness**
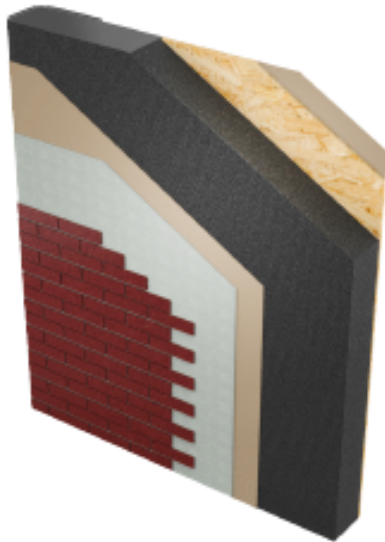- **Timber and SSP panels score equal with short life-cycle analysis**

Moderate Cost

SSP
SIPS

Not Circular ← TF → Circular

MF

High Cost

TF: Timber Frame
MF: Metal Frame
SSP: structured sandwich panel
SIPS: structural insulation panel system

Cost

SSP
SIPS

Less Effective ← TF → Effective

MF

Cost

TF: Timber Frame
MF: Metal Frame
SSP: structured sandwich panel
SIPS: structural insulation panel system

2. Development of renovation packages

Facades

(Sandwichpanels with EPS)

Roofs

(Sandwich or Timberframe)

2. Development of renovation packages

Solar panels

PV Converter

warm water storage

Heat pump

Ventilation

drain water heat recovery

Fuse box

Ventilation shafts

Electrical wire

Water

Rain drain
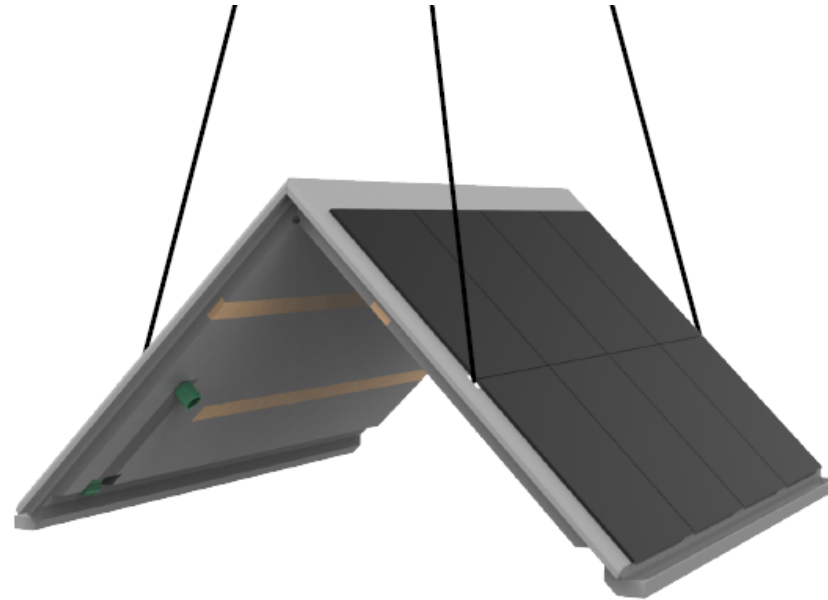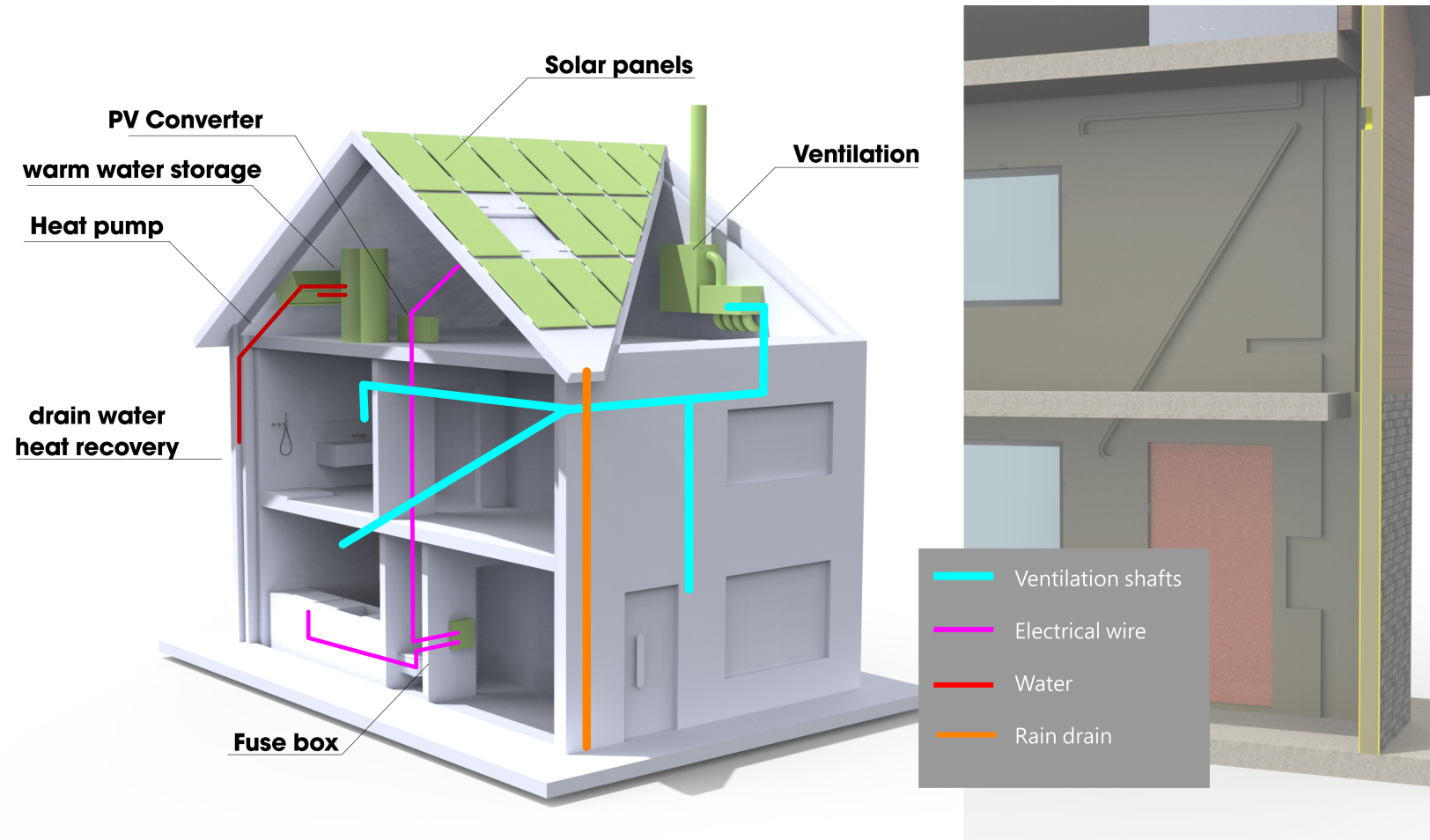
Development of the factory blueprint

3. Development of a factory blueprint
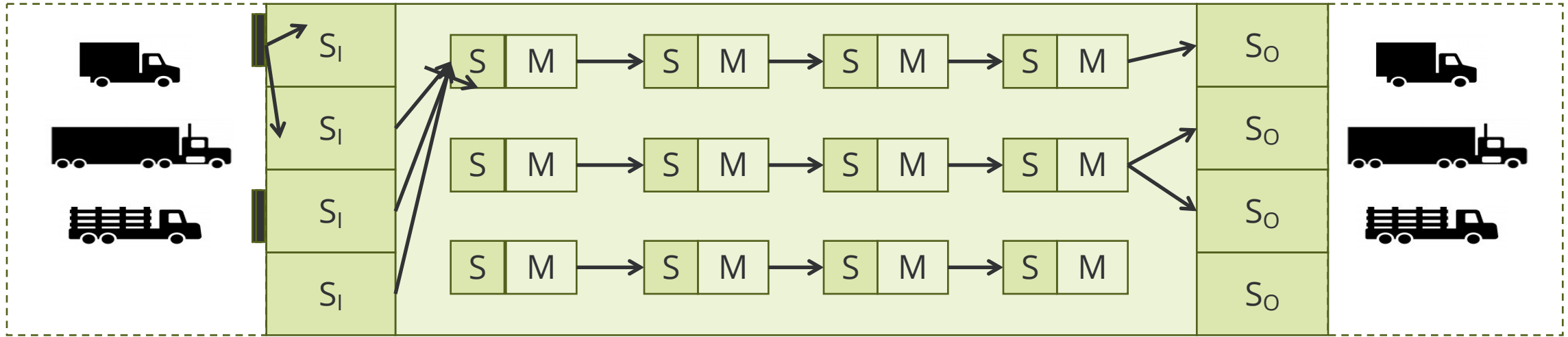
Inbound Logistics for each material:

- *Required Area?*
- Number of truck arrivals / day?
- Capacity: Required days of inventory
- Loading ramps: time slot management?
- Driving and parking areas (truck routing, Gigaliner)

Outbound Logistics:

- *Required Area?*
- + Accessability / commissioning
- + Coordination with construction site

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3. Development of a factory blueprint
Challenge: Number of elements

Target: 15.000 dwellings per year
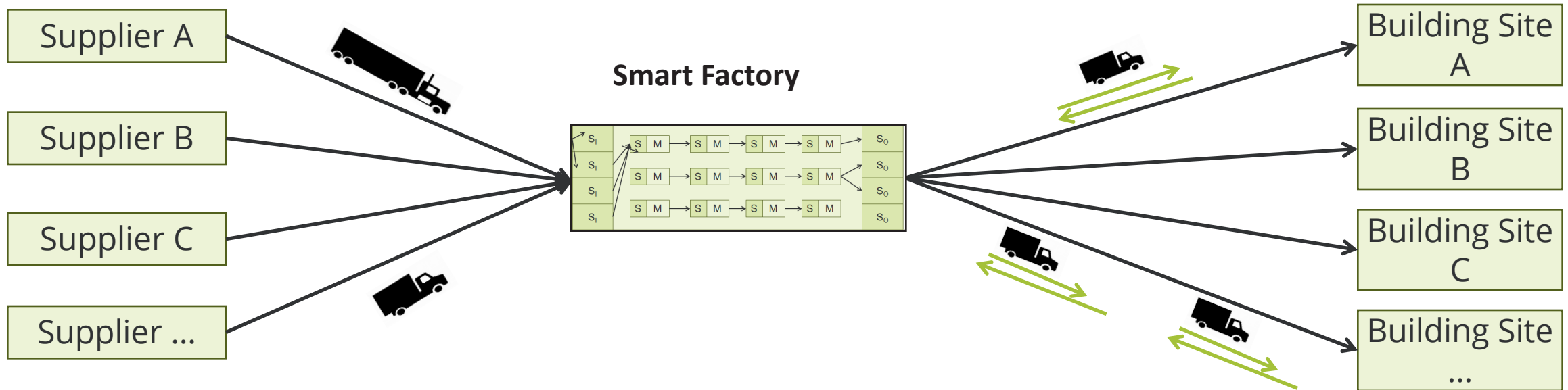
250 days/year
60 dwellings/day
9 elements

540 elements / day !

➤ *High challenge for logistics processes!*

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3. Development of a factory blueprint

Supply Chain View

Round trip calculation:

- *How many trucks are needed?*
- Distances
- Disturbances, delays

Take home message

Take home message

Industrial Net Zero renovations for half the current price!

➤ *https://northsearegion.eu/indu-zero/*

➤ *INDU-ZERO newsletter*

➤ *Webinars*

➤ *Reports*

Ulla-Britt Krämer

Prof. Dr. Kerstin Lange

Problem

Sustainable housing
too slow, too expensive

THE SOLUTION WITH INDU-ZERO

Problem

Sustainable housing too slow, too expensive
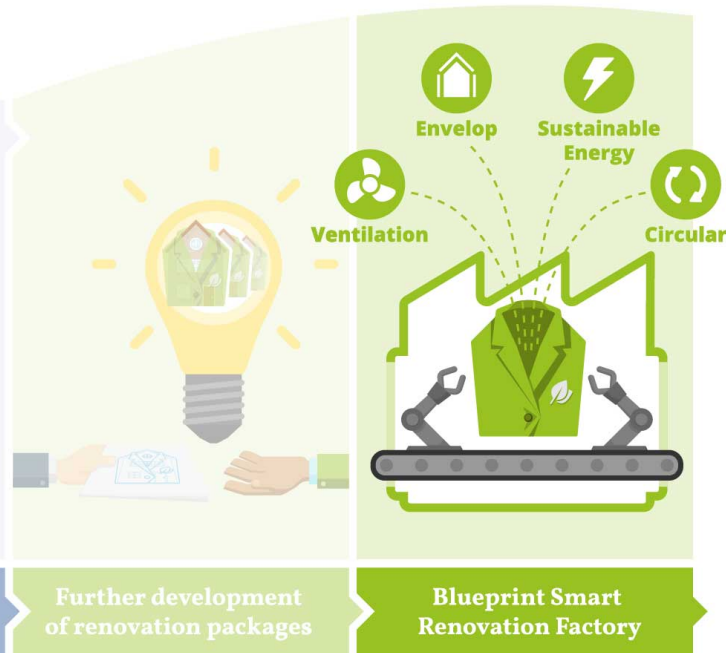
Further development of renovation packages

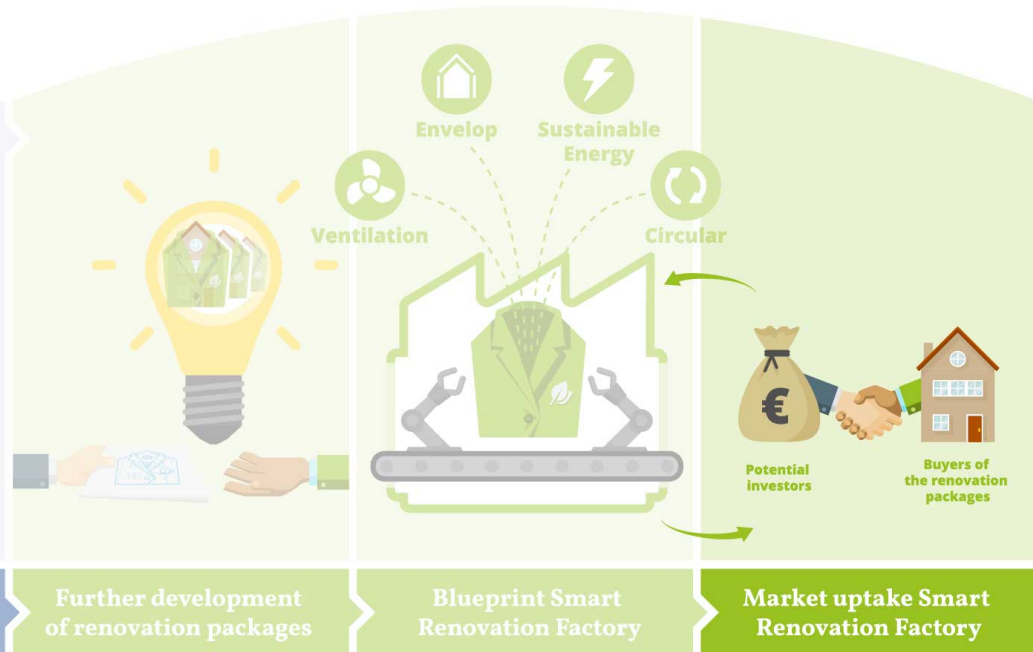# THE SOLUTION WITH INDU-ZERO

Problem

CO₂

Envelop

Sustainable
Energy

Ventilation

Circular

Sustainable housing
too slow, too expensive

Further development
of renovation packages

Blueprint Smart
Renovation Factory

THE SOLUTION WITH INDU-ZERO

Problem

Envelop
Sustainable Energy
Ventilation
Circular

Potential investors
Buyers of the renovation packages

Sustainable housing too slow, too expensive

Further development of renovation packages

Blueprint Smart Renovation Factory

Market uptake Smart Renovation Factory

The project

THE SOLUTION WITH INDU-ZERO

Problem

Future perspective

Envelop
Sustainable Energy
Ventilation
Circular

Potential investors
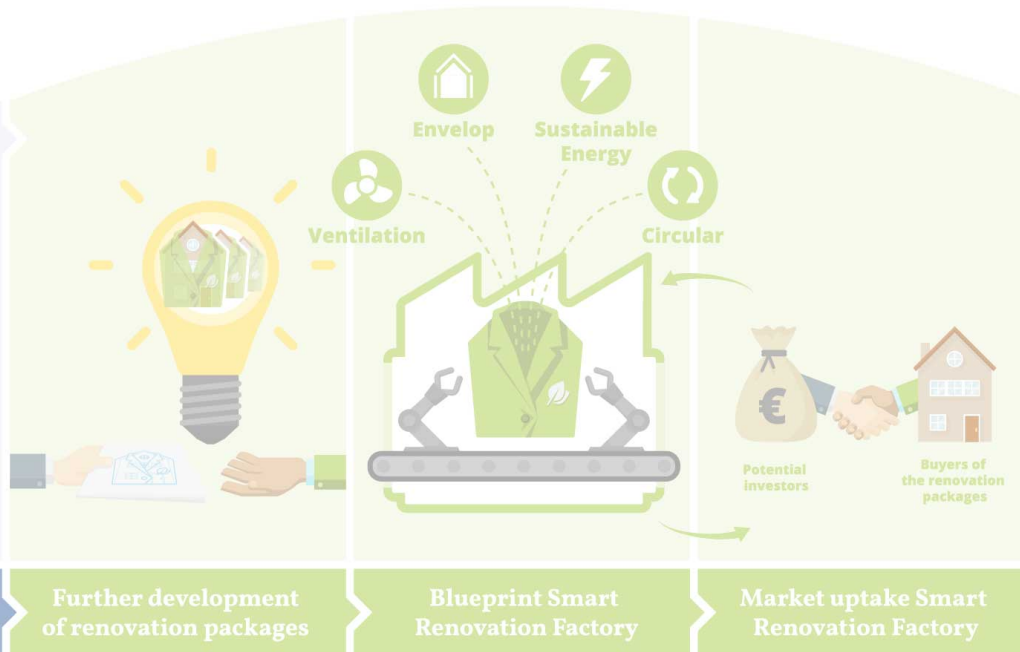Buyers of the renovation packages

Sustainable housing too slow, too expensive

Further development of renovation packages

Blueprint Smart Renovation Factory

Market uptake Smart Renovation Factory

Factory building in NSR

The project

THE SOLUTION WITH INDU-ZERO

Problem

Future perspective

Envelop
Sustainable Energy
Ventilation
Circular

CO₂

22 MM houses in 2050

Potential investors

Buyers of the renovation packages

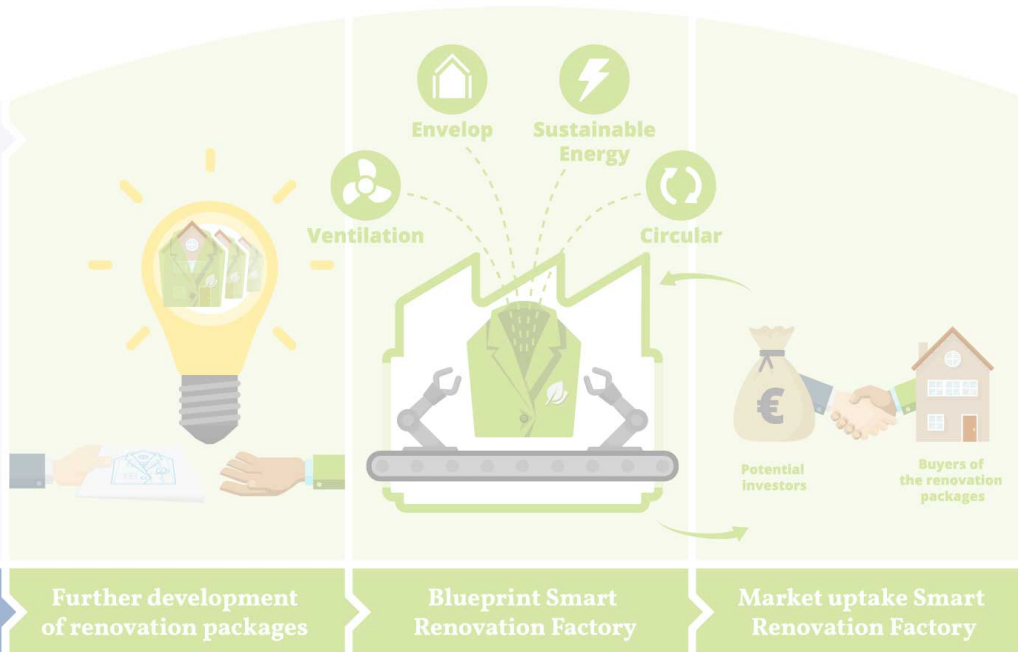| Sustainable housing too slow, too expensive | Further development of renovation packages | Blueprint Smart Renovation Factory | Market uptake Smart Renovation Factory | Factory building in NSR | Renovation houses |

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THE SOLUTION WITH INDU-ZERO

Problem

Future perspective

Envelop · Sustainable Energy · Ventilation · Circular

CO_2

Potential investors · Buyers of the renovation packages

22 MM houses in 2050

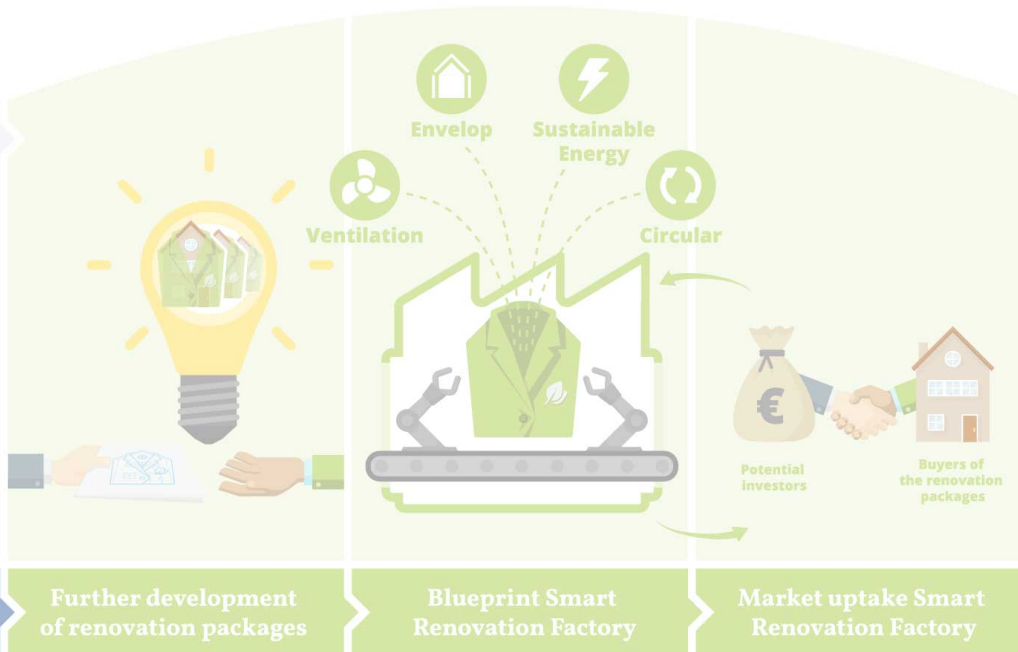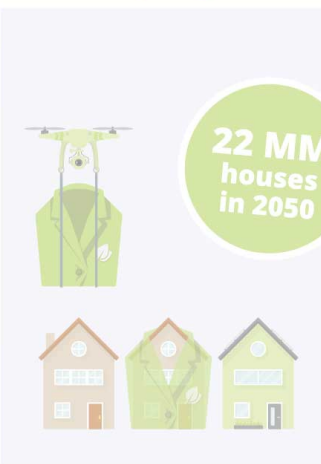| Sustainable housing too slow, too expensive | Further development of renovation packages | Blueprint Smart Renovation Factory | Market uptake Smart Renovation Factory | Factory building in NSR | Renovation houses | Future proof houses |

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Future perspective

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Potential investors

Buyers of the renovation packages

22 MM houses in 2050

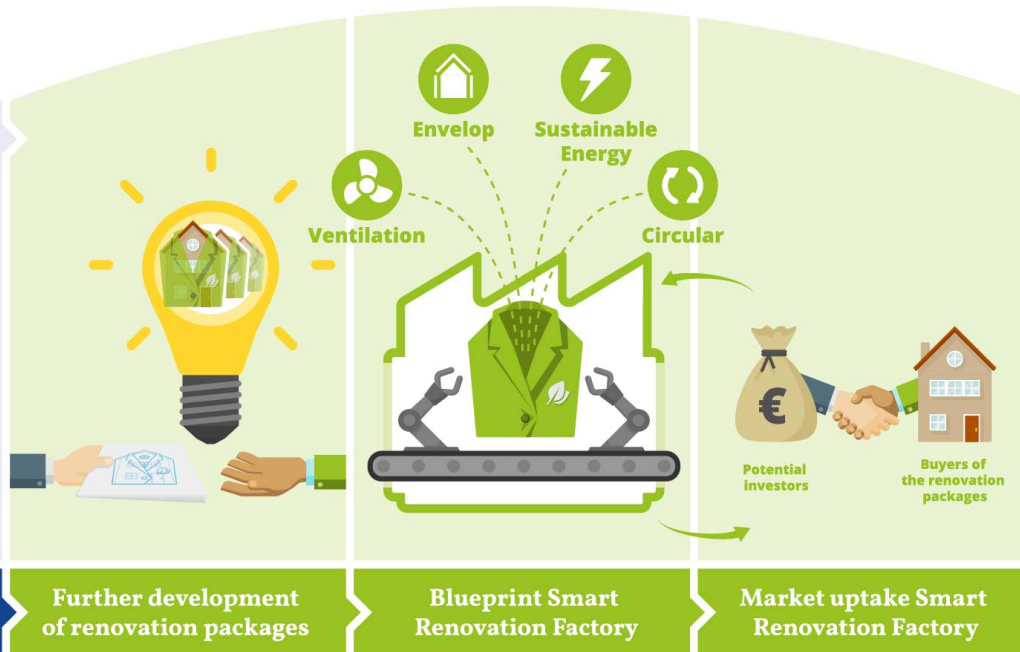| Sustainable housing too slow, too expensive | Further development of renovation packages | Blueprint Smart Renovation Factory | Market uptake Smart Renovation Factory | Factory building in NSR | Renovation houses | Future proof houses |

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