



# ZERMEG

## Zero Emission Retrofitting Method in Galvanizing industry

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gefördert aus Mitteln der  
Fabrik der Zukunft ([www.fabrikderzukunft.at](http://www.fabrikderzukunft.at))



- Environmental consulting and research company
  - National and international
- Field of Work:
  - Consulting, research and training in the field of cleaner production, process optimisation and sustainable development
  - Eco-efficiency: energy, material, waste and water management
  - Environmental management systems according to ISO 14001 and EMAS



# The approach of ZERMEG I



**Calculation of ideal  
minimum consumption**

- Numerical model of ideal minimum consumption.
- Gap analysis.
- Identification of options.



# Pickling plants: Initial situation

## Identified losses:

- High drag out
- No defined rinsing criterium
- Insufficient control
- Over flow
- Early dumping
- Not exact dosage of chemicals
- Bad mixing
- Bad removal of oil, grease and solids
- Violation of procedures
- Inadequate rinsing technology or procedure



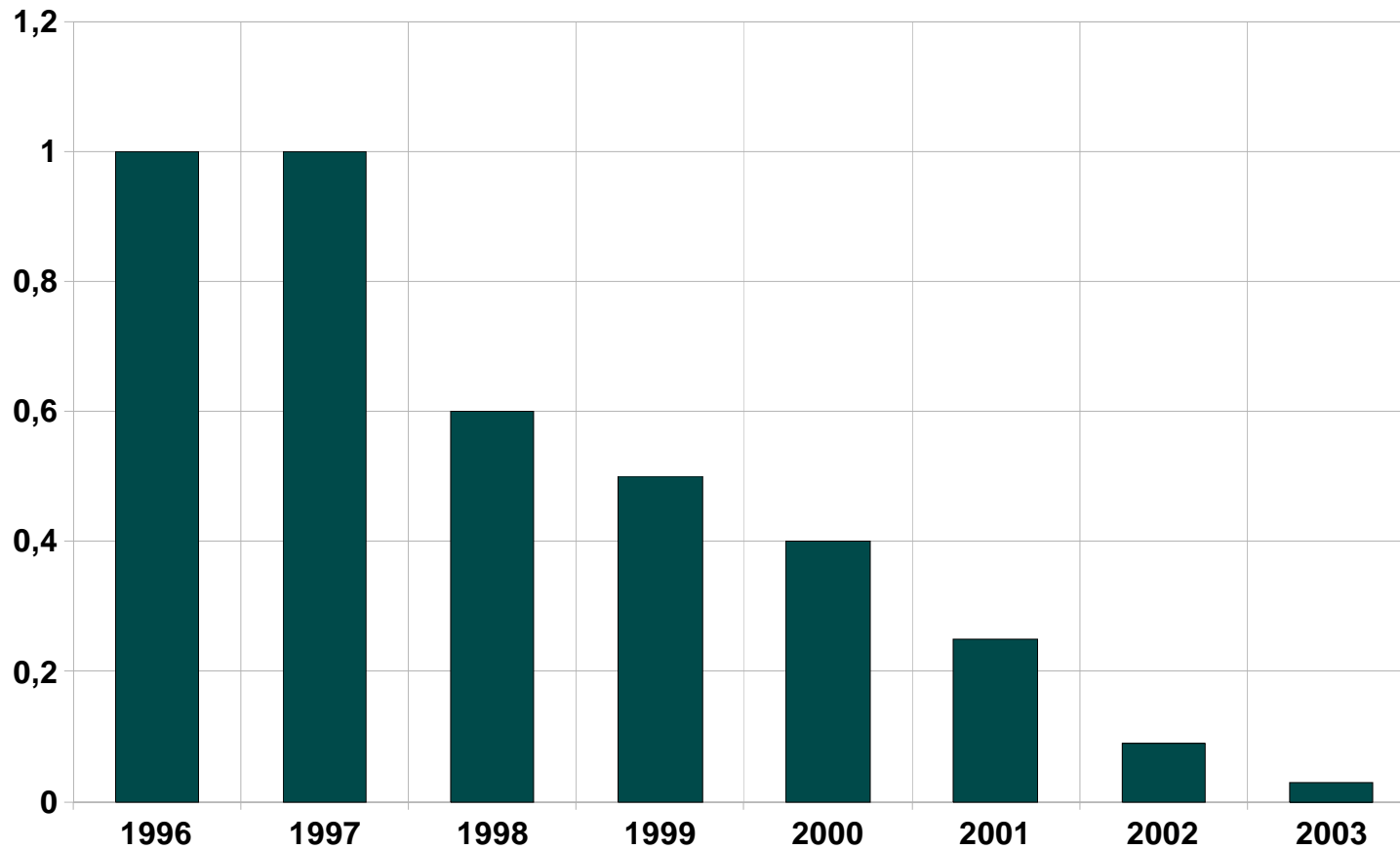
# Results - overview

Company	Reduction of specific water consumption	Reduction of specific consumption of pickling medium (acid, caustic soda)	Other
Anodisieranstalt Heuberger	95%	50%	50% reduction in specific consumption of natural gas
AT&S			Recovery of 20 kg/d copper, savings of 20 tons/yr of caustic soda, external use of sludge
Joh. Pengg AG	50%		Complete external use of spent acids planned
Mosdorfer GmbH		50%	Complete external use of spent acids achieved
Rotoform GmbH	40%	50%	



# Example: A.Heuberger

## Specific water consumption at Anodisieranstalt Heuberger



# Example: A.Heuberger

- Specific water consumption was reduced by 95%
- Specific consumption of natural gas was reduced by 50%
- Specific consumption of chemicals was reduced by 20%
- Production increase to 300%
- Rate of mistakes reduced to  $\ll 1\%$

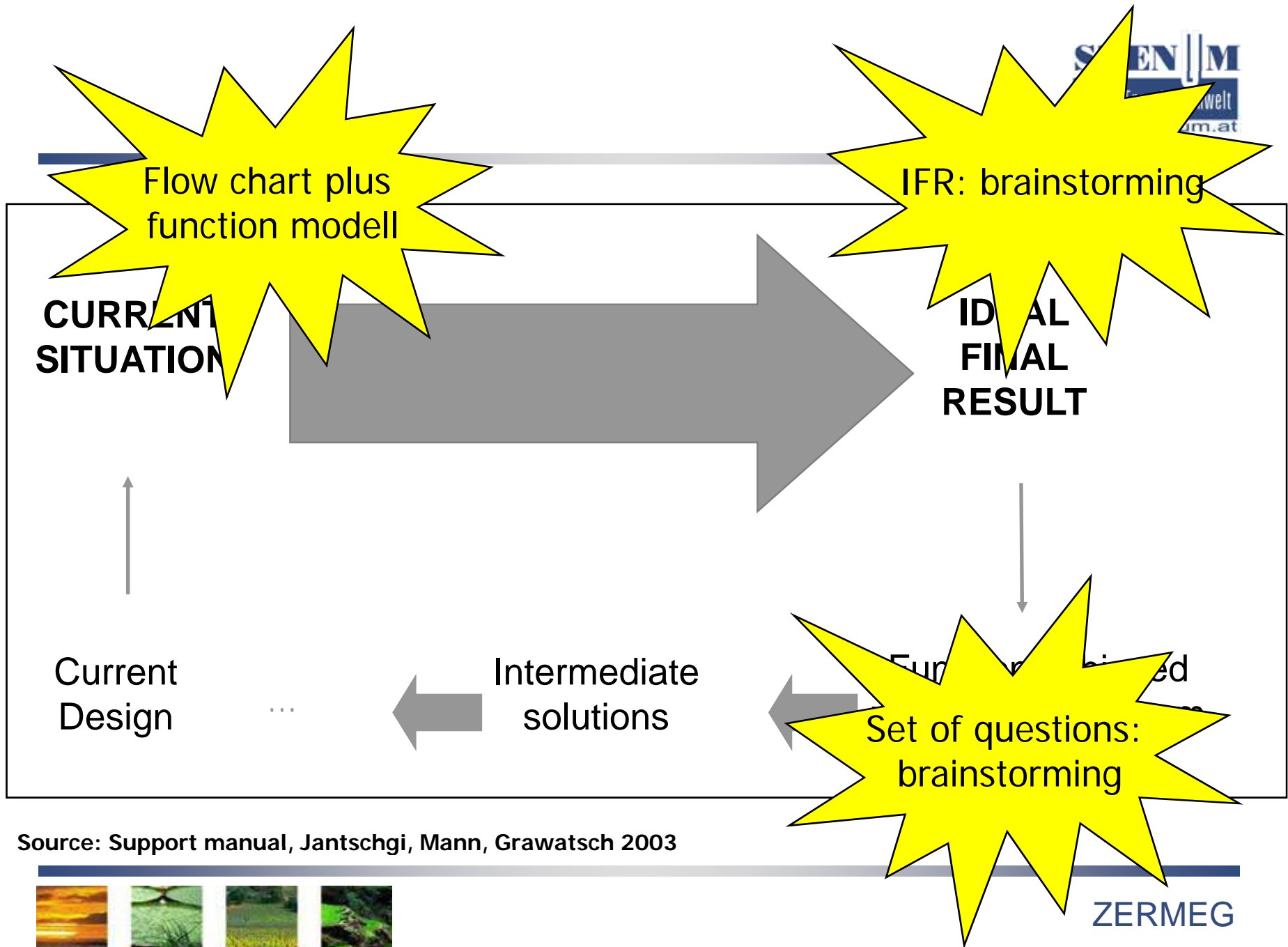


# ZERMEG II

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- TRIZ based
- Uses function modelling  
(related to natural language)
- Uses Ideal Final Result and backcasting
- Uses „Trimming“ questions

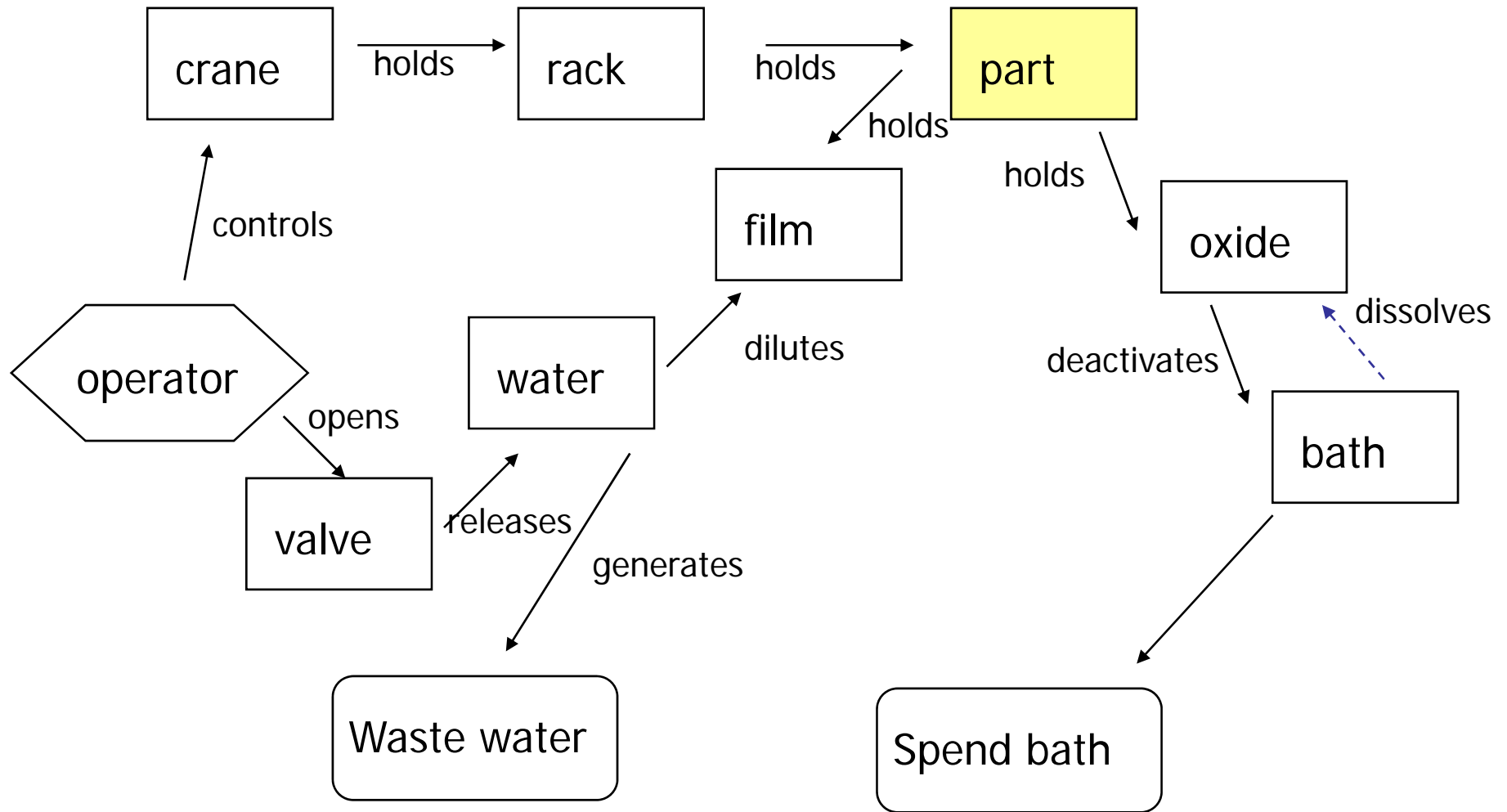




Source: Support manual, Jantschgi, Mann, Grawatsch 2003



# Simple function model of pickling and rinsing



# Trimming questions

- **Can components or functions be eliminated?**
- **Can the need for a function be eliminated?**
- **Can functions of other components or the components themselves be taken over?**
- **Can unwanted functions be eliminated by other functions?**
- **Can components be replaced by other components?**
- **Can components be replaced by existing resources?**
- **Can the system take over functions itself?**
- **Can freely available resources be used?**



# Results:

- Omax, Orient, Union Steel, Austria Buntmetall :  
-30% water
- Austria Email: -50% water, sulfuric acid: -75%
- SKM Leiterplatten:  
-30% water
- Adapted to the textile industry



# Awards

**National Award for environmental and energy technology 2008 in the category:**

**„Environmental technology and environmental services“**

STENUM was nominated as a finalist for the awards:

- ÖGUT Umweltpreis 2007
- Austrian Constantinus, Category „Management Consulting“
- Fast Forward Award Styria
- Energy Globe



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**Thank you very much for  
your attention !**



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