



Vertically integrated greenhouse complex.
Zhezkazgan City 'Nurken Center' LLC.



The concept of creating a vertically integrated agro-communal greenhouse complex

Goal: Creation of a highly efficient production complex on the principles of a "green economy", combining a greenhouse complex and communal wastewater treatment plants, for the production of export-oriented agricultural products, cleaning, utilization and recycling of waste water, generation of thermal and electric energy.

"Nurken Center" LLC and "Nurken" CHP, the initiators of the project are welcoming prospective strategic partners with their advanced technical knowledge and experience for the implementation of the vertical agriculture project. Namely, the construction of these vertical greenhouses and the joint production of shelving and LED panels for greenhouses in 25 cities of the Republic of Kazakhstan.

Problem solution in agriculture of the RK

1. In the context of a sharply continental climate in Kazakhstan, the year-round cultivation of crops and aquaculture in the open ground and in reservoirs appears to be a risky production.
2. The way out of this provision is cultivation of them in specialized greenhouse complexes that allow to maintain optimal regimes for growing and yielding of vegetable crops throughout the year, and create a favorable climate for the cultivation of fish cultures.
3. A distinctive feature of the proposed project concept is that the project proposes to use the synergetic effect of the interaction of modern greenhouses that use new developments of eco-architecture and municipal urban enterprises on the principles of "green technology". This symbiosis makes it possible to receive green products at any time of the year and at a competitive price.

4. The second distinctive feature of the vertical greenhouse complex is its compact location in the physical area. So, with an occupied area of 2 hectares, in fact, the area of production will be 11,621 hectares.

"Nurken Centerx" LLC offers to realize it in Karaganda region, Zhezkazgan region. The peculiarity of the region is located on the transport system "New Silk Road". The region is rich in mineral resources. The main producer of copper and rare earth metals in the Republic of Kazakhstan.

This project will provide green products to the population of about 220 thousand people (Zhezkazgan city, Satpayev city and the population of Ulytau district), grown in a vertical greenhouse on the basis of treatment facilities in Zhezkazgan city.

According to the calculations, at the consumption rate of 139 kg of green products per person, established by the World Health Organization, the region's demand for vegetable products will amount to 30.58 thousand tons, and in a greenhouse complex it is planned to grow 7.69 thousand tons, which will cover 25% of needs.

The synergetic effect of the construction of a vertically integrated greenhouse complex will allow using the following advantages:

- reduction of the cost of sewage treatment and cultivation of plant and fish products;
- re-use of purified water for the needs of a greenhouse complex, fish farming and sales to consumers;
- use of biogas for generation of heat, electricity for the complex;
- use of ground air collectors to reduce heating costs due to the use of ground heat;
- the use of solar collectors with thermal accumulators to reduce the cost of heating / hot water;
- use of CO₂ to increase yields in anaerobic CBS processes;
- processing of soil after fermentation and dehydration, vermiculture for the creation of humus and fertilizer;
- receiving a "green tariff".

Crop yield in a vertical greenhouse in comparison with traditional

<i>Name culture and footprint</i>	<i>Crop yield</i>		<i>Cost of production, KZT in thousands</i>	
	<i>Traditional Technology</i>	<i>Vertical Technology</i>	<i>Traditional Technology</i>	<i>Vertical Technology</i>
<i>Salad</i>	-	6 tiers x 0,08281 т/м2/year x 2734м2 = 1342,756т	-	939 928,919
<i>Cabbage, ga</i>	-	6 tiers x 0,03161 т/м2/year x 3204м2 = 607,822т	-	364 693,2
<i>Amaranth</i>	-	4 tiers x 0,082 т/м2/year x 3446м2 = 1130,419т	-	33 919,576
<i>Pepper</i>	-	6 tiers x 0,076 т/м2/year x 3528м2 = 1611,092т	-	966 655,346
<i>Strawberry, ga</i>	-	8 tiers x 0,06 т/м2/year x 3446м2 x 4 урожая = 827,136т	-	661 708,8
<i>Cucumber</i>	400 tons/ga	2 tiersa x 0,3 т/м2/year x 3204м2 = 1922,88т	96 000,0	461 491,2
<i>Tomato</i>	350 tons/ga	3 tiers x 0,27 т/м2/year x 2734м2 = 2205,799т	94 500,0	772 027,2
<i>Total mass of crops in tons</i>	750 tons c2 ga	9647,904 tons	-	-
<i>Breeding fish</i>	-	0,144кг/м3x 1256 м2 x 1,5м = 271,3т tons	-	400 000,0
<i>TOTAL</i>			190 500,0	4 600 417,141

Evaluation of the investment attractiveness of the project

The calculations are based on materials taken from European manufacturers of vertical greenhouses.

The rate applied at the rate of 1 US dollar - 330 KZT

<i>№ item</i>	<i>Name of indicator</i>	<i>Formula of calculation</i>	<i>Meanings</i>
1	Breakeven point	$T\bar{b} = \text{Revenues from sales} * \text{Constant Cost} / \text{Revenue from sales-variable costs}$	2 703 143 875 tenge
2	Coefficient of net profitability	Coefficient. Gross profitability = gross profit / sales revenue	0,4876
3	Рентабельность инвестиций в активы	Return On Investment in assets	0,1309
4	Return On Investment	Net income / current assets + main facilities	6
5	Profitability index	$1 + (\text{Net present value of the project} / \text{starting investments})$	1,17
6	Coefficient of generation arrived	Profit before tax / total assets	0,1637
7	Profitability index	the present value of money flows / initial investment	0,1667
8	NPV	Net Present Value	2 624 999 991 tenge
9	Discounted period recoupment		6

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Nurken Center

“Nurken Center” LLC, was established in 2017 to implement a vertex-integrated agro-communal greenhouse complex.

Currently, the company is affiliated in the field of "green economy".

The project received approval by Mr. Myrzakhmetov, Deputy Prime Minister of the Republic of Kazakhstan, during a meeting on the 18th of October, 2017.

The "Nurken" farm is engaged in agriculture in the Nurinsky district of the Karaganda region, mainly in grain. Since 2018, we have also been active in building farms for breeding turkeys. In addition, there are processing facilities of turkey meat. The head of both companies is Abildinov Nurlan Dumanovich, born in 1971, his educational background comprises of two degrees.

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The farm is located approximately 100 km from the capital city, Astana.

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