Tirol-Adria Ltd.
95 Wilton Road Suite 3
London SW1V 1 BZ
United Kingdom

www.tirol-adria.com
info@tirol-adria.com

Project A :
TYROL-ADRIATIC SEA-HYDROPOWER PLANTS

Content:

Introduction

The focus of the entire Tyrol-Adriatic Sea project is the use of the Ötztaler- and Stubaier alps' water resources for ensuring the operation of the most powerful hydroelectric power plant in Europe. The catchment area's water of the Inn is to be transferred into that of the Adige, the reflux into the Adige happens near Meran / South Tyrol, where because of the low bottom natural preconditions for the use of hydropower are met. In the storage lakes in high altitude we retain mainly plentiful water during the summer months and damage causing floodwater to accomplish the following goals:

1. A highly efficient power generation. This strengthens the European electricity network and would also lay the foundations to the use of renewable energy like unsteady wind- and solar energy.
2. An effective flood protection for the settlements in the valleys, at the Inn, the Danube, and the Adige.
3. An improvement of the water supply in the intensively cultivated farmland to the Adige and the Po Valley.
4. The development of the Adige river for shipping as a presupposition for a new Alpine North-South traffic artery, the Danube-Tyrol-Adriatic-Sea Passage.

I. Reconciliation of water from the Inn-Adige bottleneck

1st Facts:

The Local Government has asked the state power company TIWAG to develop an „option report“, in which the potential hydroelectric uses in Tyrol are listed. Amongst the 16 by the TIWAG proposed potential hydropower stations is also option 4, which is a water transfer from the Ötztaler Ache (Inn-Danube bottleneck) in the Adige River at South Tyrol (Italy). For this option, we have elaborated two amended proposals, in which also the stream flows on the south side of the Alps are considered. In a further step, the plan for the “Tyrol-Adriatic Sea power plants”, a comprehensive power plant project, was to link the TIWAG’s options 2, 3, 4, 5 and 9. In December 2005, we applied at the Local Government, the Environment Ministry in Vienna, at the South Tyrol provincal government and the relevant government ministries in Italy for the initiation of procedures for obtaining

- the approval of the Danube riparian countries as a fundemental prerequistie and
- the corresponding water discharge rights to establish the then “Ötzi-power plants”, today Tyrol-Adriatic Sea-Power stations.

The Environment Ministry in Vienna sent us the letter from the Local Government dated 18th of July 2005, in which they argue against a water transfer to South Tyrol, as long as no decision on the TIWAG’s options 2, 3, 5 and 9 are taken.

Furthermore it is clear from the report (Options- and Synthesis reports are published at www.tiwag.at), that the team appointed by the Local Government did not assess option 4, since this one affects major Italian territory.

By letter dated 1st of August 2005, we requested the assessment of our poposal to guarantee equal treatment amongst the candidates and to ensure the most efficient and advantageous power plant variant, regardless of which territory the individual plants will be built on.

2nd Examples of other water transfer pipelines from other catchment ares:

a) from the catchment area of the Danube:

- in the Po: diversion Inn-Adda at Livigno Reservoir.
- In the Rine:
  - By the Ill-Powerstations in western Tyrol (Rosanna, Trisanna)
  - Through the transition into the Main on the Rhine-Main-Danube Canal and the Lake Brombach **(for the Main-Danube Canal)**

b) within the catchment area of the Danube:

- Diversion of water from the Möll (Drava) in the Salzach by the Tauern-Power Plants in Kaprun (compound)
- Achensee: natural drainage to the Isar, power plant outflow to the Inn

They were achieved under difficult political conditions. Therefore, under the joint auspices of the EU, our projects – especially because they are within Tyrol (!) – should be feasible.

3rd Economic impact of the water transfer in the watershed Inn-Adige:

The countries bordering the Inn and the Danube to the Black Sea would have – in relation to the current state – through the transition into the catchment area of the Adige rather an advantage, since high water levels during the summer months' meltwater would be restrained and redirected (flood protection!). For the hydropower plants on the Danube and the Inn a disadvantage would there be limited, since they were not designed for flood and the water is just wasted on the weirs. In the winter half of the year, the outflow from the glacier region is very low and hardly affects the water level of the Inn and especially the Danube.

4th Impact on the environment:

14 million m³ of water evaporate in a second on the world's oceans, arrive as precipitation back to earth and thus form the hydrological cycle of nature. Asia is in average of 940 meters above sea level, North America 700 meters and Europe 300 meters.
Meran in South Tyrol offers due to the low bottom unique natural conditions, as there is an difference in altitude of 2.000 meters, utilizable for hydropower!
Negative effects on the environment are limited, as the discharges will be built above 2.300 meters sea level and discharging waters will drain off below into brooks, where they – together with the residual water – ensure a fair drain, which also enables white water sports in a little unperilous way.

For the „Three Gorges-Powerplant" in China, several million people have to be displaced, towns and villages disappear from the map. By realizing the Tyrol-Adriatic-Sea-Power Plants nobody has to neither leave his home nor house, because the storage lakes are now virtually in the wasteland above the growth threshold. Some sheep are losing a piece of summer pasture, in return therefore, the water storages offer completely new possibilities in other areas, such as fish farming.

II. The Tyrol-Adriatic Sea Power Plants as the most powerful hydroelectric power plants in the heart of Europe

These include the following storage facilities and water power plants:

1st storage: Gepatsch in Kaunertal (Kauner Valley) with the powerplant in Prutz/Inn (stock TIWAG). The power plant Prutz will become a pumped storage power plant. This creates a proper waterswing ex the Inn via the dams Gepatsch, Rifflsee, Rotental and Vernagt on to the Adige River watershed.

2nd storage: Rifflsee in Pitztal (Pitz Valley) with a pumped-storage power plant (PSKW). Option two provides for the construction of a store at the Rifflsee and a collection of the outflows from the Kaunergrat. Through a tunnel connecting the storage in the Rofental, in which even the outflows from the Taschach area and the Weiß- and Geigenkamm are discharged (part of the option three), water can be collected on the one hand to be led over to storage number four (Rofental) and on the other hand also to power a PSKW at the Gepatsch Reservoir. By this dual use of the Storage Rifflsee the benefits of the water diversion will be intensified and additionaly valuable surge current will be generated in the PSKW Gepatsch.

3rd storage: Fischbach in Sulztal (Sulz Valley, Stubaier Alps). For the collection and storage of the outflows from the Stubaier Alps, as in options number five and nine, a dam at

Fischbach (Sulztal) will be built. The water runs together with the feeders of the Ötztaler Alps to the Storage Rofental.

4th storage: Rofental. Water transfer from the Inn-Adige-Bottleneck to the PSKW Vernagt. **In the Storage Rofental all water drained off at the entire north side of the alps runs together.** It introduces a tunnel under the watershed to the 600 meters lower lying PSKW at the reservoir Vernagt in the Schnalstal (Schnals Valley, South Tyrol), which serves as a buffer memory.

5. Pumped storage power plant Meran: The supply from the reservoir at Vernagt to the powerplant Meran takes place in a gallery deeply in the mountain interior. In these galleries, the outflow from the Alps' southside will be discharged at an altitude of 1.700 meters above sea level, including Schneebergbach in Passaiertal (Passaier Valley). The power plant will be built in a cavern northwest of Merano at 290 meters altitude. Due to the relocation of the power plant Naturns (TIWAG's option four) into the cavern, the drop height will be increased from 1.135 meters to 1.400 meters. **The total difference in altitude therefore equals 2.000 meters!**

6. Water drainage from the Adige at Töll. In the conduction-power plant Töll (506 meters above sea level, stock of Etschwerke AG) a maximum of 60 m³ of water will be drained off the Adige to feed via a vertical tunnel the Kawernen-Power Plant, which provides at a gap of 221 meters a power of 100 MW. This discharges allows to pump greater amounts of water into the reservoir of Vernagt.

7. Water return tunnel as compensating basins: Through the water return tunnel a controlled amount of water will be returned by low-pressure turbines at Meran-Untermais (285 meters above sea level) into the Adige. Thereby we can guarantee even during the pumping operation a sufficient amount of water for about 48 hours.

8. Scope of work:

a) PSKW Kaunertal (Prutz)	400 MW	Pumping capacity 400 MW
b) PSKW Gepatsch-Rifflsee	300 MW	Pumping capacity 300 MW
c) PSKW Vernagt	700 MW	Pumping capacity 700 MW
d) PSKW Meran	2.000 MW	Pumping capacity 600 MW
e) KW Etsch-Töll	100 MW	none
f) KW Water-Returntunnels	10 MW	none

The hydropower stations Töll and Naturns (Etsch Power Stations) and Marling (Edison) and high voltage lines leading to these will be shut down. Even more interfering constructions such as canals and water pipes drop out.
[The hydropower plants at the canaltunnel Inn-Adige and Adige-Garda are cited in the report on the Danube-Tyrol-Adriatic Sea-Passage. The will perform services worth 200 MW.]

Overall performance	3.510 MW
Pumping capacity	2.000 MW
Standard benefit	5.500MW

Annual performance: 3 Mbillion kWh – without pumping power-

In comparision the TIWAG's option number five, which provides the construction of a new power plant group in the Ötztal (Ötz Valley):
Total capacity: 1.359 MW, pumping capacity: 400 MW.
It shows that the described Tyrol-Adriatic Sea Power Plant group together with the expansion of Gepatsch-Rifflsee and an enlargement of the SKW Prutz to a PSKW will result in 2.5 times the power plant's performance and 5 times pumping performance.

The power plants are constructed to produce surge current. The capacity of 3.510 MW and pumping performance of 2.000 MW result in a control range of 5.500 MW, which is the output of five nuclear power stations, or 2.500 wind turbines each 2.000 kW.
This power which is always available strengthens security of supply and forms the basis for a further development of other power generating plants from renewable energy sources, in particular the volatile wind- and solar energy.

Pumped storage power stations (PSKW) are in a position to within a few minutes either

- ? **obtain as a PSKW surplus electricity from the mains** or
- ? **work effectively as a power plant during times of need of surge current**.

Most of the produced energy shall be fed into the Italian grid. Italy covers its own power requirements to 80% from fossil energy at an efficiency of about 40%. Our project is the priority objective of the EU, the use of renewable energy sources.

III. High and low water regulation north and south of the Alps

1st High water regulation

a. In addition to the energy benefits, by skillful management these power plant facilities are in a position to ensure an efficient flood protection north and south the water and meteorological divide and to prevent flood damage in the Ötztal (Ötz Valley), but also in the settlements at the Inn, the Danube and the Adige River.
b. The five all-over-the-year storage lakes with a volume of about 450 million m^3 allow a water resources' reversion to 30% in the summer half of the year and 70% in the winter half of the year (1.11. to 30.4.). Thereby you can lift during low flow in the winter half of the year the Adige's water level.
c. During storms at the Alps north side high water will be retained in the storage lakes Rifflsee, Fischbach and Rofenache, if necessary re-routed to the Alps south side and converted in power plants there.
d. During flood danger at the Alps south side and high water levels of the Adige, the power plant Meran won't be operating. There is even the possibility to pipe the overflow collected in the supplygalleries in the reservoir Vernagt, as well as to pump water from the water return tunnels via Vernagt and the water shed into the storage Rofental. Thus you can interfer very effectively with the high water control.
e. If either the Inn or the Danube run low water, you will be able to run short-term more water from the storage lakes via the power stations Gepatsch and Prutz into the aforementioned rivers.

2nd Bridging low water periods of the Adige

a. Improving the water supply in the agriculture: For the intensive cultivation of climatically favorable growing areas located near the Adige, water is used for irrigation of the fields and fruit- and wine growing plants. The transition contributes to the security of water supply, especially if simultaneously more efficient irrigation techniques are applied. From the water return tunnels of the power plant Meran with a capacity of 1.800.000 m³ a controlled amount of water can be discharged into the Adige and tackle water shortage.
b. In the water return tunnels you can absorb the upsorge induced in the hydropower plants in the Vinschgau.
c. The lifting of the Adige's water gauge lays the foundations for beeing navigable. Whilst during the summer half of the year the drains from the catchment ares of the Adige and the Eiszack-feeder's transitions from the Stubaier Alps through the canal tunnel assure sufficient water levels, the water transfer from the dams at the Alps north side guarantee a lifting of the Adige's water levels during the winter half of the year. Thus, in accordance with nature the Adige will be made navigable and therefore the **Danube-Tyrol-Adriatic-Sea passage** enabled.

The EU has all the prerequisites to the realization of this project, which will benefit all the citizens and the community in a major way. It would be contrary to the European sense of community to not profit of the benefits of this water transfer. All the more so when one considers that we are talking about damaging flood water or abundance of water, that will be retained in the storages and led to the Alps south side, in order to achieve:

- A much more efficient power plant to generate current than those on the north side of the Alps,
- A more effective flood protection,
- An improvement of the water supply in the intensively cultivated farmland to the Adige and the Po Valley,
- **The development of the Adige as a traffic route, and the establishment of a continous waterway from the Danube to the Adriatic Sea, which opens completely new opportunities to address the acute European traffic problems,**
- A strengthening of the European electricity network.

IV. Transition scheme Tyrol-Adriatic Sea Hydropower plants (Powerpoint-Datei, 50 KB)

Tirol-Adria Ltd.
Project Ideator & Manager: Albert Mairhofer
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