Create Acceptance

Work package 2- Historical and recent attitude of stakeholders

Case 6:
Bioenergy Village Jühnde

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*C*ultural Influences on *R*enewable *E*nergy *A*cceptance and *T*ools for the development of communication strategies to promot*E* ACCEPTANCE among key actor groups

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Contents

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1. Introduction

This case study deals with a successful model of implementing the biomass for energy use. It briefly describes the most radical conversion from conventional to renewable energy supply ever happened in Western Europe in the last five years.

Whilst the first chapter of this paper gives the background and political framework of the biomass energy use in Germany, the following parts show the different steps from vision to implementation in the village of Jühnde which in the meantime called itself ‘Bioenergy Village’. This village has successfully implemented a connection rate of 70% of all households to the new biomass-supplied district heating grid.

Several dissemination activities of the basic idea and the technological concept have already been started.

2. Country overview: Energy in Germany with special focus on biomass

One of the German Federal Government’s key policy objectives is to achieve a sustainable energy supply (BMWA, 2005). Its main concern is to safeguard the energy supply of future generations while making allowance for both ecological objectives and economic growth. Germany is focussing on the phase out of nuclear power, the rational and economical use of energy, greater energy efficiency, and the expansion of renewable energies.

In the following, issues of energy efficiency and energy conservation are excluded, as they are described in another case study (OEKO, 2006).

2.1 Developments in overall energy supply

Since 1990 when East and West Germany were reunited, the primary energy consumption was slightly reduced, and some oil was replaced by natural gas. Renewable energies slowly developed, mainly from biomass, and wind (see following figure).

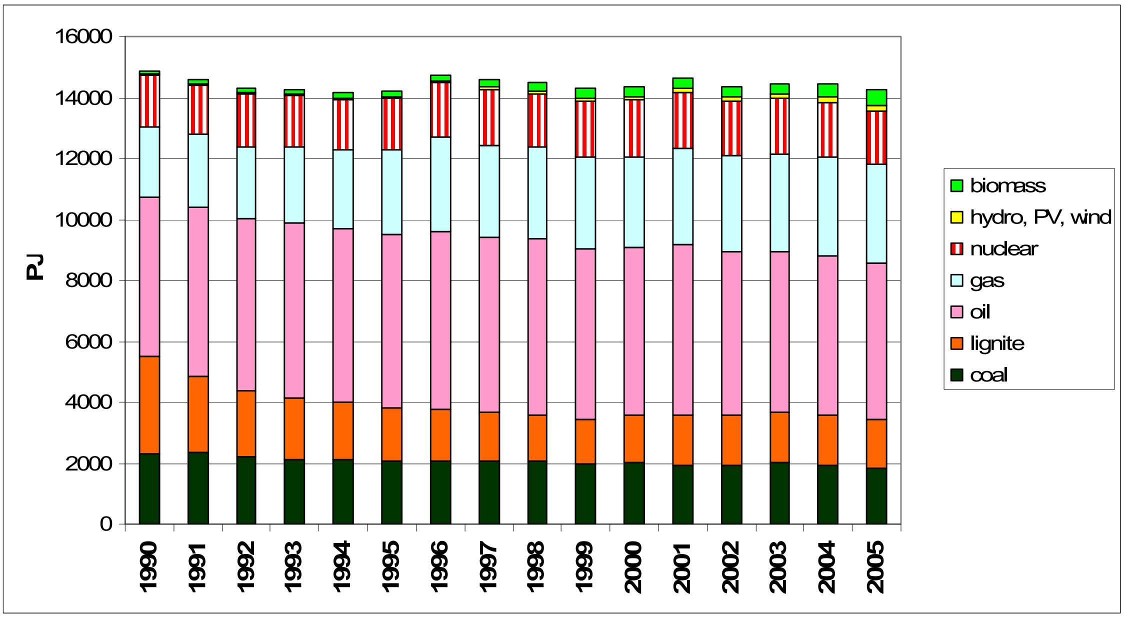

Figure 2.1 *Primary energy consumption in Germany, 1990-2005*
Source: StatBA (2006).

In parallel to the primary energy consumption, the final demand for energy carriers (end-energy) also was slightly reduced since 1990, but also lignite was replaced by natural gas, especially in East Germany.

2.2 Renewable energy sources in Germany

The Federal Government's campaign to promote renewable energy sources has proven enormously successful. Since the introduction of the Renewable Energy Sources Act (EEG) in 2000, electricity grid operators are obliged to purchase electricity generated from solar power, hydro power, wind power, geothermal energy and biomass, and to pay minimum rates (fixed feed-in tariffs) for it. The contribution of biomass has more than trebled, wind power has increased by almost fivefold and solar electricity has multiplied ten times. In the field of heat and transportation too, renewable energies have made substantial gains. In addition to the EEG there are other support and research programmes, like the Federal Market Stimulation Programme for the accelerated market introduction of renewables, financed by the revenue from the Ecological Tax Reform.

2.3 Renewable energy targets in Germany

The goals of the Federal Government are quite ambitious. As stated in Article 1 of the EEG, Germany is aiming to increase the proportion of electricity generated from renewables to at least 12.5% by the year 2010, and to at least 20% by the year 2020.

By 2050, at least half of Germany's primary energy consumption should come from renewables (BMWA, 2005). This will only be possible if at the same time energy is used far more efficiently.

2.4 Bioenergy

The use of biomass for energy in Germany is growing - but its share in primary energy consumption is still rather low, compared to other EU-25 countries, and to the EU average (BMU, 2006), but since 2000, the share of bioenergy in electricity, heat, and transport fuel supply is increasing rapidly.

2.5 Generation of electricity from biomass

Already the EEA before the 2004 amendment offered favourable conditions for generating electricity from biomass, mainly from wood residues and wastes in wood-processing industries, and from biogas. The increase since the EEA introduction was quite steep, as the following figure indicates.

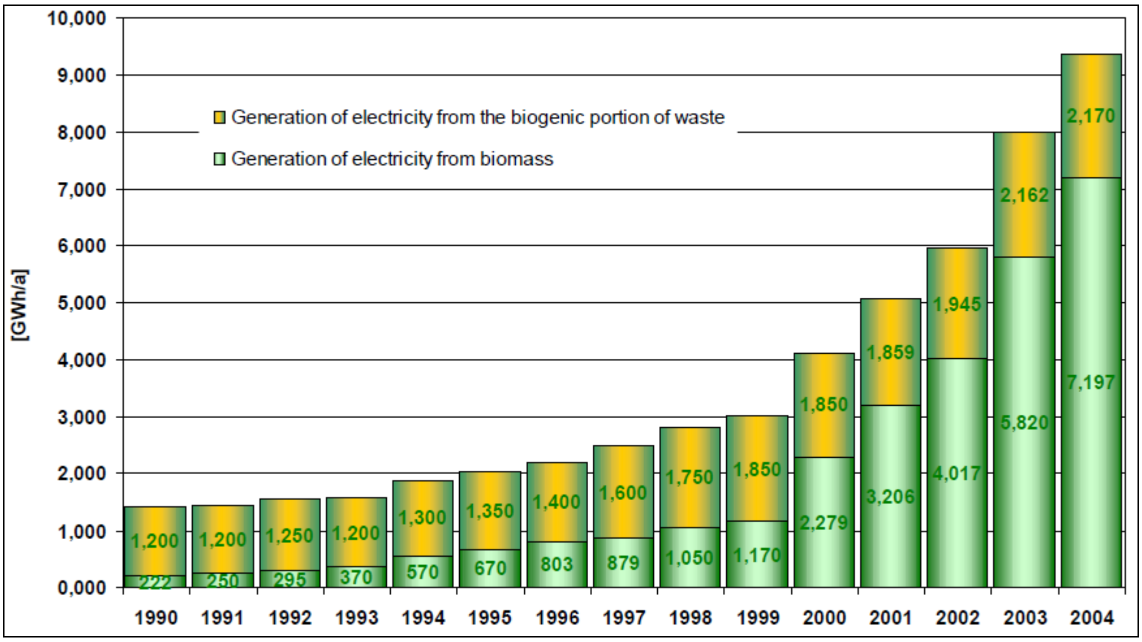

Figure 2.2 *Development of electricity from biomass in Germany, 1990-2004*
Source: BMU (2005).

In August 2004, a comprehensive amendment to the EEG came into force which further promoted electricity generation from renewable energy sources by improved feed-in tariffs, especially for systems which generate electricity from biomass:

- An output-related base rate of 8.4 to 11.5 €ct/kWh, depending on plant size.
- An additional bonus of 2.5 to 6 €ct/kWh for the exclusive use of unprocessed biomass from agriculture and forestry (renewable raw material = RRM bonus).
- An additional bonus of 2 €ct/kWh for cogeneration (combined heat and power = CHP bonus).
- An additional bonus of 2 €ct/kWh for innovative technologies (technology bonus).

This gives feed-in tariffs of up to 21.5 €ct/kWh for small biogas systems (see table).

Table 2.1 *Feed-in tariffs for biomass (EEG as of August 2004)*

installed capacity (electricity)	from biomass					from landfill gas, firedamp and sewage	
	Minimum/Basic payment		RRM bonus	CHP-bonus	Technology bonus[1)]	Minimum/ Basic payment	Technology bonus[1)]
	from 01.01.2004	for AIII-AIV as of 01.07.06					
up to 150 kW	11.5	3.9	6.0	2.0	2.0		2.0
up to 500 kW	9.9	3.9	4.0			7.67	
up to 5 000kW	8.9	3.9	2.5			6.65	
up to 5 000 kW	8.4	3.9	0.0			6.65	

[1)] The technology bonus mentioned in §8, paragraph 4, is only granted if the system is operated using combined heat and pow er generation, and if the pow er is generated by means of fuel cells, gas turbines, steam engines, Organic Rankine Cycle systems, multi-component mixture systems (particularly Kalina Cycle systems) or Stirling motors.

Source: EEG (2005); tariffs given in €ct/kWhel.

Since the EEG amendment, a rapid growth in biomass electricity is seen, especially from waste wood, and biogas - the latter mainly from bioenergy crops (maize), and manure. Since 2003, biomass electricity nearly doubled (see next table), and is expected to rise further.

Table 2.2 *Renewable electricity in Germany, 1990-2005*

	Hydropower[1)]		Wind energy[2)]		Biomass electricity[3)]		Biogenic share of waste, electricity[4)]	Photovoltaics		Geothermal electricity		Total electricity generation	Share of gross electricity consumption
	[GWh]	[MW]	[GWh]	[MW]	[GWh]	[MW]	[GWh]	[GWh]	[MW_p]	[GWh]	[MW]	[GWh]	[%]
1990	17,000	4,403	40	56	222	190	1,200	1	2	0	0	18,463	3.4
1991	15,900	4,403	140	98	250	N/A	1,200	2	3	0	0	17,492	3.2
1992	18,600	4,374	230	167	295	227	1,250	3	6	0	0	20,378	3.8
1993	19,000	4,520	670	310	370	N/A	1,200	6	9	0	0	21,246	4.0
1994	20,200	4,529	940	605	570	276	1,300	8	12	0	0	23,018	4.3
1995	21,600	4,521	1,800	1,094	670	N/A	1,350	11	16	0	0	25,431	4.7
1996	18,800	4,563	2,200	1,547	853	358	1,350	16	24	0	0	23,219	4.2
1997	19,000	4,578	3,000	2,082	1,079	400	1,400	26	36	0	0	24,505	4.5
1998	19,000	4,601	4,489	2,875	1,642	409	1,750	32	45	0	0	26,913	4.8
1999	21,300	4,547	5,528	4,444	1,791	604	1,850	42	58	0	0	30,511	5.5
2000	24,936	4,572	7,550	6,112	2,279	664	1,850	64	100	0	0	36,679	6.3
2001	23,383	4,600	10,509	8,754	3,206	790	1,859	116	178	0	0	39,073	6.7
2002	23,824	4,620	15,859	11,965	4,017	952	1,945	188	258	0	0	45,833	7.8
2003	20,350	4,640	18,859	14,609	6,970	1,137	2,162	333	408	0	0	48,674	8.1
2004	21,000	4,660	25,509	16,629	8,347	1,550	2,116	557	908	0.2	0.2	57,529	9.5
2005	21,524	4,680	26,500	18,428	11,394	2,192	2,050	1,000	1,508	0.2	0.2	62,468	10.2

Source: BMU (2006).

2.6 Heat generation from biomass

Besides the EEG-driven expansion of bioelectricity, the German Government's support schemes also fastened the development of biomass for heat production which rather stagnated since 2003 (see following table). To increase the market penetration, to reduce the system costs, and to improve the system cost-effectiveness of systems which utilize renewable energy sources, the Market Stimulation Program was introduced by the German government in 1999.

The promotion currently in place within the scope of this program provides for the following biomass support options in the heating market:

- Investment incentives for systems with automatic feeding of 8-100 kW for solid biofuels and log wood boiler systems of 15-100 kWth. The incentives take the form of grants, which are to be applied for at the German Federal Office of Economics and Export Control (BAFA).

- Investment incentives for systems with automatic feeding of more than 100 kW using mainly natural wood, by means of low-interest loans and the possibility of partial debt cancellation. These incentives are the responsibility of the German Reconstruction Loan Corporation (KfW).
- Additional investment incentives can be accessed within the scope of the building refurbishment programs on the nationwide and regional levels, and the nationwide CO_2 reduction programs.

Table 2.3 *Renewable heat generation in Germany, 1990-2005*

	Biomass heat [5]	Solar thermal energy			Geothermal heat	Total heat generation	Biodiesel [6]	Vegetable oil [6]	Bioethanol [6]	Total biofuels	Total final energy supply	Share of final energy consumption
	[GWh]	[GWh]	[1,000m²]	[MW]	[GWh]	[GWh]	[GWh]	[GWh]	[GWh]	[GWh]	[%]	[%]
1990	N/A	130	340	238	N/A	N/A	N/A	0	0	0	N/A	N/A
1991	N/A	166	468	328	N/A	N/A	2	0	0	2	N/A	N/A
1992	N/A	218	590	413	N/A	N/A	52	0	0	52	N/A	N/A
1993	N/A	279	749	524	N/A	N/A	103	0	0	103	N/A	N/A
1994	N/A	351	946	662	N/A	N/A	258	0	0	258	N/A	N/A
1995	N/A	440	1,159	811	1,425	N/A	310	0	0	310	N/A	N/A
1996	N/A	550	1,457	1,020	1,383	N/A	517	0	0	517	N/A	N/A
1997	48,546	695	1,821	1,275	1,335	50,576	827	0	0	827	75,908	2.9
1998	51,613	857	2,194	1,536	1,384	53,854	1,033	0	0	1,033	81,800	3.1
1999	50,951	1,037	2,641	1,849	1,429	53,417	1,343	0	0	1,343	85,271	3.3
2000	54,314	1,279	3,284	2,299	1,433	57,026	2,583	0	0	2,583	96,288	3.8
2001	55,326	1,626	4,199	2,939	1,447	58,399	3,617	0	0	3,617	101,089	3.8
2002	54,626	1,955	4,749	3,324	1,483	58,064	5,683	0	0	5,683	109,580	4.3
2003	70,346	2,465	5,478	3,835	1,532	74,343	8,267	52	0	8,319	131,336	5.1
2004	72,259	2,573	6,235	4,365	1,558	76,390	10,850	52	424	11,326	145,245	5.7
2005	76,014	2,960	7,197	5,038	1,586	80,560	18,600	2,047	1,683	22,330	165,358	6.4

Source: BMU (2006).

The promotion of biomass use for heating is indirectly complemented by the energy tax exemption for biomass fuels which creates an economic advantage over oil and natural gas, as those are taxed on the basis of the Energy Tax Act.

Currently, further measures for the promotion of biomass heating are discussed in Germany, especially a quota model for renewable heat which could, for example, be implemented within the scope of a ‘Heat Act’. New stimuli also are seen from the national implementation of the European Biomass Action Plan.

3. Summary

The central idea of the Jühnde model is a complete shift of energy sources for an entire village, away from conventional (fossil) energy sources to the renewable and CO_2 neutral biomass. One such community is the bioenergy village of Jühnde, located in the southern part of Lower Saxony, Germany. It is the first of its kind in Germany, and aims to completely replace its fossil energy use for heating and electricity through bioenergy.

Between 2000 and 2004, the project partners applied for permission, acquired investment subsidies, and planned the bioenergy system as well as the district heating grid. The village founded an operating cooperative in 2004 to take care of the business aspect of this endeavour. The idea of a cooperative as an adequate form to run the bioenergy system was developed by the inhabitants themselves. To become a member of the cooperative, a minimum fee of € 1,500 is to be paid; voting rights and share of proceeds depend on the specific amount of invested money.

More than 70% of the inhabitants of the village are members of the cooperative and invested in their connection to the grid. The know-how gained in Jühnde will be transferred to other suited neighbouring villages in an upcoming process, to be started in autumn 2006.

The energy system in the Jühnde model is operated exclusively by the local cooperative. Beforehand, all inhabitants were invited to participate already in the planning process. Working groups dealt with concrete visions of the energy future of their community. The common decision-making and problem-solving in the process of conversion to renewable energy sources generated a new sense of orientation and connectedness within the community.

So, this participatory process could secure a high compatibility with local needs and the network of actors, while local competence and know-how could be established. One of the formulated aims of the Jühnde model is to support the local cultural heritage, and also to strengthen the community life and identity.

4. STEP ONE: Visions of the project

Jühnde was selected in a step-by-step approach from a group of some 54 villages in the county of Göttingen on the basis of 30 criteria on nature, society, infrastructure, and economy (Eigner, 2001). The Jühnde village especially offers a local agricultural supply structure with the necessary quantity of biomass production from bioenergy crops, and forest residues.

Two local farmers were interested to change their traditional economic ‘attitude’, shifting from ‘farmer’ to ‘energy supplier’.

Moreover, several technical conditions like a minimum density of heat demand had to be met in order to establish the new district heating grid at reasonable cost. Also, a good and functioning social network existed in Jühnde which is necessary to promote the ideas of the project, and to build on the trust between the local actors. From the infrastructural point of view, facilities like a sports gym or a community centre were needed for public meetings.

Besides the question of implementing a new supply technology, the Jühnde model focuses on the active involvement of the village inhabitants and their specific know-how. Primarily based on the idea of a group of social scientists from the University of Göttingen[1], the aspect of participation and identification with the project’s ecological aims and technological requirements of changing the energy system as a whole is one of the central objectives.

At the beginning of the process, seven general objectives were formulated:

- Protection of climate and resources - The use of biomass compensates CO_2 emissions and, therefore, reduces the greenhouse gas effect.
- Soil and water protection - Soil and water contamination with nitrates and biocides could be reduced considerably through environmentally sound concepts for cultivating bioenergy crops (‘double-cropping’ with maize, triticale, sunflowers).
- Plant diversity - A wide diversity of plants, even weeds, can be tolerated as all those can be utilized in the fermentation process for biogas.
- Regional business cycle and economic effects - Selling plants and wood for energy can generate a new income base for local farmers, and could lead to higher employment levels.
- Participation - The involvement of the inhabitants is fundamental for a shift from conventional to renewable energies, as they have to invest money for their own connection to the grid. Encouraging villagers to participate and motivating them to help solve local problems will promote collective opinion-building.

[1] This group is the Interdisciplinary Center for Sustainable Development (Interdisziplinäres Zentrum für Nachhaltige Entwicklung = IZNE), see www.izne.de

- Decentralisation of energy supply - The energy plants will be operated by a local cooperative. Its decisions will be compatible with local needs. With the shift to local energy sources, a minimization of technical, environmental and economical risks comes along.
- Quality of life - The experience of common decision-making and problem-solving could generate a new self-confidence and quality of life within the community.

These general objectives were focussed to more specific goals in the different areas, and for the sociological analyses, three surveys (by interviews and questionnaires) were carried out to learn more about the residents' alignment.

Within a comprehensive action-based approach, the expectations of the villagers were evaluated. Besides the aspects of community identity and social cohesion, the so-called 'we-feeling' and the engagement for environmental concerns were the focus of the social research.

Furthermore, a new market for farmers focusing on biomass as a renewable energy source should be generated in addition to the demand for traditional agricultural crops. Selling bioenergy crops and forestry residues as biomass creates a new income base for local farmers which is independent from the fluctuations of the traditional agricultural markets.

Also economic prosperity can be achieved in the long-term, given the steady rise in fossil-fuel costs. The main thesis was that the overall effect on the region's and country's balance of trade will become positive, as payments for oil and natural gas imports are reduced, and people's money will be reinvested in local and regional facilities.

5. STEP TWO: What were the various expectations of the case?

The project 'Bioenergy Village' aims to shift from fossil energy sources for electricity and heat to a fully renewable base with active participation of the population. In that sense, it is a demonstration project for an environmentally and economic sound energy supply system in a rural region Ecological and economic aspects are reasons for the usage of renewable energies.

In the following table, project actors and their expectations are listed.

Table 5.1 *Actors' expectations and publics*

Actor	Expectation	Speaking for 'publics'
Funding Ministry	Implementation of biomass technology	Societal welfare, underpin biomass strategy, economic welfare of rural areas
University - IZNE (7 different disciplines)	Academic qualification Empirical evidence on hypothesis regarding life-style shifts, sense of community, ecological diversification	Applied research in agriculture, ecology and (cultural) life sciences
Mayor	Economic and environmental welfare, getting funds, future oriented decision (self-sufficiency)	Economic and social welfare, stabilization of the farming structure (safeguard employment)
Cooperative	Business success	Climate protection, independency
Construction firms	Ensure know-how	Ensuring employment
Inhabitants	Cheap energy, strengthening the local position	Environmental protection, supporting sustainable future, stabilization of the farming structure
Members of the cooperative / investors	Saving money in the long-term	Independent energy producers
Engineering	Image building	Ensuring employment
Committee of external experts	Professional information transfer	Scientific community

IZNE developed the first vision of a 'Bioenergy Village'. The focus was the implementation of a biomass strategy linked to societal and economical welfare in rural areas. Later on key partners like the mayor of the village, inhabitants and engineering firms joined. A very important promoter of the main ideas was the mayor of the village of Jühnde. He motivated the inhabitants in the name of future generations with the argument of a sustainable development. As he is a person of high recognition and integrity, he could convince the traditional and conservative oriented villagers. The economic and fiscal framing as well as the business model of a cooperative was mainly developed by local expertise of two tax advisors.

In the beginning of the selection process Jühnde was one of 54 potential village partners in the region. The research team looked for a village community with motivated, qualified persons and a village environment with necessary agricultural land. In the end, 17 villages volunteered to become the 'Bioenergy Village' - out of these, Jühnde and three other villages were chosen because of the very positive and engaged feedback by the actors and inhabitants.

For each of the four 'candidate' villages, a feasibility study was carried out.

With different academic qualifications in the background, the university group expected interesting research regarding life-style changes, sense of community and ecological diversification.

In the beginning, the project used a communicative top-down-approach. IZNE firstly addressed the mayor and an engineering firm (to calculate the technical potential), and in the next step further actors and inhabitants were involved through various participatory measures. In the course of the project, the flow of information was organized by IZNE, and one or two local contact persons.

The main ‘target group’ were the inhabitants of the village, as they had to change their heating systems, and to buy local energy (heat and electricity from biomass). On the one hand, it was expected that the villagers make long-term decisions on the economically relevant issue of energy supply. On the other hand, IZNE had an important influence on the information base for these decisions[2].

With the ongoing discussion of the business case and financing conditions, it became necessary that the majority of villagers took part in the project. They were expected to become members of the operating cooperative which was to ‘run the business’.

The cooperative was supposed to create energy independency for the villagers. Besides business success and climate protection, energy independency is assumed to influence the sense of community of the inhabitants.

Moreover, IZNE researchers expected that life-style changes and ecological diversification will be visible in the village.

6. STEP THREE: Understanding ‘participatory’ decision-making: negotiating expectations

In the pre-selection process to identify the model community, several instruments of information were used in 17 villages, such as

- Information flyer and brochure
- Press and media work
- Public presentations (external experts, visualizations)
- Consulting
- Door-to-door information
- Visiting demonstration projects (best practice).

The use of those instruments was organized by IZNE. The selection process was underpinned by a series of different surveys in the 17 candidate communities.

One of the main questions dealt with the willingness to change and connect to the new heat supply system. Here, the inhabitants of Jühnde agreed to switch with a 69% share of all households.

Another issue was the question of active involvement and the identification with the general philosophy of the project. While 87% of the inhabitants of Jühnde covered the idea of the project, a share of 22% of the house owners was willing to support the implementation actively (in working groups).

A 35% share of all households wanted to invest in the cooperative.

With these numbers in view, IZNE selected Jühnde as the model village, and funding from the Federal Ministry for Agriculture was expected.

After this selection process, participatory activities started and communication became more concerned with bundling local knowledge and the competences of the university.

After the decision for Jühnde as the model project, eight working groups of inhabitants were established and dealt with problems like ‘Operating company’, ‘Biogas facility’, ‘Biomass energy plants’, ‘Heating plant’, ‘District heating system’, ‘Building energy systems’, ‘Public’.

[2] E.g., IZNE authorized an external engineering firm to implement the necessary technical planning.

The working groups are the core instrument of participation where the visions of all participants could be brought together. Here, the expectations of the villagers were 'materialized' through planning steps and concrete implementation.

Besides the working groups, a system of coordination and information was established with planning workshops and meetings to focus the outcome of the working groups.

One of the central participation tools - the so-called planning workshop - consists of representatives of IZNE, the mayor, speaker of the working groups, representatives of the village and of the 'associations and clubs' of the village as well as representatives of the village council.

The coordination of the final results was sometimes seen as very time-consuming, and the decision-making process was described by the participants as less efficient. The forms of participation are outlined in the following table.

Table 6.1 *Forms of participation*

Type	Organizer	Involvement	Purpose
Village meeting	IZNE, municipality	Inhabitants, university members	Information, discussion, transparency, participation, support the « we feeling »
Planning workshop	IZNE	Speaker of the working groups, mayor of Jühnde, two local council members, members of local associations, member of Samtgemeinde, university members	Decisions in the name of the community Public discourse announced by public displays
8 Working groups	IZNE	Inhabitants, university members	Development of planning decisions, based on the 'Grounded Theory'
Round Tables / open meetings (target specific)		Different participants	Discussion of technical problems
Meeting of coordinators			Information transfer between the working groups and external stakeholders
Round Table	Communities	Several communities in Southern Lower Saxony	Gaining and transfer of Information
Festivals	Associations, 'Clubs', local authority, IZNE		Support emotions and motivation, transfer technical aspects into a positive context
Painting and jogging contests	IZNE	Children	Support emotions and motivation
Website, internet presentation		Public in general	

The group of researchers was dealing with quite different roles: the IZNE team is the initiator of the project as well as the motivator.

It also holds the management and coordination tasks as well as the function of an intermediary and of an evaluator.

The very close collaboration and communication at the beginning of the project abandoned after two years by reason of financing problems at the side of the research funding.

Overall, the trans-disciplinary cooperation was seen positively by the participants. Nevertheless, face-to-face meetings between all members of the university group and between some of the stakeholder groups like engineers, funding ministry and potential investors were rarely.

The flow of information was steered by IZNE, which led to misunderstanding and lack of communication. Moreover, the cooperation between the engineering firm and the village was mentioned to be complicated, because of the regional distance of around 400 km.

Two times a year an expert-meeting took place to offer support on a scientific basis. In that context, more frequent meetings were expected by the villagers.

7. STEP FOUR: From visions to reality

Since the selection of Jühnde as a 'Bioenergy Village' in 2001, the project was implemented in four steps. After a first overview of the regional potential and discussion with 54 villages, the second selection narrowed down the list of candidates to 17 villages. Out of these, a group of four villages was selected, mainly by identification of the villagers' expectations and engagement. In a second survey, the inhabitants of Jühnde showed the most convincing attitude regarding the prospective project.

In May 2002, the 'Bioenergy Village' cooperative was founded and established membership contracts with some 70% of the Jühnde inhabitants. Financial support was made available from the national and the regional level. Even 10% of the Jühnde villagers gave money to get the planning process started. After the positive decisions on the financial grants the investment money was ensured, and the local cooperative became operative in 2004.

The villagers who participated in the local cooperative decided collectively on the restructuring of their energy supply system. They built up a self-managed production and distribution infrastructure.

The village implemented the bioenergy system, the district heating grid and an operating cooperative within the period of four years. Meanwhile, over 73% of the inhabitants are linked to the local heating grid. Due to rise of fossil energy costs since 2004, the promoters of the project feel encouraged and confirmed, as the economy of the projects became even better than assumed before.

The energy production process itself works as follows: Under anaerobic conditions, microorganisms engage in enzymatic digestion of liquid manure and silaged plant material to create biogas in a central facility. The combustion of biogas in a combined heat and power plant (CHP) then generates enough electricity for the entire village, and the co-generated heat is mainly used to heat homes and other living space, replacing fossil fuels. A smaller portion of the generated heat is required as process energy for the digestion plant.

The amount of heat generated cannot cover the high demand during winter months in Germany, though. During this period, an additional heating plant fuelled with regional wood chips is required.

After the technical implementation, the villagers now discuss visions and further projects to realize the social aspects of the ‘Bioenergy Village’, like an attractive local coffeehouse and meeting point as well as a supermarket for organic regional food products.

With conceptional support from IZNE, the local public developed experiences of implementation which could help to transfer the model to other villages in and outside of the region. The Jühnde model has received high national as well as international attention, and local authorities of other villages want to replicate the organisational and technological approach.

Despite of some problems regarding efficient cooperation and management the ‘Jühnde’ model is a quite successful one. At present, 12 other villages in the same regional context want to become the ‘next Bioenergy Village’. The project and its dissemination will be continued, also with the support of IZNE as a project manager. The funding Federal ministry now also supports a ‘lessons learnt’ study which aims to identify success factors for future replication.

8. Lessons learned

Communication, Multiplier and Promoter

- Success - in the meaning of technical and organisational implementation - could be ensured by integrative persons (promoters) with a high level of trust (key person was the Mayor of Jühnde).
- Using events like festivals and contests (with children) help to disseminate the project ideas ‘in a positive and emotional context’.
- Households already connected to the new grid should get a visible ‘label’ to stir up some competition between neighbours (social marketing).
- A constant exchange and communication with the local and regional media is of high importance. In addition, word-of-mouth information is the base for the distribution of ‘trusted’ information.

Participation

- Several functions were partially taken by the same person, or with personal closeness of planning and economic know-how, and the municipal administration (local mayor).
- The feeling of self-efficacy could be strengthened by the process of involvement and decision making.
- The foundation of a cooperative as an operating entity allows equal participation in decision making.

Exchange of Know-how

- Joint learning and the development of know-how within the system of working groups were able to create a high level of self-confidence and supports the personal and local identity.
- Research, personnel training and skill-development in all involved businesses could increase local know-how and create new market opportunities.
- The chosen structure of working groups allowed a high level of information exchange and participatory knowledge acquisition.

Interdisciplinary Cooperation

- The extensive consultative work of the university group had to be funded, and support from their administration was needed to ensure continuity.
- The interdisciplinary cooperation based on three main categories: an agreed target and understanding of perspectives, methods and goals of other disciplines; regularly meetings of the project group; separate coordination of the whole project.

Social Acceptance of RE and RUE

- People in Jühnde and southern Lower Saxony were already ambitious with respect to RE and RUE.
- Innovation could be linked to the traditional use of RE in a step by step approach.
- The visit of demonstration projects (best practices) was described as one of the key activities to motivate and convince people of the technological approach.

Points of discussion mentioned by members of the local working groups:

- The intense involvement and particular 'monopolised' communication structure has advantages as well as disadvantages. The intermediary should allow direct contacts between stakeholders.
- The main motivation of villagers to participate was the issue of environmental protection (survey no. 3).
- In the beginning of the project, practical energy-related engineering know-how was inadequate so some of the preparing steps took a lot of time.
- The chosen structure of working groups and coordination implied a high commitment of time from involved people which should be reduced.
- Transparency regarding the work in the different working groups was missed.
- A lack of contact with the planning engineers (communication mostly via the university project group) was mentioned by some villagers.
- The planning workshop was seen as a platform dominated by the university group, and was seen as too time consuming.

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