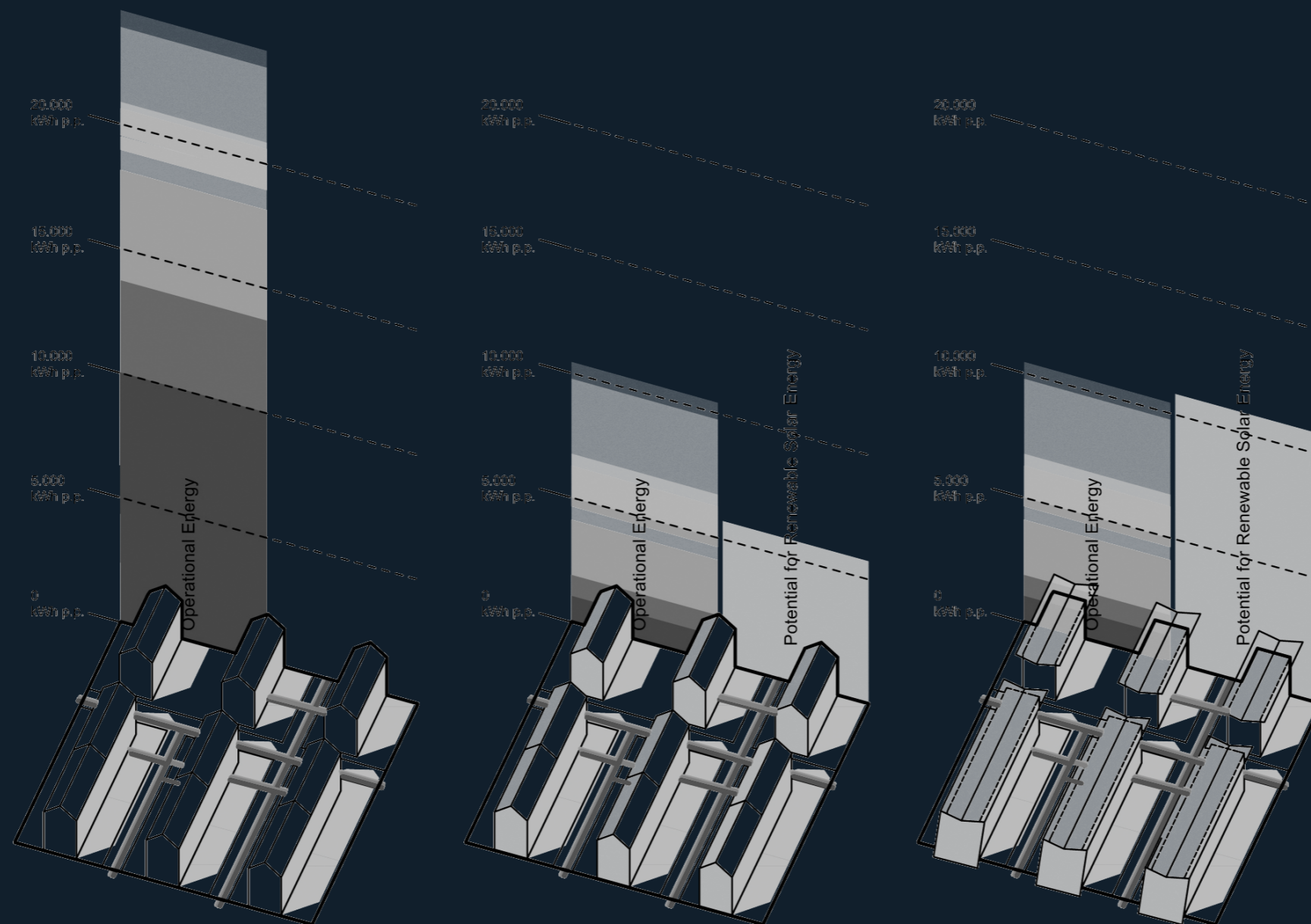


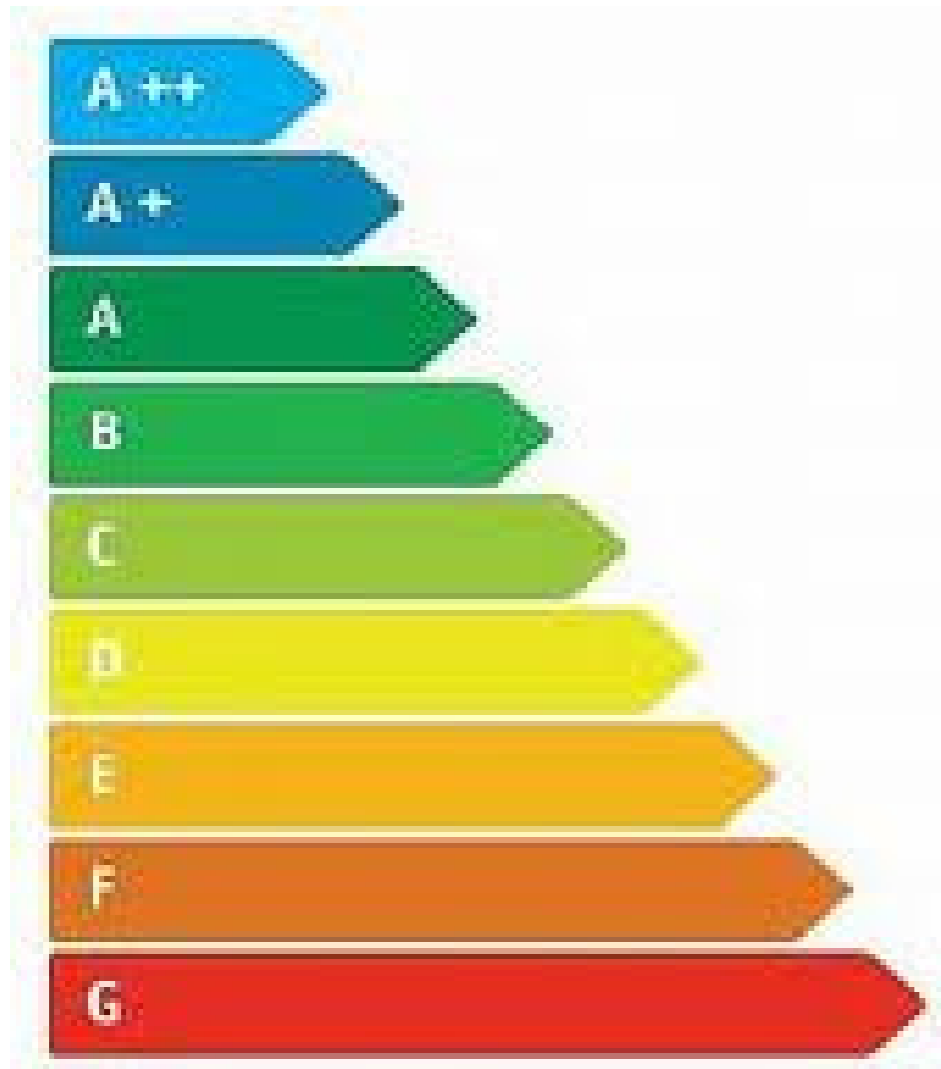
# Renovation Concepts for Residential Buildings to Plus Energy Standard



# I. Plus Energy Potential for Renovation

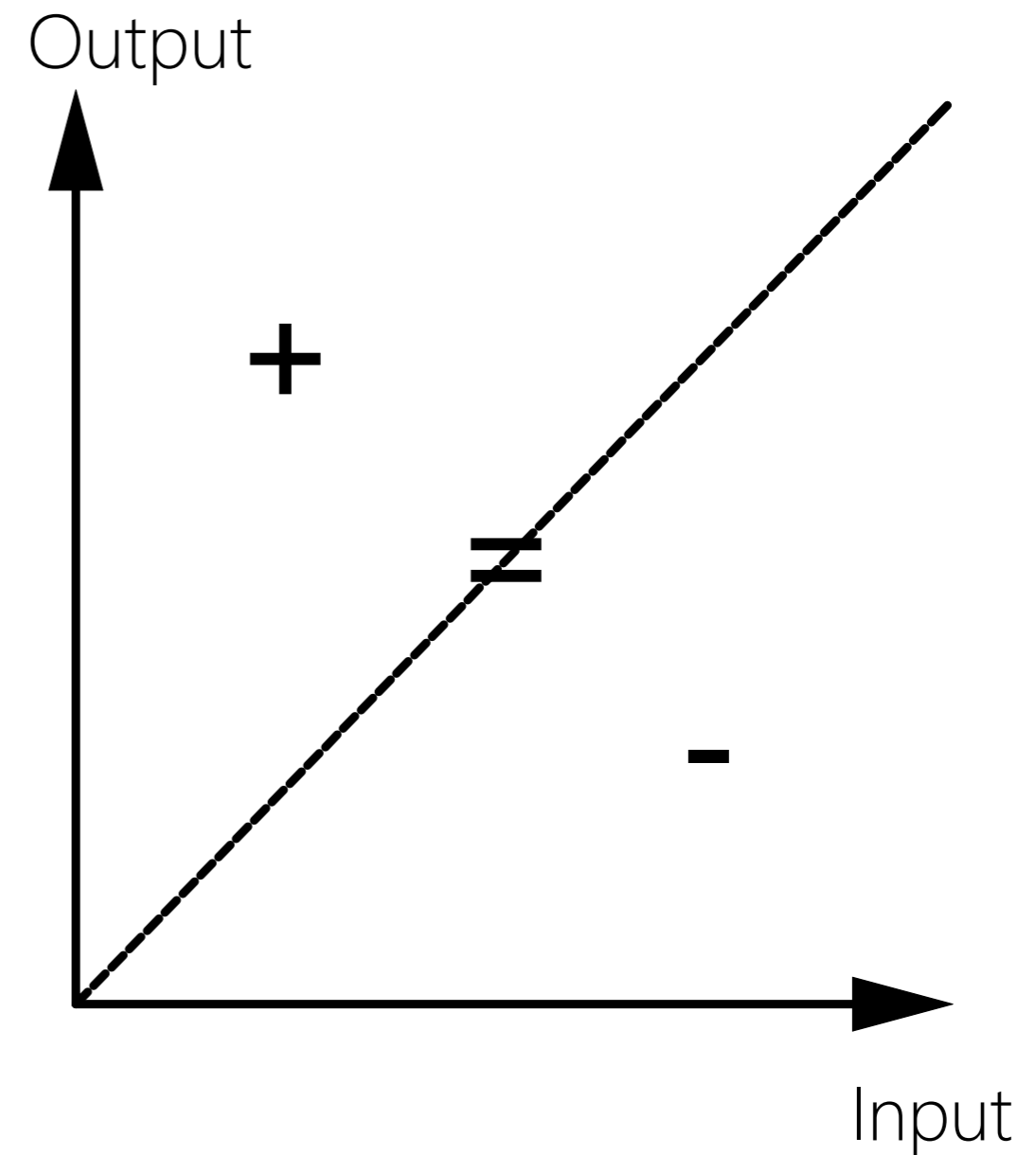


# From Energy Efficiency to Energy Balance

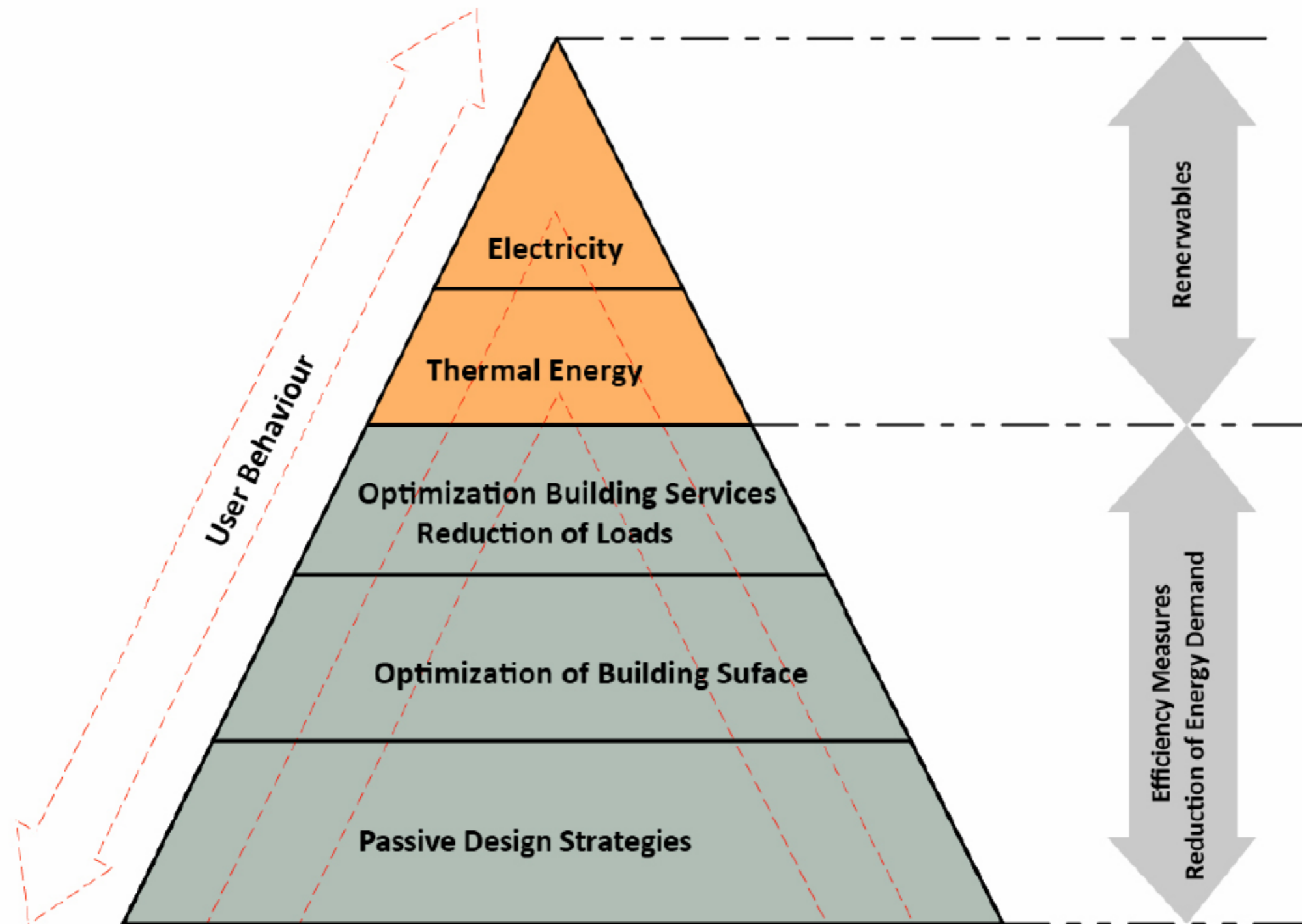


Efficiency Standard

>



Energy Balance

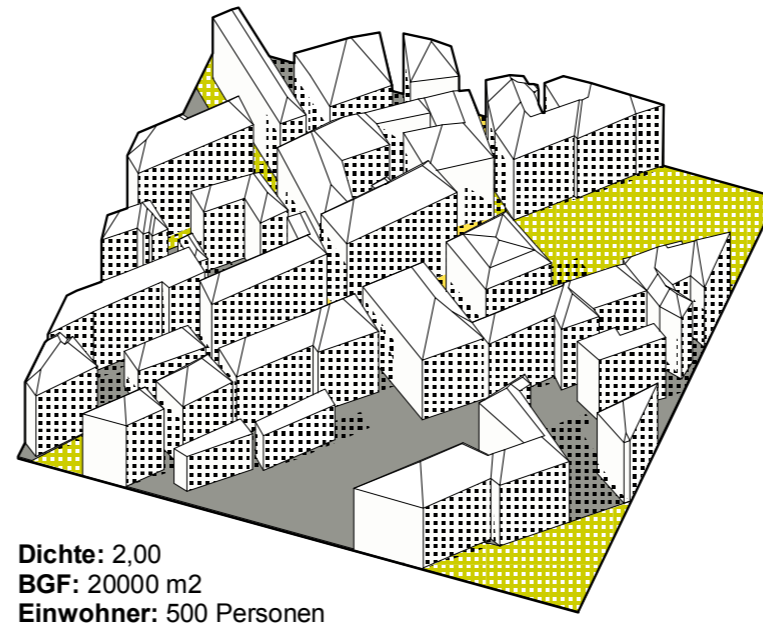
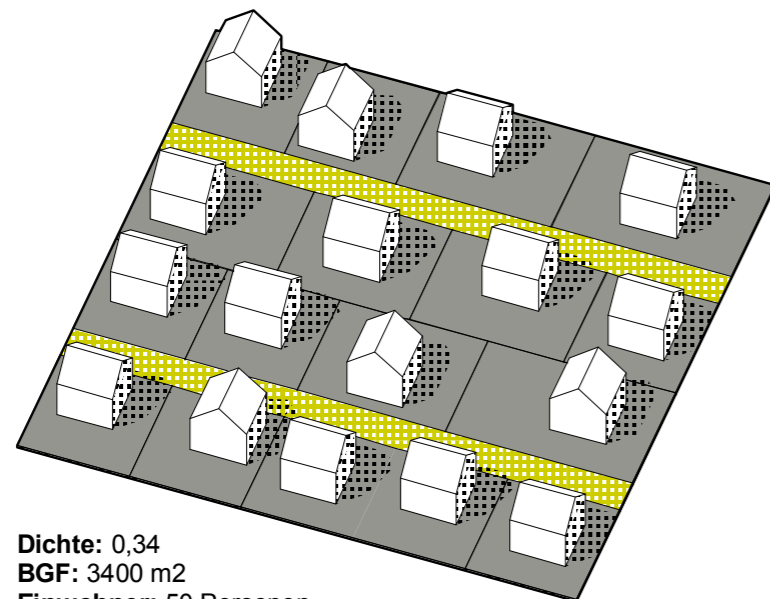


# Existing Residential Building Stock in Austria

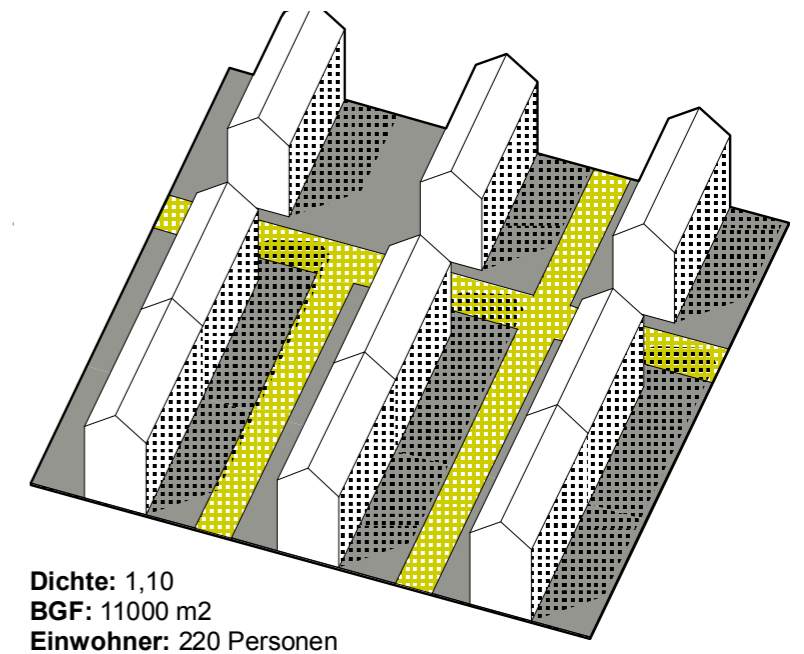
## Approx. 2 Mio Houses

**6%** Historic Houses before 1919

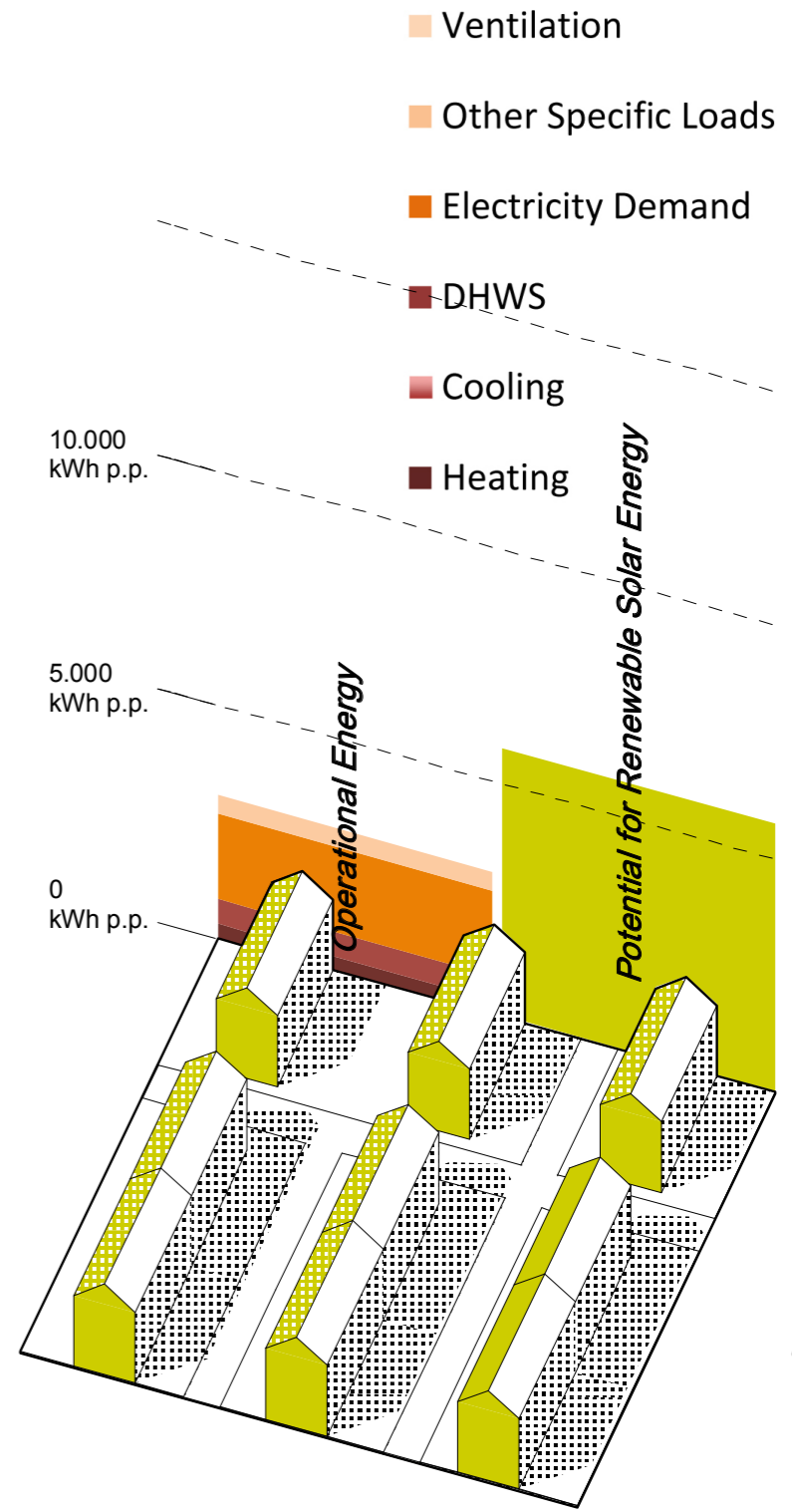
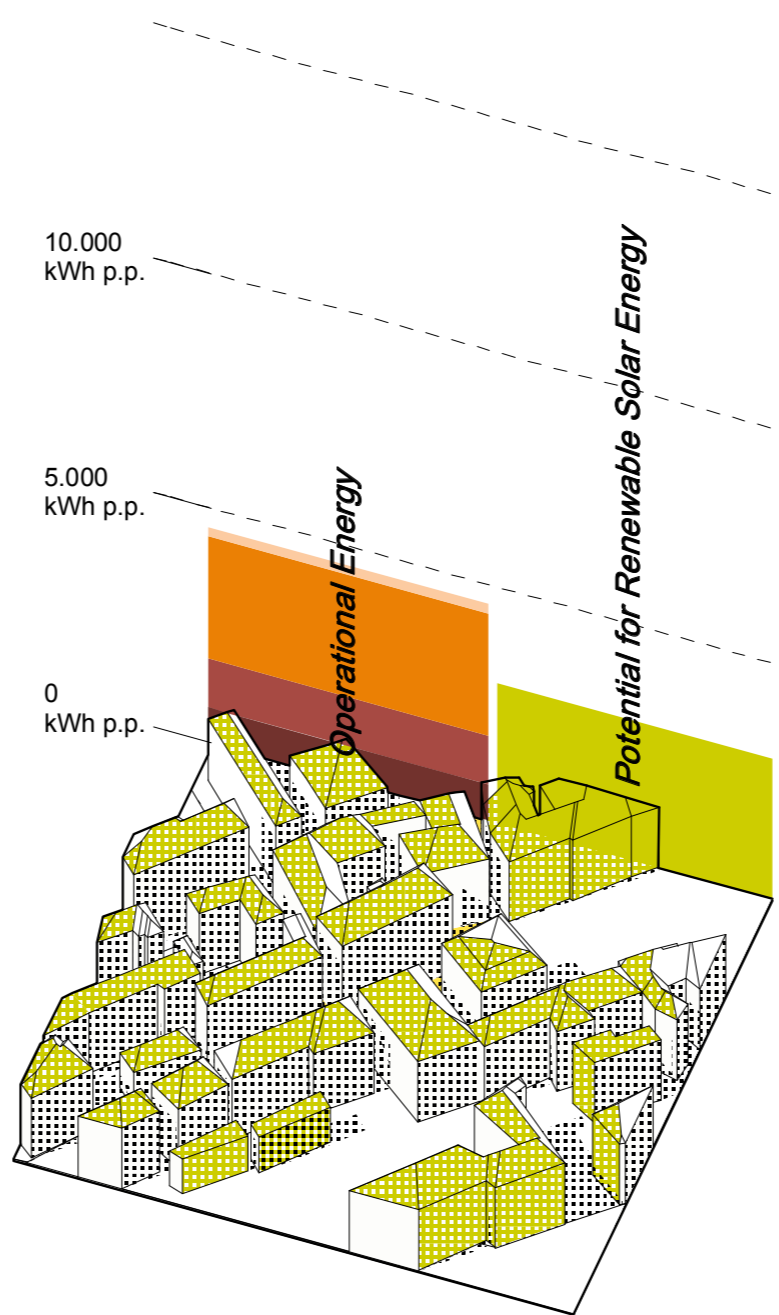
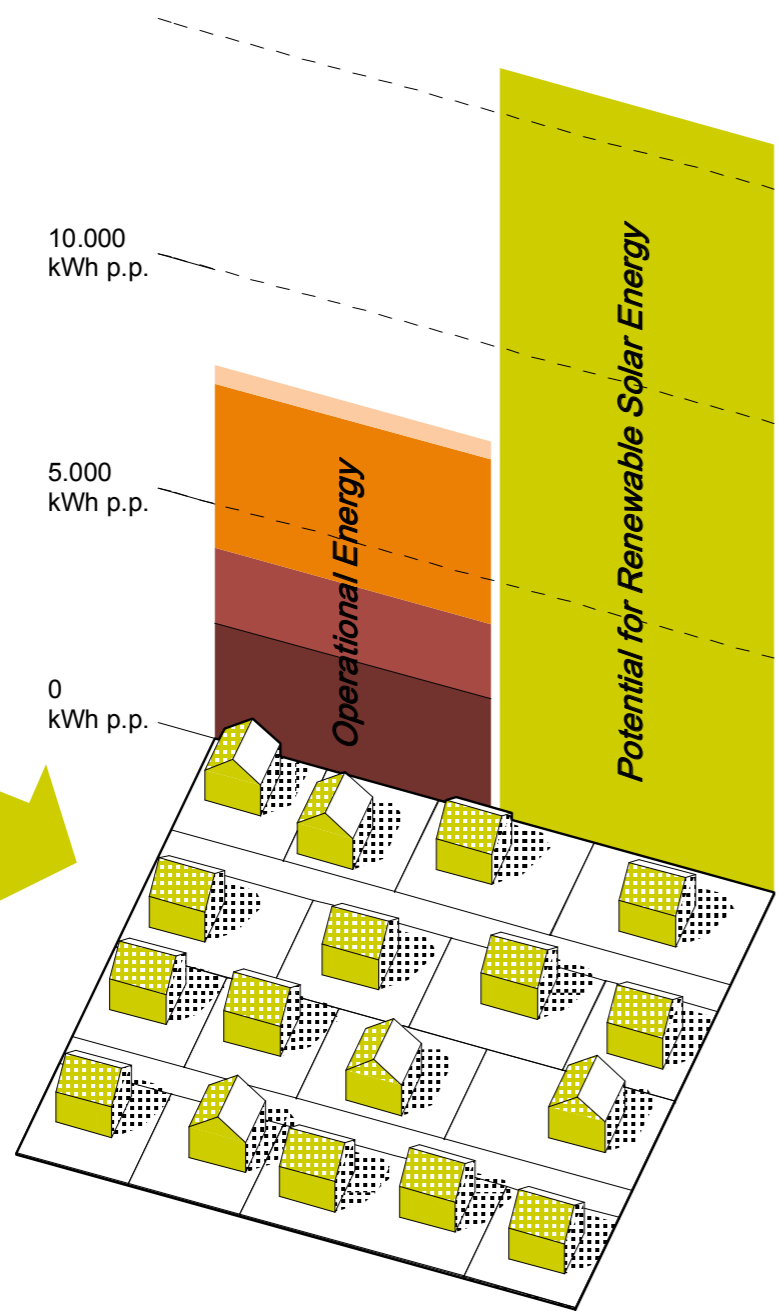
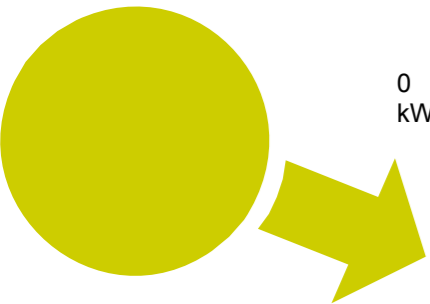
**75%** Single / Two Family Houses



**19%** Multy Storey Buildings After 1919

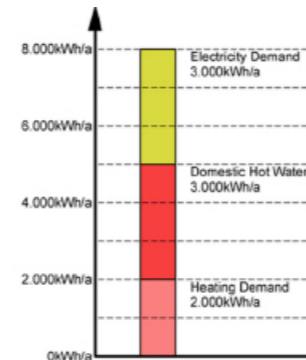
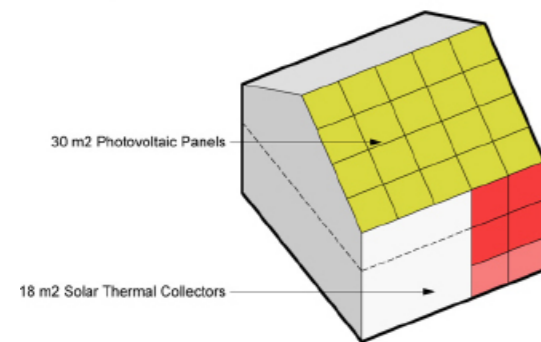


# Solar Potential For the Existing Building Stock by Typology

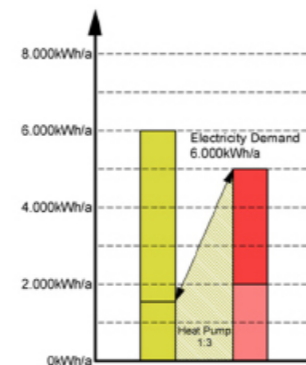
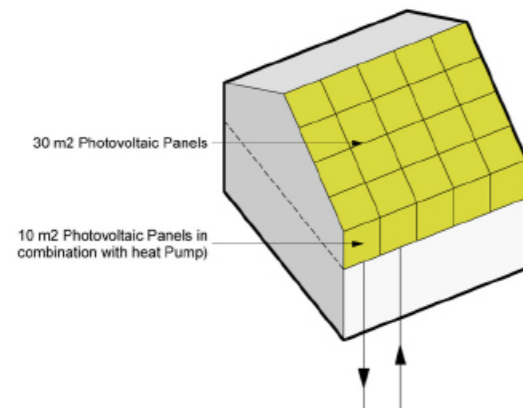


# Plus Energy Solar Building Renovation Limits

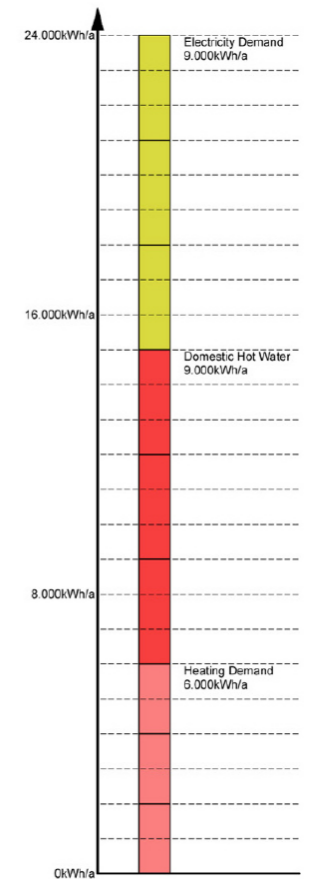
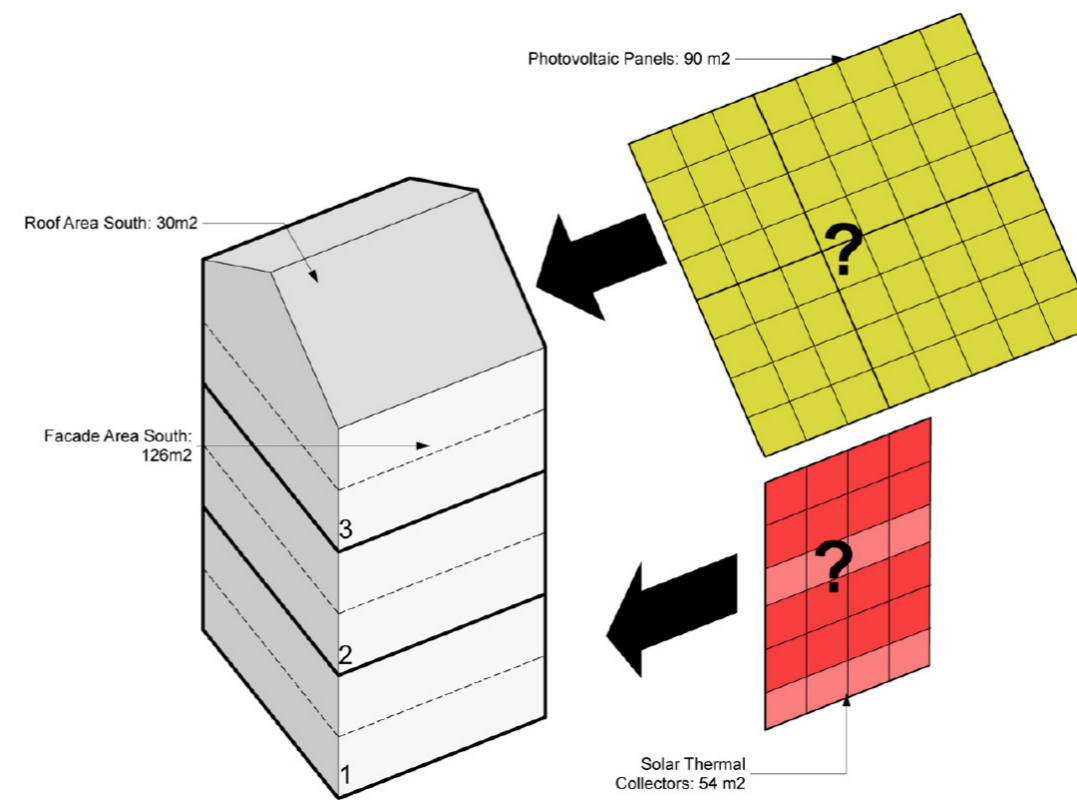
Zero Energy Building 100m<sup>2</sup> NFA "Solar Thermal - Electric Approach"



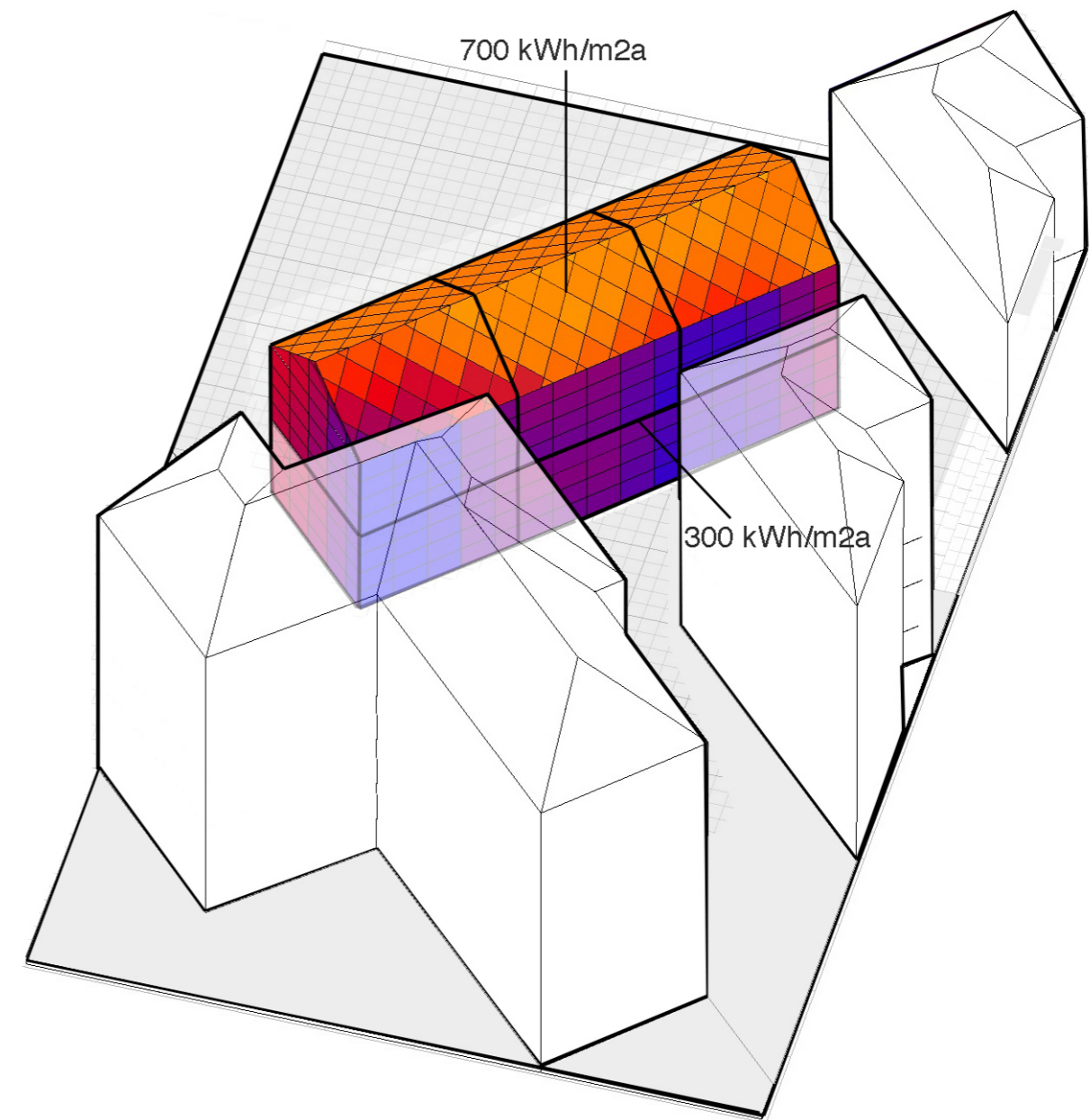
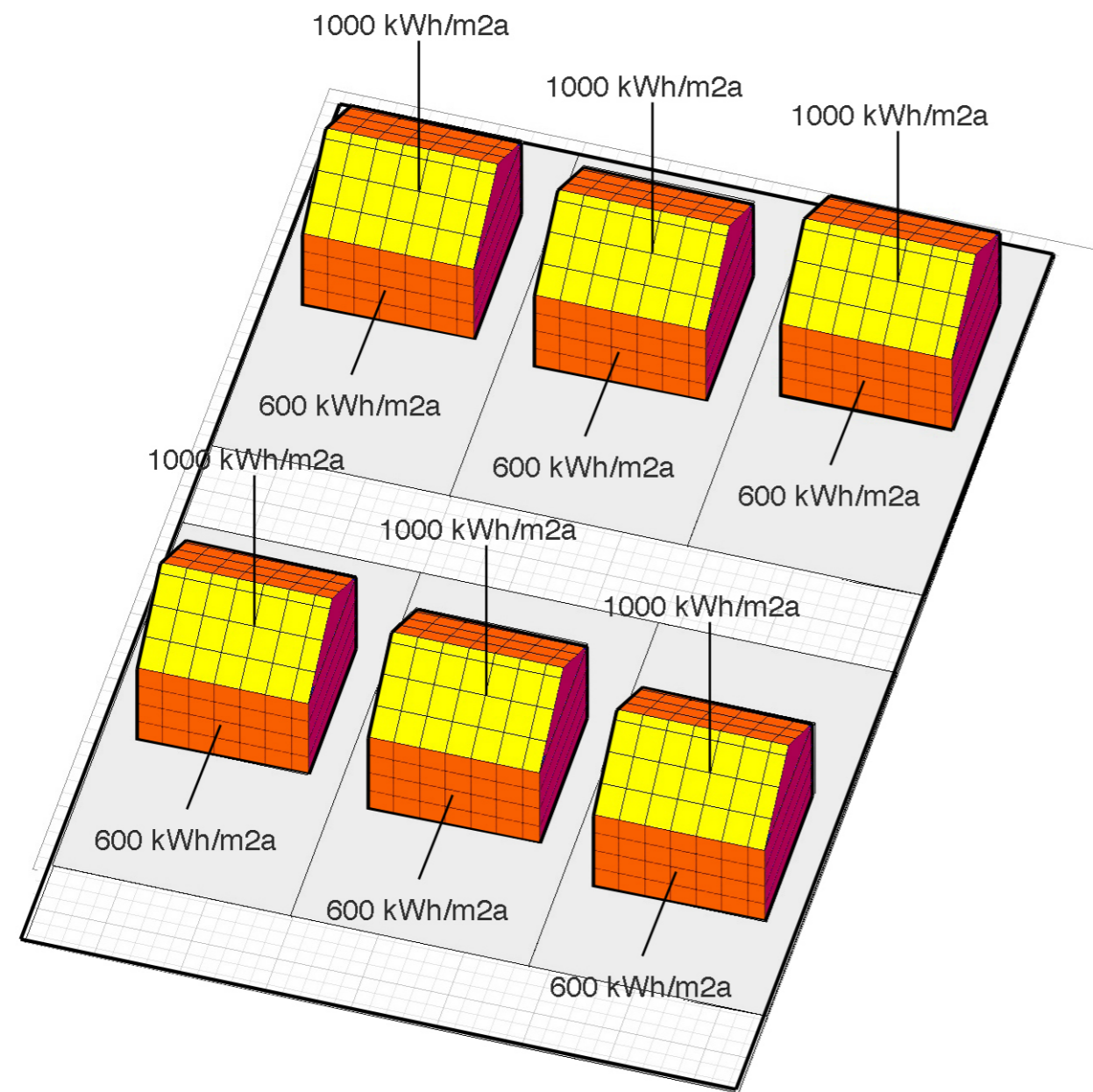
Zero Energy Building 100m<sup>2</sup> NFA "All Electric Approach"



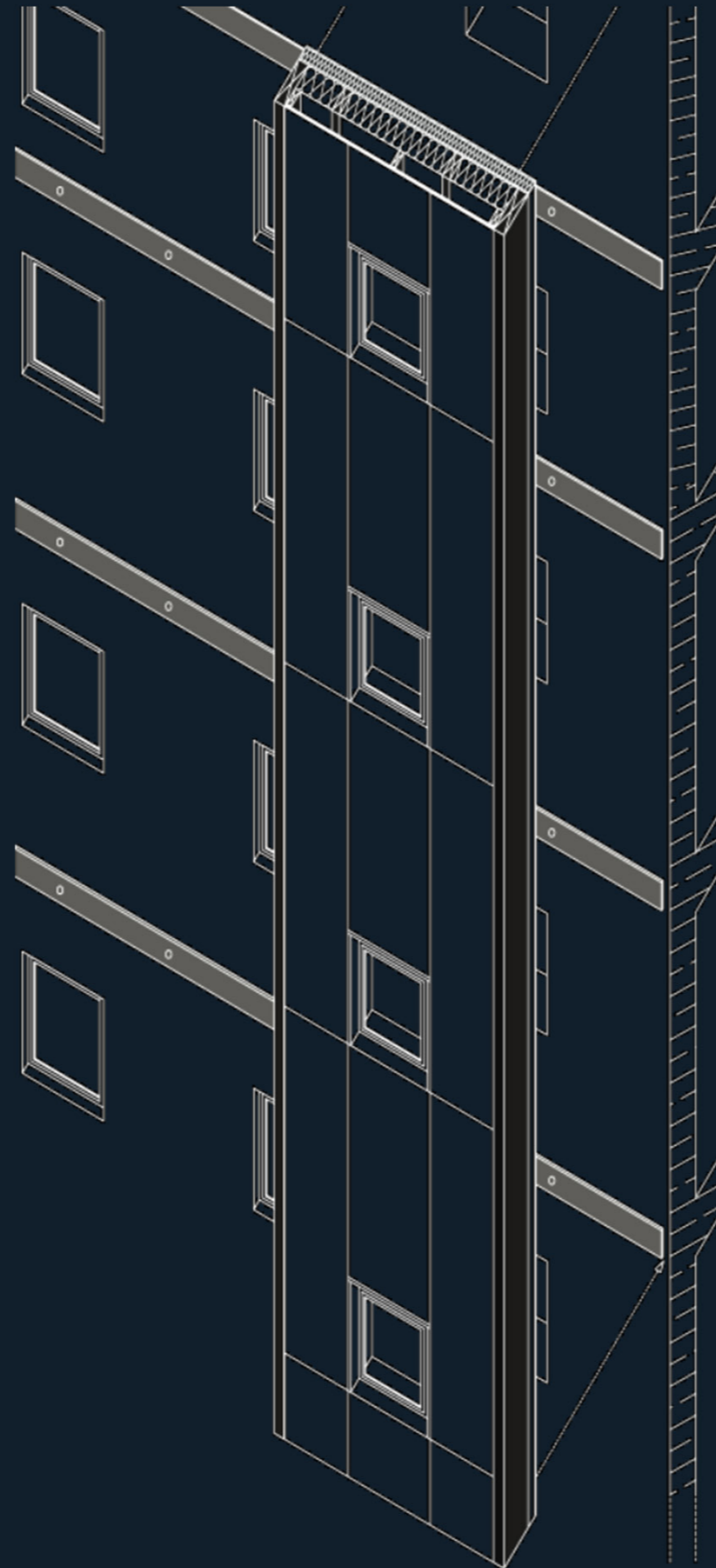
Zero Energy Multi Storey Building 3 x 100m<sup>2</sup> NFA "Solar Thermal - Electric Approach"



# Plus Energy Solar Building Renovation Limits



## II. Prefabricated Facade Modules







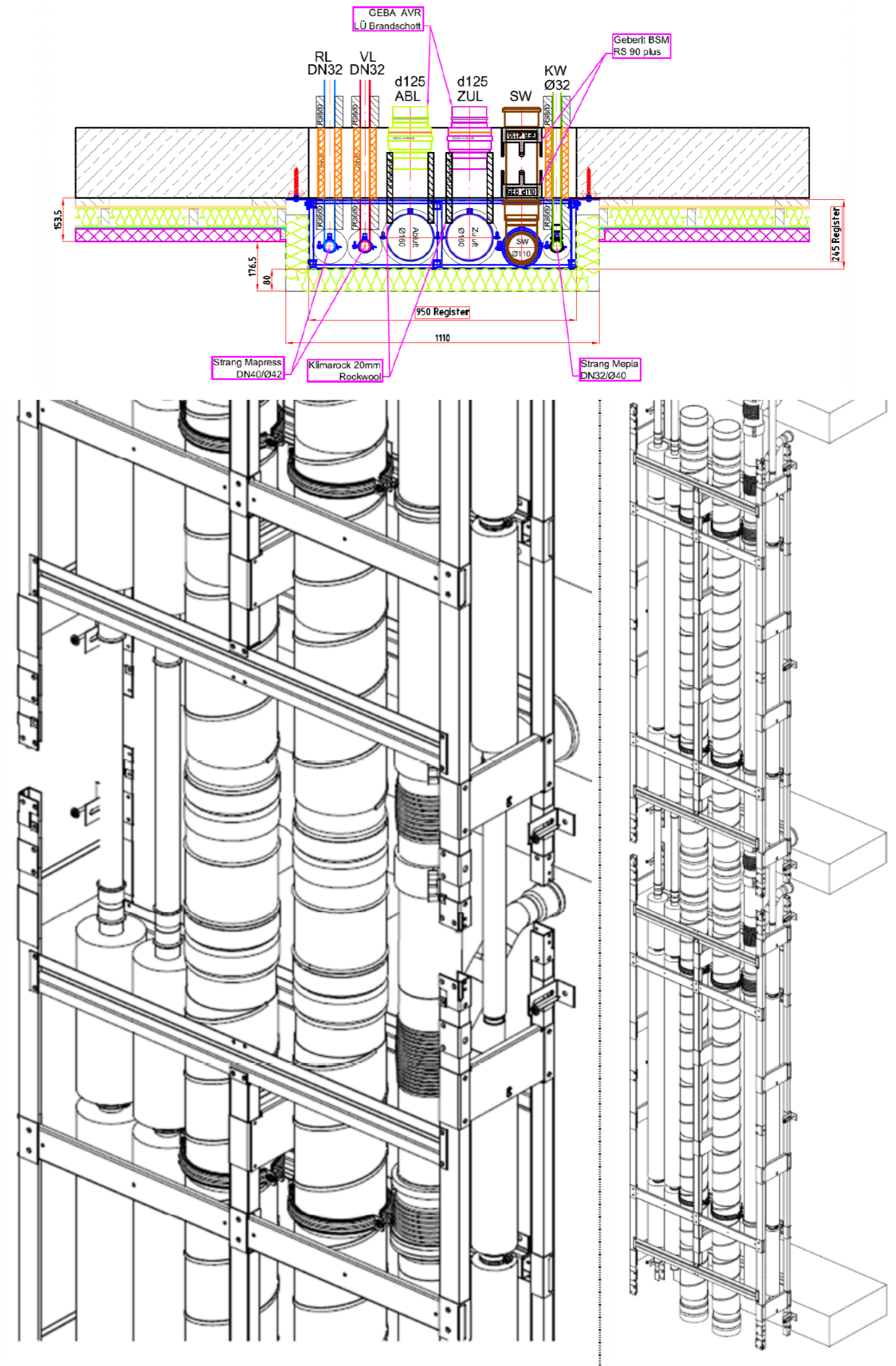
Module Integrated-  
Gap Solution



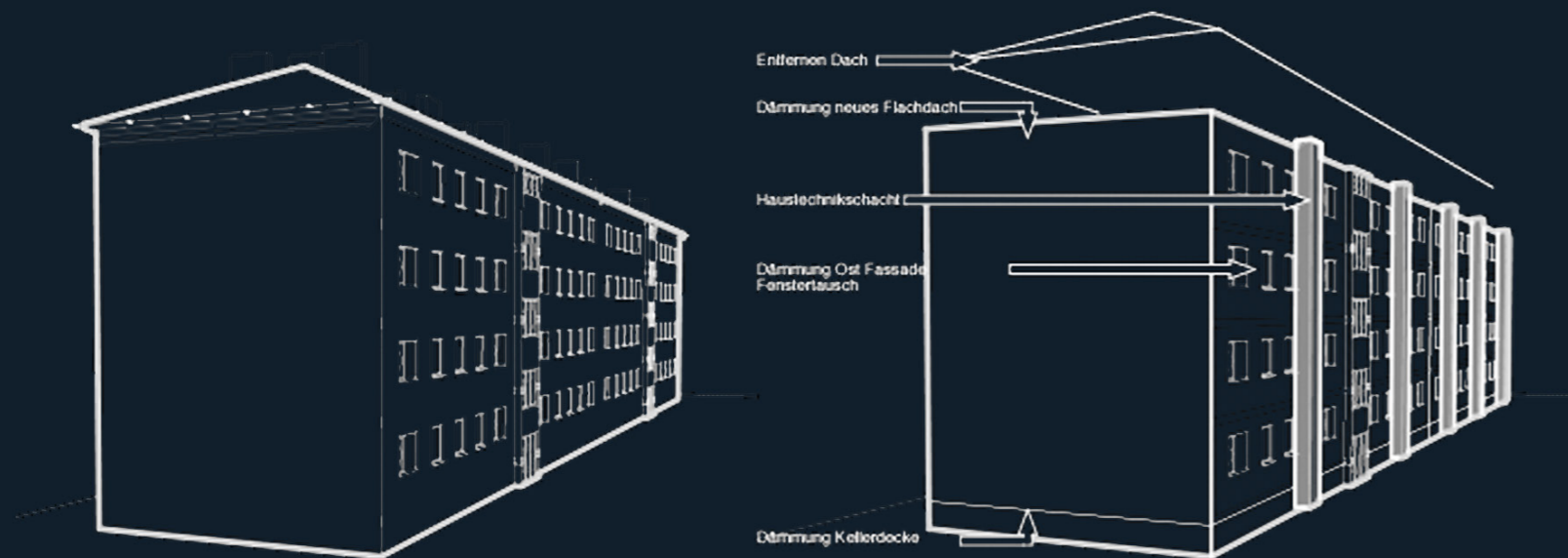
Module Integrated-  
Photovoltaics



Module Integrated-  
Solar Thermal

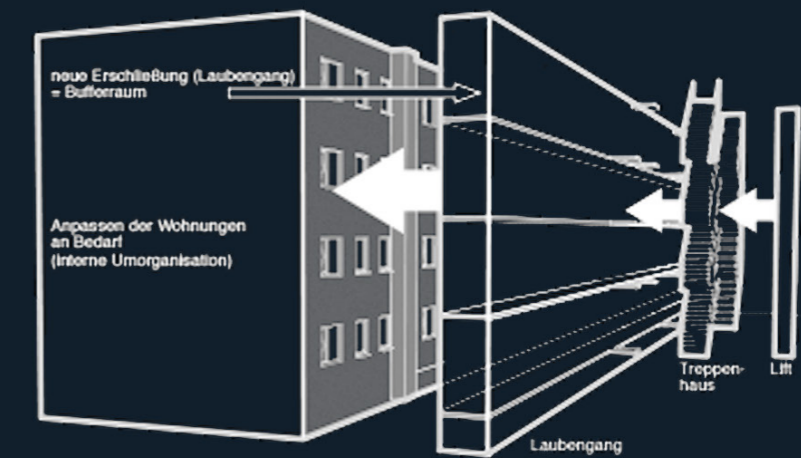


# III. Demonstration Project

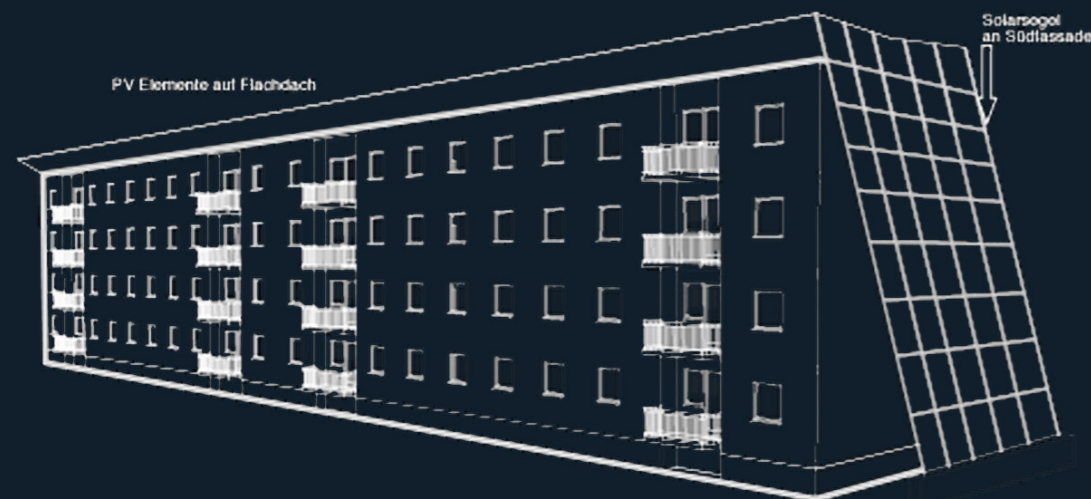


Bestand - Johann Böhm Strasse

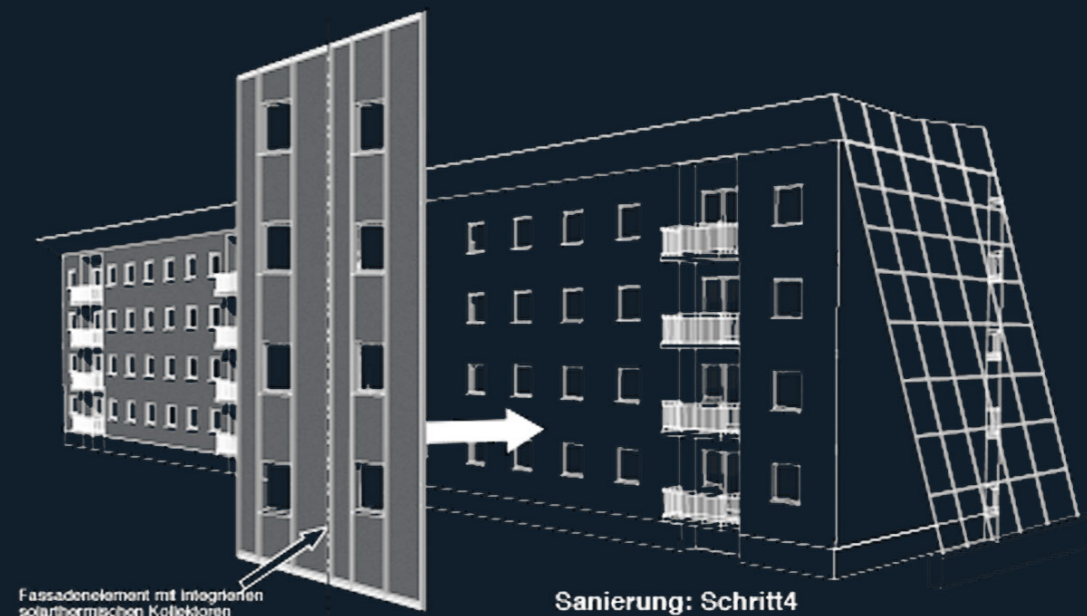
Sanierung: Schritt1



Sanierung: Schritt2

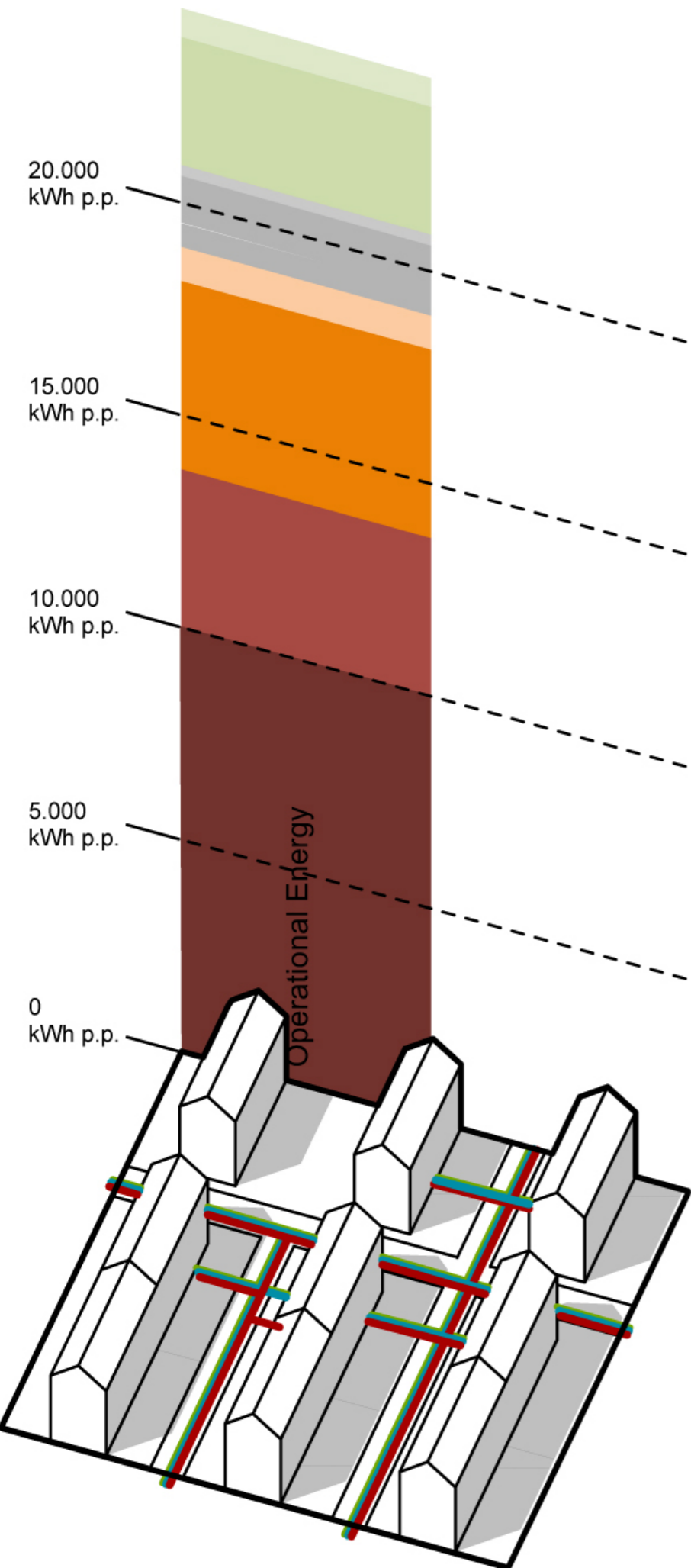


Sanierung: Schritt3

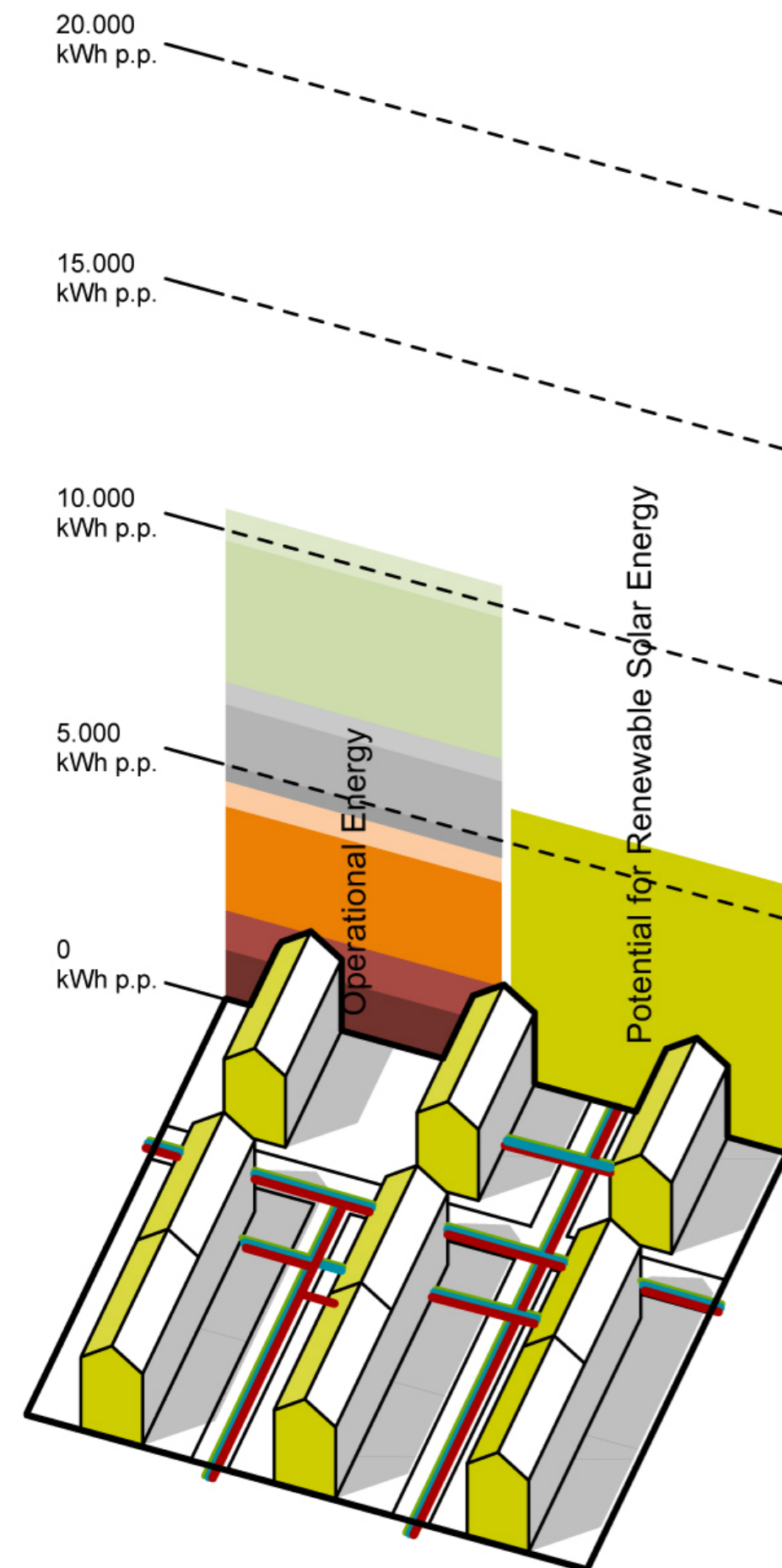


Sanierung: Schritt4

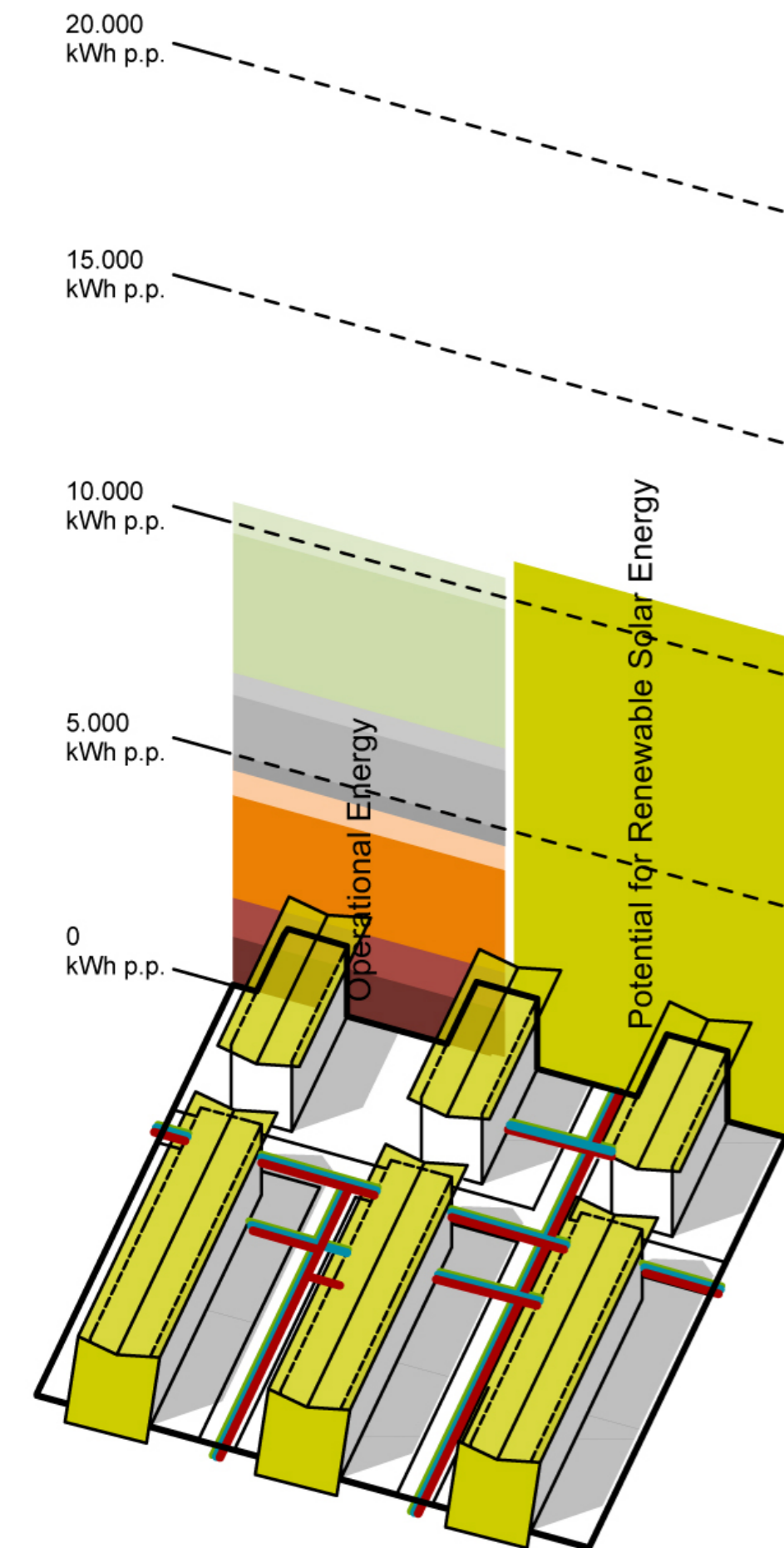
# Existing 60s Building



# „Conventional“ Solar Design Approach

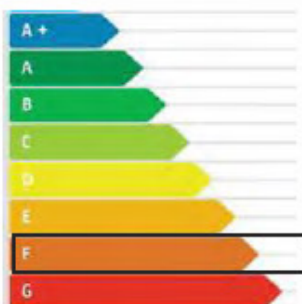


# „Active“ Solar Design Approach

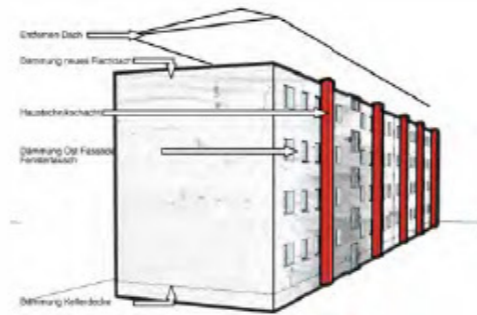




Sanierungsschritte Zum Nullenergiegebäude



Bestand - Johann Böhm Strasse



Sanierung: Schritt1



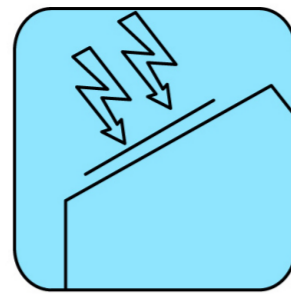
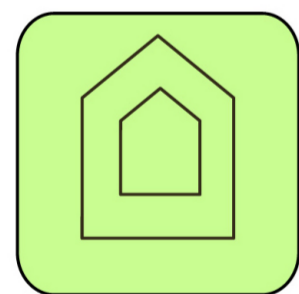
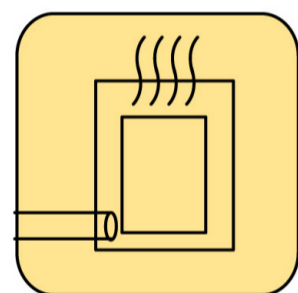
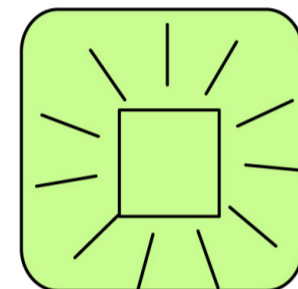
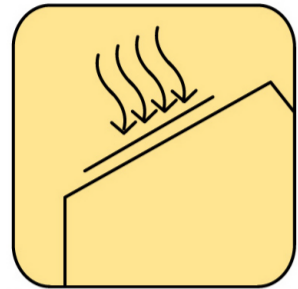
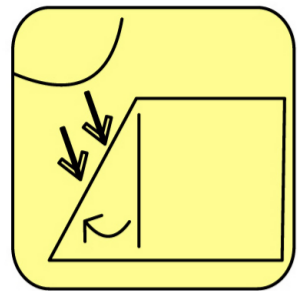
Sanierung: Schritt3



Sanierung: Schritt4







1.200 m<sup>2</sup> Roof Integrated Photovoltaic Modules

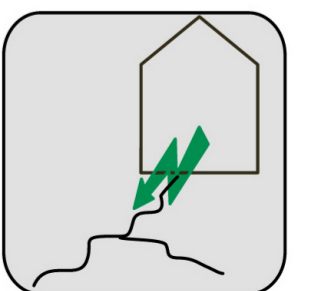
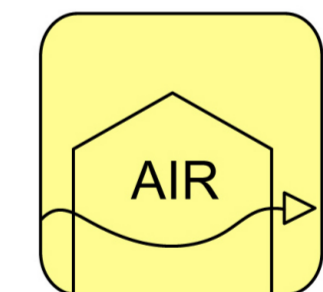
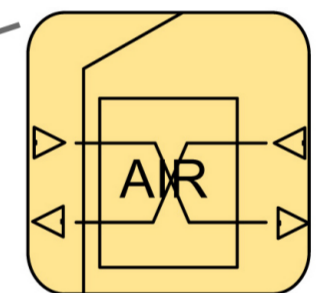
200 m<sup>2</sup> Solar Thermal Collectors

Prefab. Exterior HVAC Shafts

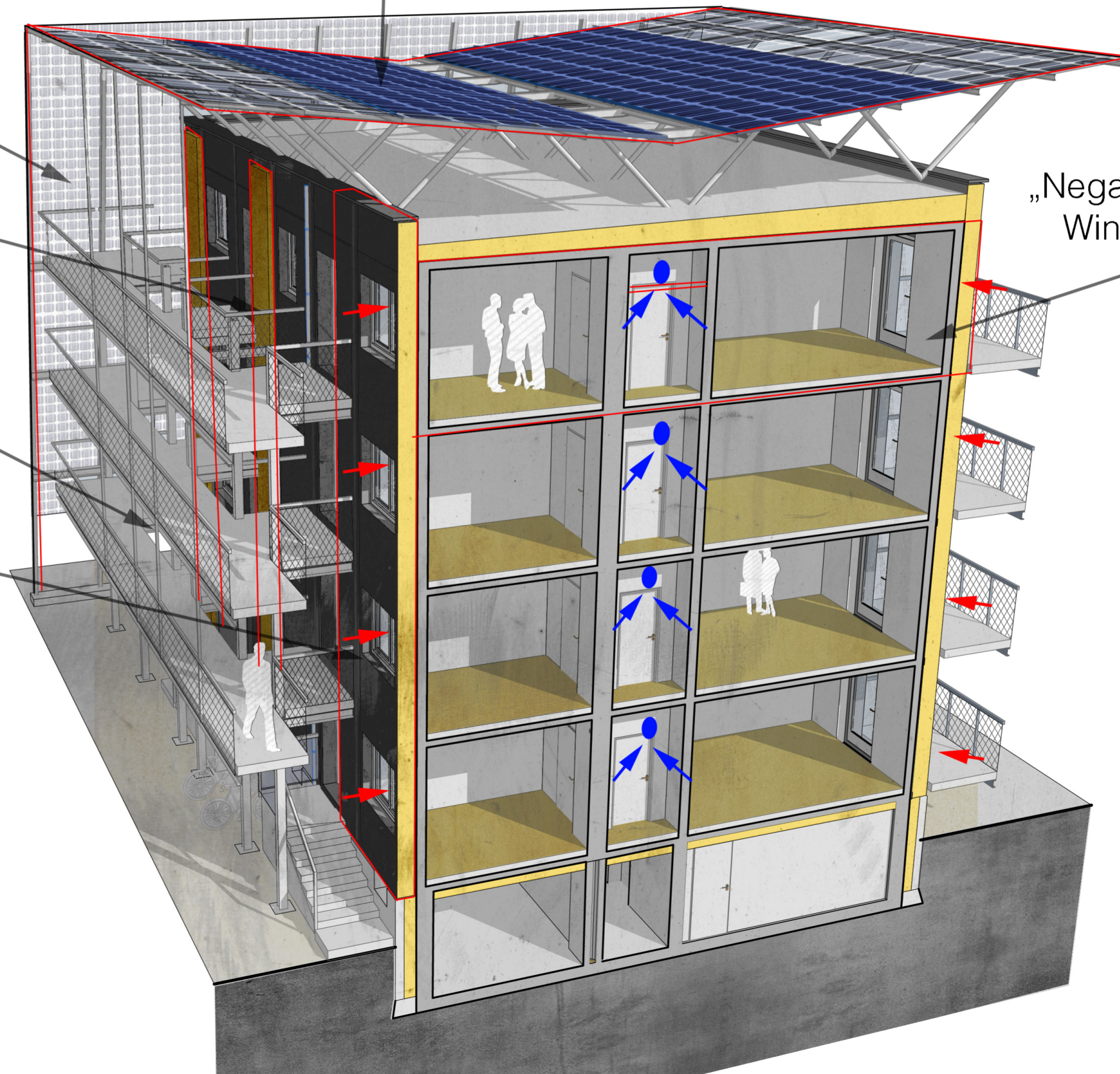
Puffer Storage Tank Situated under the Solar Wing

Prefab. Wooden Facade Modules

„Negative Pressure - Double Window Ventilation System

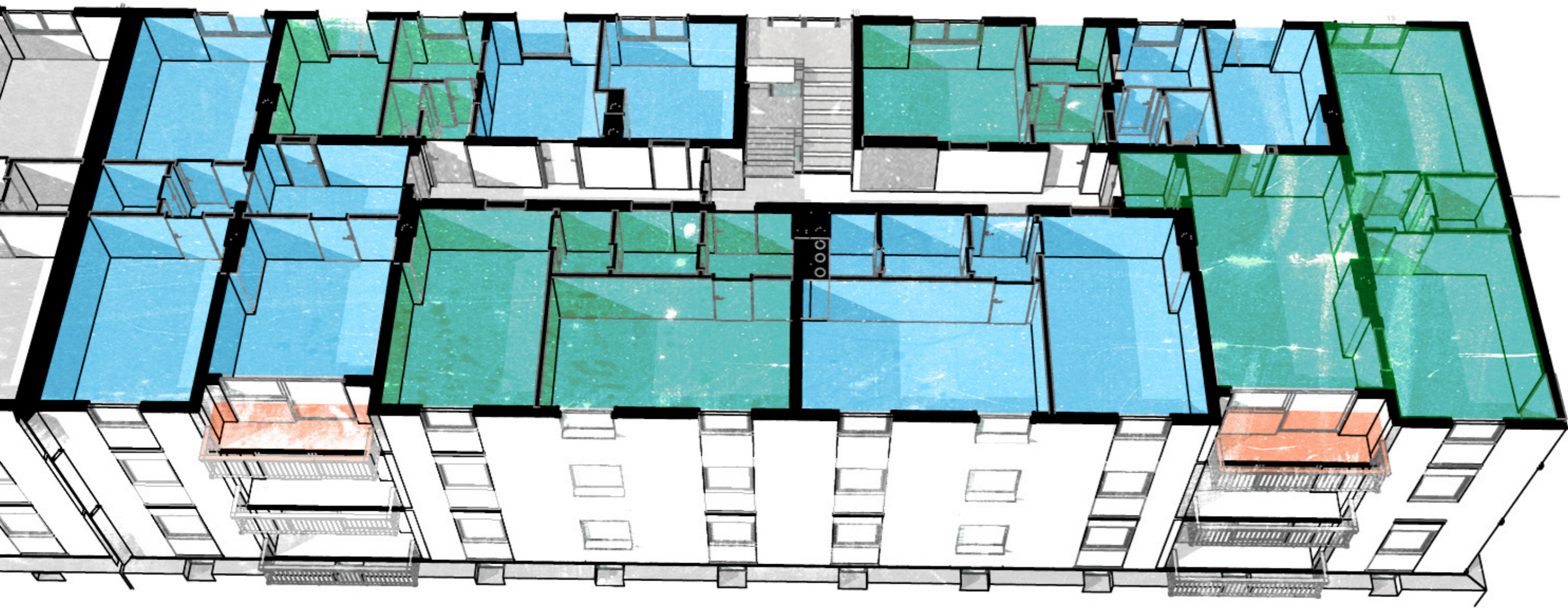


Electricity grid connected

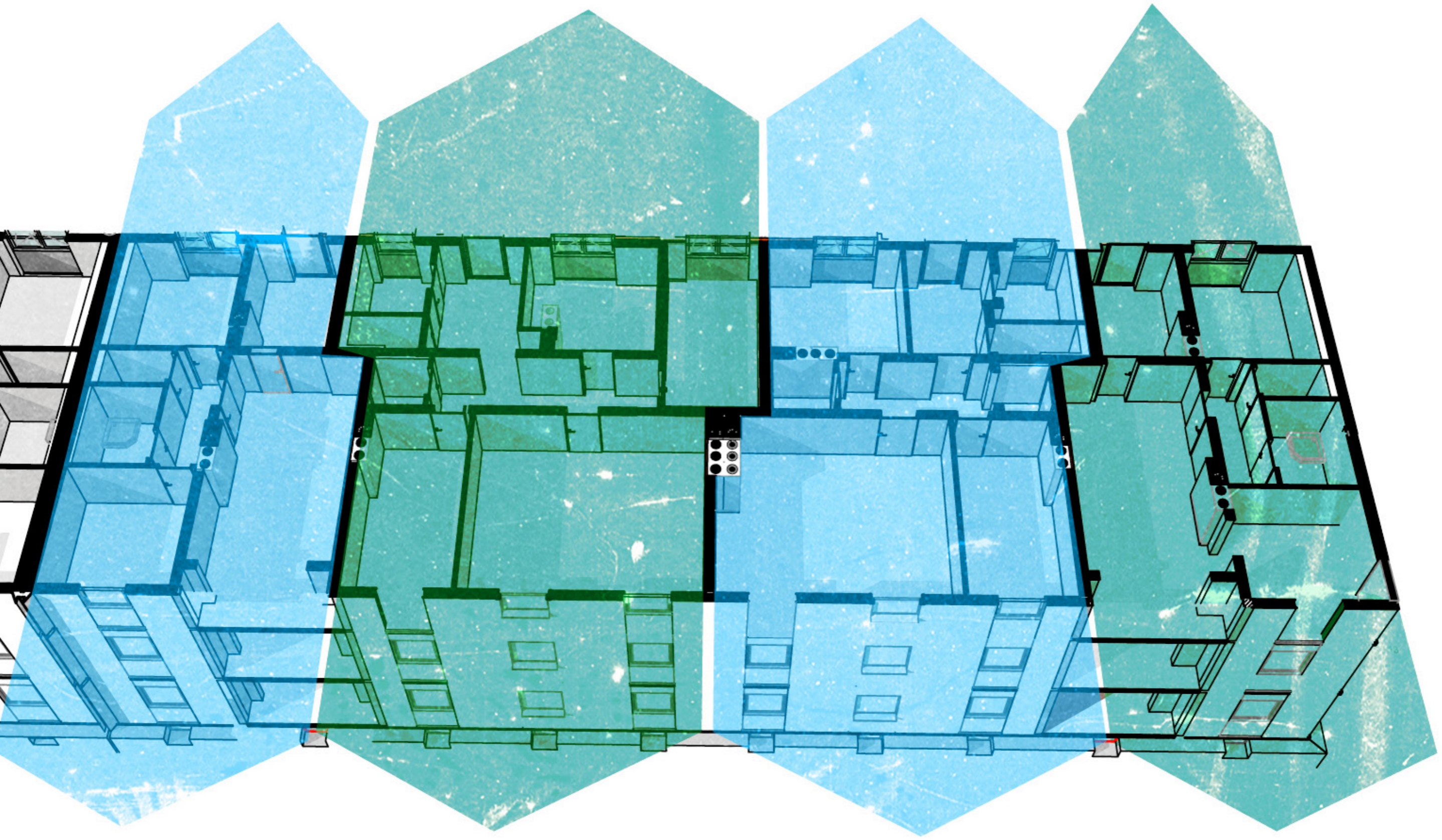




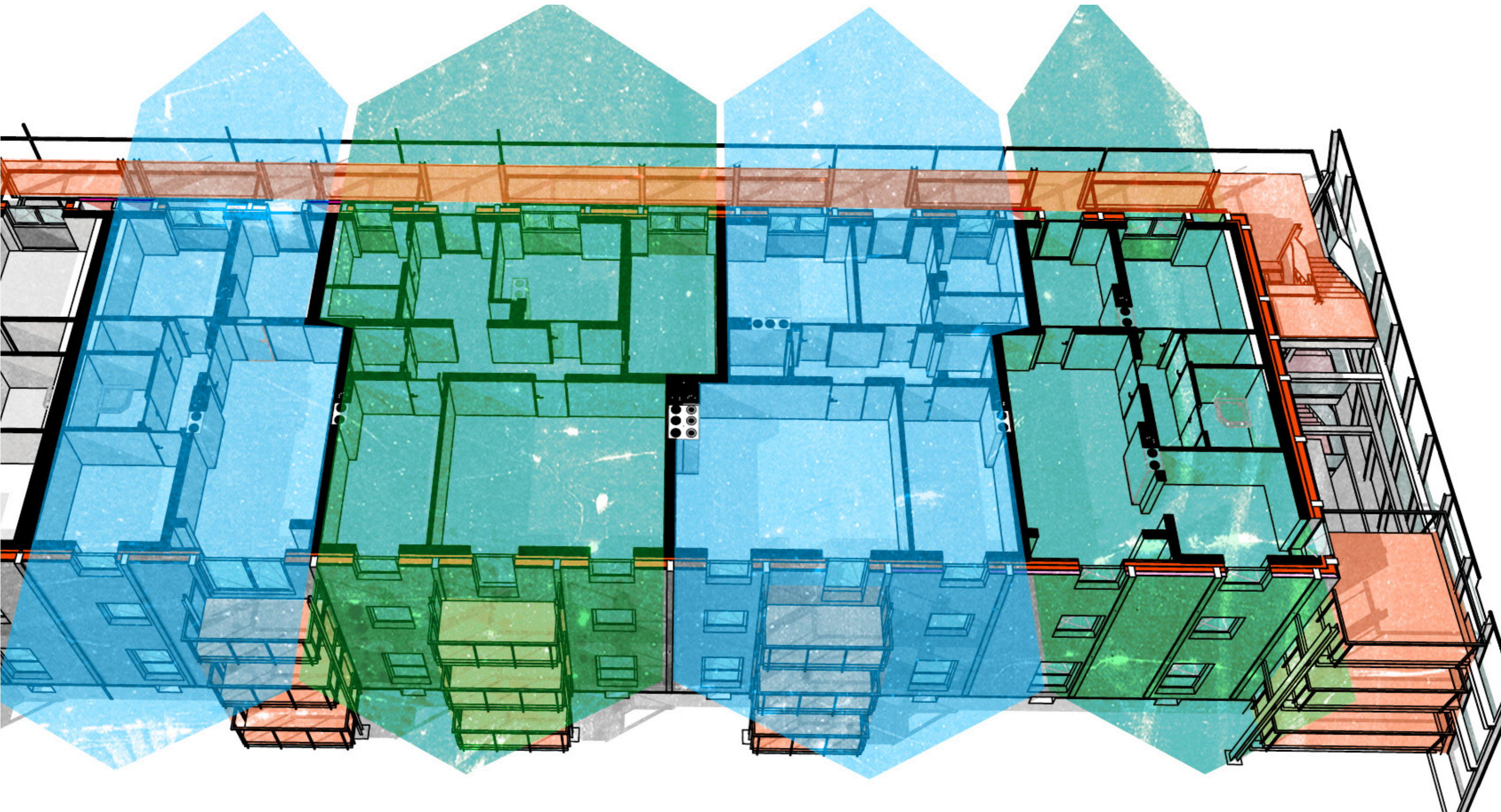
# 60ies Floor Plan Design

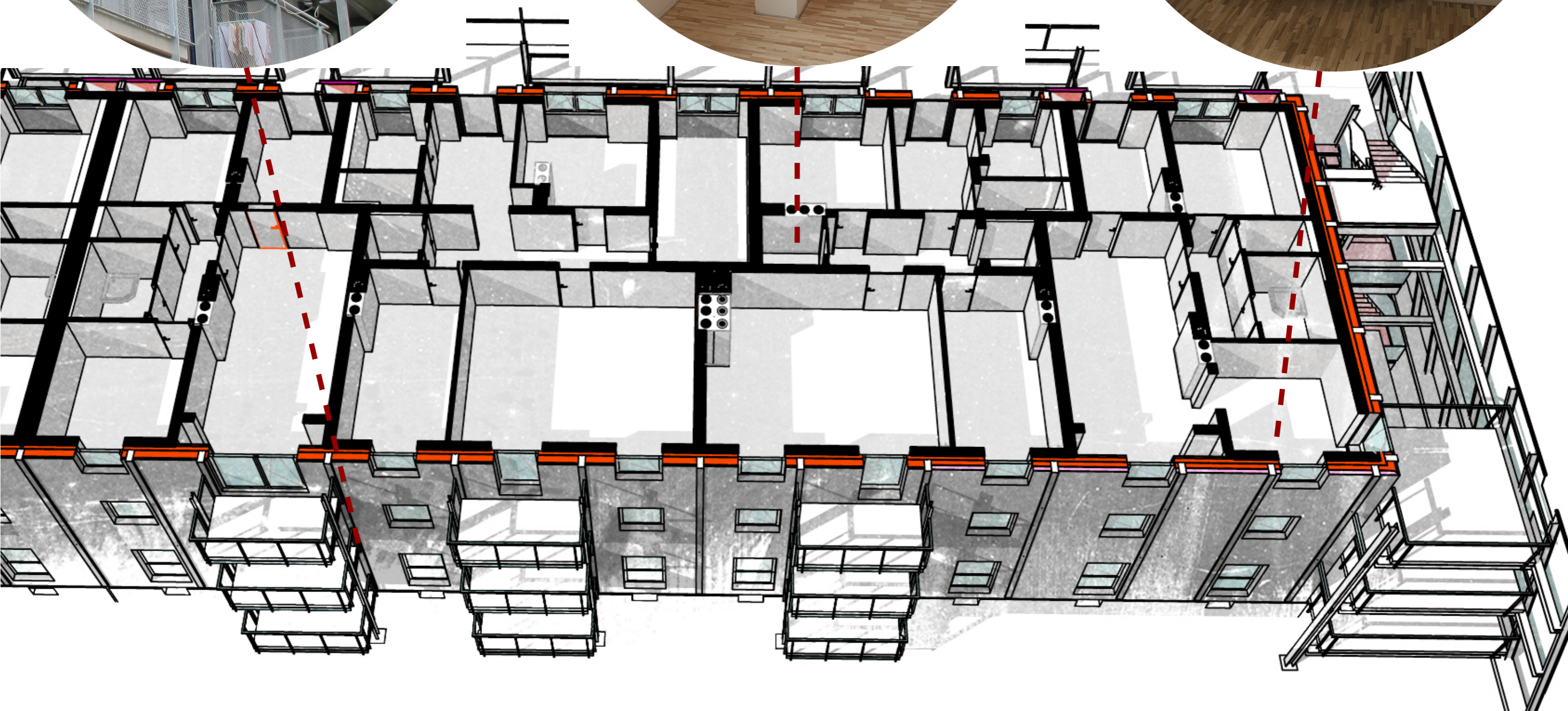


# Contemporary Floor Plan Design

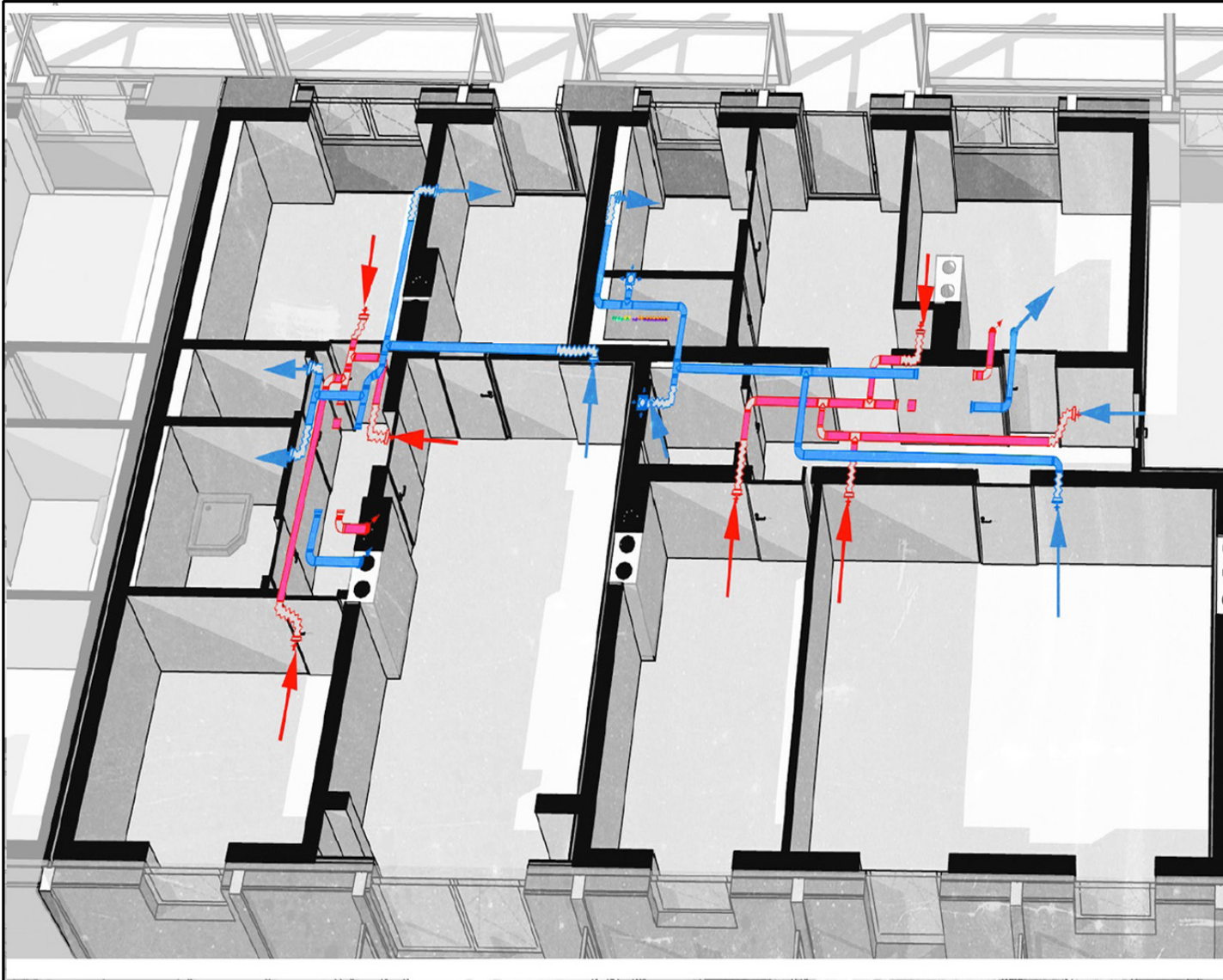


# Contemporary Floor Plan Design+ Addons

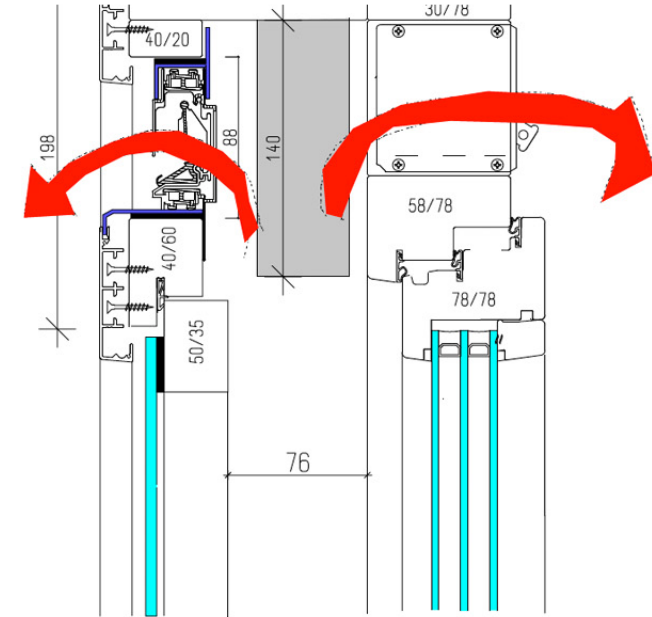
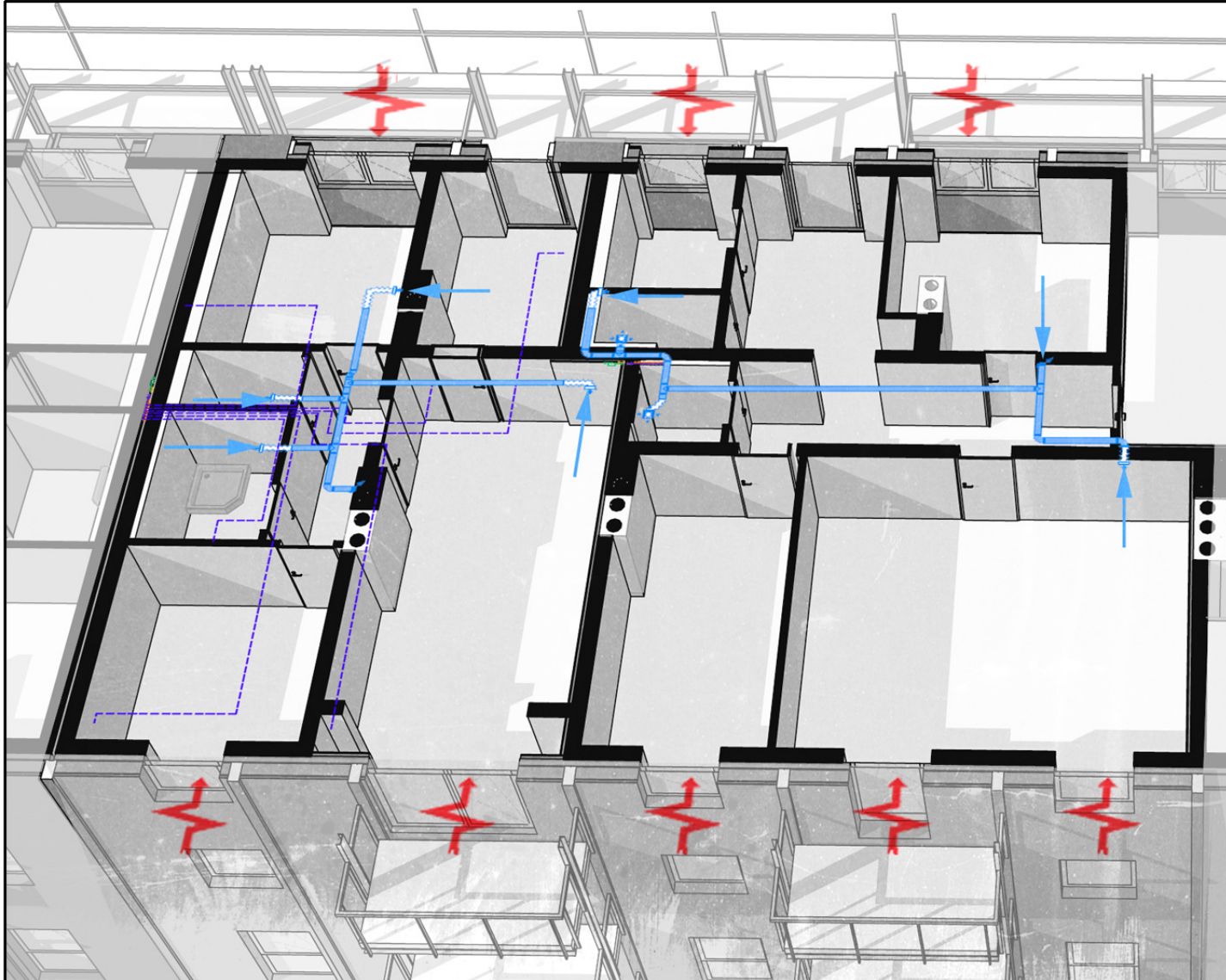




# Air Ventilation System With Heat Recovery



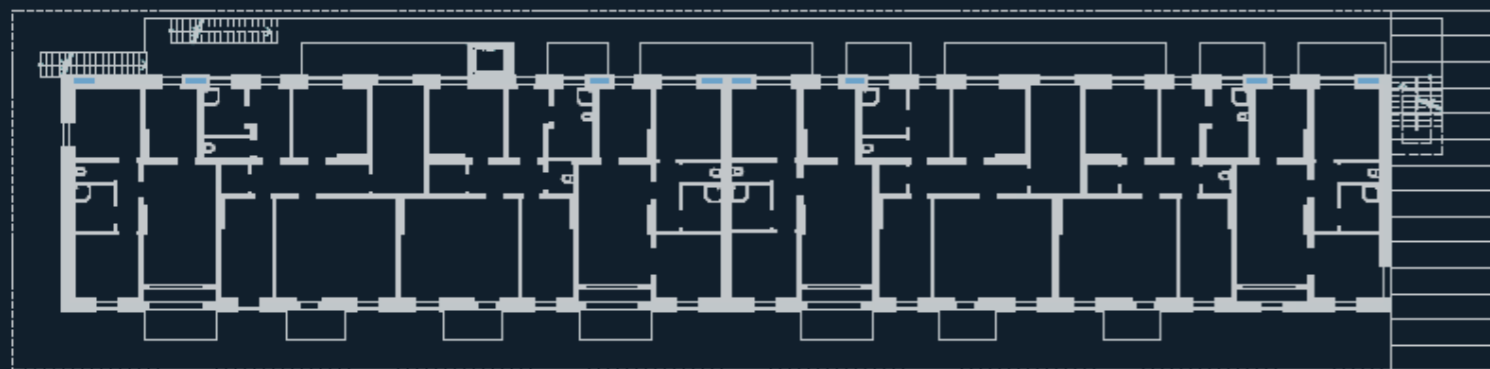
# Box Type Window - Exhaust Air Ventilation System



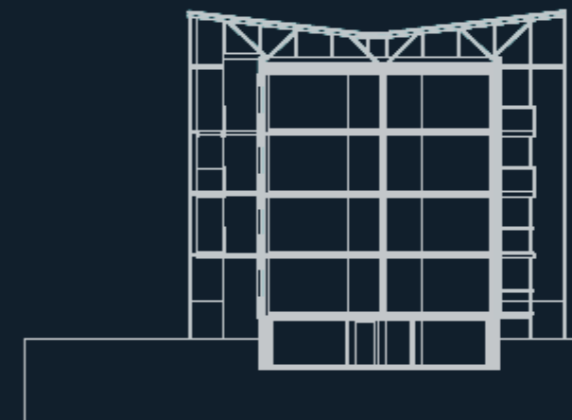
2012 10 17

# III. Demonstration Project - Construction Process

Grundriss EG



Grundriss OG



Querschnitt



# The Renovation Process



# The Renovation Process





before....



after











**Danke für die Aufmerksamkeit**

*Illustration: Tomas Saraceno*