

**Pellet Plant Modernisation (Results of Upgrading) projects with Torex as Technology Provider**

Typical target: Production increase with fuel and electrical power consumption decrease based on changes of thermal circuit and operation mode

No	Customer	Pellet Plant	Area m <sup>2</sup>	Feed Material & Fuel	Pellets Grade	Production t/m <sup>2</sup> *h	Fuel m <sup>3</sup> /t	El.Power kWh/t	Production	Fuel	El.Power	Project status	Year	Scope of work
1	Vale Brazil	Usina 1 Tubarão	278	Hematite LPG coal	DR	32	10	-	↑ 21%	↓ -33%	→ -7%	ongoing	2015 - 2020	Gas ducts complete rearrangement; Additional Process fan installation; Hoods Modification; Double layer Drying implementation; Change of Green Pelletizers; Installation of additional Screens; direct recuperator Reconstruction; Resizing of Process zones and Gases direction (Up/DownDraft);
2	Vale Brazil	Usina 2 Tubarão	440,5	Hematite LPG coal	DR	32	10	-	↑ 27%	↓ -33%	→ -7%	ongoing	2015 - 2020	
3	Mikhailovsky GOK Russia	Plant No.1 Plant No.2	520	Magnetite Natural Gas	BF	26,9	11,5	25	↑ 24%	↓ -32%	↓ -32%		I stage 2005	Operating Mode adjustmet; change of gas-duct system; Additives selection; Reconstruction of Hoods, collector mains, direct recuperator; Modification of Roller Feeder; ESP installation instead of scrubbers; Modification of Pelletizers;
					BF	28,8	10,1	22	↑ 33%	↓ -40%	↓ -40%		II stage 2008	
					BF	29,25	9,34	17,3	↑ 35%	↓ -45%	↓ -53%	ongoing	III stage 2017	
4	Severnyy GOK Ukraine	plant No 3 OK-306	306	Magnetite Natural Gas	BF	24,24	14		↑ 15%	↓ -23%	→ -2,5%		2011-2013	Gas ducts enlargement; Hoods & collector mains reconstruction; Process zones resizing; Recuperation Fan Modernisation, Direct Recuperator Modification; Drying zone rearrangement; Additional screening in Green Pelletizing; Control system Upgrading; Burner Valve Trains replacement;
5	Severnyy GOK Ukraine	Plant No 2 Lurgi-278	278	Magnetite Natural Gas	BF	24	14,5	-	↑ 15%	↓ -27,5%	→ -5%	ongoing	2013	Complete renewal of the Plant: change of Hoods and Duct system; Additional Process Fans installation; Burners replacement; ESP installation; Green pelletizing reconstruction;
6	Severnyy GOK Ukraine	Plant No 4 Lurgi-552	552	Magnetite Natural Gas	BF	24	14	22	↑ 11%	↓ -20%	→ -9%		2011	Hood and process zone size change; Gas duct and collector mains reconstruction; Replacement of two process Fan Drives in the drying and preheating zones; Deinstallation of burners in the preheating zone; Change of mode of heat treatment;
7	EVRAZ Kacgkanarsky Russia	Plant No1-4 OK-228	228	Magnetite Natural Gas	BF	24	18,65	-	↑ 4%	↓ -9,6%	-	ongoing	2007-2013	Modernisation included: change of Hoods and Duct system; Change of Combustion system (new burners installed); Process Fans modification; Green pelletizing control system installed (Granulometer);

Typical Works by TOREX include:

Comprehensive instrumental study of existing facilities; Laboratory tests; Heat engineering calculations for a variety of upgrade options;

Development of Concept; Basic Design for Modernization; Detail project supervision; Erection Supervision; Commissioning & Start-up; Guarantee Test Supervision;