

# Water scarcity: The European and the German Dimension

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Global H2O – Global Energy  
Conference  
Frankfurt/M. May 20, 2010  
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# The subject

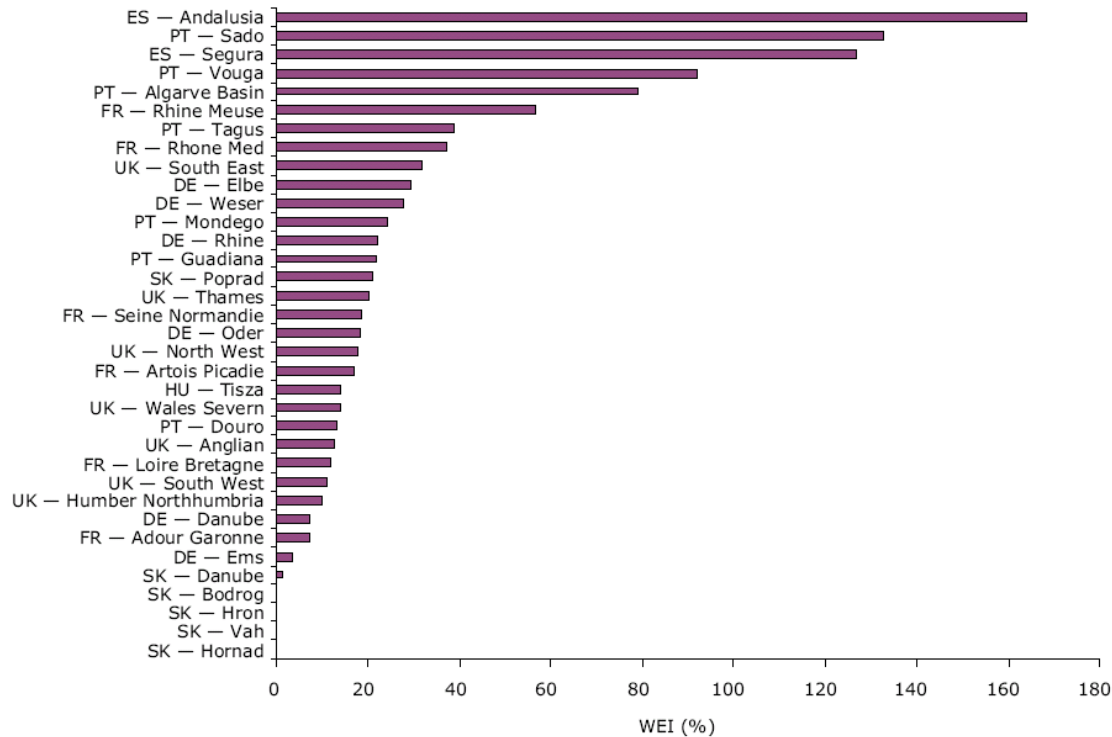
- In general, water availability seems to be not a problem inside the European Union
- This is true for the northern Member States, whereby the situation in the southern regions of the EU is already much more worse
- There will be a growing pressure on water resources due to the impact of climate change
- What about the reactions of the European Union to this foreseeable development?
- What strategies and policy options are available and what is their status?
- German water industry is confronted with quite different problems!
- What are possible solutions and do we need a new „infrastructure model“?

# Water scarcity in the European Member States

- Europe: by large considered as having adequate water resources
- Water scarcity and droughts as an increasingly widespread phenomenon
- Long term imbalances not only in the Mediterranean area; water demand exceeding available resources as a serious development restriction in the South East of England
- Further deterioration of water resources as the result of climate change
- In 2007 at least 11 % of Europe`s population and 17 % of the territory has been affected by water scarcity
- Costs of droughts in Europe over the past three decades: about EUR 100 billion

# Water Exploitation Index

Figure 2.5 WEI for selected river basins across Europe



Source: EEA based on data submitted to the European Commission, 2007.

- ⇒ Water Exploitation Index: percentage of renewable water resources consumed
- ⇒ 20% as a critical threshold; more than 40%: extreme water shortage

# European Water Framework Directive: an new approach to water management

- Legal framework to protect and to restore clean water and to ensure its long-term and sustainable use
- Innovative approach to water management based on river basins, natural geographical and hydrological units
- The WFD sets specific deadlines for Member States to protect aquatic ecosystems
- Innovative principles for water management includes among others public participation in planning and economic approaches
- Economic principles:
  - ? All water users (industries, farmers, households) should pay for the full costs of the water services they receive
  - ? Prices should not only cover the operational, the maintenance and the capital costs of the water-related infrastructure but also the environmental and resource costs
  - ? The Directive calls on the Member States to use economic analysis in the management of the water resources and to assess the cost-effectiveness and overall costs of alternatives when making decisions
- Since the passing of the Water Framework Directive in 2000 we see a lot of proceedings in water management and in the developing new economic approaches....
- but there is still a long way to go ( for example how to calculate resource costs, ways to implement full cost recovery in the agricultural sector, how to integrate environmental costs in water prices...)

## Addressing the challenge of water scarcity and droughts in the European Union (COM(2007) 414 final)

- The challenges provided by the increasing imbalances between water demand and water resources has been recognised in a special Communication from the European Commission in 2007
- Key policy options:
  - ? Putting the right price tag on water
  - ? Allocating water and water-related funding more efficiently
  - ? Improving drought risk management
  - ? Considering additional water supply infrastructures
  - ? Fostering efficient technologies and practices
  - ? Fostering the emergence of a water – saving culture in Europe
  - ? Improve knowledge and data collection
- Communication was supplemented by „follow- up reports“ and studies dealing with special aspects of the different policy options
- The Environmental Council of October 2007 supported the Commission´s 2007 Communication; the Commission is invited to review and further develop the strategy by 2012

# Water Scarcity and Droughts: Policy options

- The 2007 EC Communication on Water Scarcity presents an initial set of policy options
- Since 2007 the Commission carried out in – depth assessments of these measures and concepts to identify their current status, the implementation practice and further options:
  - ? Efficiency standards for water using products
  - ? Interlinkages between bioenergy development and water availability
  - ? Water performance of buildings
  - ? Scenarios of water demand management
  - ? Assessment of the Water Framework Directive at the EU Level
  - ? Assessment of four alternative water supply options (desalination, wastewater re-use, groundwater recharge, rainwater harvesting)
  - ? Development of Guidelines for Drought Management Plans
  - ? Analysis of the water saving potential in Europe

# New Actions of the European Commission on Water Scarcity and Droughts

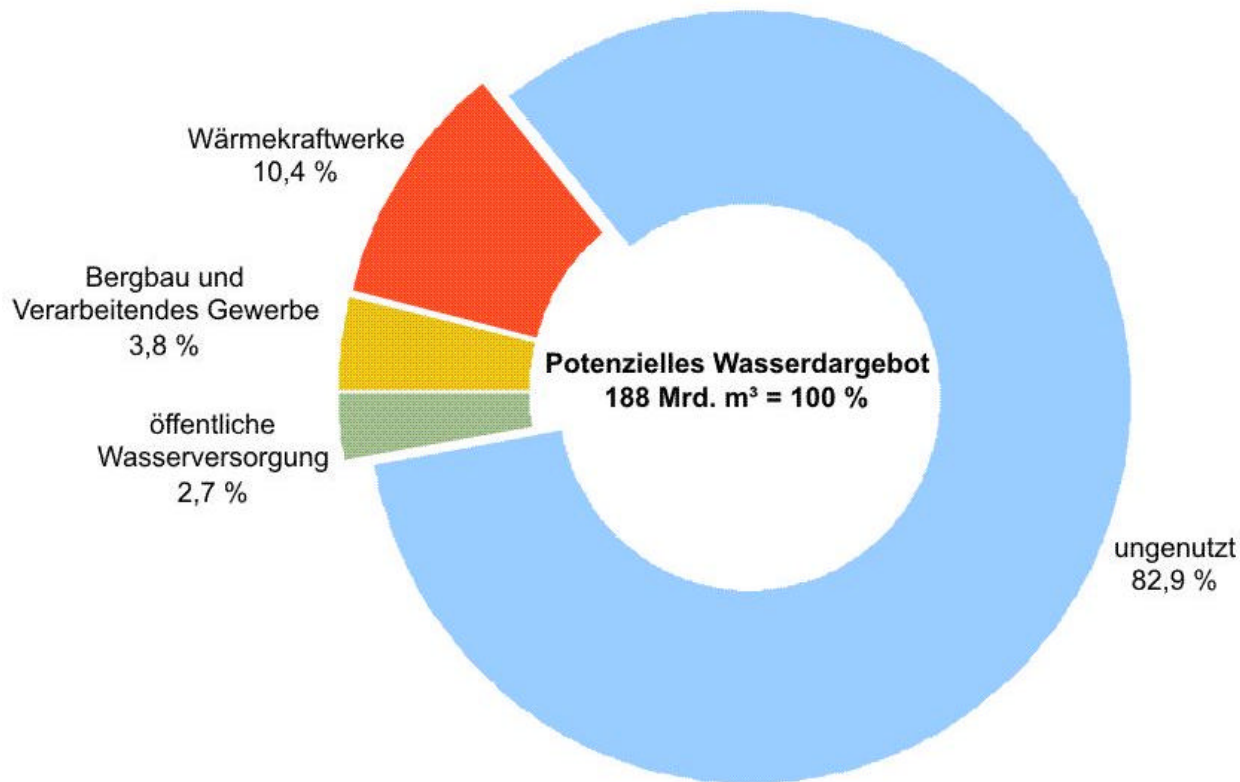
- Integration of the results of:
  - ? the review of the „Strategy for Water Scarcity and Droughts“
  - ? the analysis of the Implementation of the Water Framework Directive, and
  - ? the review of the vulnerability of environmental resources (water, soil, biodiversity) to climate change impacts
- into a new ***Blueprint to Safeguard European waters***
- Review process has started (stakeholder meeting in April 2010, follow-up report 2009 published May 2010)

# Challenges to the German Water sector /1/

- In Germany obviously there is no problem of water availability; only few areas could be described as „water problem regions“
- At the same time: pressure on groundwater quality mainly due to the negative impacts of agriculture and of other forms of land consumption; about 50% of the groundwater reservoirs will not achieve the quality requirements of the Water Framework Directive
- Impact of climate change on water resources and water demand remains uncertain, but simulations shows decreasing precipitation during summer and increasing rainfall during winter months; uneven distribution of climate change impacts between regions
- Projections for the State of Hesse shows in increase of the rate of regeneration of groundwater resources up to 25 % in 2050 compared to the average of 1970 – 2000; on the other side, there will be a reduction of the regeneration rate in Brandenburg area up to 40%
- New forms of imbalances between water resources and water demand:
  - ? Demographic change (declining population; reducing the number of households) will lead to a sharp reduction in water consumption of private households
  - ? Decoupling of water consumption and economic growth (new technologies, water recycling etc): water intensity of industrial processes (water use per GDP) decreased by more than 25% between 1995- 2004
- New challenges to water and wastewater utilities

# Water resources and water use 2007

Wasserdargebot und Wassernutzung 2007<sup>1)</sup>

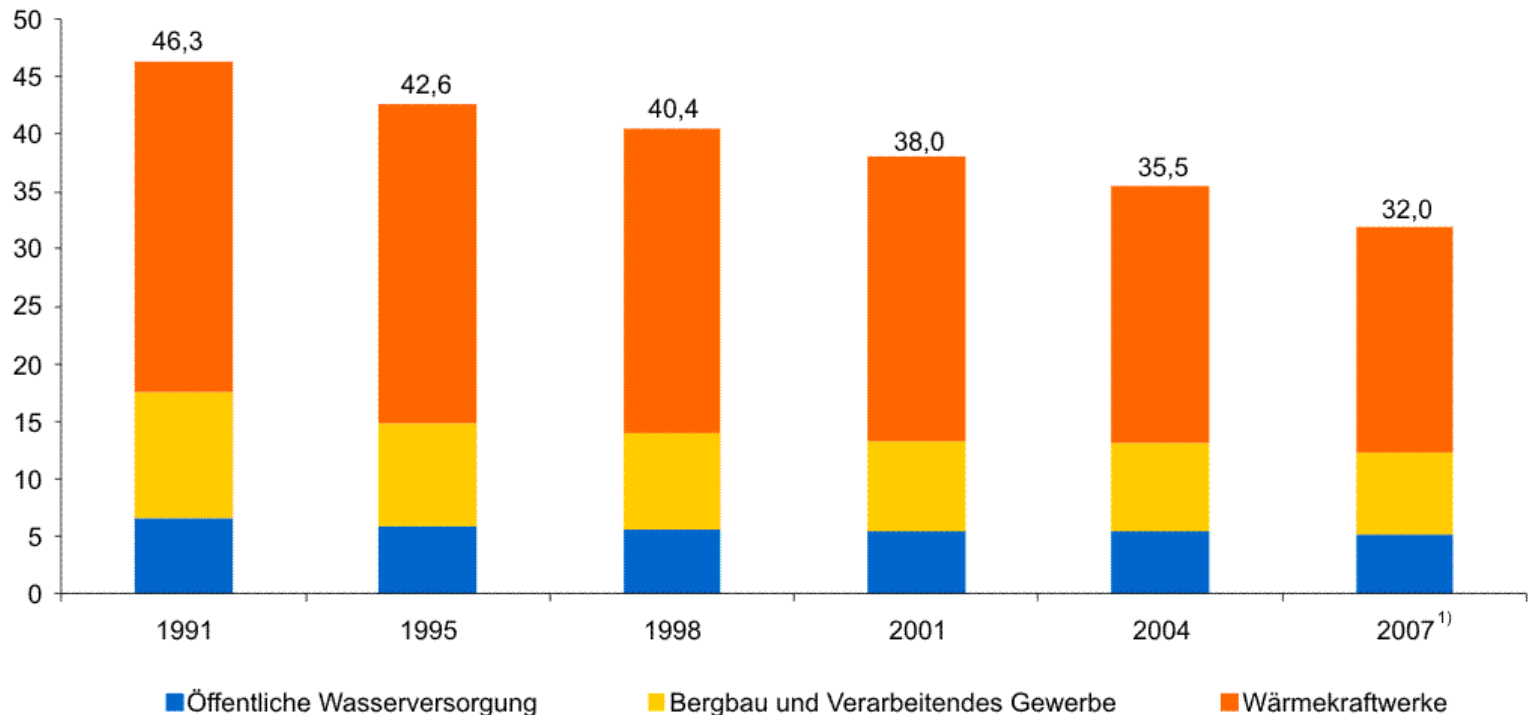


<sup>1)</sup> Anteile der Nutzergruppen: vorläufige Ergebnisse

# Water abstraction by public utilities, the industry sector and by power plants

## Wassergewinnung der öffentlichen Wasserversorgung, der Industrie und der Wärmekraftwerke

Wasserentnahme in Mrd. m<sup>3</sup>

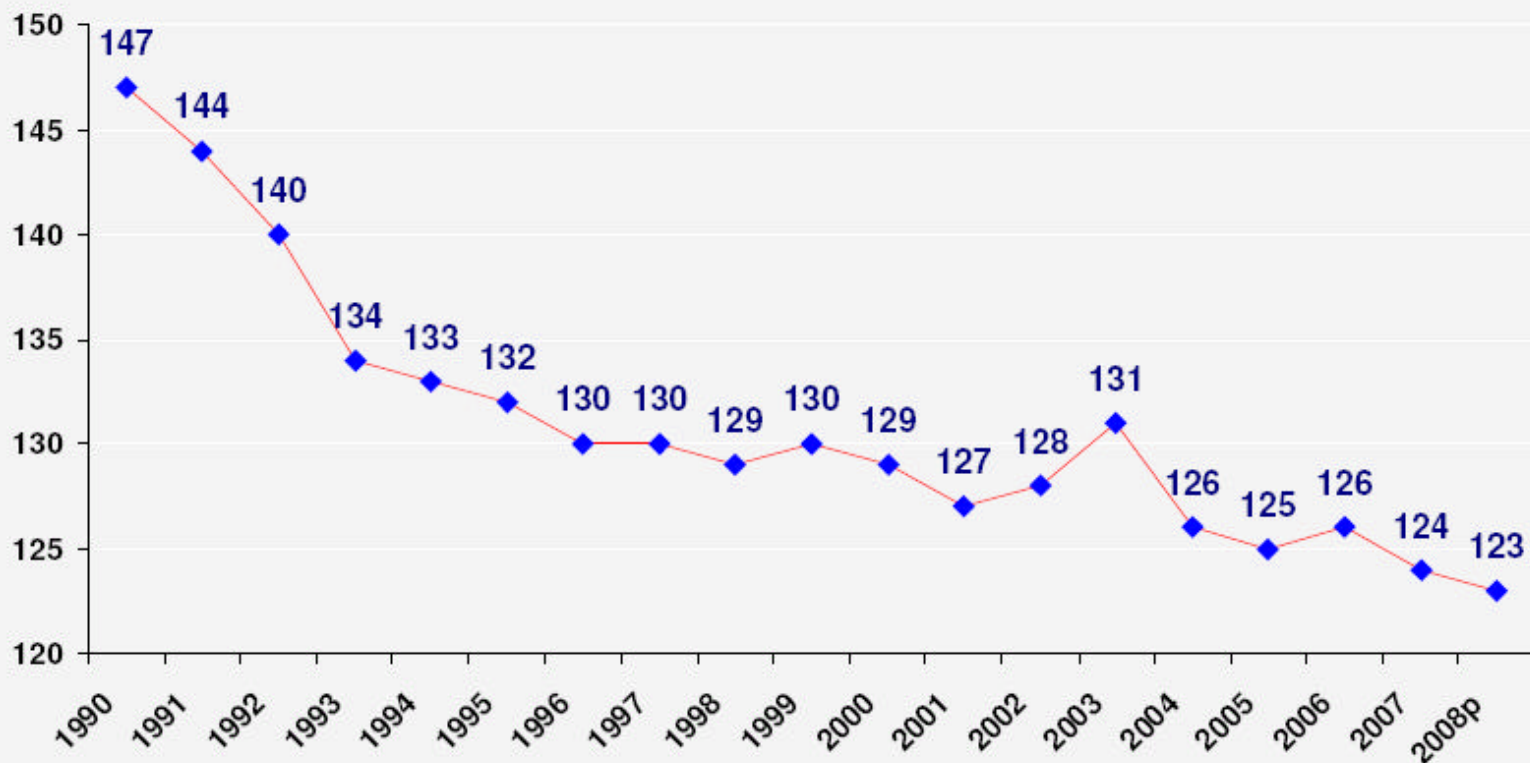


<sup>1)</sup> Vorläufiges Ergebnis

# Challenges to the German water sector /2/

- Adaptation of water infrastructure capacities to changing consumption patterns limited
- Declining water consumption will lead to the problem of underutilization of the water and wastewater infrastructure: impacts on the drinking water quality; additional cost for running the system; impacts on water prices
- At the same time high investments need for rehabilitation of an aging infrastructure network
- Local communities as owner of water and wastewater utilities under financial pressure (high budget deficits, declining tax revenues, increasing social transfer payments)
- New debate on sustainability of the water sector focusing among others on the water – energy nexus and the future role of the water sector in climate mitigation and climate adaptation policies
- Growing scepticism about the future of the traditional central network system; taken into account the new challenges to the water sector: is there a „window of opportunity“ allowing the transformation of the sector into a more sustainable direction?

# Water consumption in the German private household sector (l/person/day)



# Investment and investment needs in German Water Industry

<b>Sector</b>	<b>Investment in billion €</b>
Public water supply (2006)	2,1
Public wastewater sector (2006)	4,6
Investment needs public water supply 2006-2020	29
Investment needs public wastewater sector 2006-2020	58,2

Source: WaterBerlin 2009; BdeW, Difu

# Sustainability of the water industry: where to go?

- If the traditional network model fails to meet future requirements: then in what direction to go?
- In the “sustainable water literature” the three `traditional` dimensions of sustainability are most often mentioned (Economy, Society, Environment); but emphasizing the environmental dimension
- Different extensions of the sustainability concept:
  - ? System approach: the urban water system as part of a larger picture; linkages between urban water systems and agricultural, energy, waste management
  - ? Need for flexibility as a means of increasing the resilience of urban water systems in order to cope with a changing environment (climate change, economic pressure, demographic change)
  - ? Technical dimensions of sustainable urban water systems: alternative technologies that are more flexible; decentralised options; ‘soft path’- defined as a solution that continues to rely on carefully planned and managed centralized infrastructure but complements it with small-scale decentralized facilities

# Central elements of a new water model

- Decentralisation
- differentiation of water uses
- greywater, rainwater harvesting, dual water supply system
- wastewater as a valuable resource
- integration of water management and land use planning
- urban green infrastructures and related ecosystem services
- Transformation is not only a question of available technologies but of overcoming economic , institutional and cultural mechanism promoting resistance to change

*“... water engineers are conservative and typically reluctant to invest in innovative new technology, relying instead on building infrastructure to provide centralized control of water quality.”*

*(The Artemis Project 2009 )*

# Typology of ways to provide water services

	Freshwater only	Alternative sources of water
Central infrastructure	<p><i>Prevailing in OECD countries</i> Single quality water is provided by central infrastructures. Waterborne sewerage is centrally collected and treated in a plant usually located at the outskirts of the urban area</p>	<p><i>In use in some contexts</i> Treated or untreated rain and grey water is sent back to the city where it is used again. The system requires an additional network and energy is used to transport wastewater and reclaimed water</p>
Decentralized infrastructure	<p><i>Not common in OECD urban areas</i> Relies on point of use resources (wells). Connections to central infrastructure may be needed to ensure reliable sourcing</p>	<p><i>Widespread in specific contexts</i> Water is produced and treated locally (on the point of use). Treated or untreated rain and grey water is used for (usually non potable) uses</p>

# Some final remarks

- Compared to the global water crisis, imbalances between water demand and water availability on the European level seems to be not a dramatic problem, but
- climate change will result in new pressures on water resources and will call for new management approaches
- European Commission develops a new comprehensive strategy to tackle with these future problems (⇒Blueprint)
- What is the future of the traditional infrastructure paradigm of the „take- make- waste“ – philosophy?
- New „soft- path solutions“ are not only technology driven; implementation of technologies and management approaches depending on the special local context; there is no „one size fits all“-solution
- German water sector provides interesting insights in the transformation process and points some open questions

# Transformation process in the water industry: some open questions

- Do we need new governance structures and regulation models ?
- How to integrate decentralised components into a central network?
- What are the technical and organisational requirements for the central management and monitoring of a decentralised system?
- What about the ownership of the components of a decentralised system?
- How to secure the interests of the consumers?
- What about the future of the current system of cross-subsidies?
- How to create a new general framework for tendering procedure at the local level?
- How will act as the supplier of last resort?
- What about the costs of redundant systems?
- How to allocate cost and benefits and what are the challenges for price policies?
- How to integrate long-term considerations into the capacity planning of the water utilities?

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