



Case study: Area-oriented approach & the urban development in Station area of Utrecht

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Presentation

1. Station area of Utrecht
2. Process of integration
3. Results: Area oriented Approach







Motivations Utrecht for re-development

city

City is expanding



Inner city to small scale



Extended city centre



Inaccessible areas



Degradation of some areas



Many bicycles....



Utrecht Central station



National Keyproject





Station area of Utrecht

Large inner city re-developments:

- More than 90 hectares
- Underground constructions



Sustainable energy:

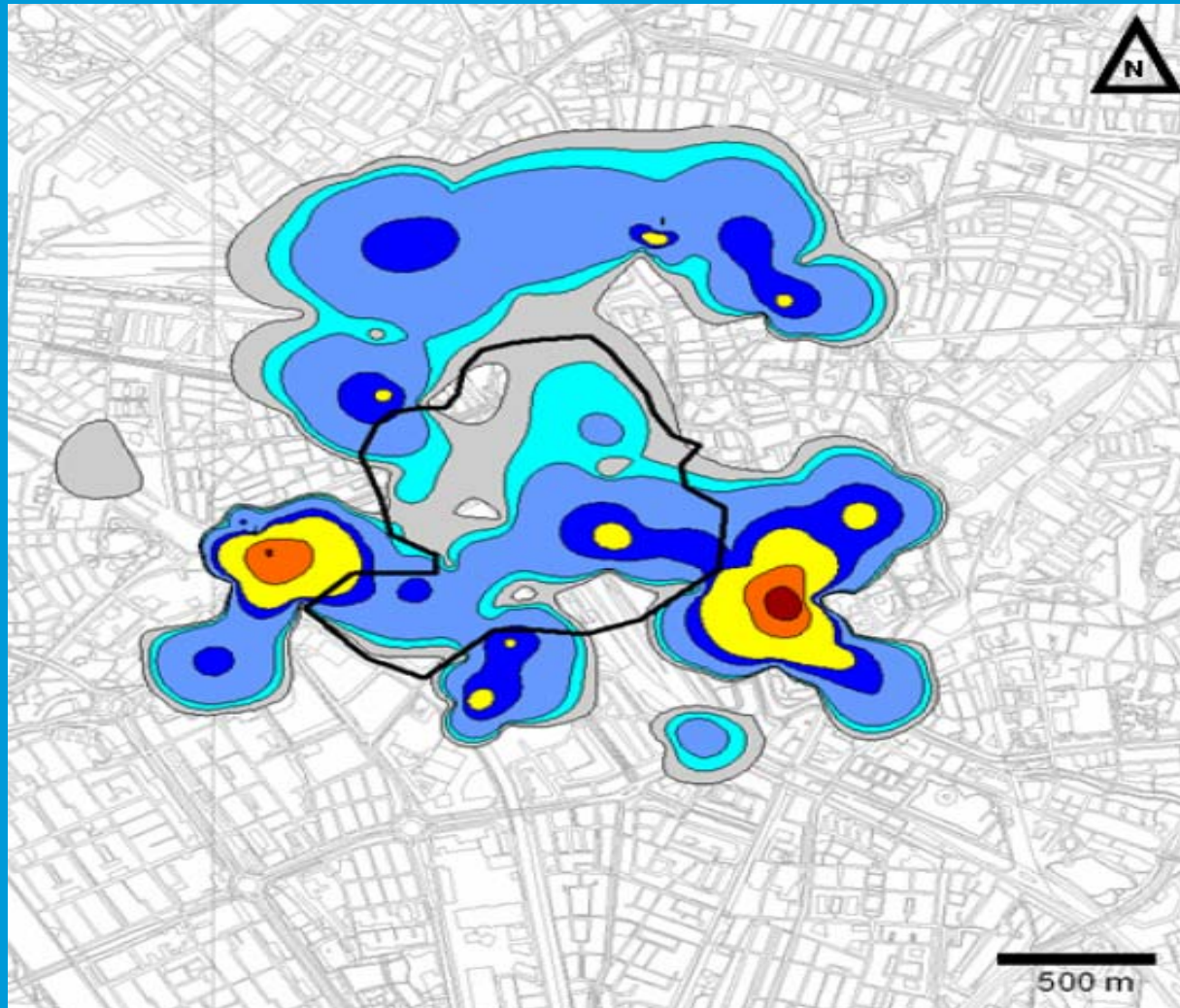
- Buildings with ATES-systems
(Aquifer Thermal Energy Systems)
 - More than 6.000 ton CO₂-reduction/ year
 - Solar energy on top of platforms





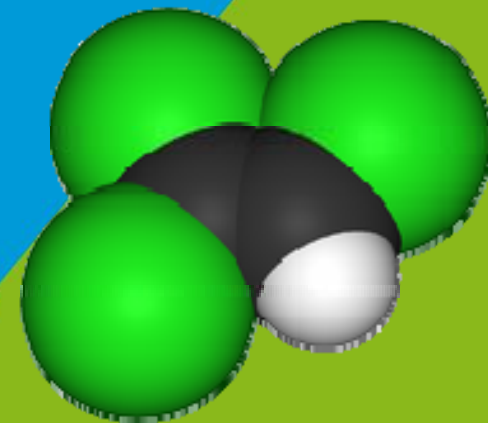
Large scale pollutions

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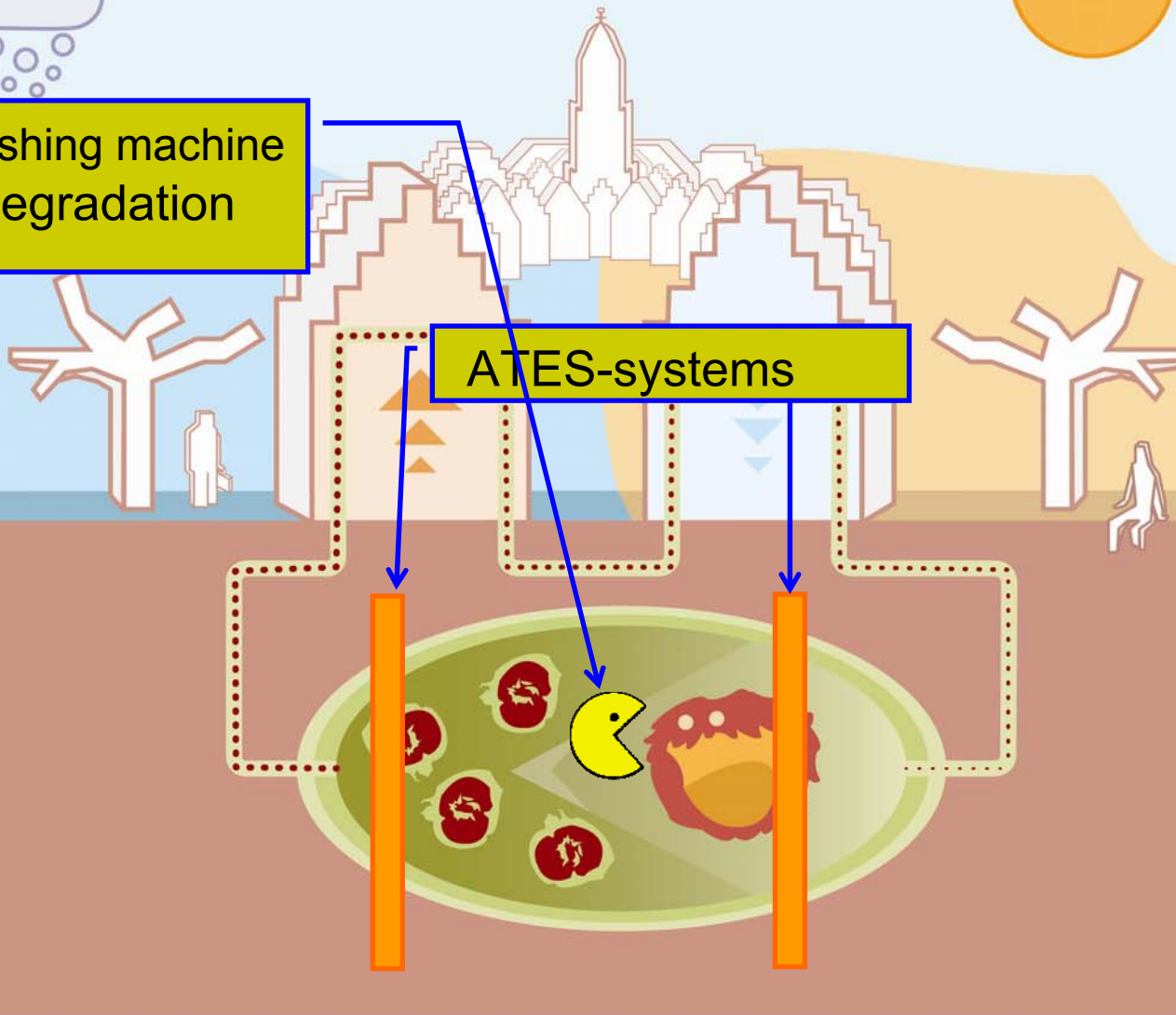


*‘Many technical, practical and financial reasons
to manage an area of multiple large scale
groundwater plumes’*

Area-oriented approach

- mixing - washing machine
- biological degradation

ATES-systems



Process of integration



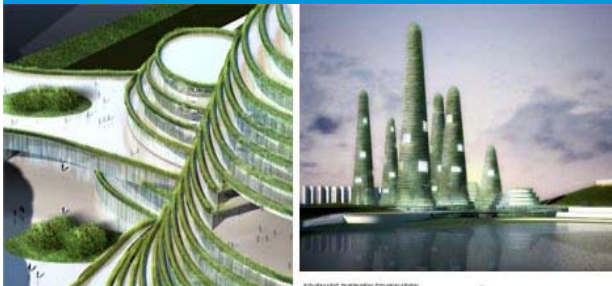
- **Working groups:** legal, technical and organisation (2008 – 2012)
- **Policy note & rules:** ‘Improve, protect and use’ the subsurface (May 2009)
- **Remediation plan Bio-washing machine:** area oriented approach of the subsurface (July 2009)

Dealing with rules



To create a sustainable city:

- be creative when using legal framework
- bend the legal framework, if necessary
- work together with government when more legal space is needed
- set up a reporting methodology for activities to be in control of subsurface



Making use of longer time frame



Solution:

- Use 30 years horizon instead of only short-term actions
- Combine ATES and biological natural attenuation, the 'Bio-washing machine'
 - 30 years: 40% reduction of VOC mass in subsurface is expected





Building a business case



NS Stations



Building a business case:

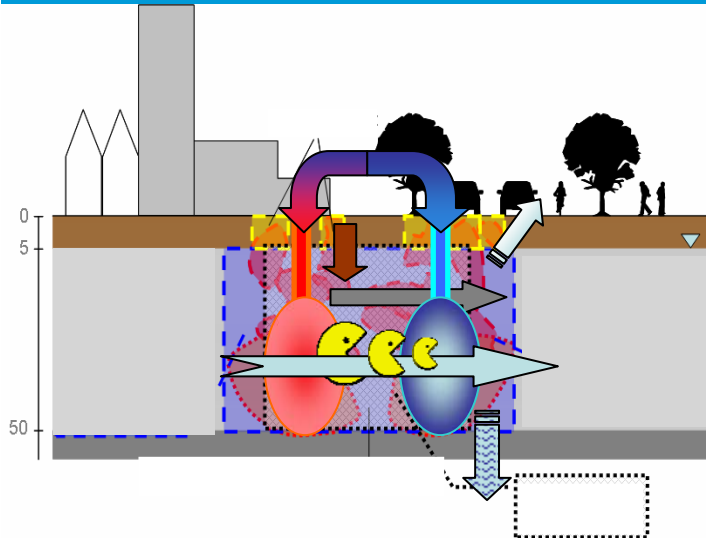


- Area oriented approach, remediation: approximately € 10 million
- municipality: 85 %
- private parties: 15 %

→ Costs of the monitoring network: € 1 million
→ Contribution activities: > € 15.000

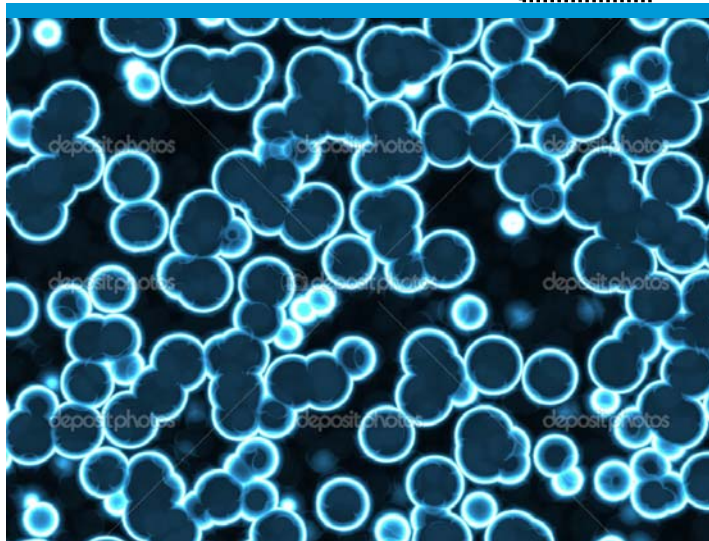
Total redevelopment costs: € 3,2 x 10⁹

Managing knowledge & technical innovations



Solution:

- Formate a 'Think tank' for research on subsurface and innovations
- Conceptual Site Model (CSM)



Examples:

- Biological capacity of subsurface
- Flux measurements
- 3D subsurface model
- soil vapour intrusion measurements



Results - 2013



Re-development:

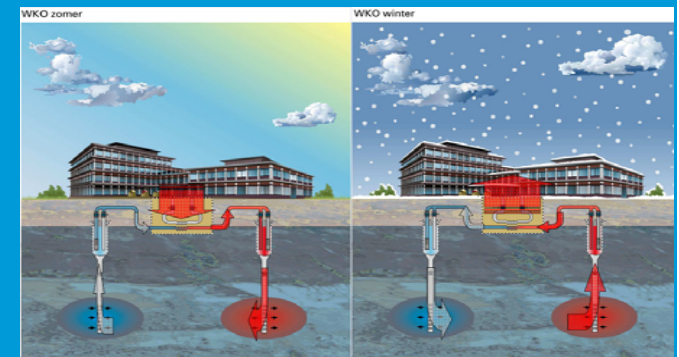
- many building projects started or finished
(De Vredenburg, Music palace, City hall, etc.)

Remediation, Bio-washing machine:

- decrease of 500 kg VOC in 2 years time

Sustainable energy:

- > 5 ATEs systems installed





Lessons learned Utrecht - Integrated Approach



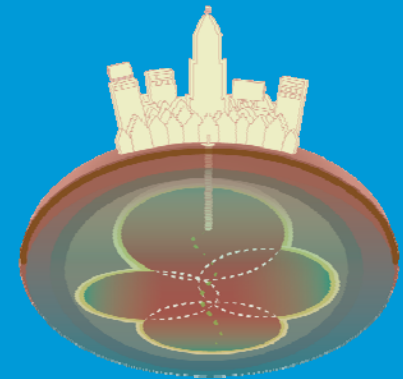
Start negotiation with stakeholders before start of the Area-oriented Approach



Use model to give insight in benefits of stakeholders



Commitment is not enough
→ *persistence is key to succes!*





This is why !

