

Capital Markets Day 2017

Modular Construction



High Performance

Identify possible building spaces or building modification opportunities within minutes

High Accuracy

Identify valuable development areas and building gaps

Acquisitions

Quickly determine value of new vacant lots of own property potential



The automatic identification of possible building spaces is currently unique in the **housing industry**

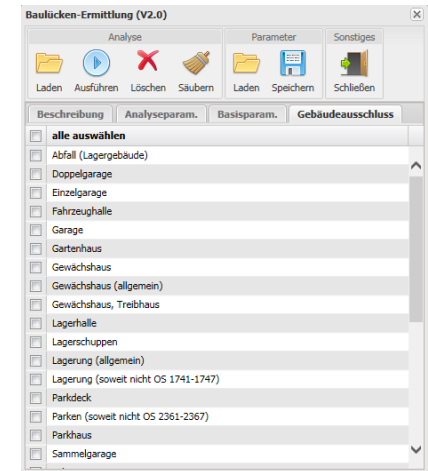
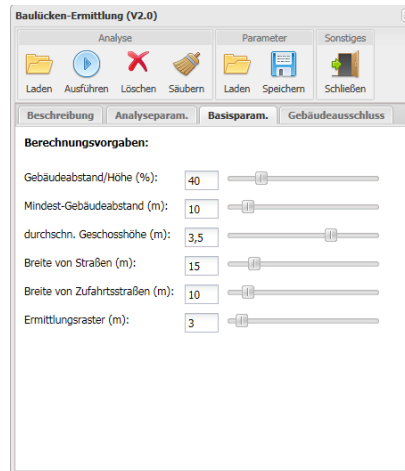
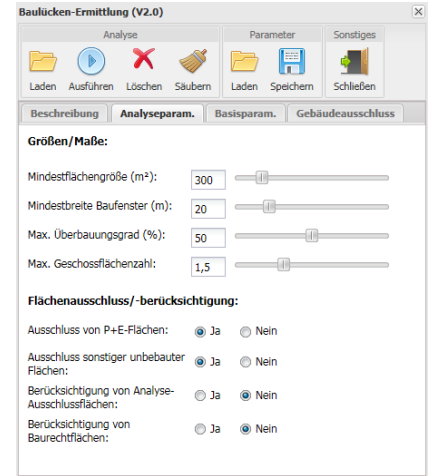
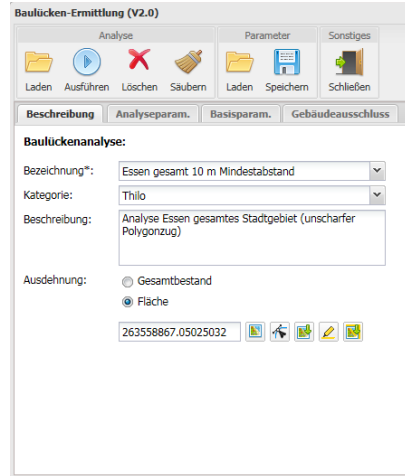
Identifying Building Potential

How the tool works

Multiple parameters

Structured potential analysis

Quick and precise results



High potential on own areas available

- **26,400 land parcels** with 41.1m sqm
- Concepts for living space need building land
- **Densification** in existing quarters

Vonovia building gap tool

- The automated building gap tool is **unique** in the real estate sector
- It identifies **potential construction areas** within minutes and with **very high accuracy**
- The tool provides a **first overview**
→ Construction areas identified must be checked manually

Accurate fitting

- Innovative serial modular construction can be used in a **variety of applications on existing areas**
 - The modular construction system allows an **individual adaptation** to every project and area
 - **Short construction** period due to high degree of prefabrication
- Fast and affordable

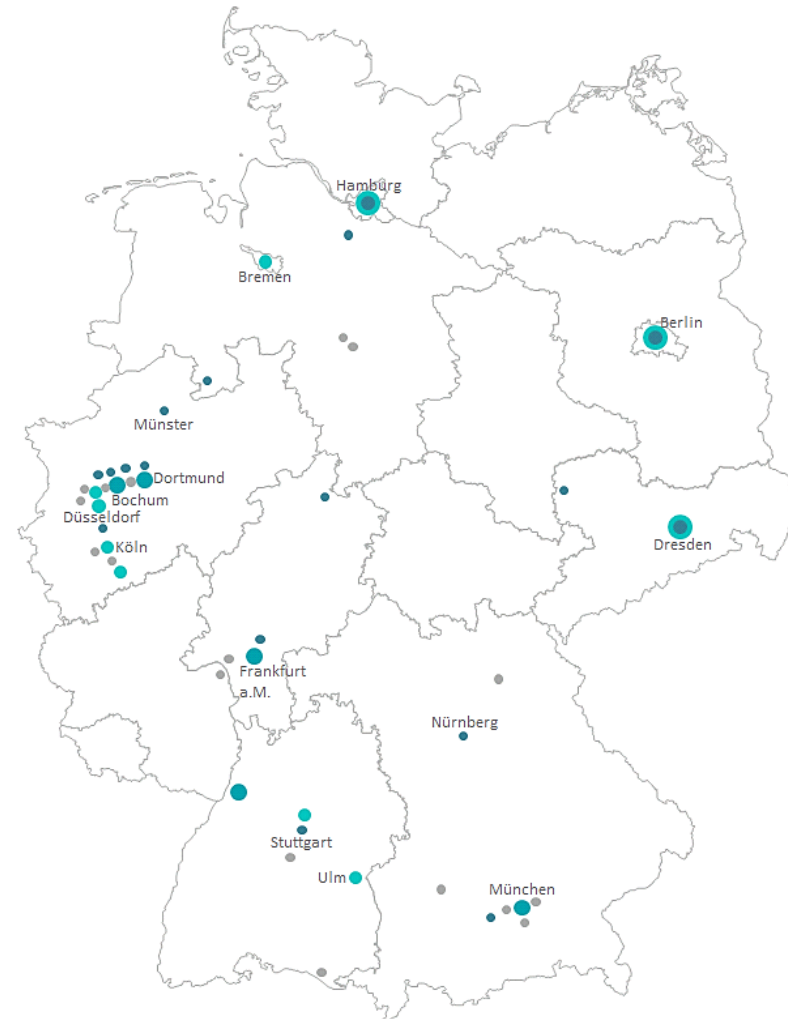


Densification Potential

Various attractive locations across Germany

High Densification Potential

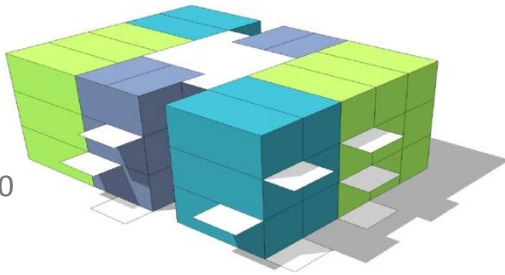
High densification potential especially in the conurbation areas of Germany like Berlin, Hamburg and the Ruhr area.



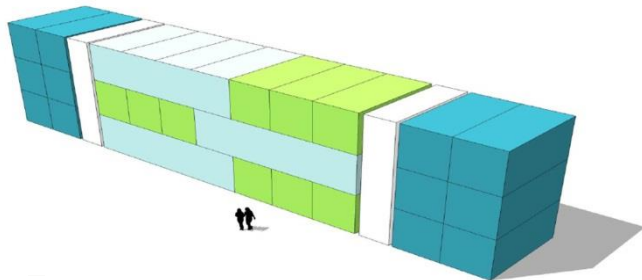
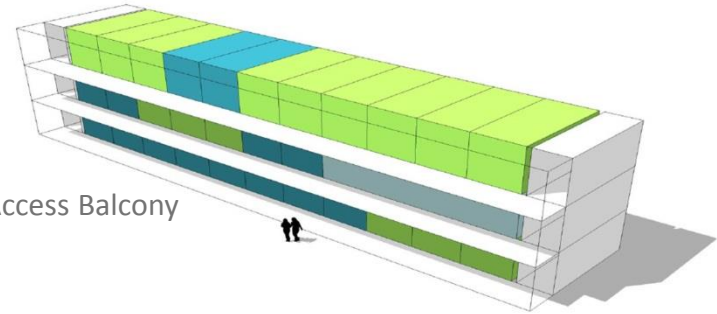
Modular Construction System

Building types

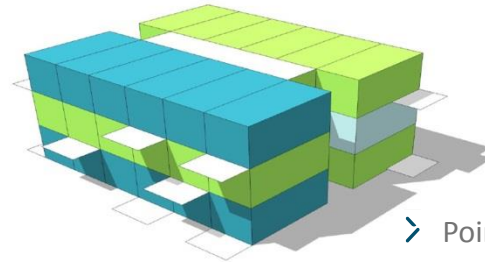
> Point Building 1.0



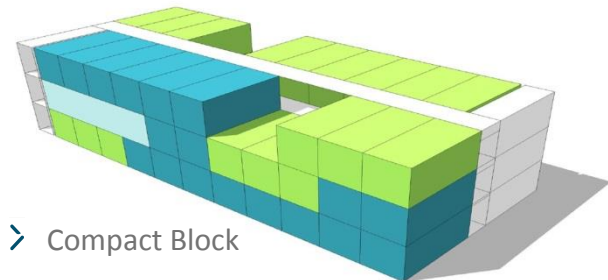
> Access Balcony



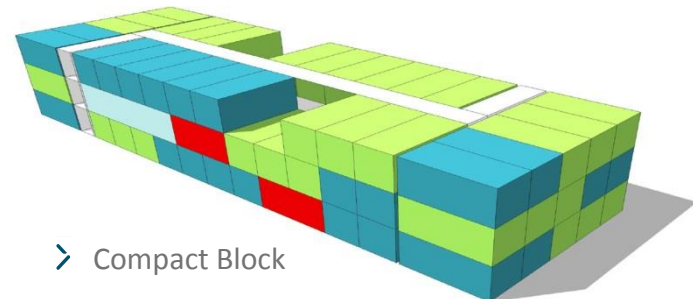
> Two or more flats per storey/stairwell



> Point Building 2.0



> Compact Block



> Compact Block

Modular Construction System

Module types

wood module



steel module



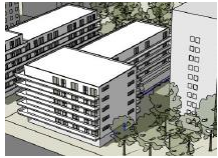
concrete module







Alt Tempelhof, Berlin



Freiburger Straße, Dresden



Holsteiner Straße, Bremen



Am Ziegelanger, Landsberg am Lech
40 units, 5 floors
2,758 sqm living space
€4.96m invest



Metzger Straße, Dortmund
14 units, 4 floors
947 sqm living space
€2.0m invest



Kaulbachstraße, Bochum
3 x 14 units, 4 floors
2,841 sqm living space
€5.6m invest

Imigstraße, Dortmund
19 units, 4 floors
1,133 sqm living space
€2.12m invest



Insterburger Straße, Bochum
14 units, 3 floors
895 sqm living space
€1.65m invest



design

preparation

construction

completed



Reicker Straße, Dresden



Spiekerooger Straße, Wiesbaden



Unverhofftstraße, Dortmund



Am Jägerpark, Dresden



Am schwarzen Steg, Bayreuth
20 units, 4 floors
1,300 sqm living space
€2.44m invest



Am Trappenhof, Bottrop
15 units, 3 floors
1,228 sqm living space
2.2 Mio. € invest



Storkower Straße, Berlin
105 units, 7 floors
9,230 sqm living space
€16.5m invest



Knorrstraße, Frankfurt
District development (non-serial)
2 Storey Addition (8 units)
3 New Buildings (32 units), 6 floors
€10.4m total invest (including modernization)



Blankensteiner Straße, Dortmund
Storey Addition
Element Construction
222 sqm living space
4 units
€0.4m invest

Full Coverage

By working with **several partner companies** a **comprehensive, national implementation** of serial modular construction is possible.

- **Cost optimization** as a result of shorter transport distances.
- Development of **benchmarks** by testing different materials and construction methods.

Continuous Improvement

Continuous optimization of the ground plans in collaboration with architects and module manufacturers.

We will use conventional construction methods where we cannot build with modules.

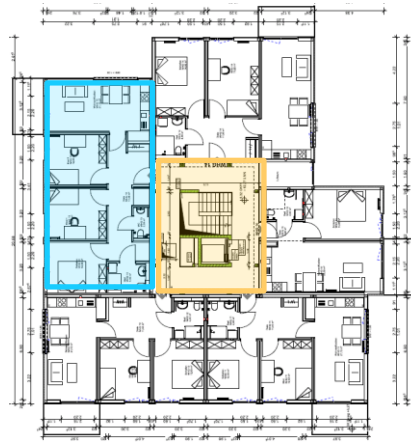
Continuous Improvement

From point block building 1.0 to point block building 2.0

Ground Floor



Attic Floor



Building view



Insterburger Str., Bochum



October 2016

Modification

January 2017

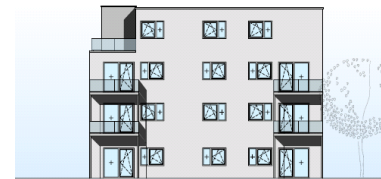
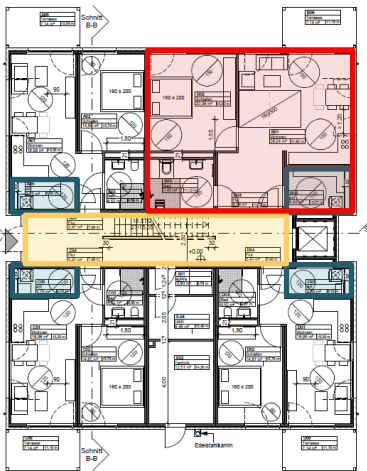
Cellar replacement rooms in the apartments

Ground plan adjustment of the wheelchair accessible apartment

General reorientation of the building

General adjustment of the ground plans

Roof terrace



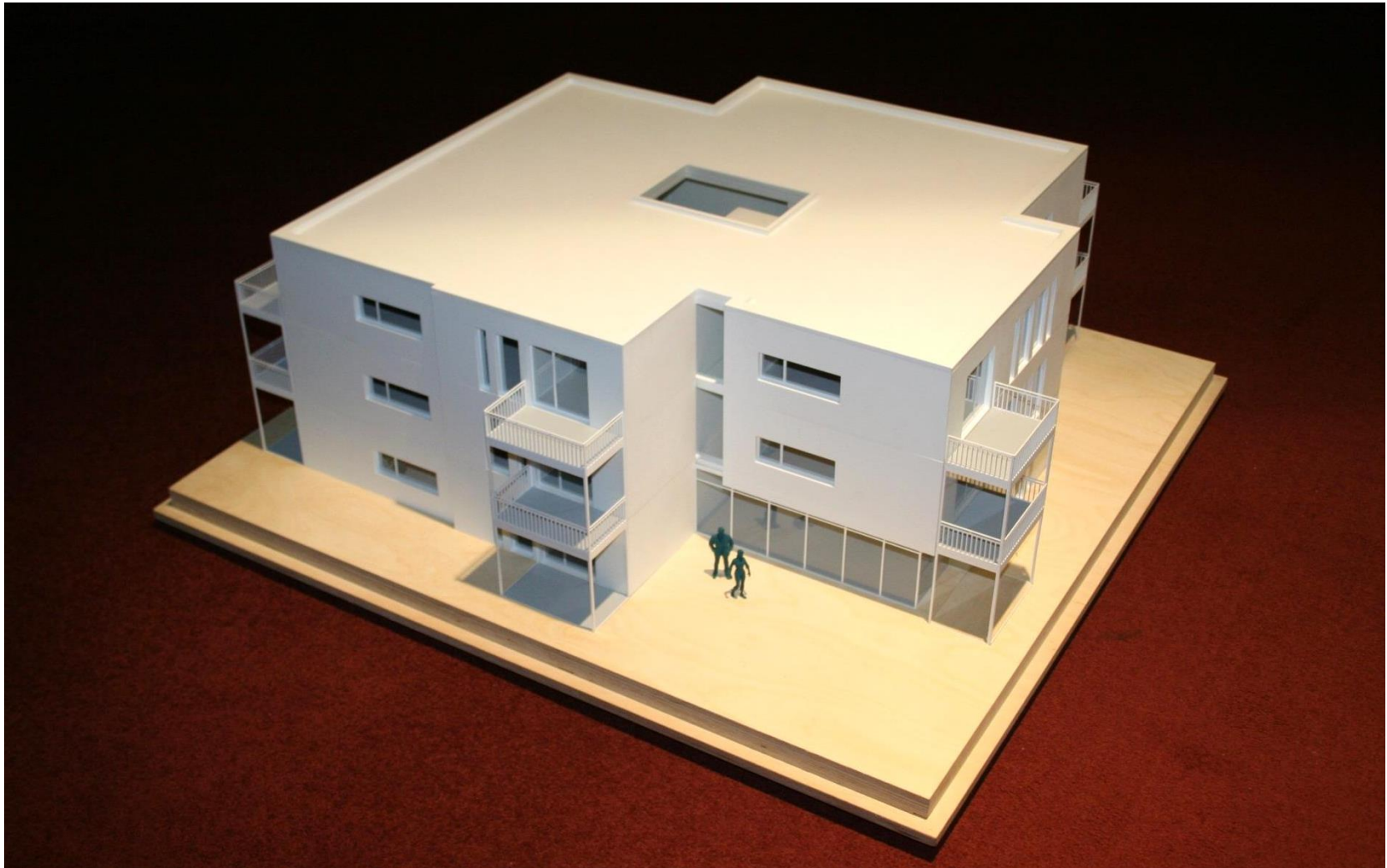
Imigstr., Dortmund



Completed new building

Insterburger Straße, Bochum

VONOVIA

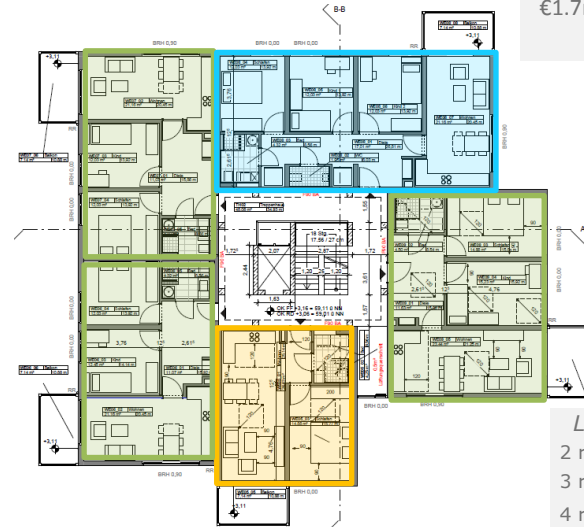


Completed new building

Insterburger Straße, Bochum



Insterburger Straße, Bochum
14 units, 3 floors
€1.7m invest



Completed Storey Addition

Blankensteiner Straße, Dortmund

Before



After



Completed Storey Addition

Blankensteiner Straße, Dortmund



Blankensteiner Straße, Dortmund

Floor Addition
Construction elements
4 units
€0.4m invest



Benefits of Modular Construction

Modular construction vs. conventional construction

Time savings

The total construction time is significantly shortened due to the high degree of prefabrication → earlier letting

Low total cost

The high degree of prefabrication and standardization minimizes the total cost by material savings and staff savings

High flexibility

Using the standardized modules, different types of apartments and building materials can be implemented and a high-quality living space can be created.

Better quality

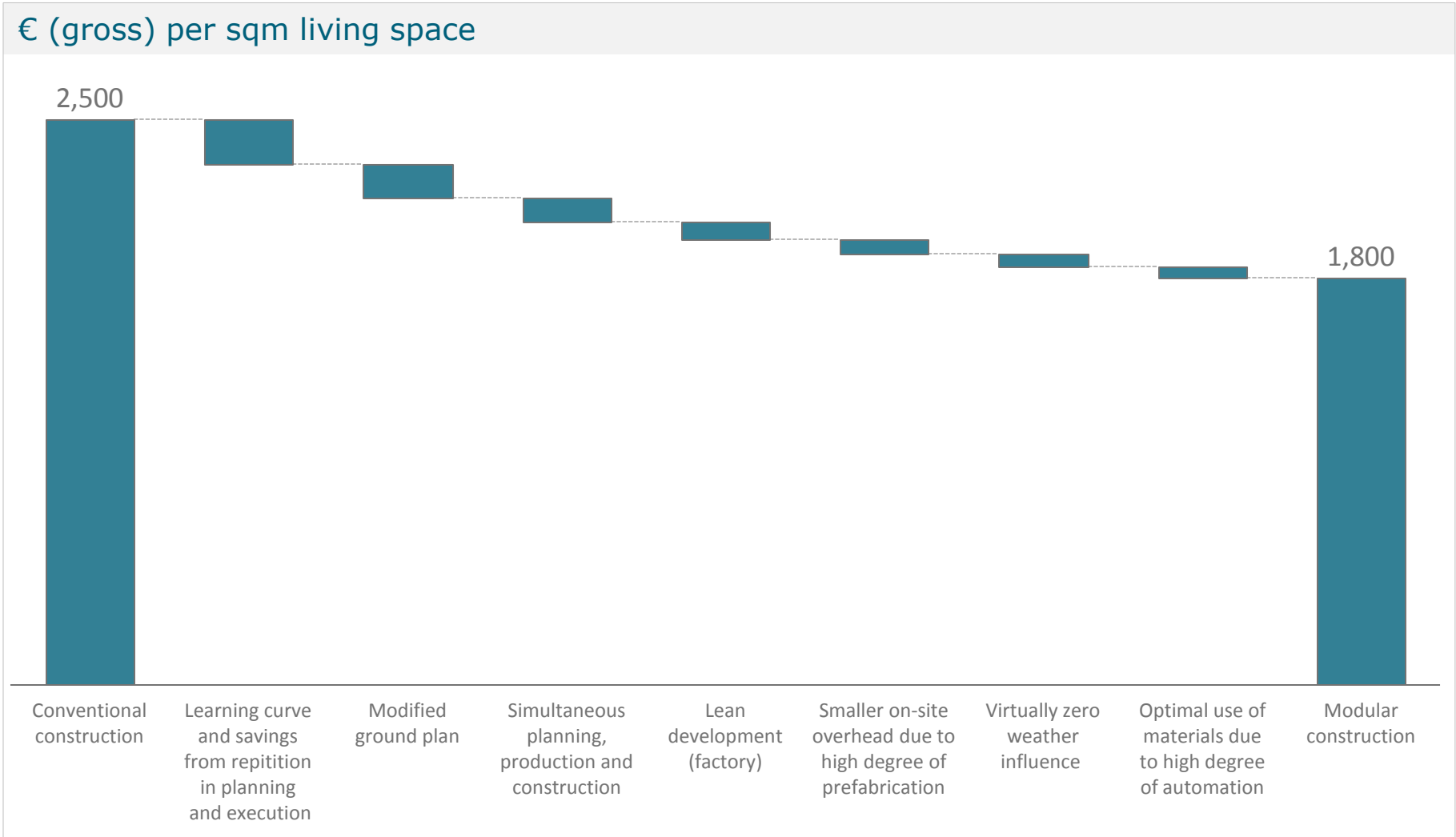
Due to the serial prefabrication, in which ceramics, windows and radiators are already installed, every single manufactured module corresponds to the required quality.



By using serial modular construction we can **add new square meters on our own land** quickly and cost-efficiently while providing attractive accommodations at market rates. The short construction time allows an **earlier letting and significantly increases the acceptance among neighboring tenants** in comparison to conventional constructions.

Benefits of modular construction

Cost reduction



Based on own assessment

Current Project

Imigstraße, Dortmund

Key-Facts:

- A building of **24 steel modules**, which are over 18 meters long
- Total construction time on site: **3 months**
- Start planning: Aug 3, 2016
- Submit planning application: Nov 3, 2016
- Building permit: Feb 21, 2017
- Completion: Jul 4, 2017
- Inspection: Jul 28, 2017
- Rental start: Sep 1, 2017
- **19 residential units** with 2–4 room apartments between 49 and 88 sqm
- Total living space of **1,156 sqm**
- All apartments with balcony or a terrace
- Gas heating with **solar panels** installed on the roof
- Two apartments wheelchair-accessible, all other apartments barrier-free
- All floors are connected by an **elevator**
- New playground and 30 bicycle stands
- Installation time of the modules: **4 working days**



Impressions

Imigstraße, Dortmund



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