

Greetings from Austria!

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The Use of Performance Indicators (PIs) for the Water Industry

Meetings on 4 / 5 July 2008 at Capital Water Beijing

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Senior President of Rohrhofer & Partners
Member of Board of Austrian Water

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About Austria

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- The history of Austria cannot be compared with the Chinese history. The Austrian History goes back only 2,000 years
- Vienna is the Capital of Austria
- Vienna was founded by the Romans
- For several hundred years, Austria has been the centre of the Austrian-Hungarian Empire
- Austria is a federal state since 1918
- Austria is famous for its clean environment, touristic attractions and classical musicians: Mozart, ...



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Where is Vienna...? •

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Water Management in Austria 1/8

- **Location: Central Europe**
- **Inhabitants: ~ 8 mio.**
- **Capital: Vienna**
- **Climate: Central European transitional climatic zone**
average precipitation: 1170 mm / a
average evaporation: 516 mm / a
- **Daily potable water consumption:**
150 liter / inhabitant, day



Water Management in Austria 2/8

- **Water supply:**
85% of the population public water supply
 50% groundwater (Denmark: 98%)
 49% spring water (Luxembourg: 65%)
 1% surface water (Australia: 90%)

- **Waste Water Disposal:**
 Sewerage system: 85%
 Cesspool: 10%
 Small WWT plant: 5%



Water Management in Austria 3/8

- **Authorities:**
 - Federal
 - States
- **Associations:**
 - Waste water: OEWAV
 - Drinking Water: OEVGW
- **OEWAV: Austrian Water & Waste Management Association**
 - Members: government, universities, councils, industry..
 - Targets: technical platform, education, information
 - Expert groups for elaboration of guidelines
 - Events: conferences, seminars, training courses..
 - Member of the International Water Association - IWA



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Water Management in Austria 4/8

- **Water Industry in Austria**

Almost all utilities are both for Drinking Water and Waste Water Public Utilities or a Stock Corporation wherein the shareholders is the City owing 100 %

- **Water Fees in Austria (average)**

Drinking Water

In the cities: Euro 1.50 / m³

In the rural areas: Euro 2.-- / m³

Waste Water

In the cities: Euro 2.-- / m³

In the rural areas: Euro 3.-- / m³



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Water Management in Austria 5/8

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Average Design Lives of Water Assets for Economic Calculations

- Pipes: 50 years
- Concrete structures: 40 years
- Pumps and mechanical equipment: 15 years
- Measuring tools / electronic parts: 20 years

Example:

Break-even point for Water Project → 50 years:

+ e.g. more than 3 times reinvestment of pumps



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Water Management in Austria 6/8

Thematic on Centralized vs. Decentralized Systems

- To improve Cost Efficiency
- In Europe: Municipalities own their Water Systems
 - Fear of loosing power of decision
 - Wish to remain independent
 - Examples of joint administration in Germany

A small Water System may be part of a centralized Water System, e. g. a Water Association.



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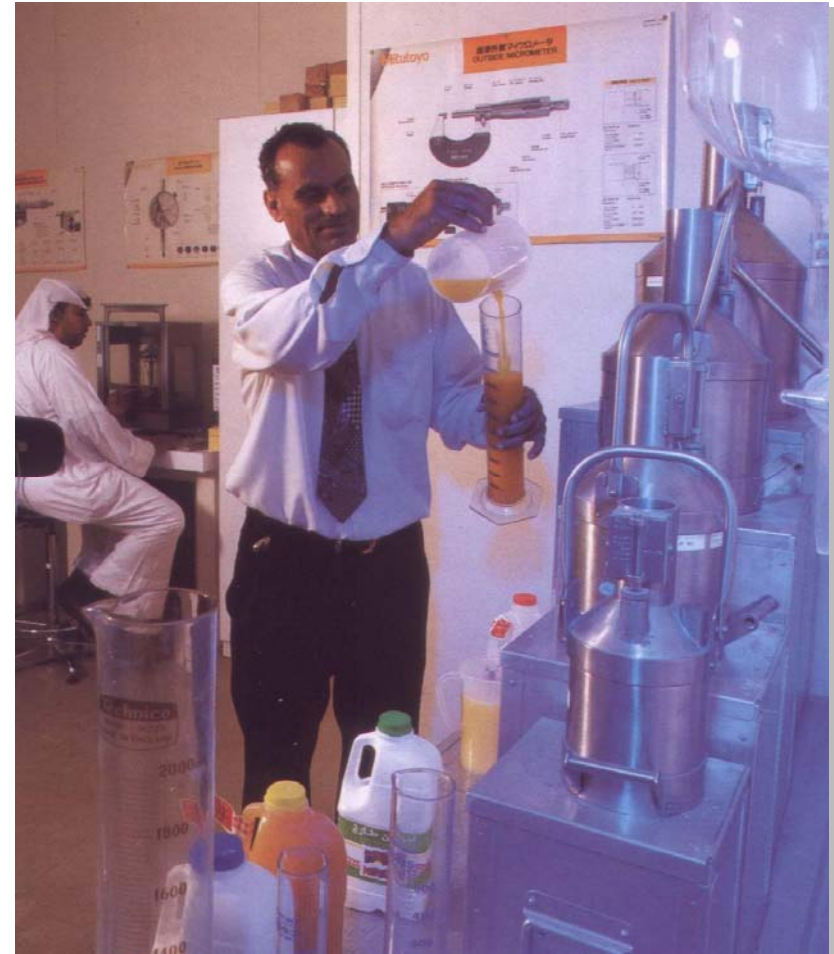
Water Management in Austria 7/8

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Centralized Training

- Water Systems of scattered agglomerations
 - No agreement on centralized administration
 - Sharing of training facilities
 - Joint organisation of training workshops

Operation of Water Systems demands learning by doing → exchange of experience



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Water Management in Austria 8/8

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Centralized Waste Water Systems	Decentralized Waste Water System
Large receiving water Large network	Small/"No" receiving water Small network
High Investment costs	Low Investment costs
"Low" O&M costs	"High" O&M costs
Centralized sludge combustion	Several sludge disposal units
Cost saving administration and training	Cost saving administration and training possible, if "united"
Sustainable	Sustainable



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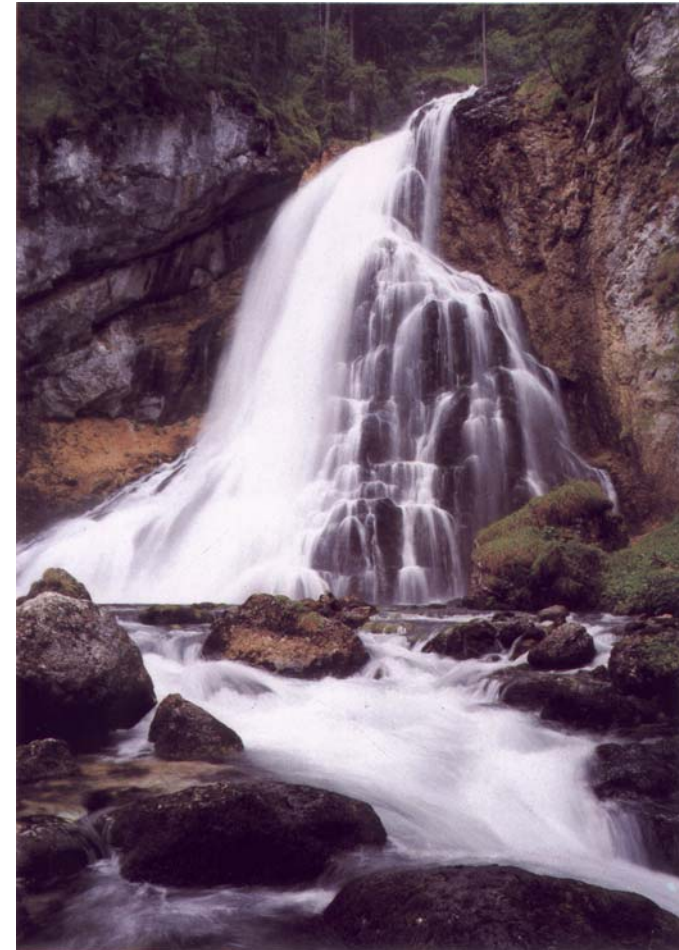


austrian water

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Renewable Energy and Water**

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Principles of austrian water:

- **Tailor-made solutions:**

Water Supply for everybody

Wastewater and Reuse

River Basin Management

Agricultural Development

Leisure and Tourism Development

- **High Tech and Lean Tech, where applicable**

- **Training and Education of Personal for the Water Industry**

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Services of austrian water

- Design Services

Project Development
Financial Engineering
Tendering / Procurement
Engineering / Construction



- Consulting Services

Human Resources Development
Public Awareness Campaigns
Training and Education



- Management Services

Operation / Administration

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Rohrhofer & Partners 1/2

Consulting for Water and Waste Management

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- **GWCC** (Engineering, Business Consultancy and Management Consulting Services)
- **OEKOREAL** (Operation; Research & Development; Training and Advisory Services for Utilities and Governments)
- **INTERIVAL** (Consulting Services for River Basin Management)
- **OEKO AUDIT** (Environmental Audits)
- **OEKOPLAN** (Engineering in Austria)



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Rohrhofer & Partners 2/2

Consulting for Water and Waste Management

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Water Resource
Management



Communal Infrastructure
Water / Wastewater



Environmental
Technologies

Training courses for Personal and Managers of Water Utilities



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PIs .. for Measuring and Assessing Water Services 1/2

PIs are the tools for measuring / assessing the performance, e. g. of Water Services

Definitions:

- **Assessment:** Process or Result of this Process, comparing a specified Subject matter to relevant References (ISO 24500)
- **Performance Assessment:** any Approach that allows evaluation of the Efficiency or the Effectiveness of a Process/ Activity through the Application of Performance Measures
- **Performance Indicators (PIs):** quantitative, efficiency or effectiveness measures of the activity of a utility



PIs .. for Measuring and Assessing Water Services 2/2

The Definition

(Alegre et al. 2000)

A Performance Indicator (PI) is a quantitative measure of a particular aspect of the undertaking's performance or standard of service. It assists in the monitoring and evaluation of the efficiency and effectiveness of the undertaking, thus simplifying an otherwise complex evaluation.



PIs and their accompanying parameters

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- PIs consist of a value, expressed in specific units
- PIs are typically expressed as ratios between variables; their units are e. g. %, \$ / m³
- PIs are computed from Variables and interpreted by Explanatory Factors (EFs)
- Variables: often obtained from external data; should be from official Survey Departments
- EFs: May depend on Short or Medium Term management Policies; EFs are known as „driving factors“



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PIs and their accompanying parameters

Drinking-, Waste-, Storm Water System

- For Strategic Information
- For Planning and Progress Measuring
- For Performance Measuring
- For Learning By Benchmarking
- For Asset Management
- For Funding / Loan Contracts



Possible applications of PIs

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- **Assessment of existing assets and the efficiency of their operation**
- **Planning of infrastructure measures and supervision of their implementation**
- **Parameters for Decision Support Systems**
... but which parameters to use?

→ **specific PIs**



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State of the Art of PIs for the Water Industry

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- IWA Performance Indicators for Water Supply Services, 2nd edition by H. Alegre et al.
- IWA Performance Indicators for Wastewater Services, 1st edition by R. Matos et al.
- ISO Series 24500 (ISO 24510, 24511, 24512)
- National Guidelines (Examples)
 - Australia
 - AWWA/ ASTM
 - Canadian WWA
 - Germany/ DVGW
 - The Netherlands/ National Standard
 - UK/ PAS 55



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IWA Pls for Water Supply

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- **Water resources Indicators**
- **Personnel Indicators**
- **Physical Indicators**
- **Operational Indicators**
- **Quality of Service Indicators**
- **Financial Indicators**



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PIs, Assessment Tools for Several Purposes in the Water Industry?

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- **Internal Tools**
 - For the utilities
 - For the responsible bodies
- **Contractual Tools**
 - For control of funding and soft loan contracts
- **Benchmarking (BM)** - voluntary or by Regulators
 - For Metric PM
 - For Process PM
- **Asset Management (AM)**
 - For Physical AM
 - For Financial AM
 - For Human Resources AM
 - For Environmental Resources AM
 - For Strategic AM



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PIs as Tools for Internal Performance Assessment (IPA) 1/3

- **Most important use of PIs is the use for assessing the performance of utilities INTERNALLY.**
- **In every utility IPA is „in use“, but many utilities do not use the State of the Art of PIs**
- **Correctly established and performed IPA grants best Water Services**



PIs as Tools for Internal Performance Assessment (IPA) 2/3

Assets

The _{present} PIs, _{interim} PIs and _{future} PIs of all assets / resources for water-, waste-, and storm water projects shall be assessed

Physical assets

Financial assets

Human resources

Environmental resources



PIs as Tools for Internal Performance Assessment (IPA) 3/3

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Possible Applications of PIs

- present PIs, interim PIs and future PIs for controlling / guiding the performance of utility
- PIs for the Assessment of
 - present / future physical assets
 - present / future financial assets
 - present / future human resources
 - present / future environmental resources
 - Efficiency of present / future operation and maintenance

... but which → specific PIs to use?



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PIs as Tools for the Control of Funding and Soft Loan Contracts

Use of specific PIs as prerequisites for financing contracts

- Key PIs shall be defined by the financing institution together with the beneficiary
- Use these key PIs already during the implementation to check for an effective use of the funds / loans
- Link the fulfilment of targets (PIs) to the granting of further funds and loans

→ In case of unsatisfactory performance, funds / conditions of loans can be rededicated or strategies of implementation can be altered



PIs as Tools for the Control of Funding and Soft Loan Contracts

The Utilities / Consultant of the Funding Institution should

- **establish together with local utility experts PIs referring to**
the condition of the present / future assets
the present / future way of using available resources
the present / future operation / maintenance of all present / future assets.

- **asses before Funding / Contract is established**

present PIs

interim PIs

future PIs

The future PIs must include medium- and long-term perspectives from both the Founding Institutions and the Beneficiary's point of view



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PIs for Metric Benchmarking (MBM)

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- **Voluntary MBM is in the last decades the target of many Water Utilities**
- **Problem of Voluntary MBM is to get „true“ data**
- **Problem of Voluntary MBM is the „comparability of the results“**
- **MBM is often used by regulators, in the case the Regulators check „on site“ data quality and the actual performance of the Water Services**



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Data availability and quality

- The use of PIs requires input data with sufficient accuracy
- The use of inadequate and/or inaccurate data obviously can have serious consequences

→ The specific PIs must be chosen very carefully

→ "Push-Pull" effects must be avoided when selecting a small number of PIs. PIs must be independent from each other in a statistical sense



PIs for Process Benchmarking (PBM)

- PBM is the best possible BM measure
- PBM takes into account all the relevant processes of the Water Services



PIs for Physical Asset Management (PAM)

- Most used PAM by utilities
- At first, detailed (electronic) maps of all physical assets shall be established
- Based on the detailed maps, a complete condition assessment of the asset shall be made
- PAM without AM of financial, human and environmental resources is not feasible
- New Work Item in ISO TC 224 starts in November 2008 to develop a Guideline on PAM



PIs for Financial Asset Management (FAM)

- Specific Financial Experts shall be employed for FAM
- Detailed financial data, as requested for FAM, shall be provided by the utility
- Fam as a „stand alone Management Tool“ is not appropriate



PIs for Human Resources Asset Management (HRAM)

- Education
- Information
- External Training
- Training on the Job
- Involvement of Employees in certain stages of decision making procedures

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PIs for Environmental Resources Asset Management (ERAM)

- No decision regarding Water Services without taking care of environmental resources
- Establishment of an ERAM shall be granted and steered by the Management of the Utility



European (including worldwide inputs) Studies on PIs

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- COST C18 Final Report is available: April 2008
Performance Assessment of Urban Infrastructure Services:
the case of Water Supply, Waste Water and Solid Waste
Editors: F. Svjovold, P. Conroy, E. Algaard
- COST = European Co-Operation in the field of Scientific
and Technical Research
Oldest and widest european Intergovernmental network
for Co-Operation in Research (since 1971)



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European (including worldwide inputs) Studies on PIs

- COST C18 deals with
 - Performance Assessment
 - Measurement Systems (PI Systems)
 - Comparative Performance Assessment (Benchmarking)
 - Prediction (deterioration and failure probability models)
 - Decision Support Systems (Multi Criteriy Systems Decision)
 - Case Studies (IWA PIs, ISO 24500, IBNET / Worldbank Benchmarking), WHO, PIs in regulatory regimes



Training Courses on the Use of PIs for ..

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- Internal Assessment
 - Contractual Purposes
 - Benchmarking
 - Metric
 - Process
 - Asset Management
 - Physical
 - Financial
 - Human Resources
 - Environmental Resources
-
- Strategic Asset Management



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Thank you for your kind attention!

**Hoping to see
you for IWA Water
Congress in
September 2008
in Vienna!**

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**Riesenrad/ Wien (Giant Wheel/ Vienna)
Constructed 1897, Ø 61 m**

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