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# *Consume and Pay Less –*

# *A Budget Approach for Running Costs in Social Housing*

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# Introduction

- Climate protection needs support of all groups of the society
- Poor people have no money for high quality energy efficient housing – rents are higher
- Low building standards and (fuel) poverty can lead to increased risk for illness
- Ancillary and running costs can reach at least half of the rents
- **„PassivehouseSocialPlus“ combines low rents, low ancillary and running cost with climate protection and a high living standard in social housing**

# Goals of „PassiveHouseSocialPlus“

- Inexpensive building for affordable living
- Significant reduction in ancillary costs (including heat, electricity and internet)
- High energy efficiency (building envelope, hot water preparation, household electricity, system technology)
- Use of treated gray water to flush toilets
- Photovoltaics, battery storage
- Flat rate rent for most types of ancillary costs (including heating and domestic hot water preparation)
- Budgets for drinking water and household electricity included in the rent
- Visualization of consumption and budget for tenants

# Existing building bevor retrofit


- 2 entrances: retrofit with passive house components
- 1 new building: passive house standard
- 42 flats, partly barrier-free, 6 flats wheelchair accessible
- 3.235 m² living area

# Retrofit with Passive House Components



# After retrofit

# New building

# New building finished

# Interior impressions

Picture scoure: Perspektive Studio D Dominique Gängler- Architekturfotografie Plus

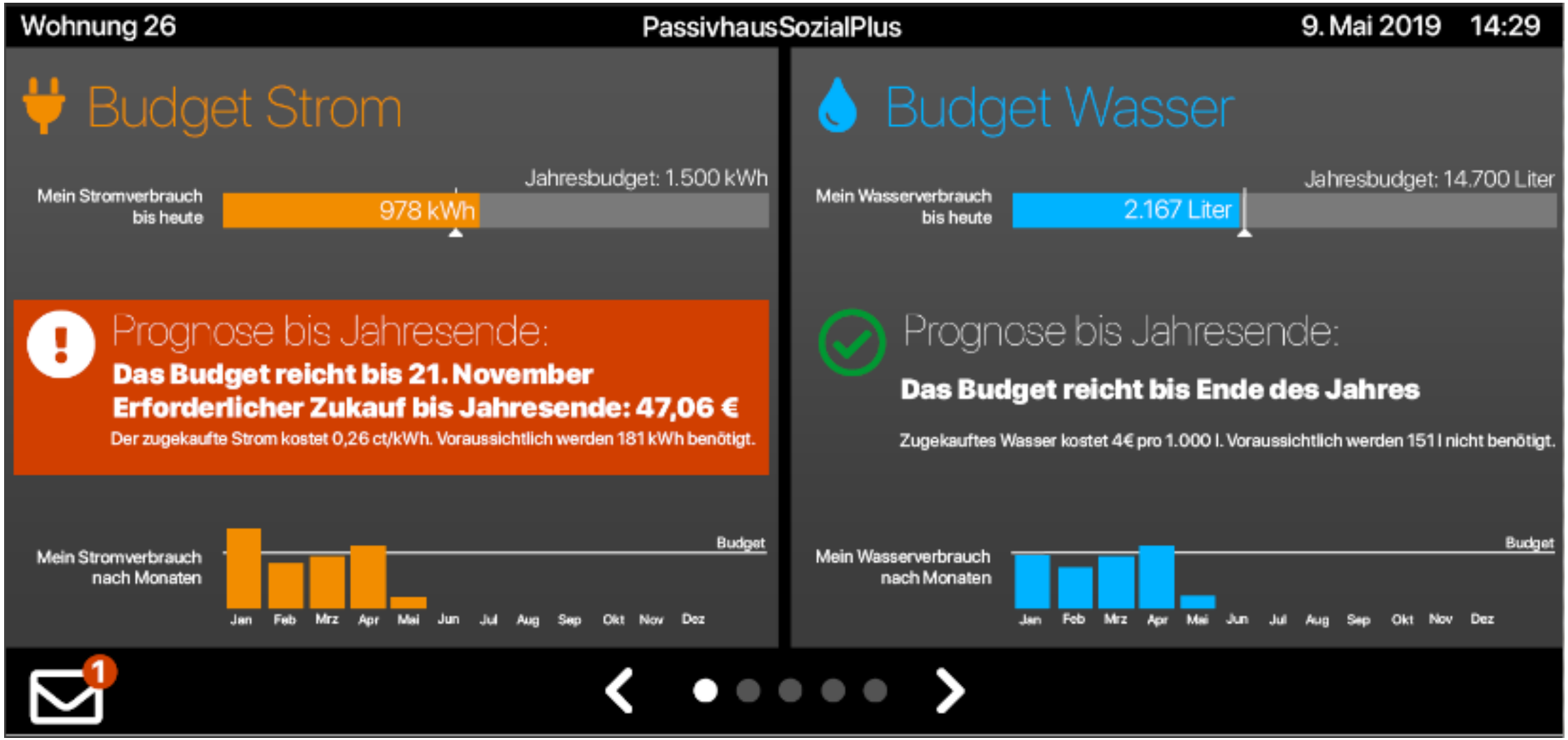
# PV-System and battery Storage


# Gray water system

# Accounting and budgeting system

- (Almost) all ancillary costs are charged at a flat rate
- Flat rate heating costs and water heating according to §11 (1) HeizkostenV
- Water and household electricity budgets included in running costs
- Calculated that an economical household gets along with it
- The amount of the budget calculated by number of people in the apartment
- If budgets are exceeded, additional purchases must be made
- Displays in the apartments inform the tenants

# Budget system – display in each flat



# Measurement results – existing building

- Room temperatures in heating period are 22.0 °C (winter between 19 °C and 24.7 °C) – same as in other energy efficient apartment dwelling with heat billing

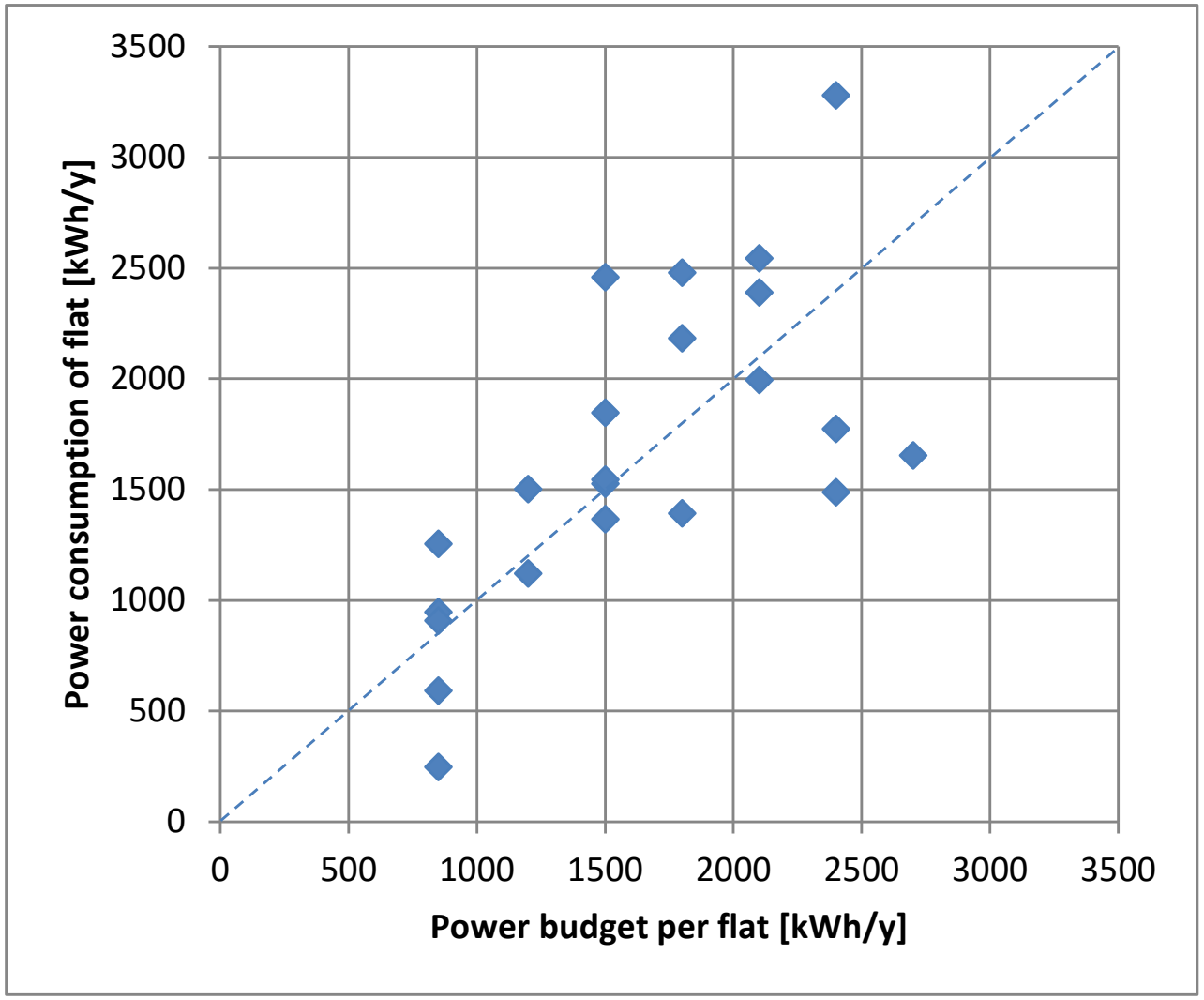
- Energy for heating (including distribution losses): 21.3 kWh/(m²*y)
- Energy for domestic hot water: 17.8 kWh/(m²*y)
- Total final energy for heat (including all losses): 48.9 kWh/(m²*y)

- Gray water cover ratio for flushing toilets: 20 - 40 % at the beginning, > 60 % after installation of additional filter

- Dinking water (without water for flushing toilets): 21.0 m³/(person*y) (-28 %)

- The PV system and battery storage cover 40% of the building's electricity consumption

# Measurement results – existing building




**Mean value for existing building:**

**Budget exceeded by only 2%!**

# Summary

- High energy standards and ventilation systems as a basis for healthy living
- At 6.50 €/m² and month rents are well below the comparable rents (10.06 €/(m²*month))
- Ancillary costs are 45 % below those of comparable users in the city
- Very low heat consumption despite flat-rate billing
- Budgets for drinking water (+9 %) and household electricity (+2 %) are only slightly exceeded

**Approaches for reducing consumption and costs seam to work also in social housing**