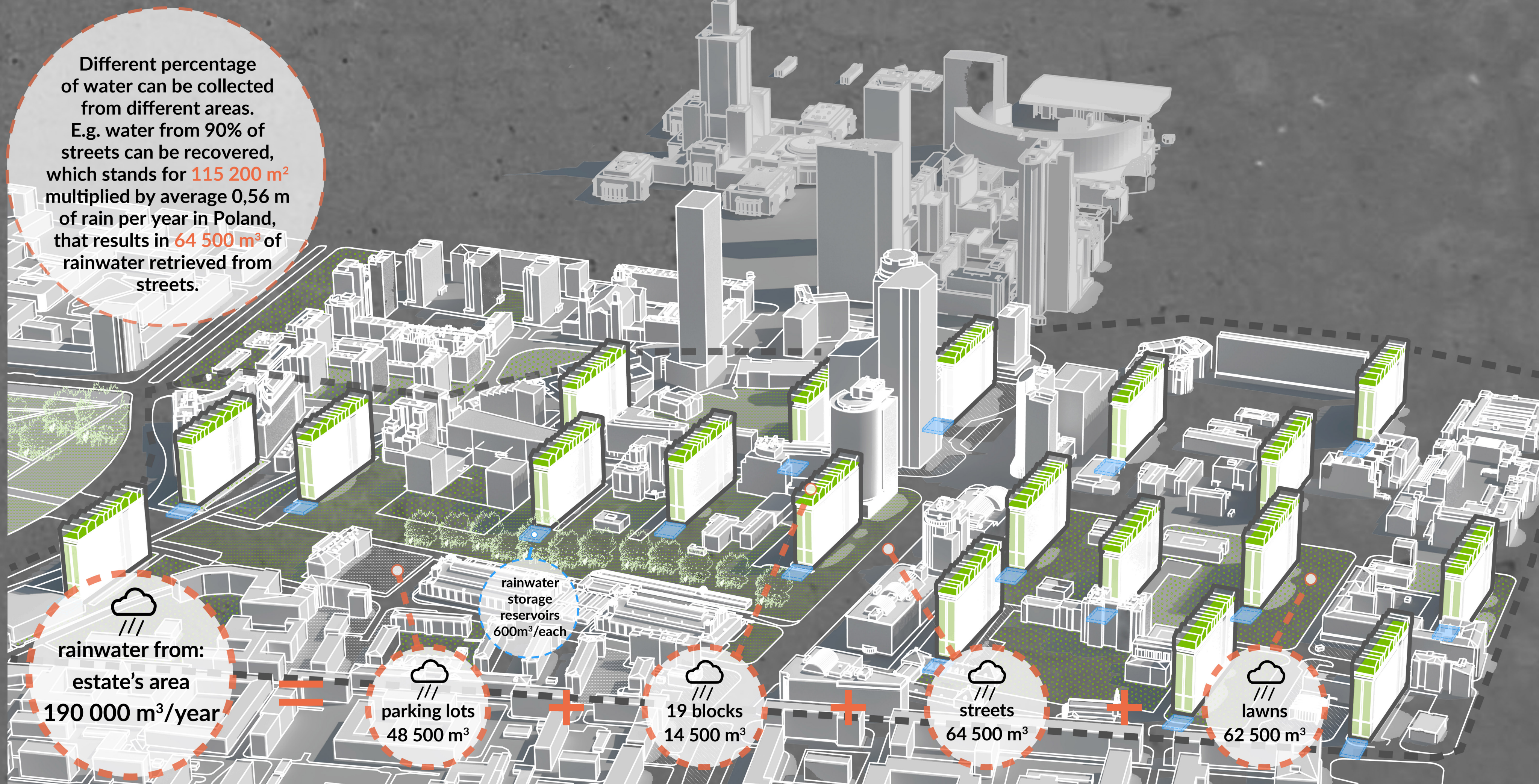


Urban Concrete Desert - to - Sustainable Green District



LOCATION AND ITS PROBLEMS

The estate was designed under the ideology of socialism in 1965-1972. Government and the communist party had a significant influence on a shape of the design.

Architecture and the construction style of the estate were oriented to settle the highest possible number of inhabitants and did so at the expense of convenience and comfort of living.

The resulting flats were mostly extremely small. All together there were ca. 7500 flats designed for 25 000 inhabitants (nowadays short-term tenants and immigrants).

Buildings are made of monolith reinforced concrete - incredibly durable and high quality structure. The hypothetical demolition of the buildings (which was proposed several times by urban planners) would be impossible. Firstly, because of polish economic and demographic situation, causing organizational problems for thousands of inhabitants. Secondly, it would be unsustainable from ecological point of view.

The Estate is not an exceptional example of radical urbanism in Poland. Many similar blocks of flats districts in polish cities struggle with problems of underfunding and insufficiency influencing lives of approximately 30% of polish citizens.

THE IDEA

The aim of this proposal is to turn a concrete urban desert of modernist blocks of flats into self-sufficient houses. The program was developed after analysis of several layers that the estate consists of.



Urban Concrete Desert - to - Sustainable Green District

WATER SHORTAGE

According to The Minister of the Environment, water resources in Poland are of the lowest in Europe. In Poland one person is provided with 1600 m³ of water per year (in the times of drought 1000m³) whereas in Europe in general this amount per person is estimated around 4500 m³ per year. In the whole world the number is ca. 7300m³. Water shortage is a serious threat for Poland. Global climate changes: scarce precipitation, snowless winters and higher air temperatures contribute to lack of potable water. Water crisis in big cities is a se-

rious issue worldwide. For instance in Cape Town water shortage began in 2015 and in Rome in 2017. Droughts already harmed Poland in mid-19th and throughout 20th century, recently in 2015 and spring 2018. Even though in Polish cities most of the households are provided with sanitary installations, soon the access to fresh water might not be possible for all citizens. There will be no possibility of relocating thousands of inhabitants, the community of the analyzed estate would be forced to adapt to natural hazard of water crisis.

THE RISK OF WATER SHORTAGE

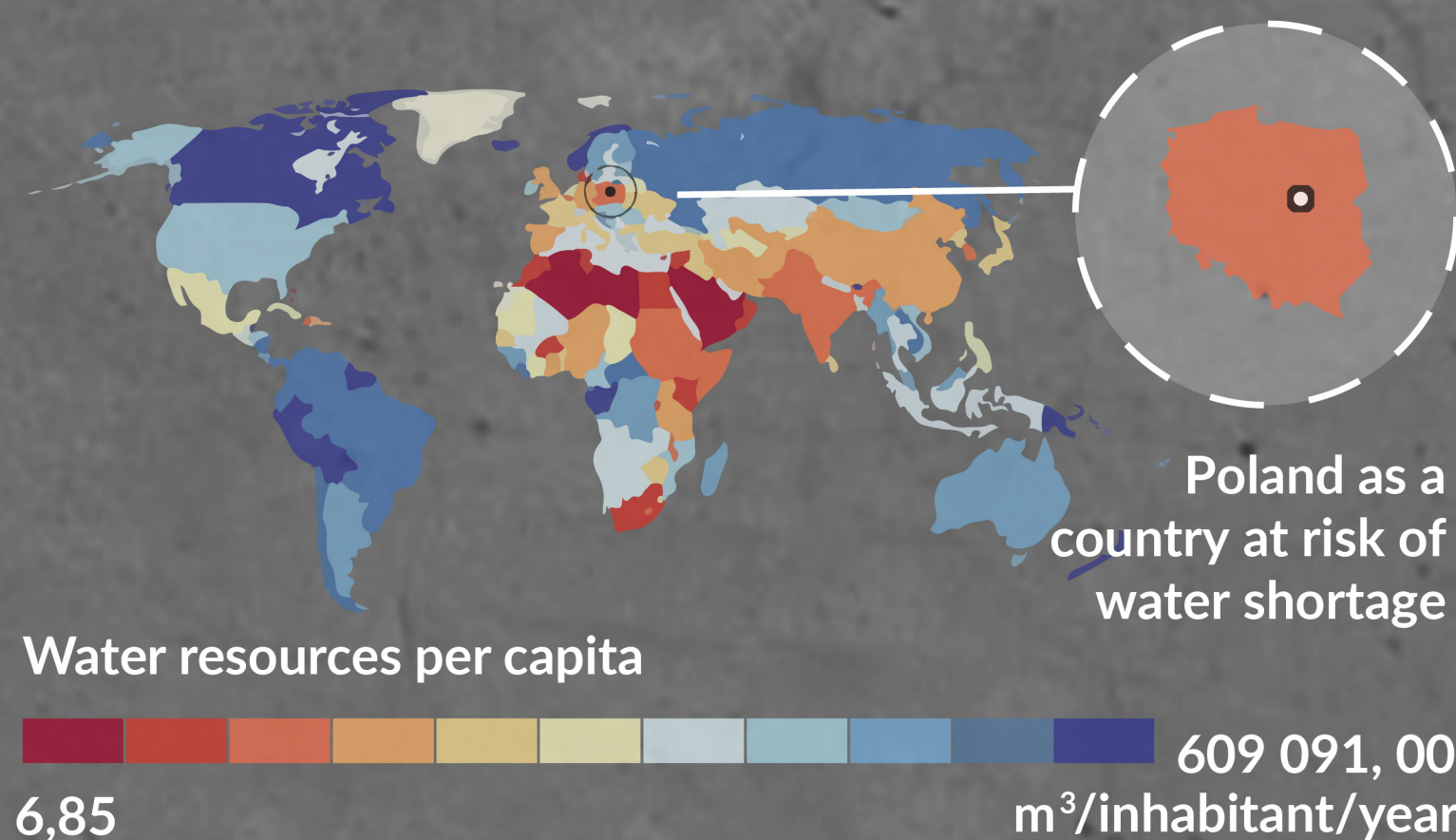


Image by authors after: Total Renewable Water Resources per capita by Country in 2008, <http://chartsbin.com/view/1470>, access: 9.10.2018

LAYER I - BLOCKS OF FLATS

1. ANALYSIS OF CURRENT STATE:

- Extremely small spaces for living
- Poor technical quality of apartments
- Anonymity inside the block – due to numerous inhabitants (approximately 1000 people per building)

2. SOLUTIONS:

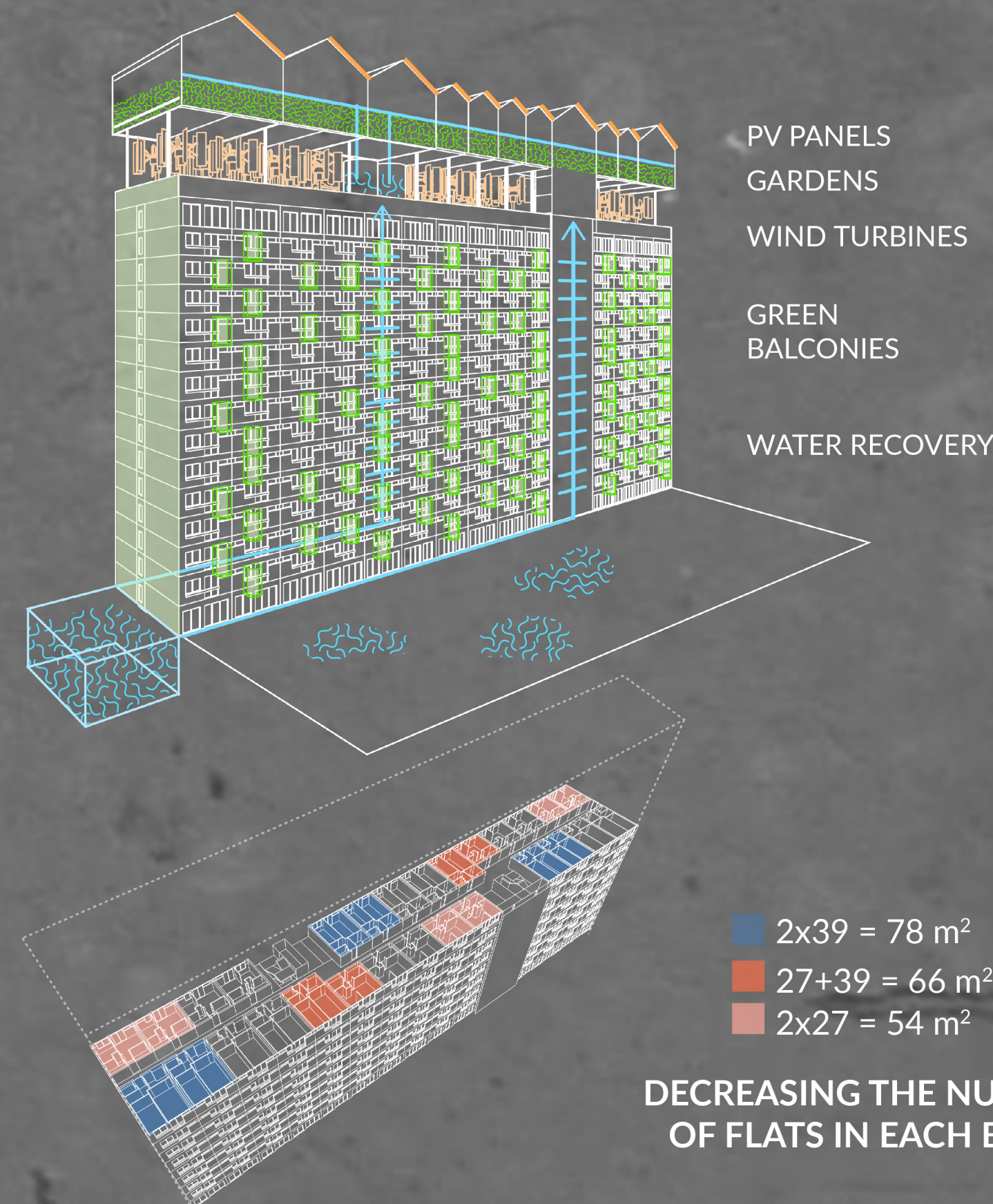
- Changing functions of two floors: ground floor into services for all citizens, the highest floor into co-working space.
- Reducing number of flats by connecting them in various configurations. Current flats of 27m² are significantly too small and poorly lightened. Spaces of this kind might be harmful for human health – resulting in discomfort or even depression.
- Adding glass bay windows – providing flats with small balconies with air purifying plants. This intervention

aims to increase comfort of living, giving a kind of barrier from polluted air which penetrates small flats through windows.

- Adding new floor with space for recreation and creative use by block's inhabitants. Originally, the blocks were designed with green roofs, however, due to government's "savings", they were never built. A garden could be arranged with different configurations. Flexible layout stands in an opposition to very regular and rigid spaces inside the building.

3. RESULTS:

- Changing the face of existing architecture to more humanitarian one
- Improvement in comfort of living
- Creating community bonds
- Inhabitants' feeling of connection with the place of living



DECREASING THE NUMBER OF FLATS IN EACH BLOCK

LAYER II - ESTATE OF 19 BLOCKS

1. ANALYSIS:

- High population and density
- Risk of shortage of resources (such as water and energy) due to high population and demands
- Anonymous space with significantly too many car parking lots
- Rigid and repeatable elevations – unhuman scale of the buildings

2. SOLUTIONS:

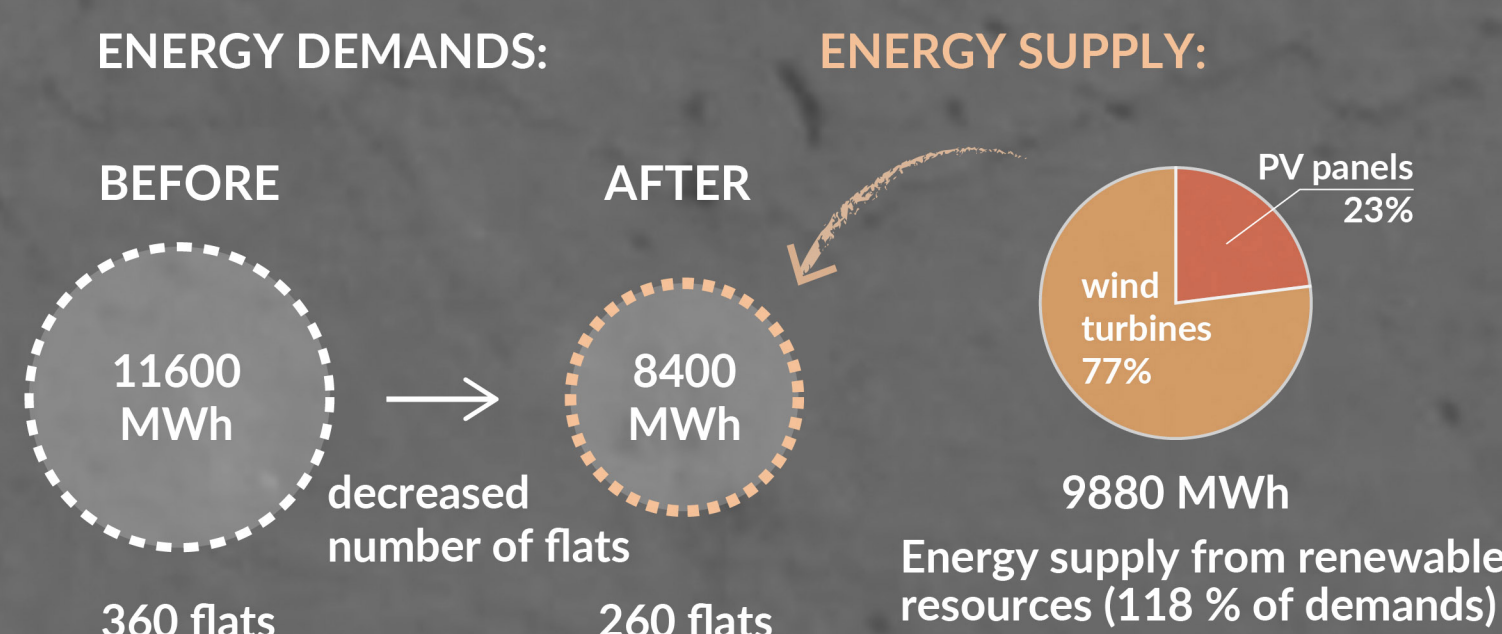
- Rooftop gardens – places for individual creative use by community of each of nineteen blocks of flats
- Green northern and southern walls

of the buildings which would decrease the "urban heat-island effect"

- Glass bay windows on eastern and western elevations which would individualize their character
- Underground car parks – hiding unpleasant view of cars and saving space for more greenery

3. RESULTS:

- More and more greenery and space for recreation
- Walkable spaces
- Community bonds and identification with the place



ADDING RENEWABLE ENERGY SOURCES

LAYER III - INFRASTRUCTURE

1. ANALYSIS:

- Loss of water – rainwater goes directly to drains, tap water is overused with little savings
- Lack of renewable sources of energy
- Little knowledge about risks of shortage in energy and water resources and possibilities of their saving

2. SOLUTIONS

- Water recovered from each block's rooftop, purified in special reservoirs on the rooftops and distributed to apartments by additional installation
- Construction of water storage reservoirs: small on the roofs - 200m³ and bigger - 600m³ on the ground level. The reservoirs allow to storage water after rainstorms
- Innovative technology of dry vacuum toilets – help to save up to 33% of water in a household

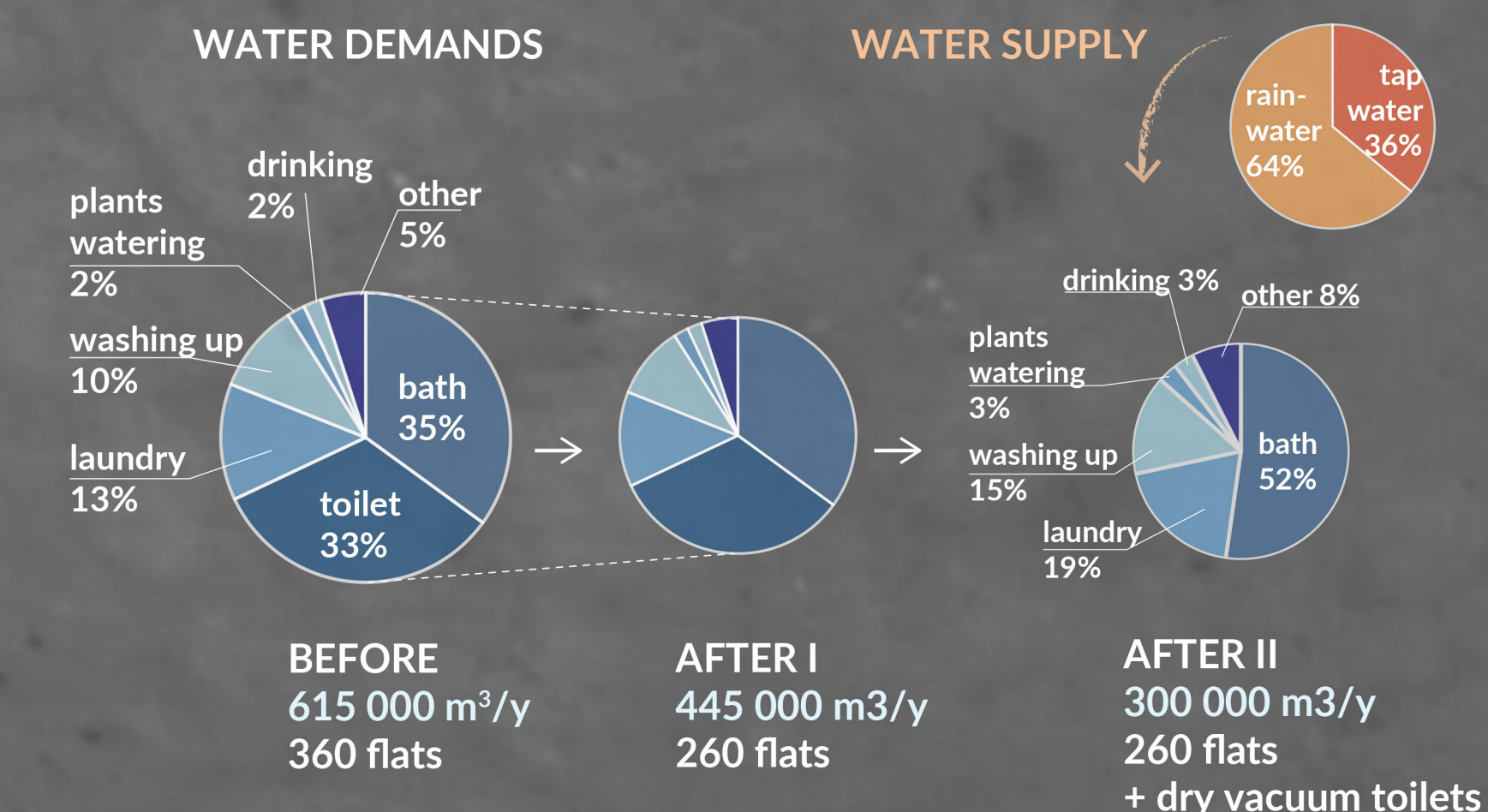
- Water use counter in each flat – to bring awareness of how many liters is being used daily

- Adding wind turbines on the roof and photovoltaic panels on glasshouses on the blocks' rooftops.

20 wind turbines with power of 10kWh on each blocks, multiplied by 19 blocks allow to obtain 7 600 MWh per year. 1200m² of photovoltaic panels on each block with power of 0,1 MWh/1m² can provide 2280 MWh per year. These energy resources sum to additional 9880 MWh yearly which stands for 118% of energy demands for the estate.

3. RESULTS:

- Energy self-sufficiency
- Saving up to 64% of water for the estate of 19 blocks
- Less demands of water supply from municipal water plants



EFFICIENT WATER MANAGEMENT

CONCLUSIONS:

Behind the Iron Gate Estate is an instance of architecture and urban planning that are obsolete for contemporary society. This, together with political changes in Poland, made the current appearance of estate's buildings similar to slums in metropolis's downtown. Increasing carbon footprint of the estate make it harmful not only for its inhabitants, but also for the whole city. All the solutions proposed above, aim to give a new prospects for the estate.

To sum up, all changes from this proposal help to:

- Save approximately 190 000 m³ of water per year (64% of demands)
- Obtain 118% of energy demands thanks to PV panels and wind power station on the roofs
- Create space for community on the rooftops