



Bundesministerium
für Bildung
und Forschung



Integrated Wastewater Concept for Industrial Zones with near-to-source technologies to save and re-use wastewaters incl. biogas generation and recuperation of valuables for tropical transformation and developing countries **exemplified at the Industrial Zone Tra Noc, Vietnam**

Giai phap tong hop xu ly nuoc thai cho cac khu cong nghiep
bang cac phuong phap thich hop nham giam thieu nuoc thai
tai su dung nang luong va thu hoi nguyen lieu quy tu nuoc thai cong nghiep
cho cac nuoc ngheo dang phat trien co khi hau nhiet doi
Trien khai dien hinh tai khu cong nghiep Tra noc Viet nam



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International Water Consultants**
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an der Privaten Universität Witten/Herdecke gGmbH**

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**64 MA, mio 6.8 € p.a.,
100% Vollkosten Drittmittel-finanziert international**

Internationale Projekte

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Anlagenbewertung
Ingenieurplanung
Projektmanagement

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Berlin, D

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Integriertes Gesamtkonzept



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IEEM - Institute of Environmental
Engineering and Management at the
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Koordination
vietnamesische Partnerprojekte



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Wasserkonzepte - Trends und Perspektiven*

24. Juni 2010, Osnabrück

PROCESSNET
EINE INITIATIVE VON DECHEMA UND VDI-GVC

3/vdM/IEEM/Rudolph/Vortraege/
Osnabruecker_Umweltgesprach/Folien

22.06.2010
Folie 3

AKIZ: Need, Action, Delivery

Vietnam has the large number of about 300 (ca. 200 registered) industrial zones (IZ), without sustainable wastewater solutions.

Accomplishing the KfW-financed investment for the central sewage treatment plant of the IZ, the

BMBF ./. **MOST research project**

shall develop an



integrated wastewater concept for tropical IZ

to secure cost-efficient and sustainable functioning of the whole system

(life cycle optimisation).

Mehrkosten durch Qualitätsmängel



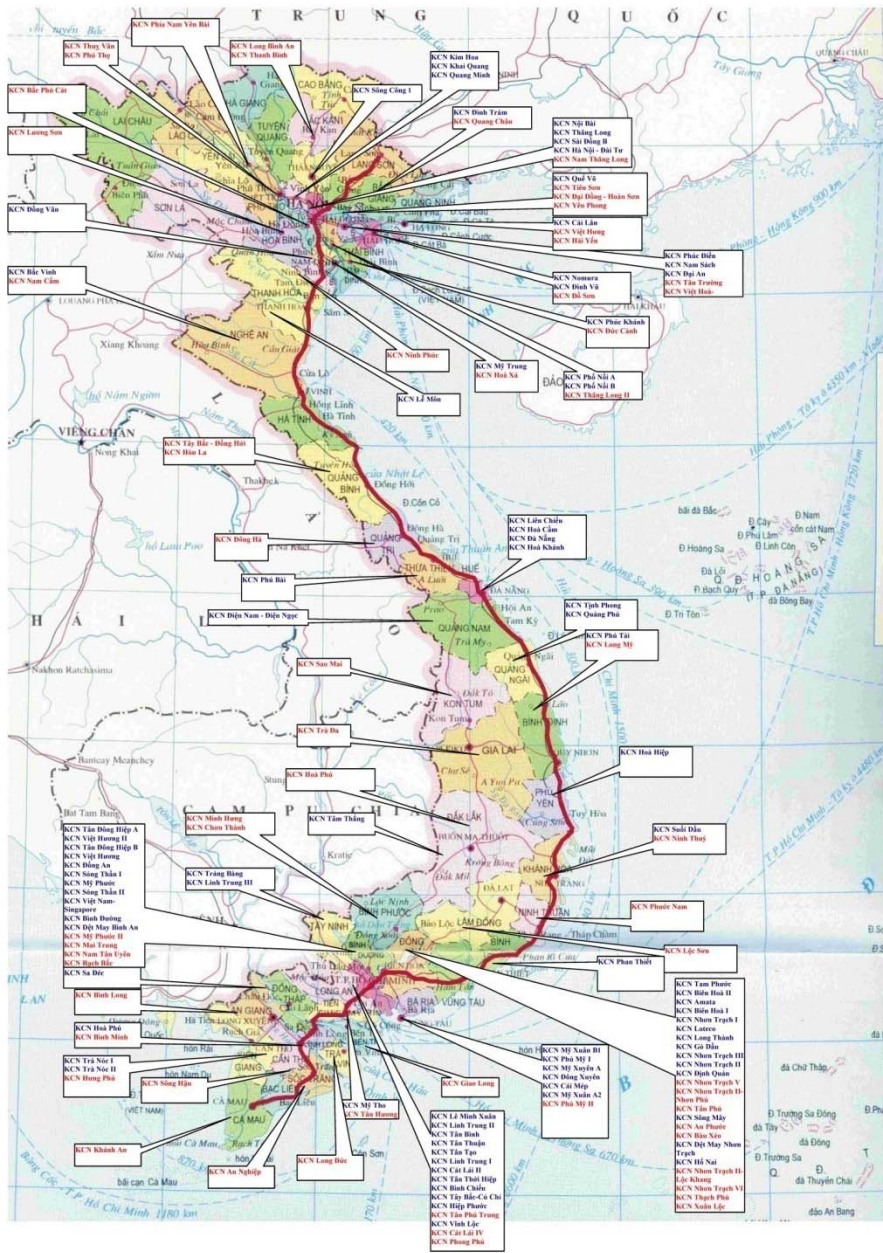
Dieses Industrie-Klärwerk in Vietnam, erst 3 Jahre alt, ist weitgehend funktions-unfähig und verursacht hohe spezifische Kapitalkosten (pro m³ gereinigten Abwassers), die ein Mehrfaches der in Deutschland üblichen Kosten ausmachen

Nachklärbecken-Sohle und Saugräumer des GWK Bitterfeld nach 13 Betriebsjahren (zur Revision entleert; es müssen lediglich Gummilippen und Beschichtungen erneuert werden)



HighTech-Klärwerk auf einer IZ in Vietnam (Neutralisation, SBR, Nachfällung, Aktivkohle-Filter, kurze Zeit nach Inbetriebnahme stillgelegt)





Selection of best IZ through IEEM, VIIC with BMBF, KfW, MOIT, MONRE, MPI, MOC



AKIZ Modules

Taking representative factories within the IZ Tra Ngoc, *near-to-source measures* shall be demonstrated, like the pre-treatment of wastewaters for the

- (a) removal **toxic**, hazardous, persistent substances,
- (b) generation of **energy**, and
- (c) recuperation of **valuables** and water-re-use.

Pilot plants, mounted in containers, shall be used to adapt and verify *High-Tech + Lean Cost solutions* to the local conditions.

Additionally, appropriate concepts for the disposal respectively for the utilisation of *sewage sludges* have to be elaborated, and the links with *solid waste* management have to be analysed and considered.

Iron-brown Wastewater from Metal Industry in Buffer Tank



One of the AKIZ Candidate Fish Factories IZ Tra Noc (1)



One of the AKIZ Candidate Fish Factories IZ Tra Noc (2)



One of the AKIZ Candidate Fish Factories IZ Tra Noc (3)



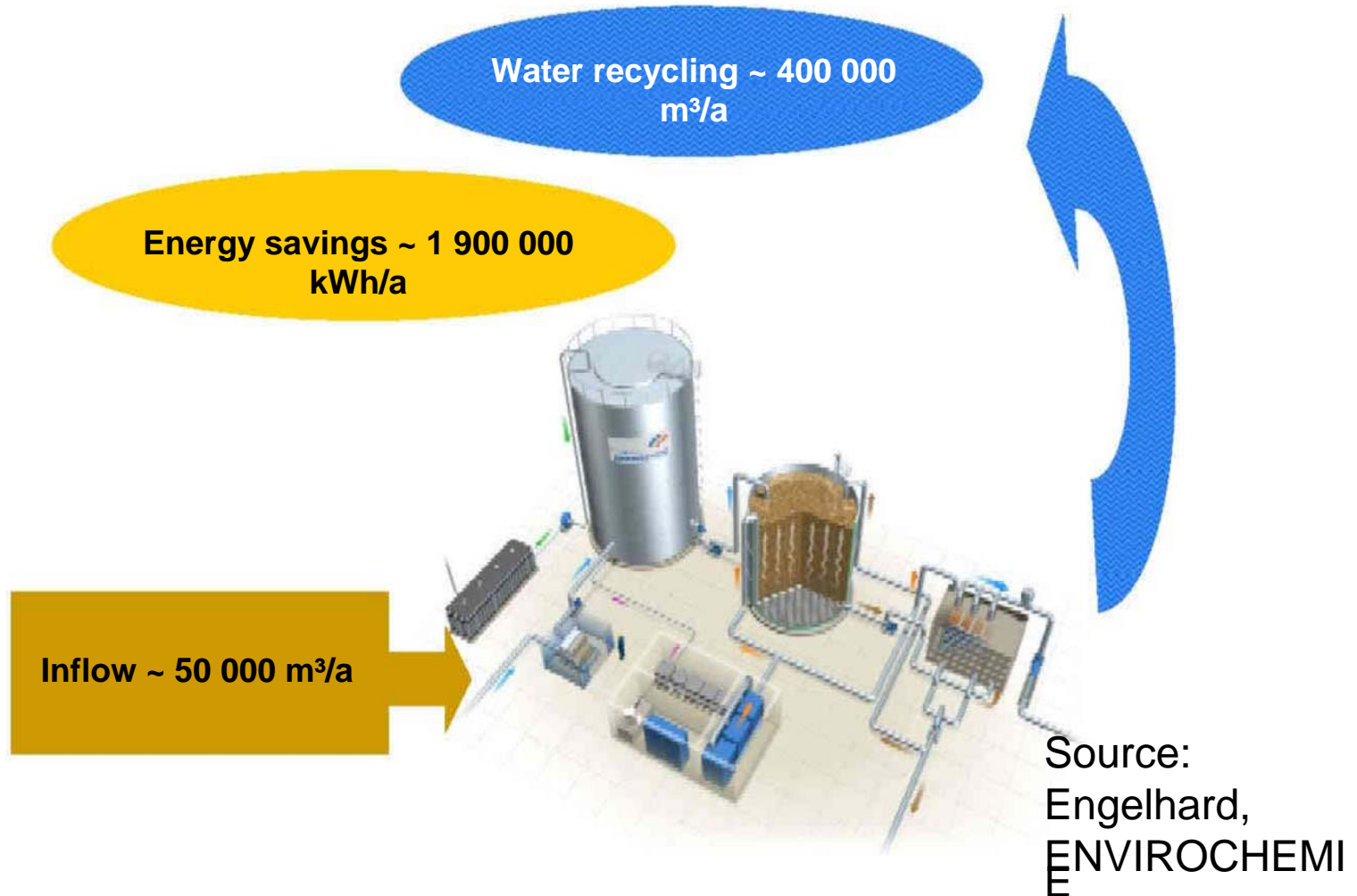
One of the AKIZ Candidate Fish Factories IZ Tra Noc (4)



Factory's Wastewater Collection Chamber



The Target: Water. The Driver: Energy (from BioGas)



...the Future may be Biofuel



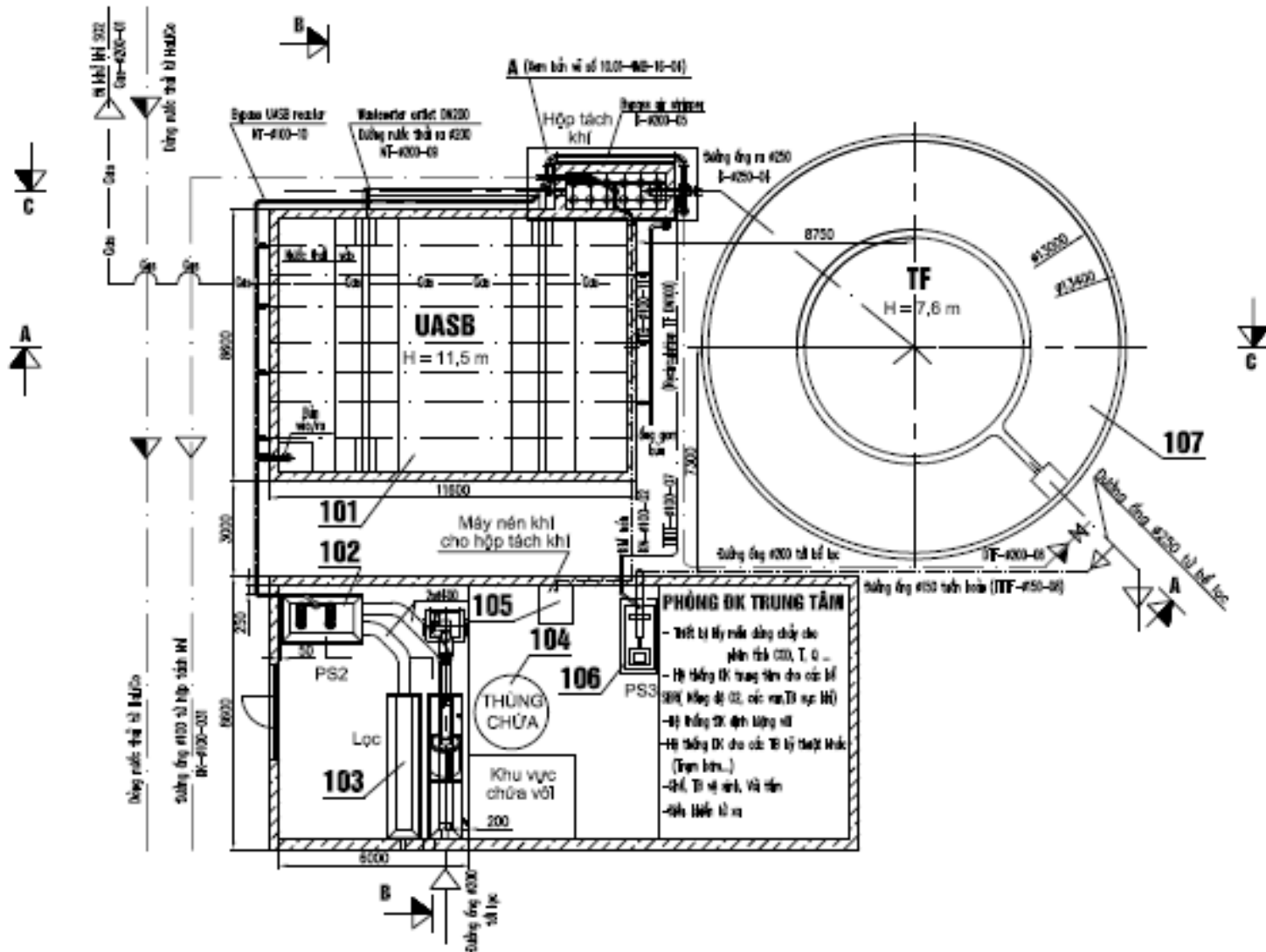
Combined Biogas Plant Emmerich (DE)

High-Tech with Extra Revenue for Energy Recovery and CO₂ Certificates

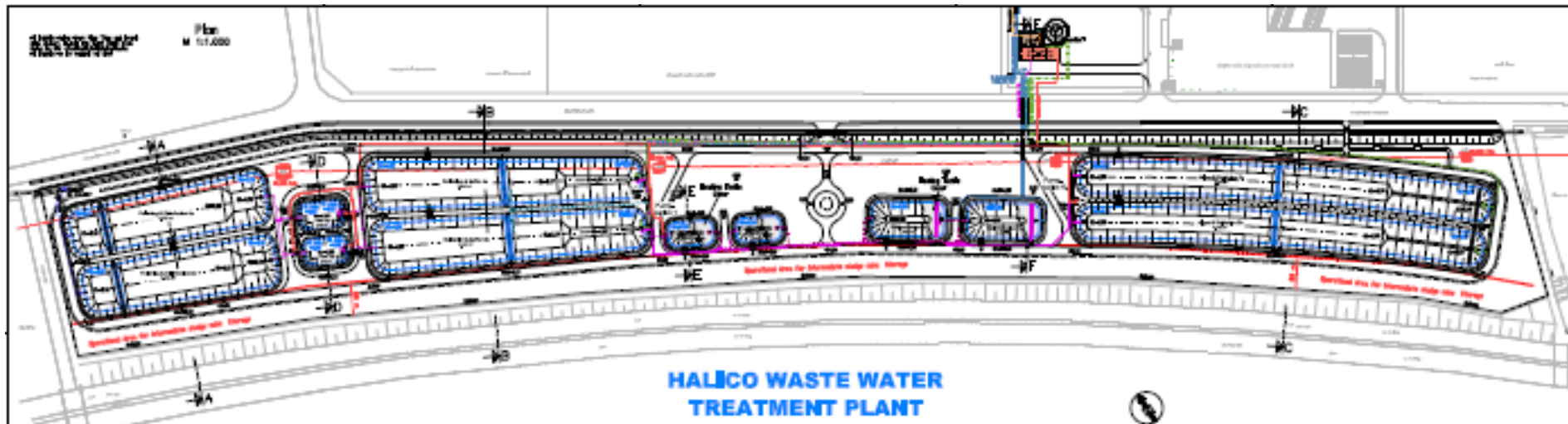
To be adapted for VN



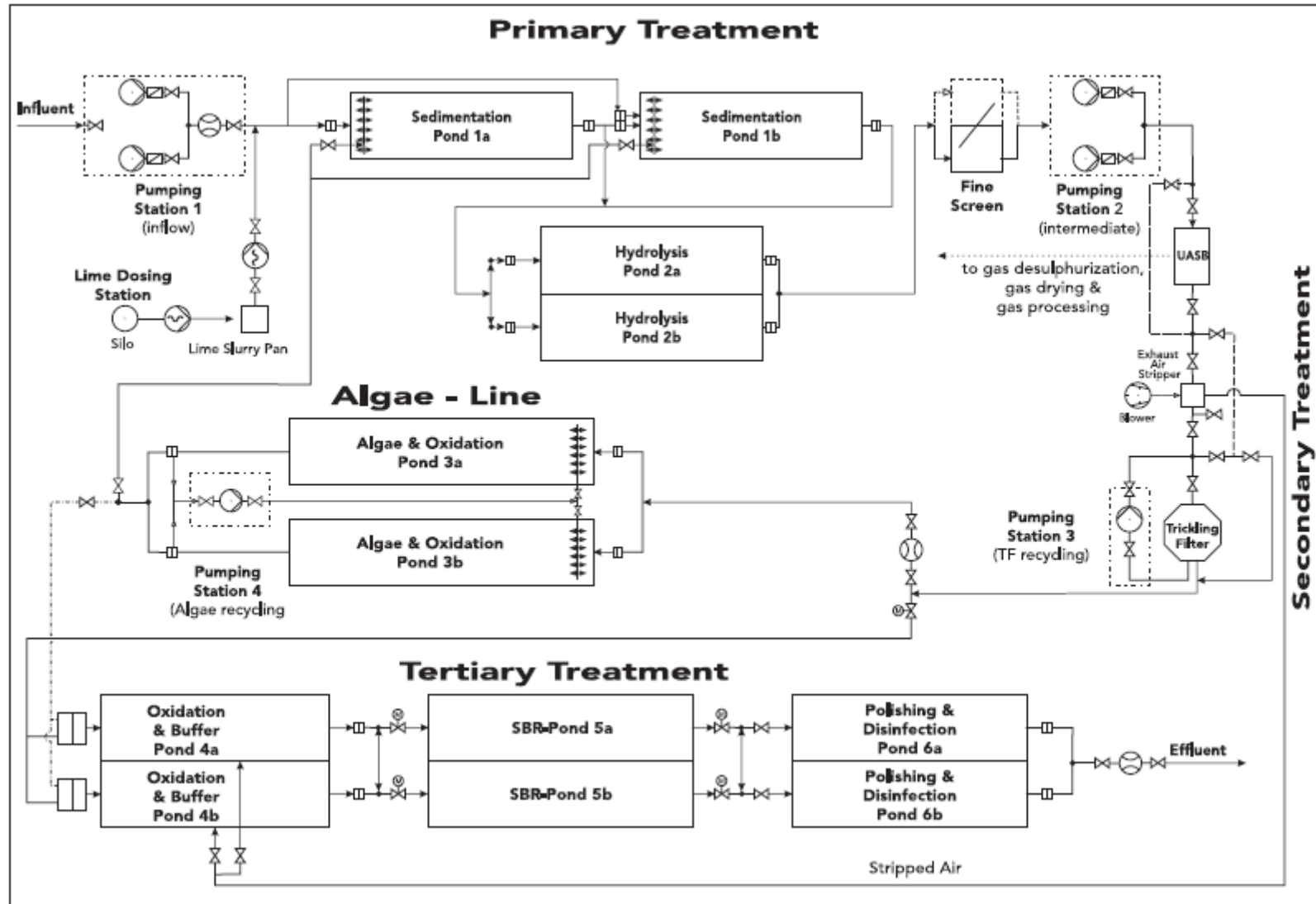
UASB, Stripper, TF et al.



Site Plan with PETRO-Ponds



Combined Process Scheme



Industrielles Verwertungsbeispiel aus BMBF-Vorhaben



RUD LPH



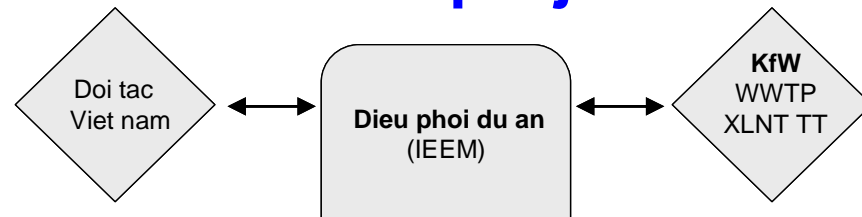
Trough Adaptation of HighTechnologies to Sustainable Solutions

Based the pilot test plant results, an **Overall Management Concept** will be elaborated for AKIZ, which shall cover the technical as well as the economic, financial functions of all facilities and organisations within the IZ.

The **decentralised solutions** from the BMBF research have to be included, protecting and accomplishing the **central sewage treatment plant** financed through KfW .

AKIZ shall include a sound **monitoring and control system**, with a reliable quality control of all day-to-day operations, cost calculations and *re-financing*.

Struktur und Beteiligte des AKIZ-Verbundprojektes



Management-Konzept für Management Concept for TP W1 (IEEM)

Co quan thiet lap & quan ly du an TP W1 (IEEM)

- UA 1 Abfall- und Altlastenmanagement (TU Dresden)
Solid Waste and Contaminated Site Management
- UA 2 Soziologische Untersuchungen (Uni Bielefeld)
Sociologic Research
- UA 3 PPP-Schulungen (HS Bremerhaven)
PPP-Workshops

- UA 1 Quan ly chat thai ran & o nhiem (TU Dresden)
- UA 2 Nghien cuu tac dong xa hoi (DHTH Bielefeld)
- UA 3 Dao tao-PPP (DH Bremerhaven)

TP I2 TP W2 Abwas- serent- giftung <i>Toxic Substances Elimination</i> (Uni Stuttgart + HST)	TP I3 TP W3 Energie- gewin- nung <i>Energy Generation (Biogas)</i> (LUH + Passavant- Roediger)	TP I4 TP W4 Wert- stoffrück- gewinnung <i>Recovery of Valuable Materials</i> (TU DA + Enviro Chemie)	TP I5 TP W5 Messung, Über- wachung <i>Wastewater Analyses, Monitoring</i> (IEEM + LAR)	TP I3 TP W6 Klär- schlamm- Konzept <i>Sewage Sludge Concept</i> (TU BS + Passavant- Roediger)
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TP I2 TP W2 Khu doc to trong nuoc thai (DHTH Stuttgart + HST)	TP I3 TP W3 Thu hoi nang luong tu nuoc thai (LUH + Passavant -Roediger)	TP I4 TP W4 Thu hoi nguyen lieu qui tu nuoc thai (DHTH Darmstadt + Enviro Chemie)	TP I5 TP W5 Quan trac +phan tich nuoc thai (IEEM + LAR)	TP I3 TP W6 Giai phap su ly bun thai (DHTH Braun- schweig + Passavant- Roediger)
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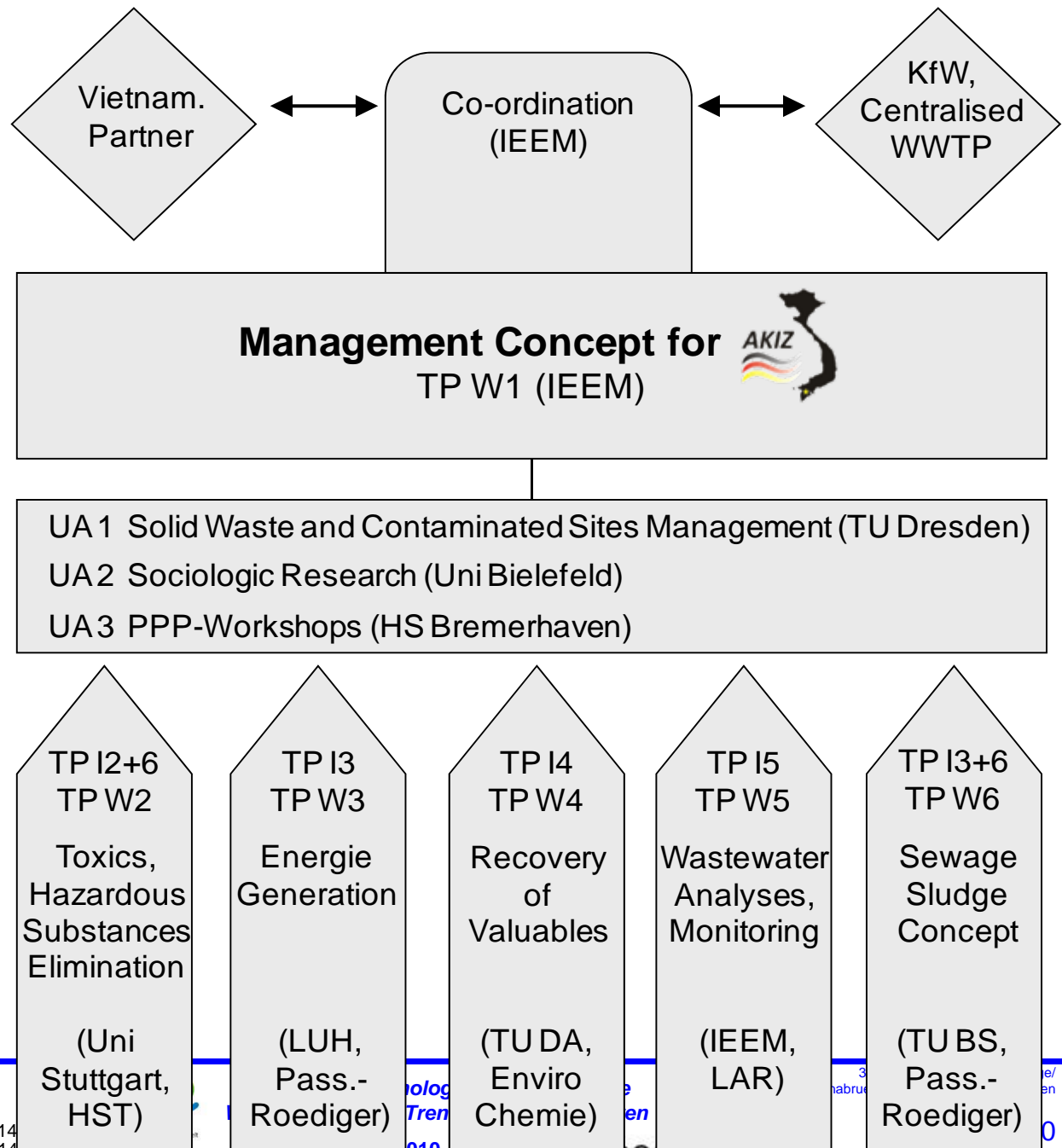
Versuchsanlagen
Pilot Plants

UA = Unterauftrag / *Subcontract*
 TP = Teilprojekt / *Project Module*
 W = Wissenschaft / *Academia*
 I = Industrie / *Industry*
 WWTP = *Wastewater Treatment Plant*

Thiet bi thu nghiem

UA = Nha thau phu
 TP = Mot phan du an
 W = Vien nghien cuu khoa hoc
 I = Cong nghiep
 WWTP = Nha may xu ly nuoc thai

Struktur und Beteiligte des AKIZ- Verbund- projektes



AKIZ Supportive Actions

- **sociological and ecological aspects, relevant to apply AKIZ, have to be researched.**
- **the sustainable implementation of AKIZ shall be supported through **capacity building** with all stakeholders.**

AKIZ shall be *multi bridging*

- **between technical sciences and socio-economics, finance**
- **between scientific research and practical application**
- **between research and development co-operation**
- **between research and industries**
- **between Vietnam and Germany**

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Thank you for listening
looking forward to your response