

INVESTMENT PROJECT



WEST FUEL GROUP

CONSTRUCTION OF STRAW-FIRED THERMAL POWER PLANT (TPP)



PROJECT OBJECTIVE IS

to organize the construction in Ukraine of a **modern TPP with small-scale cogeneration unit** which operates in the combined heat and power mode and provides



the most efficient use of fuel (**biomass made of straw** which is produced in large quantities in Ukraine) in order to reduce the use of gas, reducing greenhouse gas emissions and using the fly ash as an environmentally friendly fertilizer; creation of a logic unit with the equipment for the straw collection and delivery to the TPP

BENEFITS OF THE INVESTMENT PROJECT

KEY BENEFITS:

- initiators of the project have **significant experience** in the energy activities, agricultural sector activities and they **have a large network of business contacts** with the alternative energy market key players;
- **clear understanding of** project goals and direction has been formed. **Project objectives and their performers** at all stages have been agreed;
- The "Green tariff" is approved on **effective cost level**;
- the Hryvnia fall in exchange **reduces the cost of electricity** production, but its **sales is pegged to stable Euro** rate
- electricity sales **are guaranteed by the Government of Ukraine** and its **obligations to the international community**.

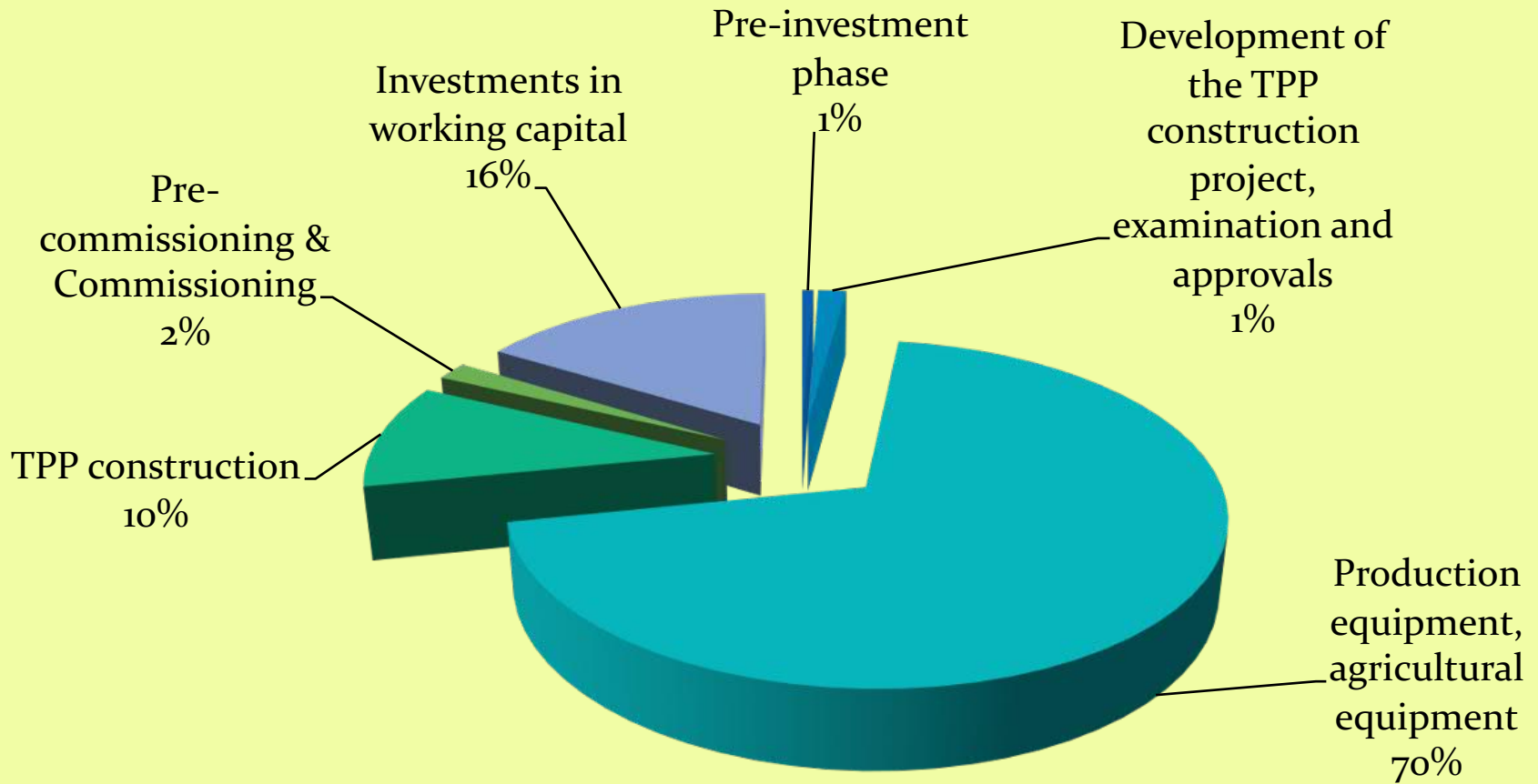
PROJECT LOCALIZATION

Ukraine

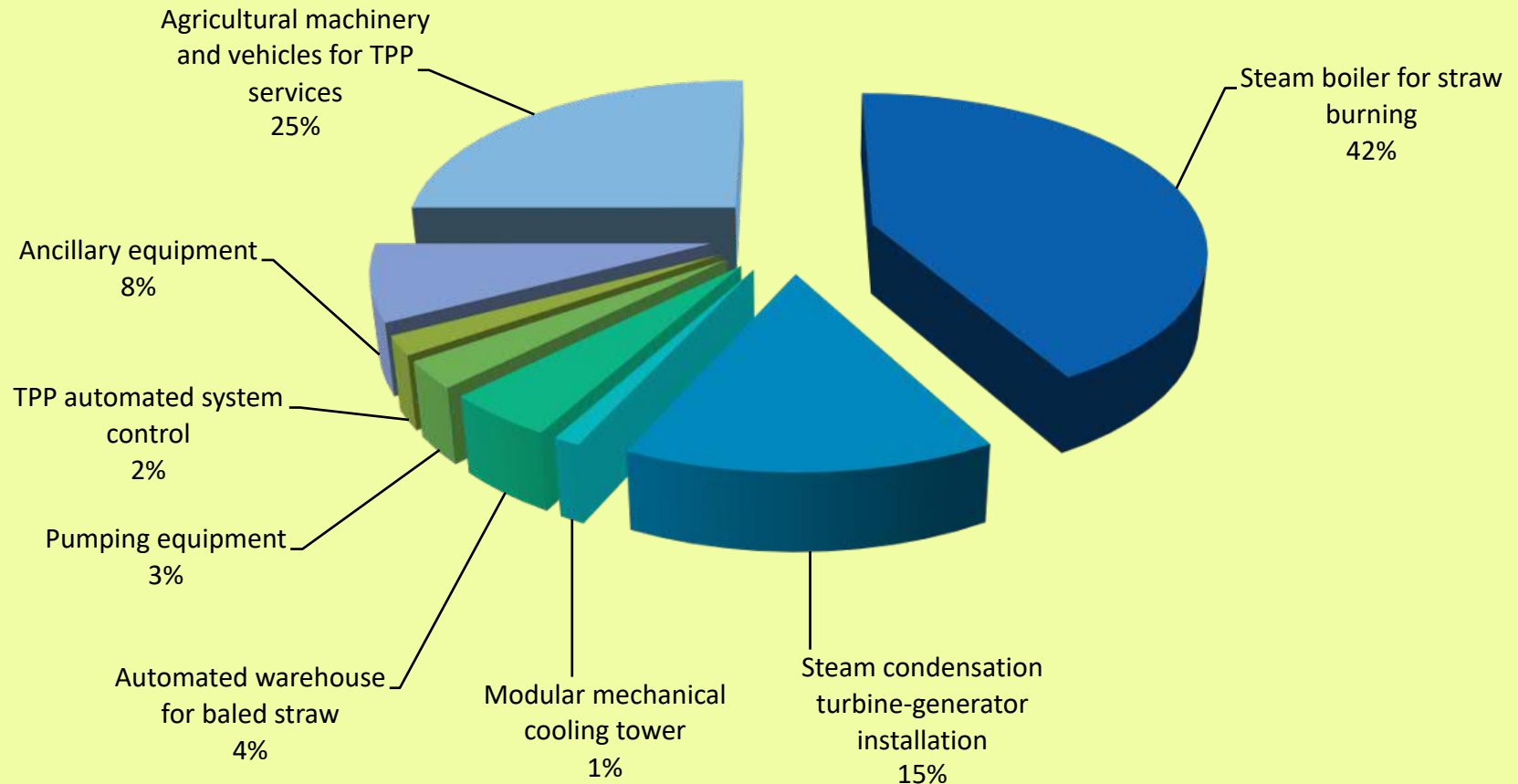


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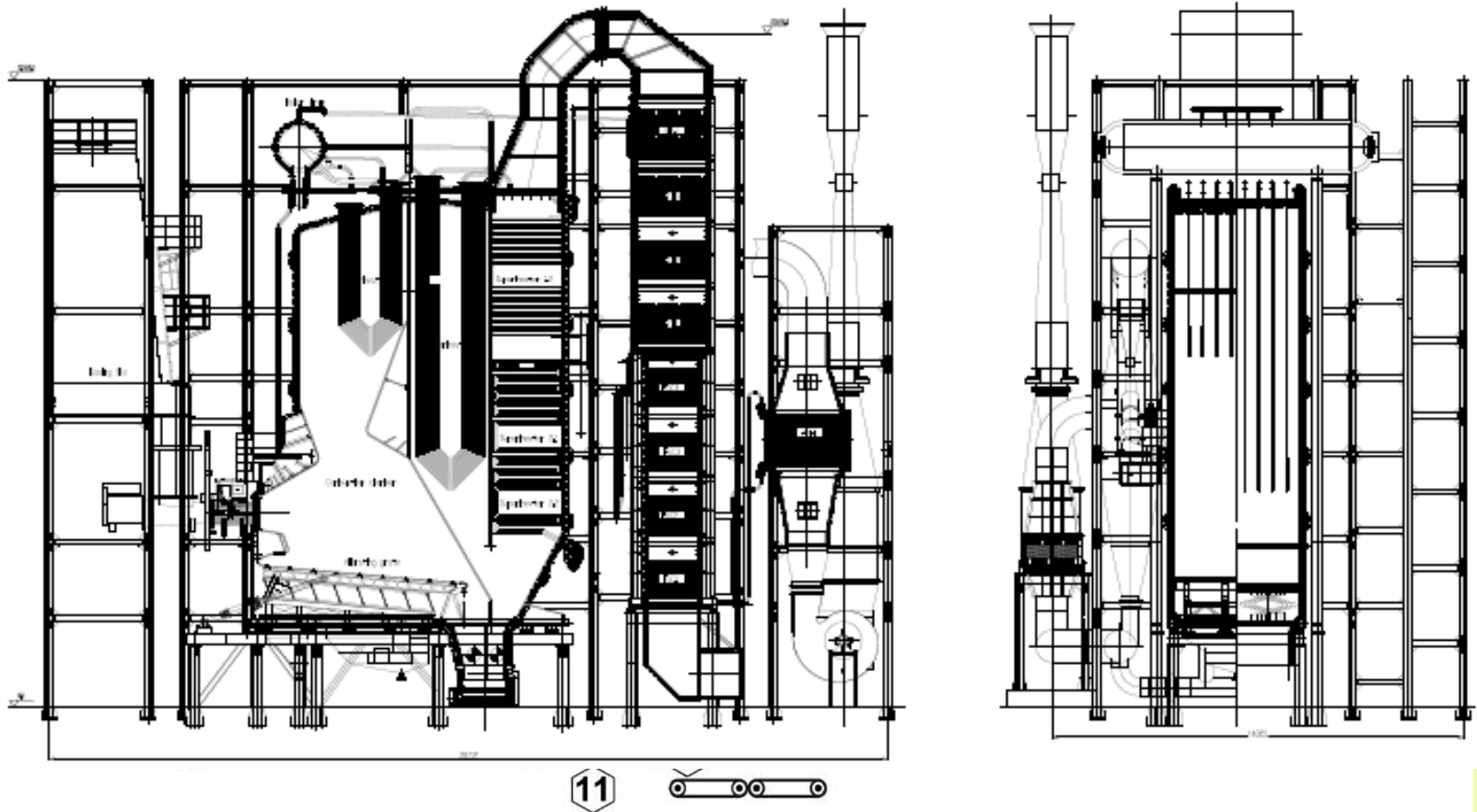
ESTIMATED PROJECT COST STRUCTURE



SPENDING PATTERN FOR THE PURCHASE OF PRODUCTION EQUIPMENT, /AGRICULTURAL EQUIPMENT

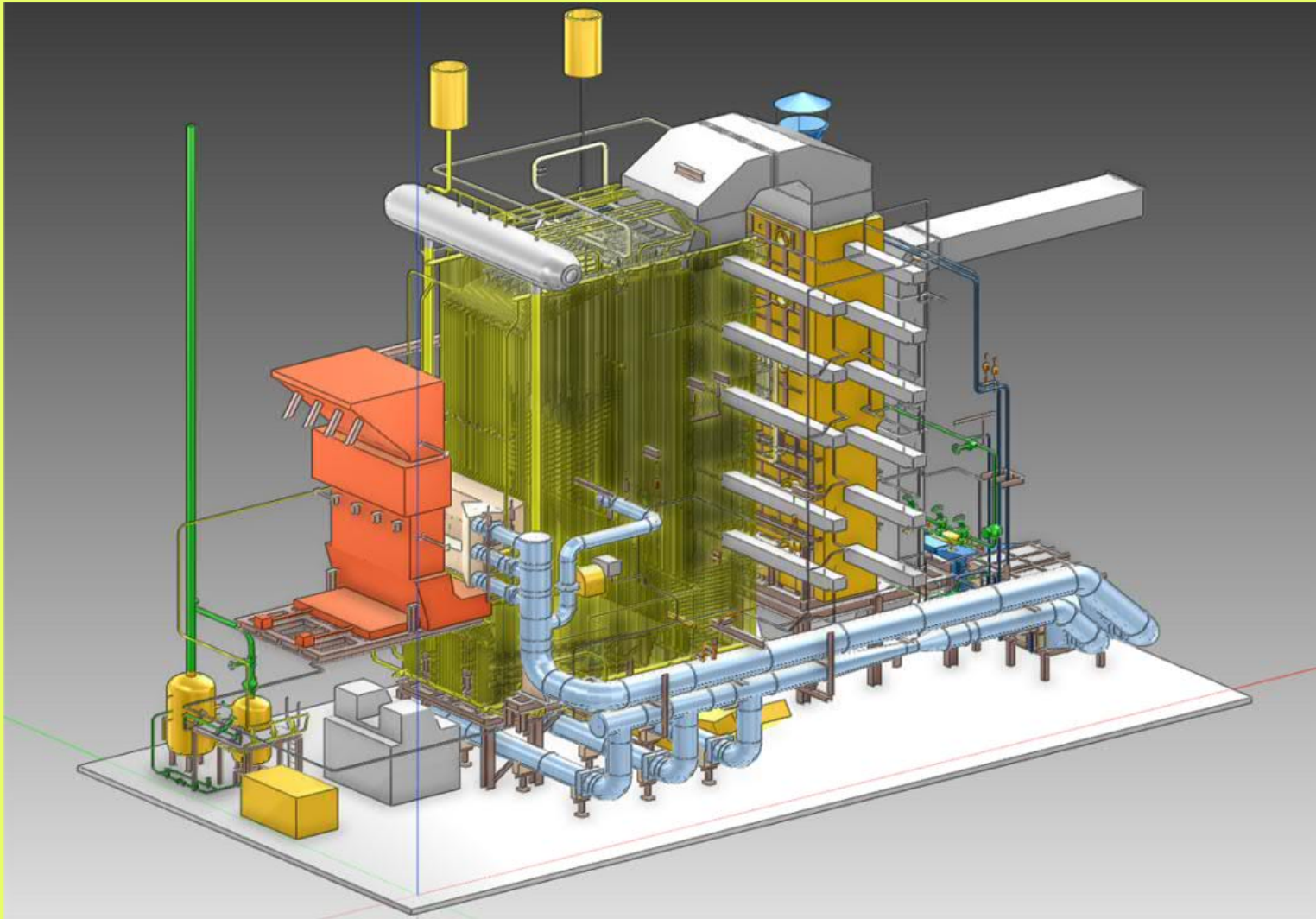


View of a steam boiler for burning straw



30 t / h, 64 bar, 480 ° C

View of Steam Boiler



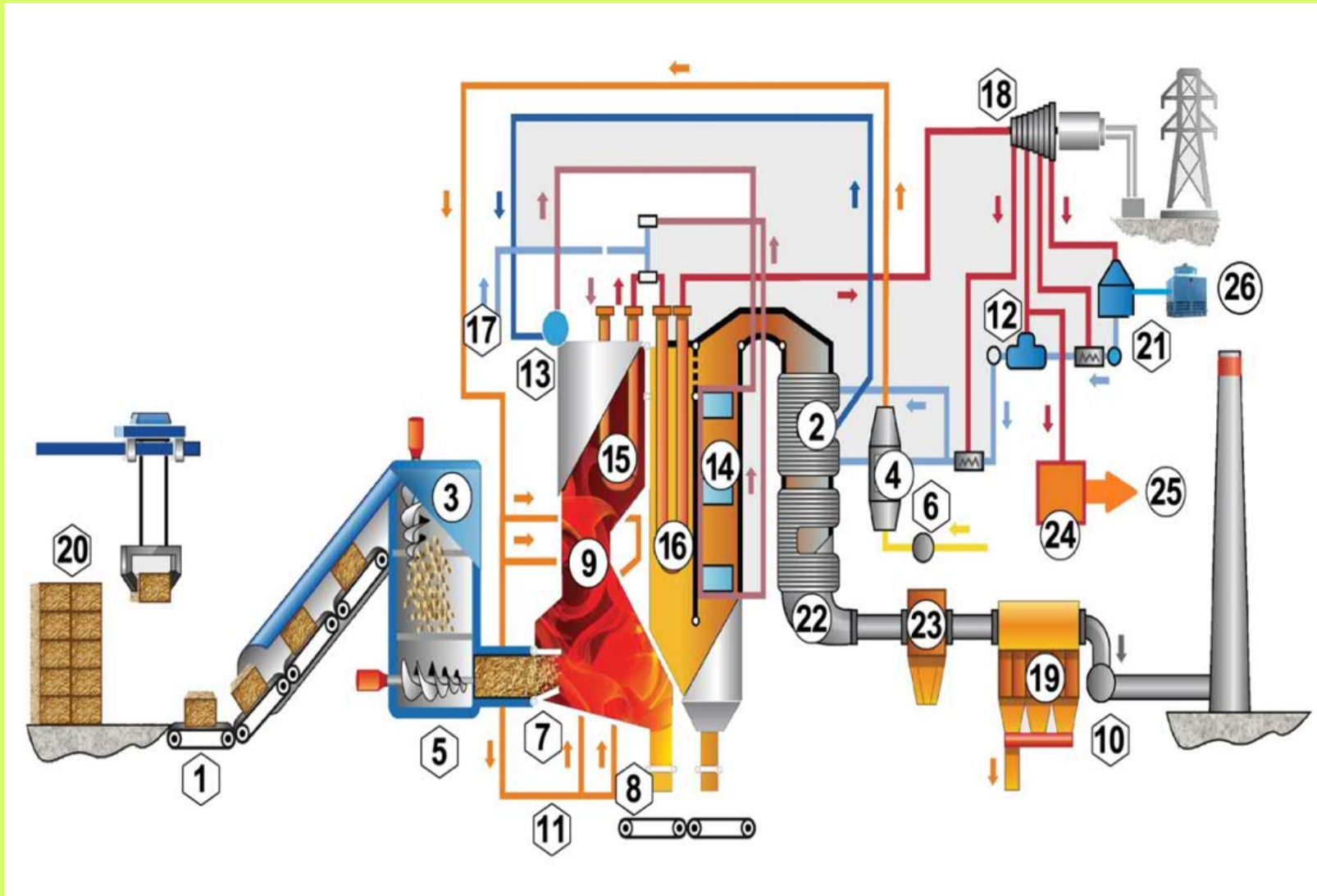
KEY TECHNICAL PARAMETERS OF THE TPP ACTIVITY

- to install a steam boiler heat **of the capacity 24.8 MW** (Efficiency - 96%) with the automated fuel supply, which generates 30 t/h of high parameters steam, namely, vapor pressure of 64 bar, a temperature of 480 degrees, the enthalpy of 805.2 kcal / kg;
- to use baled **straw as a fuel for TPP**;
- to provide **an automated warehouse of baled straw** to guarantee the reliable TPP capacity work;
- to set an electric power generation system inside the **steam condensation turbine** with controlled steam extraction and generator with the electrical capacity of 7.5 MW;
- the proposed TPP will be developing the electricity **for 7 960 hours per year**;
- **thermal energy** into electrical energy conversion efficiency is **0,302**

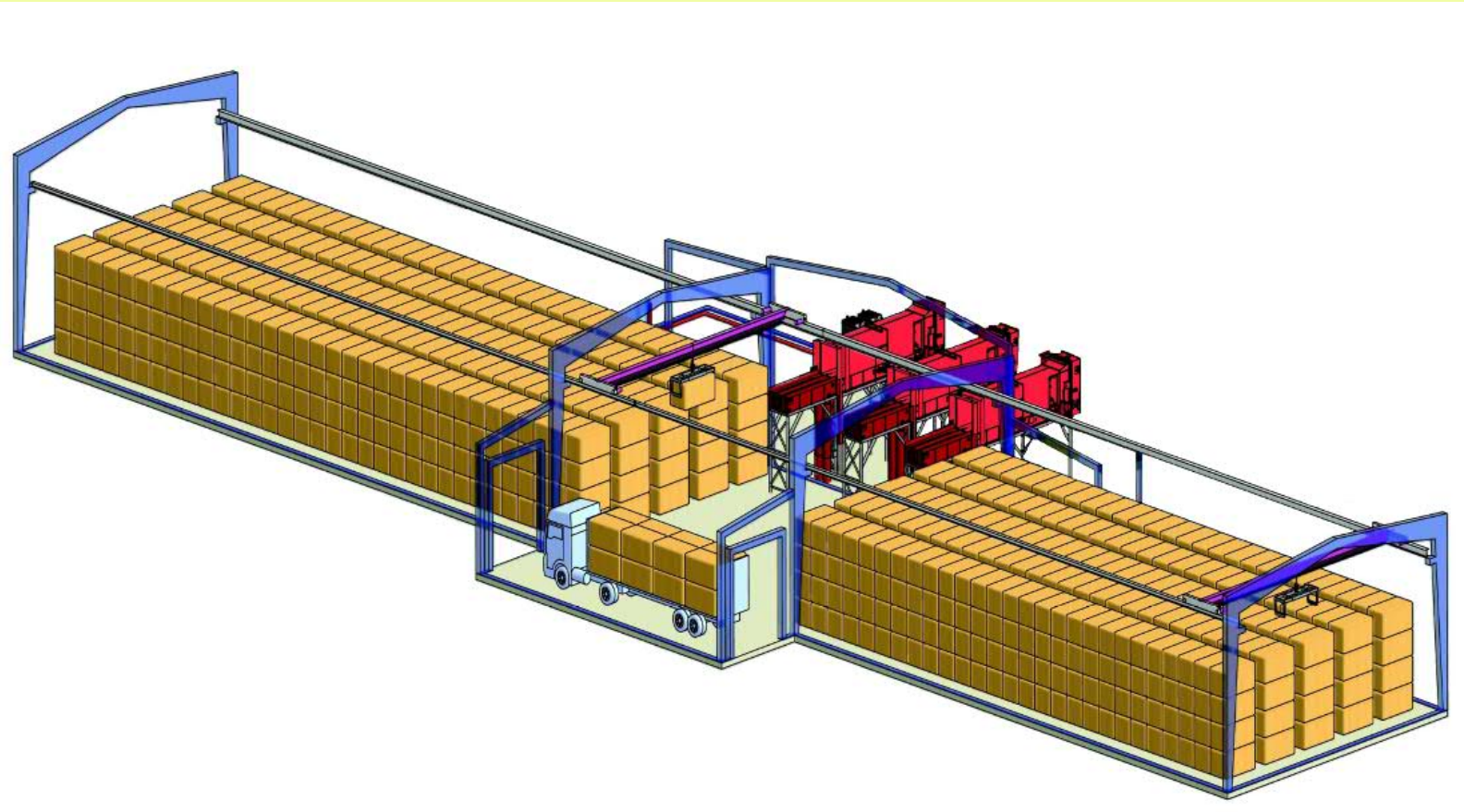
TURBINE WITH GENERATOR (7.5 MW)



Scheme of a power plant on straw



AUTOMATED WAREHOUSE FOR BALED STRAW



The general plan of the TPP on straw



The general plan of the TPP on straw



AGRICULTURAL EQUIPMENT FOR COLLECTING STRAW



POSSIBLE USE OF STRAW IN UKRAINE FOR ENERGY NEEDS

Kind of biomass	Productivity mln. Tons	Volume, mln. tons	Part of the need for energy	Energy potential			
				mln. tons	W,%	Q_H^p , MJ / kg	mln. tce
Straw cereals without maize	Crops 32,1	30,6	30%	9,2	20	14,5	4,5
Wastes from the production of grain likely incl.: Stems with leaves Trunks	Corn 30,9	40,2	40%	16,1	50	15	4,4
				12,1			3,3
		30,3 5,6		2,2			0,8
Waste sunflowers all incl.: stalks baskets	Sunflower 11	20,9	40%	8,3	60	13	1,7
				5,7			1,2
		14,3 6,6		2,6			0,5
	74,0	91,8		33,6			10,6

Capital expenditures

I. Basic Equipment	Manufacturer	Number.	Price without VAT	Costs in the first year of construction.	Costs in the second year of construction.	Costs per year of production start-up.	Total thousand euros
Steam boiler for burning straw with a steam capacity of 30 t / h. steam pressure of 6.5MPa and temperature of 480oS included.		1	6 000,00	3000,0	3 000,00		6 000,00
Steam condensing turbogenerator unit with adjustable steam extraction for 7.5 MW heating complete.		1	3000	1500,0	1 500,00		3 000,00
Block fan cooling tower.		1	220	110,0	110,00		220,00
Automated composition of straw bales.		1	820	410,0	410,00		820,00
Total:				5 020,00	5 020,00		10 040,00
VAT				82,00	1 926,00		2 008,00

II.Auxiliary equipment::							
Low and high pressure condensate heaters.		1	60	30	30		60,00
Network heater 10 MW.		1	0	0	0		0,00
Pumping equipment.		1	500	250	250		500,00
Chemical cleaning and dosing system for reagents at the TPP.		1	110	55	55		110,00
Deaerator with 15 m3 condensate tank and evaporator cooler.		1	40	20	20		40,00
Automated control system of the TPP.		1	350	175	175		350,00
Armature.		1	320	160	160		320,00
Stack.		1	90	45	45		90,00
Electrical part 10,5 kW.		1	70	35	35		70,00
The electrical part of 0,4 kV - equipment, cabinets, cable products, lighting.		1	250	125	125		250,00
Fire alarm and fire extinguishing equipment.		1	20	10	10		20,00
Grounding equipment, lightning protection.		1	15	7,5	7,5		15,00
Sheet metal.		1	30	15	15		30,00
Pipelines.		1	300	150	150		300,00
Insulating material.		1	105	52,5	52,5		105,00
Total:				1 130,00	1 130,00		2 260,00
VAT				226,00	226,00		452,00

III. Fuel Logistics:							
Bale baler New Holland BigBaler 1290.		11	150	825	825		1 650,00
New Holland T7060 tractor.		11	100	550	550		1 100,00
MONITU 732 forklift.		11	57	313,5	313,5		627,00
JCB 535-95 forklift.		5	76,5	191,25	191,25		382,50
Car tractor for trailer.		5	66,16	165,4	165,4		330,80
Tractor trailer.		5	15	37,5	37,5		75,00
KRONE 13,6x2,48m trailer.		5	22,08	55,2	55,2		110,40
Total:				2137,85	2137,85		4 275,70
VAT					855,14		855,14

IV. Design work			<i>260,00</i>	<i>260,00</i>	<i>0,00</i>		<i>260,00</i>
V. Construction work			<i>1 600,00</i>	<i>800</i>	<i>800</i>		<i>1 600,00</i>
VI. Installation and commissioning works			<i>1 000,00</i>	<i>0</i>	<i>700,00</i>	<i>300,00</i>	<i>1 000,00</i>
VII. Connection to the power grids			<i>729,63</i>	<i>0</i>	<i>729,63</i>		<i>729,63</i>
VIII. EPC contractor costs				<i>432,60</i>	<i>459,00</i>		<i>891,60</i>
Costs, total:				9780,45	10976,48	300,00	21 056,93
VAT				<i>520,00</i>	<i>3 453,07</i>	<i>60,00</i>	<i>4 033,07</i>

III. EXPENDITURE 3 INVESTMENTS IN WORKING CAPITAL

<i>3.1. Production stocks</i>			<i>2 271,08</i>	<i>0,00</i>	<i>1 135,54</i>	<i>1 135,54</i>	<i>2 271,08</i>
<i>3.2. Operating expenses</i>			<i>525,84</i>	<i>20,00</i>	<i>20,00</i>	<i>525,84</i>	<i>565,84</i>
<i>3.3. Planned costs</i>			<i>148,61</i>	<i>0,00</i>	<i>0,00</i>	<i>148,61</i>	<i>148,61</i>
<i>3.4 Payment for success in organizing an investment project</i>				<i>80,00</i>	<i>160,00</i>	<i>160,00</i>	<i>400,00</i>
III. Costs, total:				100,00	1 315,54	1 969,99	3 385,53
III. VAT :				<i>0,00</i>	<i>227,11</i>	<i>256,83</i>	<i>483,94</i>
Total expenses				9 880,450	12 292,017	2 269,986	24 442,452
VAT				520,000	3 680,173	316,830	4 517,003
Total, including VAT				10 400,450	15 972,190	2 586,816	28 959,456



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The energy of the future