Case Study I		
Country:	**City:**	**Key Sectors:**
Thailand **Case Study 1**	**Nakhonratchasima** **(Korat)**	**System efficiency service (SES)** **Water and wastewater pumps**
Local Partner Organization		**Geography and Population**
Nakhonratchasima (Korat) Municipality		Area of 37.5 sq km 173,117 population registered about 250,000 unregistered 4 districts (14 sub-districts)
Contact Information		
Korat Municipality: Contact:	Project Coordinator: Rashane Sala-Ngarm Contact: rashane.sala-ngarm@giz.de Tel.: 08170 22955	

Summary

The main source of water supply for Korat City is from Lamtaklong dam. A total of around 450,000 people in the 4 districts and surrounding area of Korat city depend on this water source for livelihood and irrigation. There is water scarcity in the dry season. The raw water is pumped into the city for treatment/purification and distribution, through 60 Kilometres pipeline. Water losses from pipes are about 35-45 %. The Municipality pays roughly Baht 6 million for electricity for water pumping per month (for Lamtaklong and Makhamtao stations alone).
For the 9 waste water pumping stations another Baht 300,000 per month electricity charges have to be paid and another Baht 300,000 for the pumps at the waste water treatment plant have to be paid per month.
This excludes the maintenance and repair cost in all three cases. Thus Nexus advisory service concentrates on optimizing resource management by implementing system efficiency service (SES) of the water and waste water pumps at Lamtaklong, Makhamtao, and one waste water pumping stations.

Rationale

Korat-250 kms far from Bangkok is the gateway to the Northeast region of Thailand. Korat municipality has area of 37.5 sq km. with its 173,117 population registered and about 250,000 unregistered. According to laws, Korat Municipality has to provide the basic services to meet the needs of its population i.e water supply, electricity, health service, solid waste collection. With rapid growth of population the land use pattern is changed from agriculture to residential and urbanized areas. Although people don't feel unsecure the increased severe climate and global warming affects the crop

production and plantation. The local governments should be aware of this harm and foresee the sustainable provision of water, energy and food security. Thus the Nexus compliant integrated resource management is introduced to fully utilize the interaction and synergies in the three nexus sectors and to integrate into urban planning and development processes of Korat municipality. For successful implementation the involvement of stakeholders from the civil society, private sector,and academic institutes is essential in the planning/consultation processes.

Water supply to Korat City, there are 2 water purification plants outside and 1 plant inside city area. The raw water from Lamtaklong Dam is pumped into the city for treatment/purification and distribution, through 60 Kilometers pipeline. The water pumps used for both pumping the raw water into the city and pumping the treated water to the households consume large amount of electricity. There are also leakages in the pipe network at a rate of 35-45%, which forces the plants to pump even more water into the network than in reality required, in-turn causing the pumps to consume even more electricity. The city is looking at other alternatives such as pumping water from a nearer water reservoir or river. However, the river water is polluted and inadequate for water production.

Project Description

To increase efficiency in water provision as well as waste water management, the Project has investigated the water and waste water pumps at pumping stations to advice on energy cost savings through replacement of pumps calculating the payback period. Training and capacity building on preventive and routine maintenance and repair of water and waste water pumps has been provided.

In a nutshell:
Decrease energy consumption for water supply and waste water treatment system through:

- Building capacity for local technical officer on operation and maintenance system;
- Replacement of old and outworn pumps through energy efficient new pumps.

Stakeholders / Target groups

The key stakeholders include

- Municipal Water Supply Department
- Municipal Water Engineering and Sanitation Department
- Financial and Planning Department

At the meso-level, among others, the city associations, training institutions and non- governmental organizations are crucial stakeholders.
At the national level,

- Office of Natural Resources Policy and Planning (ONEP) under MONRE will assist to up-scale the nexus approaches via the exchange of visit and organizing national workshops.

the 320,000 people living in Korat Municipality and neighboring areas.

Costs / Financing

Studies / Reports / Training

- MORGENSTADT BENCHMARKING AND CITY DEVELOPMENT CONCEPTS, the Urban Nexus & Sustainable Urban Governance/ Fraunhofer Institute for Industrial Engineering

IAO/July 2014

- KSB Reports, Thailand/Bangkok, 2014

Results (Impact)

The decision makers of Korat Municipality have been made aware of how to decrease energy consumption and costs for water supply and waste water treatment:
Replacement of outworn water and waste water pumps;
Introduction and implementation of a regular operation and maintenance system for the equipment (pumps);

In detail:

- KSB Pumps Co. Ltd checked performance of the existing water pumps at Makamtheo. This includes the calculation of efficiency and checking the actual capacity. As a result it is recommended that the front station alone has sufficient capacity to supply water to the communities. However, there is a need to have more fresh water storage capacity. Thus the 2 reservoirs (tanks) are to be connected in the view to shut down the middle and back pumping stations – saving maintenance cost of the stations as well as the high electricity consumption of the outdated pumps at the stations.

- KSB Pumps Co.Ltd Ltd also checked performance of the existing water pumps at Lamtaklong pumping station. There are 6 pumps in total. Two bigger pumps have a capacity of 1,000 cm3/hr and the 4 smaller pumps have a capacity of 752.4 cm3/hr. Despite several limitations on site which do not allow a thorough analysis of the pumps (such as opening/closing of the pump valves), KSB was still able to measure individual pump performance and compare it to the performance of a new pump of the same capacity. Subsequently, KSB recommended that there 3 options for the municipality:

  - Option 1: Change all pumps – Return on investment will be 3.3 years
  - Option 2: Change the 2 big pumps – Return on investment will be 2.1 years
  - Option 3: Change the 4 small pumps – Return on investment will be 5.3 years

Which means Option 2 should be the most interesting one for the municipality.

- KSB Pumps Co.Ltd visited the 3 waste water pumping stations to inspect their operation. KSB cannot run testing as it has to take the pumps out of station. It is recommended to pick up one of waste water pumping stations to record operating time of each pump including the electricity cost for a month (September). Based on this KSB will use KSB new pump with the same duty points with the waste water pump's nameplate and compare the power consumption.