



## Contact

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# Biodiversity & threatened species

## Freudenau, Austria

### Positive sustainability aspect

The Danube Island Monitoring Programme is investigating the success of habitat restoration and associated ecosystem connectivity along the Danube in Vienna.

### Overview

The Danube in the region of Vienna is a braided river system on a floodplain. Since the 17<sup>th</sup> century there have been efforts to control the Danube, mainly to provide flood protection. A main channel was created in the 1870's, while some flow remained on the floodplain. This was increasingly felt to be ineffective for flood protection. The excavation of the "New Danube" commenced in 1972, with excess material used to construct the 21 km long "Danube Island" between the Danube and the New Danube.

However, over time the water table was found to be decreasing and damage was noted in the foundations of bridges and other heavy structures. Similarly the riparian Prater woods were beginning to show symptoms of dehydration.

Freudenau hydropower Plant was constructed after much consultation – it is situated in the centre of Vienna and the Danube Island is a much visited recreation area. Flood protection, groundwater management and ecological considerations were incorporated into the design.

## Scheme Specifications

### Dam Name

<b>Scheme operator</b> VERBUND Austrian hydropower	<b>Size of scheme (MW)</b> 172 MW
<b>Country</b> Austria	<b>Catchment area</b> 102 000 km <sup>2</sup>
<b>River</b> Danube	<b>Effective reservoir capacity</b> Run of river
<b>Construction years</b> 1992-98	<b>Reservoir size</b> Run of river

### External recognition

2001 Austrian NEPTUN-Water Prize – awarded the in the area of "water technology" for the ship lock design

Environmental management system acc. to ISO 14001 and EMAS

TUV certificate electricity from hydropower

RECS (renewable energy certificate system)

Eco-electricity acc 7 Austrian eco-electricity law

### Details on sustainability aspect

Prior to construction, three years of study were carried out on the hydrology, limnology, botany, zoology and climatology of the area, which found in favour of the project.

During the construction of Freudenuau hydropower Plant, new inshore structures were created on Danube Island and a remnant backwater protected (which also serves as a fish pass). The previously straight, steep riverbanks were replaced with shallow areas, gravel banks, small side channels and temporary waters. They were also constructed to enable connectivity between the floodplain and the downstream Alluvial National Park.

The Danube Island Monitoring Programme (DIMP) was set up to evaluate the success of these created habitats and allow for adaptive management of issues affecting their success. Monitoring includes surveys of macrophytes, terrestrial vegetation, dragonflies (*Odonata*), amphibia, reptiles and waterfowl.

Results for dragonflies (indicators of ecological quality of land) show that the Danube Island is functioning as a corridor through Vienna. Results for other groups indicate

that they are utilising the created habitats with amphibia successfully breeding at several sites.

## Other Aspects

### Community engagement and acceptance

In 1991 a referendum on the construction of the Freudenau plant was held and construction was supported by a majority of approximately 75%.

### Siting and design

Building a hydropower dam in the middle of a large city and on a major shipping route posed challenges to construction. Notable aspects of siting and design other than those relating to biodiversity:

- planning and management were critical components due to the limited site space
- construction was carried out in three phases all contained within the riverbed and immediately adjacent riverbanks
- at all times shipping lanes were maintained
- each excavated area was protected by walls designed to protect against 1 in 100 year flood levels
- a receding water and surge control system was installed to reduce shock waves to the urban zone
- a two-system 110 kV crosslinked polyethylene cable line was installed to avoid additional overhead transmission lines
- an award winning ship lock has been designed to harness extra energy by passing the water through a “matrix turbine” as the lock fills and empties.

### Water quality

The Viennese water table is controlled by twin diaphragm walls containing 25 pairs of wells that regulate the flow of water across the walls. There is on line monitoring of water levels and quality, including an innovative bio-monitoring station using water fleas. All of this is integrated via a groundwater model developed for the site.

## Further Information

[http://www.verbund.at/en/group/powerplants/donau\\_e/2.1.9/freudenau\\_e.htm#TopOfPage](http://www.verbund.at/en/group/powerplants/donau_e/2.1.9/freudenau_e.htm#TopOfPage)

[http://www.verbund.at/en/group/forschung\\_umwelt/research/projects/c5\\_5151\\_e.htm#TopOfPage](http://www.verbund.at/en/group/forschung_umwelt/research/projects/c5_5151_e.htm#TopOfPage)

[http://www.verbund.at/en/investor/irnews/2001/120010323\\_e\\_neptun.htm](http://www.verbund.at/en/investor/irnews/2001/120010323_e_neptun.htm)

<http://www.aquamedia.at/templates/index.cfm/id/656>

<http://www.industcards.com/hydro-eur-at.htm>