

INDU-ZERO

Innovative Dämmtechniken 18.Fachforum

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**Smart
Renovation
Factory**
by INDU-ZERO

Interreg
North Sea Region
INDU-ZERO

European Regional Development Fund



EUROPEAN UNION

Green Deal Europa

Renovation wave

- 2030 – 55% CO₂ Reduktion
- 2050 – CO₂ Neutral

Gebäude verantwortlich für:

- 40% Energieverbrauch
- 36% Treibhausgasemissionen

- 2030 – Ziel: 35 Mio. Gebäude saniert
- 2050 – Ziel: 152 Mio. Gebäude saniert

➤ **Bedarf eines industriellen Ansatzes zu geringeren Kosten!**



Das Projekt

Interreg
North Sea Region
INDU-ZERO
European Regional Development Fund



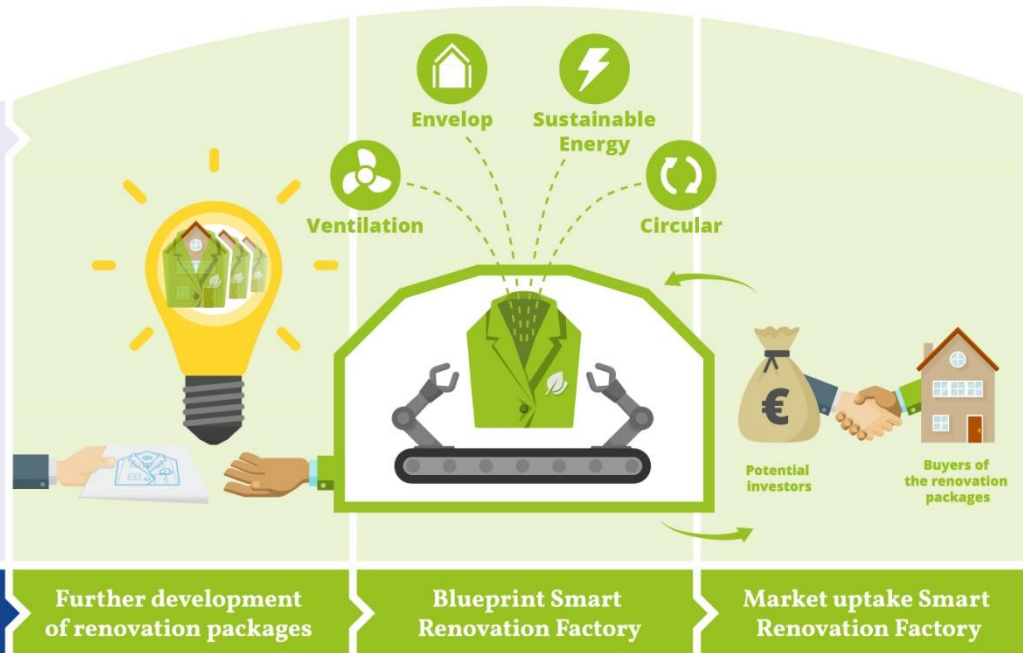


THE SOLUTION WITH INDU-ZERO

Problem



Sustainable housing
too slow, too expensive



Further development
of renovation packages

Blueprint Smart
Renovation Factory

Market uptake Smart
Renovation Factory

Future perspective



Factory building in NSR



Renovation houses



Future proof houses

[Interreg INDU-ZERO project - YouTube](#)

INDU-ZERO im kurz zusammengefasst

- **Blaudruck für ein High-Tech Fabrik**
- **50%** Reduktion der heutigen (Stand 2022) Preise für eine **NetZero-Standard Sanierung** → **bezahlbare Sanierungskosten**
- **Produktion von 15.000 Sanierungspakete pro Jahr pro Fabrik**
→ **hohe Qualität**

Partner und Beirat



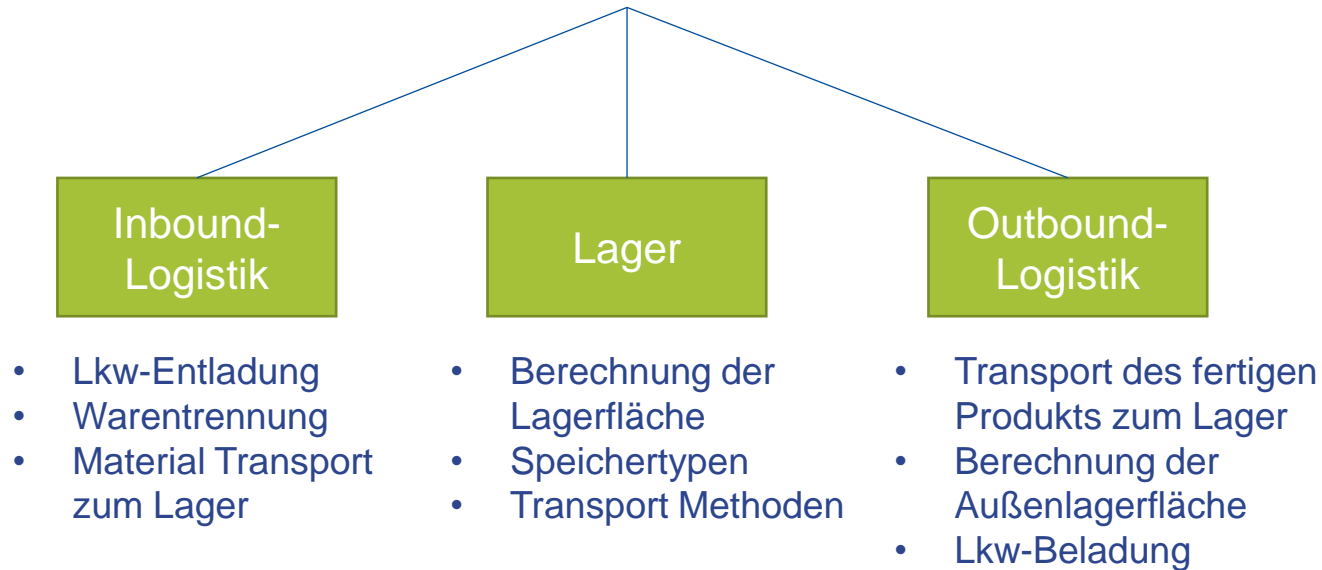
Unternehmen die mitgedacht haben



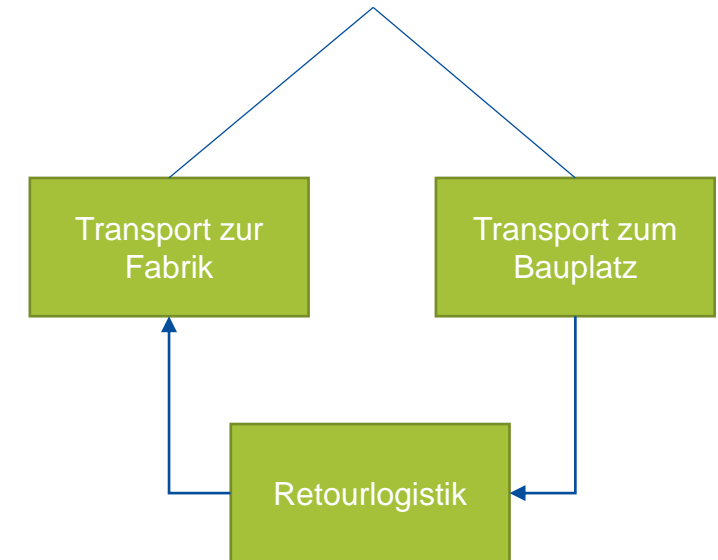
Logistik

Logistik Prozesse

Intralogistics



Cross-company



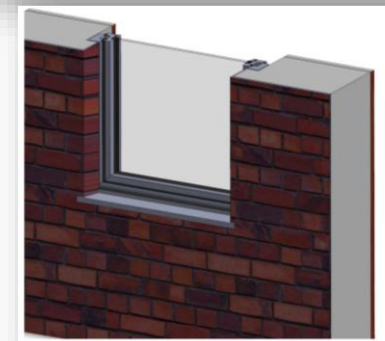
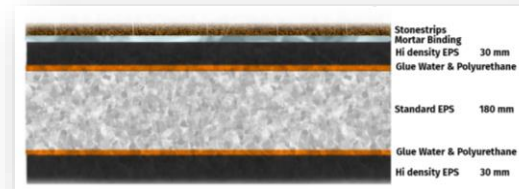
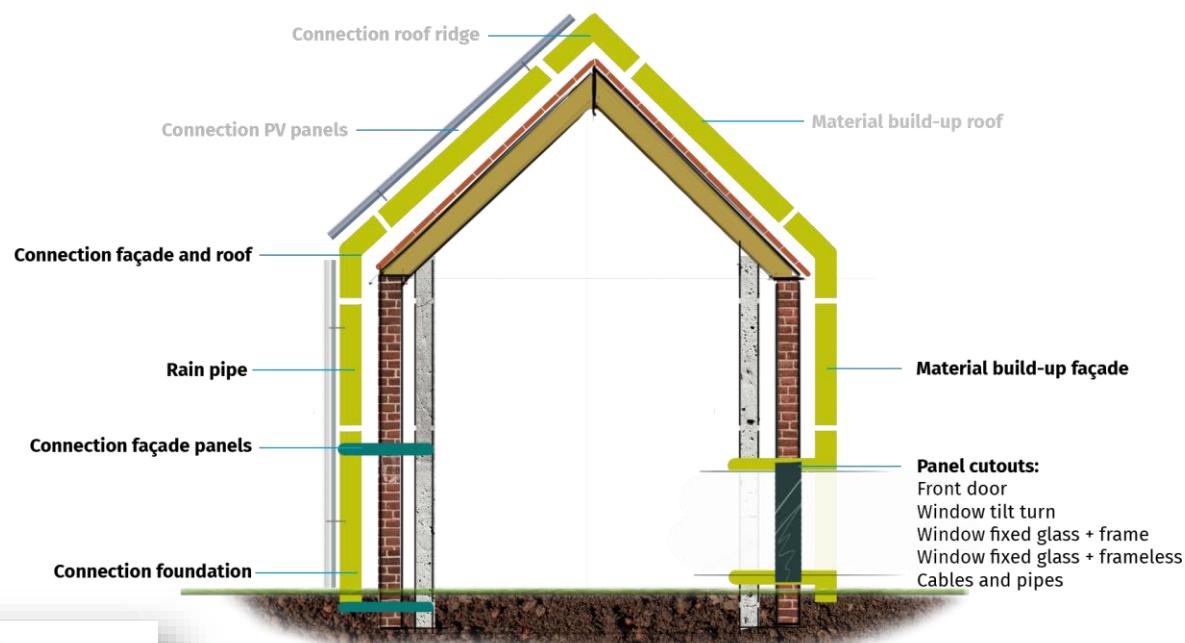
Sanierungspakete

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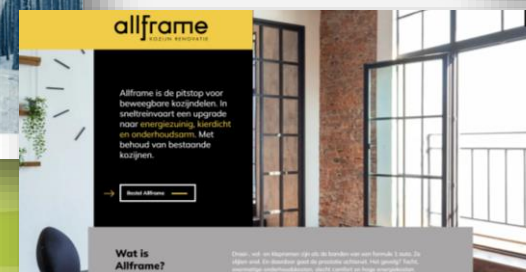
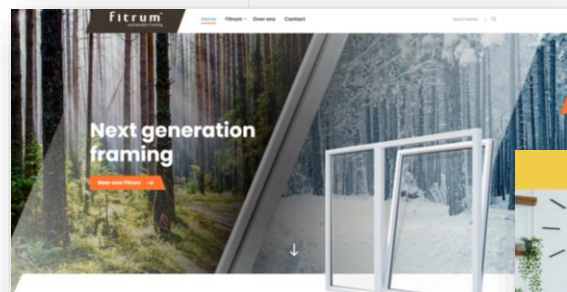


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Neues Produkt entwickelt



EASY TO MOUNT ANCHOR



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Impression der Smart Fabrik

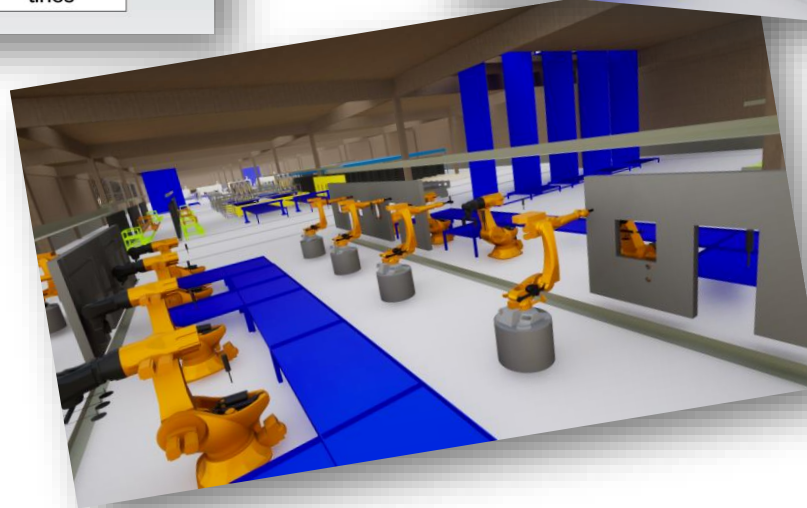
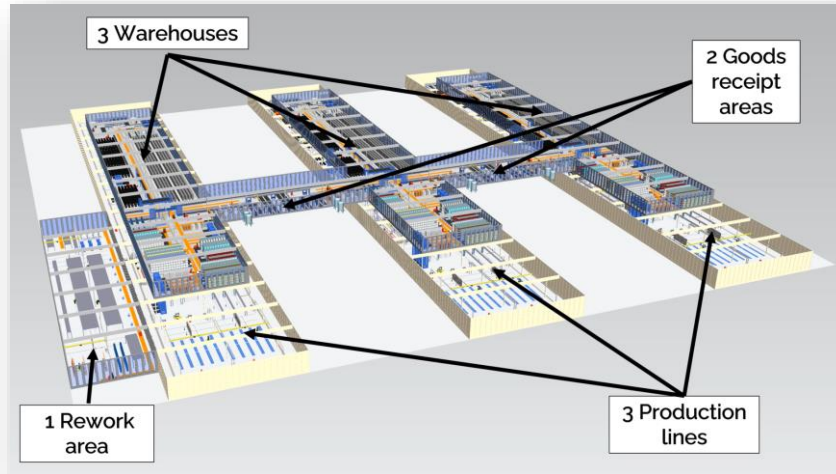
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Blaudruck der INDU-ZERO Smart Fabrik



INDU-ZERO Smart Fabrik



- Fabrik: ca. 26 ha
- Total: 31 ha
- Taktzeit 2 Minuten
- 614 Elemente pro Tag
- Inbound & Outbound Logistik
- ≈ 150 Lkws pro Tag
- 440 Mitarbeiter

INDU-ZERO Video Smart Fabrik



Montage vor Ort

Montage vor Ort



- Ziel: Totale Sanierungszeit innerhalb von 3 Tagen mit 5 Mitarbeiter (Reihenhaus)
- 1022 Mitarbeiter pro Jahr
- Bewohner können zu Hause bleiben



Source pictures renovation Domijn, Rc panels



Showcase Sanierung

Reihenhaussanierung bei Domijn in Enschede / NL

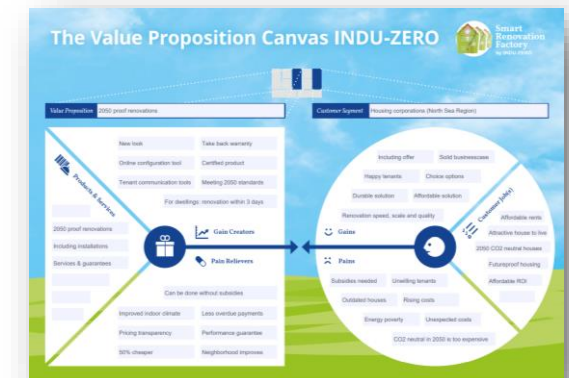
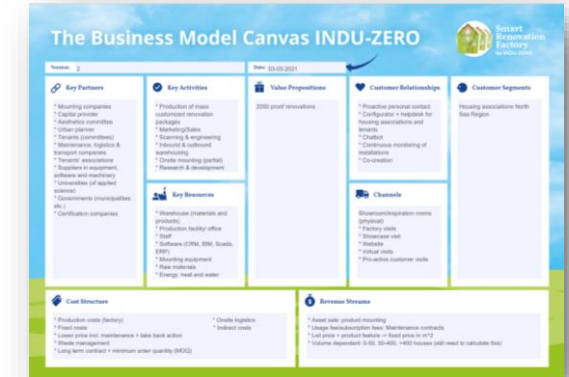
- NetZero Standard Sanierung
- 3 verschiedene Installationen
(Wärmepumpen / PV oder PVT)
- Neuentwicklungen integriert




Geschäftsmodell


Geschäftsmodell des gesamten Prozesses


- Business Model Canvas
- Nutzenversprechen „Value propositions“
- Kundenmarktforschung (NL/D)
- Produkt-Service-Empfehlung
- Break-Even-Berechnung
- Total Cost of Ownership Berechnung



Theoretische Angebotsunterlage für das INDU-ZERO Produkt

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Bidbook project INDU-ZERO Net Zero renovation

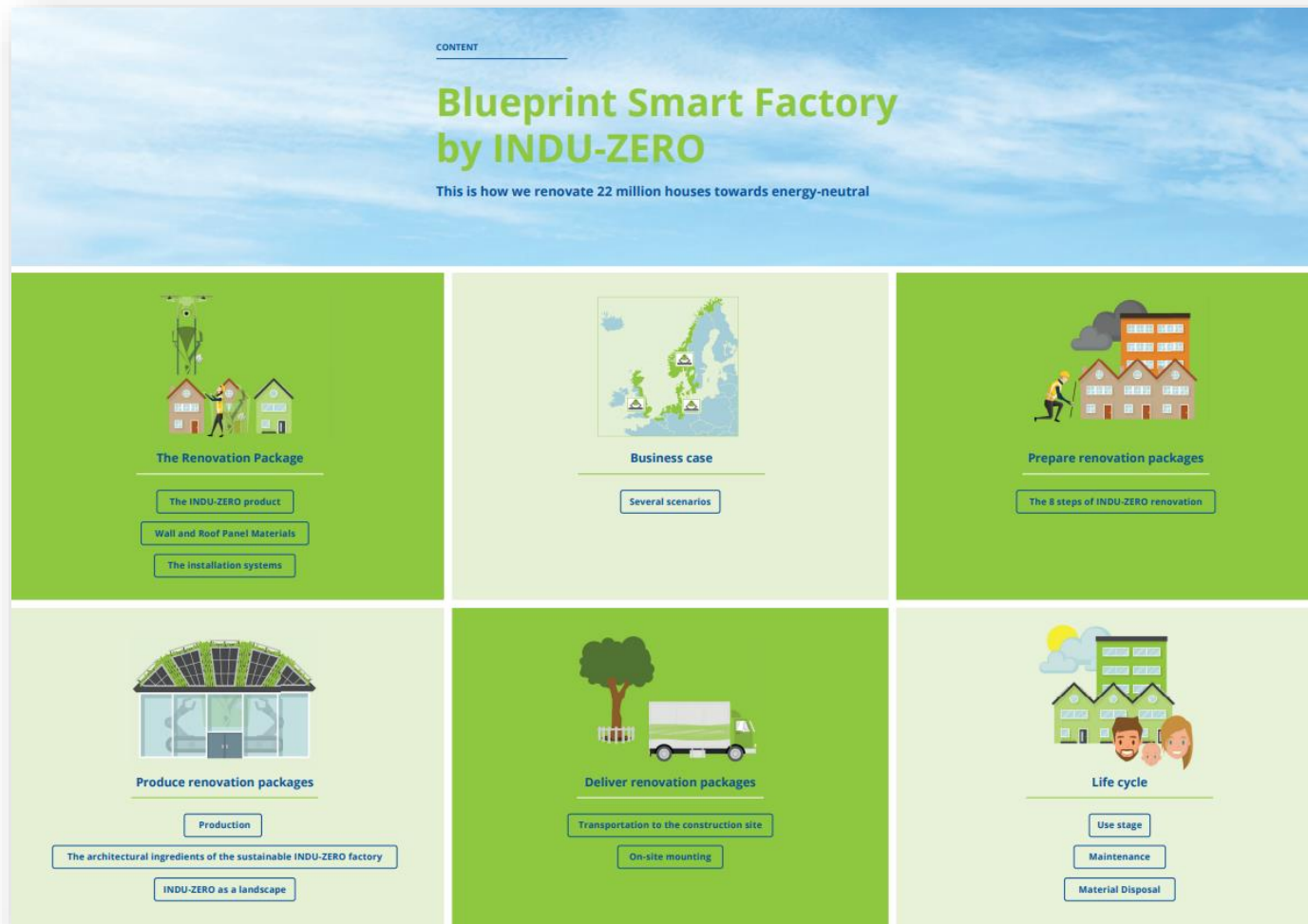
Building type		<ul style="list-style-type: none">Terraced house rice houses; Corner house - 1965 - 1975 (110 m², size 5.7 m)
Price		<ul style="list-style-type: none">€58,000 terraced house; €65,000 corner house excl. VAT <p>The costs include:</p> <ul style="list-style-type: none">Design costs, process costs recordingsDemolition costs of chimney, removal of old roof tiles, glass and internal parts of windows and doors, removal of central heating boilerApplying the facade and roof panels, including windows and doorsConnecting and adjusting all mentioned installationsResident guidance preparation (3 sessions, 1 visit building site)Resident instructions, use installationsPermit application preparationConstruction and assembly insuranceGrant adviceNotification Authorities, start renovation
Panels		<ul style="list-style-type: none">Sandwich panels for the facade, Rc value of 7 m²/K/WSandwich panels for the roof, Rc value of 8 m²/K/WAirtight, airtight (QV 10 value per m³ = 0.15 litre/s.m²)Sill connection / transitionFacilities suitable for the conservation law (birds & bats)Comply with the requirements of the Building Decree (fire resistance requirements, etc.)Ready for connections for outdoor fixtures and blinds/screens
Installations	Central unit	<ul style="list-style-type: none">3-phase meter box + connection induction hobAir/water heat pumpBoiler vessel2 expansion vesselsCentral ventilation system with heat recovery (WTW)Water-side balancingInfrared radiator bathroomKitchen hood recirculation
	Solar panels	<ul style="list-style-type: none">22 PV panels; 330 WP + inverter; on average about 6,170 kWh/year
	Monitoring's system	<ul style="list-style-type: none">Monitoring's system
	Glazing and exterior doors	<ul style="list-style-type: none">Window frames with triple glassSkylightInsulated new doors U-value of up to 0.8 W/m²K
Standard		<ul style="list-style-type: none">0 = Net Zero standard
Guarantee		<ul style="list-style-type: none">10 year performance guarantees
Building time		<ul style="list-style-type: none">Entire renovation ready within 4 working daysTenant stays at home during renovationResident calendar: planning incl. (clean up) tasks resident

Project dependent (additional costs)	Product costs	<ul style="list-style-type: none">Floor insulation ground floor RC 3.5 m²/K/WElectricSafety glass according to NEN 3569 (costs in accordance with reference types)Vacuum GlassSun protection (starting point; sun protection kitchen/living room on the south, slatce facility)Induction CookerRadiators (slightly larger than existing due to heating)Fan 50 m³/h if not yet presentFan 25 m³/h if not yet presentAdditional offer for common ZAVsReplace/move outside tapReplace/move water wellNew fences garden wallsPipes sewer, fibre optic/cablePan setAir conditioningConservation law - exclusion flaps, mitigating measures
Project dependent (additional costs)	Process costs	<ul style="list-style-type: none">Full resident guidancePermit application and feesAsbestos removal costsExpense and nuisance allowances for residents; wallpaper curtains carpeting etc.Grants (applications)
Cheaper alternatives	Product costs	<ul style="list-style-type: none">2 decentralized ventilation systems (CO2 controlled) with WTW (alternative to central WTW) in addition to the use of existing mechanical ventilation and natural ventilation in bedroomsMailbox outside

Blaudruck – Online Zeitschrift

Online Zeitschrift

<https://northsearegion.eu/indu-zero/about-the-blueprint/>



Zusammenfassungsvideo

Zusammenfassungsvideo

The INDU-ZERO project

This is how we renovate Net Zero houses.
Join us!



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Nachrichten zum Mitnehmen

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**Industrielle NetZero Standard Sanierung zum
halben Preis ist möglich!**

➤ <https://northsearegion.eu/indu-zero/>



Ulla-Britt Krämer

Fragen?