

**RENOVATE**

**Serial  
Renovation  
at LEG**

**Why? / What? / How?**

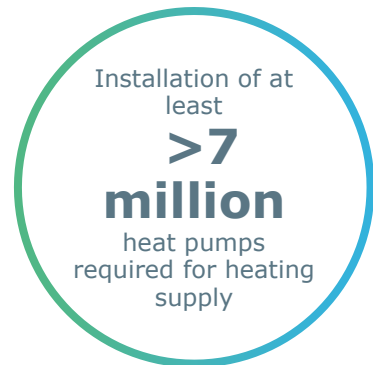
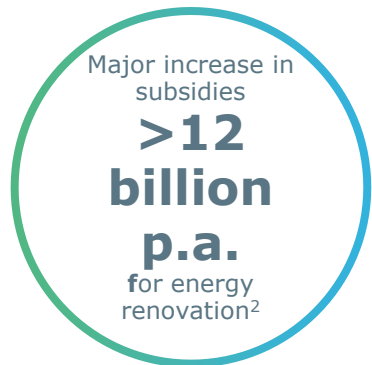
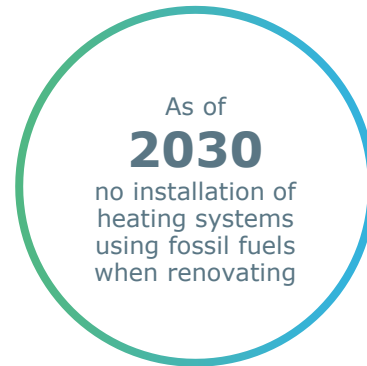
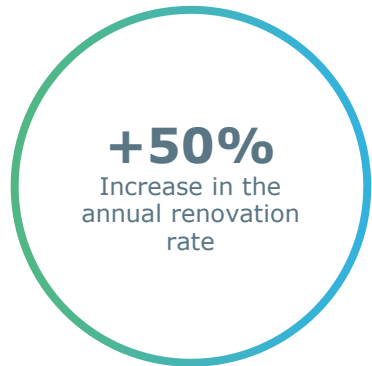




## Challenge

# Climate targets for 2045 and climate legislation of the EU and federal government will yield major effects and opportunities in the building sector

## Possible<sup>1</sup> levers for achieving the goal (excerpt)



The **shift needed** to combat climate change **offers great opportunity** for innovation in the building sector

1. possible levers, in some cases currently not yet legally binding - legislation expected to be tightened in line with the measures outlined

2. based on political appeals by Agora Energiewende

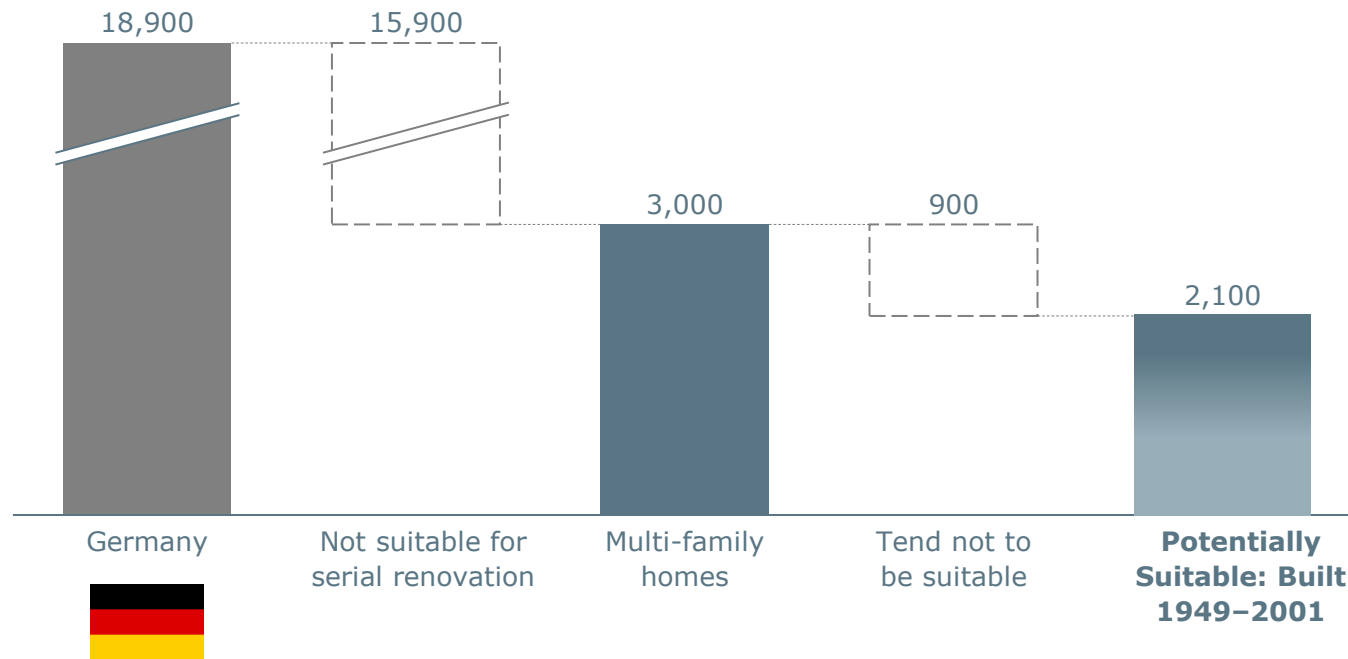
Source: Federal Government; dena; Agora Energiewende

## Market potential

### 2.1 million MFH in Germany potentially suitable for serial renovation due their age – huge market potential

#### Building stock in Germany

in 000's



Note: MFH = multi-family house

1. single-family houses and terraced houses with additional potential are not included.

Source: dena Building Report 2019, destatis, Housing and Environment Institute

#### Core implications

- Building stock in Germany at **18.9 million buildings**
- Of which approx. 3.0 million **multi-family houses (MFH)** as primary focus for serial renovation
- **Aged structures** are best suited for serial renovation
- In Germany, up to **~2.1 million MFH (~70%)** can benefit from serial renovation

# Opportunity Climate Targets 2045

## Core elements of serial energy retrofitting ...



E2E control of the process



Interdisciplinary planning



Solution scalable across building types



High degree of prefabrication



## ... with significant advantages over the traditional method



Lower renovation costs



Significantly shorter construction time on the building



Increased tenant satisfaction



Less rent rebates/vacancies



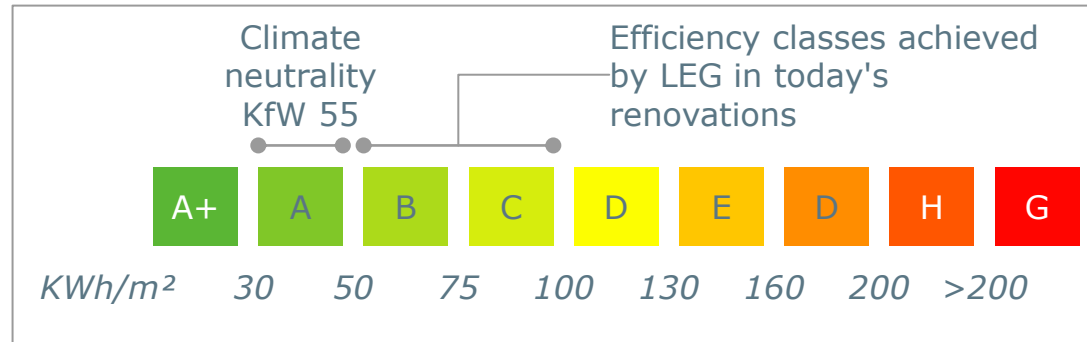
Waste reduction



## Solution

# Serial renovations with KfW/BEG 55 as the level of ambition for climate neutrality

### Energy certificate Energy efficiency classes



- Climate pathways for Germany show that **climate neutrality in the building sector is only possible** through much more comprehensive measures.
- **KfW efficiency house standard 55** common approximate value for climate neutrality in the building sector
- Measures in the KfW 55 standard include both the **renovation of building components** (e.g. façade, windows) and **systems engineering** (e.g. heating, ventilation, line).

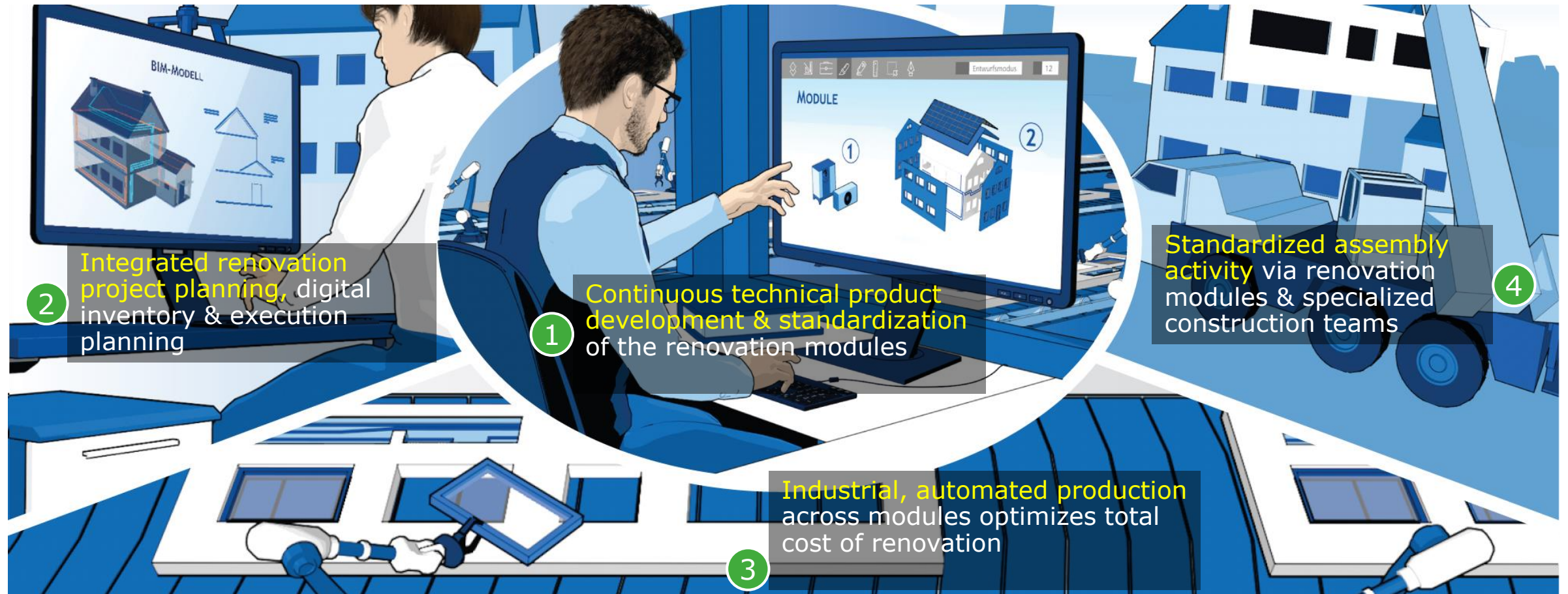
### Ambition level for Renowate solution

#### Achievement of "class A" energy efficiency (Proxy: BEG/KfW 55)

- Complete energy renovation of the building envelope
- Plant technology optimization, incl. heating exchange
- Avoidance of CO2 costs for tenants and landlords

## Solution

# Industrialization and serialization of energy renovation as the best approach to managing renovation volumes





# Solution

1

# Product development & standardization



**Insulation facade**

**Replacement windows/ doors**

**Insulation basement (ceiling)**

**Insulation roof**

**Structure PV/Solar**

**Ventilation system installation**

**Line renovation**

**Renewal heating**



# Solution

2

# Overall cross-module planning

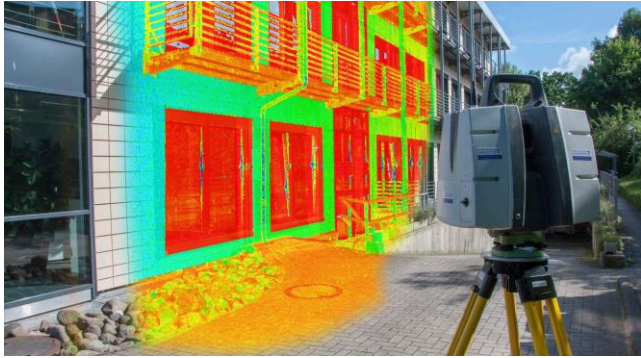


## Target image

i

### Inventory of the buildings

- 3D scan of the existing building and digital recording of its technology
- Transfer to digital tool for planning or module production (BIM vs. PLM) for further renovation process



ii

### Cross-module planning

- Technical planning of the refurbishment solution across trades
- Planning of the renovation modules incl. preparation of CAM drawings
- Execution planning of the assembly activities incl. logistics planning



+

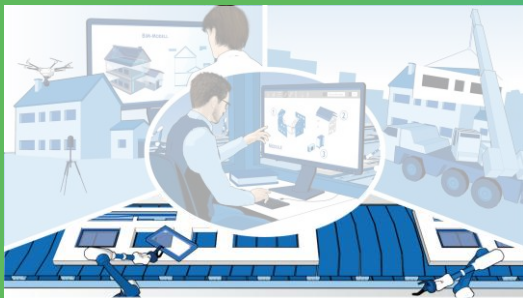
### Interface to product development

- Feedback loop from rehabilitation planning in product development regarding technical design of the modules
- Integration of developed modules in BIM for use in planning

# Solution

3

# Industrial, automated manufacturing



## Target image

- i **Prefabrication of building envelope and roof modules**
  - Automated production of façade elements incl. insulation and windows based on BIM model
  - Production of the roof modules incl. integration of PV/solar systems
  - Direct ventilation system and line integration into façade elements according to TGA planning

- ii **Kitting of the individual parts into renovation modules**
  - Assembly of the renovation modules (i.e., building envelope, roof and heating) per project for logistics
  - Automated kitting of the modules with auxiliary materials
  - Just-in-time loading of trucks with building-specific renovation modules

### Interface to product development

- +
  - Feedback loop from production to product development on technical limitations of production or automation possibilities
  - Optimization of the renovation modules regarding production efficiency/automation



# Solution

4

# Standardized construction



## Target image



### Preparation of site and building

- Standardized & just-in-time preparation of building sites for assembly team
- Preparation of the building stock for assembly activities (e.g., balcony cutting)



### Carrying out module assembly

- Standardized (scaffold-free) assembly of façade and roof elements and heating according to the execution plan
- For tenants minimally intrusive replacement of the windows & line/cable connections incl. a few hours in apartment
- Reduction of onsite construction time to a few days (5–10) instead of several months



### Interface to product development

- Feedback loop from assembly to product development regarding technical limitations in assembly activities
- Further development of the modules for easier assembly



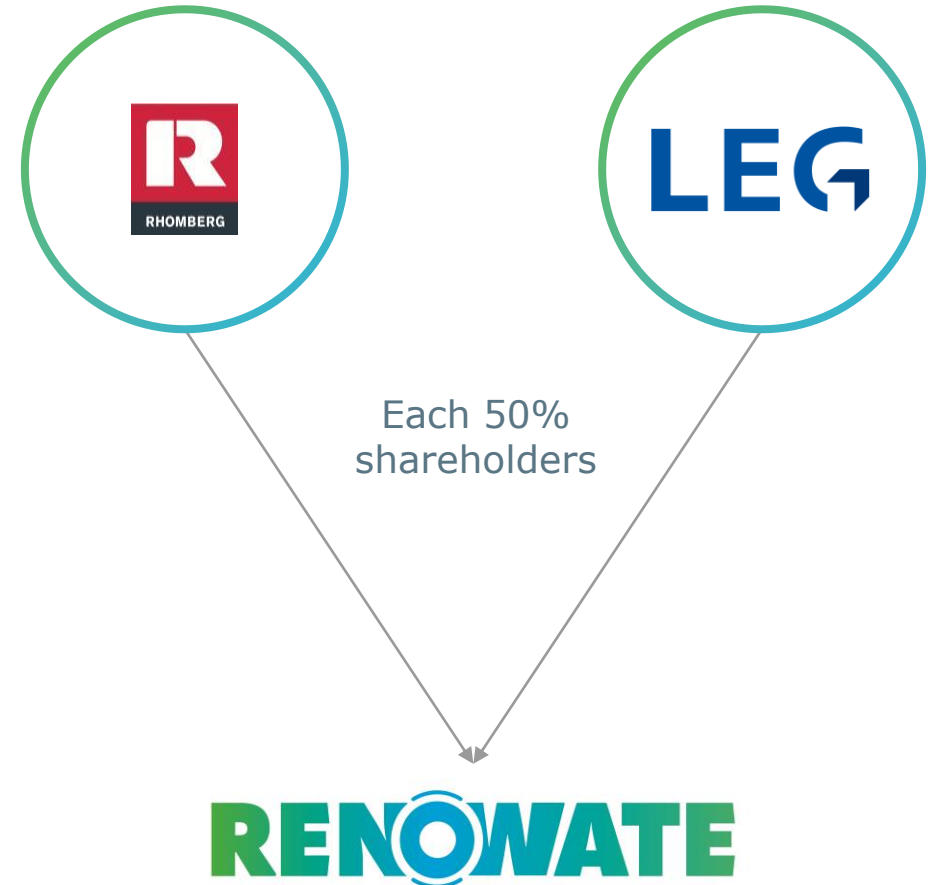
# Renowate Ltd.

## Overview

Renowate GmbH combines real estate knowledge and more than 166,000 existing apartments from the LEG with decades of planning and construction experience of the Rhomberg Group.

Renowate currently consists of 2 managing directors and 12 employees (as of 09/01/2022). Established as a joint venture in January 2022 with locations in Düsseldorf (DE) and Bregenz (AT), it plans to grow to about 25 employees by year-end 2023.

Renowate's goal is to be the decisive solution provider in the field of serial energy-related renovation. This is to be achieved through holistic customer care in the concept of "Renovation as a Service".



# Renowate's target USPs

- Solution provider for housing industry CO2 reduction in DACH
- Holistic renovation approach can be implemented in a short period of time
- Digitized value chain throughout the entire processing time
- Unique renovation-as-a-service approach that relieves clients of the red tape by taking over services
- Client services from a single source
- Taking over services such as tenant communication, subsidy advice and application, etc.

# Renowate Ltd.

## Renowate pilot properties

### Zeppelinstrasse, Mönchengladbach



### Vossenbäumchen. & Frankenfeld, Mönchengladbach



### Canadian Housing Complex, Soest





