

## Refarm Technologies

REFARM is a innovative, scalable format which brings together two distant worlds: soilless agriculture and waste-to-energy. The challenge is creating a virtuous pipeline where the side product of each process can be effectively reused by the other process, therefore optimizing the overall resource usage and the project sustainability. This will ultimately result in an improved financial performance too.

Our aim is to build a medium scale, indoor vertical farm based on aeroponics. Aeroponics represents the maximum evolution of soilless agriculture: the growth medium is completely removed. Plants are physically supported and grow with roots suspended in mid air; a solution made of water and nutrients is vaporized directly on the roots. Aeroponics has a variety of advantages compared to open field agriculture and to other soilless growing techniques like hydroponics: crops grow without pesticides while water consumption is 95 lower than open filed agriculture. Yields are up to 40 times higher than open fields agriculture and seasonality is not existent as we grow indoor. Capex and Opex are cheaper, yield predictability is almost 100%.

We see a potential in Northern Europe for small vertical aeroponics farms: climate conditions are not suitable to grow open field. Greenhouses are limited by the amount of sunlight and are challenging in terms of heating, especially during winter time.

Our approach is based on small/medium self contained installations which can be placed in former warehouses or indoor urban spaces, therefore reducing the logistic impact of moving foods and allowing the regeneration of abandoned industrial buildings. Crops are grown year round locally to satisfy the North European countries used to import goods from Southern Europe.

Our growing environment requires room like, controlled conditions. One of the challenging aspects in Northern Europe is the ability to keep the temperature in the 15-22° C degrees range which is mandatory to create the ideal growing conditions.

One of the many innovative aspects of our project is the idea to couple together the soilless growing room with an additional process which generates, as a side product, heat and electricity: a 0km Waste-to-energy plant of our subsidiary Ki Energy. Using the side product of the growing cycle (the roots) as fuel.

By establishing this virtuous pipeline we optimize the energy cycle and the management and cost of waste disposal.

Our first planned installation is a self contained unit of around 650 square meters. It will be installed in a leased industrial warehouse just outside the Tallinn city center in order to prove a short logistic supply chain. The unit will be equipped with all the technologies required to maintain suitable conditions for both the growing and energy management activities. It will be managed and monitored 24/7 through a cloud software layer while local manpower fulfils the daily operational tasks.

REFARM is a format we're planning to scale up in Estonia and across Northern Europe. The first installation will be used to prove the model and to establish a commercial network for the crop distribution. Once this first stage is achieved (we estimate 18 months since project kick off), the format will be iterated by Ixellion OU itself or by selected commercial partners.

