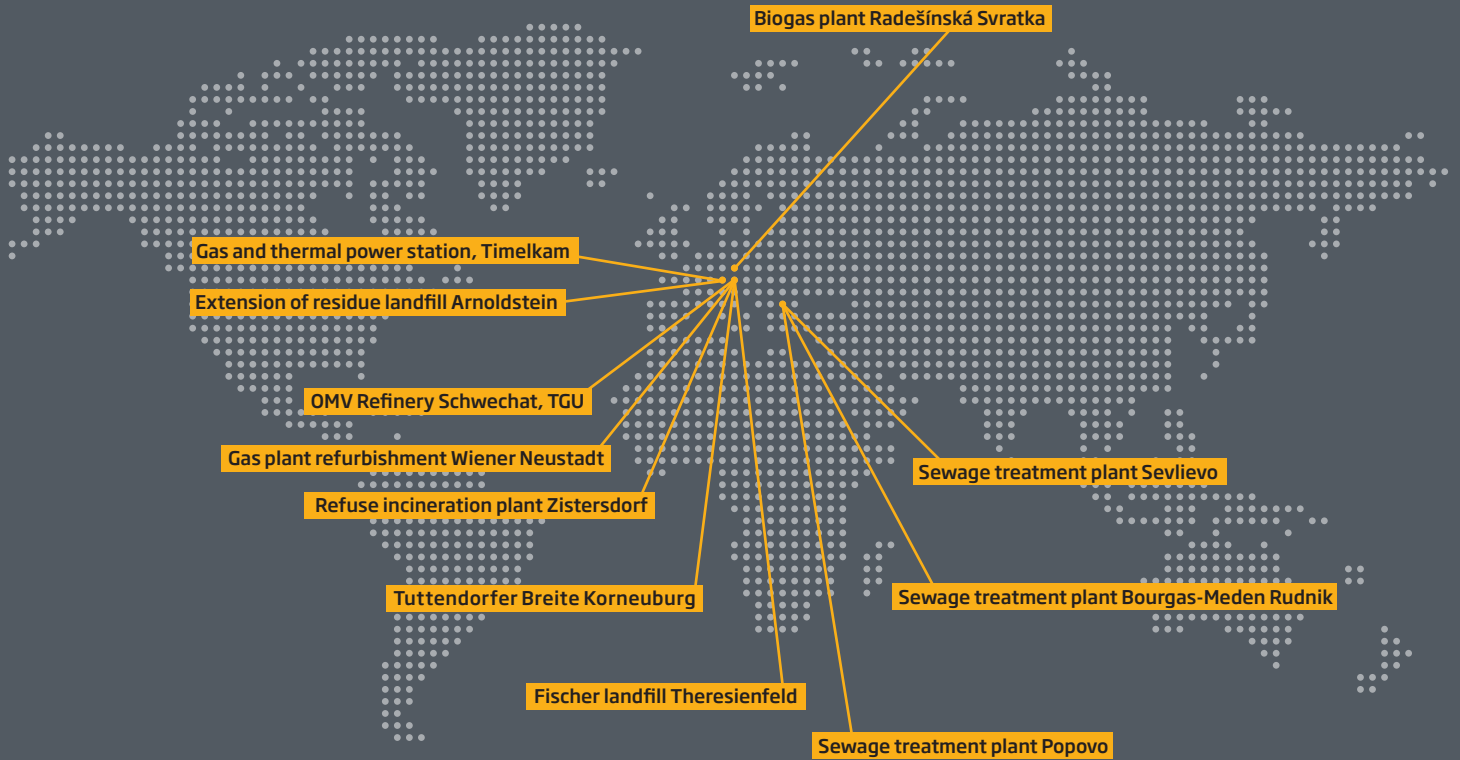




Environmental
Engineering

However environmentally aware you are
Our range in environmental engineering





At the Core of Construction. Worldwide.

Founded in 1965 as a small construction machine dealership, ALPINE is now one of the leading construction groups in Europe. Today, our name is synonymous with state-of-the-art know-how, extreme flexibility, tailor-made solutions and the use of the latest in material and equipment. We cover the entire spectrum of construction output with competence in every single sector and complete projects of any kind and size reliably and on time in more than 30 countries. In doing so, we are committed to each project as if it were the only project we had.

The classic construction activities are complemented by a number of services

in project administration, planning and financing. Our intensive commitment to R&D is to ensure the highest possible quality in future constructions and secure our leading position in construction procedures and material.

ALPINE's success is based on the motivation and qualification of our employees. High investments in training of employees and our above-average commitment in safety at work are witness that we take responsibility for our employees seriously. Responsibility for people also means responsibility for the environment. Part of our company culture is a careful use of natural resources.

PORTFOLIO ALPINE GROUP

- Bridge Construction
- Building Construction
- Energy
- Environmental Engineering
- Foundation Engineering
- Power Station Construction
- Railway Construction
- Road Construction
- Sports Facility Construction
- Underground Construction



Refuse incineration plant Zistersdorf / AT

Construction period: 2007 - 2009
Order value: € 23,1 million

04



Extension of residue landfill Arnoldstein / AT

Construction period: 04 - 12.2007
Order value: € 3,5 million

05



Sewage treatment plant Popovo / BG



OMV Refinery Schwechat, TGU / AT

06



Gas plant refurbishment Wiener Neustadt / AT



Biogas plant Czech Rep. Radešinská Svratka / CZ

07

FURTHER REFERENCE PROJECTS

Fischer landfill Theresienfeld / AT // Clearance

Tuttendorfer Breite Korneuburg / AT // Rehabilitation
of contaminated sites

Gas and thermal power station Timelkam / AT

Sewage treatment plant Bourgas-Meden Rudnik / BG

Sewage treatment plant Sevlievo / BG

For more information
and reference projects,
please visit our website.

► www.alpine.at



Building in harmony with the environment

In addition to the energy sector, environmental engineering is one of ALPINE's strongest growing business areas. State-of-the-art methods and technical equipments are being employed. Our portfolio includes the construction and operation of landfills, the construction of refuse incineration, treatment and recycling plants or the construction of flood control measurements, the treatment, reprocessing and disposal of contaminated soil as well as the construction of sewage treatment plants and biogas plants.

Specialist services are offered as well, such as the microbiological treatment of oil-contaminated soil, every service to do with recycling, remediation of contaminated sites and asbestos as well as building site waste management.

ALPINE draws its own experts in this field from the companies ÖKOTECHNA Entsorgungs- und Umwelttechnik GmbH as well as ALTEC Umwelttechnik GmbH.

COMPETENCIES

AWARD-WINNING MOBILE RECYCLING PLANTS REDUCE TIME AND COSTS

Undestroyed mineral parts of buildings are treated either immediately at the construction site and/or at a collection site. High-grade recycling granulate is re-used for construction on site, resulting in massive savings of costs and time. ALPINE has been awarded the „quality mark for mobile recycling plants“, making it a leader in quality standards in this sector.

SORTING ISLANDS

Waste sorting islands have the purpose of separating and precisely assigning construction industry wastes generated by any company involved in construction. The system or an orderly collecting point requires fewer containers at the construction site and removal and the separate disposal of waste is optimized.



WHAT IS ENVIRONMENTAL ENGINEERING?

- **Waste management:** waste disposal, refuse incineration, recycling, construction of controlled dumps and waste water treatment
- Technical measures for the protection of/from **surface and underground water, soil, noise and radiation**
- Measures taken to **reduce air pollution:** flue gas desulphurisation, flue gas cleaning and dust removal procedures
- Technologies to effectively **utilize renewable energy sources:** solar energy, geothermal energy, biofuel
- Instrumentation-engineering recording methods to **monitor pollutants and damage to the environment**

Additionally, there are environmental-engineering concepts and measures for an environmentally friendly production, energy conservation and for the prevention and/or reduction of emissions and waste.

Source: <http://de.wikipedia.org/wiki/Umwelttechnik>



Refuse incineration plant Zistersdorf

This refuse incineration plant subjects waste to a treatment by incineration. At the beginning of construction, the required soil stabilisation has been a particular challenge. However, despite the very high loads and despite the

clayey soil, deep foundations have not been installed. Doka climbing technique was used for the concrete construction of the refuse pit (36 m height) and for both stair towers (about 40 m height).

Absolute precision was required when lifting prefabricated parts into the middle level of the refuse pit **at a height of 21 m.**

SPECIAL FEATURES

- ▶ The largest individual prefabricated parts had a **weight of up to 70 tons** and have been lifted into place by a so-called „tandem lift“ - using a 400 ton and 200 ton crane.
- ▶ The soil stabilisation **required an approx. 3 metre deep excavation from the level of the lower edge of the floor slab.** The excavated material was temporary stored and then reinstalled in 30 cm layers. A mixture of chalk and cement was milled in between each layer and compressed to solidify the ground.
- ▶ The mountaineering progression technique (progression steps of 3.30 m) involves the **installation of climbing cones at every progression step.** Later on the climbing gear will be hooked into these cones and the formwork and reinforcement work done from there.
- ▶ The plant has **zero wastewater discharge** and **70 %** of refuse arrives by train.

REFUSE INCINERATION PLANT



AUSTRIA

Concrete: **15,000 m³**

Formwork: **47,000 m²**

Reinforced steel: **1,600 t**

Construction steel: **200 t**

Soil stabilisation: **21,000 m³**

Earth movement: **120,000 m³**

Construction period: **2007 - 2009**

Order value: **ca. € 23.1 million**





Extension of residue landfill Arnoldstein

The Asamer-Becker Recycling GmbH, seated at the industrial zone in Arnoldstein, operates a statute-conform residue landfill close to the industrial zone in an area between the A 2 South-Motorway (to the West) and the river Gailitz (to the East). First, the clearing and rough subgrade work was done that contributed to the improvement of the foundation (exchange of soil) of

the landfill's rough subgrade. This was followed by profiling with fill material and eventually fine subgrade work of surface and slope areas. Particular requirements on safety at work, quality and costs were placed on experts and equipment in the construction of the slope with an inclination of 2:3 and a height of 30 m with two intermediate levels.

The challenge for construction and environmental engineering was the short preparation time of the the construction site within which the **required fill material had to be obtained within an economically sound distance** of the construction project.

SPECIAL FEATURES

- ▶ While filling, the installation of the mineralized sealing layer (**2 x 20 cm with our own recipe**) (smectite content ca. 3 %) was installed.
- ▶ Purchased smectite was processed and optimized into our own recipe with the **support of the Technical University Graz**.
- ▶ Additional requirements were the construction of a smectite mat, PE-HD foil, protective membrane and/or geogrid and pipework. Subsequently a 50 cm thick pervious shell 16/32 had to be applied.

RESIDUE LANDFILL



AUSTRIA

Fill material: ca. 110,000 m³

Earth movement: ca. 60,000 m³

Construction period: 04 - 12.2007

Order value: € 3.5 Mio.





Sewage treatment plant Popovo

The sewage treatment plant in the city of Popovo in the north-east of Bulgaria, approximately 300 km away from Sofia, will serve about 38,000 people in the city and neighbouring municipalities. The plant is intended to biologically degrade nitrogen and phosphate elements and to mineralise sludge. The project is co-financed by the European Union as part of the ISPA Programme (Instrument for Structural Policies for Pre-Accession). The objective is to support the implementation of EU environmental legislation requiring a particularly high investment.

SPECIAL FEATURES

- ▶ Additionally, ALPINE trained the executives and staff of the sewage treatment plant.
- ▶ The construction of the waste-water treatment plant was a turnkey project according to FIDIC Yellow Book, i.e. the supplier performed the entire planning.

SEWAGE TREATMENT PLANT



BULGARIA

Concrete: 5,295 m³
 Formwork: 14,009 m²
 Reinforced steel: 327,000 kg
 Construction steel: 55,000 kg
 Building volume: 42,800 m³
 Soil stabilisation: 23,400 m³
 Earth movement: 196,529 m³
 Construction period: 2007 - 2009
 Order value: ca. € 9.71 million

ALPINE is responsible for the **planning, construction, equipment and commissioning** of the sewage treatment plant.



OMV Refinery Schwechat, TGU

ALPINE performed the extensive concreting construction of the TGU (Thermal Gasoil Unit) refinery in Vienna Schwechat as well as the external installations. The entire facility was essentially constructed by way of a pipe bridge with air cooler framework, a preceding equipment framework, a HRD (Heat Recovery Unit) with gas turbine, a compressor as well as a switchgear building and an off-site pipe bridge.

SPECIAL FEATURES

- ▶ Permanently elastic, hydrocarbon-resistant sealants were specified to seal grooves as well as penetrations of any hardstanding.

TGU - THERMAL GASOIL UNIT



AUSTRIA

Overall dimensions of equipment framework: ca. 90 x 10 m
 Pipe bridge: ca. 70 x 9.5 m
 Overall height support structure: ca. 25 m
 Concrete foundations: C25/30
 Concrete hardstanding: 6,660 m²
 Construction period: 06.2007 - 09.2009
 Order value: € 12.5 million

The support structure of the equipment framework and of the pipe bridge with air cooler framework was mainly constructed using the **reinforced-concrete skeleton-construction method** and using precast concrete members.



Gas plant refurbishment Wiener Neustadt

From 1860 until 1960 city gas has been produced from coal at the former gas plant Wiener Neustadt. Subsequently the plant was changed into a natural gas cracking plant without creating by-products. In recent years this area was used only by a central station to distribute natural gas.

Ground contamination typical to a gas plant has been determined as part of earlier construction works (PAK, phenols, cyanide).

SPECIAL FEATURES

- ▶ Classifying the types of controlled dump has been a real challenge to the consortium due to the fact that the excavated material showed different qualities from metre to metre.
- ▶ Securing of site by bored piles and 1,700 m² shotcrete.
- ▶ For purposes of underwater excavation, box systems had to be constructed using sheet piles (ca. 2,500 m²) as well as a ground-water treatment plant.



Biogas plant Radešínská Svratka

As part of this project, the building shell construction of the main and secondary fermenter, the round container and the horizontal silo have been constructed. ALPINE stavebni společnost CZ, s.r.o also completed the canalization, road links and all earthwork.

SPECIAL FEATURES

- ▶ The special task was the construction of two fermenters with 2,640 m³ and 1,400 m³ for the anaerobic digestion of the biomass. Both fermenters are designed as monolithic waterproof basements and suitable for content with a temperature of up to 55°C.

GAS PLANT



AUSTRIA

Surface removal: 6,000 m²

Excavation: ca. 90,000 m³

Conditioning of concrete: ca. 13,000 t

Disposal of:

Residual material and bulk waste:

92,500 t / Material that cannot be

disposed of in landfills: 43,850 t /

Return-flow suspension: 1,650 t

Remedial actions (surface):

20,000 m²

Construction period: 2007- 2009

Order value: € 20.5 million

A **high-pressure mortar-mix injection** was implemented in four locations of the plot boundary.

BIOGAS PLANT



CZECH REPUBLIC

FERMENTER BUILDING

Concrete: 780 m³

Formwork: 5,200 m²

Reinforced steel: 93 t

RUNDBEHÄLTER, FAHRSILO

Concrete: 1,525 m³

Formwork: 8,500 m²

Reinforced steel: 165 t

Construction period: 05.2009 - 12.2009

Order value: ca. € 1.87 million

A **VABH asphalt surface** served as the sealing layer for the area covered by the horizontal silo.



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