

CASE STUDY

## HST Turbocompressor Exceeds Energy Savings Goal at the Township of Neptune

The Township of Neptune Sewerage Authority (TNSA) owns and operates a wastewater treatment plant that serves Neptune and its surrounding neighborhoods. The plant is rated at an annual average flow of 8.5 million gallons per day (MGD) with an associated peak flow of 21.25 MGD. Treated effluent from the wastewater treatment plant is conveyed to the Atlantic Ocean by gravity through a 4 mile long 24 inch outfall pipe.

The wastewater treatment plant utilizes the trickling filter fixed film process. The chlorinated effluent is pumped to the aerated stabilization pond with a capacity of 18 million gallons and an average depth of approximately 10 feet. The pond is equipped with fine bubble air diffusers.

### The Sulzer difference

Clever aeration and mixing solutions ensure efficient treatment at low power consumption.

The turbocompressor type ABS HST offers reliable operation and top efficiency at the lowest cost while minimizing the environmental impact.

In the high speed turbo compressor market, Sulzer is the leader in magnetic bearing technology.

“ *The Sulzer turbocompressors have on average provided a power savings of 58% as compared to the power draw of the original single stage blowers. This power savings has resulted in energy savings of \$32,800.00 to date.* ”

Richard Crane, Sr. Technical Environmental Engineer, T&M Associates

### The challenge

The existing multi-stage centrifugal blowers had been in operation since the mid-1970s and had exceeded their useful life. Typically one blower was in operation 24 hours /day, 365 days/year with the second blower acting as a standby unit. The main blower had experienced significant bearing and impeller failures making the main blower inoperable, thus compromising the redundancy of the aeration system.

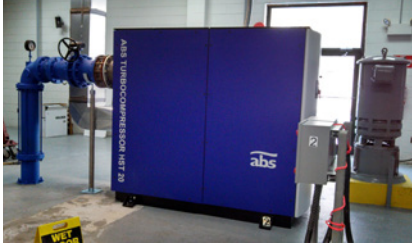
Upon reviewing the performance data provided by the blower manufacturers, an estimated wire-to-air power of 69.9 kilowatts was deemed to be reasonable and was therefore used to compute the blower’s expected energy consumption and energy savings.

### The solution

The Township of Neptune Sewerage Authority embarked on a project to replace their existing inefficient single stage centrifugal blowers that supplied air to the plant’s aerated stabilization pond in efforts to increase the overall blower efficiency of the aeration system, reduce electrical energy costs, and to improve overall system reliability. After much research, the Authority decided to pursue the installation of ABS turbo compressors manufactured by Sulzer on a “Try and Buy” basis. The blowers were commissioned in December 2013.



Existing stabilization pond



Turbocompressor type ABS HST 20 installation at the wastewater treatment plant of Neptune

## Customer benefit

The projected annual energy consumption for the blower based upon estimated air inlet conditions and published blower performance for wire-to-air horsepower requirements yielded a projected annual energy consumption of 735,840 kW-hrs per year with a projected annual energy savings of 735,840 kW-hrs – 612,324 kW-hrs = 123,516 kW-hrs per year. At an electric energy rate of \$0.108/kW-hr, the projected annual energy cost savings was calculated to be \$13,340/year.

Encouraged by the the calculated savings, TNSA elected to participate in the New Jersey Clean Energy Custom Measures Program. Based upon the submitted application, the expected energy incentive was computed to be \$19,762.00 with an internal rate of return of 10%.

TNSA has received an energy incentive check from the New Jersey Clean Energy Program in the amount of \$19,425. Based upon actual power recording readings, the actual energy savings was 303,315 kW-hrs/year and at an electric energy rate of \$0.108/kW-hr, yielding an actual energy savings of \$32,800.00 and exceeding the calculated savings.

After 120 days of the blowers in operation, the average electrical energy consumption was approximately 46 kilowatts; considerably less than the anticipated energy consumption of 69.9 kilowatts.

## Product data

The turbocompressor type ABS HST 20 is a completely integrated and practically noiseless package. The air cooling system, outlet diffuser, silencers and more are all incorporated into the cabinet, which eliminates the cost of installing separate accessories.

Once in operation, the maintenance is limited to regular check-ups and occasional change of the air filter.

Magnetic bearings allow the turbocompressor type ABS HST 20 to be run in a safe and controlled manner with small impeller clearances.

The control system of the turbocompressor type ABS HST 20 visualizes necessary actions on the touchscreen display and uses stored process data to help operators make far-reaching improvements.

Turbocompressor type ABS HST 20	
Airflow range	1,300 - 4,400 scfm
Pressure	4 - 13 psi
Input power	150 - 250 hp

### Contact

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### Applicable markets

Municipal and industrial wastewater treatment

### Applicable products

Turbocompressor type ABS HST 20