Conditions for transforming waste to energy in La Paz and El Alto

Executive summary

A report from the project Waste-to-biogas in Bolivia

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This report presents the identified conditions to be faced when aiming to transform waste to energy in La Paz and El Alto. The analysis gives particular attention to generation of organic residues, actors involved in the supply chain of waste-to-biogas, and barriers to implementation. The study is a result of the project Waste-to-Biogas in Bolivia – Promoting Sustainable Development (WABB). The objective of the project is to develop a strategy for generation of biogas from organic waste for La Paz and El Alto in Bolivia.

The urban area of La Paz and El Alto in Bolivia is facing problems with waste management, water contamination, land use, and environmental burdens. Waste-to-biogas can provide an opportunity to alleviate these problems while also helping shift the country’s energy matrix towards more renewables, and reduce greenhouse gas (GHG) emissions. Bolivia’s energy matrix is dominated by subsidized domestic natural gas. Imported diesel for transport is also subsidized, which altogether implies a high cost for the national government and a barrier for the development of renewable energy. As much as 94% of the primary energy production comes from fossil sources, which implies increasing GHG emissions as the economy grows. There is need to devise and develop new energy alternatives to set course for a sustainable energy future.

Meanwhile, large quantities of organic residues are generated in La Paz and El Alto: about 493 tonnes per day with 50% organic content in La Paz, and 483 tonnes per day with 66% organic content in El Alto. It is estimated that only 40% of the costs incurred in managing this waste is covered by the collected waste fees in La Paz and El Alto, implying an economic burden on the municipalities. In addition, GHG emissions from the waste sector in Bolivia have increased three fold between 1990 and 2004, with a doubling of the share of emissions from solid waste. Biogas applications could potentially reduce the costs of waste handling and bring additional benefits in the form of reduced GHG emissions. This is an opportunity for Bolivia to contribute to climate change mitigation while also promoting sustainable development within the country through valorisation of residues and promotion of waste-to-energy technologies.

The waste management system in place is inefficient for recycling and reusing resources since segregation of waste is not common practice. Waste segregation does exist but only through a few small companies and focused on specific resources such as plastics. Nevertheless, waste-to-biogas is still a realistic proposition having the present system as a starting point together with agents operating collection, transport and final disposition of residues in the two municipalities. The waste can be redirected from landfills to biogas plants to generate energy. Also the organic residues accumulated in the landfills can be used to generate energy through the extraction of landfill gas. This will mitigate methane emissions.

Three implementation steps have been outlined for the implementation of waste-to-biogas in La Paz and El Alto based on proved biogas technologies. The first step consists of an active extraction system at landfills which is generally the least expensive measure to obtain biogas. The second step is a biogas plant without pre-separation of waste. The third step is a biogas
plant which receives separated organic waste. The steps are complementary, and logistics and infrastructure can evolve to combine them.

Implementing a waste-to-biogas plant can address local, national and global problems. At the local level, elevated costs for waste management and limited landfill capacity are putting pressure on the municipalities to find long-term cost-effective solutions. This may require cooperation across municipal borders not least to achieve scale. At the national level, it will be advantageous to identify opportunities to diversify the country’s energy matrix. At the global level, renewable energy alternatives provide a pathway for climate change mitigation and sustainable development.

Cooperation is crucial at various levels if waste-to-biogas is to be developed. No actor controls the entire supply chain from waste generation to deposition at landfills. Hence coordination of efforts is necessary along the supply chain. Furthermore, cooperation between municipalities might be needed to solve problems related to waste, land availability for landfills and development of biogas plants. As an example of challenges to land availability it can be mentioned that the only landfill of El Alto will reach capacity limit already within three years, if the waste flow is not reduced. This is a real problem for the municipality since social resistance makes it difficult to find new suitable sites in El Alto. La Paz municipality is facing similar challenges since there is not much land available, due to topographic reasons. Best practice from Västerås, Sweden, shows that it possible to only deposit 1% of generated waste at the landfills by measures of recycling and recovering residues. Waste-to-biogas together with efficient waste management can, thus, strongly reduce the need for new landfills. However, to implement waste-to-biogas in La Paz and El Alto the actors must have a common goal and agenda. This project shall contribute to catalyse efforts in this agenda.

To contribute to development in this direction we have organized a Workshop in La Paz joining different stakeholders and discussing the challenges of and opportunities of waste-to-biogas. We have also realized site-visits, interviews with authorities, data collection, and waste sampling to be analysed in laboratory. The analysis presented here is based on that work. To further disseminate the results, we have launched a home page: www.biogas-bolivia.proj.kth.se and also presented the project at a conference (Nordic Biogas Conference 2012).

The study has been carried out by Swedish and Bolivian organizations: KTH – Royal Institute of Technology, Mälardalen University and VafabMiljö (municipal company) in Sweden; and CPTS (non-profit organisation) and GAMLP (municipality of La Paz) in Bolivia. The project is financed by the Nordic Climate Facility, and in-kind contributions of project partners. Nordic Climate Facility (NCF) is financed by the Nordic Development Fund (NDF) and implemented jointly with the Nordic Environment Finance Corporation (NEFCO).