

# A CLEAN AND RENEWABLE ALTERNATIVE TO COAL FOR ELECTRICITY GENERATION

AIREX-ENERGIE.COM



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**TORREFIED PELLETS:  
THE ONLY ENERGY SOURCE  
THAT CAN READILY REPLACE COAL**

Airex Energy develops, manufactures and markets torrefaction systems that convert biomass into torrefied pellets, a clean, renewable and readily available alternative to coal for electricity generation. Torrefied pellets, also known as biocoal pellets, are made from sawmill waste, logging residue and forestland biomass.

Biocoal is produced through the torrefaction of biomass and the resulting carbonized biomass is then densified into pellets. Torrefied (black) pellets provide several advantages over industrial-grade (white) pellets:

- Superior energy content, one similar to that of coal, which enables a generating unit to achieve full load with minimal boiler modifications.
- Superior energy density, therefore reducing supply chain and logistics costs by 25% to 30%.
- Weather resistance, allowing torrefied pellets to be stored outside in a pile where they can withstand the elements. Industrial pellets easily deteriorate under wet conditions and require dry storage systems.
- Easily integrates into existing systems used for handling and grinding coal while industrial pellets require a specially designed handling system and additional grinding equipment.



*Torrefied pellets produced by Airex Energy are similar to coal in terms of energy density, durability and weatherability and can be easily integrated into existing power plant infrastructure.*

Airex Energy's torrefied pellets can be used as a direct replacement to coal for electricity generation and contribute to reduce greenhouse gas (GHG) emissions by approximately 90% per GWh of electricity produced.

- Coal emits approximately 1,000 tons of CO<sub>2</sub> equivalent per GWh of electricity whereas torrefied pellets produced from primary processing waste (sawdust, bark or offcuts) is considered to release less than 100 tons of CO<sub>2</sub> equivalent per GWh of electricity.
- Biocoal combustion also reduces nitrogen oxides (NO<sub>x</sub>) emissions by 50% to 70% and sulfur dioxides (SO<sub>2</sub>) emissions by 90%, without generating toxic mercury emissions.



## BIOCOAL IS BECOMING A GAME CHANGER IN THE BIOENERGY MARKET

Biocoal's unique properties allow it to be co-fired with coal in any proportions or replace coal completely. Torrefied pellets can be easily integrated into existing systems used for handling, storing and grinding coal, without major changes or expensive conversion. Thus enabling power plant operators to extend the useful life of existing coal-fired facilities while achieving GHG reduction targets.

	Industrial Pellets	Torrefied Pellets	PRB Coal
Conversion to biomass	Major	Minor	-
Conversion costs	\$150M ~ 500M	< \$5M	-
Net Calorific Value* (GJ/metric ton)	16 ~ 17	18 ~ 22	20 ~ 23
Bulk density (kg/m <sup>3</sup> )	600 ~ 650	700 ~ 750	675 ~ 900
Energy density (GJ/m <sup>3</sup> )	9.6 ~ 11	14 ~ 16.5	13.5 ~ 20.7
Dust	Limited	Limited	Limited
Water resistance	Poor	Good	Good
Biological degradation	Yes	No	No
Grindability	Poor	Good	Good
Handling	Special	Good	Good

\*as received

Source: ISO-TS 17225-2 Graded Wood Pellets; IEA Bioenergy Task 32; U.S. Department of Energy (NETL-401/012111)

## AIREX ENERGY'S TORREFIED PELLETS SPECIFICATIONS

Airex Energy's torrefied pellets meet or exceed ISO Technical Specification ISO-TS 17225-8-Graded thermally treated biomass.

- Diameter, Length: D 6±1, 3.15 < L < 40 (mm)
- Moisture: < 5% (as received wet basis)
- Ash: < 1.5% (dry)
- Fines: < 1%
- Mechanical Durability: > 96.5%
- Net Calorific Value: > 18.0 MJ/kg (as received)
- Bulk density: > 700 kg/m<sup>3</sup> (as received)

