



Colt Solutions for  
Power Generation & Energy from Waste Facilities  
Ventilation products and solutions



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# COLT SOLUTIONS FOR POWER GENERATION AND ENERGY FROM WASTE FACILITIES

*Ventilation products and solutions*

## **Front cover image**

Belvedere Riverside Resource Centre, Bexley  
(M F Robinson)

## **This page image**

Allington Energy from Waste Facility, Maidstone



## SHAPING THE WORLD OF TOMORROW - WITH ENERGY EFFICIENT TECHNOLOGIES FROM COLT.

Power generation plants and energy from waste facilities, whatever their size, present several design challenges related to ventilation.

How can heat be removed efficiently from such a building without noise breaking out and in all weather conditions? What can be done to ensure that humidity, dust, fumes and odours do not impact negatively on the local environment?

Emergency situations need to be considered too: if there is an explosion, what means are there of reducing its impact on the building? If there is a fire, how is smoke to be removed so that people can evacuate safely, fire fighters can attack the source of the fire and damage is limited?

## COLT'S ANSWER

Colt has the expertise to develop the most efficient and cost-effective solution to tackle the ventilation challenges presented by all types of power generation plants. Colt experts can rely on an extremely broad range of products, which are fully tested, durable, high in performance, easy to install, multi-functional in character (in many cases offering both smoke control and natural ventilation) and low in running costs.

Colt is represented in more than 75 countries around the world by local teams of experts that are able to support designers and building owners from the outline design phase up to completion of the installation of the proposed solution.

## WORKING FOR A SUSTAINABLE BUILT ENVIRONMENT

Colt offers an integrated approach as the partner who is responsible for design, delivery, installation and performance of the entire ventilation system, so that you will only deal with one partner for the full project.

Colt systems harness nature to provide healthy, comfortable and safe working conditions.

Colt systems work together to create energy efficient buildings and contribute to a sustainable built environment.

Each facility is different and presents its own issues. This is where Colt's effective problem solving approach comes in to tackle the challenge of developing a design that will guarantee optimum performance.

Please find about our Design Approach on the next pages.

## THE BENEFITS OF WORKING WITH COLT:

- *Integrated approach - One partner responsible for design, delivery, installation and performance of the ventilation system*
- *Pre-order design service*
- *All Colt products have been fully tested and where they are used as smoke and heat exhaust ventilators, they are CE marked*
- *Low running costs*
- *High performance products*
- *Computational Fluid Dynamics simulations for guaranteed optimum solutions*
- *Broad experience and know-how built on a global track record spanning many decades*
- *Founded in 1931, Colt has been providing healthy, comfortable and safe working conditions in industrial and commercial buildings for over 80 years*



# Our Design Approach

## ALL BUILDINGS ARE INDIVIDUAL

A building's internal climate is affected by various factors: its location, orientation, the materials used in its construction, and what it is used for. The building interacts with the environment, so that its internal climate is affected by seasonal changes in weather conditions and temperature.

It is particularly challenging to maintain a good internal climate within a power plant, as additional factors come into play.

## VENTILATION-RELATED DESIGN CHALLENGES

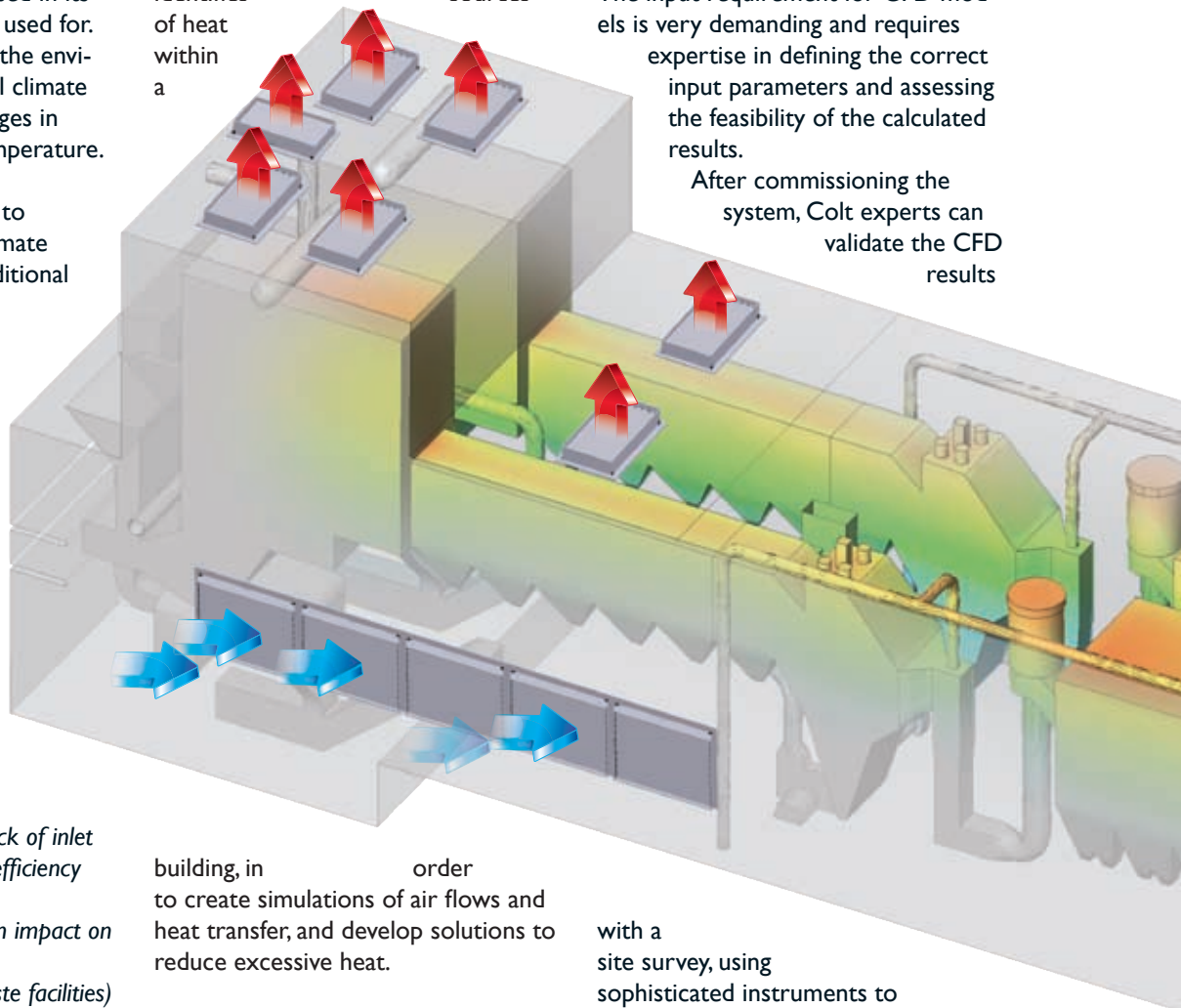
- *Excessive temperatures: the plant typically has minimum and maximum operating temperatures for optimum plant efficiency and to ensure comfortable working conditions for its staff*
- *Poor indoor air quality*
- *Excessive condensation*
- *Need to ventilate in all weather conditions*
- *Under pressure through lack of inlet air – may reduce ventilation efficiency*
- *Risk of explosion*
- *High noise break out – can impact on the local environment*
- *Odour (in energy from waste facilities) – can impact on the local environment*
- *Need to evacuate smoke if a fire breaks out.*

Good ventilation design mitigates these factors so that the facilities can operate at maximum efficiency.

## SIMULATIONS FOR OPTIMUM SOLUTIONS

Colt experts use advanced Computational Fluid Dynamics (CFD) simulations to develop the best smoke control and ventilation systems to achieve the ideal conditions: a comfortable, safe and energy-efficient internal climate, whilst avoiding unnecessary over-sizing of the plant. The CFD tool enables our experts to predict flows

and transfers of energy within a specific building in different situations. It can also be loaded with the data resulting from thermal imaging, which identifies sources of heat within a



building, in order to create simulations of air flows and heat transfer, and develop solutions to reduce excessive heat.

## THE CFD ADVANTAGE: HIGH PRECISION PREDICTIVE MODELS

CFD enables the designer to make extremely reliable predictions about the internal environment without needing to test a scale model in a wind tunnel. A 3D model of the relevant building is created for this purpose, consisting of thousands and sometimes even millions of control volumetric elements. This model can then be used to calculate and graphically represent the results of the parameters, which can include air speeds, temperatures, air pressures and concentrations of pollutants. A building or process is visually examined from all perspectives using a model of the environment.

## IMPLEMENTATION: FROM MODELING TO VENTILATION SYSTEM DESIGN

The input requirement for CFD models is very demanding and requires expertise in defining the correct input parameters and assessing the feasibility of the calculated results.

After commissioning the system, Colt experts can validate the CFD results

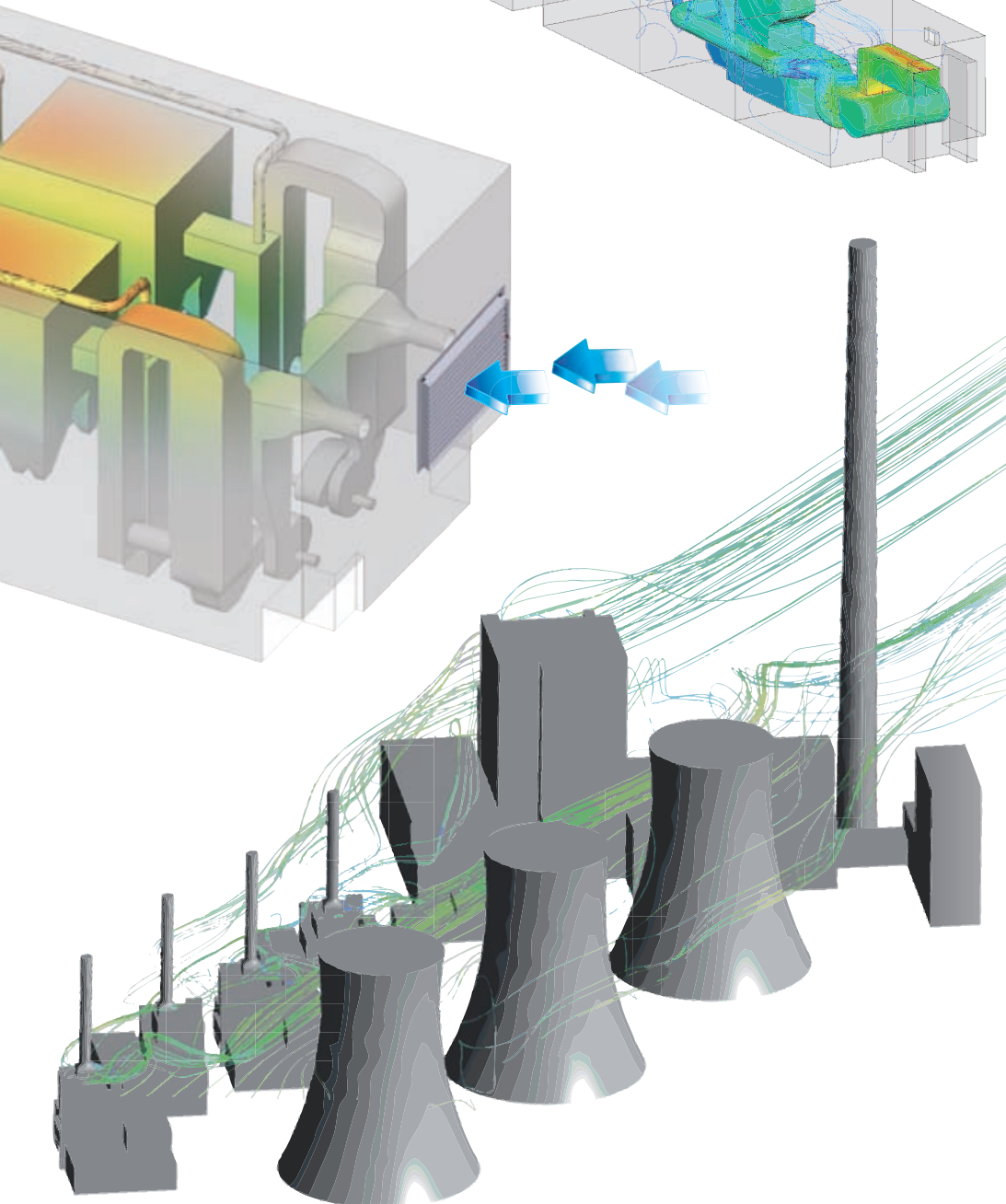
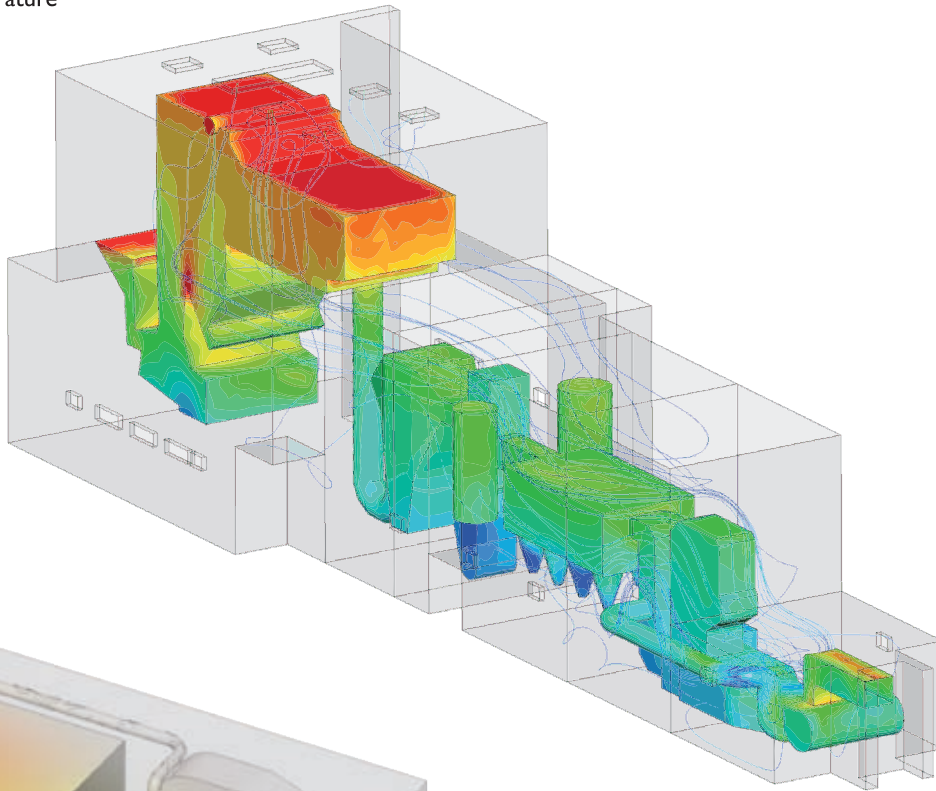
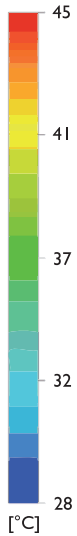
with a site survey, using sophisticated instruments to check temperatures, noise, airflow, air pressure and air quality.

In addition, if necessary Colt can conduct empirical wind tunnel tests in its own R&D centre.

Where the building already exists, Colt uses the latest technologies to carry out detailed analysis which enables it to design tailor-made concepts fully suited to the situation, providing systems that are guaranteed to perform as required.

These methods make Colt an excellent partner for the design of complex ventilation systems for the power generation sector, where we not only design, produce and install the system, but also provide certainty and guarantee results.

Temperature



**Main illustration:** Heat is extracted through the natural ventilators installed on the roof, whilst cool free inlet air enters the building at low level.

CFD simulations analyze mass flows, heat transfer and associated phenomena, enabling us to:

- quantify the expected effects, including temperatures, air speeds, emissions and pressures;
- discover unexpected effects and optimise them;
- implement “what if” scenarios;
- use animations in order to visualise air flows.

**CFD diagram top right** – This 3d CFD illustration shows the temperature gradient within the building. In the lower areas where the cold air flows in from the outside, the temperature remains low. The temperature rises as the air moves towards the roof, and its natural buoyancy ensures that the air is efficiently extracted through the natural roof ventilators.

**CFD diagram bottom right** – This CFD illustration shows the air paths. It enables the designer to establish the best position for the extract ventilators, where they will be free from adverse wind suction or wind pressure effects.



“Because energy is still the essential component for economic growth and because of our limited fossil energy reserves, energy efficient technologies are ever more important. We are now able to make use of the potential to increase energy efficiency.” Andreas Knoll, Product Development Manager at Colt.

Colt systems are highly advanced and use efficient technologies, with low initial investment and low running costs.







# The Colt Product Range

Wherever possible, Colt will design solutions that make use of natural ventilation, which reduces running costs through the reduced consumption of energy. The many advantages of this solution include no energy consumption or CO<sub>2</sub> emissions, minimal maintenance, silent in operation, self regulating, very low operating costs, ventilators have a long life span and not liable to breakdown.

In cases where the design of the building or the client's requirements do not permit the use of natural ventilation, Colt will use mechanical ventilation to achieve the desired result.

## A BROAD OFFERING FOR TAILORED SOLUTIONS

Colt offers a broad product range befitting the wide demands from the power generation sector.

The conditions in a power station or an energy from waste facility demand rugged equipment. Colt products are fully tested in its own and third party laboratories and highly durable. The majority of them are manufactured under the ISO 9000 series of standards.

Colt offers **natural and mechanical ventilation systems** to remove heat, humidity and contaminants:

- Wall/inlet ventilators, e.g. [1] FCO or [2] Universal Louvre
- Natural roof/extract ventilators, e.g. [3] EuroCO/Seefire, or [6] Labyrinth
- All weather natural ventilation module, e.g. [4] Weatherlite
- Explosion relief ventilator, e.g. [5] Securex
- Mechanical extract units, e.g. [7] Liberator
- Mechanical input units e.g. Coltair
- Cooling units e.g. Coolstream evaporative cooling system.

**Smoke ventilation units** can be integrated in the natural ventilation system to ensure safe evacuation and fire fighting and to minimise smoke damage in a fire.

**Performance and screening louvre** systems ensure ventilation while protecting from the rain (see [2] Universal Louvre).

**Acoustic baffles** prevent unwanted noise breakout for low environmental impact while ensuring effective ventilation.

To find out more about these products, visit: [www.colt-powergen.com](http://www.colt-powergen.com)





Colt worldwide Power Generation and Energy from Waste projects

## Colt Power Generation projects

Steinbeis Papier power station, Glückstadt;  
SCA power station, Witzenhausen;  
AZN energy from waste facility, Moerdijk;  
Belvedere Riverside Resource Recovery Centre, Bexley;  
Allington energy from waste facility, Kent;  
Timelkam energy from waste facility;  
Elektrárna Ledvice power station;  
WTE energy from waste facility, Delfzijl;  
HVC power station, Dordrecht;  
Turlough Hill hydro electric power station, Wicklow  
Channel Islands power station, Darwin;  
Elektrociepłownia power station, Kraków;  
Lublin power station, Wrotkow;  
Patnow power station, Konin;  
SITA energy from waste facility, Roosendaal;  
Areva Comhurex, France



Didcot power station, Oxfordshire;  
Aghada power station, Cork;  
Mannheim GKM power station;  
Electrabel NY power station, Aalst;  
Luzern Centralschweizerische Kraftwerke AG power station, Horw;  
Umformstation power station, Graz;  
Amercentrale power station, Geertruidenberg;  
REMU power station, Amersfoort;  
Eemscentrale power station, Eemshaven;  
Hemwegcentrale power station, Amsterdam;  
Graz hydro electric power station;  
WKC Galileistraat power station, Rotterdam

Pforzheim power station;  
Aschaffenburg coal power station;  
Warmkrachtcentrale Almere;  
Badenwerk AG power station, Karlsruhe;  
Boltic Cabel HVDC power station, Kruseberga;  
Chooz power station;  
Neckarwerke power station, Esslingen;  
B & W Diesel power station, Augsburg;  
Bühl power station;  
Frico Domo power station, Beilen;  
Interatom GmbH power station, Bergisch Gladbach;  
Kraftwerk Union AG power station, Berlin;  
Steweag power station, Graz;  
Stadtwerke Bonn;  
Electrabel SA power station, Bressaux;  
EBV Fernwärme power station, Aachen;  
KW Simmering Schalthaus power station, Austria



Stadtwerke Braunschweig power station;  
Überlandswerk power station, Bremen;  
Bremerhavener energy from waste facility;  
Stadtwerke, Augsburg;  
Dinslaken energy from waste facility

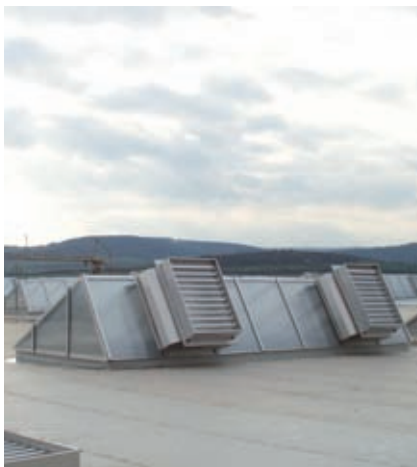
Stadtwerke Duisburg;  
Siersdorf power station, Herzogenrath;  
Electrabel SA power station, Deux-Acren;  
Nordwestdeutsches power station, Emden



Viscosuisse Emden, Emmenbrücke;  
AEG Kanis Turbinen, Essen;  
Isar nuclear power station, Essenbach;  
Roosecote power station;  
Friedrichsroda energy from waste facility;  
Stadtwerke Frankfurt;  
Arge energy from waste facility, Göppingen;  
RWE Energie AG, Grevenbroich;  
SA W Fahrzeugteile, Großpetersdorf;  
Kraftanlagen AG, Hamburg;  
Electrabel SA, Strepv-Bracquegnies;  
Hamm nuclear power station;  
Gewerkschaft Brigitt, Hannover;  
Gemeinschaftskraftwerk Hattingen/Ruhr;  
Kraftanlagen Heidelberg;  
Stadtwerke Dortmund



**Promest Warmtekrachtcentrale, Helmond;**  
**Wendker Leichtmetall, Herten;**  
**Stadtwerke Landshut;**  
**Eschweiler Bergwerk, Herzogenrath;**  
**Arge nuclear power station, Essen;**  
**Purmerend energy from waste facility;**  
**Berliner Kraftzentrale;**  
**EAB Fernwärme GmbH, Berlin;**  
**Electrabel SA, Vilvoorde;**  
**Heizkraftwerk Niehl, Köln;**  
**Stadtwerke Klagenfurt;**  
**Verein Wertach, Kaufbeuren;**  
**KW Luzern Centralschweizerische Kraftwerke, Plattschachen;**  
**Stadtwerke Lünen;**  
**Kraftwerk Laufenburg;**  
**KW Luzern Centralschweizerische Kraftwerke, Littau;**



**Lohr energy from waste facility;**  
**Stadtwerke Mönchengladbach;**  
**Kraftwerk Union AG, Mülheim;**  
**Ilse Bayernwerk AG, München;**  
**Clauscentrale Maasbracht;**  
**Stadtwerke Mainz;**  
**Mannheim nuclear power station;**  
**Wagner Biro, Graz, St. Peter;**  
**Neckarwestheim power station**

**Deutsche Babcock Werke Oberhausen;**  
**Doel nuclear power station;**  
**Stadtwerke Pforzheim;**



**Pöls West Fernwärme-Umformstation, Pöls;**  
**Riezlern energy from waste facility;**  
**Isle of Grain Power Station, Rochester;**  
**GRAAB Avfallskraftvärmeverk Sävenäs**

**Salzburger Stadtwerke;**  
**Elektra Birsell, Schweizerhalle;**  
**GEW Köln;**  
**Oberösterreichische Kraftwerke AG, St Pantaleon;**  
**Kraftanlagen Heidelberg, Stuttgart;**  
**Ilse Bayernwerk AG, Vilshofen;**  
**Fernheizkraftwerk Puchstraße, Graz**



**Würzburger Versorgung;**  
**Simmering Graz Pauker AG, Wien;**  
**Enka Insaat, Wittmund;**  
**Gemeinschaftskraftwerk Essen;**  
**Stadtwerke Hamm;**  
**Harculo Centrale, Zwolle;**  
**Stadtwerke Wuppertal**

**For further references and Colt systems in action go to:**

**[www.colt-powergen.com](http://www.colt-powergen.com)**





*Energy from waste facility E.ON, Delfzijl (NL)*



*Energy from waste facility Rothensee GmbH, Magdeburg (D)*



*Energy from waste facility MVA Leudelage (L)*



*Energy from waste facility MVV, Königswusterhausen (D)*



*Energy from waste facility Rothensee GmbH, Magdeburg (D)*





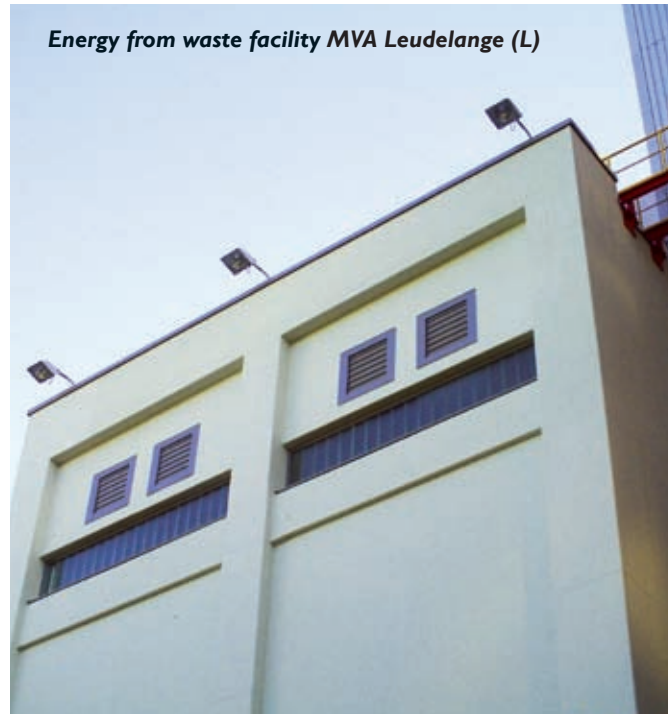
*Belvedere Riverside Resource Recovery Centre (UK)*



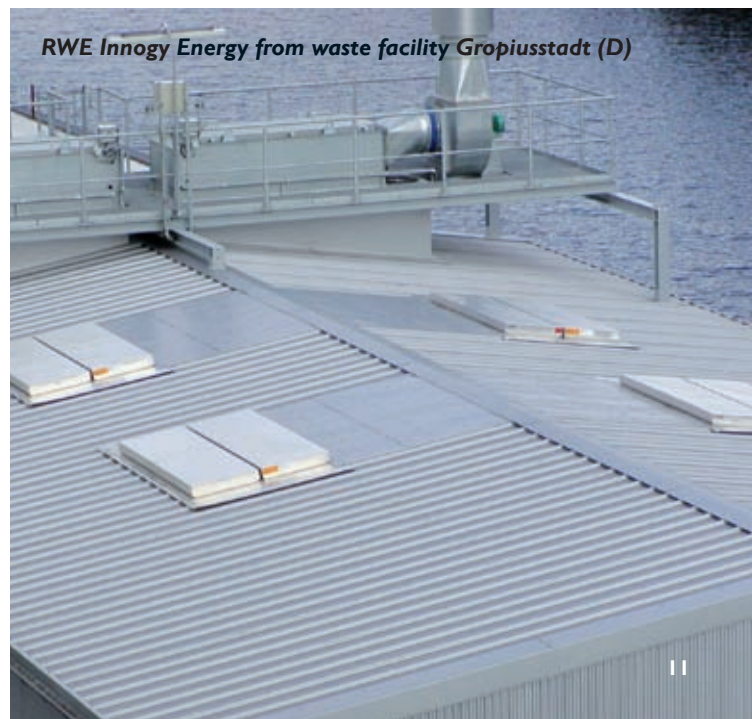
*REW Innogy AG Didcot power station, Oxfordshire (UK)*



*Energy from waste facility Rothensee GmbH, Magdeburg (D)*



*Energy from waste facility MVA Leudelange (L)*



*RWE Innogy Energy from waste facility Gropiusstadt (D)*



Colt International is a Colt Group Company, one of Europe's leading independent providers of building services. Founded in 1931, Colt has been providing healthy, comfortable and safe working conditions in industrial and commercial buildings for more than 80 years. Colt systems harness the natural elements of the sun, wind and light to create energy efficient and healthy buildings, contributing to the creation of a sustainable built environment.

For further information about the location of Colt's local offices, to find out more about Colt's products and services, or to find out more about Colt's projects, please go to:

[www.coltgroup.com](http://www.coltgroup.com)  
[www.colt-powergen.com](http://www.colt-powergen.com)



*"People feel better in Colt conditions."*

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