



# Success Story

## BIOMASS-FIRED POWER PLANT CONTROLS DUST WITH LIGHTWEIGHT, AIR-SUPPORTED CONVEYOR



*Martin® Air Supported Conveyors were installed at the BKE Biomass-powered station in Emden Germany.*

[Emden, Germany] – A biomass-powered 20 MW generating station has specified a totally-enclosed, air-supported conveyor system to feed its new woodchip-fired block, achieving exceptional control of fugitive materials in the strong winds common to its North Sea location. Owned by BKE (E.On Kraftwerke 70% and STATKRAFT Markets

GmbH 30%) and managed by STATKRAFT Markets GmbH Kraftwerksgruppe Nord-West, the facility's new conveyor installation has proven so successful that it has been able to comply with strict dust control specifications and prevent nuisance dust from accumulating on new automobiles in nearby transit lots.

At the outset, company officials knew they needed a conveyor with a relatively long span to transport bulk material 167 meters (548 feet) from the ship unloading facility to two storage silos. In addition, because of the proximity to the sea, corrosion protection was essential to the conveyor system's durability. Complicating the engineering task was a limited amount of available space for the conveyor's support structure. The system would be expected to operate for extended periods with very little maintenance, preventing the escape or buildup of fugitive material and also protecting the load from rain that would introduce unwanted moisture to the fuel.

## **Specifying the Right System**

After reviewing several options, the company specified a lightweight conveyor design with a history of delivering excellent dust control from Martin Engineering. The Martin® Air Supported Conveyor is a simple and economical system that resolves many of the issues encountered with conventional belt conveyors.

“Air-supported conveyors eliminate the carrying-side idlers used on conventional designs,” explained Werner Baxmann. “Instead, they employ a film of air rising from a troughed pan to lift the belt. By removing a source of friction and the need for periodic maintenance, air-supported designs can offer significant advantages, including energy, environmental and safety benefits,” he said. This thin air film can properly support loads and deliver high speed operation, while generating virtually no mechanical friction. As a result, a drastic reduction in operating and maintenance costs can be achieved.

To accommodate space limitations at the Emden facility, the conveyor structure was engineered with an innovative triangular framework. Constructed of galvanized steel to withstand the coastal climate, the high-strength modular design was able to span the entire distance with just two intermediate supports. The conveyor is 40 inches (~1 meter) wide and travels up a constant 10° incline for a total elevation of 29.5 meters (97 feet) over its total span.

## **Designed for a Smooth Ride**

The concept of the air-supported design is fairly simple, with the load zone and carrying sections contained in a plenum, which is pressurized by a centrifugal fan. Holes in the top of the plenum create an air film between the plenum and belt, which supports the moving load. By starting with the weight of the belt and the load at the Emden plant, system designers could estimate the pressure needed to deliver about 1 mm of lift, which requires minimal air volume in most applications.

The conveyor needs no compressor, able to power up to 600 feet (183 meters) of belt supported by a single low-power fan. Extremely low friction inherent to the design can reduce overall drive power requirements vs. conventional conveyors by as much as 30% on a horizontal run.

### **Pursuit of Perfection**

“Even in the best of installations, the troughing idlers in conventional systems can’t provide a perfect belt line,” Baxmann continued. “The up-and-down motion agitates the material, which can cause some particles to become airborne. That disturbance can also push some material to the outside edges of the belt, where it might be spilled. The stable belt path of the air-supported system minimizes turbulence and the resulting fugitive material.”

The air-supported design also eliminates maintenance issues such as idler replacement and belt alignment, and the modular system allows replacement of existing conveyor sections with CEMA standard construction. Air-supported and conventional roller sections can be integrated to accommodate loading zones, tracking idlers, belt scales or other needs.



*Air-supported conveyors eliminate the carrying-side idlers used on conventional design and are fully-enclosed to eliminate the the escape of fugitive materials.*

On new conveyors, the air-supported systems are engineered to suit specific requirements, able to span longer distances and higher inclines than conventional systems. By eliminating idlers and pinch points, the air-supported system further reduces maintenance requirements and potential safety risks.

The Emden plant reports extremely low- maintenance service from the air-supported design. The conveyor has exceeded the company's 98% operational requirement, and the fully-enclosed system prevents the escape of dust. The facility converts approx. 130,000 metric tons of biomass into energy each year, with the conveyor transporting 110-120 metric tons per hour.

Martin® Air Supported Conveyors are employed around the world in a wide variety of bulk material applications, including wood chips, pellets, grain, crushed coal, rock/aggregate, cement/clinker and mining.