BIOGAS PRODUCTION
STUDY CASE: THE HAGUE CITY

INTRODUCTION

The accumulation of solid organic waste is thought to be reaching critical levels in almost all regions of the world. These organic wastes require to be managed in a sustainable way to avoid depletion of natural resources, minimize risk to human health, reduce environmental burdens and maintain an overall balance in the ecosystem. Energy is extremely important for economic growth, social development, human well-being and improving the quality of life. All the sectors of economy – agriculture, industry, transport, commercial and domestic needs inputs of energy. In this way the increase in energy consumption has become relevant. That is why is important the development of alternatives types of energy sources. One of the sources available and which has great potential for development and feasibility is the biomass. The use of biomass as a renewable and sustainable source of energy, whether as organic solid waste, industrial or commercial effluents and rural waste, allows diversify the energy matrix, besides reducing the emission of gases that contribute to the greenhouse effect.

DEFINITION ASSIGNMENT

Through the process of anaerobic digestion is possible to obtain a very important gas for the generation of energy, known as biogas. Methane (CH_4) is the main component of biogas, classified as biofuel that can help humans set free themselves from the dependence of fossil fuels. Biogas can be used as fuel in substitution of natural gas or liquefied petroleum gas (LPG), both extracted from mineral reserves. So, the production of biogas is possible from various organic waste, such as animal manure, sewage sludge, household waste, agricultural waste, industrial effluents and aquatic plants. In this case, when the anaerobic digestion is carried out in specially planned biodigesters, the gas mixture produced can be used as fuel, which, besides its high calorific value, does not produce toxic gases during burning and is an excellent alternative for the use of organic waste, still leaves as a residue a sludge that is an excellent biofertilizer. Than the anaerobic treatment processes have become a key technology for environmental and climate protection and for the conservation of fossil fuel resources.

THE HAGUE AS A CASE STUDY AREA

In a city-scale, biogas can help to solve problems in public waste disposal and wastewater treatment. Biomass for both electricity and heat generation can play an important role in the sustainability of the energy supply in The Hague.

	2015	2016	2017	Unit
GFT	11,42	12,33	10,60	Kg/year

GFT per capita for The Hague

The population around 525000 inhabitants produces around 5571 ton of GFT yearly.

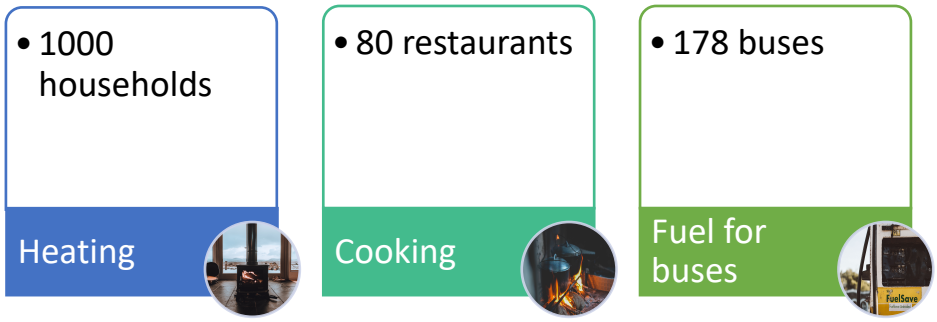
THEORETICAL BIOGAS PRODUCTION

1. Bushwell's formula
2. Results from Zhang's studies (2007)
3. ADM1 in the research from Zaher (2009)
4. Practical research from Zaher (2009)

Methodologie	Daily theoretical biogas production (m^3)	Yearly theoretical biogas production (m^3)
1	1768.5	645515
2	1454.2	530769
3	989.3	361083
4	1148.9	419359
Average of the methodologies	1340.2	489182

Theoretical biogas production using 4 different methodologies

RESULTS - SCENARIOS FOR THE USE OF BIOGAS



CONCLUSION

The aim of this study was to present some techniques to estimate biogas production from food waste for the city of The Hague. The average of the methodologies for the daily production of biogas was of 1340.2 m^3, generated by 5.571 ton of organic waste yearly in the city of The Hague. The research also presented several uses for the biogas and the storage each one needs. For the 3 scenarios showed, the use as fuel to bus has more advantages, since the storage for this use is smaller, so the biogas doesn`t need to be storage for a long period.

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