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The Synergies of Community Ownership, Renewable Energy Production and Locality – The Cases of Güssing and Samsø

Abstract

In order to mitigate the consequences of climate change and to reduce energy dependency, new key words of energy planning are local renewable energy sources and energy autonomy. However, renewable energy projects should be implemented in a fast, successful, but also beneficial way for the locality. This paper presents the concept and the main forms of community ownership. According to our hypothesis, the presence of community ownership generates numerous additional benefits for the local economy, society and renewable energy development. Analysing the literature and the cases of Güssing, Austria and Samsø, Denmark help to recognise how to promote a successful local renewable energy project and what kind of additional benefits may be earned by applying the appropriate ownership model and project outline. Community ownership, compared to local ownership forms, can generate a higher level of citizen participation, acceptance of renewable energy projects and change in lifestyle.

Key words

Community ownership; Renewable energy; Local benefits; Güssing; Samsø

1. Introduction

In recent years, the urgent need for a radical change in lifestyle and consumption patterns of the so-called 'developed' countries has been scientifically proven (INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, 2007; STERN, N. 2007; MOTESHARREI, S. *et al.* 2014). One of the main problems causing numerous global and local issues, such as decrease of biodiversity, disappearing habitats, climate change, health damage, political conflicts, etc., is the quantity and quality of current energy production and consumption. Regarding quantity, a radical decrease is needed to reach a sustainable level of energy production and consumption through higher efficiency and sufficiency. In case of quality, an urgent shift from fossil to renewable energy sources would enable to fulfil the real human energy needs with tolerable environmental impacts (INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, 2014).

It is important to notice that these changes cannot be fully realised by focusing only on the energy sector. Moreover, to reach truly sustainable solutions, all three pillars of sustainability—environmental, social and economic—have to be considered, from which social and ecological are often underrated. Meanwhile, contextual settings, like the socio–economic framework—including values, political will, level of democracy, legal settings and regulations, etc.—has to be altered to promote and ensure a thorough and rapid change to sustainable energy systems (MENDONCA, M. *et al.* 2009).

The change of dominant energy sources were also slower processes in history, taking around 50 to 60 years in case of coal or oil, and, presumably, renewable energy sources would not be exceptions from this trend (SMIL, V. 2014), if socio–economic framework were still unnoted and unaltered. Furthermore, planning and implementing renewable energy projects within the same settings can even hinder the spread of sustainable solutions. Renewable energy projects carried out by profit-oriented large companies, without proper relationship with the local residents can cause the so-called NIMBY (Not in My Back Yard) phenomenon (DEAR, M. 1992; BURNINGHAM, K. *et al.* 2006). It arises local resistance towards renewable energy investments which makes the

spread of renewables even more difficult and moderated, as it occurred in many situations e.g. in the *United Kingdom* or the *Netherlands* (CASS, N. – WALKER, G. 2009; SCHREUER, A. – WEISMEIER-SAMMER, D. 2010; WARREN, C. R. – MCFADYEN, M. 2010).

However, in other countries like *Germany* or *Denmark*, a widespread and explosive development of renewable energy technologies and production has been experienced. Behind these processes, a high level of residential acceptance of renewable projects (and renewable energy sources in general) was pointed out (BROHMANN, B. *et al.* 2007; WARREN, C. R. – MCFADYEN, M. 2010; MUSALL, F. D. – KUIK, O. 2011). By numerous successful examples, local community ownership was found as a key factor (SCHREUER, A. – WEISMEIER-SAMMER, D. 2010).

According to the author's hypothesis, community ownership is a missing link from the international practice of renewable energy projects, providing sustainable local socio–economic settings related to renewable energy sources, thus creating a sustainable local framework of energy production. Probably this is not the only solution, but one of the most successful operable ones. Therefore, the aim of this paper is to give an insight into community ownership and its significance in renewable energy production and local benefits through the examples of *Güssing* and *Samsø*.

2. Aims and research methods

The aim of this paper is to investigate the significance of community ownership in renewable energy projects in order to create local sustainable energy solutions while maximising benefits for the locality. Therefore, the following research questions have to be answered:

- How can community ownership spread the use of renewable energy, hastening energy transition of localities?
- What benefits can be earned by the locality from community ownership and how can they be maximised?
- What are the key factors of successful community renewable energy projects?

To find answers for these questions, the research work was based on two main methods: literature review and analysis of two case studies.

Regarding literature research, a broad spectrum of review papers and case studies were processed connected to community ownership or community energy projects. They were mainly originated from Europe, focusing on the *United Kingdom*, *Denmark*, *Germany* and *Austria*.

For the case studies, *Güssing (Austria)* and the island of *Samsø (Denmark)* were chosen as successful local renewable energy projects, but each with different community ownership solutions. Besides scientific reports, papers and studies, also the international and local media (news, articles, and websites) were investigated; furthermore, study trips were carried out.

Samsø was visited in May of 2011, where several interviews were carried out with the members of *Samsø Energy Academy*. The interviews were made by two working groups (including the author) of the *Sustainable Energy Planning and Management MSc Program* of *Aalborg University*, *Aalborg*, and partly published by CANET, A. *et al.* (2011).

Two interviews were carried out (and recorded) in November of 2012 in *Güssing* with *Katalin Bődi*, Project Coordinator of *Renewable Energy Centre* (in Hungarian), and *Peter Vadasz*, mayor of *Güssing* (in English). The interviews were made by the author and *László Magyar*, who published the interview questions and partly the answers in his MSc thesis (MAGYAR, L. 2013).

The following chapter clarifies the main concepts of this paper.

3. Theory – community ownership

Since various conditions can be laid down depending on different geographical places (countries), interest groups and time; and also community ownership forms have different models; the definition of community ownership varies by literature and projects. The definition of 'community ownership' used in this paper was outlined by a review of various approaches, presented in the following sections.

3.1. Community and community energy

An often applied definition by WALKER, G. (2008) distinguishes 'communities of interest' and 'communities of localities'. In the first case, the members of a community are living geographically dispersed, for example as individual investors of a renewable energy project. 'Communities of localities' refer to people living in a certain geographical area, which may know each other, but may have diverse interests as well.

TAKÁCS-SÁNTA, A. (2012) argues that (ecological) local small communities could play a key role in forcing bottom-up sustainable transitions. Besides locality and shared interest, he emphasises frequent personal interaction and joint actions for common aims. Since these communities are in fact companionships, he maximises their geographical scale up to micro-regions.

As this paper's aim is to find the way how locality can benefit from renewable energy production and community ownership, it is important to present the concept of 'community energy' as well. According to the DEPARTMENT OF ENERGY & CLIMATE CHANGE (2014) of the *United Kingdom*, community energy means "projects or initiatives shared an emphasis on community ownership, leadership or control where the community benefits". WALKER, G. – DEVINE-WRIGHT, P. (2008) suggest a method to further define the term community energy project through two dimensions of it: process (who develops and runs the project, or who has control or influence over it) and outcomes (who, and in what geographical and social distribution does gain the benefits of a certain project). They define 'ideal' community energy project as one being fully led by local people (open and participatory process) and where all benefits are gained by the local community (local and collective benefits). The other extreme is closed and institutional in process where the benefits are mostly distant and private, which are usual characteristics of conventional renewable energy investments of large companies.

On the basis of the above mentioned, and considering the aim of maximising the benefits of a locality from renewable energy projects,

the word 'community' will imply in this paper all residents living in a certain locality (settlement or micro-region) who may be affected and benefited from a certain renewable energy project. All residents influenced by a local renewable energy project can take an active part in the process of a project as a member of a small local community or have a passive role just in gaining benefits.

In this paper, the term 'community energy' means renewable energy project led by a local, small community. The word local is significant besides community since it can ensure the environmental sustainability of a project. Local people are more likely to know and appreciate local values and resources and plan for long-term utilisation solutions for the community rather than short-term individual financial benefits. Moreover, as the social side of sustainability, a project should empower participation and activity of local residents where the collectiveness of benefits is as wide as possible. To meet these requirements, besides to an appropriate project design, a suitable ownership form has to be chosen. In particular, the existence of local investors does not ensure the local spread of benefits of a renewable energy project (e.g. local farmers can buy wind turbines individually). As WALKER, G. (2008) points out regarding local communities, different community ownership forms can ensure different degrees of inclusiveness and collectiveness.

3.2. Renewable energy ownership forms and community ownership models

Before the introduction of the possible community ownership models, the dominant ownership forms are shortly presented by countries—namely *Denmark*, *United Kingdom* and *Austria*—with particular regard to geographical (socio– cultural) contexts such as national specialities and success factors.

In *Denmark*, most of the wind turbines are owned by local residents, communities, farmers or landowners (DEPARTMENT OF ENERGY & CLIMATE CHANGE, 2014). In the middle of the 1990s 80% of the wind power capacities were built by citizens-led projects and only 20% by

conventional power companies. In 2004, more than 150,000 people were members of wind co-operatives in *Denmark* (BIRCHALL, B. 2009 cited in BUTLER, J. – DOCHERTY, 2012).

This high level of public participation originates in cultural and historical reasons. Next to the Danish traditions of forming co-operatives, there was a strong anti-nuclear and alternative energy movement in the 1970s, where the topic of renewable energy, energy autonomy and local ownership were discussed (LUND, H. 2010). The innovative technical and also ownership solutions, therefore the integrated spatial planning, the learning-by-doing attitude and the bottom-up strategy were also important factors of success (SCHREUER, A. – WEISMEIER-SAMMER, D. 2010).

The Danish legislation also favours locally owned renewable energy development. The new *Renewable Energy Act* of 2009 (DANISH PARLIAMENT, 2009) includes four new schemes supporting local renewable energy initiatives, from which the option-to-purchase scheme should be highlighted. This scheme states that when a more than 25 m high wind turbine is erected, the investor is obligated to offer at least 20% of the shares to the local (living maximum 4.5 km from the site) residents or the affected municipality (DANISH ENERGY AGENCY, 2014). Furthermore, *Denmark* has a very successful feed-in tariff system, and a strong and wide political will on the side of renewable energy development—including an official governmental plan of a 100% renewable-based energy strategy by 2050 (DANISH GOVERNMENT, 2011).

However, the trend of the dominating community-owned wind turbines seems to change, because since 1995, the majority of repowering and new wind turbines installed are owned by individuals and energy companies (DANISH ENERGY AGENCY, 2009) in different partnership forms (DEPARTMENT OF ENERGY & CLIMATE CHANGE, 2014). These wind turbines are usually larger both in size and capacity—and, therefore, also more expensive—reaching a size which is not affordable to local cooperatives any more (SCHREUER, A. – WEISMEIER-SAMMER, D. 2010).

In the *United Kingdom*, corporative ownership dominates the renewable energy sector. Since an early political choice supported large-

scale renewable energy investments and local energy activism had weak traditions, small companies or community ownership forms could not be involved in renewable energy projects (SCHREUER, A. – WEISMEIER-SAMMER, D. 2010). Furthermore, due to the large investments from outsider companies with projects providing a low level of communication and local influence, the NIMBY effect often emerged (MUSALL, F. D. – KUIK, O. 2011). Even in the last decades, unfavourable legislation, lack of tax incentives or cooperative law set back the development of community energy projects (SCHREUER, A. – WEISMEIER-SAMMER, D. 2010).

However, since 2000, the government of the *United Kingdom* has actively started to encourage and support community energy initiatives through numerous support schemes, funding programmes and communication about community energy benefits (WALKER, G. 2008; COMMUNITY POWER, 2013; SEYFANG, *et al.* 2013). Since that, more than 500 ongoing or completed projects were recognised in the *United Kingdom* at the end of 2004 (WALKER, G. 2008). These initiatives form effective networks, especially in *Scotland* where numerous organisations support the development of community renewable energy production (BUTLER, J. – DOCHERTY, P. 2012; HARNMEIJER, A. *et al.* 2012; CARSS, R. 2013). A significant further boost can be expected from the first *Community Energy Strategy* of the *UK*, published in January 2014 by the DEPARTMENT OF ENERGY & CLIMATE CHANGE (2014).

The most usual community ownership forms in the *United Kingdom* are co-operatives (especially for small-scale hydroelectric power projects), community charities, development trusts (particularly in *Scotland*) and shares owned by a local community organisation (WALKER, G. 2008; WALKER, G. – SIMCOCK, N. 2012).

The development of community energy in *Austria* has been significantly driven by biomass projects, namely BDH (biomass district heating) systems from the 1980s. The emergence of the BDH systems was a result of local initiatives of rural areas and the policy aim to support agriculture and forestry (MADLENER, R. 2007). Therefore, capital grants,

loans and know-how were ensured for co-operatives, typically organised by farmers (SCHREUER, A. – WEISMEIER-SAMMER, D. 2010).

In the field of wind energy, the GmbH & Co. KG (a private limited partnership with a limited liability company) model and private investor-owned wind portfolio companies are typical, similarly to *Germany* (SCHREUER, A. – WEISMEIER-SAMMER, D. 2010).

In the above examples, according to different geographical, socio–economic and cultural settings, a wide variety of ownership models can be found in the renewable energy sector. The main dimensions of differences are: individual or collective investors; community of interest or locality; producing energy for feed-in (electricity) or for local consumption (heat); scale of investment; full control over a project or just participation through shares; full ownership or co-ownership with a professional investor; and sense of ownership (TLT SOLICITORS, 2007; SCHREUER, A. – WEISMEIER-SAMMER, D. 2010; BUTLER, J. – DOCHERTY, P. 2012; CARSS, R. 2013).

However, focusing on ownership forms providing renewable energy development and benefits for the locality, three main groups of ownership forms can be drafted.

1. Purely community-owned ownership forms: co-operatives; public limited companies; community charities; development trusts, etc.
2. Partly community-owned ownership forms: community ownership of certain turbines or shares; community investment in joint venture; public limited company enabling shares of large, professional investors, etc.
3. Local ownership forms: shares or ownership of local authorities; of local municipality; farmers; local small businesses, etc.

Compared to the first, the 'ideal' group of fully community-owned local renewable energy projects is usually led by local small communities; the second group may partly be open for larger, for-profit investors, while the third shifts to more institutional or even individual, but still local ownership forms. The reason why all these ownership forms

are considered here as community ownership forms is that fully community-owned projects are in several cases not possible, suitable, viable or feasible (yet). On the one hand, cooperatives and other community-owned projects have numerous barriers (mainly depending on countries) like access to capital, access to suitable land, lack of awareness and recognition of these ownership models and their benefits (e.g. by authorities or banks), associations with 'socialist' images in *Eastern European* countries, etc. (HUYBRECHTS, B. – MERTENS DE WILMARS, S. 2014). On the other hand, co-operative ownership is not a universal solution for every case. In larger projects, the requested capital cannot be gathered by the local community, therefore inviting investors or creating partnerships can enable to finance the project. Besides the capital, professional experience in technology and project management, co-operative ownership form is more known and acceptable also from the aspect of banks. This can be an advance for commercial partners, if the community can ensure not to shift towards a for-profit direction, where some community benefits can be lost (HUYBRECHTS, B. – MERTENS DE WILMARS, S. 2014). While the ownership forms of the third (local ownership forms) group do not ensure several benefits which could be offered by stronger local communities, locality still provides more benefits (e.g. because of local incomes and supply chains) than conventional investments coming from outsider companies. Also, in some cases where the small local community is a part-owner only, numerous benefits can be ensured through this way, as well; furthermore, some authors highlight the importance of sense of ownership rather than the actual legal form of ownership (SCHREUER, A. – WEISMEIER-SAMMER, D. 2010; WARREN, C. R. – MCFADYEN, M. 2010). However, it can be said that the success of a project, the spread of the benefits and the satisfaction of the participants are depending both on the ownership model and the project design and implementation.

3.3. Benefits of community ownership

Producing community energy, especially in a fully community-owned form creates much more, than just electricity or heat. Compared to a

commercial renewable energy investment by a large outsider company, community-owned energy production changes the local socio–economic context in a way that it develops the locality, strengthens local community and promotes the further use of renewable energy sources. Although, these benefits can usually have multiple effects, in the followings, a collection of the possible benefits of community-owned energy production is listed by effects on sustainability and renewable energy production, locality and the local community.

3.4. Benefits for renewable energy production and sustainability (environmental benefits)

- Creating acceptance by the local community for a project. The 'community' label makes the project easier to implement and problems might be solved faster (WARREN, C. R. – MCFADYEN, M. 2010; MUSALL, F. D. – KUIK, O. 2011; HARNMEIJER, A. *et al.* 2012; WALKER, G. – SIMCOCK, N. 2012).
- Creating awareness in environmental issues such as renewable energy sources and local values (WALKER, G. – SIMCOCK, N. 2012). This may cause acceptance and support of further renewable energy projects (WARREN, C. R. – MCFADYEN, M. 2010; HARNMEIJER, A. *et al.* 2012; COMMUNITY POWER, 2013; DEPARTMENT OF ENERGY & CLIMATE CHANGE, 2014; HUYBRECHTS, B. – MERTENS DE WILMARS, S. 2014).
- Raising awareness about (energy) consumption patterns and the individuals' daily life (WALKER, G. – SIMCOCK, N. 2012). Furthermore, the members of a community usually accept more easily the advices from their own community regarding energy consumption and lifestyle (TAKÁCS-SÁNTA, A. 2012; COMMUNITY POWER, 2013; HUYBRECHTS, B. – MERTENS DE WILMARS, S. 2014).
- Decreasing energy consumption (WALKER, G. – SIMCOCK, N. 2012). Several renewable energy co-operatives helped their consumers to reduce their overall energy consumption; some of them were able to reduce it by 20–30% (COMMUNITY POWER, 2013; HUYBRECHTS, B. – MERTENS DE WILMARS, S. 2014).

- Decreasing CO_2-emissions of the community (WARREN, C. R. – MCFADYEN, M. 2010; RAE, C. – BRADLEY, F. 2012; COMMUNITY POWER, 2013).
- Creating innovative solutions and piloting new approaches. Communities can set diverse examples to other communities about innovative solutions in project management, ownership forms, renewable energy integration, smart metering and new technologies, etc. (HARNMEIJER, A. *et al.* 2012; DEPARTMENT OF ENERGY & CLIMATE CHANGE, 2014).

3.5. Benefits for the locality (economic benefits)

- Generating local income. Local ownership forms help to return investments in a number of ways, e.g. selling the electricity that is produced (HARNMEIJER, A. *et al.* 2012; WALKER, G. – SIMCOCK, N. 2012; COMMUNITY POWER, 2013; LI, L. W. *et al.* 2013).
- Creating local employment. The installation and maintenance of the energy producing unit as well as project management or providing local sources from agriculture or forestry increase the number of local jobs (RAE, C. – BRADLEY, F. 2012; BUTLER, J. – DOCHERTY, P. 2012; WALKER, G. – SIMCOCK, N. 2012; DEPARTMENT OF ENERGY & CLIMATE CHANGE, 2014).
- Regeneration of local economy. Spending extra income and taxes on local goods and services can also boost the local economy (WALKER, G. – SIMCOCK, N. 2012).
- Providing cheaper and more reliable energy. This can help on areas suffering from energy or fuel poverty (BUTLER, J. – DOCHERTY, P. 2012; RAE, C. – BRADLEY, F. 2012; COMMUNITY POWER, 2013; DEPARTMENT OF ENERGY & CLIMATE CHANGE, 2014; WALKER, G. – SIMCOCK, N. 2012).
- Mobilising non-market resources (HUYBRECHTS, B. – MERTENS DE WILMARS, S. 2014).
- Creating eco or energy-tourism in an area with visitor facilities (WARREN, C. R. – MCFADYEN, M. 2010; BUTLER, J. – DOCHERTY, P. 2012; LI, L. W. *et al.* 2013).

3.6. Benefits for the local community (social benefits)

- Strengthening community cohesion and deepening local social capital (WALKER, G. – SIMCOCK, N. 2012; COMMUNITY POWER, 2013; DEPARTMENT OF ENERGY & CLIMATE CHANGE, 2014). The participants of a project get to know each other and work for a common aim which can generate further successful co-operations as well.
- Local control. The local community is able to influence the site, scale and other characteristics of a local project (WALKER, G. 2008; DEPARTMENT OF ENERGY & CLIMATE CHANGE, 2014) in a democratic decision-making process (HUYBRECHTS, B. – MERTENS DE WILMARS, S. 2014) which can ensure a higher level of satisfaction of the participants.
- Increasing community engagement and participation (RAE, C. – BRADLEY, F. 2012).
- Strengthening local identity of the community; building pride in them (WARREN, C. R. – MCFADYEN, M. 2010; MUSALL, F. D. – KUIK, O. 2011; LI, L. W. *et al.* 2013).
- Engendering trust in the project and the stakeholders (HUYBRECHTS, B. – MERTENS DE WILMARS, S. 2014).
- Developing new skills and self-confidence (DEPARTMENT OF ENERGY & CLIMATE CHANGE, 2014). Project participants of the community—and also from a wider circle—may improve their project management, communication, etc. skills regardless age or education.

4. Practice – case studies

To present how the theories of the above mentioned work in practices, two case studies are presented in this chapter: initiatives on the island of *Samsø* in *Denmark*, and the district of *Güssing* in *Austria*. Both initiatives are internationally known examples as of successful projects, reached through different ways.

4.1. Samsø

Samsø (Figure 1) is a 26 km long and 7 km wide island situated in the *Kattegat*, close to the geometric centre of *Denmark* with a decreasing population of 4000 local residents, traditionally living from farming and tourism (ANDERSEN, T. R. *et al.* 2013). In 1997, the *Danish Ministry of Energy* announced a competition for the most realistic plan for a 100% renewable energy self-sufficiency strategy of an island, to be realised in 10 years (ANDERSEN, T. R. *et al.* 2013). *Samsø* won the competition, winning around one million Euros for preliminary studies and project materials (JØRGENSEN, P. J. *et al.* 2007).

Figure 1 – The situation of Samsø in Denmark and in Europe.
Edited by SÁFIÁN, F. (2014)

Søren Hermansen, an environmental studies teacher undertook the leadership of the project, and later became the director of the *Samsø Energy Academy*, established in 2006. He put a huge effort to reach and activate local citizens through numerous local meetings, discussions, later seminars about renewable energy options, while the popularity, trust and interest were growing regarding the project. Soon after the

start, energy cooperatives, local energy companies, *the Samsø Energy Company* (from 2005: Agency), and *Samsø Energy and Environment Office* were established (JØRGENSEN, P. J. *et al.* 2007; RADZI, A. 2009).

Several energy saving programs were launched. Regarding heat consumption, five programs were run including renovation grants for pensioners, free energy appraisals, demonstration of alternative insulation materials made by local carpenters, etc. Electricity saving programs promoted several energy saving options and applications and to change electrical heating to other solutions. Despite the huge efforts, however, between 1997 and 2005, heat consumption increased by 10%, while electricity consumption stagnated (JØRGENSEN, P. J. *et al.* 2007).

Next to the existing district heating plant in *Tranebjerg*, three new systems were established, often with the help of extremely active local groups initiating new plants, collecting new consumers, and several times changing the details of the original master plan. The new plants are based on locally produced renewable energy sources: straw, wood chips and solar heat. One is owned by the energy utility company *NRGi*, one by its consumers in a cooperative ownership (run by a cooperative association including members of the company and consumers elected by the municipality and the consumers) and one by a local energy company (run by a local committee consisting of members of the company, the consumers and an island council member). In the case of the latter two, changes of heat prices are approved by the municipal council, providing the lowest heat prices on the island (JØRGENSEN, P. J. *et al.* 2007; RADZI, A. 2009; ANDERSEN, T. R. *et al.* 2013).

In order to produce the island's electricity needs from local renewable energy, 11 on-shore wind turbines were erected in 2000, each of 1 MW. The project has a wide local acceptance due to the option of local ownership. Finally, 9 turbines are owned by local farmers and two of them by a cooperative of 450 local residents (JØRGENSEN, P. J. *et al.* 2007; ANDERSEN, T. R. *et al.* 2013). To offset the transportation's mainly fossil energy consumption, 10 offshore wind turbines were planned 3.5 kilometres away from *Samsø* of a total of 23 MW. The mu-

nicipality owns 5 turbines, 3 was bought by large investors, and the last two is owned by small local investors through 1,500 shares in two companies (JØRGENSEN, P. J. *et al.* 2007).

Since the aim of 100% self-sufficiency based on (mostly local) renewable energy sources had already been fulfilled by 2005, the overall project is considered to be successful—even if it means only an offset of fossil energy use of some sectors. The district heating systems provide 43% of the heat consumption and approximately half of the all-year houses invested in renewable energy applications for heat production. While some parts of the master plan failed to be realised, some initiatives in transportation and agriculture sector (e.g. farmer producing rape oil) were also successful. The average investment of the whole project was around 14,300 Euros (~11,414 GBP) per capita, from which public subsidies accounted for approximately 1000 Euros (~800 GBP), while an estimated 1300 Euros (~1,040 GBP)per capita remains on the island, previously spent on electricity or fossil energy sources (JØRGENSEN, P. J. *et al.* 2007).

4.2. Güssing

The town of *Güssing (Figure 2)* with around 4000 inhabitants is the capital of *Güssing* district (with an estimated population of 26,394 in 2014), situated next to the South Eastern boarder of *Austria*. Due to its peripheral situation and poor infrastructure, in the 1980s, this was the poorest district of Austria with high migration and unemployment rate and 70% of the workers commuting (VADASZ, P. – BŐDI, K. 2012). The economic situation of the town was very problematic: *Peter Vadasz*, town council member (later mayor of *Güssing*) and *Reinhard Koch* engineer pointed out, that as the largest expenditure *Güssing* spends 6 million Euros annually for importing electricity and fossil fuels, while this amount of money could remain locally. In 1990, the town council accepted their new policy proposal with the unconventional aim of starting a municipal business for local renewable energy production, aiming the phasing-out of all fossil fuel consumption in the long-term.

The transition process was accelerated when *Peter Vadasz* who was elected to the mayor of *Güssing* (MARCELJA, D. 2010).

Figure 2 – The situation of Güssing in Austria and in Europe.
Edited by SÁFIÁN, F. (2014)

Already since 1989, energy saving investments have been made in public buildings such as insulation, changing windows or implementing better monitoring and maintenance practices, actively communicated to the local residents. As a consequence, after a few years, energy expenses of the public sector decreased by 40–50% (VADASZ, P. 2012, VADASZ P. – BŐDI K. 2012).

When planning the transition to local renewable energy sources, local wood seemed to be the most significant energy source, since 45% of the district is covered with forests. To solve the problem of the fragmented forest parcels, 5200 forest owners established the *Forest Association of Burgenland (Burgenländischer Waldverband)* and signed

a contract with the municipality to deliver and process wood fuels for local energy production. Therefore, wood chips from local forestry and industrial wastes ensured cheap and local renewable sources for self-sufficiency (SIKOR, T. 2008).

In 1991, a biodiesel plant was opened from the initiative of the government of *Burgenland* in co-operative form, producing a larger quantity of biodiesel per year than the fuel consumption of the local transportation. In 1992, the first small district heating plant was built near to *Güssing* which was followed by dozens of similar biomass-based local district heating systems in the district. The initiatives were mostly led by the municipality, in some cases by local individuals or farmers, owned by co-operatives of local farmers or the municipality (EUROPEAN CENTRE FOR RENEWABLE ENERGY, 2011; SIKOR, T. 2008). Before these investments, information campaigns were carried out to present the advances of the district heating systems to the rather sceptical local residents. Furthermore, investors also tried to ensure heat demand by connecting public buildings and industrial consumers to the district heating system (VADASZ P. – BŐDI K. 2012). In 1996, the biggest CHP (combined heat and power) plant of *Austria* was built in *Güssing in terms of capacity*. It is owned by the municipality in 80% (BŐDI, K. *ex verb.* 2014.), supplying more than 600 households, all public buildings and existed and new companies in *Güssing*, creating more local job opportunities. In 2001, a new CHP power plant was built as the first in the world applying an *Austrian* innovation of the fluidised bed steam gasification technique, enabling to produce synthetic gas, liquid fuel or hydrogen. With the establishment of the *European Centre for Renewable Energy* in *Güssing*, further researches and experiments were encouraged, and also eco-tourism was generated from all over the world (MARCELJA, D. 2010; EUROPEAN CENTRE FOR RENEWABLE ENERGY, 2011). The investments were mostly financed and supported by the local municipalities, the state of *Burgenland*, after 1995 by the *European Union*, and since 2003, by *Austria* through new legislation favouring green electricity production (MÜLLER, M. O. *et al.* 2011).

The development of renewable energy in *Güssing* enabled to reach 71% of self-sufficiency in 2010 regarding private households, public buildings and industry. Without considering industry and services, since 2001, the town is producing more electricity, heat and fuel, than it consumes; gaining extra profit which is reinvested in renewable energy development. The annual net municipality income is more than 9 million Euros (£7.2 Million) from energy production, while energy sales reache 14 million Euros (£11.2 Million) per year (MARCELJA, D. 2010). Regarding the whole region of *Güssing*, the level of self-sufficiency was approximately 50% in 2006 (KOCH, R. *et al.* 2006, VADASZ, P. 2012). More than 50 new companies and 1,100 new jobs were created (MARCELJA, D. 2010). However, while energy production became local and renewable-based, there is no information about changes in consumption patterns of the residents, meaning that the renewable energy production is just offsetting the fossil fuel consumption, especially regarding transportation. Furthermore, bio fuel production and selling paused in *Güssing* due to financial barriers (BŐDI, K. 2014).

5. Discussion and Conclusion

Both of the case studies are considered as successful initiatives, having numerous characteristics in common. Both *Güssing and Samsø* are isolated areas in a geographical and/or socio–economical way, therefore focusing on local energy sources was obvious in their case. Problematic economic and social arrangements forced the local governments to invest in a fundamental change and participants to create innovative solutions. Both communities had a charismatic "local hero" who has been able to take over and see through the whole concept and manage different community interests, scepticism of citizens and conflicts between stakeholders. Also, they had a transparent and detailed plan, created with professionals, and well-communicated to the local people. Community ownership forms, supportive regulation environment and available funds also played an important role in the development process. These common things can be said to be keys of success of local renewable energy projects.

As a consequence, the gained benefits are also similar in the two localities: significant renewable energy production; cheaper energy (regarding district heating: by 30% in *Güssing*, according to RADZI, A. 2009), and more stable energy prices (in some cases decided by the municipality); impressive decrease in CO_2-emissions; keeping incomes and values locally; new jobs and enterprises; stronger local economy; innovative solutions; and eco-tourism.

However, there are also some important differences, from which the issue of the community ownership should be highlighted. Both projects were originally started as top-down initiatives. However, they partly evolved into several bottom-up actions locally, which were more widespread and more active in the case of *Samsø*. This may be a result of a higher level of communication and involvement of local people, encouraging them to take part in the planning, decision and implementation stages. The other reason is that in *Samsø* project developers ensured the opportunity for local residents not only to have influence on the project, but also to be owners of renewable equipment. This generated an essential element to ensure active participation and support: the economic interest of residents. In *Güssing*, mostly the municipality and local farmers' cooperative own the energy producing units, with a significant beneficial effect on the partners of the local fuel supply chains in the agriculture and forestry sectors. In *Samsø*, numerous households have shares in wind turbines, district heating power plants or individual renewable energy equipment. Therefore, they are more supportive and active regarding renewable energy investments and participation on community-related issues. Furthermore, forming small local communities (e.g. in form of organisations) through working on common aims can help to spread new ways of thinking, lifestyle and energy consumption efforts in the community (TAKÁCS-SÁNTA, A. 2012), which was the case in *Samsø* as well (RADZI, A. 2009). Therefore, it can be stated, that community ownership, renewable energy development, stronger local communities and participation of citizens are strengthening each other and the creation of further benefits for the locality.

According to the main groups of ownership forms presented in section 3.2, *Güssing* can be said to have rather local than community energy, while *Samsø* has good examples for fully or partly community-owned energy production. As it was discussed above, the most of the benefits are the same in both projects, since in the case of *Güssing*, a very transparent, well-communicated and opened project outline was created and implemented, with an effort to involve local citizens. However, this intention could have been more efficiently fulfilled with the application of community ownership.

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