Walking in the Fields of Gold

Project Description
The concept capturing solar energy and photovoltaics has been around since the turn of the 17th century. Despite its increasing presence in the energy production competition, it has yet to be explored more aesthetically. Due to its rigid characteristics, physical appearance and high cost, it is mostly installed in large buildings and infrastructural projects and seldom celebrated as a design element.

Walking in the Fields of Gold is an art installation that integrates solar, wind, kinetic energy harvesting on the project site in Mannheim, Germany. The modules integrate canopies overhead that will utilize a Dye-Sensitized Solar Cell (DSSC) fabric. This allows the textiles to have energy harvesting capabilities. DSSCs are categorized as thin-film solar cells that are integrated into a textile structure. The Fabric will also utilize the motion captured by the wind in order to harvest secondary additional kinetic energy. On the ground level, piezo electric pavers will harvest kinetic energy from visitors' footsteps proactively immersing pedestrians in the sustainable art installation. Lastly, the installation would include modules that collect rainwater that can be filtered and used for the agricultural program on site. The infrastructure not only provides power to the agricultural infrastructure on site, but also its adjacent community.

The relatively new scientific application of Dye-sensitized solar cells (DSSCs) could broaden the application of photovoltaics. Benefits include low production cost, scalability and simplified manufacturing. DSSCs have hurdles to overcome before reaching commercial production. However, once hurdles are successful navigated, applications for DSSCs can have implication across various fields including fashion, infrastructure, healthcare and emergency shelters.

The site will have features of a public park, but it will also be a platform for agricultural program and education. Walking in the Fields of Gold will be a series of modular follies that populate the site. The remaining area of any unused landscape will be used as agricultural grounds for harvesting food for migrant farmers.

Mannheim Site
Walking in the Fields of Gold will span over two lots on the Mannheim Site. The lots are sub-divided into smaller plots that would better curate a human scaled experience. The sub-divided plots are divided into 15 meter wide agricultural strips land will host different fresh food for the public. Finally, the 5 meter by 5 meter modular art installation will be integrated into the agricultural landscape.

Modular Design
The structural grid of each module is 5 meters wide, by 5 meter deep, by 5 meters tall. Each module consists of wooden structural members, DSSC fabric, piezo-electric pavers and/or water collection modules. The three-dimensional grid layout allows the system to be expanded horizontally and vertically in order to meet the power needs of its adjacent community, or to take advantage of its natural environment.

Technology
The overhead canopies will be lightweight, flexible, and low-cost DSSC textile coated in polymethyl methacrylate (PMMA) for weather protection. The DSSC substrate will utilize a kinetic textile consisting of conductive multi-walled carbon nanotubes/polyethylene terephthalate (MWCNTs/PET) wires (7) allowing it to have weather protective, but structural resilience. The battery would also be integrated into the fabric so the need for a centralized battery location would be removed. The textile weaving process can be divided into three steps: battery textile weaving, photovoltaic textile weaving, and encapsulation-layer coating (PMMA).

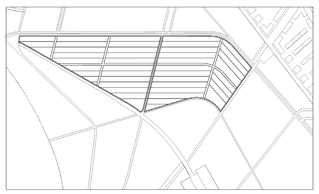
On the ground floor paved walk ways are designed to capture kinetic motion use piezo electric panels that are commercially available.

Water collection modules would consist of a hydrophobic surface that would be piped to tanks that would use underground irrigation to provide water for the on-site agriculture.

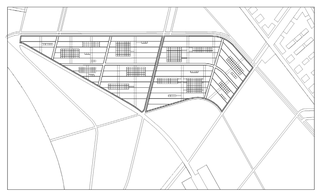
Site Diagrams

The project will span over two lots on the Mannheim Site.

The lots are sub-divided into smaller plots that would better curate a human scaled experience.



The sub-divided plots are divided into 15 meter wide agricultural lands. Each land will host different fresh food for the public.



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