

KfW Water Symposium 2009

Financing Sanitation

Session 3

Semicentralised Supply and Treatment Systems Integrated Infrastructure Solutions for Urban Areas of Tomorrow

Speaker:

Prof. Dr.-Ing. Peter Cornel



KfW Wasser Symposium 2009



**Financing Sanitation:
Future urban spaces – how to provide and finance
service to peri-urban areas**



Semicentralized Supply and Treatment Systems

Integrated Infrastructure Solutions for
Urban Areas of Tomorrow

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Dr.-Ing. Susanne Bieker

October 8 to 9, 2009

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Overview

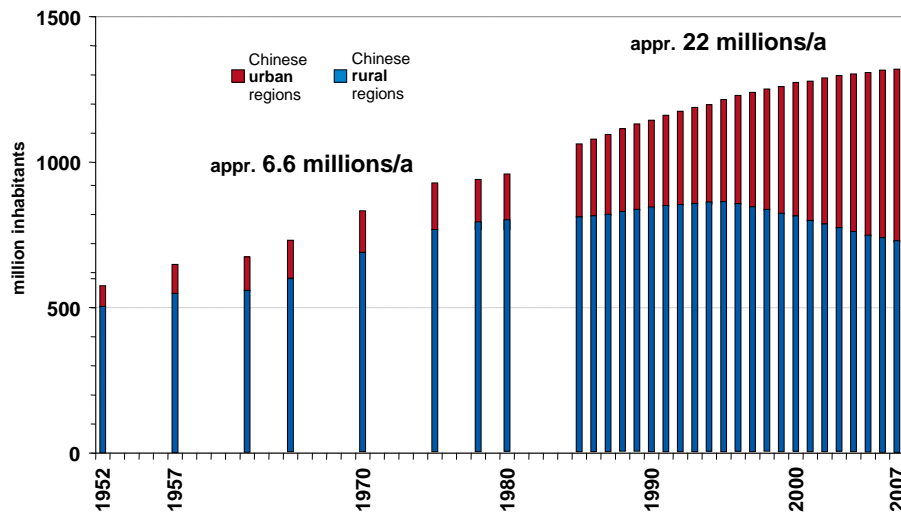


- ☞ Challenges of fast growing urban regions
- ☞ The Alternative: The Semicentralized Approach
- ☞ Reuse and Recovery
 - not only a matter of natural resource efficiency
- ☞ Advantages of the Semicentralized Approach
- ☞ Challenges and Fundamentals
- ☞ Summary and Conclusions

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Challenges of fast growing urban regions



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New Infrastructure Solutions needed



▪ Needs for supply and sanitation systems

- reduce fresh water demand → **enable water reuse**
- low cost, low energy demand (**energy self-sufficient ??**)
- **ensuring high hygienic quality standards** for potable and process water
- reliable and robust
- minimizing unaccounted water losses
- adjusted growth
- modular structure of supply and treatment units
- “autarchic” suburbs / quarters
- synergy between supply and treatment units



Conventional centralized supply and treatment systems as well as household based de-central sanitation can not fulfil these needs

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Consequences: The Semicentralized Approach A matter of **Scale**



1. Water reuse fosters decentralization

- minimizing energy demand for pumping
- minimizing capex for sewer and pipe systems
- minimizing water losses

2. Energy recovery fosters decentralization

- e.g. heat recovery from greywater (showers, laundry,...)

3. fulfilling high quality standards fosters professional operation

→ rather semi-central as de-central

4. Energy self sufficiency fosters

combined treatment of water and (organic) waste

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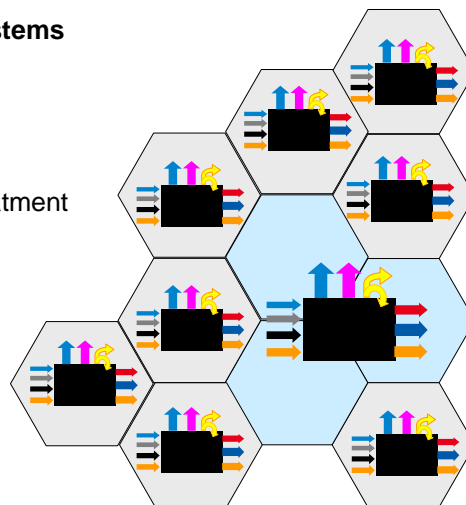


The Semicentralized Approach – integrated treatment on district level



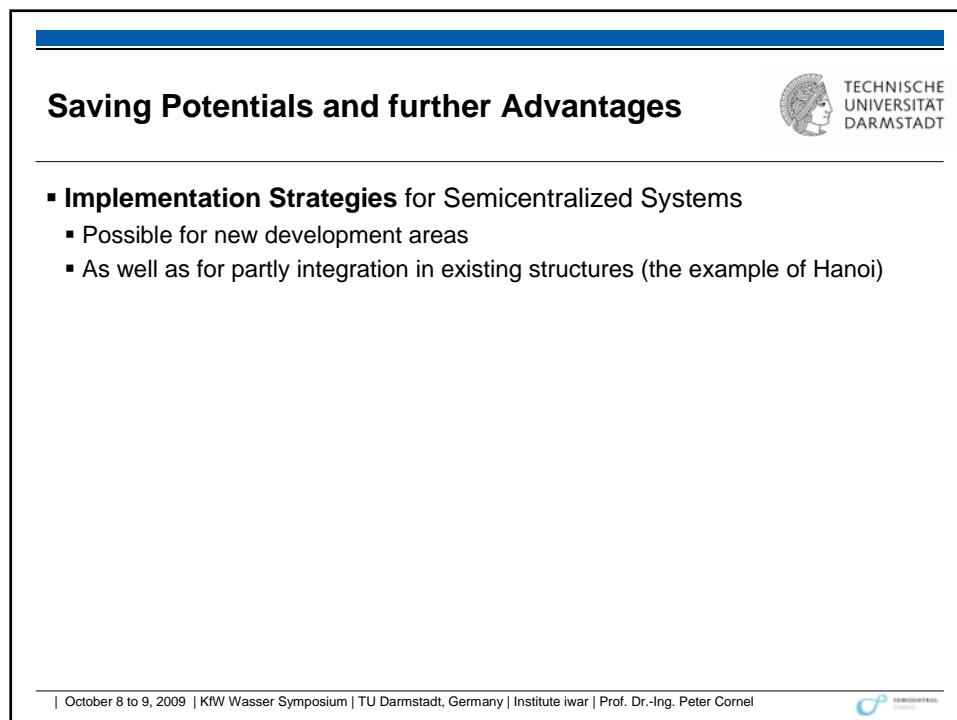
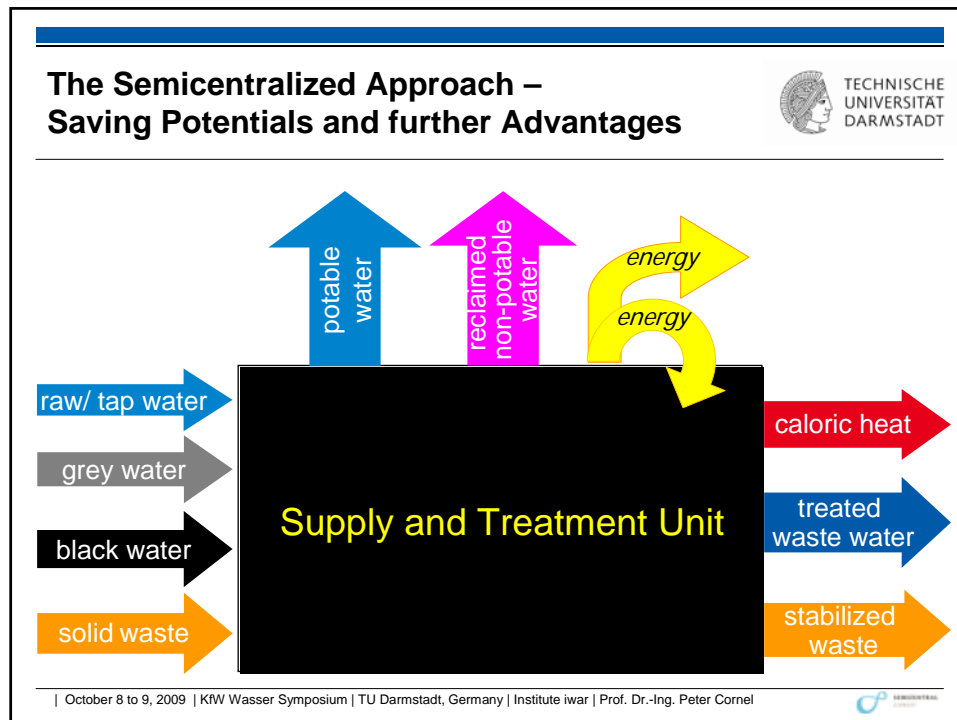
Integrated Semicentralized Systems therefore

- focus on smaller,
- more compact units
- **Each district has its own**
Semicentralized Supply and Treatment
Centre (STC)
- integrated approach,
- focussing material flow-based
management,
- utilizing synergy effects and
re-use potentials

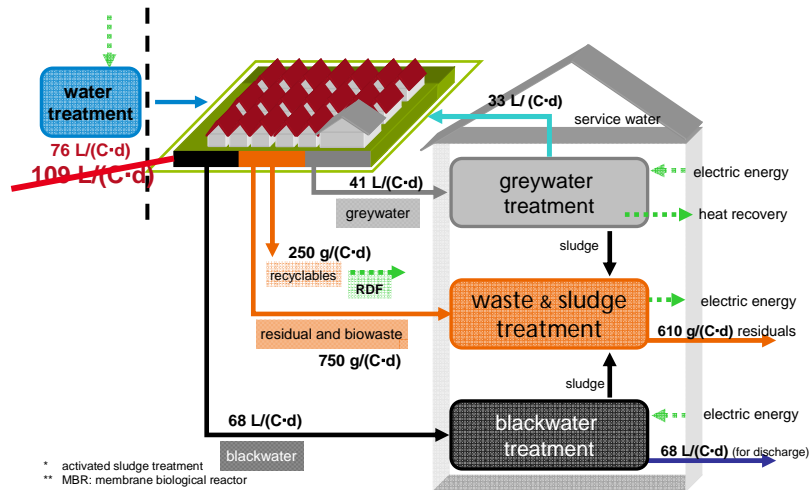


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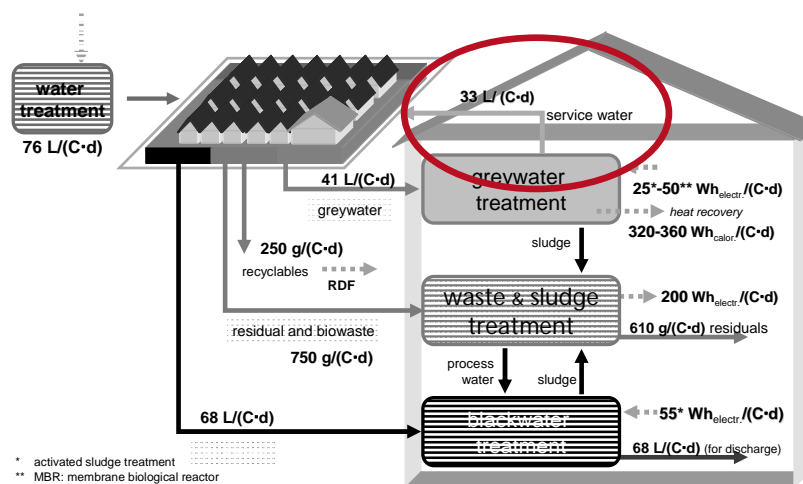


The Semicentralized Approach Case Study Qingdao

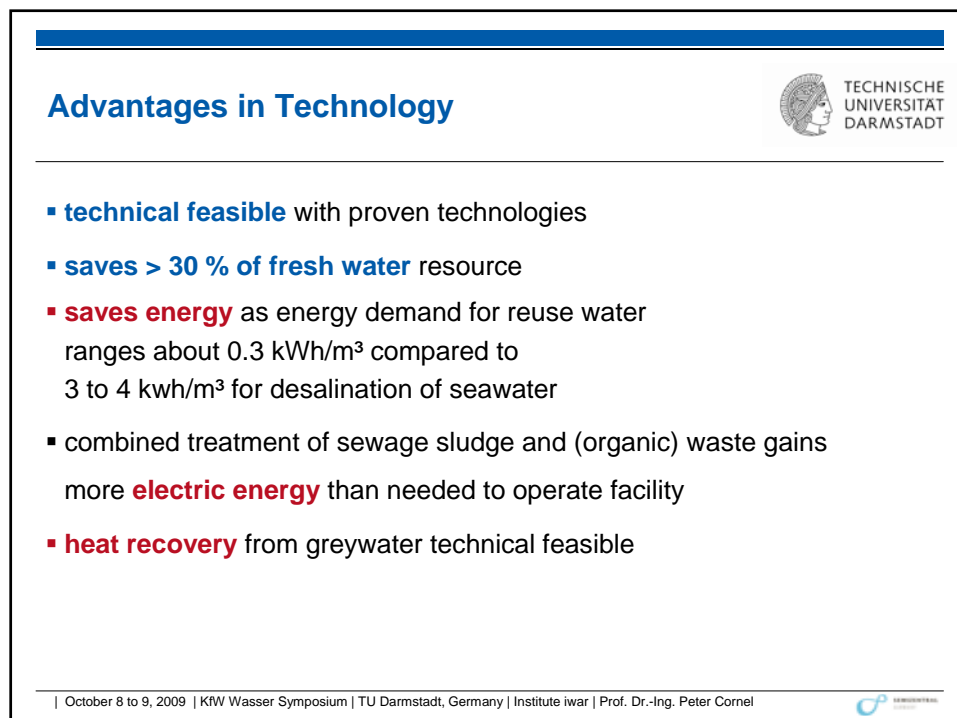
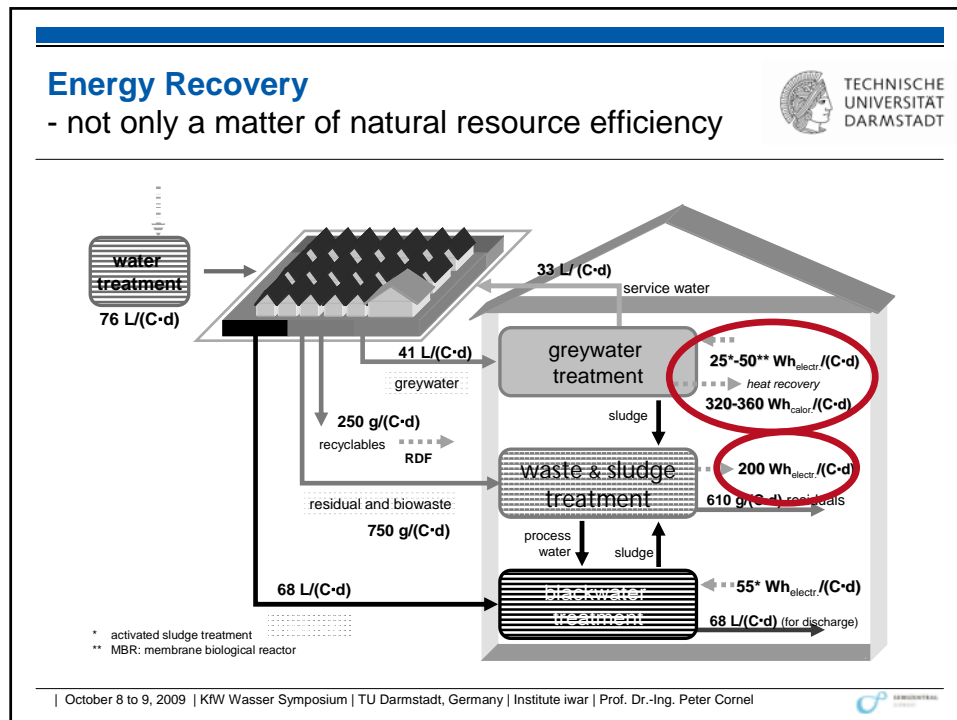


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Water Reuse - not only a matter of natural resource efficiency



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“non technical” advantages



- more flexible to cope with changes
 - faster realisation → less risks
 - reduced overall cost
 - energy self-sufficiency → operation
 - planning and operation are more reliable (reduced probability of economical disaster)
 - less vulnerable to external catastrophes
 - floods,
 - earthquake
 - shut down of electricity
 - terroristic attacks

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Obstacles



- **The integrated approach**
 - Does not reflect the organisational structures in politics, administration and even in financing
 - interdisciplinary thinking, negotiating and acting is not common at all
- **Prices, cost, fees**
 - Onsite treatment results in cost e.g. for greywater
 - Cost are competitive, **but not** necessarily **with subsidised freshwater cost**
- **Ownership**
 - Treatment facilities within private territory
- **References**
 - New concepts need references, but
No one will be first, No one will take that “risk”
 - Financers ask for references (“We will finance only proven technology”)

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Obstacles



▪ Funding

- Research funds only for lab scale and pilot plants
- References / Large scale implementation not to be funded or (co-)financed by BMBF nor by KfW or other banks

▪ Open tendering

- usually not for integrated approaches
- not feasible for innovations
- not feasible for reference plants
- Banks tend to be conservative in means of requiring large numbers of references

▪ Financing institutions

- Prefer few large objects rather than large amount of smaller objects
→ rather centralized than decentralized approach
- Insist on references

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The Qingdao Case



- Research in cooperation with Qingdao Tech University ✓
- Piloting finished (some components still under investigation) ✓
- Feasibility study completed ✓
together with
 - Municipality of Qingdao
 - ITT Water & Wastewater
 - Passavant-Roediger
 - Kocks Consultant
- Test field area for a real scale test (20,000 capita) identified ✓
- Implementation trapped in net of
 - open tendering
 - missing references
 - funding and financing
 - competence



Nice concept,
but implementation failed ??

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Summary and Conclusions



- Urban growth brings up **new challenges in infrastructure planning**
- New challenges require infrastructure systems
- Water and energy recovery in conjunction with professional operation fosters semi-centralized infrastructure
- **Integrated Semicentralized Systems offer higher resource efficiency**
 - Water savings of about 30% and more
 - Energy self-sufficient operation (treatment)
 - Potentials of heat recovery
- **Implementation of integrated infrastructure Systems pre-failed as long as thinking, administration, operation and financing is sectorized ??**

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Acknowledgement



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- Semicentralized Supply und Disposal Systems for urban areas in China – project part I (02WD0398)
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- Solutions for Semicentralized Supply and Disposal Systems in fast growing urban regions – the case study of Hanoi, S.R. Vietnam (02WA0973)

Project periods: 2003 - 2011

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Thank you for your attention!

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www.semicentralized.net