Energy Supply for the Demonstration Global Interactive Village Environment

Background

The Demonstration Global Interactive Village Environment (DemoGIVECon) is a concept on how to build villages and/or smaller cities for a sustainable lifestyle as a competitive alternative to cities and megacities. As a key element, it aims at electrification of rural areas in India through off-grid solutions. Integrated and scalable green technologies are a fundamental prerequisite for DemoGIVECon, which will be fully self-sustaining with energy, water as well as food. All waste streams shall be incorporated in an optimized value-chain to re-use as much as possible, for instance food waste and manure from local livestock will be used as substrate for biogas production, which can power the village. Fish farming in aquaponds will both provide fish and will also produce waste streams with a high biogas yield.

Scope:

The scope of this MSc work will be to investigate different technologies to generate electricity to supply the village with sustainable power and to define an Excel-based cost model to calculate the production cost of the electricity. A local electricity grid is to be installed in this village and will be part of this investigation. As the village is to be built as a green-field option, many different generation technologies will need to be investigated. Of course, the location of the village will be defined at the start-up of the project as will other required boundary conditions, such as number of inhabitants, age distribution, annual weather data and hours of rainfall & sunshine, vicinity to a river (for potential hydropower) as well as miscellaneous of importance for the energy and water supply and management. This definition process will be done in an iterative way with close contact to the project group.

Electricity generation technologies that shall be investigated for their respective potential for the defined site include: solar PV; concentrated solar power, biomass and / or waste plant, biogas plant, small-scale wind power, small-scale hydropower, organic Rankine cycle, Stirling engines etc. as well as suitable back-up solutions. This list can be extended if needed but focus is to be put on technologies that are already on the market today.

The project group:

The architecture company **Designavd Friberg & Palmér AB** is a small well-established architecture office, located in Stockholm, Sweden.
ScanIndian Sustainable Solutions, SISS is a small Swedish consultant company working with concept development and networking with strong business relations in India.
COWI AB is one of the largest Scandinavian consultancy companies working with infrastructure, energy & process engineering solutions.
Regular meetings will be held with the student(s) to ensure good communication as well as an interesting MSc thesis to work with.

Duration:

The project should start in spring 2016 and should not extend for more than 6 months.
Specific starting date to be discussed.

Location: KTH - Energy Department. The student will be provided required hardware and software.

Main Supervisor: Björn Laumert, PhD – *KTH,* Jürgen Jacoby*, PhD - COWI*

Examiner: Björn Laumert, PhD – *Associate Professor*

To apply send your CV together with University grades and expected starting date