

bluefacts2013

International Journal of Water-Management



AKIZ Project Tasks

In the project, selected decentralised technical solutions for near-to-source detoxification and energy recovery from wastewater as well as recovery of valuable materials from process water are demonstrated in different companies in the Tra Noc IZ. The application of proven and efficient high-tech solutions for industrial wastewater treatment requires that the technology (as applied in Germany and other industrialised countries) is adapted to the specific local conditions and tropical climates. Container-based pilot plants from German industrial partners are being applied in selected pesticide processing, seafood production and life sciences industries as well as in breweries.

Fig. 2: Research on Treatment of Sewage Sludge in sub-project TP 6



Additionally, existing concepts for treatment and disposal of sewage sludge are being adapted and developed. Waste and contaminated site management issues are being taken into consideration as well. The development and implementation of a monitoring system, including a container laboratory to be designed for industrial zones in Vietnam, also covers the generation of databases for technological adaptation and for the administrative and financial management of wastewater infrastructure.

All the above mentioned aspects are integrated into a comprehensive management concept for industrial zones, which will comprise the sustainable technical and economic operation of the wastewater infrastructure in the industrial zone. This includes decentralised wastewater treatment, as well as the planned central wastewater treatment plant, starting from the metrological control and monitoring system to secure the ongoing operation, and including cost accounting and financial modelling.

AKIZ Project Activities and First Results

The coordination of all project partners as well as the consolidation of results for the management concept are being realised within the framework of subproject TP 1 (Fig.1). To date, numerous capacity-building measures for the local stakeholders (such as environmental authorities and industrial zones management), as well as workshops on various topics (e.g. on monitoring of indirect dischargers and investment and financing of wastewater infrastructure) have been organised and carried out, in cooperation with the German Agency for International Cooperation (GIZ). Furthermore, financing concepts for wastewater infrastructures in industrial zones are being developed in cooperation with donor banks such as KfW, ADB and the World Bank.

Sub-project TP 2 identifies efficient combinations of common technical processes for detoxification of heavily contaminated industrial wastewater, such as separation techniques, precipitation and flocculation, adsorption with activated carbon, filtration, biological treatment, chemical and further oxidation with H_2O_2 etc. For this purpose, a pilot plant on the premises of a pesticide processing company has been set up in order to evaluate and optimise the detoxification process during operation. Together

Source: ISWW

Industrial Zones in Vietnam

Since the start of the economic modernisation policy (meaning the transition from a central planning economy to a socialist-oriented market economy, called “doi moi”) in 1986, the economy of the Socialist Republic of Vietnam has grown steadily. In the last decade, Vietnam’s real gross domestic gross (GDP) growth rates have been fluctuating between 5.3 percent and 8.5 percent [1]. As a result of the economic growth, about 280 industrial zones had been established in Vietnam by end of 2011, of which 180 had been in registered operation [2].

According to the Vietnamese Decree No. 29/2008/ND-CP [3] industrial zones are defined as “[...] zones specializing in production of industrial goods and provision of services for industrial production, having fixed geographical boundaries”. Circular 08/2009/TT-BTNMT [4] defines that with 1 January 2011 all industrial parks in Vietnam are obliged to construct and operate a centralized wastewater treatment system which shall collect and treat wastewater, generated by the industries, according to the relevant standards.

It is a fact that most of the established industrial zones in Vietnam do not have any sustainable and functioning centralized wastewater treatment system in place up to now. The consequences of this situation are: heavy pollution of the aquatic environment and growing health risks for the population. In order to improve this situation, the “Vietnamese Strategy on Environmental Protection to 2020” [5] has set the following goals: 75 percent of the industrial zones shall be furnished with a centralized wastewater treatment system by 2015 and 95 percent by 2020. But next to the construction of centralized wastewater collection and treatment systems, the sustainable operation of these systems is and will be a huge challenge for Vietnam’s industrial zones.

AKIZ Project Objectives

Due to the need for improving the situation of wastewater infrastructure in industrial zones in Vietnam, an integrated wastewater concept for industrial zones (AKIZ – www.akiz.de) is currently under development within the framework of the German Federal Ministry of Education and Research (BMBF) joint research project AKIZ [6]. The Tra Noc industrial zone (IZ) in Can Tho, South-Vietnam, is used as a model with a view to its being made generally applicable to other industrial zones in tropical climates.

The findings of the project will be condensed into two comprehensive guidelines for integrated wastewater concepts for industrial zones (Best Practice Guides) for both German and Vietnamese decision makers:

- “Guideline on integrated wastewater concepts for industrial zones” as a decision support tool for the implementation of wastewater infrastructure and
- “Financial modelling of wastewater solutions for industrial zones” as prerequisite for sustainable investment and operation.

AKIZ Project Structure and Partners

The project is realised in cooperation with ten German and nine Vietnamese universities and industrial partners in six sub-projects which cover various developmental aspects of the wastewater management concept. Key components of the integrated concept include a mixture of centralised and decentralised technical solutions for wastewater treatment as well as the linking-up of technical planning with financial planning, including adapted tariff models.

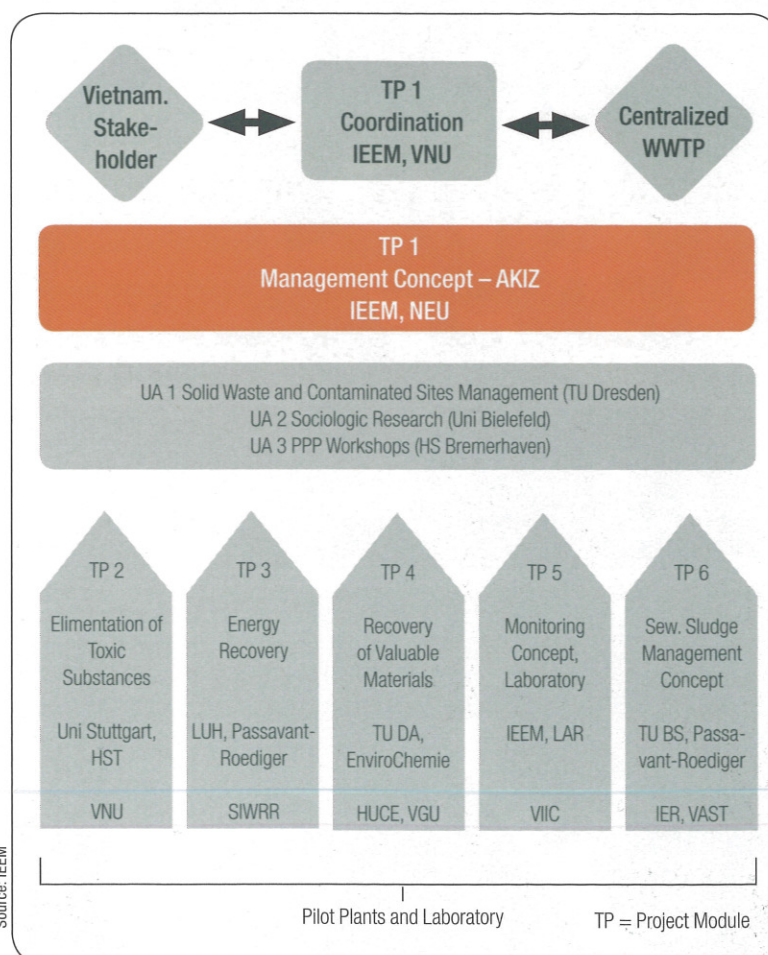


Fig. 1: AKIZ Project Structure and Partners



Pilot Plant of sub-project
TP 4 for the Recovery of
Valuable Materials using
Membrane Technology

Source: IWAR EnviroChemie

AKIZ

– A Joint Research Project for the Development of an Integrated Wastewater Concept for Industrial Zones in Vietnam

In Vietnam, there are more than 200 registered industrial zones (IZ), most of them without any sustainable and functioning wastewater system. In order to identify means of addressing this potentially hazardous situation, an integrated wastewater concept for industrial zones (AKIZ) is under development within the framework of the BMBF joint research project and using the Tra Noc industrial zone in Can Tho (Vietnam) as a model with a view to its being made generally applicable to other industrial zones. Selected decentralised solutions for near-to-source detoxification, energy recovery and recovery of valuable materials are demonstrated on company premises in the Tra Noc IZ. The application of proven and efficient high-tech solutions for industrial wastewater treatment, requires that the technology as applied in Germany and other industrialised countries be adapted to the specific local conditions and tropical climates. To this end, container-based pilot plants from German industrial partners are being applied in selected pesticide processing, seafood production and life sciences industries as well as in breweries.

by: Prof. Dr. mult. Karl-Ulrich Rudolph, Dipl.-Ing. Sandra Kreuter,
Dipl.-Ing. René Heinrich, Dipl.-Phys. Nguyen Van Long
(IEEM GmbH, Witten)

In Vietnam gibt es mehr als 200 registrierte Industriezonen (IZ), für die keine nachhaltig funktionierende Abwasserentsorgung existiert. Um Lösungskonzepte für die prekäre Situation aufzuzeigen, soll im Rahmen des BMBF-Verbundvorhabens am Beispiel einer Industriezone in der Stadt Can Tho begleitend zum Bau einer Zentralkläranlage ein Integriertes Abwasserkonzept für Industriezonen (AKIZ) entwickelt werden, das auch auf weitere Industriezonen übertragbar ist. An Beispielbetrieben in der Industriezone werden ausgesuchte dezentrale Lösungen für die quellenaher Entgiftung, die Energiegewinnung und die Wertstoffrückgewinnung aufgezeigt. Der Einsatz bewährter und effizienter High-tech-Lösungen für die Industrieabwasserbehandlung setzt die Adaption an die speziellen Arbeitsbedingungen und tropischen Klimaverhältnisse voraus. Dazu werden Container-basierte Versuchsanlagen deutscher Industriepartner in ausgewählten Unternehmen aus den Bereichen Pestizidverarbeitung, Sea-Food-Herstellung, Brauereiwesen und Lifescience eingesetzt.

with the GIZ, a hazardous waste incinerator project has been built for the pesticide company, eliminating a major source of toxic effluents into the wastewater system.

In order to demonstrate the feasibility of an anaerobic wastewater treatment system with energy production under “real-life conditions”, a pilot plant has been designed for a fish-processing company that produces high organic loads, and it is to be tested in sub-project TP 3. The pilot plant consists of anaerobic reactors, equipment for the collection and cleaning of the produced biogas as well as sampling and control units. The biogas will be used as an energy source for the operation of a cooling device (Fig. 2).

The container-based pilot plant of sub-project TP 4 had been in operation at a brewery in Tra Noc IZ. Through the use of membrane filtration technology, the caustic bath used for the bottle washing has been recovered including its washing additives. At the moment, the pilot plant is operated at a factory which extracts the substances chitin and glucosamine from shrimp shells. Here, membrane filtration is employed for the treatment of wastewater resulting from the deproteinization processes.

In the AKIZ container laboratory of sub-project TP 5 several analytical methods have been adapted to the specific conditions in Tra Noc and are developed to date. Additionally, wastewater samples from all the sub-projects are analysed here for their specific parameters. Monitoring investigations in the Tra Noc sewer system have shown that the Hau River is of significant influence on the sewer system, caused through periodical back-flow during high tide and certain weather conditions. These conditions must be taken into account for the planning of a monitoring system for indirect wastewater effluent dischargers.

The pilot plant container of sub-project TP 6 is equipped with a batch plant for anaerobic biodegradation tests as well as a continuous flow reactor for anaerobic sewage sludge stabilisation experiments, including a newly developed gas measurement process (Fig. 3). Furthermore, TP 6 examines the following small scale sewage sludge treatment methods: sewage sludge composting, humification in reed beds, solar sludge treatment and vermi-composting.



Source: IEEM

Fig. 3: Pilot Plant of sub-project TP 3 – Energy Recovery from Wastewater of a Fish Processing Company

Literature:

- [1] General Statistics Office of Vietnam: “Key Indicators on National Accounts”. WEB: http://www.gso.gov.vn/default_en.aspx?tabid=468&idmid=3&ItemID=12981. - 14 February 2013.
- [2] Nguyen Viet-Anh: “Industrial Wastewater Management in Vietnam - Current Status and Solutions for Improvement”, unpublished presentation at AKIZ Workshop on 10 October 2012.
- [3] Decree No. 29/2008/ND-CP, on industrial zones, export processing zones and economic zones, Ha Noi, 14 March 2008
- [4] Circular No: 08/2009/TT-BTNMT, providing for the environmental management and protection of economic zones, hi-tech parks, industrial parks and industrial complexes, Ha Noi, 15 July 2009.
- [5] Decision 1216/QĐ-TTg, The National Strategy on Environment Protection to 2020, with Visions to 2030, 05 September 2012
- [6] Rudolph, K.-U., Kreuter, S., Heinrich, R., Long, N.V.: “Integrated Wastewater Concept for Industrial Zones”; In: Vietnam-Germany, Scientific-Technological Cooperation in the Field of Water and Sustainability Research”, 2013, ISBN: 978-3-00-041141-0.



Authors:

Prof. Dr. mult. Karl-Ulrich Rudolph
 Dipl.-Ing. Sandra Kreuter
 Dipl.-Ing. René Heinrich
 Dipl.-Phys. Nguyen Van Long
 IEEM – Institute of Environmental Engineering
 and Management at the Witten/Herdecke
 University gGmbH
 Alfred-Herrhausen-Str. 44
 58455 Witten
 Germany
 tel.: +49 (0)2302 91401-0
 fax.: +49 (0)2302 91401-11
 e-mail: mail@uni-wh-utm.de
 web: www.uni-wh-utm.de