# Verbund – Austrian Hydro Power AG

# Implementation of WFD and sustainable electricity production - tasks, challenges and experiences in Drava river basin

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# Topics

- Introduction
- Status of hydro power development on the Austrian Part of river Drava
- Implementation of WFD - AHP's viewpoint
- Actual measurements of AHP related to WFD (research, pilot projects)
- Future developments

# Verbund Austrian Hydro Power (AHP)
# Company Presentation

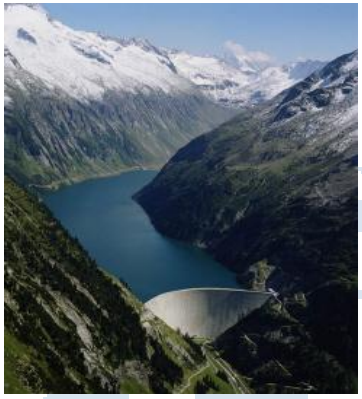
Freudenau/Wien

Schwabeck

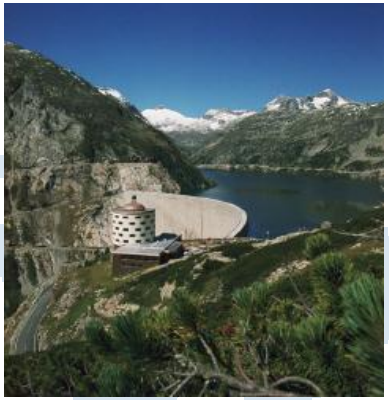
90 Hydro Power Plants
69 Runoff HPP and 21 Storage HPP
6.023 MW Capacity
22.774 GWh/a Annual Generation
(equal to 40% of Austria's electricity consumption)

St. Veith

Kaprun

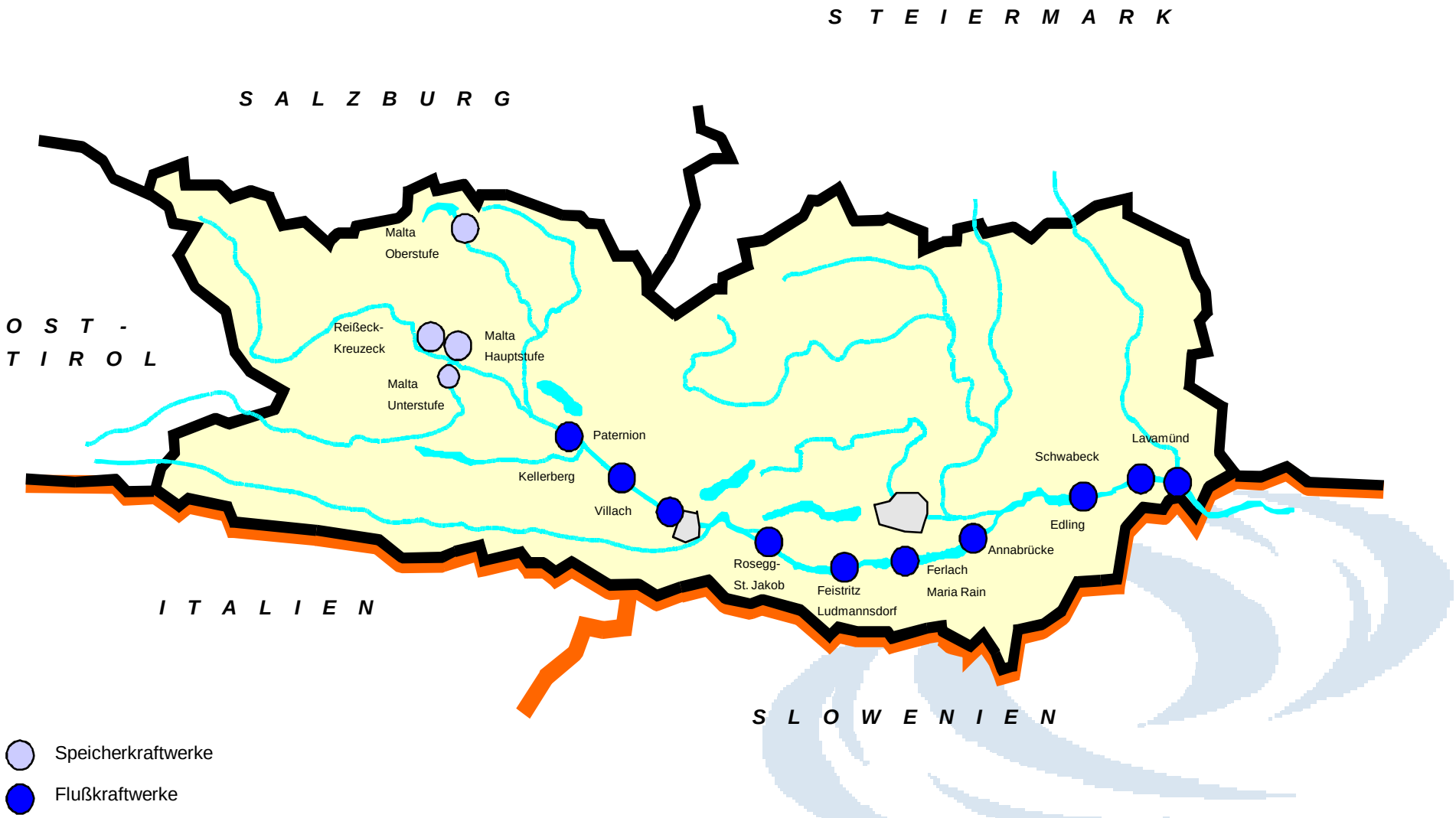


Zillergründl

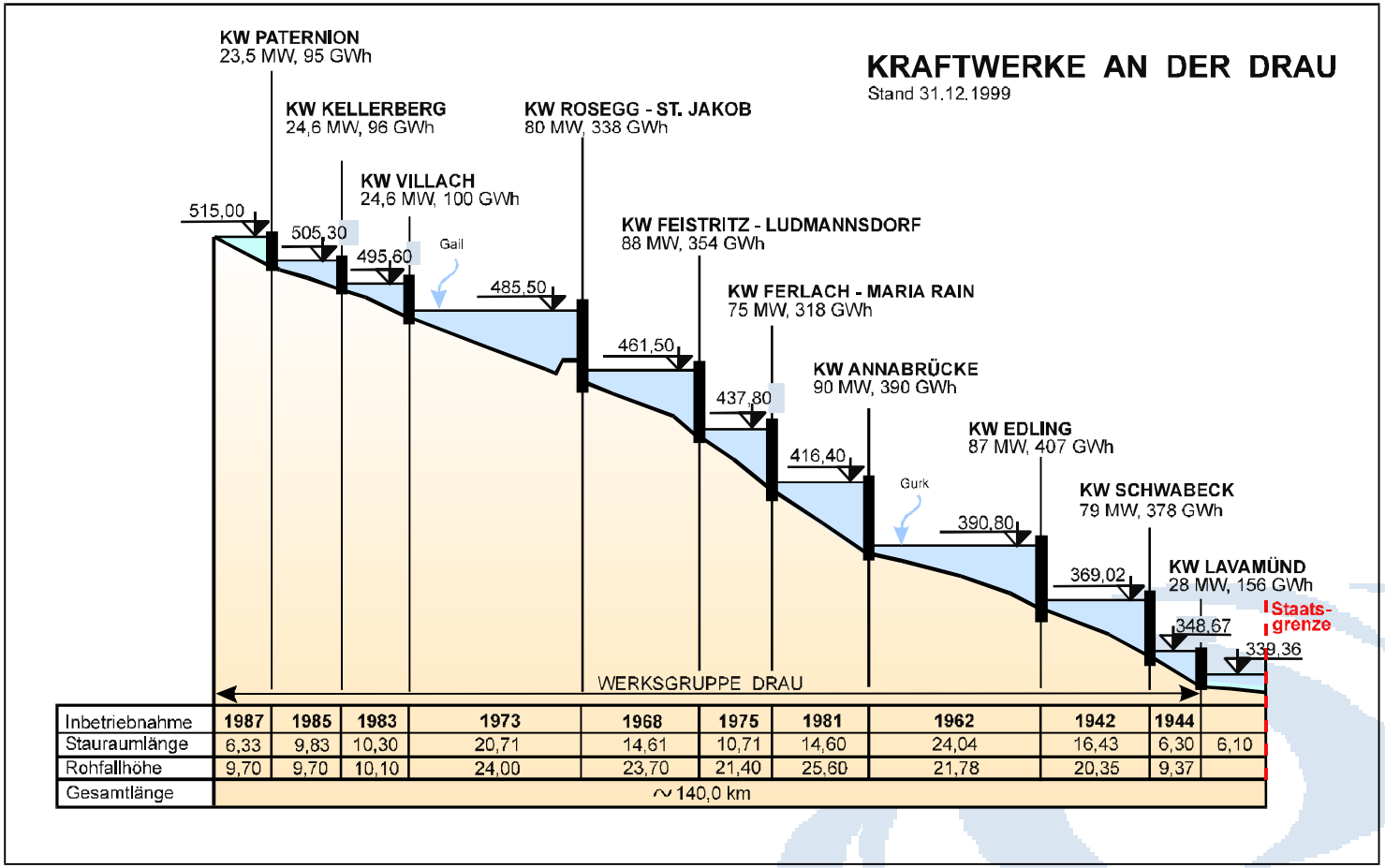


Malta

# AHP in Carinthia – general Overview



# Power Plant Cascade in River Drava in Carinthia




| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inbetriebnahme | 1987 | 1985 | 1983 | 1973 | 1968 | 1975 | 1981 | 1962 | 1942 | 1944 | |
| Stauraumlänge | 6,33 | 9,83 | 10,30 | 20,71 | 14,61 | 10,71 | 14,60 | 24,04 | 16,43 | 6,30 | 6,10 |
| Rohfallhöhe | 9,70 | 9,70 | 10,10 | 24,00 | 23,70 | 21,40 | 25,60 | 21,78 | 20,35 | 9,37 | |
| Gesamtlänge | ~140,0 km | | | | | | | | | | |

# Actual Framework for Hydro Power

- Energy Policy:
  - Liberalisation of Energy Markets
  - Renewable Energy Directive (Proposal)
    - European Target: Share of Renewable Sources 20% 2020
  - General Dependency of European Energy Supply
    - 70% dependency on energy sources outside Europe (prediction for 2030)
- Environmental Policy
  - Implementation of Water Framework Directive (WFD)
  - FFH Directive, Bird Directive (NATURA 2000)

# WFD – Results of Status Quo Analysis

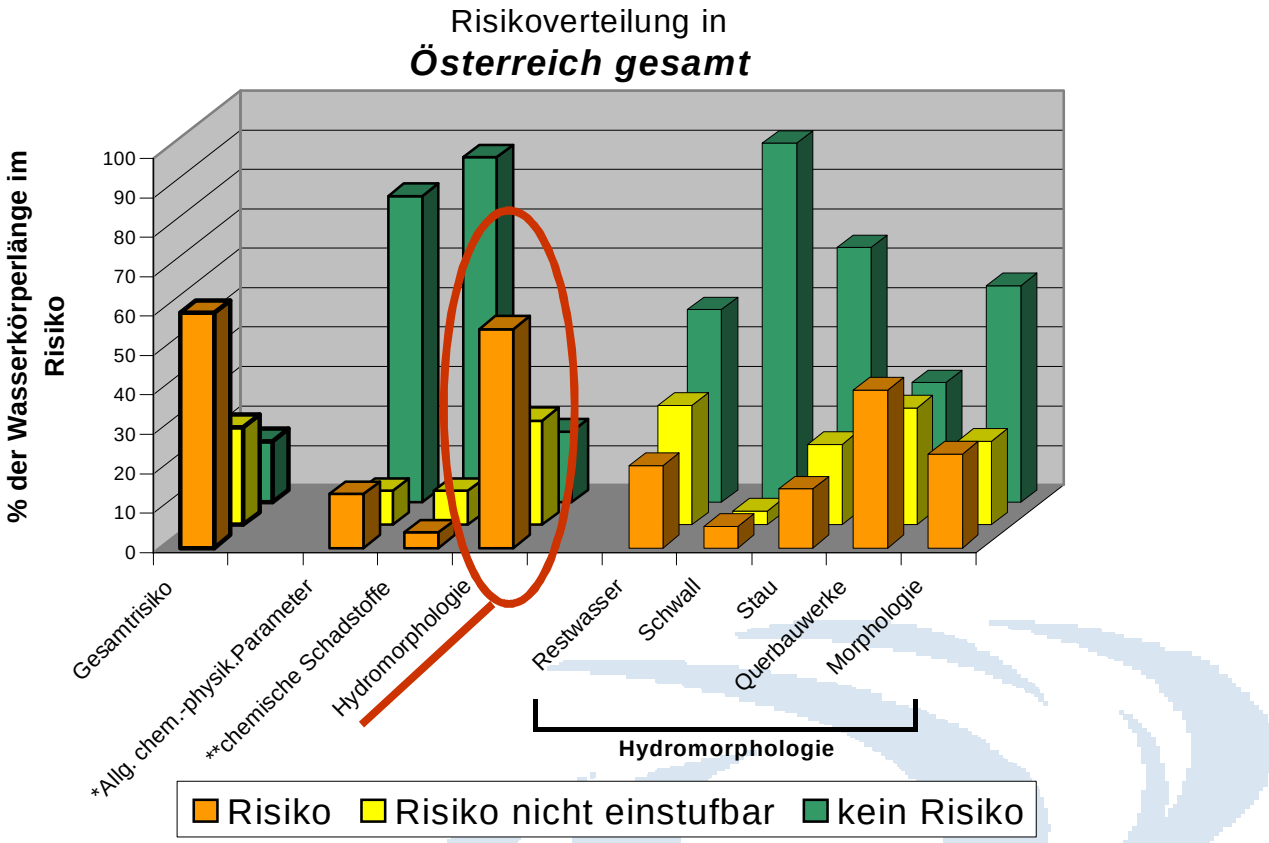
## 940 Water bodies

**Results of Risk Analysis, Hydro morphology:**

**56 %** **Risk**

**26 %** **Risk not evaluated**

**18 %** **no Risk**

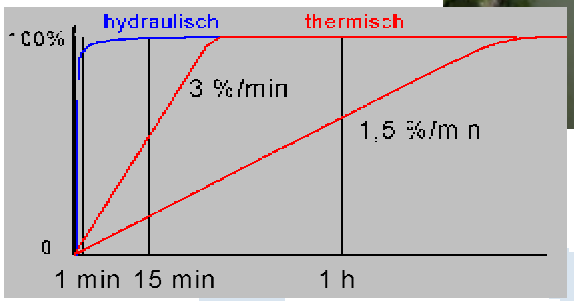



* **inklusive Gewässergüte**

** **prioritäre Stoffe + Stoffe der Liste I**, gem. RL 76/464/EWG und **sonstige Schadstoffe** gem. WRRL

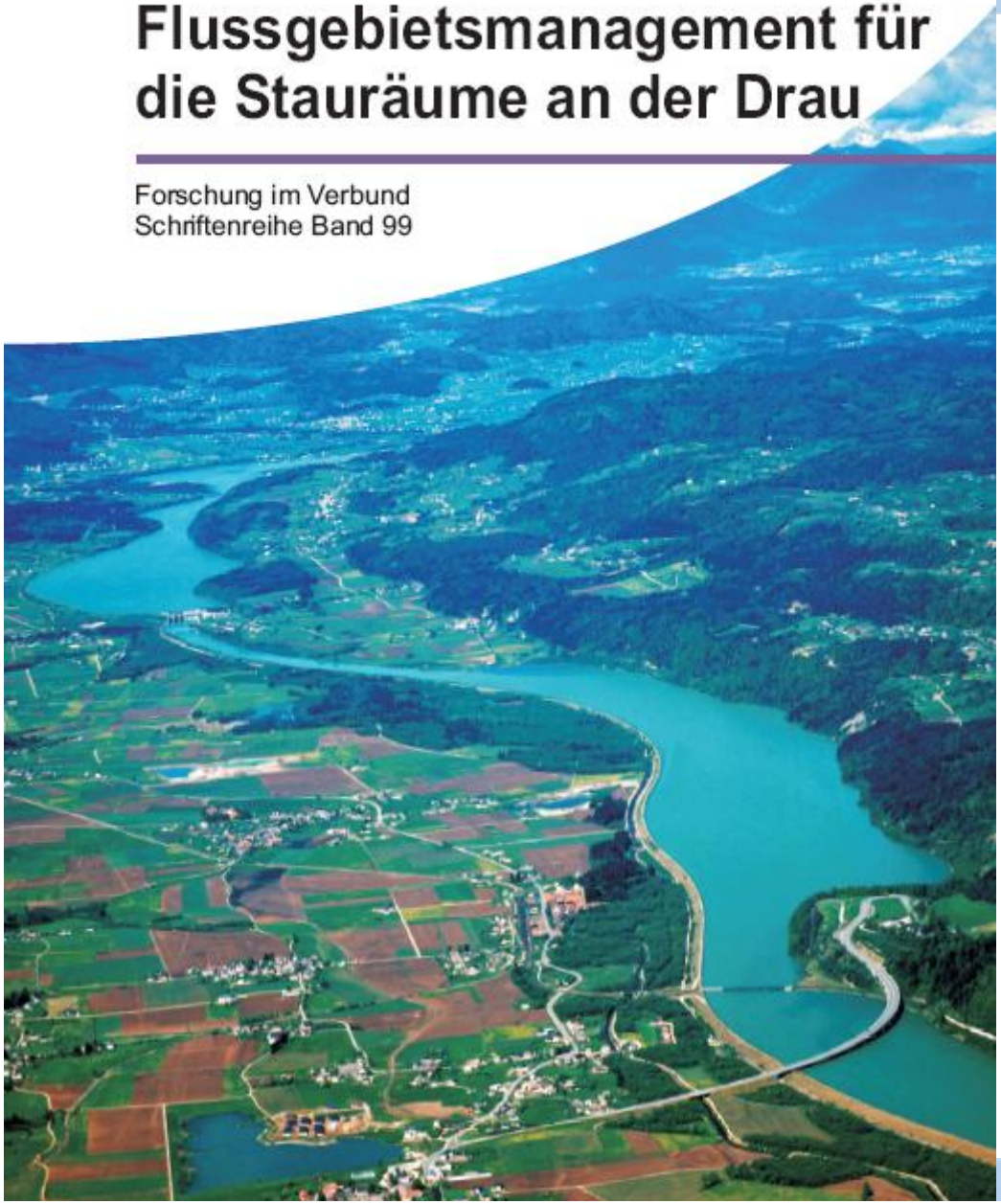
# Potential Conflicts Related to Hydro Power

- River continuum, lateral and transversal
  - Additional Investment Costs
- Ecological Flow
  - Reduction of generation (Assumption for Austria app. 2 - 7 %)
- Hydro Peaking
  - Impacts on energy and grid management)



# Challenges for AHP on River Drava

- Target à Sustainable use of hydro power:
  - Energy Production
  - Flood and Sediment Management
- Applied R&D Projects and Pilot Projects
- Implication on Investment Strategy




- **Research Project: River Basin Management for the reservoirs on river Drava**
  - **Status Quo Analysis**
  - **Identification if problems**
  - **General mitigation measures**

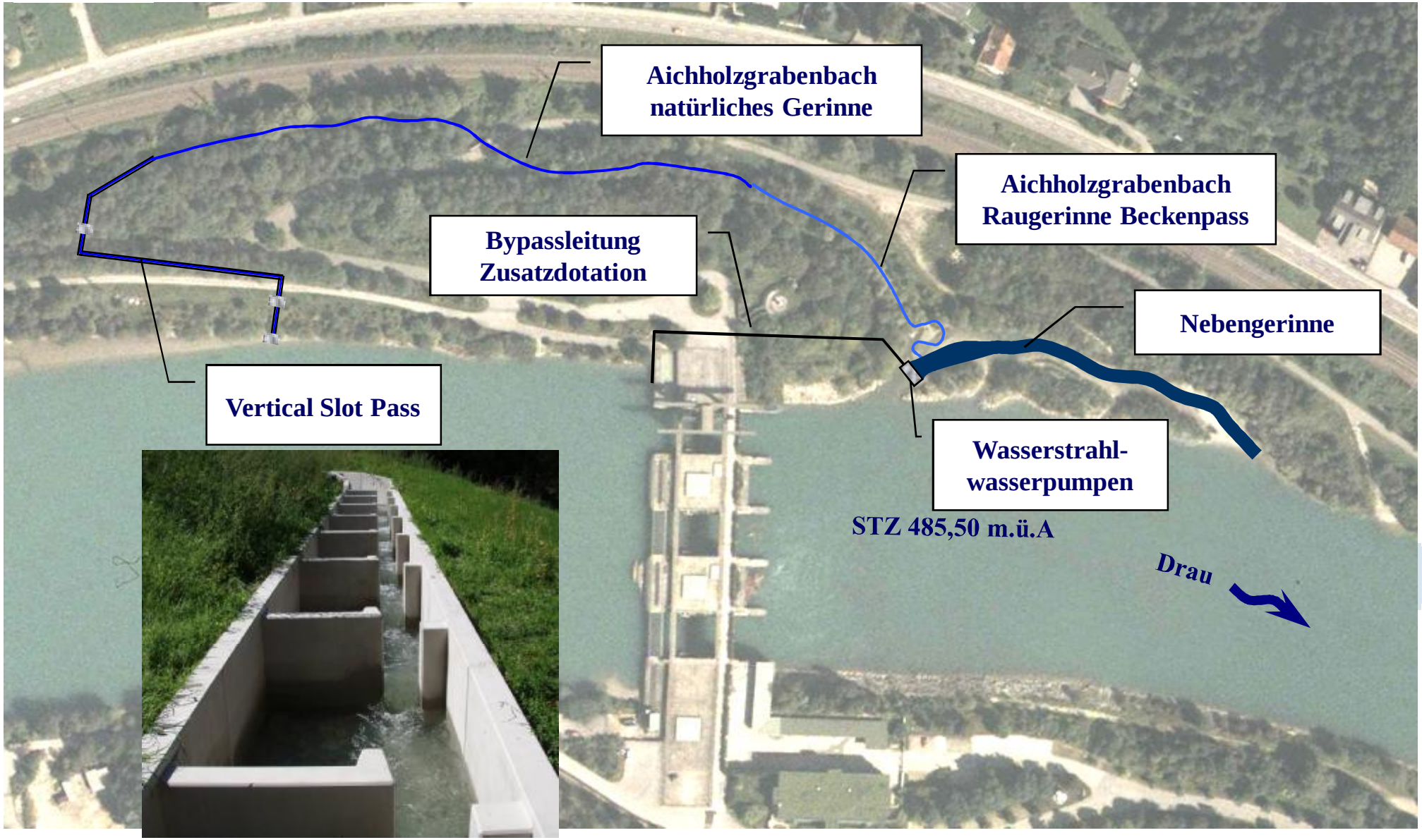
# River Basin Management Project – Identification of Problems and need for action

Tabelle 1: Übersicht Problembereiche der Abschnitte

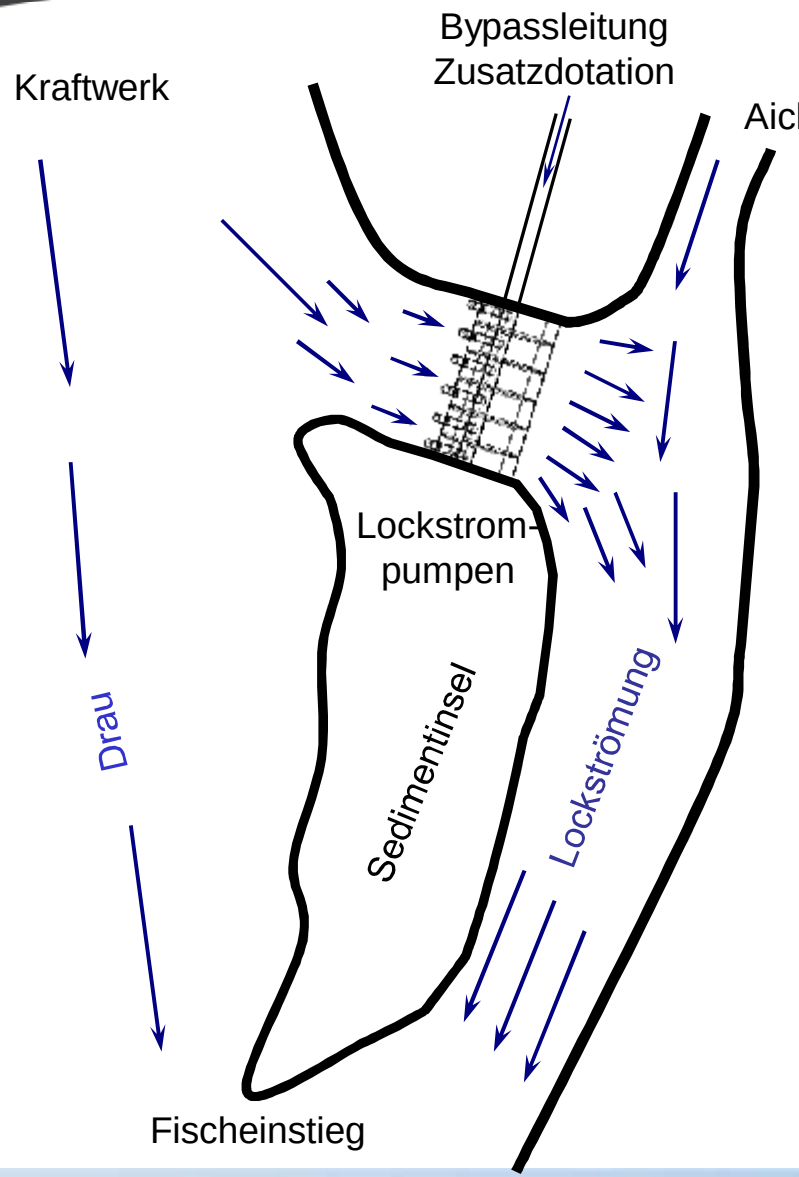
| Nr | Handlungsbedarf |
|---|---|
| 1 | hoch |
| 2 | mittel |
| 3 | gering |
| 4 | keiner |
| 5 | keine Angaben |

| Abschnittsbezeichnung | Stauraum KW Paternion | Stauraum KW Kellerberg | Stauraum KW Villach | Stauraum Rosegg - St. Jakob im Stadtgebiet Villach | Stauraum Rosegg-St.Jakob unterh. Stadtgeb. Villach | Restwasserstrecke KW Rosegg - St. Jakob | Oberwasserkanal Rosegg - St. Jakob | Stauraum KW Feistritz-Ludmannsdorf | Stauraum KW Ferlach-Maria Rain | Stauraum KW Annabrücke | Stauraum KW Edling (Völkermarkter Stausee) | Stauraum KW Schwabeck | Stauraum KW Lavamünd |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bauwerke und sonstige Baumaßnahmen | 2 | 4 | 4 | 2 | 3 | 4 | 3 | 3 | 4 | 4 | 2 | 4 | 4 |
| Dämme | 4 | 4 | 4 | 4 | 2 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 |
| Ufersicherungen | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| Verlandung-Hochwassergefährdung | 2 | 3 | 3 | 2 | 1 | 1 | 4 | 3 | 4 | 4 | 2 | 4 | 4 |
| Sedimentmanagement im Zuge von Hochwassermanagement | 2 | 3 | 3 | 4 | 1 | 3 | 4 | 1 | 4 | 4 | 4 | 4 | 4 |
| Technische Entlandungsmaßnahmen | 1 | 2 | 3 | 3 | 1 | 1 | 4 | 1 | 3 | 3 | 2 | 3 | 4 |
| Lagerungsflächen | 2 | 4 | 4 | 4 | 2 | 2 | 4 | 3 | 2 | 3 | 4 | 4 | 4 |
| Bewuchsmanagement | 2 | 2 | 3 | 2 | 2 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 3 |
| Durchgängigkeit / Fischaufstieg | 1 | 1 | 1 | 1 | 1 | 3 | 3 | 1 | 1 | 1 | 1 | 1 | 1 |
| Anbindung der Zubringer/Nebengewässer | 4 | 4 | 4 | 3 | 4 | 1 | 4 | 4 | 3 | 2 | 4 | 4 | 4 |
| Ökologische Strukturdefizite | 3 | 3 | 2 | 1 | 3 | 3 | 4 | 2 | 2 | 3 | 3 | 3 | 3 |
| Kontaminierung Sediment | 4 | 4 | 4 | 4 | 1 | 1 | 4 | 3 | 4 | 4 | 4 | 4 | 4 |
| Wasserspiegelschwankung durch laufende Betriebsführung | 2 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 1 | 2 | 2 |
| Wasserspiegelschwankung im Zuge von Hochwassermanagement | 4 | 4 | 4 | 4 | 3 | 3 | 1 | 1 | 4 | 3 | 2 | 3 | 2 |
| Erhöhter Sedimenttransport bei Hochwasserereignissen | 4 | 4 | 4 | 4 | 2 | 2 | 4 | 3 | 4 | 4 | 4 | 4 | 4 |
| Nutzungskonflikte | 2 | 3 | 3 | 2 | 1 | 1 | 3 | 1 | 3 | 3 | 1 | 4 | 4 |

# Pilot Project Fish Pass Villach HPP (2006 – 2007)

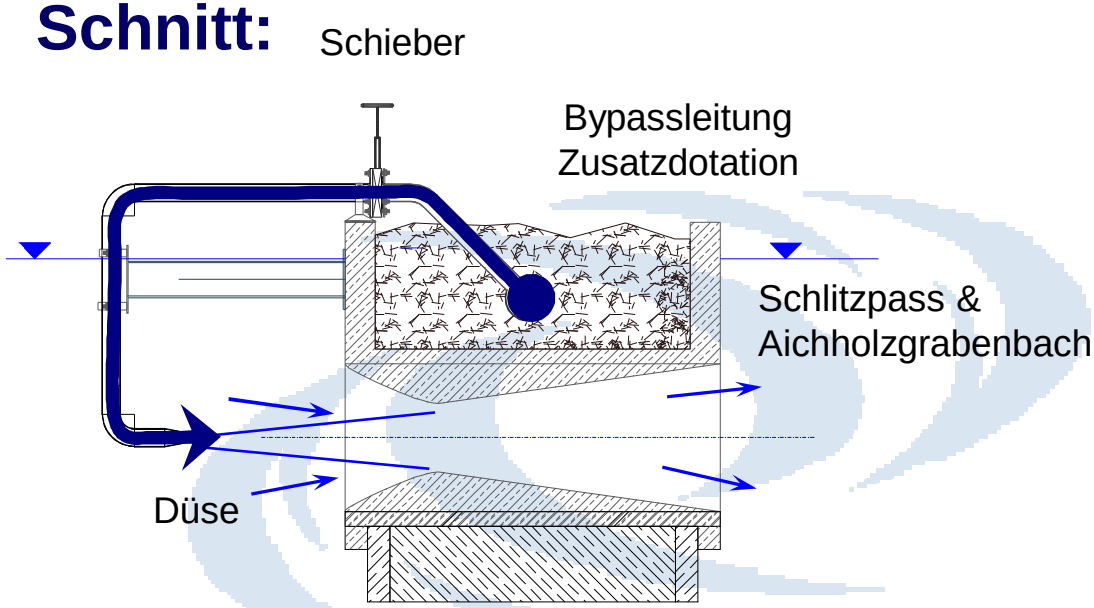


# Additional Dotation (Jet Pump principle)



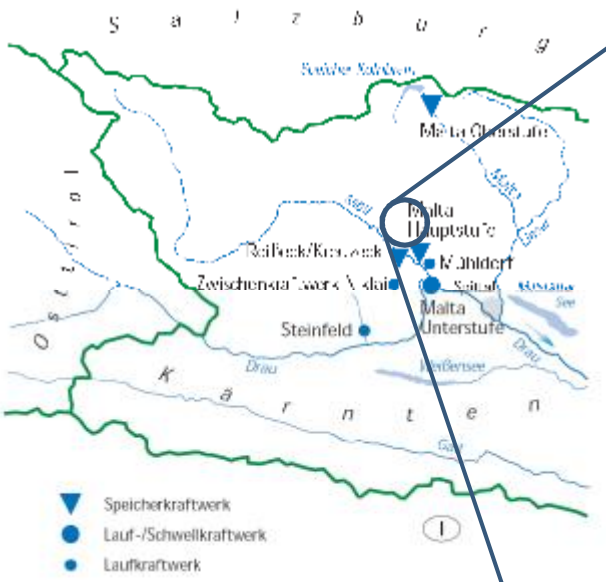

| | | |
|---|---|---|
| *Schlitzpass* | *275 l/s* | *13%* |
| *Aichholzgrabenbach* | *50 l/s* | *2%* |
| *Zusatzdotation* | *150 l/s* | *7%* |
| *Unterwasser* | *1650 l/s* | *78%* |
| ***Lockströmung**:* | ***2125 l/s*** | |

**Schnitt:**



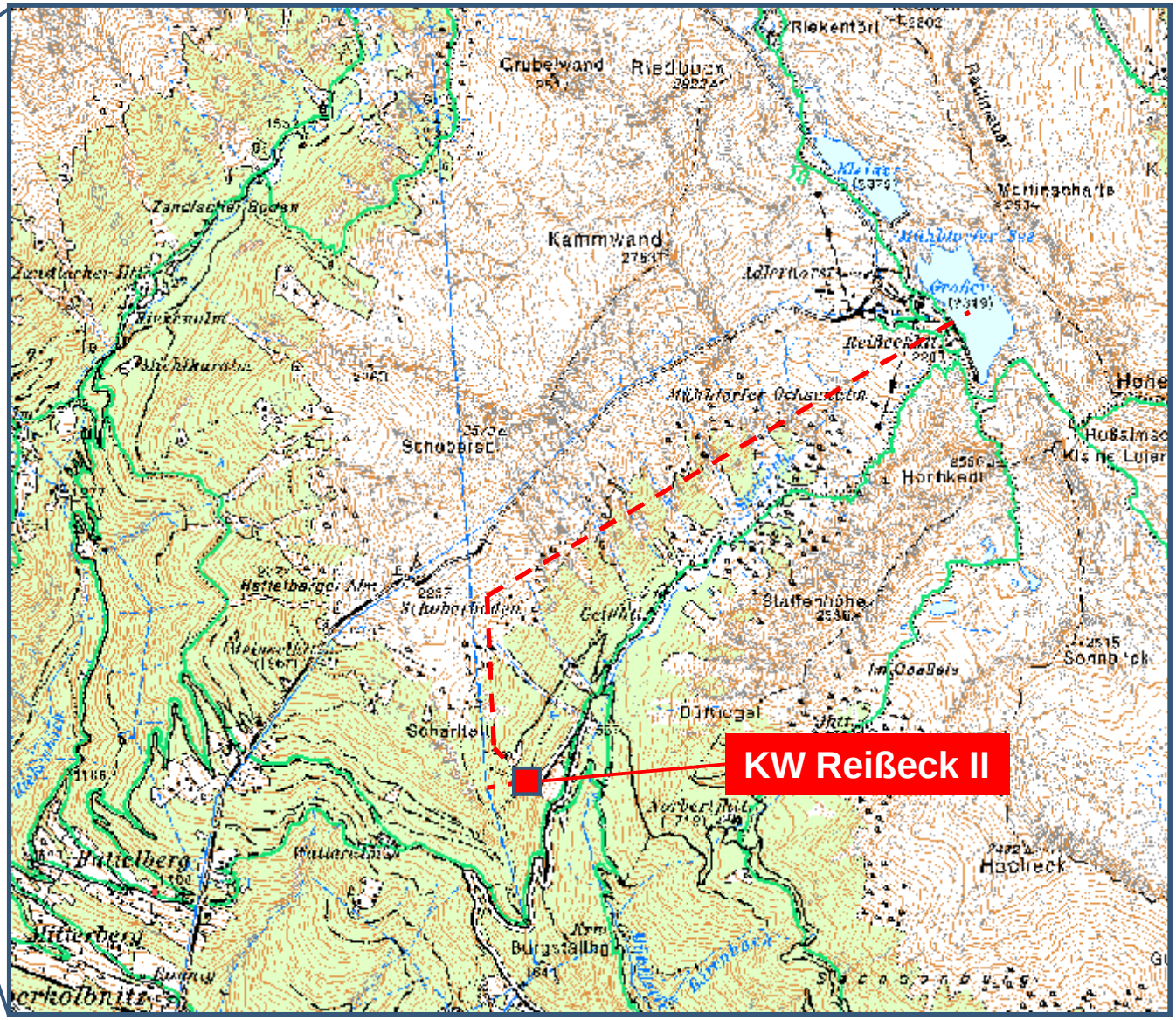
# Fish Pass Spielfeld / Mur (2006 – 2007)
## Interegg IIa - Project

# Pumped Storage Power Plant Reißeck II




## Project Area

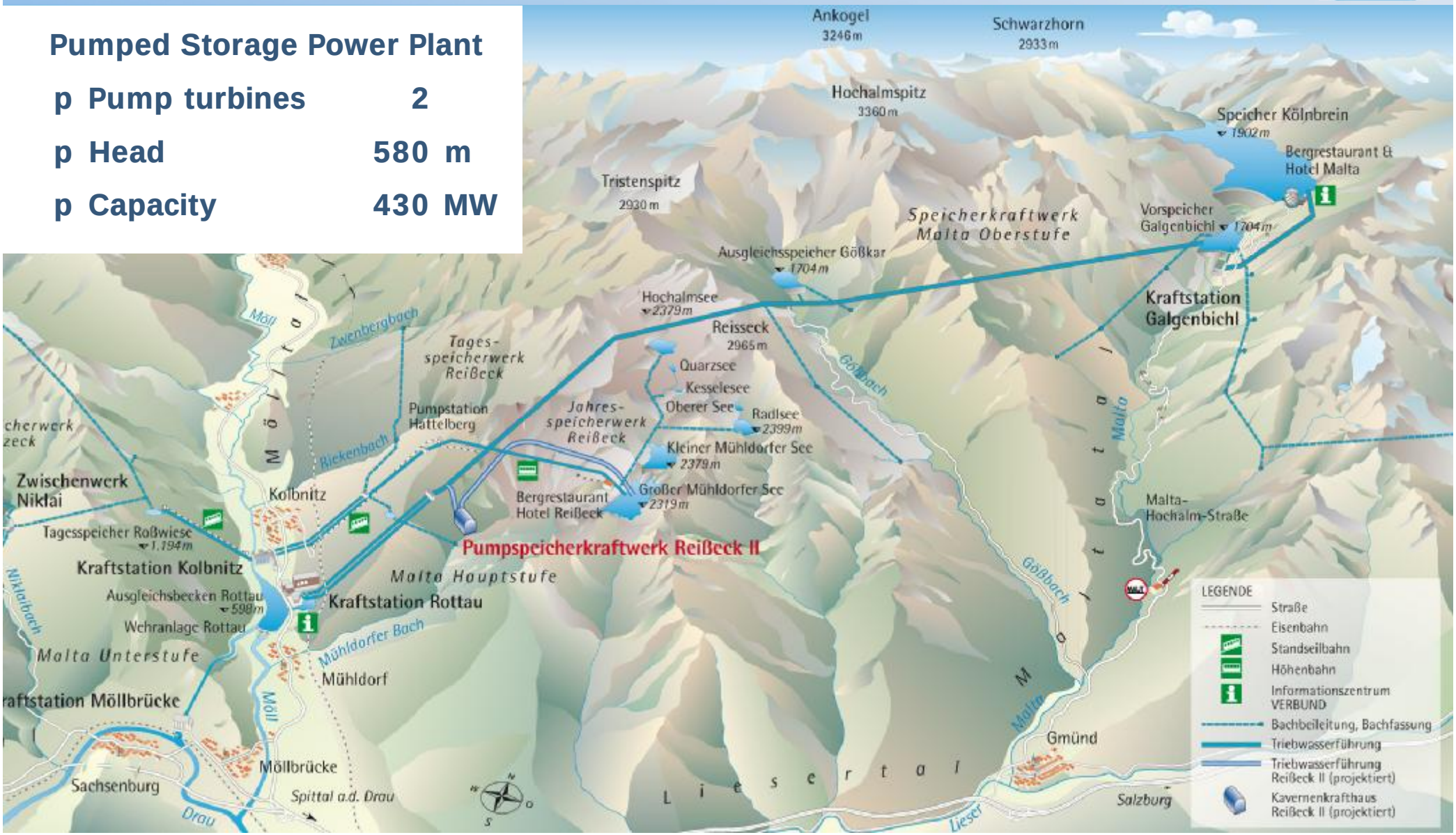
Power Plant Group
Malta/Reißeck



# Specific Data Reißeck II

**Pumped Storage Power Plant**

- **Pump turbines** 2
- **Head** 580 m
- **Capacity** 430 MW



# Outlook

- Implementation of WFD
  - Essential points for hydro power: river continuum, residual flow, hydro peaking
  - Balanced management plans and adequate involvement acc. Actual practice
- Investment Strategy in Energy Infrastructure
  - primary optimization and upgrading of existing facilities)