Promoting Renewable Energies in Tourism

An actor-based SWOT-Analysis

Laura Müller
Dep. of Civil Engineering
HTWG Konstanz
Germany
Laura.Mueller@htwg-konstanz.de

Prof. Dr. rer. nat. habil Benno Rothstein
Dep. of Civil Engineering
HTWG Konstanz
Germany

***Abstract*—In tourism, energy demands are particularly high. Tourism facilities such as hotels require large amounts of electric and heating resp. cooling energy. Their supply however is usually still based on fossil energies. This research approach analyses the potential of promoting renewable energies in Black Forest tourism. It focuses on a combined and hence highly efficient production of both electric and thermal energy by biogas plants on the one hand and its provision to local tourism facilities via short distance networks on the other. Basing on surveys and qualitative empiricism and considering regional resource availability as well as socio-economic aspects, it thus examines strengths, weaknesses, opportunities and threats that can arise from such a cooperation.**

Keywords: biogas plants, tourism, integrated energy, short distance networks, SWOT, cooperation

I. INTRODUCTION

To consider climate change mitigation as well as adaption within one climate-effective sector, tourism must be looked at in combination with its high energy requirements, i. e. electricity, heat and fuels. The continuous use of fossil energy sources is directly linked to climate change. With 47%, the energy sector primarily contributes to increasing the highly climate-effective gas CO2 in the atmosphere. Even though worldwide interventions of mitigating climate change spread continuously, greenhouse gas emissions raise by 2,2% per year [1].

Generally, the supply of energy and particularly of heat in tourism is based on fossil sources. In some destinations however, the development of renewable energies is quite dynamic. Several hotels for instance transfer to green energy providers or implement wood chips heating and solar energy systems [2].

The development of renewable energies in tourism regions is not only limited by regional resource availability. In rural areas, tourism stakeholders can play a key role within social networks due to their economic significance. They – amongst others – are able to strongly influence communal energy concepts. Tourist stakeholders in destinations that are strongly linked to the experience of nature will naturally reject most forms of landscape impairment, such as wind energy plants or solar parks. Concepts promoting renewable energies should hence be congruent with the stakeholders of a particular region. Joining an alliance with local power plants could be an innovative mean for tourist facilities to re-regionalize their energy supply, save costs and promote an eco-friendly image.

In Germany, due to political promotion subsidies as well as agricultural availability, biogas plants are relatively widely spread [3]. Biogas offers the possibility of producing both electrical and thermal energy highly efficiently. But despite its potential within the transformation of an energy system towards more renewable energies, the biogas branch faces an uncertain future. The main reason for this lies within the temporal limitation of the German renewable energy law (EEG: Erneuerbare-Energien-Gesetz). This law played a major role in encouraging the development of biogas plants in Germany [4]. With its termination after usually 20 years, proprietors of biogas plants must decide to continue operating their plant under market economy conditions or to (preliminarily) shut it down.

II. FOCUS OF RESEARCH

To face this problem, this research approach analyses potential short distance networks between energy consumers in tourism and biogas plants that are located within a five kilometre radius. Key aspect is the all-season energy and especially heat demand tourism facilities display.

Strengths, weaknesses, opportunities and threats of this form of collaboration are identified. While focusing on the stakeholders involved, solutions to possible impediments or conflicts of interest are evaluated. Geographically this study focuses on the Black Forest as a typical German low mountain range. The Black Forest is a frequently requested tourist destination facing climate change on several levels. On the other hand, this region offers a high density of biogas plants, being particularly located in the north and east of the Black Forest. Favouring a joint purchase of energy, tourist stakeholders on the one hand can be enabled to realise an economy-priced and long-term energy supply. By strengthening their green image they could also generate further market shares in this highly competitive branch [5, 6].

On the other hand, the characteristics of tourism´s heat demand is met by the interest of biogas stakeholders to sell their product throughout the entire year. Proprietors of biogas plants would have more planning security and diversify their economic foundation [7, 8]. Implementing this form of co-

Ministerium für Umwelt, Klima und Energiewirtschaft
Landesanstalt für Umwelt, Messungen und Naturschutz

operation would contribute to re-localising regional value chains and support local cohesion.

There are numerous studies analysing tourist energy demands. According to a study by the University of Wuppertal, Germany, hotel´s energy needs for instance make up for 136 kWh per m^2 for heat and 72 kWh per m^2 for electricity per year. Heat supply usually means the space and water heating as well as process heat in the kitchen etc. [9] Energy needs usually correspond with the individual amenities of tourist facilities. Naturally, they are reflected in the corresponding energy costs, accounting for up to almost 8% of turnover [2] and [10]. The correlations between tourism and climate change [11] and [12], energy and climate change [1] as well as energy and tourism [9], [10], [13] have been scientifically examined to a great extent. There are however very few analyses combining tourism and climate effectiveness with the energy subject.

This integrated research approach contributes to filling this gap by analysing the reciprocal effects within this triad. It aims at finding answers to the following central questions:

- Focusing on its highly climate affective energy demands, how can the Black Forest tourism implement effective means and mitigate climate change?
- What are the characteristics of current heat supply in Black Forest tourism? Are renewable energies a part of local heat (and electric energy) supply?
- Are touristic stakeholders aware of climate effectiveness of energy sector? Are they open-minded to innovative energy strategies and willing to implement corresponding concepts?
- Are the proprietors of biogas plants motivated to invest in repowering of their plants and ally with tourism?
- What are the fundamental obstacles, what aspects facilitate expansion of short distance networks supplied by renewable heat?

Building on the status quo, options to improve regional energy supplies by increasing biogas plant efficiency are determined. Accordingly, this approach contributes to climate change mitigation by promoting renewable energies – particularly biogas – in tourism.

III. METHODOLOGY

To methodically approach this subject, a variety of empirical and non-empirical methods was used.

In the context of secondary data collection, the scope of the investigated study region – the Black Forest – is defined according to the physio-geographical specifications by the LUBW (Landesanstalt für Umwelt, Messungen und Naturschutz Baden-Württemberg) [14]. Heat consuming objects within this region were collected and localised. These objects include swimming pools, thermal baths, laundry service facilities supplying tourism and accommodations such as hotels. With regard to the definition of the accommodation´s energy demands the decisive criterion is an award of hotel stars The award is based on parameters indirectly indicating high or low energy demands. For example, indicators would be room furnishings, hotel features, service offers, catering etc. [15]. The objects were located via GIS-analysis. The corresponding biogas plants were identified in relation to the tourism objects within a radius of five kilometres.

Within the scope of primary data analysis, quantitative as well as qualitative empiricism has been applied. A survey amongst proprietors of biogas plants has been conducted, focusing on efficiency of their waste heat usage, energy supply strategies and their interest in feeding short distance networks. Furthermore, a corresponding survey of stakeholders in tourism has been sent out. Current heat supplies and the interest in joining the described co-operation were addressed [16] [17]

In order to substantiate quantitative findings, qualitative interviews will be conducted [18] [19]. Possible interview partners would have detailed knowledge within the fields of tourism, biogas, regional planning or politics for instance.

IV. PRELIMINARY RESULTS

First results indicate tendencies towards an increased use of renewable energies in Black Forest tourism. As expected, this means basically wood chip heating and the installation of photovoltaics and solar thermal energy [20]. Occasionally efforts towards energetic self-sufficiency are made [21].

The certification of several accommodations by the Eco-Management and Audit Scheme (EMAS) point to a certain environmental sensitivity in Back Forest tourism. However, this does not constitute an extensive trend [22].

The empirical results give insight into fostering and impeding factors of creating co-operations between biogas and tourism and of implementing local heat networks.

In regard to secondary data analysis, 105 hotels, 37 swimming pools and thermal baths and 17 laundry service facilities were collected and localised. In relation to that, 43 biogas plants were collected, 37 of which could be contacted within the scope of the survey.

The response rate of over 56% shows a high interest towards the subject. It was established that many biogas plants in the Black Forest have already implemented means to utilize waste heat. This status quo can certainly be seen as a strength in promoting renewable energies in tourism.

On average biogas plants produce 1,644,280 kWh heat p. a., with a broad individual range between 52.000 kWh and 4.4 million kWh per year. Concepts for short distance networks should thus be elaborated individually, counting as a weakness within this analysis. Since waste heat is mostly used for the heating of own residential and farm building, it is usually free of charge. This however is the clue to an economically sustainable strategy. An opportunity lies within the adequate charge of this top quality product. Other purposes are for the heating of other homes, municipal building like schools and community houses, or as process heat for industrial usage. The supply to tourism facilities seems to be new ground, indicating the need for common initiative and entrepreneurial drive. Almost 60% of the respondents declare their interest in feeding a local heat network that is mainly used by tourist objects. Opposing this strength, obstacles to do so are primarily unstable political frameworks, a lack of communal support and little financial incentives. Of these aspects, only some can be addressed and changes stimulated.

In order to countervail these empirical findings, a survey amongst tourism stakeholders has been conducted. Since it is currently open, results are still due. However, empiricism so far has underlined the potential of promoting renewable heat as well as electrical energy in tourism.

V. Conclusion

In order to face climate change on various levels, this approach focuses on the reciprocal effects between the tourism and energy sector. Aiming at improving tourism´s and tourist´s influence on climate change, it thus evaluates practical means to promote renewable energies in tourism. First results indicate to corresponding activities both on the side of the tourism and the energy sector respectively the biogas branch. A successful implementation of local heat networks focusing on objects in tourism could set an example. As the produced energy can also be used for cooling, the concept could easily be transferred to other regions and climate zones.

Obviously though, the implementation of this particular concept so far is focused on West European conditions. The concept benefits from conducive circumstances like high availability of biomass, stability of the rights of land owners as well as infrastructural and social conditions.

Scientific research within this project has not been completed yet (expert interviews, final feasibility study). Thus, final results have yet to be published.

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