

SIATAI – Vertical Farm&Meadow System

Inspired by the location of Mannheim’s Spinelli Park (NE of the city), a part of the Rhine-Neckar green corridor, we propose SIATAI: a sustainable energy production solution which is based on water, as the major resource. Water makes up a substantial part of green biomass, drives the most bio-diverse ecosystems, and serves as a natural buffer for rapid changes in climate. Wetland vegetation provide cooling effects through shading and transpiration. Biomass stores large amounts of chemical energy, transformed from the sun energy. All the components of biomass production are renewable; moreover, carbon dioxide component is one of the problematic and excessive greenhouse gasses.

Water may interact with the wind, for instance, by providing a flat surface for stable, predictable and firm currents (or streams of air). Wind is the second driver of the SIATAI concept. The wind phenomenon is often seen a destructive force, increasing in unpredictability and severity along the climate change. Though, when channeled appropriately, wind may supply huge amounts of free energy, in a biodiversity-safe way, particularly when no large, rotating turbines are used.

SIATAI system technology overview

There are three energy production methods implemented in our system:

- A - plant biomass chemical energy: via biogas extraction (transferable to heat or electricity);
- B - oscillation energy (wind-induced aerostatic flutter effect): via windbelts;
- C - mechanical pressure energy (induced by wind drag): collected by piezoelectric ceramic elements.

There are two levels of modularity in the SIATAI system: each unit consists of basic elements (or modules), enabling various output shapes and total height adjustment; whole units form a higher-level modules, and may work together in smaller or larger groups. The three technologies are synergistically combined in the system, supporting each other.

