

# Positive Energy Districts in Austria – Frameworks, Case Studies and Definitions

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Applied Sciences Vienna

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# Questions addressed

## **This is just a teaser of our activities**

- 🏠 How can neighborhoods be defined and their system boundaries be determined?**
- 🏠 How can climate neutrality of buildings and neighborhoods be assessed and demonstrated?**
- 🏠 How can the cross-linking of individual buildings and within a district be optimized in the interest of saving energy and protecting the climate?
- 🏠 How is exported energy handled and what role do embodied emissions play?
- 🏠 How can an assessment of climate protection measures at building and district level be integrated into different steps of the design process?

# Zukunfts Quartier

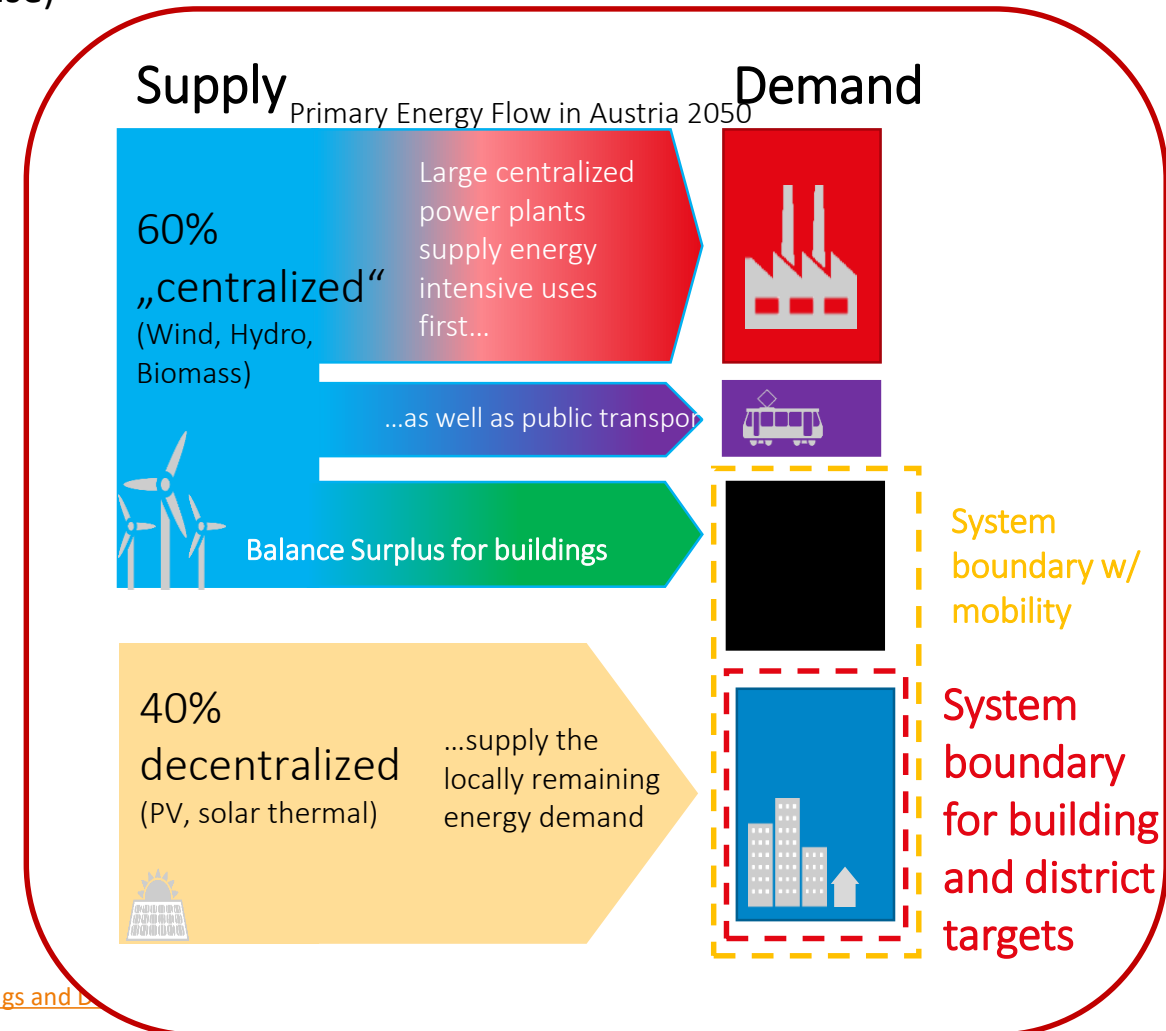
## Exploration of “Future Districts” in Vienna

July 2018 – June 2019 (Completed)

6 exploration sites in Vienna (25 – 40 000 m<sup>2</sup> mixed use)

🏠 Proposition of PED definition & system boundaries

▶ Connection to **national climate neutrality and sectoral scenarios**



[Final Project Report \(German\)](#)

Results of explored districts: [Leibold et al. 2019](#)

System boundaries and frameworks:

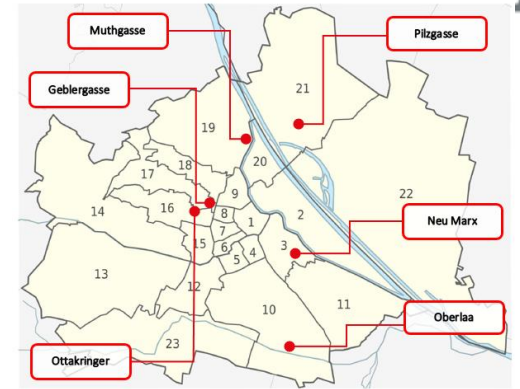
- ([Schneider, S., Bartlmä, N., Leibold, J., Schöfman, P., Tabakovic, M., Zelger, T., 2019. New Assessment Method for Buildings and Districts “Compatible with the Energy Scenario 2050. Presented at the REAL CORP 2019, Karlsruhe.](#))
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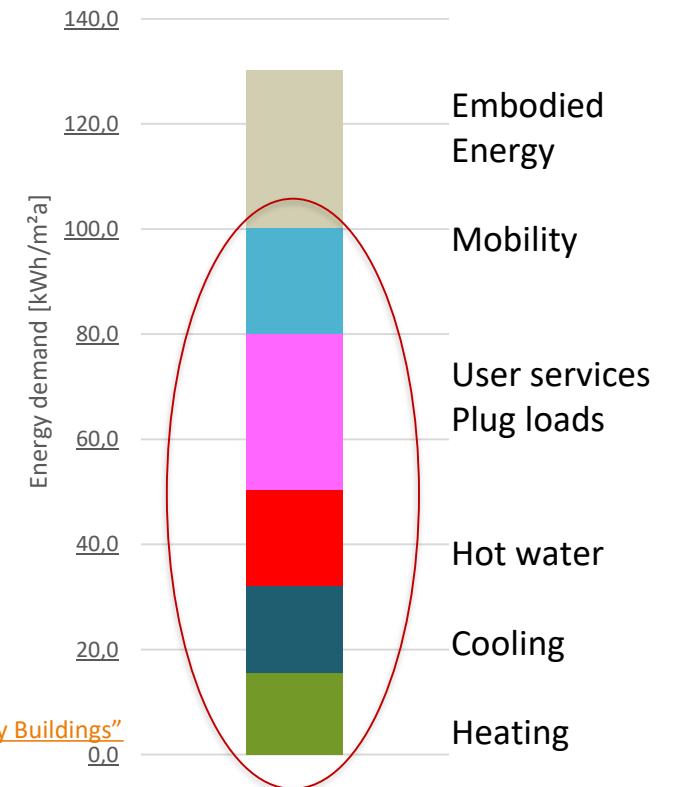
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### 🏠 Proposition of PED definition & system boundaries

- ▶ Connection to **national climate neutrality and sectoral scenarios**
- ▶ Includes **Mobility** (location efficiency) and **User energy services** (usage mix synergies)

Energy services considered



[Final Project Report \(German\)](#)

Results of explored districts: [Leibold et al. 2019](#)

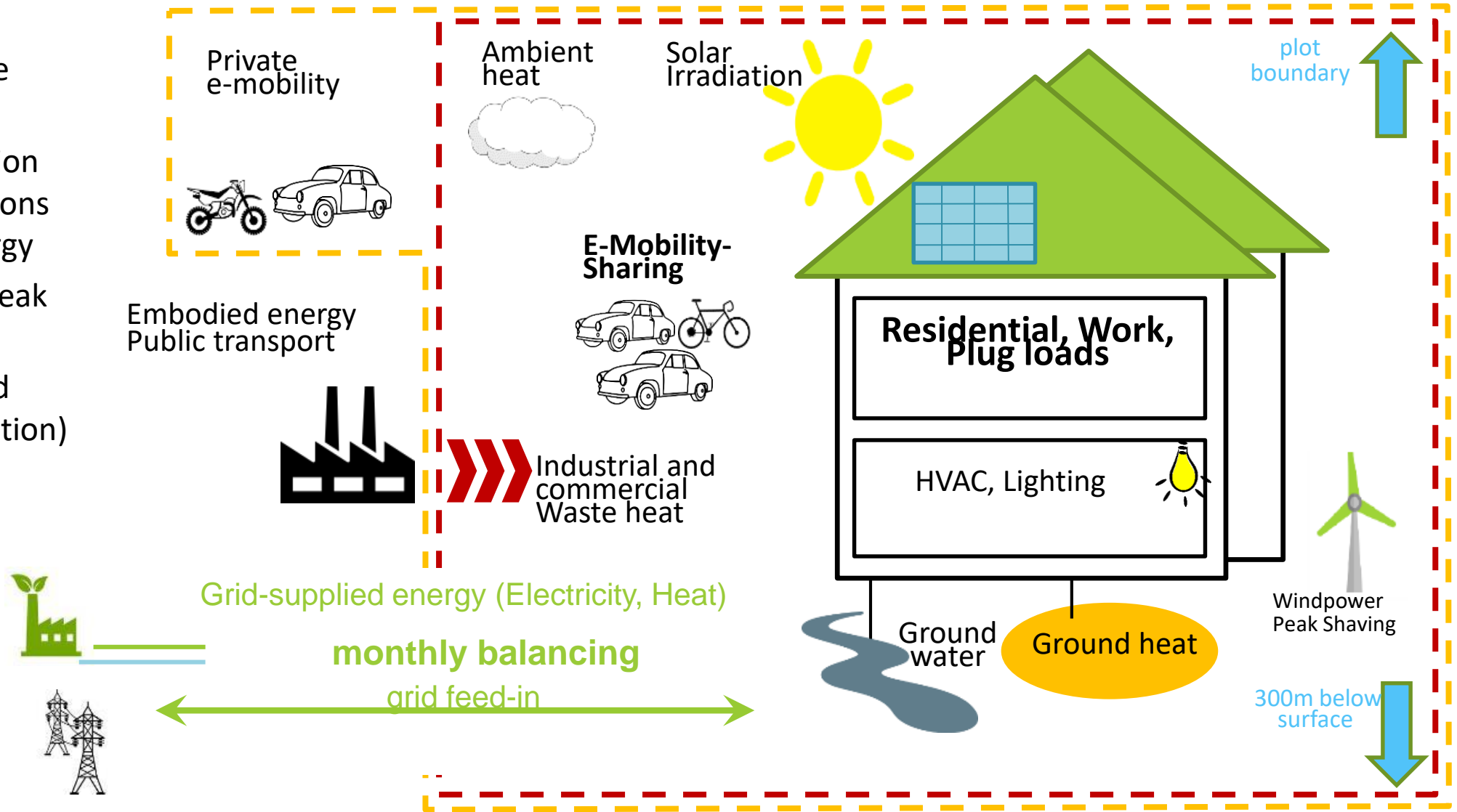
System boundaries and frameworks:

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# System boundaries *Zukunftsquartier*

System boundary ZQ PEBm      System boundary ZQ PEB

- 🏠 Includes all onsite energy services
- 🏠 Monthly conversion factors for emissions and primary energy
- 🏠 Includes offsite Peak shaving
- 🏠 Includes exported energy (PE-substitution)

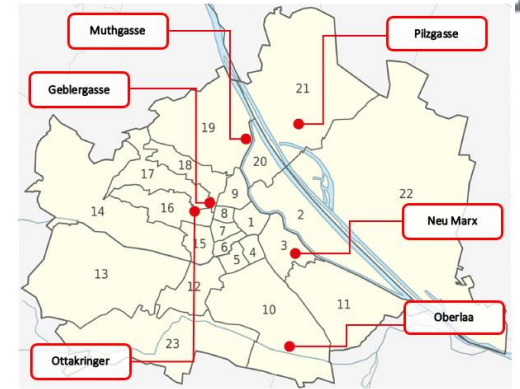


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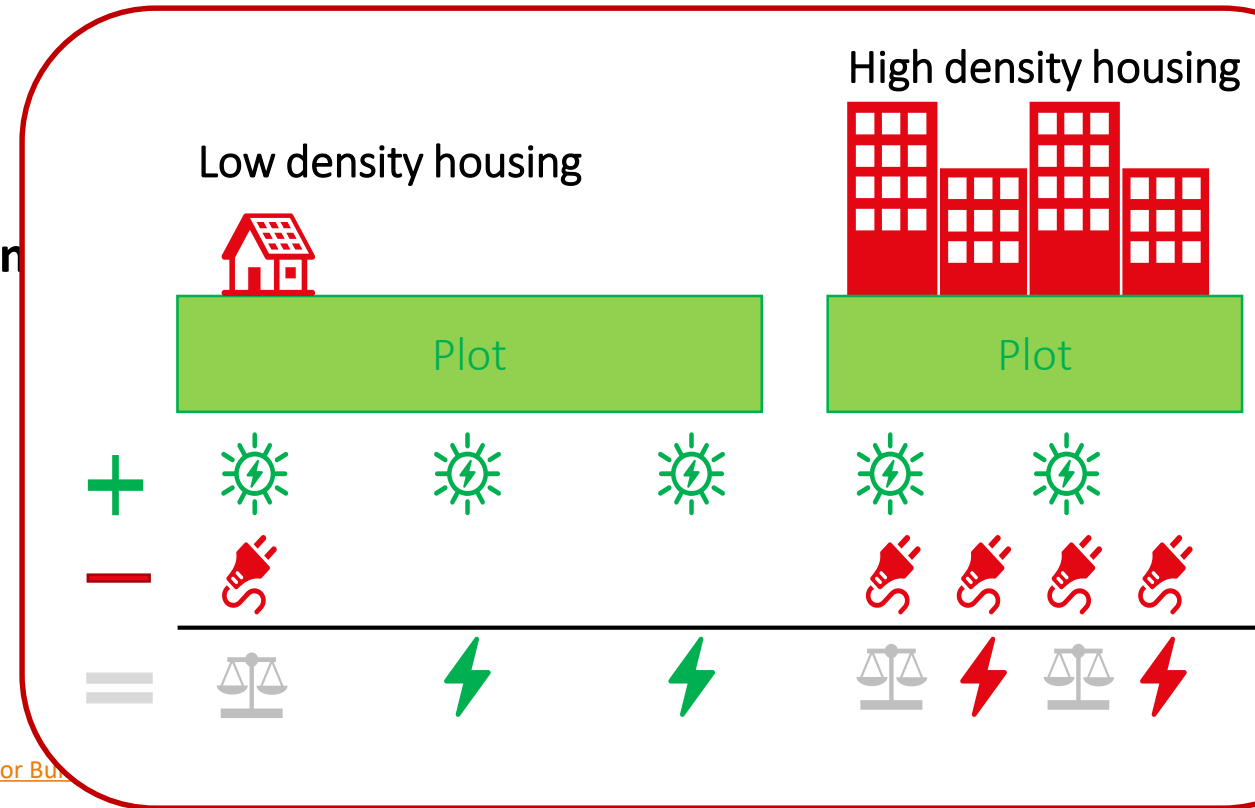
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- ▶ **Balance Targets depend on density** (efficient use of the valuable estate settlement area)



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- ▶ Flexible use of **onsite and offsite RES** w/ thermal and electrical storage

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Results of explored districts: [Leibold et al. 2019](#)

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# Zukunfts Quartier 2.0

## Demonstration “Future District” in Vienna

July 2019 – November 2021 (In progress)

30 000 m<sup>2</sup> Residential/Office/Commercial in Vienna

[Website](#)

🏠 25-30 kWh PV /m<sup>2</sup> useable floor area, (approx. 30 kWp/m<sup>2</sup> floor area)

🏠 70% self-utilization rate

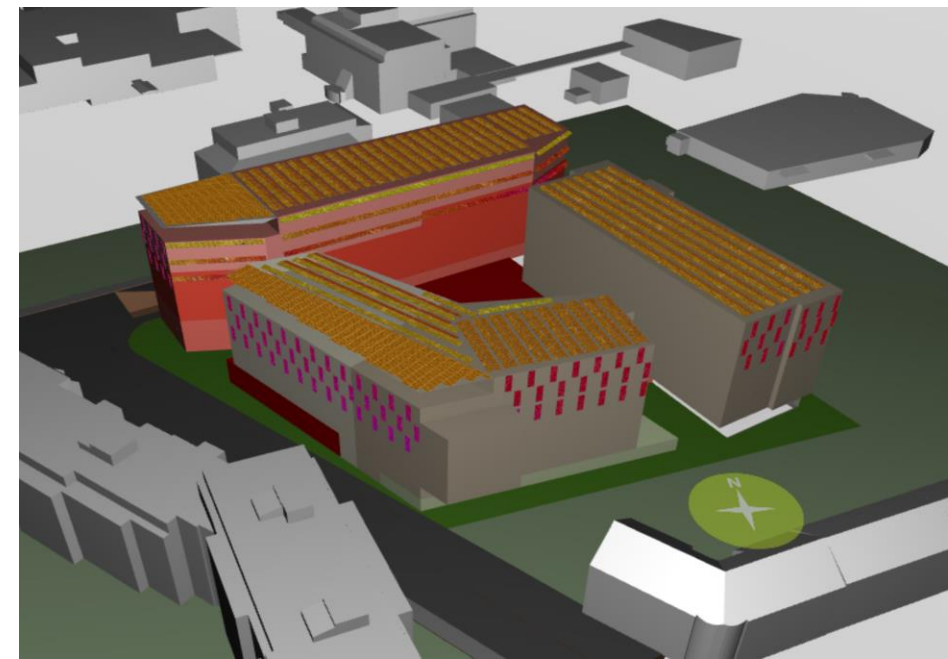
▶ Boreholes + Heatpumps + thermally activated concrete core

▶ Buffer tanks

90% self-utilization with Hydrogen Storage

🏠 Grid supportive storage management

▶ Inclusion of Offsite RES peak shaving





# 3 Pillars for a future-proof, climate neutral district

## Utilization of local renewables

- **Solar:** Thermal , PV
- **Heatpumps** w/ ambient heat (ground, water, air)
- Local **waste heat** from cooling, waste water and processes

**PED**

## Energy Efficiency

- **Thermal hull:** passive house vs austrian building code
- **HVAC:** Low-temp heating, heat recovery ventilation
- **Demand:** eff. Lighting, appliances

## Energy Flexibility

- **Thermal storage:** Buffer tank, **TABS**, boreholes
- **Electric storage:** DSM, (batteries, e-cars)
- **USER flexibility:** room temp

# Recommendations for “Future Districts” in Planning, Implementation and Quality Assurance

May/2020 – April /2021)(In progress)

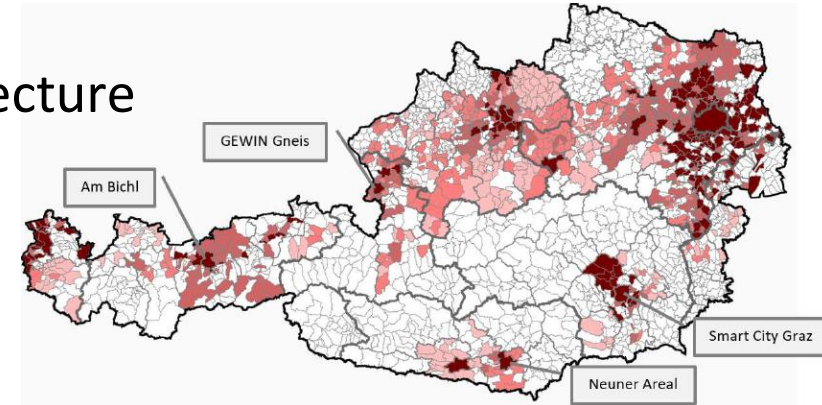
4 Example Districts in Austria’s major cities

🏠 Define energy and emission targets before city building and architecture competitions

▶ Architects will find enough space for PV

🏠 Reach out to public utility companies

▶ Economic feasibility relies on sensible grid connection deals





# Flexible User comfort in hourly carbon-free districts

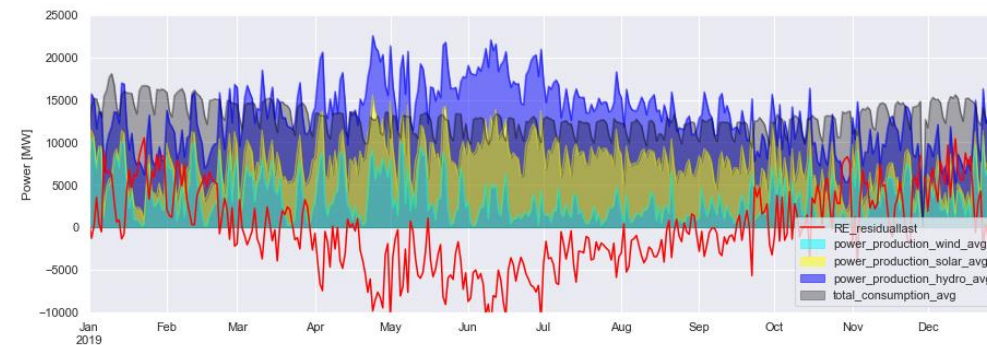
September/2019 - August/2021 (In progress)

3 Example Districts in Austria

Website: <https://www.fluccoplus.at/>

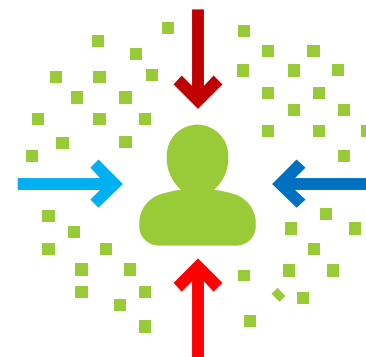
🏠 Detailed climate-neutrality concepts need **hourly carbon emissions** of future energy grid

▶ Annual Energy and emission balance is insufficient



🏠 Detailed climate-neutrality concepts need **user support and flexibility**

▶ Are they OK with oscillating indoor temperatures?



# Thank you for your attention!

## Simon Schneider

Competence team for liveable Positive Energy Districts  
Research group Sustainable buildings and cities  
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[Simonschaluppe.org](http://Simonschaluppe.org)

## Further Information

[Project Zukunftsquartier](#)

[Projekt Zukunftsquartier 2.0](#)

FH Technikum @

[res.technikum-wien.at/kolpeq/](http://res.technikum-wien.at/kolpeq/) [www.technikum-wien.at/forschung/forschungsschwerpunkte/](http://www.technikum-wien.at/forschung/forschungsschwerpunkte/)

## Team

- Nadja Bartlmä (IBRI)
- Jens Leibold (FHTW)
- Simon Schneider (FHTW)
- Petra Schöfmann (UIV)
- Momir Tabakovic (FHTW)
- Thomas Zelger (FHTW)

# Zukunfts Quartier 2.0



# Zukunfts Quartier



Institute of  
**Building Research  
& Innovation** ZT-GmbH

KolPEQ – Competence team for liveable Positive Energy Districts



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