

Case Study: Steam Turbines for Waste-to-Energy

Project: The Waste and Energy Company of Amsterdam (Afval Energie Bedrijf / AEB) is an independent undertaking that belongs to Amsterdam City Council. The company produces sustainable electricity, heat, metals and building materials, thereby creating value from waste. For the better part of 100 years, and using a variety of technologies and processes, AEB has been turning virtually all of the city's waste (99%) into recycled-grade metal, gypsum and salt.



The world's first Waste Fired Power Plant

The culmination of Amsterdam's long experience with waste incineration is the world's first Waste Fired Power Plant (WFPP®), a new facility designed to transform waste with high efficiency into energy and building materials.

The WFPP generates sustainable electricity from waste. It is highly efficient and has been awarded the "Green Status" signifying minimal environmental impact.

Waste-to-energy is an important component of integrated waste management strategies, assisting in waste incineration to relieve pressure on landfill and dispose of waste that cannot be recycled. This is a double benefit as energy generated can be fed either back into the plant itself or into the local grid.

The aim of the new plant was to use a systematic approach to optimize recovery of energy and materials, using proven technologies in new combinations.

Afval Energie Bedrijf (AEB – Waste and Energy Company Amsterdam)

Answers for energy.

SIEMENS



Left: The SST-700 RH installed in the plant, showing noise enclosure (red) over the HP-module, generator and gear.
 Right: SST-700 LP-module, condenser (green), LP inlet (silver), LP exhaust (brown).

Reheat turbine for high efficiency

A Siemens SST-700 reheat solution was selected in 2003 for the 4th generation WFPP. The 74 MW **SST-700RH turbine** is an extraction condensing machine used in **reheat configuration**. It consists of one geared high-pressure (HP) module and one direct-drive low-pressure (LP) module. Proven standardization ensures low investment and life cycle costs. The SST-700RH has a high volume flow and a large exhaust area for high efficiency and maximal performance.

The plant was designed to burn 940.000 tonnes of waste per year at an efficiency of 22%. In 2007, with the SST-700RH at the heart of the process, this has increased to 1.5 million tonnes at an efficiency of 30%.

“Nothing is waste!”

Project advantages:

- AEB achieves the highest possible energy recovery from the combusted waste, with increased steam parameters. The reheat solution is the core innovation enabling such recovery
- The plant produces waste materials which are fully recyclable: energy for reuse in the production cycle, and high quality building materials
- Energy optimization in the process has enabled an increase in efficiency from 22% to 30%
- The plant gives Amsterdam more sustainable energy from the same amount of waste, thus keeping processing charges low



The LP rotor under assembly in the Swedish workshop. The diameter of the last stage blades is the largest fabricated for this type of turbine.

Published by and
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Siemens AG
 Energy Sector
 Freyeslebenstrasse 1
 91058 Erlangen, Germany

Siemens AG
 Energy Sector
 Oil & Gas
 Wolfgang-Reuter-Platz
 47053 Duisburg, Germany

Siemens Industrial Turbomachinery, Inc.
 10730 Telge Road; Houston
 Texas 77095, USA

www.siemens.com/energy

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