**TITLE:**

'OFFLINE PARK’

THE PARK OF THE 21ST CENTURY WILL BE OFFLINE

**CONCEPT:**

Sustainable development should be two pronged— generative and reductive. A public park is a public good. The schrebergärten was the late nineteenth century garden-as-antidote prescription to the rapid growth of the industrial city, a green-escape for mental wellbeing among the suffocation of the metropolis. Today our mental-health problem is not the industrial city, but the new culture of data and our inability to switch-off. The park of the 21st century will be an OFFLINE PARK; an urban space shielding electromagnetic radiation (blocking phone signal). This new type of public (and private off-grid) park-as-antidote is too a prescription for mental wellbeing and a green-escape, this time from the suffocation of an always-alert life. Our project is fundamentally the reinvention of the park (in the spirit of Dr Schrebergärten) as an entirely new type of energy-landscape-infrastructure. Our project generates solar-energy (a solar canopy) at the same time as reducing energy-in-use (placing smartphones and data consumption on pause). Our solar canopy (a woven 96% open mesh incorporating a multitude of micro spherical solar cells) forms a healthy shield against electromagnetic radiation, so as both to block phone signal (a faraday cage, in combination with mesh screen walls), as well as to protect butterflies (and other insects) that are suffering species decline in Germany due partly to the harm of electromagnetic radiation, and which are so essential to biodiversity as pollinators. A micro spherical solar mesh is able to receive the suns beam from varying directions, and so can be incorporated into an undulating surface such as that formed by a mesh or textile. The act of reforestation contributes carbon sequestration, flora and fauna habitat, and in the situation of the former Spinelli barracks, contributes even further to the mitigation of the heat island effect (the sites development goal). Our solar canopy is supported by a living-willow-structure (instead of an energy-intensive concrete and steel foundation and sub-structure for example), and is inspired formally by the art nouveau light stands of Wasserturm Water Tower Mannheim. Our park is a forest, a faraday cage, a butterfly garden, and the protective veiling of various multi-purpose platforms and courtyards that can be considered flexible in four ways: 1. the space is inherently flexible in use, 2. the rootballs of the structure can be pushed and pulled to reposition over time, 3. the rootball bags themselves can be deformed by peoples sitting and leaning, and 4. the canopy can be designed with sections of water-proof or with various beneficial microclimates under special conditions of diffused light for plant growth and the clear illumination of flora and fauna (a museum of sorts with nature amplified). Taking an archaeological approach, the plan is detailed as a palimpsest memorial like tracing of the revolutionary site history, producing a ghosted synthesis of previous structures and cultivations, as a new (yet familiar) and distinct pattern of some meaning and idiosyncrasy. Our living-willow-structure starts life as a willow recycling bin (a basket) for the organic (and also non-organic) waste generated during BUGA 23 (waste remediation), and is subsequently transported and installed as a base of exposed rootballs (for excellent soil oxidation) for the planting of the forest, which can be altered, shifted, shaped, and grown (scalable), by people and by nature, over time. Finally, plant microbial fuel cells utilise areas of planting within the forest for energy generation and, as sited around public toilets, for wastewater purification. In the future, all cities will have an OFFLINE PARK; a public place which is also private (no data); and where new cultures of disconnection and reconnection and grown.

**SCHREBERGARTEN APPLICATION:**

The typical schrebergärten has good access to direct sunlight, and is used both as a space for the cultivation of plants (particularly agricultural cultivation) and as a space for living (sitting, talking, reading, dining, exercising, resting, playing, etc). Each schrebergärten has various and varying requirements; for shelter, protection, security, storage, and furniture. Although there can be found to be general conditions— such as tall planted boundaries (hedges and planted fencing), trees, a terrace, and a small outbuilding or shed— it can also be argued that the ideal system for the schrebergärten module, would be a system that could simultaneously meet the needs of shelter, protection, security, storage, and furniture, whilst at the same time generating energy from the sun, and to do so through an adaptable and customisable system (not a repeating module), and even to be a personable system that allows for individual specificity, complexity and self-expression. Our system of a micro spherical solar mesh textile can be such a system (examples shown opposite), tied between trees, connected to boundaries, and covering new living-structures such as peoples creative willow sculptures. The possibilities are as varied as the schrebergärten itself.

**ENVIRONMENTAL IMPACT SUMMARY:**

Forests provide habitat for wildlife, help remove dangerous greenhouse gases from the atmosphere, reduce soil erosion, and help sustain the environment in other ways. The majority of plants need pollinators like butterflies to reproduce, essential for many ecosystems to thrive. Butterflies in particular help flowers pollinate, eat plenty of weedy plants and provide a food source for other animals. Insects have declined by 75% in the last three decades. For butterflies the risks of wireless broadband radiation are on top of risks from habitat loss. Higher frequency 5G technology may destroy the sensing mechanisms of insects, such as the antenna of butterflies, which also equals death. Recycling of horticultural waste on site reduces transportation and deconstruction environmental impacts. Solar installations usually require steel frameworks and concrete foundations. By constructing upon existing foundations and compacted earth, and by using lightweight raised rootball living-structures, the environmental impact of new foundations and framing systems is eliminated.

**TECHNOLOGY:**

* SOLAR MESH: Woven open solar mesh incorporating multitude of micro spherical solar cells (flexible suspended canopy surface). The suns position is always moving, and light does not fall uniformly (it is dispersed and reflected by the environment). Spherical solar cells, such as those developed by ‘Sphelar’, are able to receive light from multiple directions. This opens new possibilities for a large solar array to be both a flexible curved surface, and also a surface that may change shape and deform over time. Micro engineering of such solar cells, to around 1mm diameter, may be incorporated into a woven mesh designed for maximum transparency (in our design this is a 98.4% open mesh). The mesh may also be engineered to provide various beneficial micro-climate conditions under, such as providing shade, waterproofing, and thermal mediation.
* MICROBIAL FUEL CELL: Plant microbial fuel cells and urine powered microbial fuel cell public toilets. Plant microbial fuel cells are a bioelectrochemical system that integrates the photosynthetic reaction from living plants to generate electricity via microorganisms at the rhizosphere of the plant roots. The fuel cell essentially uses organic matter in the soil as fuel, converting solar energy into electrical power by using microorganisms, which degrade root exudates and pollutants at the anode and pass the electrons to acceptors at the cathode. Further, human waste such as urine contains organic compounds that can also be utilised as fuel for a microbial fuel cell system, along with disposing of the waste from toilets.
* FARADAY CAGE: Woven open ‘faraday cage’ mesh blocking electromagnetic radiation through enclosure (as part of the solar mesh canopy). A faraday cage is essentially a container, or a shield, that blocks out electromagnetic radiation from across the electromagnetic spectrum, such as radio waves and microwaves. A faraday cage can be made of any material that can conduct electricity, such as a wire mesh, and is perfect safe with a grounding wire. The mesh can be fine and thin, and engineered to be open whilst also blocking phone signal and access to the internet. A faraday cage will block the entry or escape of electromagnetic fields, meaning both downloading and uploading to the internet from smartphones for example. A faraday cage may also be designed to block particular frequencies and radiation harmful to insects such as butterflies.
* LIVING STRUCTURE : Living willow structure (supporting the solar canopy) recycling and remediating the horticultural waste of BUGA 23. Installing energy generating technology such as solar panels, usually requires the construction of energy expensive steel framing and concrete foundations. Alternatively it can be possible to engineer living plants as an architectural structure. The advantages are multiple; instead of a carbon cost, plants and trees provide carbon sequestration and are a natural and renewable resource; growing a structure reduces many energy costs and waste involved in manufacture and transportation; a forest or garden provides habitat for flora and fauna, and contributes to biodiversity. Willow structures and sculptures have a history and culture in Germany, not unlike the culture of creative cultivation of the schrebergarten.

**MWh GENERATION:**

* TOTAL GENERATED PER YEAR: 3,045.38 MWh (solar canopy) + 39.42 MWh (microbial fuel cell) = 3,084.80 MVh
* TOTAL REDUCED PER YEAR: 6.72 MVh (faraday cage)
* NEW TOTAL NET ENERGY CONTRIBUTION PER YEAR: 3,091.52 MWh

**UN SUSTAINABLE DEVELOPMENT GOALS:**

* GOOD HEALTH AND WELL-BEING: The smartphone is a transformational technology. However research has shown a high level of smartphone addiction today, and with over-use, various negative impact mental health and well-being. Reducing smartphone usage by even just an hour a day for a week can improve your mental health. An offline park is a civic space for public good.
* AFFORDABLE AND CLEAN ENERGY: Our micro spherical solar mesh canopy is an affordable clean energy solution able to cover large areas of land with flexibility and in such a way that the land remains usable and productive.
* INDUSTRY, INNOVATION AND INFRASTRUCTURE: The Park of the future is an offline space. We have designed this new type of public-park infrastructure as an innovative canopy that is also an energy generating landscape.
* SUSTAINABLE CITIES AND COMMUNITIES: Sustainable development should be two pronged— generative and reductive. We have contributed to the city not only through the design of an energy generating landscape, but also through the design of a cultural and community device, that reduces through habit the use of electronic devices such as smartphones.
* RESPONSIBLE CONSUMPTION AND PRODUCTION: A forest is a consumer and a producer; purify the air we breathe, filtering the water we drink, maintaining a habitat for wildlife, and acting as a buffer against climate change. Our energy generating landscape is also an artificially created living forest.
* LIFE ON LAND: Pollinators provide many benefits to nature and humankind. German butterflies species are in decline, partly due to the harm of electromagnetic radiation. Conserving butterflies, and creating biodiverse urban corridors, are key to pollination and a biodiverse ecosystem. Our living-structure forest and protective canopy provides an ideal habitat for butterflies and other fauna to thrive.