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Toikka, Arho

Consumer views and their effects on bioenergy futures in different countries

Sustainable Bioenergy Solutions for Tomorrow

CLEEN OY
ETELÄRANTA 10
00130 HELSINKI
FINLAND
www.cleen.fi

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Toikka Arho

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Summary

What the general public thinks about bioenergy projects, technologies and systems is crucial to their success. They engage with bioenergy through various media: through voting as political consumers, through democratic participation mechanisms such as public hearings as local residents and through market mechanisms as consumers buying electricity and heating services in various forms. A bioenergy project has to engage with all these different facets of a 'consumer' simultaneously. This report reviews the literature in three different countries, Germany, Poland, and India, in order to establish the grounds for successful strategy for community engagement. We focus on bioenergy broadly, including agricultural residues, energy crops, forest products, together with other renewable energies, as the amount of consumer and community acceptance research on specific bioenergy technologies is fairly limited. Actually, the support for bioenergy expansion varies even more so than for solar or wind power, with support ranging between 21 and 75% in the EU member states (Heiskanen et al. 2007). Bioenergy, then, requires careful consideration of who the stakeholders in a project are and how a consumer would be involved with a particular situation.

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1 Consumer views and their effects on bioenergy futures in different countries

1.1 Abstract

What the general public thinks about bioenergy projects, technologies and systems is crucial to their success. They engage with bioenergy through various media: through voting as political consumers, through democratic participation mechanisms such as public hearings as local residents and through market mechanisms as consumers buying electricity and heating services in various forms. A bioenergy project has to engage with all these different facets of a 'consumer' simultaneously. This report reviews the literature in three different countries, Germany, Poland, and India, in order to establish the grounds for successful strategy for community engagement. We focus on bioenergy broadly, including agricultural residues, energy crops, forest products, together with other renewable energies, as the amount of consumer and community acceptance research on specific bioenergy technologies is fairly limited. Actually, the support for bioenergy expansion varies even more so than for solar or wind power, with support ranging between 21 and 75% in the EU member states (Heiskanen et al. 2007). Bioenergy, then, requires careful consideration of who the stakeholders in a project are and how a consumer would be involved with a particular situation.

1.2 Introduction

In this text, we consider as consumers those stakeholders who are not directly involved in the production process but are likely beneficiaries of improved availability of electricity and heat in the area, even if they not actually in a consumer relationship with the company. Social acceptance of technology has three different dimensions: socio-political acceptance, community acceptance, and market acceptance (Wustenhagen et al. 2007). These dimensions can be analyzed as they emerge in connection to various actor groups, including political actors and companies, but here we focus on lay people not involved directly in any organization that makes decisions over energy production. It should be noted that the concept of acceptance is contested, both theoretically and empirically: for example, Batel et al (2013) demonstrate the differences between lay people accepting a technology and supporting their use.

Market acceptance covers the actual willingness to purchase as consumer, but the nature of electricity as good means that simply focusing on buying does not cover all aspects of a consumer relation. Recognizing and understanding the adoption process is a key factor for new innovative products that require active consumer involvement, like for example of wood-pellet heating in households (Tapaninen & Seppälä 2008). Domestic micro-generation involves consumers making long-term investment decisions, can potentially involve them as producers when selling to grid technologies and policies are adopted, and these decisions can have wide-ranging effects on behavior within the household (Sauter & Watson 2007).

The processes and mechanisms of grid-based electricity or district heating services are quite different, as the final consumer is only even aware of the fuels used if they choose to be actively involved. For those who do, environmental labelling of contracts is key mechanism

(Kåberger 2003). In this report, we discuss labelling mostly in the context of developed economies, in the Germany section, even though these ideas might be more generally applicable. Still, it is necessary to broaden the viewpoint beyond consumers making contracts. Electricity is technically a private good in that it is rivalrous (my use of it diminishes your ability to benefit from it) and excludable (it is easy to determine and delimit where electricity is going), but there are common pool resource elements to how energy production is organized in practically all existing societies (Ostrom 1996). The grid is a quasi-public good, and government involvement through subsidy, policy, and ownership gives electricity many of the properties of a public good. In such situations, collective agreements and concerns can often be more important than private consumption questions. One study found that perceived social-environmental dimensions guided intentions to use bioenergy (Halder et al. 2013), and economic concern such as price are probably of lesser importance in choosing to be marker consumer in bioenergy. This opens the consumer discussion to a variety of relationships.

Socio-political acceptance is the general feeling towards a technology while community acceptance refers to specific projects. It includes the processes of how individual and collective actors make decisions, resolve conflicts, form partnerships, and respond and engage in in government policies nad public issues (Alasti 2011). The socio-political acceptance of bioenergy is connected to views on climate change and environmentalism in general and the political setting, including party structure. While regulatory support and public subsidy are key to further developments in bioenergy, these often happen at wider, international scales. The aim of this report is to focus more on individual action that happens at local scales. At its most general, socio-political acceptance is measured through generic surveys like the Eurobarometer for the European Union countries. However, the relevance and meaning of acceptance measures captured through such methods has been challenged. They are sometimes considered fleeting “pseudo-opinions” (de Best-Waldhober et al. 2009) that are easily changed by making more information available. But research in experimental settings has also found that more information does not necessarily translate to better acceptance.

This is due the complexity in trying to separate the abstract opinions on a technology in general from the context they are embedded in. Socio-political acceptance evolves in relationship to community acceptance. These two are a spectrum of spatial and governance level scope, the first usually measured at a national or regional levels, the latter at a smaller scale down to a village level when necessary. At the more local levels, project acceptance is usually u-shaped: acceptance tends to be high before the commencement of a project and once it is established, but it is low during implementation (Wolsink 2007). This may be for practical reasons (many local disturbance are at their highest during building phase), but also due to feeling that participation is not feasible at this stage.

The three types of acceptance are always interdependent and vary between technologies and local settings. In a large-scale review of European renewables projects, Heiskanen et al. (2007) found local neighbourhood level acceptance to be the most important factor in the case bioenergy, while other technologies had more salient issues with socio-political acceptance (like CCS) or consumers as customers (like solar). In analyses of socio-ecological systems studies, there is an increasing consensus that there are few general rules that apply to all problems, but rather a systems-and-interactions –based approach will be

required (Ostrom 2007). In renewable energy policy, strong tensions between centralized or generic environmental policies and local diversity and the associated local support for initiatives have been found in different settings (Wolsink 2010).

These tensions are often viewed under the label NIMBYism or not-in-my-backyard behavior (van der Horst et al 2002), but it is probably more apt to understand these as a form of spatial discounting (Perrings & Hannon 2001): just as individuals and companies discount events further away in time due to uncertainty, they discount events further away in space due to uncertainty. It is not an issue of preferring dirty activities or activities that are seen as dirty to be done elsewhere, it is a question of known local issues near own area versus unknown issues in other areas. This theoretical point of view is elaborated in the literature review on the three countries, as the initially NIMBY-like concerns are usually revealed to be grounded in very local situations, unique to each project. That is, the claims are rarely about saying that we do not want the air pollution, others should deal with it, but rather about pointing local natural and social structures that might be changed or challenged by new bioenergy products.

As actual market consumers, there are still numerous ways for lay people to participate and these also differ in different countries. In developed countries consumers mostly engage via electricity and heating contracts, but also more and more as small-scale investors, with co-operatives and other mechanisms becoming more and more common. In developing countries, consumers might not be on the grid yet, and market engagement happens through localities establishing grid participation.

2 Germany

2.1 Socio-political consumer

In developed countries, bioenergy has high levels of support at the general level (Walter & Gutscher 2011). As part of the Energiewende policy, Germany has supported bioenergy in the form of small-scale biogas plants, and their number has increased from 1300 to 7000 in decade with a capacity increase of almost 2500% (Federal ministry.. 2012). Often, community engagement campaigns aim at increasing the knowledge levels in the population. Knowledge does not necessarily lead to more favorable views towards bioenergy sources (Cacciatore et al 2012). There are real policy issues, like the increasing trade in the absence of certification standards is one potential problem area that needs to be resolved somehow (Magar et al. 2011) in order to establish informed acceptance in developed countries, but there are also procedural and justice concerns that might not be allayed by simple improving communications.

Procedural justice or acceptance of the process of decision-making is very important. Walter and Gutscher (2011) list five strategies for promoting trust at this level: keeping information simple, assuring high levels of transparency and accuracy, taking citizens' fears seriously, correcting parameters according to citizens' wishes, and sustaining long-term relationships with communities. For example, specific and well-known terminology, such as talking about wood stoves or agricultural residues rather than abstract bioenergy promotes acceptance (McCormick 2010). Socio-political acceptance is also built through community acceptance by locally embedded examples of successful projects.

The socio-political acceptance in developed societies is formed in a 'battle of institutions', which in Germany in the case of wind and solar power meant a parliament supported by an advocacy coalition, that designed and backed support policies (Jacobsson & Lauber 2006). These coalitions built on earlier support systems enabled in communities, like local feed-in tariff schemes, or in consumer markets, such as ecolabelling of energy. The German experience, even with the recent challenges to the models, should be understood as a function of consumer acceptance as well as market acceptance.

2.2 Community as consumer

Siting controversies result from a variety of community concerns, which can often be made more acceptable by high levels of early public participation (Walter & Gutscher 2011). The actual community concerns over bioenergy are traffic, odor, noise, exhaust gas exposure, dust, landscape impact, and unsustainability of raw materials used. The communities are concerned with distributional justice and procedural justice issues. The environmental impacts are negative distributional concerns, of whether the plant owners will be responsible for the harms they cause in the community, but the positive, monetary distributional concerns are important too, as bioenergy plants are sometimes seen as potentially transforming the local economy of local farmers and small-scale tourism infrastructure to favoring actors outside the community, like technology providers and in some cases large companies operating the plants. Procedural justice is about giving the communities a role, building trust and improving citizen's standing, openness about developer and operator/owner roles, and early involvement.

The political framework for dealing with landscape protection is developed with sites assigned through higher scale democratic processes, and landscape concerns should be less of an issue in Germany. But it is still a problem that comes up, and care should be taken to alleviate landscape concerns. One method that has been found successful is engaging the public with simulated images of the changes (Dockerty et al. 2012).

In a successful and well-publicized German example, a bioenergy village was established as collaborative effort by a multidisciplinary team, with the community involved from the beginning and actively, as part of the group initiating the project (Heiskanen et al. 2007). This included, for example, including locals as part of the information dissemination. The availability of locals to take the information to their area generated a feeling of unity and made the material more approachable. The well-designed local involvement procedure resulted in changing the meaning of bioenergy: it was not simply about getting electricity and heat with some associated harms, but it also generated new group identity, feelings of belonging and well-being, and environmental behavior not related to energy production (Schmuck et al 2013).

In this approach, public engagement is not solely about convincing locals about their concerns on future harms, but more about involving them in the project in a way that is aligned with their values and lifestyles. New roles for citizens and consumers are generated and negotiated, and there is a period of mutual learning and adjustment that builds a new economic and social organization (Heiskanen et al. 2007). Such an approach is probably not always feasible, but when projects have profound effects on local economic and cultural life, a deep involvement should be aspired to.

Problems in developed countries have emerged around lack of trust, failure to articulate and communicate a vision, failure to see early signs of problems or conflicts and lack of suitable procedures for incorporating stakeholders (Heiskanen et al. 2007).

2.3 Market consumer

Germans are among the most worried about climate change and most likely to reduce energy use for environmental reasons in EU, but about average in willingness to pay more for renewable energy, in 2006 (Heiskanen et al. 2007).

Germany is a European frontrunner in microgeneration at the household level and the German experience can inform other European countries in microgeneration technology markets (Sauter & Watson 2007), even if the German political and social setting is quite particular in multiple ways. For residential systems, like wood pellet heating systems, the German certification systems and quality labels are well-develop (Verma et al. 2009). Coupled with the policy level measures taken, small-scale bioenergy has advanced in Germany.

Who are they users and why they choose to take on the bioenergy challenge? Fischer (2004) analyzed early adopters of micro-CHP facilities and found that these adopters were characterized by an interest in technology, some ecological concerns without identifying as environmentalists, valuing autonomy and self-sufficiency, and a specific contingent occasion, like the necessity of replacing heating systems in the home.

Fischer (2006) mapped the attitudes of microgeneration pioneers or early adopters and found that besides their interest in the environment, they have an interest in community affair and are positive that existing problems can be solved, that technology can contribute to the solution, and are personally willing to contribute their share. Barriers to adoption were uncertainty about reliability, maturity, cost and profitability of the technologies. In developed countries, microgeneration is likely to be driven by these enthusiastic hobbyist pioneers. Willingness to experiment with a novel and immature technology and enthusiasm about sharing their experience and spreading the word can be critical in spreading a technology (Fischer 2006). An important factor is also the differences between urban and rural economies and energy settings (Bergmann et al. 2008). Welfare gains (and losses) from bioenergy adoption are very different in different localities and this should be accounted for in communication schemes.

For electricity consumers, eco-labelling of energy has been available since the mid-1990s. In 2006, there were a wide range of products available from more than 134 marketers supplying 1700 GWh of eco-labelled energy (Wustenhagen & Bilharz 2006). This represented a 1.3% market share of residential customers. Mostly, the supply is hydropower, but all renewables are represented to a degree. Kaenzig et al (2013) found an implicit willingness to pay for a 16% premium in German electricity customers, higher than the realized market situation would suggest. The factors influencing the adoption of ecolabelled electricity in Germany are social endorsement, environmental attitude, and views on the difficulty of switching, while knowledge on options available and knowledge of the process were not found evidence to be an influence in the switch (Gerpott & Mahmudova 2010). An international review of analyses in Germany and other developed countries replicated these results, highlighting the importance of attitudinal factors in comparison to just demographic factors (Diaz-Rainey & Ashton 2011). Trust in the labelling scheme was another important factor and repackaged product offerings marketed as renewable energy while consisting also of conventional production has impeded adoption in some cases (ibid).

This is especially important in the case of bioenergy, as sustainability standards criteria are only now being settled on. Consumers exhibited a lower willingness to pay for biogas and biomass compared to other renewables sources (Kaenzig et al. 2011). For better acceptance, better international coordination between initiatives to establish clear communication of how sustainability concerns are secured, how regional flexibility is attained, and how stakeholders are involved in a certification process for fuels are needed (van Dam et al. 2008).

3 Poland

3.1 Socio-political consumer

Bioenergy in Poland is dependent on socio-political acceptance for extraction of forestry residues and the introduction of new management practices and harvesting schemes (Nilsson et al. 2006). The nature of Polish economy in the energy and forestry sectors poses unique challenges on this due to their centralized character. Agriculture, on the other hand, forms a large part of the economy and the landscape, but is technologically not very advanced and farm sizes are small (Chodkowska-Miszczuk & Szymandska 2013). This combination makes the socio-political setting challenging, as rural communities would face significant pressures at the adoption of a bioenergy system. Collaborative production projects have been attempted in Poland, but technological, institutional and coordination problems have led to limited success (Mangoyana & Smith 2011). Coal sector actors remain powerful and there is no unified framework for the renewables sector – these were identified as the two most important challenges in the sector, followed by high investment costs upfront, social acceptance, and lack of knowledge (Abramczyk 2014)

In the Polish political situation, the high level of self-sufficiency by using local coal is valued highly, making co-firing biomass with coal in large power plants a much more appealing option for Poland (Nilsson et al. 2006), compared to more developed countries where decentralized options are likely more appealing to the general public. Still, there is a growing interest domestic, agricultural and district heating options. Investment and strategy decisions in Poland and the EU with regards to agricultural land and energy production will be important to determine the societal response as well. The socio-demographic situation in Poland is improving, as a young and entrepreneurial is more likely to adopt new business models and new technologies, already visible in the correlation between age distribution and energy crops adoption over different Polish regions (Szymanska & Chodkowska-Miszczuk 2011).

The future development of socio-political acceptance hinges on the ability of the sector to bridge development between agriculture, forestry, and energy. Stimulation of development in agro-forestry communities with high levels of unemployment is required (Budzianowski 2012). How to engage as an outside actor requires careful consideration of trust relationships, as it is a complex network of relationships with big differences in the social structure of centralized and government owned sectors and private, small-scale sectors.

3.2 Community as consumer

A large-scale study in Poland identified five different types of relationship to place: traditional attachment, active attachment, alienation, place relativity, and placelessness (Lewicka 2011). The relationship was highly predictive of trust toward outsiders, trust toward community members, sense of coherence and continuity in the community, and there were group differences in public participation as well. This cluster analysis methodology only analyzed the community as it was, but the model could prove useful in community engagement. Depending on the distribution of the groups in a particular community, different communication strategies might be less or more effective.

There is heavy regional concentration in all renewables, including biomass, in Poland. Especially the region of Kujawsko-Pomorskie Voivodeship around the city of Torun has been at the center of expansion of renewables (Iglinski et al. 2010). Lack of knowledge and public acceptance were identified as key hindering factors in the Polish sector (Abramczyk 2014), but little research is done on these issues and data on all sustainability issues and consumer response is not of the same quality as in more developed countries (Korpysa 2013). This also relates to changes in the meaning of community as Polish democracy emerged in the post-Soviet transition, as even though democratic institutions have been established, especially the community indicators of a working civil society are lagging behind. These include levels of civic engagement, affiliation with local community organizations and initiatives, and low trust in institutions (Jakubowska & Kaniasty 2014).

Hence, demonstration projects and community- and consensus- building initiatives are needed with the various actor groups involved. There is no culture of discourse between companies and consumers and media is usually not critically engaged in this debate either (Kronenberg & Bergier 2012). This Soviet-era cultural aspect is unlikely to change rapidly and there is no set framework to involve the different interested sectors, even though they might hold considerable lobbying power. It is thus necessary to be actively involved with a variety of actors. Key groups are the centralized forestry actors of National Forestry Holding, wood industry actors in especially particle- and fibreboard production, farmers, and heating sector actors (Nilsson et al. 2006). Initiatives that involve especially the local decision-makers of district heating systems in a constructive communication with potential fuel providers would be the next step in Poland.

A case study on a wood processing company by Kronenberg & Bergier (2012) is probably the most important lesson and example. Initial community support for an initiative providing jobs turned sour when rising incomes and living standards increased demand for environment quality, as predicted by the environmental Kuznets curve. Disillusionment of the local population over local pollution issues and nuisances was resolved by broader transparency, strengthening local institutions that acted as a counterbalance to the company, and cooperation mechanisms.

3.3 Market consumer

Polish consumers are less likely to worry about climate change, less willing to pay more for renewable energy, and less likely to be reducing energy consumption as an environmental measure than EU average, but also less likely than consumers in other Central and Eastern European countries, like the Czech Republic (Heiskanen et al. 2007). Consumer awareness is low and that is holding back market expansion in biofuels, for example (Frost & Sullivan 2008). At the same time, Poland has adopted EU regulation systems and set renewable energy goals in accordance to EU negotiations. It could be said that the market consumer problem in Poland is trickier for these reasons: there is less environmentalist values representation than in developed countries, but also bioenergy does not offer previously unavailable services like grid energy in developing countries.

The Polish electricity market was only recently liberalized and home consumers have had the option of choosing their energy provider since 2007. Ecolabelling is still a very minor thing in the Polish market. Market consumer decisions are much more commonly taken by those who

use biomass for household heating, but even in this area there are no established government policies for supporting such bioenergy uses, with no tax schemes, fiscal incentives or feed-in tariffs (Cansino et al. 2011). Consumer demand for sustainability is still low and EU policy has so far been a larger driver in company environmental action (Kronenberg & Bergier 2012). General awareness campaigns are run by NGOs and some public-private partnerships are emerging, but active consumer involvement is quite uncommon.

4 India

4.1 Socio-political consumer

In India, energy is discussed in a very different context than in more developed countries: an important and inefficient rural sector together with uncontrolled or unmanageable growth in some cities needs the fulfilment of basic human needs, and health and work opportunities have a different meaning than they do in the developed countries (Akella et al. 2009). Energy needs are 3-4 times the energy consumed today (Kumar et al. 2010). In developing countries, economic factors are pivotal and environmental values cannot usually overcome them (Mangoyana & Smith 2011). Renewables policy is an energy poverty reduction tool (Bhide & Monroy 2011)

There are national promotion efforts to promote renewable energy. These include information campaigns, special government supported stores that sell and repair devices, and district-level advisory committees in the 550 districts of India (Kumar et al. 2010). Also, state level initiatives and support schemes are important for successful adoption (Panday et al. 2012). These economic incentives have been successful in expanding bioenergy use, but their relationship to socio-political acceptance is still unclear.

Along with traditional household use, large-scale biomass policies in India have a history of decades. However, the technological choices and centralized leadership led to very disappointing results up the 1990s. Since that, branching into locally suitable niches and upscaling towards commercial systems has been more successful, but the particularities of the Indian power structure are still an important challenge (Verbong et al. 2010). Especially rural electrification is still done in the context of class differences quite distinct from what is understood in the West.

4.2 Community as consumer

Community concerns usually have to do with local pollution and disturbance issues. Eswarial et al. (2014) review the literature on community concerns in acceptance of bioenergy projects. They looked at over 50 specific concerns in six main categories (with some uncategorized concerns found in unique studies). Table 1 summarizes their findings by calculating how many studies reviewed found the various concerns in each category important. For example, siting issues includes four concerns: issues to do with location of the power plant, issues to do with disposal of by-products, issues to do with location of biomass crops, and proximity to residential areas. The goal of the quantitative summary in the table is to highlight that in India, local concerns are important: usually the community is worried about local emission issues, which include light, noise, and odor along with health hazards and air pollution. The category of landscape and agriculture includes concerns over urban and rural landscapes, with high chimneys disturbing cultural heritage and even archeologically significant sites. Trust and credibility of the developer was a key factor in lessening these concerns. This underlines the importance of understanding what the local community values and speaking to those values. It is not sufficient to show the environmental feasibility of a bioenergy production method, but it is necessary to talk to the local community on how a particular project fits with the framework of society.

Community concern	Prevalence in case studies (% of studies and subissues)
Siting issues	22%
Emissions and health hazards	46%
Transport issues	30%
Environmental issues	22%
Landscape and agriculture	40%
Economic effects	26%

Table 1. Summary of findings from Eswarial et al (2014), calculations by author

In India specifically, the main concerns were local air pollution, inappropriate storage of by-products and credibility of the developer (Eswarial et al. 2014).

Village-level community engagement in energy production has been tried in India, with varying levels of success. For example, Mangoyana & Smith (2011) describe the Hosahalli village biomass gasifier project. In the project, the management of the plant was handed to the community after sensitization meetings and training with good results on social capital, but eventually obsolete technology led to the abandonment of the plant. In a case study in Kochi, South-India (Estoppey 2010), the social acceptability of household biogas systems was explored. Economic factors (avoided gas purchases) and a clean way to treat waste and manage the household were the most important drivers in adoption. The participating rural families struggled to memorize and follow the instructions given to them for the use and management of the machinery.

Strategic Niche Management (SNM) could be a key tool in avoiding a top-down “blueprint” approach in renewables projects in developing countries and there is some research suggesting this might be the case. This approach focuses on understanding the social networks, generated expectations, and learning processes in technological niches (Verbong et al 2010). Romljin et al. (2010) review four village-level biogas systems from a SNM perspective with a learning based-approach. They identified problems in project design and management (technology as starting point, not needs), communication with target group, lack of project champion, underestimation of rivalries and vested interests, and neglecting the importance of the external electricity regime. In their cases, local socio-political disagreements and competing interests complicated effective management. Verbong et al (2010) analyze the history of the biomass gasification in India and point to the importance of research institutes, sometimes to the neglect of local stakeholders, in the social networks, that was accompanied by overblown technological expectations and too little weight given to local learning processes, including learning about local factors such as power structures.

4.3 Market consumer

In the Indian and developing country context, bioenergy is often a necessary option for providing electricity, as rural areas and villages are commonly outside the grid and even in

urban areas supply can be problematic. A decentralized system with villages involved would probably be necessary to establish supply (Hiremath et al. 2009). This involves a change from a traditional biomass system – wood stoves are still common – to an advanced biomass system (Ravindranath & Balachandra 2009). This generates unique developing country concerns, as bioenergy needs to come with new cooking systems, new lightning systems, and an overall modernization process. The market acceptance of individual consumers is very much dependent on the community acceptance aspects, especially with regards to trustworthiness and dependability on actors. Replacement of traditional technologies with electric appliances can be seen as a risk, if the electricity providers are not seen as a part of the community.

Promotion of small-scale plants should account for the local societal context. In a rural society, a manure and gas plant will be more appealing than just a gas plant for a small cattle farmer (Madiath 2005). Biogas plants can also improve quality of life by reducing workload in firewood collection, enhance gender equality as women are usually responsible for household management, improve health and sanitation by reducing indoor smoke pollution, and improve food security by providing bio-slurry for an efficient fertilizer (Rakotojaena 2013)

There are important cultural differences in acceptance. For example, most Indians do not consider cattle dung to be dirty, but human toilets are considered extremely so, and cattle dung plants that also connect to toilets face strong resistance (Madiath 2005). Thus, using the existing structures and understanding the culture is necessary, and field missions and mapping local incentive frameworks are key tools for domestic plant projects (Rakotojaena 2013).

5 Conclusion

The goal of this report has been to explore how the general public as consumers views bioenergy in developed, transition economies and developing countries. The key message is that in each setting, the socio-political acceptance, community acceptance, and market acceptance are intimately linked, but the links depend on the situation in each country. Therefore, it is suggested that a consumer involvement strategy simultaneously accounts for these three factors. A strategy that separates political communication and speaking directly to locals is unlikely to succeed.

The overarching theme from the literature is the necessity to understand local level dynamics. Technology is embedded in societies in complex ways. This report highlighted a few of the more theoretical approaches that could be useful for generating such a nuanced community involvement. Strategic Niche Management is one example of such tools. But overall, whatever the theoretical approach, the literature emphasizes the importance of getting boots on the ground early, engaging in genuine two-way communication, with willingness to adapt to local demands and circumstances, and keeping the communication up throughout the project. Energy is a particular type of good and the market is very particular, and consumer engagement strategies have to reflect that.

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