

Summary: Vertical Farm Dublin

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My building tries to be the starting point for a new perspective. It is designed as a prototype of a new kind of technology and reflects its intentions in a variety of ways. The idea of the project was to develop a system that is flexible enough to work on nearly any location. As regards sustainability, it is important that this system will save energy and resources. The first logical step therefore was to use an already existing non-profitable building in a big city.

Right at the start of the project, I came across two major points that might greatly affect the success of this project. On the one hand there are hardly any empirically established figures or guidelines on this new typology. On the other hand it is not a given fact that the public will accept high tech urban food production. I thus consider my building as a first step to introduce vertical farming in our society. Its main aim is not to maximize the amount of food produced but rather to research the opportunities of this typology and to communicate them to the public. The result of this is a hybrid building serving two functions: a research centre and a place for a sincere exchange of views with the public. This building shows and researches the opportunities mentioned above while at the same time it informs the public about its necessity today.

Dublin seems a perfect location to develop a prototype of this kind as Ireland imports most of the fruit and vegetable that is consumed and prices are well (more than 30%) above EU average. Furthermore there are excellent universities and research centres based in the city of Dublin.

Liberty Hall in Dublin, headquarters of SIPTU, and still the tallest building in Ireland as well as the city's landmark, is likely to be torn down in 2009 to clear space for a new building. It was built in the sixties and its layout does not seem to be profitable anymore. My idea was to preserve this very special and historical building for Dublin while showing that it is possible to make use of existing buildings in a meaningful way.

The urban city planning process redevelops the quarter and creates a quiet marketplace, which forms a strong contrast to the typical hustle and bustle of Dublin's streetscape. The approach to the building is given by the extraordinary location of this site, which forms a link between harbour and city and integrates itself perfectly into the existing city structure. The user is particularly attracted by the height of this landmark and its special structure, in which the plants are moving. The user enters the building through the barrier-free ground level, which consists of a market place and a food court. The stairs in the centre of the building invite visitors to walk up to the tower. On this level you will find an overlapping of the building's two main functions: research and information. Both parts are clearly distinguishable through the material they are made of. The public zones are coated with a light transparent facade while the research areas appear more like a closed object. These "L" shaped forms are connected and create communication zones.

The design of the greenhouse tower is based on a flexible and room-intensive layout. It consists of three separate greenhouses, which have an identical structure. The system allows for creating whatever atmosphere of light, temperature, humidity and CO₂ concentration is necessary to assure the best climate for each culture. It is also possible to create different scenarios. You can use one greenhouse with just a bit of energy input and another one with a lot of energy to obtain the highest yield. To use the available amount of space most effectively, there are only one harvest floor and one control floor with space for labs and installations for each greenhouse.

The plants grow on hydroponics, which are placed in pockets on a textile sheet. These sheets are attached to a transport system which runs through the complete greenhouse. The sheets are moving along this system and are shifting from one level to the next in the free space between the new curtain facade and the existent floor. A plant changes the floor level every day. After three days it has gone up to the top of the greenhouse and starts its way down again. Another three days later the plant is back on the harvest level. In this area the plants can be harvested, controlled or replaced.

Each greenhouse floor consists of three different rings. The outer light-intensive ring constitutes the first ring, the second ring is partly shadowed and the last ring generates a dark and cool night-time atmosphere that allows the plants to rest. By using artificial light it is possible to create a steady day and night production, thus doubling the yield and minimizing the dependence on the outside weather condition. The building generates its own energy by using a living machine and an algae facade. Solar panels and heat pumps may also be integrated.

In the beginning this building will hardly create enough energy or food as to level the high costs of construction. However, the products grown are free from pesticides and herbicides and they are produced locally and ecologically. To my mind, it seems important to research this typology and to make use of the knowledge gathered by it to find new ways of coping with the ever-growing problems of urbanisation, overpopulation and the climate change. This prototype is designed as one first innovative step to meet the challenges that lie ahead.