

VONOVIA

Capital Markets Day

**The Urban Quarter: Vonovia's Nucleus for Sustainable, Intelligent and
Interconnected Housing**

September 28, 2023

Agenda

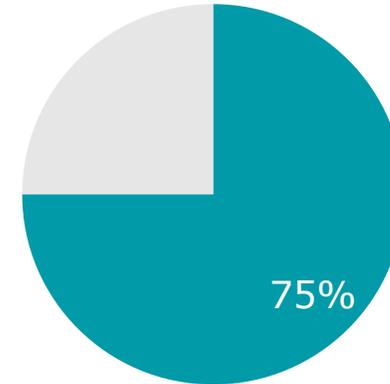
1. Setting the scene
2. Solar (PV / Photovoltaic)
3. Outlook: Energy and Technology

Setting the Scene

In residential real estate, an urban quarter is usually defined as a cohesive urban structure that is considered by its inhabitants as a self-contained area. It is the predominant aggregation level where a real estate company can make the biggest difference and most positive contribution for inhabitants.

In concrete terms, this means, depending on demand:

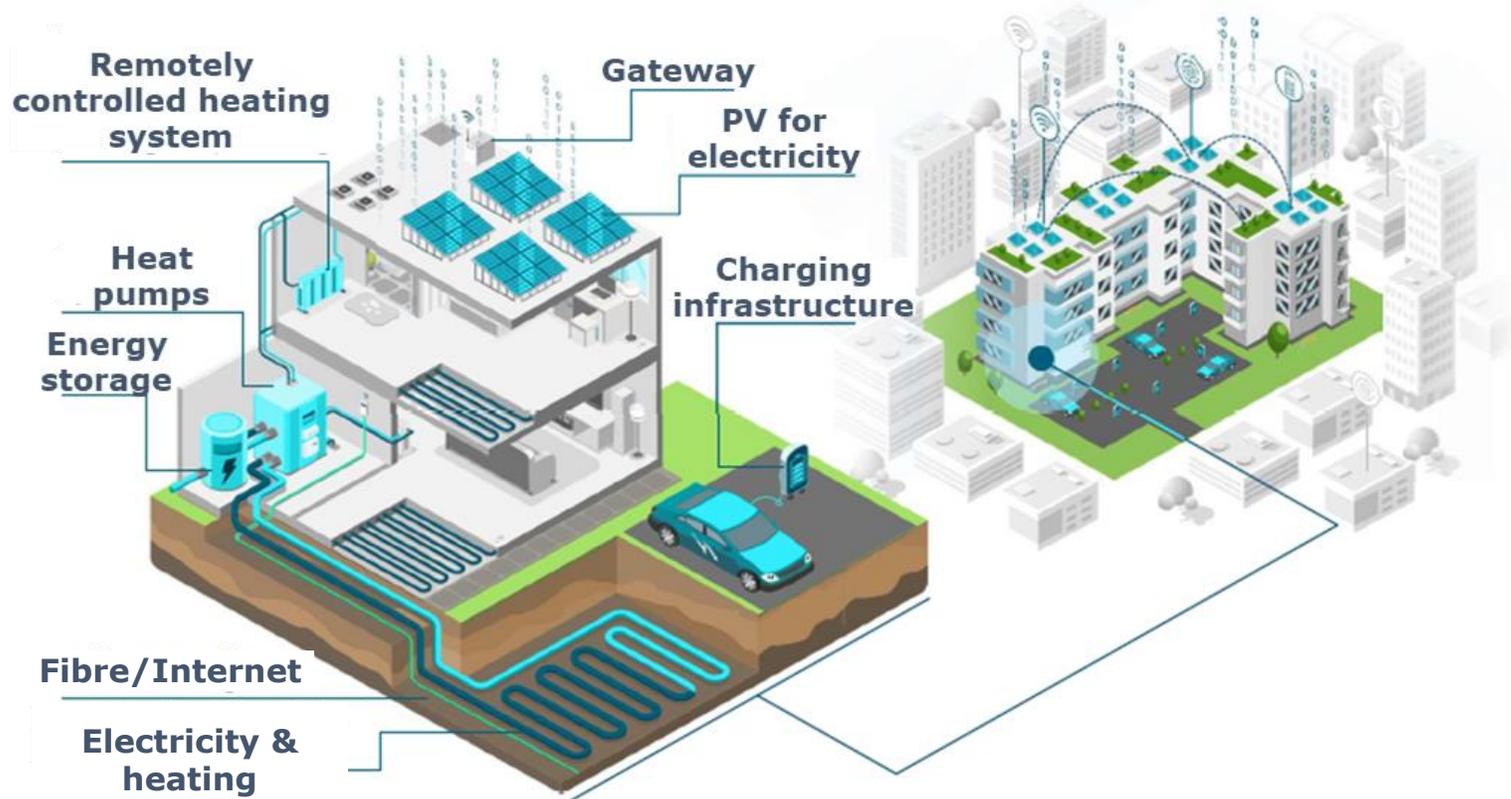
- Creating affordable homes by means of vertical expansion, densification and new construction
- Implementing modernization in a socially responsible manner
- Optimizing the energy requirements of our portfolio
- Defining the residential environment in an integrated way, including recreational areas, playgrounds, and holistic mobility concepts
- Local suppliers, daycare centers, doctors, social and cultural institutions
- Promoting dialogue with tenants and stakeholders in order to encourage acceptance and influence



- 75% of Vonovia's German portfolio is located in urban quarters
- The 792 urban quarters have an average of 460 residential units



Setting the Scene



Within an urban quarter, Vonovia can manage its multi-utility infrastructure somewhat similar to a public utility company, including:

- High speed internet (fibre)
- Distance heating
- Solar (PV / Photovoltaic)
- EV charging infrastructure
- IoT Monitoring
- Submetering

In addition, development of service contracts (b2c) are essential to the investment strategy.

Setting the Scene

The Multi-utility Approach Is Bringing Together Products We Have Talked About In the Past.

Capital Markets Days 2019 & 2022

Operate Vision

1. Use of dynamic data

- > Set up processes on the basis of digital platform information
- > Adding additional technical systems
- > Implementation of predictive maintenance
- > Development of data-driven business models as future prospects

2. Use of static data

- > Optimize logistics and maintenance processes by using digital building twin
- > Example: Elimination of multiple trips to customer / work site as the digital building twin holds all the information as to what material needs to be used

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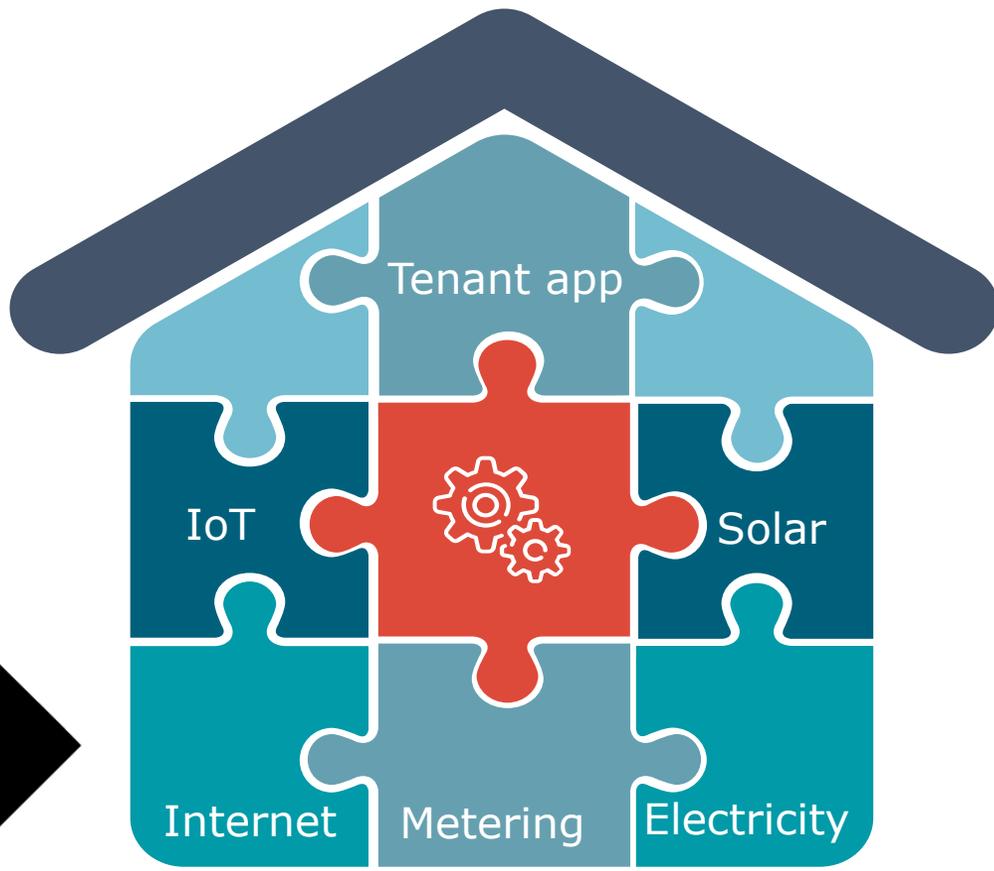
Highly Relevant Use Case
IoT Offers Great Potential for Remotely Monitoring Heating Systems

Rollout of IoT-monitoring system ongoing

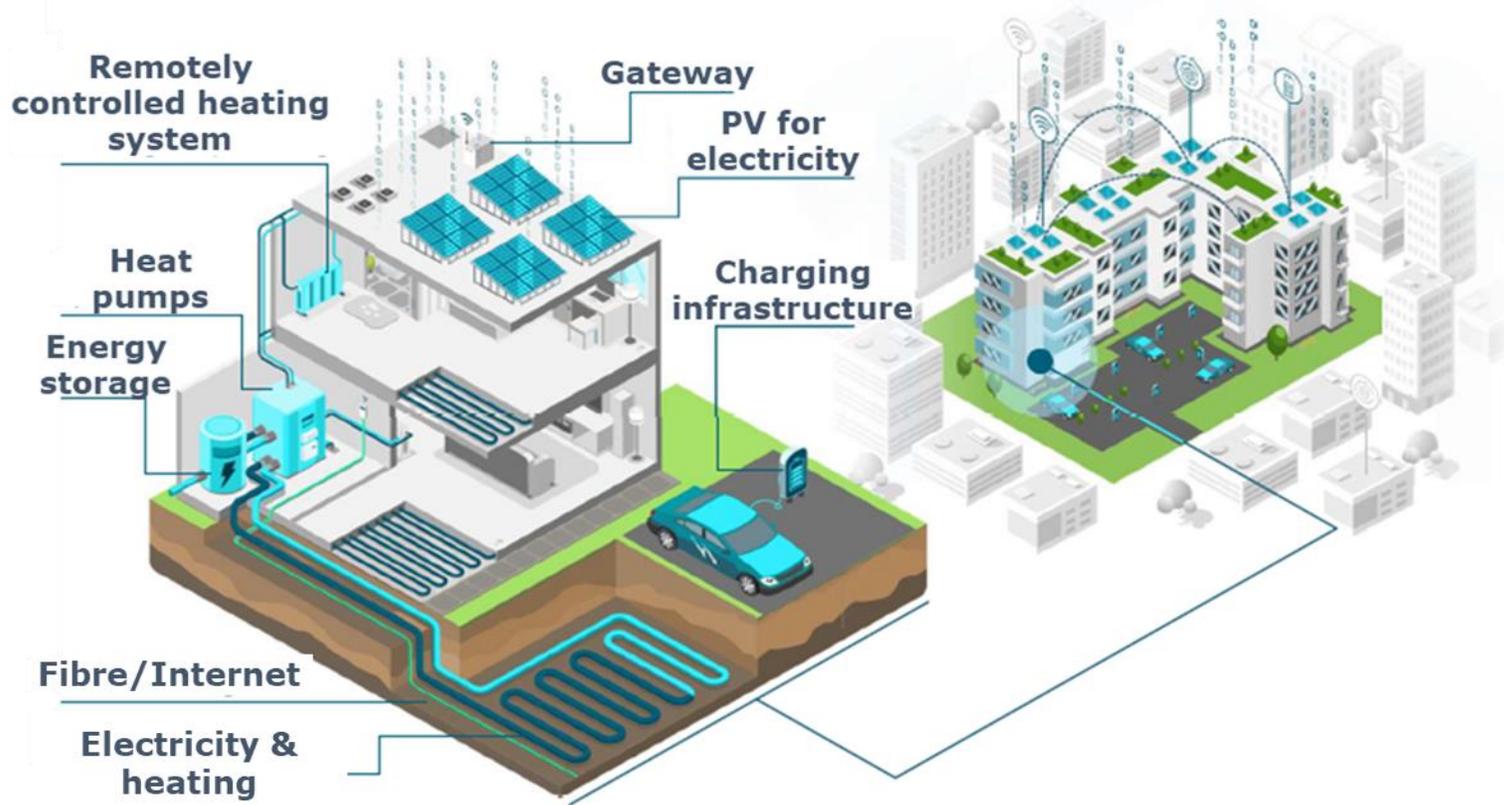
How does the monitoring work in practice?

What is Vonovia doing?

- Reading out of every boiler parameter and visualization in an online platform.
- Remote parametrization of heating systems for system optimization.
- Generation of detailed error reports for exact root cause analysis.
- Direct interface to the heating system of several manufacturers.
- Optimization management to reduce energy consumption and carbon footprint of heating systems (today: a manual process, in the future: smart algorithms).



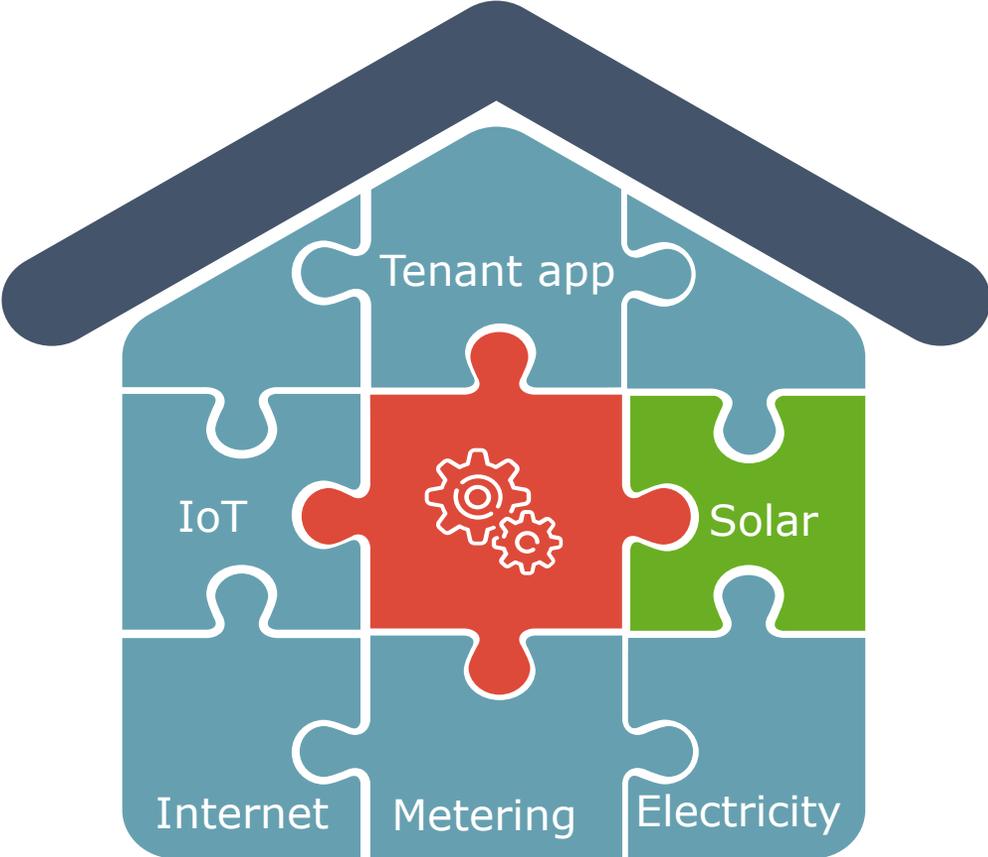
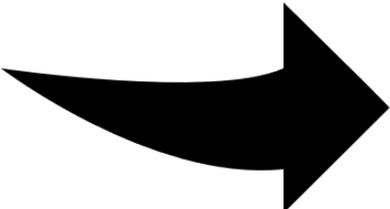
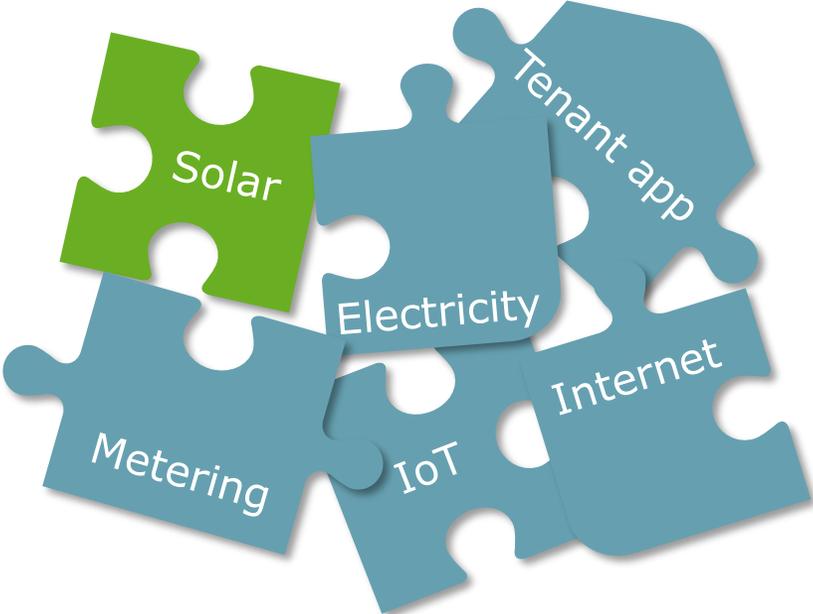
Setting the Scene



Unique positioning enables us to further develop solutions

- Strong contribution to Vonovia's **climate path**.
- **Develop value proposition** to tenants based on strong products for energy and Internet.
- Direct access to tenants allows for easier **monetization of products**, incl. cross and upselling opportunities.
- Recent legislation **improved** regulatory environment for PV based b2c contracts (tenant electricity supply or "Mieterstrom").

Today, let's focus on Solar



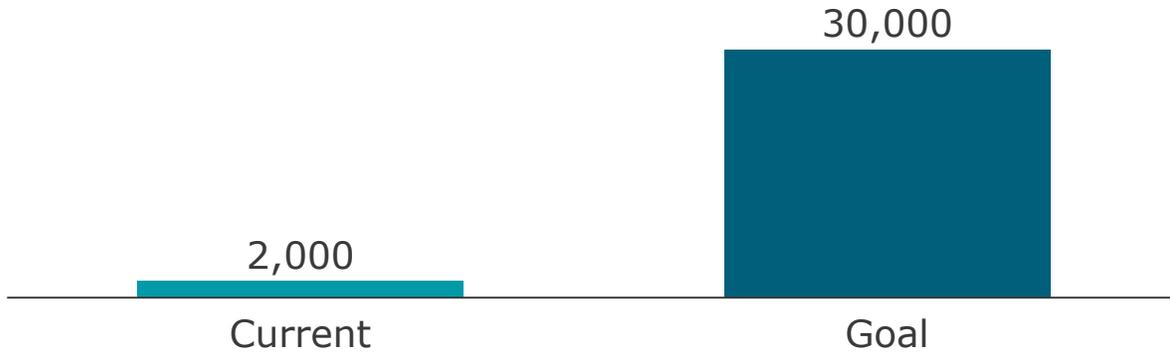
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1. Setting the scene
- 2. Solar (PV / Photovoltaic)**
3. Outlook: Energy and Technology

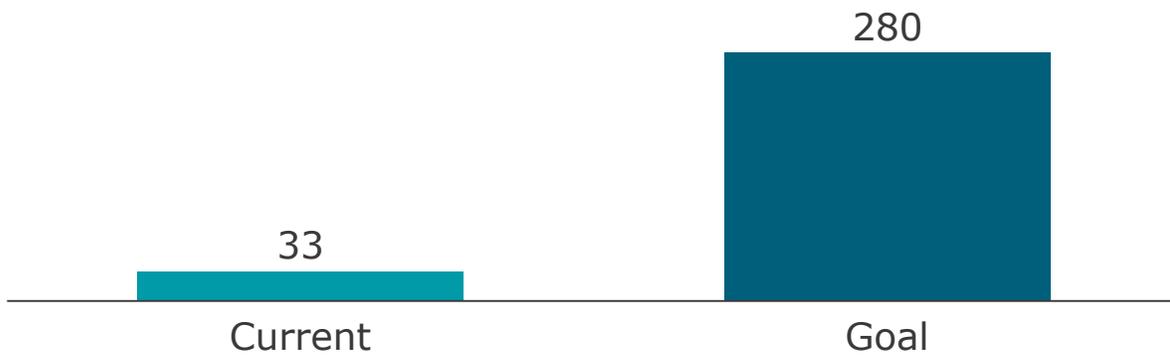
280 MWp by 2030

Landlord-to-tenant Electricity from 30,000 Roofs, with further capacity growth to 60,000.

Photovoltaic installations (number of roofs)



Energy generation capacity (MWp)



Ina Scharrenbach, Construction Minister of North Rhine-Westphalia, made an on-site visit to Bochum to learn more about Vonovia's plans for increasing the use of renewable energy.

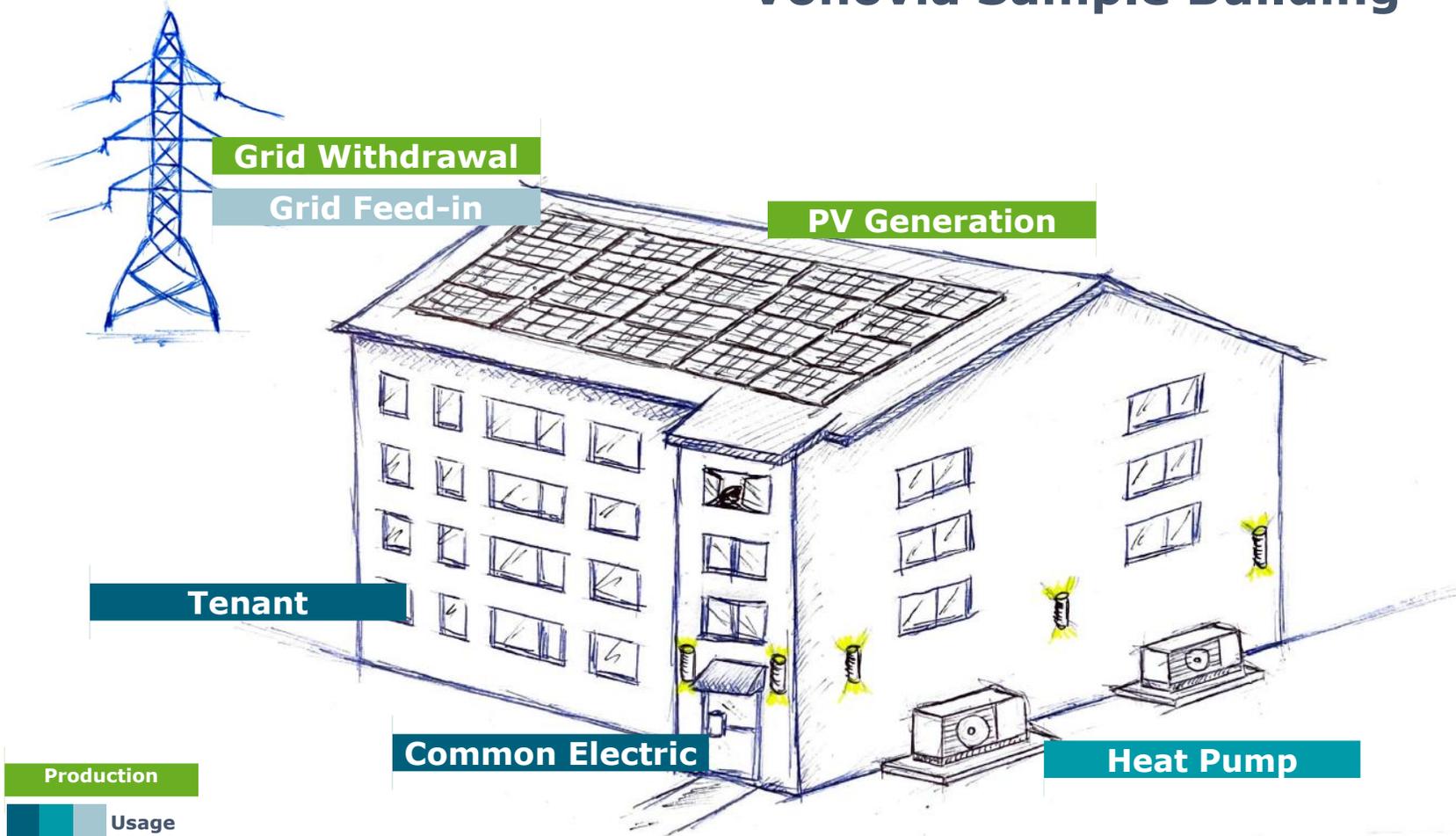


Completion of the 1,000th PV roof in Bochum in 2021

Solar

The Solar Unit Supplies Tenant, Heat Pump, and Common Electricity.

Vonovia Sample Building

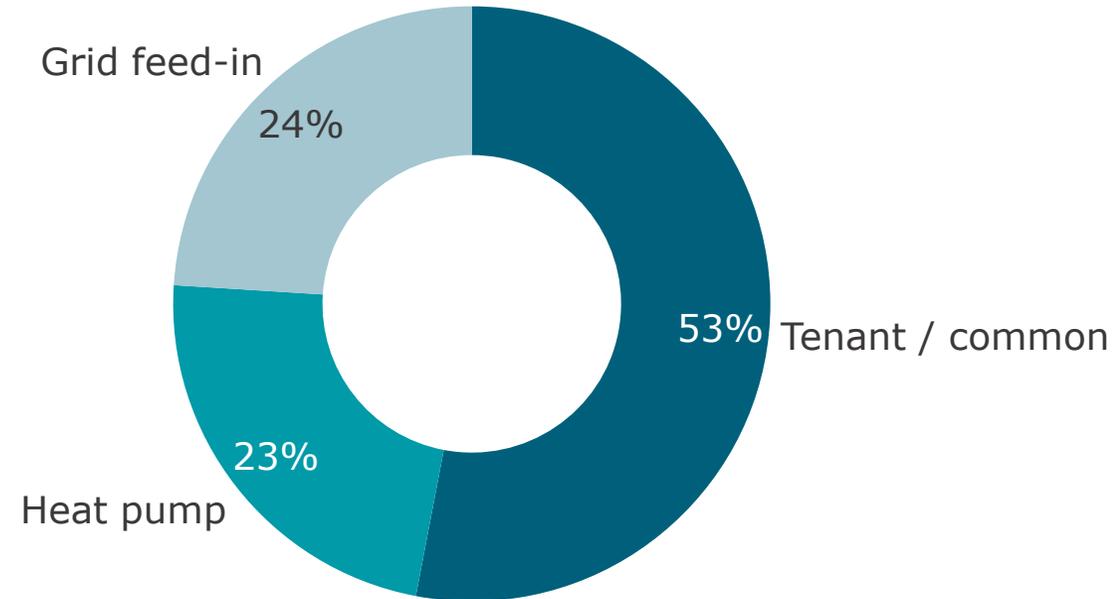
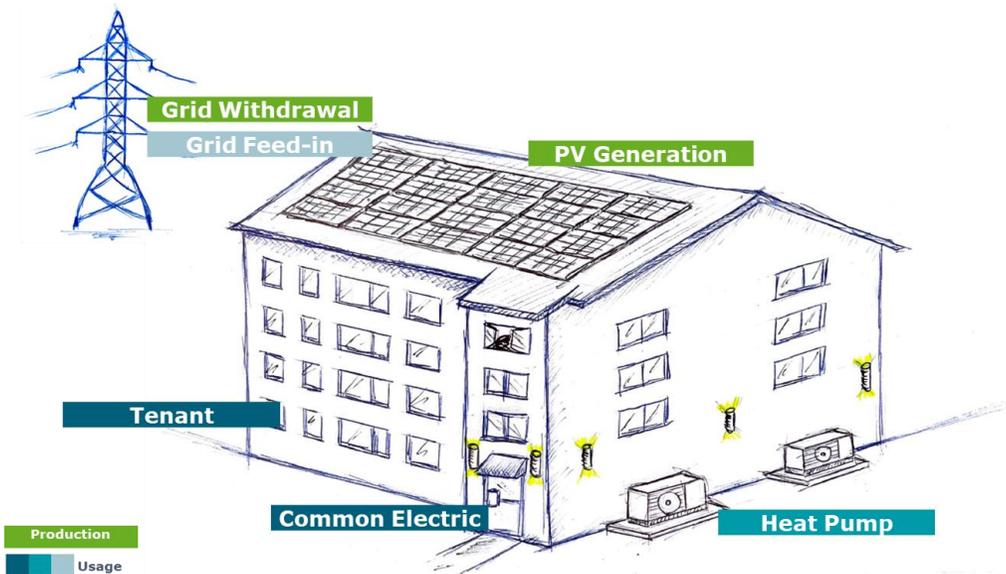


- 16 apartments with a total of 1,000 sqm
- Energy efficiency class C
- Average electricity demand
 - Tenant/common: 28,800kWh
 - Heat pump: 38,676kWh
- Installed PV capacity: 24kWp
- Annual PV generation: 21,600kWh,
grid withdrawal: 51,070kWh
(all data p.a.)

Solar

The Solar Unit Supplies Tenant, Heat Pump, and Common Electricity.

Vonovia Sample Building



Active R&D efforts in storage capabilities will develop solutions to reduce the 24% grid feed-in (Example: Energy Center of the Future in in Bochum Weitmar).

Controlling the Supply Chain is Part of the Scaling Process (Plan-Build-Operate)



We closely monitor markets and market developments regarding hardware products.

We optimize supply chain process to facilitate logistics to the construction site.

Internal craftsmen organization ensures steady flow of project realization.

Sales & marketing alongside commissioning.



Controlling the Supply Chain is Part of the Scaling Process (Plan-Build-Operate)

Project overview



Abbildung: Übersichtsbild, 3D-Planung

Screenshot of 3D planning for PV modules



Abbildung: Screenshot06

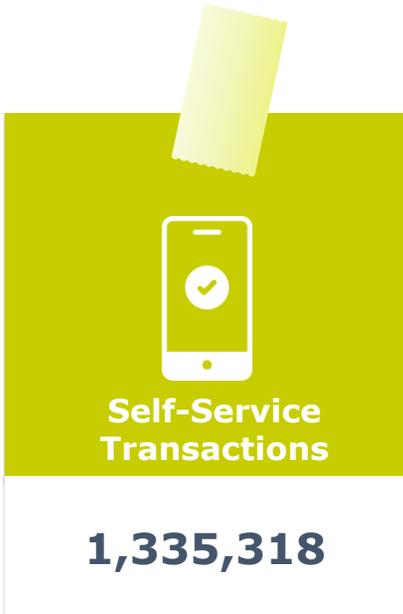
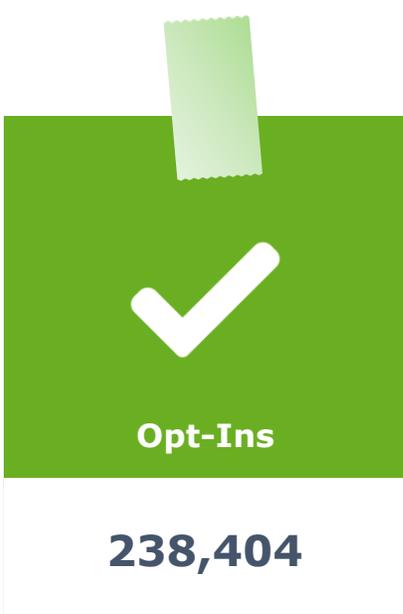
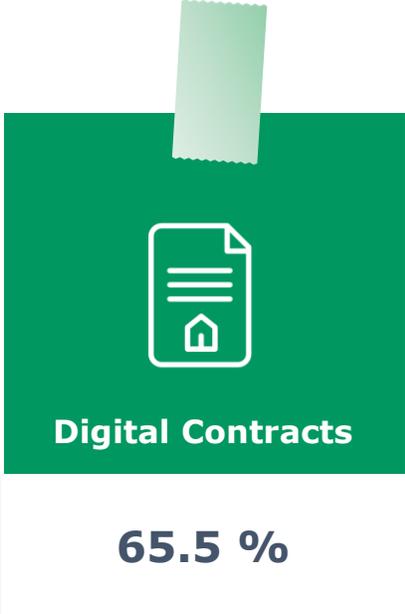
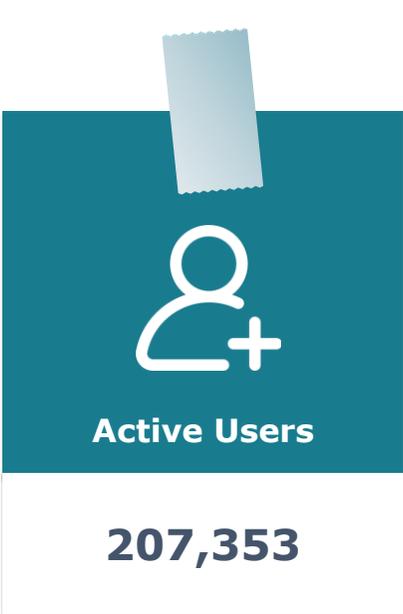
PV Unit

3D View, grid-connected, Solar Installation with electric consumption

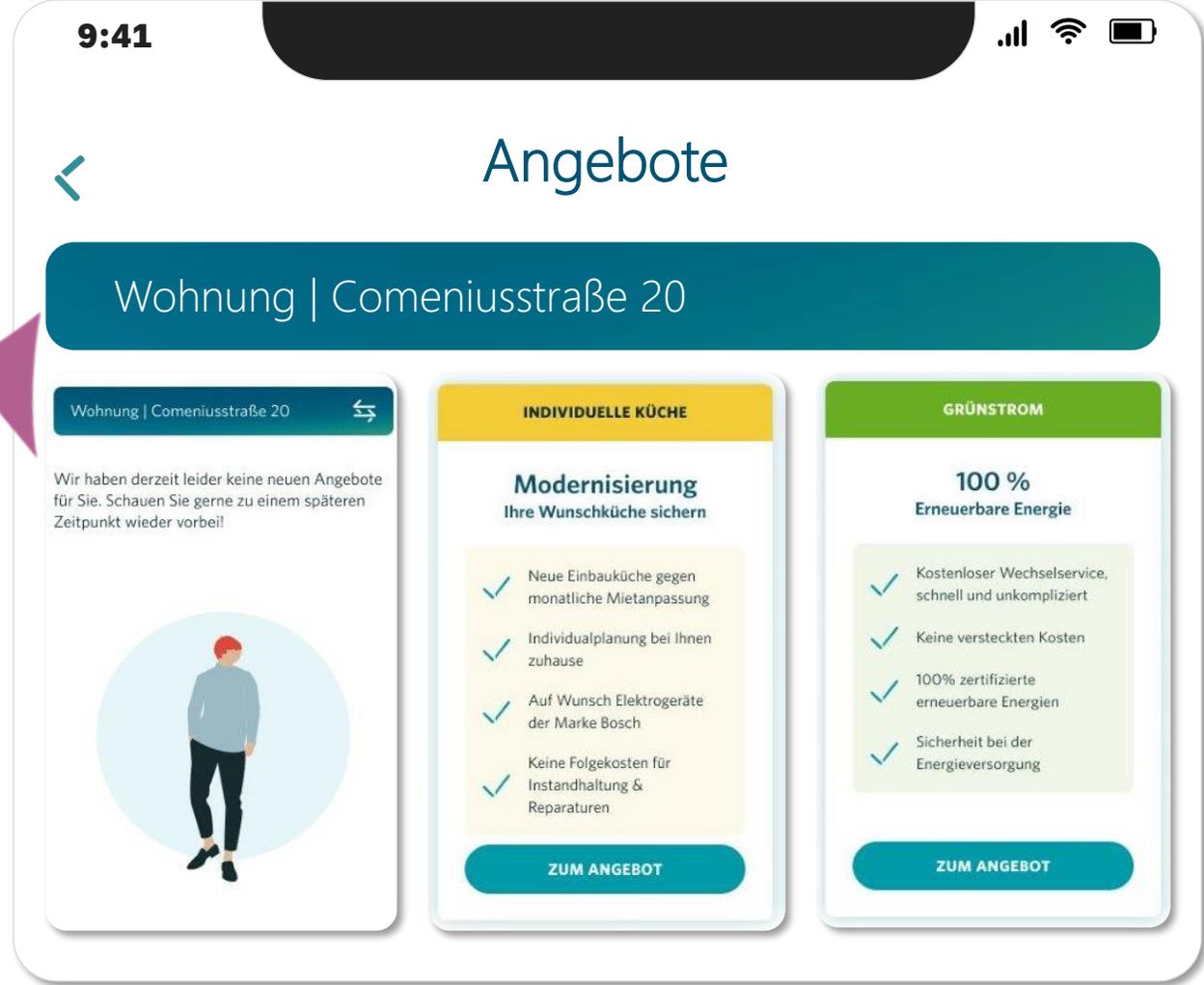
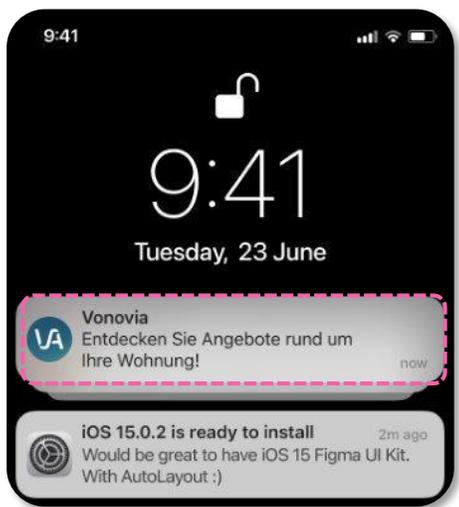
Climate date:	Herne, GER (1995 – 2012)
Source of Data:	DWD
PV-generator power	86,52 kWp
PV-generator area	402.2 sqm.
Number of PV modules	206
Number of Inverters	5

Unique Access to Tenants Is Key to Success

Vonovia's App has...

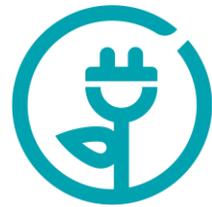


Vonovia's App Brings Product Offerings Directly into the Palm of the Customer



Two Product Offerings with Clear Migration Opportunity

3rd-party green electricity



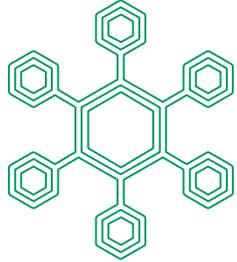
Vonovia green electricity



- Standard „green“ electricity products.
- For sale nationwide.
- Procured internally with own trade desk.

- PV / Solar generated electricity sold directly to the tenant.
- 24 month contract term.

Summary

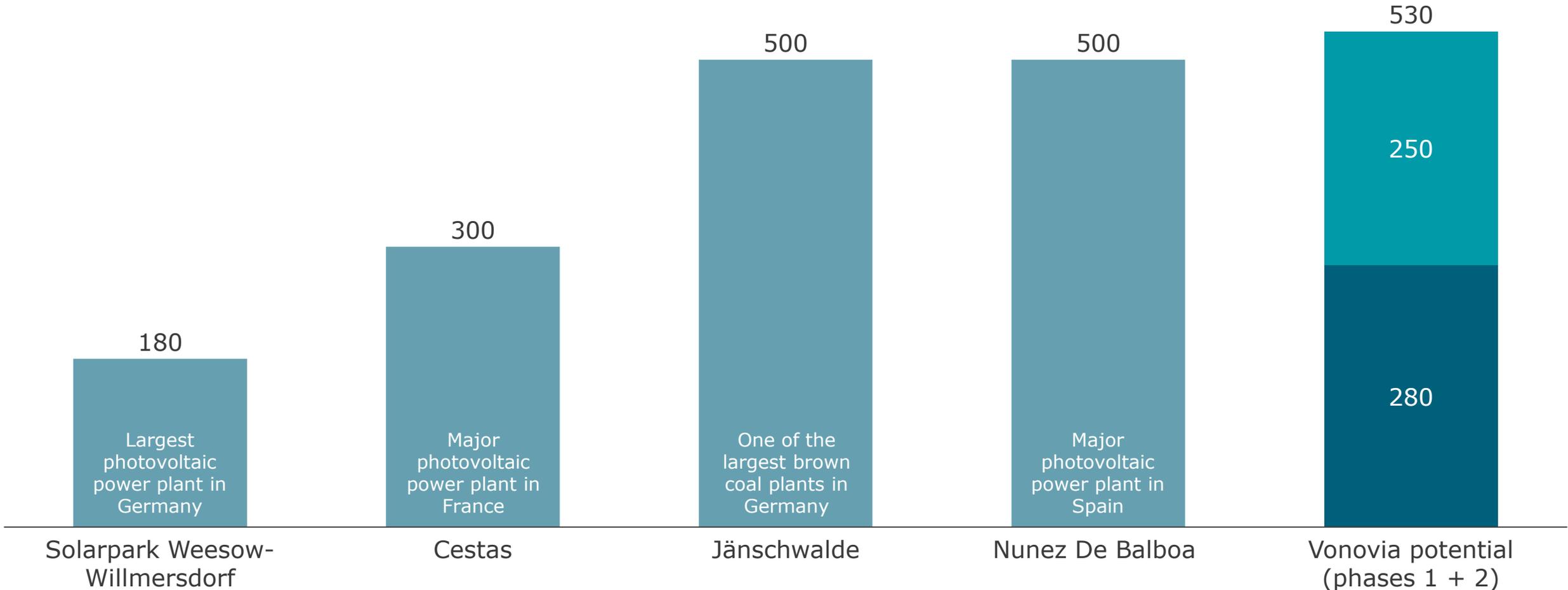


Clear product proposition and migration path from *3rd-party green electricity* to *Vonovia green electricity*

- 1 Simple, digital and transparent.**
- 2 Increase customer satisfaction.**
- 3 Monetization of relationship.**
- 4 Electricity infrastructure already available.**

Vonovia's Portfolio Offers Substantial Potential for Electric Power Generation

Power Generation (MWp)



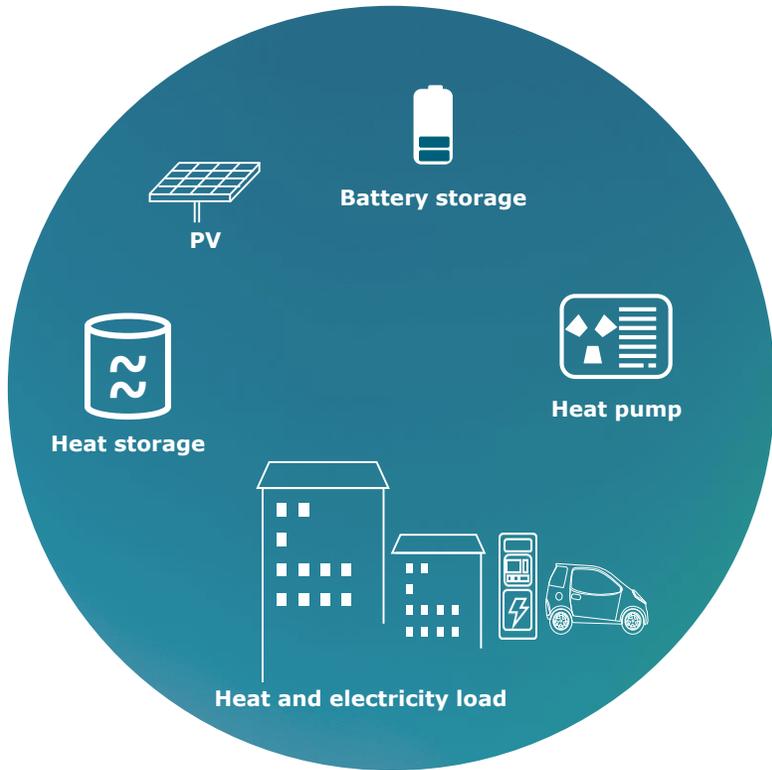
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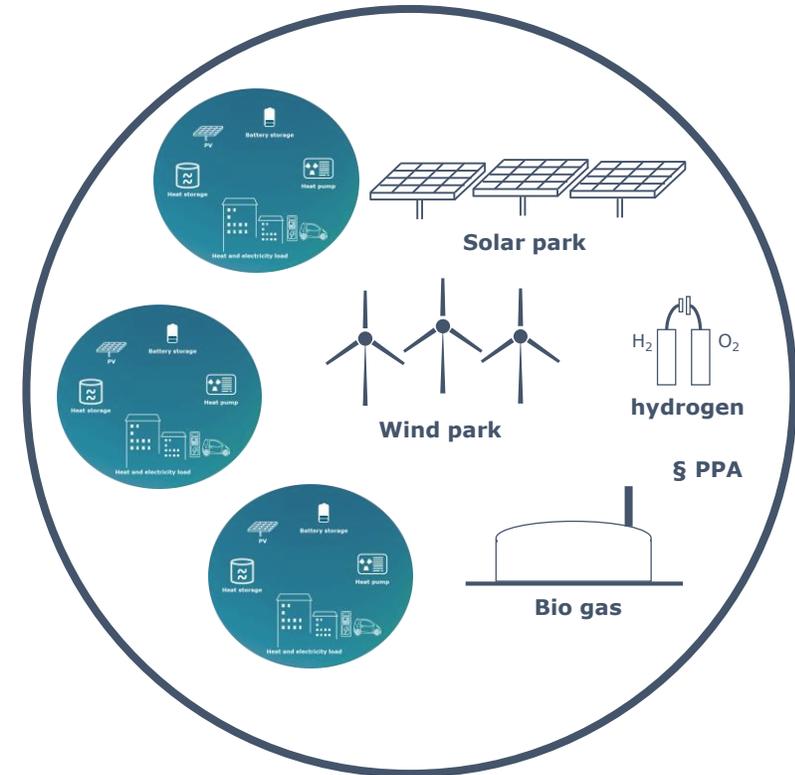
Energy Management System

Managing Energy Supply in the Urban Quarter

Behind the meter



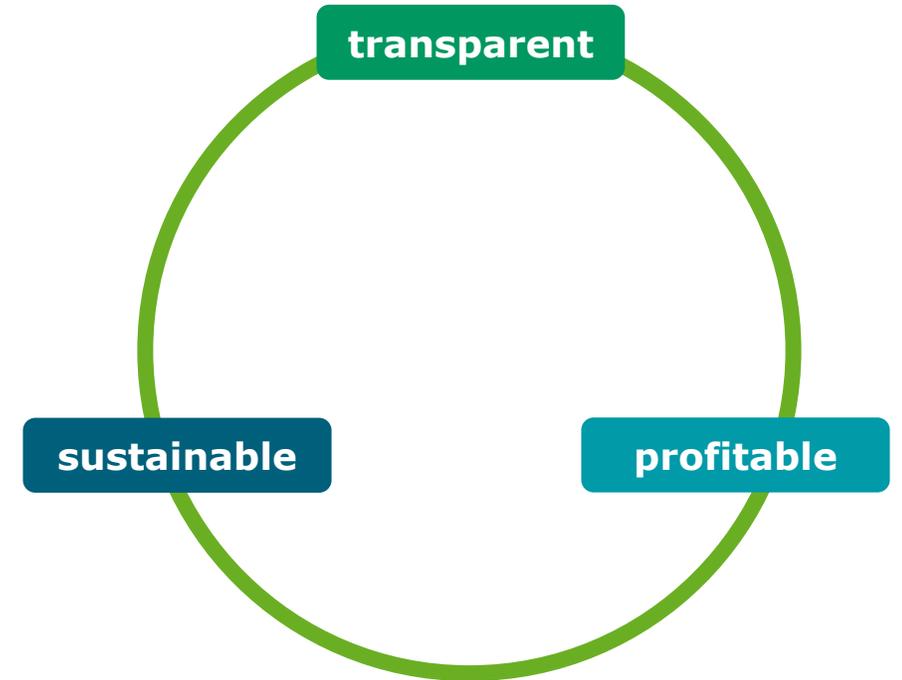
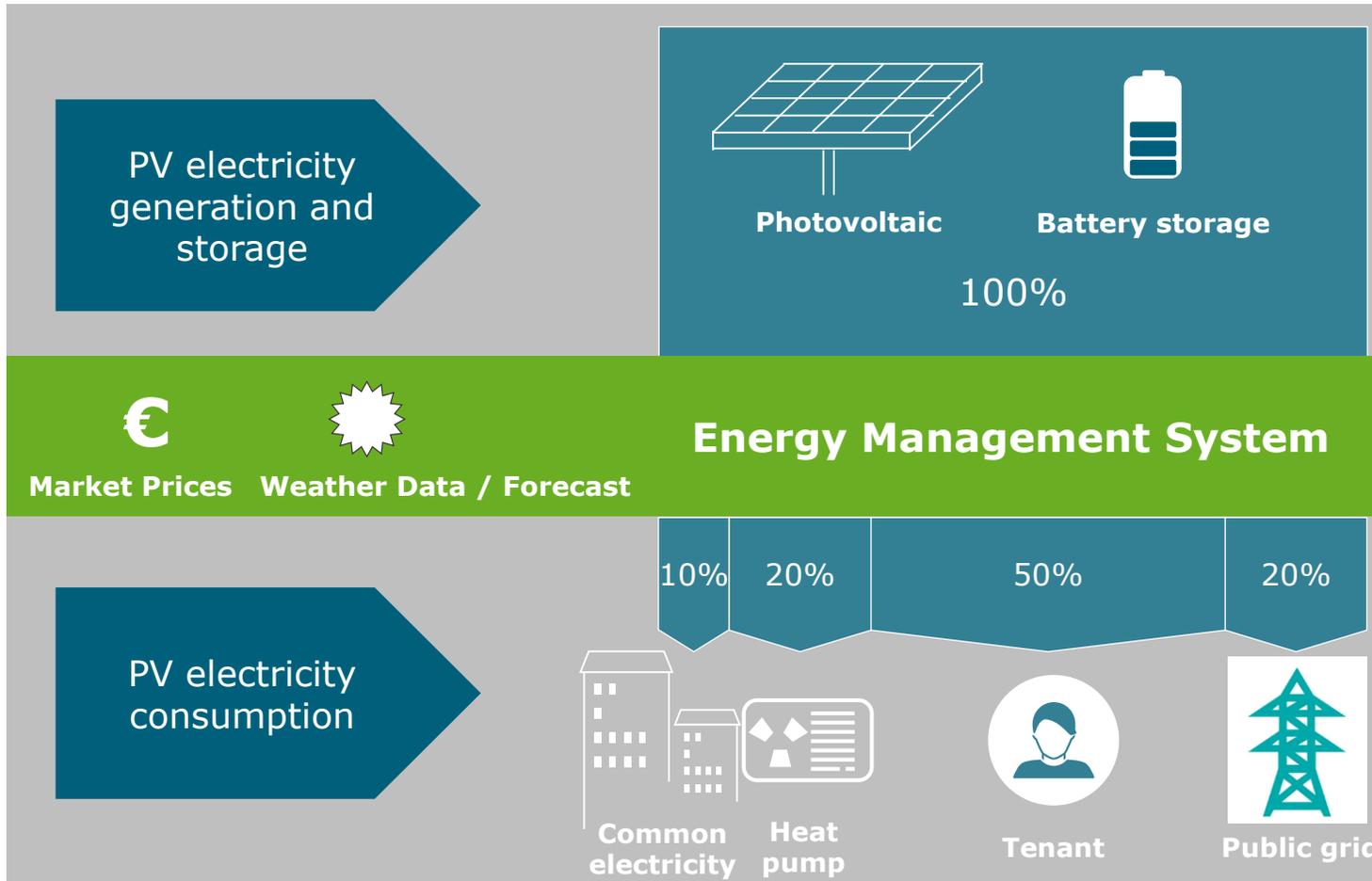
Grid Procure, Sell, Market, Flexibility



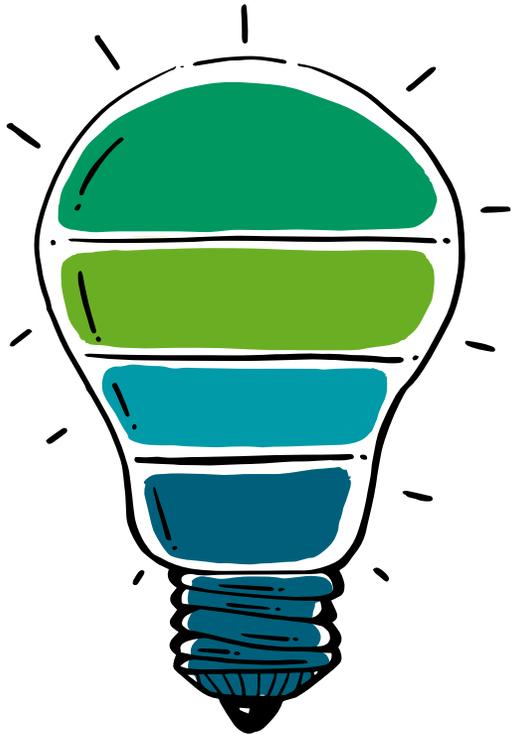
Technology

The Consumption of Solar Electricity Can Be Optimized

Behind the meter – optimization in the quarter



Summary



- 1 We have established a multi-utility concept for our urban quarters.
- 2 We are now putting the puzzle pieces together to execute and optimize operations.
- 3 We have a strong connect to our tenants allowing us to create additional product relationships.
- 4 All these developments contribute to the climate path and increasing earnings.



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