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Subsector Analysis

Community-based renewable energy models – an analysis of existing participation models and best practices

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Table of Content

Figures

Tables

Examples

Abbreviations

Abbreviations	English Term	Original Term (if applicable)
AG	Public limited company	Aktiengesellschaft
AöR	Public agency	Anstalt öffentlichen Rechts
BaFin	Federal Financial Supervisory Authority	Bundesanstalt für Finanzdienstleistungsaufsicht
BBEn		Bündnis Bürgerenergie e.V.
BGB	Civil Law Code Germany	Bürgerliches Gesetzbuch
BMWi	Federal Ministry for Economic Affairs and Energy	Bundesministerium für Wirtschaft und Energie
BUND	Friends of the Earth Germany	Bund für Umwelt und Naturschutz Deutschland
BWE	German Wind Energy Association	Bundesverband WindEnergie
CARES	Community and Renewable Energy loan scheme	
cb-RE	Community-based renewable energy	
CCC	Civil and commercial code	
CEC	Clean Energy Collective	
CHP	Combined heat and power	
Ct	Cent	
DECC	Department of Energy and Climate Change	
DKK	Danish krone	Dansk krone
DOE	U.S. Department of Energy	
e.G.	Registered cooperative	Eingetragene Genossenschaft
e.V.	Registered association	Eingetragener Verein
EEG	Renewable energy act	Erneuerbare Energien Gesetz
EnWG	Energy industry law	Energiewirtschaftsgesetz
FiT	Feed-in tariff	
GbR	Civil society partnership	Gesellschaft bürgerlichen Rechts
GenG	Cooperative societies act	Genossenschaftsgesetz
gGmbH	Non-profit private limited company	Gemeinnützige GmbH
GIZ		Deutsche Gesellschaft für International Zusammenarbeit
GmbH	Limited liability company	Gesellschaft mit beschränkter Haftung
GmbH & Co. KG	German limited partnership with a private limited company as a general partner	Gesellschaft mit beschränkter Haftung und Compagnie Kommanditgesellschaft
GmbHG	Act regarding the private limited companies	Gesetz betreffend die Gesellschaften mit beschränkter Haftung
HEG		Heidelberger Energiegenossenschaft e.G.
HGB	German commercial code	Handelsgesetzbuch
I/S	(Danish) partnership	Interessentskab
IPS	Industrial and Provident Society	
KfW	German Bank for Reconstruction	Kreditanstalt für Wiederaufbau
KWEC	Kilbraur Wind Energy Co-operative	
kWh	Kilowatt-hour	Kilowattstunde
kWp	Kilowatt-peak	
LCoE	Levelized cost of electricity	
M	Million	
MoEN	Ministry of Energy	
MW	Megawatt	
NABU	Nature And Biodiversity Conservation Union	Naturschutzbund Deutschland
NIBMY	Not in my back yard	
NI	Non-institutional	

OHG	General commercial parnership	Offene Handelsgesellschaft
PD	Project Developer	
PDP	Project Development Programme	
PPA	Power purchase agreement	
PublG	German transparency and disclosure act	
PV	Photovoltaic	
RE	Renewable energy	
RECs	Renewable Energy Certificates	
RoI	Return on investment	Kapitalrentabilität
SPV	Special purpose vehicle	
StromStG	Electricity tax act	Stromsteuergesetz
StromStV	Electricity tax regulation	Stromsteuerverordnung
UG	Small limited liability company	Unternehmergesellschaft
VermAnlG	Investment act	Vermögensanlagengesetz

Executive Summary

Several states and countries are planning a 100 % renewable electricity supply. While well-endowed countries like Costa Rica and Iceland have largely reached the goal of switching to renewables. Scotland and the German state of Schleswig-Holstein plan to reach 100 % renewable electricity supply by 2020 (Scottish Government 2011, Schleswig-Holstein Website n.d.), Rhineland-Palatinate in Germany plans full renewable electricity by 2030 (MWKEL n.d.) and Denmark plans to fully switch its electricity and heat production to renewables by 2035 (DEA n.d.). This transition of entire energy systems requires support from entire societies.

This report helps understand how citizens can play an active role in renewable energy development by presenting four different types of involvement with different degrees of participation and decision-making power of communities. It has been commissioned in the frame of the Project Development Programme (PDP) implemented by GIZ of the "renewables – Made in Germany" - initiative on behalf of the German Federal Ministry for Economic Affairs and Energy (BMWi) and supported by the Ministry of Energy (MoEN) in Thailand. Thailand is the front runner with regard to renewable energy technologies in South-East Asia and aims at remaining in that position. Especially the country's targets for biomass, wind and solar energy underline its strong commitment. Under the current political framework, several initiatives focus on the community level with the goal to promote sustainable energy production on a decentralized level. With this report PDP wants to provide an overview of community involvement in Germany and internationally to inspire the development of participation model in the Kingdom.

Community-based energy production has a long tradition all over the world. In a series of countries like Germany and Denmark, it has been an important ingredient for the large-scale deployment of renewable energy. Ever since 1979 citizens have started to cooperate and construct modern wind turbines together. In the first wave, many citizen wind farms have emerged. Later on, solar installations (free field plants and rooftop systems) and biogas plants have been financed and installed by community collectives. Many citizens have started to invest individually in energy installations like PV and biomass plants either to feed the electricity into the grid or for self-consumption. The intensity and form of community involvement in all these projects vary widely.

The energy transition demands large volumes of investments in energy generation facilities, which do not need to originate solely from institutional investors but can also come from *private investors*. As an energy system transition requires *acceptance* of infrastructure, particularly in rural areas, it is important to have the local population participate and share the benefits of these investment. Benefits such as local tax payments and charities can be compensation schemes for the local community. (Shared) ownership and profit participation is a tool that allows people in both rural and urban areas to benefit from the renewable developments that can create *fairness* and *acceptance*. Profits, channelled back to local communities, create local value-added cycles.

Building on examples from Germany and around the world, we introduce experiences and set-ups for benefit sharing. In the centre of the study are community benefit schemes and the involvement of (non-institutional) investors who are natural persons or small businesses and farmers, who invest individually or cooperatively in a renewable energy plant.

Community involvement in renewable energy projects differs widely with respect to the number and type of benefits and the degree of participation. Community investments, such as PV home systems or mini-grids, to generate power for self-consumption or to improve grid reliability will play only a marginal role in this report – here we focus on those projects in which citizens invest in projects that show a viable business case even though electricity can be accessed reliably from the grid. This report groups community-involvement models based on four criteria that correspond to different purposes for the inclusion of the community:

(1) *Openness to non-institutional, non-local investment* (equity or debt) can be a means to enhance access to new forms of financing and allows individuals to benefit financially from renewable energy projects.

(2) *The creation of Wider Community Benefits* (e.g. through community donations or job creation) can improve *local acceptance* of energy projects.

(3) *Openness to or active mobilization of non-institutional local investment* can improve the *local acceptance* of renewable energy (RE) projects but also reflects the notion of getting a fair share from the exploitation of their natural resources.

(4) *Making decisions locally through communities* combines the notion of *fairness* towards the local community to benefit from RE projects with an *empowerment* of the community who takes the lead in the development in their area. Profits stay within the community and create local value-added cycles

Based on these criteria, four types of community involvement were identified that are described with the help of a large number of illustrative examples. These four types of community involvements are:

I) In the *Open Investment Model* individuals or small businesses can participate financially in a project, e.g. in the form of holding a junior bond or another form of financial stake. Non-institutional investment is a financing vehicle for project

developers. The investment projects pay a dividend, interest or rewards. Return on investment can be fixed or connected to the profits of the project. These financial contributions are not specifically collected from local investors, i.e. those geographically close to the RE project. They allow the population to participate in the economic opportunity offered by a "green" energy investment but do not necessarily foster ownership and *empowerment* of the local population.

II) In the *Compensation Model,* the local community receives some form of benefit from a RE project, independently of who owns the financial shares. The *Wider Community* are all community members who can be negatively (e.g. visually) or positively (e.g. through improved public services) affected by the project. Benefits from renewable energy can range from financial benefits (e.g. a preferential electricity tariff), environmental benefits (e.g. through compensatory ecosystem improvements during or after construction), to social benefits (e.g. charity financed by the renewable energy plant). Minimum financial contributions to the communities are normally defined in the local tax law and compensatory environmental measures are defined in national or local legislation. In some cases the community and the project developer agree on contributions such as to employ local construction firms or to donate funds for a social purpose. Registries of such voluntary contributions can increase transparency and improve the bargaining position of the community. In principle all forms of ownership described in the models I, III and IV can be combined with these types of *Wider Community Benefits*.

III) The *Community Connected Model* is a partnership between professional developers e.g. commercial project developers or municipal utilities and the local community. A cooperation with a professional partner is possible particularly for large and typically complex projects like wind farms. The model is open to non-institutional investment and offers up to 49 % of shares to the local community. Different set-ups exist: The local community can a) own shares in the entire project e.g. in the case of a solar field projects or b) own and operate a specific part of a RE project, e.g. when an individual wind turbine is split off and handed over to citizens to own and operate. The sub-forms of this model are therefore *a) a shared revenue model* and *b) a split ownership model.*

IV) In the *Community-based Model* the local community holds at least 50 % of the decision-making power. Citizens pool their resources to cooperatively initiate energy projects. A 50:50 cooperation with a commercial or municipal partner is generally referred to as a *joint venture***.** Local actors function as investors, owners and in many cases even as the operator of the plant. The community or individual proprietor can develop the project autonomously, in particular for smaller projects. For complex projects the community will typically hire a professional project developer to procure technology and deal with the grid connection but the community is involved at the earliest stage of the project or has even initiated it. *Community-based Models* are frequently combined with *Wider Community Benefits* (model II).

For each model the enabling environment was analysed based on an actor-framework roster that includes the (1) project developer (2) the supply chain and support network, (3) the financiers (4) the local community (5) the business/market framework and (6) the legal/ policy framework.

Since private individuals often invest their savings or even retirement accounts the security needed is higher than for risk capital. Individuals or community groups getting involved in energy projects tend to favour risk averse and simple business models, even if these go along with lower returns on investments. Rules and regulations need to be particularly easy in terms of bureaucracy, reporting and legal set-up for non-professionals and volunteers to handle them.

Most such projects are legally set-up as a special purpose vehicle (SPV), i.e. as a stand-alone legal entity. The SPV can take various legal shapes. The SPV itself does not tell what type of organisation stands behind it: it can be managed by highly participatory cooperatives or by more anonymous corporations less responsive to requests from non-institutional investors or affected tiers of the population. The most common legal options of setting up a project for the German context are cooperatives, GmbH & Co. KGs (German limited partnership with a private limited company as a general partner) and Gesellschaften bürgerlichen Rechts (Civil society partnership) – to name a few – these are presented in the
Annex I: Legal forms and uses (see p. 57).

While many of these models were created around a guaranteed feed-in tariff, now the rapid cost reduction makes RE also viable alternatives in countries without such a price guarantee. Photovoltaics' investment costs in Germany – which is still a global reference market – have decreased between 2005 and 2015 by around 75 % to about 1300 Euro/ kWp for medium-sized 10-100 kWp rooftop installations (Fraunhofer ISE, 2015). These price decreases allow a new range of investors to join energy production particularly or self-consumption models. Community involvement models are spreading internationally beyond high-income countries like Germany, Denmark or the US. In Argentina – a country with a long tradition of energy cooperatives – we found examples of cooperatives taking the lead in investments in renewable energy already in the mid-nineties. The first successful experiences have been made for example in Costa Rica and Chile with net metering models. Once a business case is established for RE and the framework conditions allow communities to participate, they are eager to engage in a sustainable energy revolution.

1. Introduction

The leading idea behind community involvement in the energy sector is that benefits of energy development can accrue to private citizens, as consumers or producers. With huge investment needs in the energy sector, equity of regular citizens and small businesses can be tapped to *access financing*, while at the same time channelling back profits to society increases the *social acceptance of sustainable development* and renewable energy (RE) expansion. Particularly for rural communities, that export electricity to urban and industrial centres and do thus not necessarily benefit from the electricity generation, participation in decision-making and in profits is a question of *fairness* and a prerequisite for *local acceptance* of the energy infrastructure installed. Additionally, funds channelled into the communities can be beneficial to *social and cultural life*. Local community involvement can also *strengthen local economic cycles.* RE projects can create temporary or sometimes long-term jobs and profits of the local investors are invested back into the community and benefit the local economy further. Particularly if communities are taking over the driver's seat in a project, they develop important cooperative *skills and empower* themselves and the community.

The Danish Vindmøllelaug (wind turbine guilds) movement can be traced back to three families living in Ny Solbjerg on the outskirts of Aarhus. After the sharp rise in oil price in 1979 the families, who had previously shared a snowplough, decided that they should club to buy a wind turbine together (The Renewable Energy Partnership, 2004). From then on, individuals and communities have started to get involved in all aspects of modern RE production encompassing electricity and heat generation including heat networks from renewable sources such as small-scale hydro power, wind, photovoltaics, solar thermal, biomass and geothermal.[1]

There are many different forms of community involvement in RE projects, in respect to the number and type of benefits and the degree of participation. Community projects are legally often structured in a special purpose vehicle (SPV). The SPV can be managed by highly participatory entities, or by corporations that are not responsive to affected tiers of the population, therefore a differentiation along the lines of legal set-ups does not seem adequate. Instead, this report uses a clustering methodology based on four criteria: (1) *openness to non-institutional, non-local investment*, (2) *creation of benefits for the Wider Community*, (3) *openness to or active mobilization of non-institutional local investment* and (4) *making decisions locally through communities*. The criteria clustering model is presented in the following section (p.11 ff.)

With these criteria, four types of community involvement were identified that are described in detail giving a series of illustrative examples. These four types are (1) *Open Investment Models* (p.18 ff.), (2) *Community Compensation Models* (p.23 ff.), (3) Community *Connected Models* (p.29 ff.) and (4) *Community-based Models* (p. 37 ff.).

Common legal forms to engage in renewable energy projects are sole proprietors, civil society partnerships, associations, foundations, cooperatives, in the case of Germany a limited partnership with a private limited company as a general partner (GmbH & Co. KG) and Public companies. Public agencies play a role as the supportive framework or as partners of community projects. The choice of a legal set-up depends on the duration and long-term strategy of a project, the business risks and liabilities distribution desired, the access to financing necessary, and the type of participation and democratic decision-making desired by the partners, the administration and reporting requirements, e.g. the minimum capital required. Special purpose vehicles are very common, among other things to limit liability. The legal options of setting up a project are therefore presented in a separate chapter (
Annex I: Legal forms and uses, see p. 57).

The study at hand will mainly focus on the German context and will refer to international experience, particularly European experiences, where suitable. We will discuss aspects relevant to all four models such as business models, investment risks and motivation of participation in separate chapters following the model descriptions (see p. 46 ff.).

Definitions of community involvement

Roberts et al. (2014) define "community power as projects where citizens own or participate in the production and/or use of sustainable energy." At the same time the authors refer to the work of Meacham (2012) and emphasize that "community ownership and participation [...] suggests that the community itself is taking at least some responsibility for aspects of the project" and that citizens move out of their role as mere passive consumers (Roberts et al. 2014; Meacham 2012: 3).

In the German discussion, Bürgerenergie (roughly translated into: *citizens' energy*) is more narrowly defined regarding this degree of participation. Degenhart & Nestle (2014: iii) define *"Bürgerenergie in the narrow sense"* as investment projects that are (1) not financed by large corporations but by natural persons or local businesses and farmers, who invest equity capital individually or

[1] Projects in the field of energy use reduction and energy demand management will not be specifically addressed by this report but the principles and approaches described can be adopted easily to these fields. Ifeu (2015) for example analyses community-based energy efficiency measures.

cooperatively in a (renewable) energy plant, if these (non-institutional) investors (2) hold at least 50 % of the voting rights and (3) are from/based in the region where the plants are constructed. *Bürgerenergie in the broader sense* applies if only one of the following components (a) 50 % voting rights or (b) regionally based is fulfilled.
In this study we focus on the involvement of a) non-institutional (NI) investors such as individual and small businesses and on benefits transferred to local non-investing community members. The study differentiates four models of involvement according to the following four criteria:

1. Openness to non-institutional, non-local investment
2. Creation of *Wider Community Benefits*
3. Openness to or active mobilization of non-institutional local investment
4. Making decisions locally through communities

Each of these criteria fulfils an important purpose that community involvement in the energy sector can deliver. In the following section, we will describe the four criteria.

Criterion 1: Openness to non-institutional investment

Openness to NI investment refers to the collection of mezzanine[2] or equity capital from NI investors, such as private individuals or small businesses. The investors do not necessarily live near the place of installation of the plants, but they receive some form of compensation or share in profits for their investment.

Purpose and effects of openness to non-institutional investment

Openness to NI investment offers new financing channels for institutional and NI investment of the RE sector. The invitation of citizens to participate in some form in the RE sector is also a means to introduce issues of sustainability and climate change in social consciousness and to create support for RE expansion.

Criterion 2: Creation of Wider Community Benefits

Classical local revenue streams generated from renewable energy projects are the return on investment and land rents or taxes. Other forms of benefits are e.g. job trainings for local residents or charities. In order to understand the benefit for the local communities, it is necessary to look at what a community is and who in this community benefits. The visual impact of wind farms, for example, often affects several municipalities, which might or might not be part of the administrative unit that receives tax payments. Land rents are typically only a benefit to land owning members of the community and only community members affluent enough to invest receive returns.

For this study, we identified two general types of community members. Those that are directly involved in the project, e.g. hold voting, profit participation right, or receive payments for land rented out for the construction of the plant, will be referred to as *Involved Community Members*. Those individuals that are outside of the project but local and can be negatively (e.g. visually) or positively (e.g. through incomes or improved public services) affected by the project form the *Wider Community* (Figure 1).

A more specific definition of the *Wider Community* and its boundaries will not be necessary for the purpose of this study. Specific definitions do exist in practice though: the Scottish Highland Council (2011) for example, bases its community definition on proximity to the site, visual impact, construction impact and number of inhabitants in the area. The Danish Promotion of Renewable Energy Act[3] considers all residents in a spatial radius of 4.5 km of a wind farm to be the relevant local community. The draft of the Bürgerbeteiligungsgesetz (~*citizen inclusion act*) Mecklenburg-Vorpommern 2015[4] considers 5 km appropriate (see p. 29). The UK Infrastructure Act[5] suggests the use of distance measured from the facility, the number of residents and administrative boundaries of any kind as criteria.

The generation of *Wider Community Benefits* refers to benefits going beyond the group of investors or landowners. Tax payments for instance can be such a community-wide benefit. In cases of RE projects being constructed on administrative community boundaries the sharing of taxes between all affected communities would constitute a *community wide* distribution of benefits.

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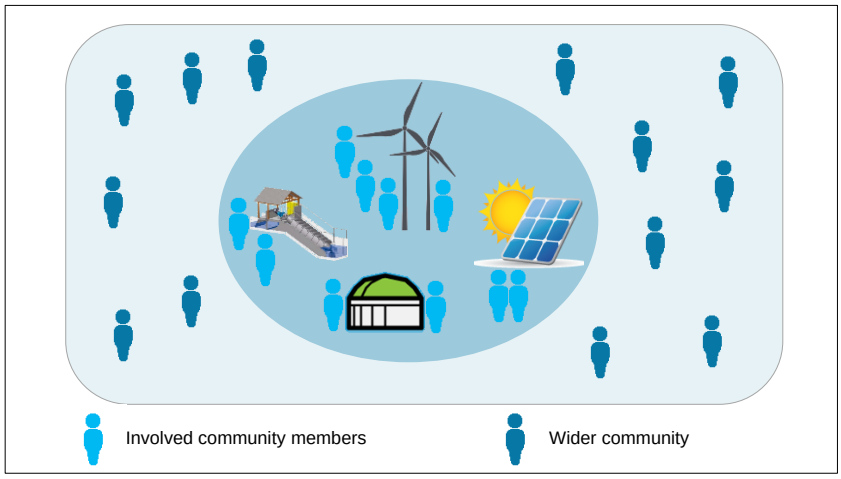
[2] Mezzanine capital is the layer of financing between a company's senior debt and equity capital. It ranks after senior debt and before equity, there is a self-liquidating element and the financing structure is frequently linked to the financial performance of the project (DEG, 2010).
[3] A translation of the Act can be found here: http://www.ens.dk/sites/ens.dk/files/supply/renewable-energy/wind-power/onshoRE wind-power/Promotion %20of %20Renewable %20Energy %20Act %20- %20extract.pdf
[4] Draft of the Bürgerbeteiligungsgesetz (~citizen inclusion act) Mecklenburg-Vorpommern 2015: https://www.landtag-mv.de/fileadmin/media/Dokumente/Parlamentsdokumente/Drucksachen/6_Wahlperiode/D06-4000/Drs06-4568.pdf
[5] UK Infrastructure Act 2015: http://www.legislation.gov.uk/ukpga/2015/7/contents/enacted.

Figure 1: Involved Community versus Wider Community of a renewable energy project



Source: own illustration

Purpose and effects of the creation of Wider Community Benefits

Community benefits are an important way to compensate the community for their *acceptance* of the project, particularly if most of the electricity is exported, e.g. to urban or industrial centres. Local tax payments, jobs or financial benefits like preferential electricity tariff can improve the local economic situation.

Criterion 3: Openness to or active mobilization of non-institutional local investment

Local financial participation generates a flow of returns on investment into the community where the energy is produced. This participation in the investment goes beyond openness to NI investment (criterion 1) because the project developers explicitly invite and facilitate investment from local community members. This facilitation can take place by explicitly advertising the offer locally or arranging preferential financing to those who otherwise would not be able to invest by e.g. allowing the minimum financial contribution to be particularly low. Those community members able to invest become *Involved Community Members* as shown in Figure 1.

Purpose and effects of the openness to or active mobilization of non-institutional local investment

In addition to raising equity funds – as in the case of criterion 1 – facilitating investment participation from local investors can also create *local acceptance* and enhance the notion of *fairness* towards a community. It provides the local community with the opportunity to participate in the profits that are generated by exploiting their local natural resources. Like in criterion 2, the local investment effect also creates economic cycles and strengthens the local economy. This can be particularly important for rural communities.

Criterion 4: Making decisions locally through communities

Decision-making power allows participation in the management and operation of the RE plant, such as the selection and control of the project operation staff, decisions on selling the project to another investor, choosing a construction company or decisions on the utilization of revenues such as offering communal co-benefits. The criteria (1) openness to NI investment, (3) local participation in investment and (4) local decision-making power all describe financial investment opportunities for NI investors. However, they differ in the degree of ownership of the local community. Even if community members participate as investors in a project (criterion 3) they are not automatically granted decision-making powers. Based on the definition of Degenhart & Nestle's *citizens' energy in the narrow sense* (2014: iii) criterion (4) is only fulfilled if local residents hold at least 50 % of the decision-making power in a project.

Purpose and effects of making decisions locally through communities

Community-based renewable energy is desirable because it strengthens *social capital*. The participants develop skills such as *teamwork, cooperation, bargaining* and *knowledge* to deal with administrative procedures and technology. Through community-based projects the participants experience *self-efficacy* and it helps community members to transfer their knowledge to other fields

even outside of the energy sector. Finally, community-based projects integrate people in the creation of a *sustainable low carbon society* and is therefore an important social pillar of energy system transformation.

Visualisation of community involvement

To assess how a specific model or project is involving the community according to the four criteria a visualization tool can be used. For the purpose of visualization the criteria are rated according to the system listed below:

(1) *Openness to non-institutional (NI), non-local investors* can be rated between 0 and 100 % of the equity or mezzanine capital collected from non-institutional investors.

(2) The *creation of Wider Community Benefits* can be rated from 0 to 4 based on the number of contribution sources or revenue streams to a community e.g. a RE project might (i) pay profit taxes locally with the municipality, (ii) carry out compensatory measures locally, (iii) explicitly employ and train local electricians and (iv) feed a foundation with a share of the profits. Some of these income streams can be legally required while others might be voluntary.

(3) *Local participation in investment* should be rated analogously to criteria 1 between 0 and 100 % of the equity or mezzanine capital collected from local investors.

(4) Similarly, we suggests to divide *local decision-making power* between 0 and 100 %.

The visualizations presented in the section Community Involvement Models of this study (p.18 ff.), depict "pure" models that only fulfil one criteria, while actual cases such as the wind farm of Schlalach (Figure 22, p.53) address more than one criteria. The definition of "local" depends very much on the context, examples of such definitions have been provided on p.11.

Table 1: Rating system for the four criteria description model

Rating	0 ☆	1 ★	2 ★★	3 ★★★
I) Openness to non-institutional, non-local investment	NI, non-local investors are not invited to participate	NI, non-local investors hold less than 50 % of the equity/mezzanine capital	NI, non-local investors hold more than 50 % but less than 100 % of the equity/mezzanine capital	NI investors hold 100 % of the equity/mezzanine capital
II) Creation Wider Community Benefits	0-1 benefit stream(s)	2 benefit streams	3 benefit streams	4 benefit streams
III) Openness to or active mobilization of non-institutional local investment	Locals are not explicitly offered shares	Locals hold less than 50 % of the equity/mezzanine capital	Locals hold more than 50 % but less than 100 % of the equity/mezzanine capital	Locals hold 100 % of the equity/mezzanine capital
IV) Making decisions locally through communities	Locals have no decision-making rights	Locals hold less than 50 % decision-making rights	Locals hold the majority decision-making rights	Locals hold all decision-making rights

NI: non-institutional investors

Source: own table

2. Models for community involvement in renewable energy technology

The fulfilment of one of the four criteria forms one of the four models of community involvement and community benefits (Figure 2) presented in this study.

The first model, complying with criterion (1), includes projects that – without specifying the geography – allow for non-institutional financial engagement, e.g. in the form of profit participation. This model is a financing scheme using equity from private individuals for renewable energy. The model will be referred to as (I) *Open Investment Model.*

In some cases, communities do not receive a return on investment but the *Wider Community Benefits* from an improved tax base or the creation of jobs during the construction phase of a plant. These projects will be described under the (II) *Community Compensation Model*.

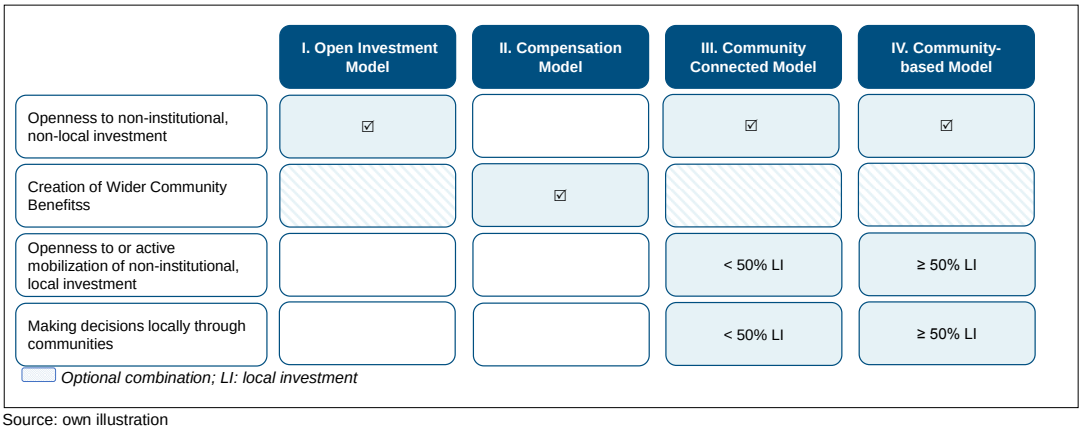
Projects that actively invite investments by the local community fall under model (III) the *Community Connected Model.* Particularly for communities exporting the electricity to other area, turning local community members into investors helps increase *acceptance* and *fairness*. Local decision-making is not necessarily present in this model and frequently the investors hold mere profit-participation rights.

The fourth model will be referred to as (IV) the *Community-based Model*. Community-based renewable energy is defined in accordance with Degenhart & Nestle's "*Bürgerenergie in the narrow sense*" as covering only those projects that allow for a majority of community ownership, where local communities can influence how the project is managed and can participate in the returns of the project. This definition includes projects of individuals or local businesses such as rooftop-solar and biomass projects. Even though these projects do not include elements of social cooperation, in a sense of joint implementation by several community members, they fulfil the criteria of decision-making power and of profits remaining in the locality.

In the following chapter we will describe each of the four models listed in Figure 2 in more detail.

In practice, projects frequently combine elements such as a community-based project will make use of crowdfunding to access additional investment from outside of their region. Even in cases of projects deeply rooted in the community, such as cooperative projects, benefits from the RE plant might be spread only among the associates (*involved members* according to Figure 1) rather than to the wider local community who do not invest. Therefore also this model might include a compensation add-on such as a charity.

Figure 2: Range of non-institutional involvement in renewable energy projects



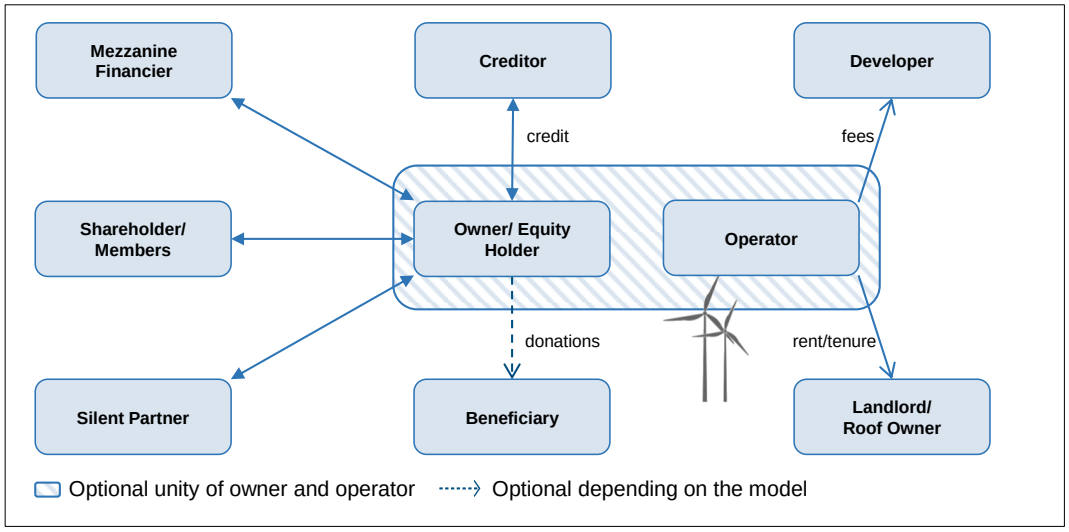
Source: own illustration

Stakeholder positions in renewable energy projects

In each of the four models presented, communities take over different roles in the energy project. Figure 3 illustrates the range of stakeholders and roles, which can be involved in a renewable energy project. At the centre of the diagram one finds the owner of a RE system, who might rent land (e.g. for a wind turbine) or a roof (e.g. for a PV system) from a landlord or a roof owner. The RE owner can assign a developer with the planning of the system as well as an operator for the operation of the system. The owner is

responsible for collecting the necessary capital – this can be equity capital (from shareholders/members, mezzanine financiers or silent partners) or debt capital (usually from commercial banks in form of credits). Further, the owner/equity holder might be engaged in charitable activities via donating to a charity (e.g. an association or a foundation).

Figure 3: Stakeholders in a renewable energy projects



Source: own illustration

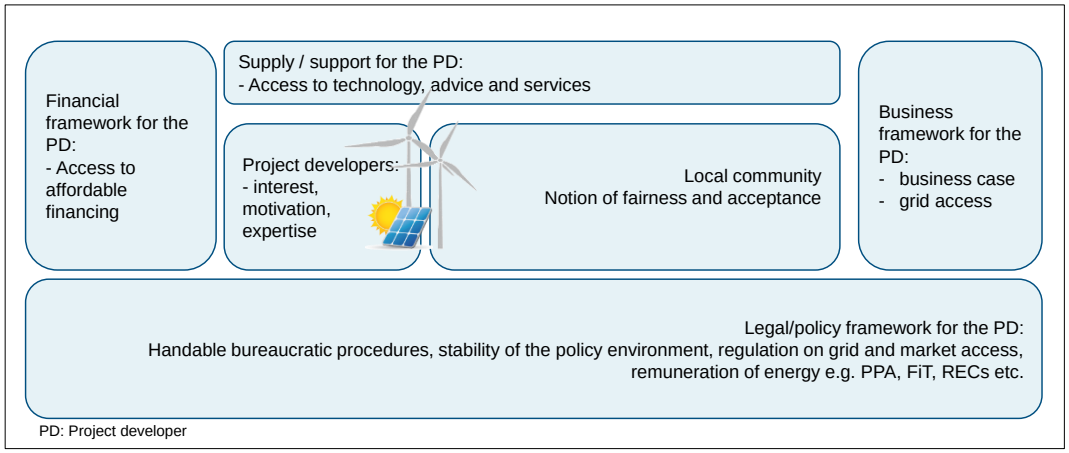
In the models presented in this report, the community takes on different roles. They can be a) investors, b) recipients of a flow of benefits e.g. from a charitable foundation or c) be present as *Involved Community Members* in the centre of the project as its co-owners and decision-makers. The *Involved Community* can also assume the role of the operator of their plant.

Enabling environment for renewable energy projects

In the following, we have adapted the *Theory of No Change* (Wörlen & Rieseberg 2015) to a similar framework that includes barriers as well as supportive elements for project developers and the *Involved Community*. For each of the four models we will apply the same structure to analyse the enabling environment along the following fields: (1) project developer, (2) supply chain and support network, (3) financiers, (4) local community, (5) business/market framework and (6) legal/policy framework.

The purpose of this analytical model is to assess key barriers, and understand what interventions or support structures are helpful to improve framework conditions. Figure 4 shows the enabling framework for RE projects in general.

Figure 4: Enabling environment for renewable energy projects



Source: own diagram

In the next section, we present the application of this framework to renewable energy projects, independently of concerns of community involvement (Figure 4). Since community involvement can only take place, if renewable energy projects in general are feasible.

(1) Project developer

Project developers (PD) need to be *interested and motivated* to engage in renewable energy projects. The project developers need to *trust the technology* and their equipment. They need to have *sufficient expertise* to deal with their respective project and its technology. The PD needs to *act responsibly* securing the sustainability and safety of the project and need to follow procedural rules such as carrying out a public consultation process.

(2) Supply chain and support network

Project developers need access to affordable and reliable renewable energy *technology* and the respective networks of *services and maintenance* industries such as electricians etc. Equipment, spare parts and services need to be available in *adequate timeframes* and at *adequate cost*. Access infrastructure to the renewable energy site and the grid needs to be in in place. Project developers need skilled human resources and technical expertise in the supply chain. Further the PD might need *advice and services* such as lawyers and tax advisors. Support networks can be chambers of commerce or business *consultancies* that offer information about the sector.

There can be a number of reasons due to which the supply chain, the service industry or the support networks fail to deliver: The industry may suffer from a *lack of expertise* to provide the technology or the necessary services. If the market is too small or unwilling to pay, they might a *lack of a business model* e.g. a lack of market size. Even if a potential markets exists, the industries may *lack the capital* to tap the newly emerging market. Support networks though a soft rather than a hard barrier might not exist for a certain market or may not be able to provide the necessary information to project developers.

(3) Financiers

The RE project needs to be *affordable* for developers. Developers can be equipped with sufficient equity capital, or need access to affordable financing.

Financiers face their own difficulties and barriers to provide financing to project developers. Investors, such as commercial banks, need to be sufficiently endowed to lend the capital needed, *interested and motivated* to invest in renewable energy, and sufficiently experienced to assess the project. The business model needs to be *trustworthy and sufficiently profitable* to pay dividends. Several potential barriers of the financiers lie within the legal and policy framework such as investment permissions and tax incentives for investments and can only be tackled there.

(4) Local community

Involved Community Members are those that profit from a project, e.g. they are owners, investors or benefit from land rents. Even if some community members might profit from the project, the wider local community as a whole needs to accept the project in its vicinity. Opposition may lead to lengthy lawsuits, resistance of local authorities and in the worst case to active civil resistance. A project developer therefore needs *acceptance* of the project to proceed.

(5) Business/market framework

The project needs to demonstrate profitability, i.e. *the business model needs to be viable*. The project needs to show the necessary *cost-effectiveness of the business model*. In many countries, this is only possible if an adequate *regulation*, e.g. FiT is put in place. In cases when market participation is already cost-effective or affordable for consumers such as if renewable energy tariffs can be offered or self-consumption models, *consumers* still need to be *interested* or motivated to purchase the energy product.

Many other aspects of the business framework are essentially decided within the policy framework such as regulations on the market structures, e.g. application process to become an energy utility, or rules on *grid access*. Other elements of the business framework such as the cost structure need to change within the supply chain.

(6) Legal/policy framework

Policy framework for the business model: Renewable electricity needs to be competitive with alternative energy production. While falling technology prices increase competitiveness, fossil fuel subsidies distort the market. In many countries, RE subsidies, preferential prices for RE, or RE tax benefits exist to allow a business case for RE. Other adequate framework conditions can be constituted by RE obligations or net metering (see p. 46 for RE business models). Investors need to have sufficient trust in the legal and political system over the time of the project, e.g. over the 20 year FiT period. This trust can be created by political commitment e.g. renewable energy targets and related policies. Other important policies affecting the cost structure are regulations of tariffs and taxes of equipment as well as import licenses.

Policy framework regarding finances: Policies in the field of financing are among others the availability of subsidised loans or of securities, tax deductions for investments in RE but also licensing requirements for investment offers.

Policy framework regarding the market access: RE projects need access to the energy market and to the grid and ideally preferential grid feed-in for RE. Policy makers need to pass regulation on grid codes. Grid access needs to be enforced against transmission and distribution grid utilities. Bureaucratic procedures such as energy production and market participation permits need to be transparent, simple and fast enough for project developers to be willing to engage in the sector.

Policy makers might not create these frameworks if they perceive RE to lack *cost effectiveness*. This might occur if they lack understanding of benefits and co-benefits of RE, so that in their understanding the "costs" outweigh the benefits. They might have little *interest* and personal or public energy preferences may differ. In other cases, policy makers might lack the *expertise* and information or the funds to put the necessary regulations in place.

Community involvement to overcome barriers

Only if framework conditions are favourable for renewable energy projects in general, and constitute a risk-reduced investment environment, community involvement models can be put in place. At the same time community, involvement models can be a solution to barriers in many stakeholder dimensions. Early on communities have acted as *(1) project developers* long before professionals were interested in the field of RE. Compared to commercial banks or other institutional investors such as pension funds citizens in Germany were willing to invest over longer terms and accepted lower returns (see also p. 48 on investment motivations),reducing the financing costs (*dimension (3) financiers*) of renewable energy considerably. In dimension *(4) "local community",* community involvement can counteract opposition to RE infrastructural projects.

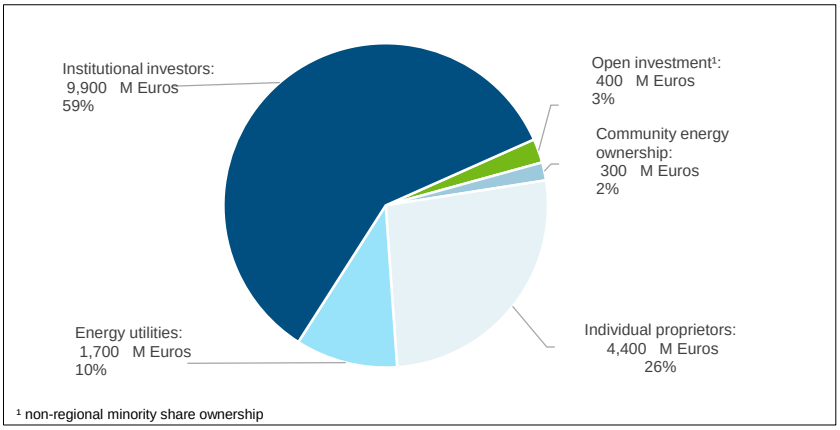
Model I – Open Investment Model

Description

In the Open Investment Model individuals or businesses can participate financially in a project, e.g. in the form of holding a junior bond or participation right. Non-institutional investment brings equity and quasi-equity to the project developers. The stakes are sold via offers from banks, crowdfunding websites etc., but most often via direct marketing by the project developers. Apart from shares, they can also be offering a bond, a credit or a loan opportunity to non-institutional investors.
Open Investment participation is in theory feasible for any RE technology. Most often it is used to collect funds for medium to large scale investment projects (several M Euro). The lender's capital is often repaid over the lifetime of the project with fixed instalments covering interest and principal payments. The investment projects pay a dividend, interest or – in the case of rewards-based crowdfunding – rewards.[6] Return on investment can be fixed or connected to the profitability of the project.

Open investment in Germany is the most important tool to collect the necessary funding for a project. Figure 5 shows the data analysis of Nestle & Leuphana (2014) on RE investment volumes in Germany for the year 2012. Open investment from citizens who do not live near a RE project and own only a minority of shares in the project, amounted to 400 M Euro most of which was invested in wind energy projects. Communities invested 300 M Euro collectively in RE projects with the community holding majority ownership and where investors live close to the project, 70 % of the investment went to wind energy projects. Individuals invested 4,400 M Euro in their own projects, 90 % of which are PV projects.

Figure 5: Net investments in renewable energy projects 2012 in Germany



Source: own adaptation from Nestle & Leuphana (2014)

Investments in open investment projects can be limited by a variety of criteria e.g. limited to cooperative members, to customers of an energy utility or a bank. The Open Investment Model differs from the "Community Connected-model (III)" by the fact that financial contributions from the local community at the sight of the RE project are not specifically invited or facilitated. An example of possibly blocking locals from investing is to target affluent investors by setting a high starting share. Therefore, in Open Investment Models returns are not necessarily steered back into the affected communities. Community members are not involved, nor are benefits deliberately transferred to the community (compare Figure 1). The investors that benefit financially are in unspecified locations. Training of the local workforce or other impacts on the local economy are not necessarily promoted. With respect to the stakeholder position (Figure 3), NI actors are positioned as investors outside of the project (left side of Figure 3). Assuming that the reception of benefits or local community involvement will counteract against the objection of vicinity of the RE plant, the social benefits of connectedness, *local acceptance* and safe guarding against "Not in my backyard" (NIMBY)[7] attitudes are not delivered. Still, it is a form of "Bürgerenergie" (citizens' energy) and those citizens that own stakes on these renewable energy facilities are developing a special relationship with green energy.

Different project developers or owners in various legal forms make use of this model. In Germany the most common legal forms utilized for open investment are GmbH, AG, e.G. or GmbH & Co. KG (see p. 57 ff. for details on these forms). In cases of significant involvement of community members, e.g. if a community initiates this model and uses open investment to collect equity capital, the Open Investment Model functions as a financial vehicle in the Community-based Model (IV).

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[6] Rewards-based crowdfunding as opposed to donation-based crowdfunding is the funding of a company or project by selling small amounts of equity to many investors with an expectation of return on investment returns. A famous model is the company Mosaic collecting rewards-based crowdfunding sums and channelling them to renewable energy projects (ASU, 2014).
[7] NIMBY = "not in my backyard" refers to the objection to the construction of something perceived as unpleasant or hazardous in their own neighbourhood, especially while raising no such objections to similar developments elsewhere; (Oxford Dictionaries - definition of Nimby)).

Enabling environment for Open Investment Models

The following section discusses the framework conditions that should be in place or that could form barriers if missing to successfully establish an Open Investment Model. The description follows the system laid out in section "Enabling environment for renewable energy projects" (see p.15). For this model the enabling environment must be nurturing for project developers as well as for the NI investors.

(1) Project developers

In contrast to RE projects without investment from non-institutional actors (compare p.16), project developers need to go through additional effort to attract NI investment.

(2) Supply chain and support network

For the project developer the framework conditions regarding the supply chain and support network do not differ from those outlined for regular RE projects (compare 16).

For the non-institutional investor: This model requires a distributional infrastructure that brings investors and project developers together. NI investors need to be able to get *informed* about the investment offers from RE project developers. Most of these offers are *distributed* via commercial banks or crowdfunding website that ideally secure the minimum standards for an investment and thereby establish trust, e.g. by undertaking reviews of their offers. Legal requirements should be in place to protect investors from dubious offers.

(3) Financiers

Affordability: Non-institutional investors need to have sufficient disposable income available.
Interest: The investors need to be *interested* in the participation and decide against alternative investments or consumption.
Expertise: Citizens only participate as investors in this model. In contrast to Model IV, no technical knowledge is needed to participate. Some level of *expertise* is necessary to be able to understand the investment risks to the investor.

(4) Local community

As in any RE project, practicability relies on the local willingness to accept the project without any specific compensation or *empowerment* of the local community.

(5) Business / market framework

Competition for non-institutional investors: If alternative investment opportunities exist that provide higher returns on investment at equally low risks these act as competitors for the project developer. In Germany investment opportunities with comparable risk-return profile are rare. All other aspects regarding the viability of the business case were described already on p. 16.

(6) Legal/policy framework

RE investment by non-professional investors has gained considerable momentum in Denmark, Germany, some US-states and the UK – to name just a few. For the model to be usable, the legal framework conditions and the protection mechanisms for non-professional investors need to be in place. The most basic condition for the Open Investment Model is the legal opportunity for project developers to collect money from NI investors. According to transparency regulations, this normally requires an investment prospectus that satisfies a set of predefined criteria in terms of the risk and sensitivity analysis provided.

Legal requirements on this aspect differ widely between countries. US legislation on the protection of investors, for instance, does not allow reward-based crowdfunding in the majority of US states. Germany has fewer regulations regarding the collection of equity capital than countries like the US. The Vermögensanlagengesetz (~Investment Act) regulates publicly offered investments, and stipulates, amongst other things, that for the majority of investment offers, a sales prospectus needs to be published. In July 2015, the *Kleinanlegerschutzgesetz* (~the Act for the Protection of small investors) was passed and the publication regulations were reinforced. Exemptions of the obligation to draw up a prospectus are, remained for crowdfunding, social and charitable projects as well as for religious associations (BaFin n.d.).

In the UK the offer of community shares, specifically in the form of withdrawable, non-transferable shares issued by societies registered under the Cooperative Societies and Community Benefit Societies Act, is not a regulated activity and falls outside the scope of the Financial Services and Markets Act 2000. The Community Shares Unit (Community Shares Unit n.d.), a government

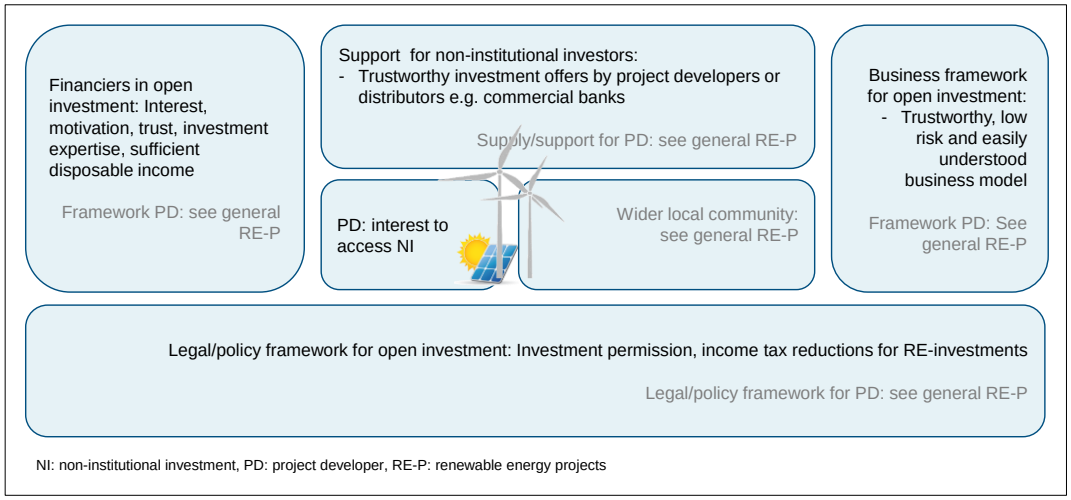
supported organisation, develops and promotes standards of good practice for community share offers as part of its commitment to encourage voluntary self-regulation.

Policy framework regarding the tax system: Roberts et al. (2014) suggest that tax frameworks should be adapted to allow for preferential tax rules, e.g. income tax exemptions or reductions, for individual investment in renewable energy.

The framework conditions regarding regulation of the energy remuneration, market and grid access do not differ from those outlined for regular RE project (compare 16).

Figure 6 shows a summary of the enabling framework conditions of Open Investment Models.

Figure 6: Framework conditions of Open Investment Models



Source: own diagram

Risks of the Open Investment Model

Since the model potentially carries considerable investment risks, a protection particularly for low-income households is important. The main risk involved in the Open Investment Model is the complete loss of the money invested. In this respect renewable energy projects do not differ from any other investment form.[8] The experience in Germany is for instance that some wind farm projects were overly optimistic e.g. regarding the wind conditions. Therefore many private investors need to deal with the risks that profits might be lower than promised (FAZ, 2014, Deutschlandfunk 2013).

Summary and examples

Table 2 shows a summary of the main characteristics of the model and Figure 7 depicts the Open Investment Model's ranking graphically. The following section presents a series of examples.

Table 2: Summary of the Open Investment Model

Participation model	Open Investment Model
Description of the model	The project allows for NI financial engagement, e.g. in the form of profit participation, without a specific emphasis on local connection.
Openness to NI, non-local investment	★ to ★★★ The project collects up to 100 % of its required equity/ mezzanine capital from NI investors. The degree of investment collected from NI actors can be a variation of this model.
Benefits	
Benefits of Involved	Land/ roof rents, local investment is not deliberately invited therefore RoI mostly does not remain locally

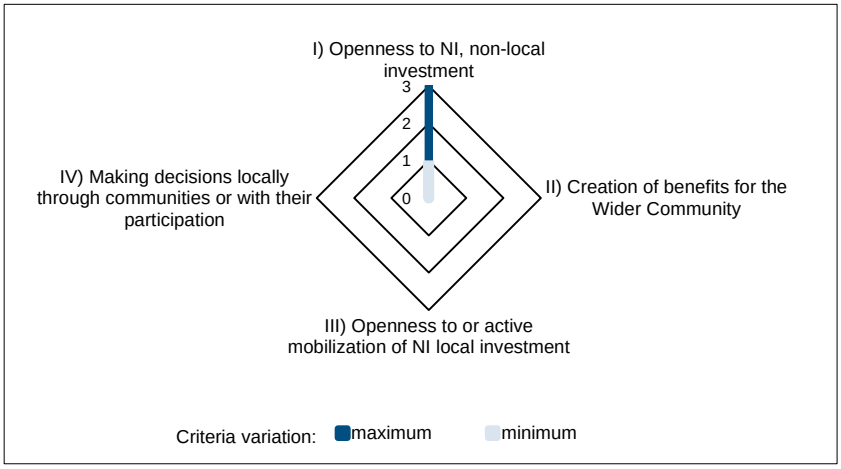
[8] An illustrative example of the risks involved is the example of German wind farm project developer PROKON. The company had handed out profit participation rights totalling a value of 1.4 bn Euro to 75.000 investors. In 2015 shareholders expected losses of 42 % after complex insolvency procedures (Manager Magazin, 2015).

Participation model	Open Investment Model
Community Members	
Wider Community Benefits	☆ No benefits are delivered to the local community, the model can be combined with a "compensation model"
Local participation in investment	☆ Local participation is *not* deliberately invited or facilitated, individual community members might get involved autonomously.
Community involvement in decision-making	☆ Locals have no decision-making rights
Phase of this involvement	No community involvement beyond legal requirements
Local competencies required	Investors need to be sufficiently skilled to assess the investment risks.
Most common legal forms in Germany	GmbH, AG, e.G., GmbH & Co. KG
Suitable business model	Any complexity depending on the professionalism of the project developer.
Financing scheme	Open Investment is the capital acquisition from NI investors.

Source: own table

Figure 7shows the community involvement in a "pure" Open Investment Model where only the degree of investment collected from NI actors is a variation. In this case no benefit streams to the community are assumed, a combination with the compensation model allowing for a minimum of wider community benefits (e.g. due to tax law obligations) occurs frequently.

Figure 7: Ranking of the Open Investment Model according to the four criteria



Source: own diagram

Example 1: Open Investment: Lacuna wind farm Hohenzellig, Germany

The following example for an Open Investment Model is the case of the Lacuna Wind Farm. The wind farm consists of eight wind turbines with a total capacity of 19.2 MW. The Nordex turbines with 2.4 MW capacity each were installed in 2014. The park is planned and constructed by the Lacuna/FRONTERIS-Group. The Lacuna AG is the distributor of financial products of the Lacuna Group and as such the issuer of shares. The total financial project volume is 43,400,000 Euro with an equity share of 11,960,000 Euro (~28 %) (Naturfinanz NF n.d.). The minimum stake is 10,000 Euro plus 5 % agio (an additional transaction fee). The business model of the wind farm is based on the guaranteed FiT, additional returns may occur due to direct marketing at the wholesale market. Risks for the investors include the complete loss of their investment (Lacuna 2014).

Website: http://www.naturfinanz.de/sachwerte/windpark-hohenzellig-in-bayern/

Example 2: Wind farm Frehne (Landkreis Prignitz), Germany

The energy utility EnviaM offered citizens a share in a wind farm in the German state Brandenburg. They could sign shares between 1,000 and 20,000 Euro with a guaranteed interest of 4 % p.a. independent of wind speed situation and further an additional interest of up to 2 % based on the wind yield. 800 individuals signed shares.

Website: https://www.enviam.de/irj/go/km/docs/z_ep_em_unt_documents/unternehmensportal/Privatkunden/2_Strom/2.6_Neue-Energien/BroschuereWindpark_Frehe.pdf

Example 3: Crowdfunding webpage– CITIZENERGY, EU

CITIZENERGY is an EU online platform that brings together renewable energy crowdfunding platforms and cooperatives from across Europe in one, easy to navigate space. It offers EU citizens the opportunity to invest in renewable energy projects across Europe.

One example for a project that is crowdfunded is Valle Hermoso, a PV plant of 2.2 MWp in Alcolea del Rio, Sevilla in Spain. The land where the facility is located is rented by Som Energia for 25 years. Som Energia is a Spanish renewable energy cooperative, which is steadily growing. As a non-profit cooperative Som Energia started selling green energy from existing sources in October 2011. Meanwhile they are developing their own RE projects to produce energy for their members. They have already invested 3.6 M Euro from their associates in several PV plants, one biogas and one and biomass project.

Website: https://citizenergy.eu/citizenergy/site/view-project?e=e7s1&i=9

Model II – Community Compensation Model

Description

In Compensation Models the wider local community receives some form of benefit from the RE project. The provision of benefits resulting from a project to the community facilitates personal association with the project as well as public awareness thereby increasing the *acceptance* of a renewable energy project. In many cases however, benefits of renewable energy to the community neighbouring an installation are very limited, because neither production nor service industries are based in the community and even the initial construction personnel travels into the community from outside. Taxation systems can be organised in such a way, that taxes are paid based on the location of the registered office of the plant owning company rather than based on the location of the plant. If however, the framework conditions are adjusted to maximise local benefits, e.g. by contractually securing payments into a foundation or by restructuring taxation systems, local communities can reap a number of benefits from renewable energy projects. Examples of such benefits are (a) financial benefits (b) environmental benefits or (c) social benefits are listed in Table 3.

Table 3: List of possible local benefits of renewable energy projects

Possible benefits
(Quasi) Financial or market benefits: [1]
▪ Deliberately promoting local job creation and local job markets (e.g. for the construction, supply or service industry),
▪ Improving local infrastructure
▪ Offering training opportunities
▪ Investments in further energy projects e.g. Via a foundation
▪ Lower prices for electricity/ hot water or heat
▪ Household energy efficiency measures
Environmental benefits:
▪ Improvements to the *local* environment e.g. compensatory measures[2] reforesting public land
▪ Donations to foundations supporting local environmental projects
Social benefits:
▪ Infrastructure such as streets or grids laid out in a beneficial way to the community
▪ Social spending through increased public income
▪ Charitable community benefit fund that supports local community activities

[1] The benefits of community ownership such as returns on investment from ownership or loans are covered by the other community involvement models I, II, IV
[2] Compensatory measures are intended to offset the environmental damage of a construction, e.g. a loss of a habitat can be offset by planting trees or reversing soil sealing elsewhere.
Source: own compilation

With respect to the stakeholder position (Figure 3, p.15) local actors in the Compensation Model are positioned outside of the project and receive charity or benefits. In the Compensation Model both *Involved Community Members* (compare Figure 1) e.g. those renting out farm land and the wider local community reap benefits from the project. The community might step into the process deciding on their benefits early if they have local planning powers and the community council needs to approve of the plant.

Enabling environment for Community Compensation Models

The following section is describing the frameworks conditions that should be in place or that could form barriers if missing, to establish Community Compensation Models that are meaningful from the community's point of view. The principal agents for whom framework conditions need to be adequate are the project developer and the benefitting community members.

(1) Project developer

For the project developer the conditions do not differ very much from RE projects without compensation (compare p.16), but the PD might need to engage in a negotiation process with the community about *Wider Community Benefits.*

(2) Supply chain and support network

For the project developer the framework conditions regarding the supply chain/ support network does not differ from those outlined for regular RE project (compare p.16)

Community receiving compensation: Trustworthy institutions and advisory support networks to help communities bargaining the compensation are particularly helpful for communities confronted with RE projects for the first time (compare Example 7Baywind Energy Coop (p.34) for an example of such networks).

(3) Financiers

The same conditions as outlined for general RE projects apply (see p.16).

(4) Business/market framework

The business framework conditions necessary to allow for renewable energy projects in general apply (see p.16).

(5) Local community

Motivation to get involved: For compensations going beyond legal minimum requirements, a number of community members need to get involved with the project and initiate the necessary discussion and negotiation processes in the community and with the project developer.

Expertise: The community receiving compensation should have a minimum expertise to negotiation their voluntary benefits. Prior to the negotiation the community should clarify who affected residents are, e.g. including neighbouring communities and what the *Wider Community* needs.

Resources: The community should clarify how to administer compensation payments and weather enough resource and abilities are available in the community, e.g. volunteers to run a charitable foundation.

Even if a community receives compensation not all residents close to a RE plant might agree or benefit, therefore *acceptance* cannot be guaranteed. For the project to be successful, the *Wider Community* members need to accept the compensation result as fair and adequate.

(6) Legal/policy framework

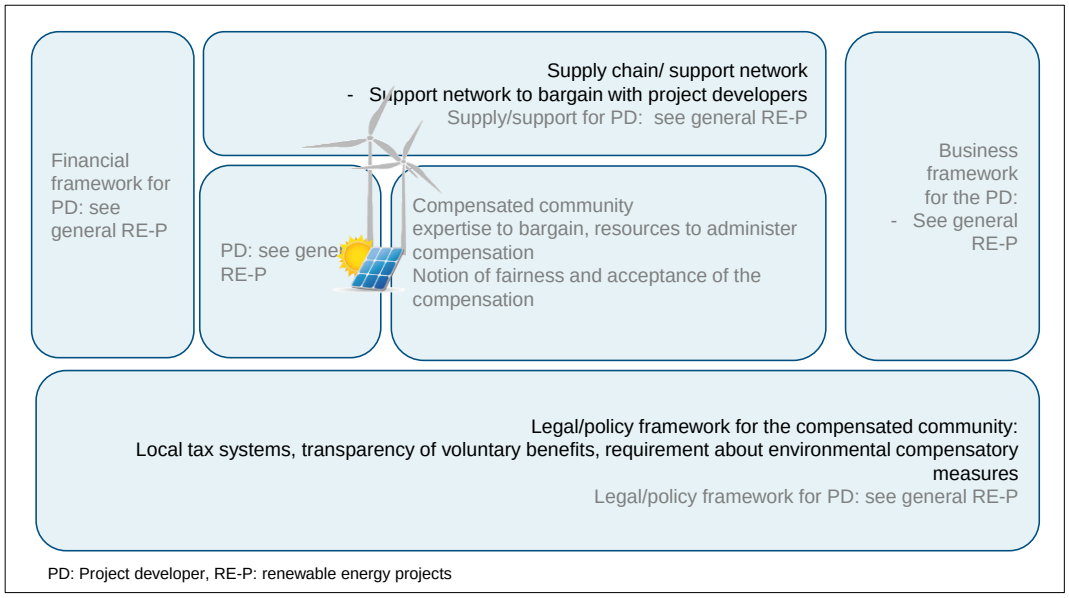
Community compensation models should be based on legal minimum standards such as local tax payments, compensatory environmental measures and compensation payments if the real estate prices are heavily affected by the plant's construction.

Beyond legal minimum contributions, transparency about additional voluntary contributions is important. Scotland is an example of a well-established voluntary contribution system: The Scottish Government has launched a Community Benefit Register (CBR n.d.) to "*encourage transparency and consistency in the community benefit process and help communities to negotiate with developers*" (SPICe 2012).[9] The government further on published a Community Renewable Energy Toolkit (Community Energy Scotland Limited 2011) to support community groups to develop renewable energy projects including outlining models to deliver community benefits (SPICe 2012). Community benefit payments from wind farms are frequently designed as index-linked payments of £/ per MW per year, the register allows communities to compare the benefits they receive.[10] The register also lists the purposes that the funds are used for, ranging from energy efficiency measures, renewable energy, youth sector, community buildings and sports to culture and heritage. DECC has introduced a community benefits register for England analogous to the Scottish one.[11]

Figure 8 shows a summary of the enabling framework conditions of community compensation models.

[9] The Scottish register can be found here: http://www.localenergyscotland.org/view-the-register/
[10] Other indicators for the contributions used in Scotland are for example payments per MWh generated, fixed per year, as a percentage of profit, community buy in / share schemes.
[11] The English register can be found here: http://www.communitybenefitsregister.org/

Figure 8: Enabling environment for Community Compensation Models



Source: own diagram

Risks of Community Compensation Models

Voluntary contributions have the characteristic of goodwill contribution and are used as a compensation device. The nature of these contributions is highly debated and by some actors labelled as a "*bribe*" (in Roberts et al. 2014), as a "*carrot or stick approach*" or as "*undermining the impartiality of the planning process*" (in SPICe 2012). Some research suggests that community benefit packages may not in all cases lead to increased acceptability of new renewable electricity developments (Cass et al. 2011), which would indicate that additional models like Community Connected Models (III) should be combined with compensation models.

A further problem funds and foundations pose, is that they require doubling administrative infrastructure, which does exist for tax systems but cannot be used for the trust fund. Not all communities can afford or find suitable volunteers for such administration (SPICe 2012).

Overly positive expectations regarding the possible benefits lead to disappointments and damage the reputation of RE projects, this was the experience in some German communities were expectations for tax revenue did not materialize (Die Welt 2012).[12]

Summary and examples

Table 4 summarize the main characteristics of the Compensation Model. The following section presents examples of Compensation Models.

[12] Due to the use of loopholes and exemptions, many wind farms in Germany ended up paying considerably less taxes and this led to the disappointment of the communities. Among those loopholes are e.g. tax exemptions: a series of project developers reduced their commercial taxes excessively by splitting wind farms into individual companies for each turbine (Richter n.d.).

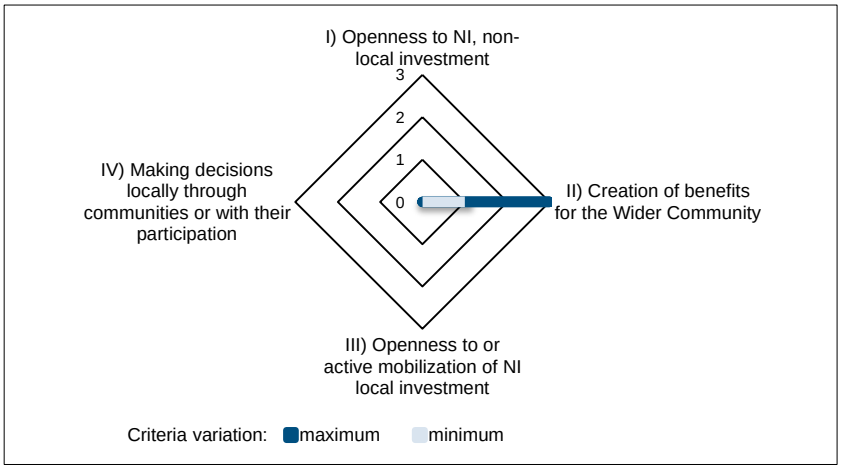
Table 4: Summary of the Community Compensation Model

Participation Model	Community Compensation model
Description of the model	The project delivers a series of benefit streams to the local community.
Openness to NI, non-local investment	☆ The openness to investment is not a specific criterion but could result from the combination with an Open Investment Model.
Benefits	
Benefits Involved Community Members	land/ roof rents
Benefit of the wider local community	★ to ★ ★ ★ Several benefit streams to the local community.
Local participation in investment	☆ Local participation is *not* deliberately invited or facilitated.
Community involvement in decision-making	☆ Locals have no decision-making rights, but the community might get involved in negotiating their benefits if they have spatial planning responsibilities.
Phase of this involvement	The community might get involved in negotiating their benefits early on particularly if they have spatial planning powers.
Local competences required	None
Most common legal forms in Germany	Any
Suitable business model	Any complexity depending on the professionalism of the project developer.
Financing scheme	Any

Source: own table

Figure 9 visualizes the ratings listed in Table 4. The number of compensatory sources e.g. the legal obligation to pay taxes locally combined with a training program, varies between different compensation models. A combination with other models occurs in many examples presented in this study; looking at the list of projects of the Scottish Benefit Registry on the other hand, reveals that "pure" Community Compensation Models without community investment is the norm rather than the exception.

Figure 9: Ranking of the community compensation model in the four criteria



Source: own diagram

Example 4: The Whitelee wind farm, United Kingdom

The Whitelee wind farm is the largest wind farm in the UK. An access strategy was developed for the site, leading to the creation of 90 km of access tracks over previously inaccessible and rarely used moorland, and a visitor centre (SPICe 2012). The centre offers

interactive learning activities around the wind farm and renewable energy generation (Whitelee Visitor Centre n.d.). Whitelee has become an eco-tourist attraction with about 300.000 visitors between 2009 and 2014.

Website: http://www.whiteleewind farm.com/visitor_centre

Example 5: Ökologisch-Soziale Stiftung Zschadraß & Association Ländliches Leben e.V, Germany

The Ökologisch-Soziale Stiftung Zschadraß is an example of a combination of the community involvement models II, III and IV. In 2000 the community of Zschadraß, a village in the district of Leipzig in Saxony, developed a "Sustainable Zschadraß" plan targeting energy efficiency, as well as energy self-sufficiency of the community by 2050 (Gemeinde Zschadraß 2000). As of 2014, the share of renewable energy generated of total community electricity demand is 100 % and about 35 % of total community energy demand is provided by renewable energies (Heinrich-Böll-Stiftung 2014).

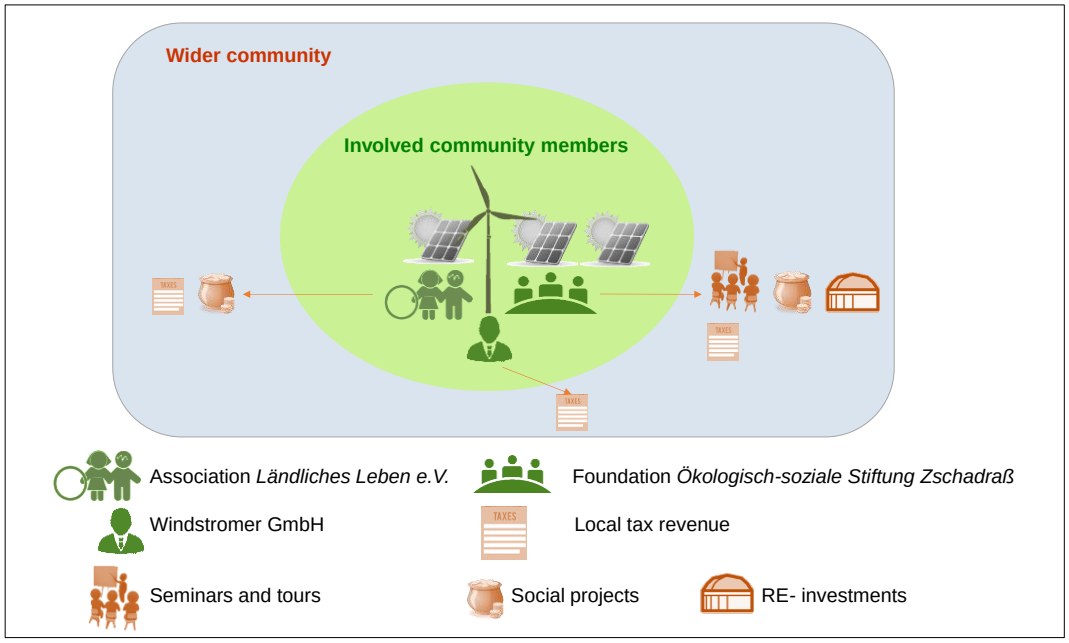
The Ökologisch-Soziale Stiftung Zschadraß – a foundation set-up in 2004 – co-finances the investments in RE. Since a municipal administration itself is legally not allowed to make profits from the renewable energy systems, many communities own municipal utilities, which again belong to the community and allow for profit-making and cross-financing other public services (AEE n.d.). Since Zschadraß did not have the financial or human resources to set up its own utility, the municipality decided to outsource the operation of RE systems to the foundation.

The foundation capital was donated. The board is composed of citizens of Zschadraß. The foundation reaps returns from their rooftop-PV projects on public buildings which would fall under the model of community-based renewable energy (Model IV, p. 37). The foundation also holds 5 % of the shares in a wind turbine set-up as a GmbH & Co. KG which was installed in 2009 (2.2 MW, investment 3.2 M Euro).
The citizens of Zschadraß have additionally formed an association "Ländliches Leben e.V." (*~rural life association*) that also invests in renewable energy projects. The association owns among other investments 15 % of the wind turbine company. The foundation and the association own one fifth of the turbine while the residual 80 % of investment comes from a private operator from the village. Since the entire investment is owned locally this involvement be categorized as a community-based energy model (Model IV, p. 37).

The *Wider Community Benefits* in Zschadraß in accordance with the Community Compensation Model are channelled both via the association and the foundation and are based on returns from their energy projects. The foundation channels the returns into ecological projects such as a biofuel-transit-bus, a solar thermal installation, construction of a wood-pellet system at a farm, visitor tours and seminars, and into social projects e.g. payment of school-food for lower-income kids and children's holiday camps (Colditz n.d.). The association funds the local kindergarten. The complete set-up of the community involvement in show in Figure 10.

Website: https://www.landwirtschaft.sachsen.de/landwirtschaft/download/09_20111122_Schmiedel_Zschadrass.pdf

Figure 10: Project structure of the Ökologisch-Soziale Stiftung Zschadrass and the Association Ländliches Leben e.V



Source: own illustration

Example 6: Wind farm Druiberg GmbH & Co. KG in Dardesheim, Germany

As in the case of Zschadraß community benefits are often connected to community-based projects. The case of Dardesheim is another combination of a community-based renewable energy project with *Wider Community Benefits* and is described in more detail in Example 6 (p.28). The village is located in the German state of Saxony-Anhalt with an installed wind power capacity of 66 MW. The wind farm is organised as a GmbH & Co. KG but with only local residents as partners. Profits are also channelled to a local charitable association Förderverein Stadt Dardesheim e.V. for use in local infrastructure and social projects or cultural events.

Website: http://www.energiepark-druiberg.de/
See also the movie (in German): Bündnis 90/ Die Grünen (2011). Neue Energie in Bürgerhand. https://www.youtube.com/watch?v=lCSjhPYAXks

Model III – Community Connected Model

Description

An alternative to the previous model are partnerships between institutional developers such as commercial project developers or municipal utilities and the local community allowing communities to buy into developments. In this model, commercial/institutional developers plan the project, operate the plant and own the majority of shares.
The local community can a) own shares in the project or b) own and operate a specific part of a renewable energy project, e.g. when an individual wind turbine is split off and handed over to citizens to own and operate. The Department of Energy and Climate Change (DECC 2015) refers to the former version of this model as **a) shared revenue** and the latter as **b) split ownership**.

In a *Shared Revenue Model* the community does not own any physical asset and its ownership is of the rights to an income stream. In depth technical and business knowledge is not required by the community if they are not involved in the planning stage. With respect to the stakeholder position (Figure 3) local actors find themselves in the position of financiers. The project developer is responsible for its operation and maintenance. Research on potential renewable energy projects in the UK found a preference for "low-level forms" of participation (Rogers et al 2008) which would speak for partnership models in which the community shares the ownership with a commercial developer, rather than models in which the community has full ownership.

In the S*plit Ownership Model* the community benefits from partnering with a developer who carries the risks at the early stages and brings the experience and competence required to bring a large-scale project to reality. The community members later split parts of the farm or park off and run it themselves. In respect to their position (Figure 3) the involved community is at the centre of the project. Increased knowledge is needed in the Split Ownership Model when plants are handed over to the community for operation and ownership.

The model is most frequently used for larger projects that are met by considerable public opposition such as on- or off-shore wind farms and open-free field PV plants. The Community Connected Model can be the result of a bargaining process for compensation (model II) with the community receiving investment rights as their compensation package.

The most frequent legal form used in Germany is a GmbH & Co. KG (see p.76) or if individual plants are handed over the communities form a cooperative (see p.71). This model can be merged with the Community Compensation Model.

Enabling environment for Community Connected Models

(1) Project developer

The project developer needs to be either willing or legally obliged to offer Shared Revenue or Split Ownership in the project. The other conditions do not differ from RE projects without investment from NI actors (compare p.16).

(2) Supply chain and support network

For the project developer the framework conditions regarding the supply chain and support network does not differ from those outlined for regular RE projects (compare 16)
Local community: As shown in Example 7: Kilbraur Wind Energy Cooperative (p. 34), support networks that provide advice and back-up during the negotiation process can be highly important to Community Connected Models.

(3) Financiers

Non-institutional investors: As in the case of Open Investments (compare p.19), the community members investing need to have *sufficient disposable income* available to invest, the *interest to invest* in RE projects rather than in other investments or consumer goods and need to trust the investment offer. Low-income levels are a challenge for Community Connected Models particularly because these groups cannot benefit from income tax credits or commercial low-cost financing. *Low minimum financial participation thresholds* and preferential loans are mechanisms to enable local low-income investors to participate nevertheless. Particularly in developing countries work-for-shares swaps can be an alternative in which working hours, e.g. during plant construction, is exchanged for profit participation rights.[13] Work for shares swaps are also an option in case of employee based renewable energy projects constructed at a company's property. As shown in Example 15 (p.42), the hosting company offered preferential loans to its employees for them to be able to buy shares in the project.

[13] An example is the South Lalitpur Electrification Campaign Committee in Nepal, to receive a grid connection communities must contribute at least 20 % of the total cost of grid extension one payment option is labour (TUED, 2015)

(4) Local community

Involved Community - negotiation expertise: In the absence of a legal framework, communities with sufficiently high expertise and motivation can bargain a right to invest as a form of compensation with project developers (compare p. 25).

Involved Community -motivation: To get involved in a RE project requires existing *social capital*, experience with social cooperation and/or strong leadership by individuals from the community.

Involved Community - Split-ownership model - technology expertise and time investment: As in the case of open investments (model I, see p. 20), community members getting involved in the project need sufficient investment expertise to understand the risks associated with the project, appropriate legal framework condition protecting non-professional investors.
As shown in Example 8- wind farm Schlalach- in case of a split ownership model, community members need additional motivation and interest to run their own RE plant. The community though does not need to get involved in planning and technology choices to the same degree as in a Community-based Model, but must nevertheless decide on a plant operator or carry out operation itself. Even when outsourcing operation and maintenance, the managerial responsibilities remain with the community.

The *Involved Community* members who invest in the project are part of the local community, nevertheless the remaining *Wider Community* (see Figure 1, p. 12), particularly those not financially capable or interested in investing in the project, must also be willing to accept the development. As in the case of compensation models (see p. 23) profit participation does not replace democratic participation processes and can even invite criticism of bribery intended to divide a community to reach official approval.

(5) Business/market framework

a) *Shared revenue:* If the project is operated by a professional operator the enabling environment conditions of general RE projects (see p. 15) apply.

b) *Split ownership:* If the community runs parts of the RE development autonomously the business framework conditions of a community-based renewable energy project (model IV, see p. 37) apply: business models should be particularly low risk, low complexity and offer long-term security. Regulations on communities' energy market participation and grid access need to be appropriately simple for non-professionals to master (see p. 46 for details).

(6.1) Legal/policy framework: Mandatory offer schemes

Among the enabling factors for the model are legal requirements to offer a minimum share of a project to the local community: This *right to invest* exists in Denmark and is considered by the legislators in the UK, Germany and Belgium.

Countries with formerly high levels of community-based renewable energy such as Denmark and Germany have seen cb-RE slow down or even come to a hold among others due to advances in technology (leading to the construction of larger plants with higher investment costs), advanced markets with highly professionalized project companies or the introduction of tender systems (Roberts et al. 2014). One attempt to counteract the decreasing share of community ownership, while at the same time tackling increasing public resistance to new projects, is the mandatory offering of shares to the community. Some countries have put in place structures to ensure the participation of local citizens in renewable energy projects – either in the form of voluntary recommendations or even mandatory regulations towards shared ownership.

In the UK the DECC taskforce suggests that meaningful levels of ownership imply a minimum share in the range of 5 % to 25 % (Shared Ownership Taskforce 2014) and introduced a voluntary protocol that encourages developers to offer a minimum of 5 % community ownership for projects worth £2.5 M or more. If the desired voluntary activities by the RE industry to offer ownership stakes to communities do not materialize, the Infrastructure Act Sections 38 and 39[14] offers the legal framework for the introduction of a *right to invest*. The *right to invest* only applies to projects with a total installed capacity of more than 5 MW. A stake may take any of the following forms (a) one or more shares in a company; (b) any other interest in a body other than a company; (c) an equitable interest; (d) a right to a royalty related to revenues, (e) a loan. The price of any "stake" must reflect a measure of fair value. There are also provisions dealing with how a fair value is determined by reference to the capital costs incurred by a developer (up to a maximum of 5 %). The legislation was criticized for setting the maximum offer with 5 % too low and the installed threshold of 5 MW to high (Social Economy Alliance n.d.). At the time of writing, a review of the voluntary process in the UK had not taken place yet.

The region of Walloon, Belgium drafted the 'Cadre de Reference' (Frame of Reference, still to be approved by the regional parliament) proposing a 24.9 % offer of 'direct' citizen participation and 24.9 % participation by the relevant local authority would be required (Roberts et al. 2014).

[14] The Infrastructure Act can be found here: http://www.legislation.gov.uk/ukpga/2015/7/contents/enacted

The Danish 'Promotion of Renewable Energy Act' (adopted in 2009)[15] stipulates a minimum of 20 % of the shares (20 % of the value/cost of the turbines) to be offered to any citizen (of 18 years or above) living within 4.5 km of new wind turbines, residual shares shall be offered to permanent residents in the rest of the municipality. A share corresponds to the price of 1,000 kWh, which is currently around DKK 3,000-4,000 (~400-539 Euro) and shall have equal cost, revenue, risk and influence structure as all other shares.

A proposition based on the Danish law was submitted in Mecklenburg-Vorpommern, a federal state in Northern Germany, in order to promote citizen participation in RE projects.[16] It would in essence require the developers of wind farms to give communities and citizens in the direct influence area ("Einwirkungsbereich") the right of first refusal to the purchase of shares totalling a minimum of 20 % of the project (Bringewat 2014). At the time of writing, the draft of the Act was undergoing inter-ministerial department agreement. The Act further stipulates a maximum share price of 500 Euro. There was no limit set to the amount of shares that can be purchased (FAZ 2015).

While the general scope of the Danish act and the Mecklenburg-Vorpommern draft can be considered similar, the German version differs in some important dimensions: 1) a fixed maximum share price, 2) prioritization of interested municipal buyers, 3) stipulated limitation of liability. Table 5 shows details of the Danish Act as well as the German draft legislation.

Table 5: Overview of mandatory enablement of community ownership legislation

	Denmark-Promotion of Renewable Energy Act (2008)	**Germany- Draft of the Bürgerbeteiligungsgesetz (**citizen inclusion act*) Mecklenburg-Vorpommern 2015**
Technology in focus	Wind turbines	
Minimum share to be offered	Min. 20 % of shares offered to the community	
Definition of eligible persons	First 50 available shares to eligible persons that live within 4.5 km of the project, remaining shares must then be offered up to eligible individuals that reside in the local municipality.	Residents, municipalities as well as associations of local authorities in a radius of 5 km to the project are entitled to rights to shares.
Regulations regarding the share price	• Shares may not be ranked lower than other shares in the company • The proceeds of the sale shall cover a proportional share of the erector's project costs, so that the erector and the buyers pay the same amount per share. The ownership shares shall be offered at a price calculated on the basis of a production of 1,000 kWh per share.	• Financing of the investment with 100 % debt capital is possible • Max. share price 500 Euro as stipulated in the draft • Max. number of share purchases is not specified
Protection of investors	• Liability for investors is not necessarily limited by the act • It is stipulates that sales material shall contain information about the extent of the liability per share	• The project developer needs to make sure the liability of all parties entitled to purchase shares is limited to their share value.
Rules on municipalities	• Offers a slightly higher FiT in exchange for offering an additional 10 % (making a total of 30 %) ownership to the local municipality	• Municipalities are part of the definition of 'eligible persons' to buy shares. • In case interested buyers exceed the amount of shares offered, 50 % of the share offerings shall be distributed to municipalities and associations of local authorities. • Municipalities are only allowed to participate economically, if the produced electricity is being consumed largely by the residents in the municipality.

[15] A translation of the Act can be found here: http://www.ens.dk/sites/ens.dk/files/supply/renewable-energy/wind-power/onshoRE wind-power/Promotion %20of %20Renewable %20Energy %20Act %20- %20extract.pdf
[16] Draft of the Bürgerbeteiligungsgesetz (~citizen inclusion act) Mecklenburg-Vorpommern 2015: https://www.landtag-mv.de/fileadmin/media/Dokumente/Parlamentsdokumente/Drucksachen/6_Wahlperiode/D06-4000/Drs06-4568.pdf

	Denmark-Promotion of Renewable Energy Act (2008)	Germany- Draft of the Bürgerbeteiligungsgesetz (*_citizen inclusion act_) Mecklenburg-Vorpommern 2015
Other regulations	• Time limit for citizens to make an offer: 4 weeks from publication. • Requirements regarding the content of sales material for the shares, timings as well as procedure to distribute shares in case of excess of offers over shares.	• The share offer can be made a maximum of 2 months before the planned start of operations and has to be finished by the time of start of operations. • The project entity can offer the eligible persons alternative financial participation rights, e.g. a reduced local electricity tariff.
Criticism	• No guarantee for *acceptance* by local citizens (e.g. some individuals still see the scheme as a bribe) [17] • There are not always enough citizens interested in buying shares. • Criticism of only favouring affluent citizens/communities	• Constitutionality of the Act is being debated • Accusations against the allegedly arbitrariness of the spatial radius (5km) in which residents should be offered ownership rights. • Similar critique (no *acceptance* guarantee, risk of lack of interest) as for the Danish Act is applicable here

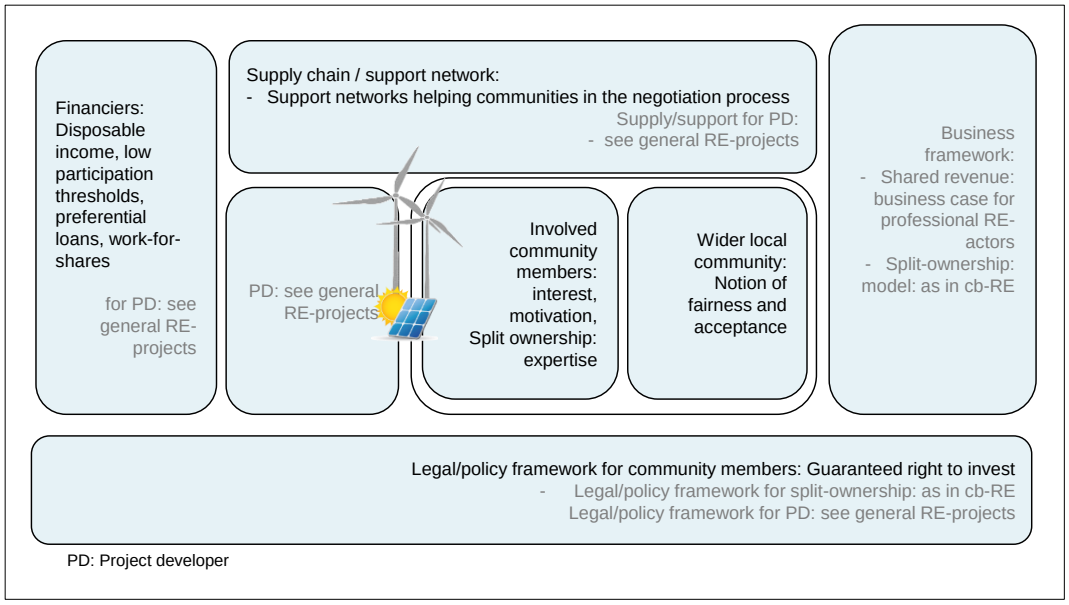
Source: Maslaton (2015), Roberts et al. (2014), Denmark: Promotion of Renewable Energy Act (2008), Germany: Draft of the Bürgerbeteiligungsgesetz" Mecklenburg-Vorpommern 2015

(6.2) Legal/policy framework for split ownership models

Split Ownership Model: If the community becomes active at the energy market to sell its energy product, framework conditions of community-based renewable energy apply, such as permission of community groups to participate in energy production, low market entrance barriers, simple bureaucratic procedures etc. (see details on p. 39).

Figure 11shows a summary of the enabling framework conditions of Community Connected Models

Figure 11: Enabling environment for a Community Connected Model



Source: own diagram

Risks of the Community Connected Model

As in the Open Investment Model, the risk for these investments is the full loss of the invested capital.
Experience from the Danish Renewable Energy Act's obligation has been that prices for the wind farm shares have been set too high. Policy makers need to carefully set and adapt legislation to protect investors against overly positive project presentations and secure

[17] Roberts et al. (2014)

correct information to ensure the required levels of oversight and protection. The fair price, at which the ownership should be offered, should not exceed the free market value (SCO-RE 2015).
The business model is independent of the participation model but high-risk models are riskier for the investment.

Summary and examples

Table 6 presents a summary of the main characteristics of the Community Connected Model.

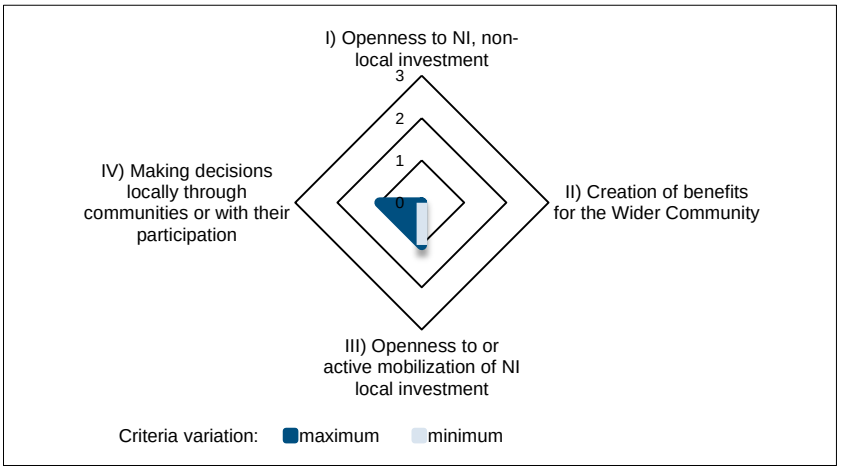
Table 6: Summary of the Community Connected Model

Participation model	Community Connected Model
Description of the model	Projects that are either legally obliged or willing to actively invite minor investments by the local community.
Openness to NI, non-local investment	☆ Model can be combined with an Open Investment Model
Benefits	
Benefits of Involved Community Members	Investors receive a return on their investment.
Wider Community Benefits	☆ No benefits, the model can be combined with a "compensation model"
Local participation in investment	★ to ★ ★ Local ownership or investment ranges between 5 % to 49 %
Community involvement in decision-making	★ to ★★ Decision-making rights of the local community range from 0 % to 49 %.
Phase of this involvement	The community is invited to buy-into the project before construction or earlier.
Local competences required	No technical skills are required for a shared revenue models, technical and business competences are required in case of split-ownership.
Most common legal forms in Germany	GmbH & Co. KG, GmbH, AG, e.G.
Suitable business model	Any complexity depending on the professionalism of the project developer, for a split ownership the business model should be suitable for the community's competences
Financing scheme	Can be combined with an Open Investment Model.

Source: own compilation

Figure 12 shows the Community Connected Model's ranking in accordance with the rating system developed in Table 1. The degree of investment collected from NI actors within the community can vary, whilst local contributions remains a minority. The community share is judged in relation to the entire project size, e.g. in relation to the entire wind farm, of which the community holds a minority share even if they own 100 % of an individual turbine. In some cases local ownership may go hand in hand with decision-making power, particularly for Split Ownership Models. In others, e.g. if the local community is merely contributing loans to the project developer, the decision-making lies exclusively with outsiders. A combination with the compensation model allowing for *Wider Community Benefits* is possible (see the for example the ranking of wind park Schlalach in Figure 22, p.53). In the following section, we will therefore present an example for a shared revenue model, a split ownership model and a split ownership model with additional benefits.

Figure 12: Ranking of the Community Connected Model in the four criteria



Source: own diagram

Example 7: Baywind Energy Cooperative and Kilbraur Wind Energy Cooperative, United Kingdom

The following example is intended to show two important features of community involvement: 1) successful community involvement schemes are spread and copied in community networks, 2) in many cases communities increase their share in a project, e.g. when wind farm expansions are planned or the community secures an option for increasing their share once more capital is collected.

Baywind Energy Cooperative was the first community-owned wind farm in the United Kingdom. It was set up in 1996 in Cumbria when community members had an opportunity to own part of a wind farm. The cooperative raised the capital required for the purchase of the turbines through share offerings. It raised £ 1.2 M to buy two turbines in 1996–97, and in 1998 raised £ 670,000 to allow the purchase of an additional turbine. The cooperative currently has over 1,300 shareholders. Since 1996, members have received return of between 7 and 8.2 % (ILO 2013). Baywind Co-op founded Energy4All to spread its model and to facilitate the ownership and operation of renewable energy projects by local or community-based co-operatives (Kilbraur n.d.).

Kilbraur Wind Energy Cooperative Ltd (KWEC) was formed after the example of the Baywind Energy Cooperative Ltd. The KWEC is an investment cooperative linked to a Falck Renewables' wind farm site in Sutherland in the north of Scotland. KWEC was founded in 2008 with the primary objective of providing local people with an opportunity to invest in the wind farm.
The wind farm is owned by Kilbraur Wind Energy Limited (KWEL) a subsidiary of Falck Renewables Wind Ltd. The initial share offer in the wind farm raised just over £1 M from 528 investors, and this formed KWEC's initial stake in the wind farm with shareholdings ranging from £ 250 to £ 20,000 with an average of £ 2,015. Falck is guaranteeing a minimum return of 6.5 %. A subsequent share offer associated with an extension to the wind farm in 2011 increased the co-op's stake to £ 1.6 M Investors receive annual interest payments based upon the performance of the project. Many investors use their interest to augment their pensions. At the other end of the age range, some of the shares are held in trust for young people under the age of 18 years (DECC 2015).

Website: http://www.kilbraur.coop/

Example 8: Split ownership with additional benefits: Wind farm Schlalach, Germany

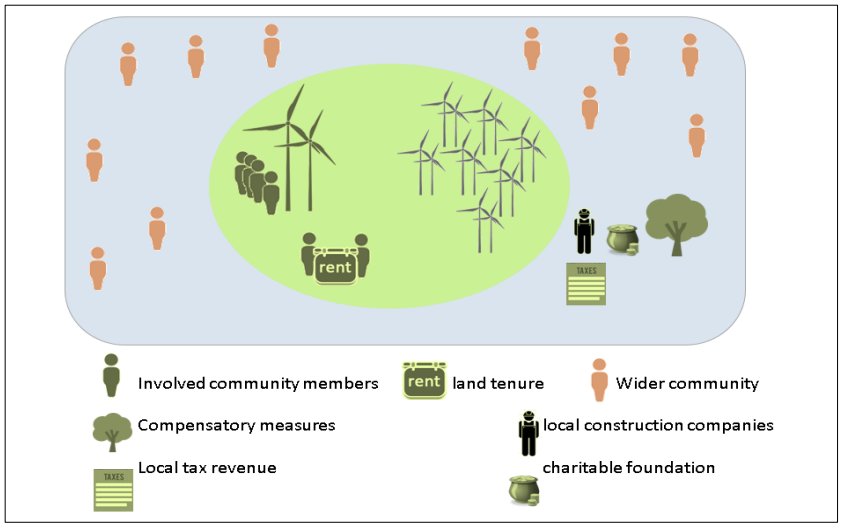
Schlalach is a district of Mühlenfließ in the federal state Brandenburg. Schlalach has 320 inhabitants. In 2002 an area close to Schlalach was designated as suitable for a wind farm. The area was however owned by different people and split into 330 plots. Around 10 different project developers directed requests for the plots to the individual landowners. Instead of individually handing over their plot to the company offering the most, the landowners called upon a citizens' assembly resulting in the formation of a "working group wind energy".

The working group was supposed to find the best outcome for the community. The group identified different stakeholder groups such as landowners, citizens without land, farmers, the municipality, neighbouring municipalities, the environment and the local economy. The working group agreed that plot owners were supposed to benefit financially from their land equitably independent of where their land was in the farm. All inhabitants of Schlalach as well as regional construction firms and local agriculture were supposed to profit from the project. The working group formulated the conditions and requested project developers to hand in their proposals according to these conditions. The working group subsequently chose the most suitable proposal. This included a fair land tenure model a so-called 'pooled space model' in which the land rent is distributed equally between property owners. The proposal secured an option to buy two turbines as community turbines out of the 16 turbine farm and specified that ecological compensatory measures were carried

out in the municipality of Schlalach. A citizen foundation was founded into which parts of the farms' profits are channelled and charitable projects are financed (Arbeitsgruppe Windkraft Schlalach 2013).

The working group suggested the individual plot owners to sign their favourite proposal and only a year later more than 80 % of the area had been sold to the suggested wind farm developer.

Figure 13: Wind farm Schlalach community ownership and community benefits



Source: own illustration

As soon as the citizens of the region manage to raise the necessary equity, they will join the farm with their own turbine. At the time of writing, the option of two turbines was not likely to be realized, as the necessary equity cannot be raised in a sparsely populated region with medium to low disposable income rates therefore the local ownership-share in the farm will remain low. Schlalach shows that a minimum community equity to start their own turbine poses problems in contrast to the option of buying shares that can be slowly ramped up over the course of a project.

The financing is expected to be finalized by 2016. From that point Schlalach can be described as a combination of a Community Compensation and a Community Connected Model. The villagers managed to succeed in their demands for a share in the investment as well as a contribution to the wider public of the village.

Contact details: Details of the Working Group Windkraft Schlalach can be found here: http://www.eti-brandenburg.de/fileadmin/user_upload/energietag_2013/Forum_4/4_Hahn.pdf

Table 7: Project stages of the wind farm Schlalach

Project stages	
Decisions on the project set-up	• The working group suggested one project developer for the entire park. This developer would be solely responsible for all aspects such as planning, construction, operation and decomposition.
Choice of business model	• FiT
Decisions on co-benefits	• Working group suggested ENERCON to the plot owners
Decisions in the RE plant planning stage	• The planning risks (planning, construction application) lay exclusively with ENERCON, the working group engaged with ENERCON during the process
Construction phase	• The risks during the construction phase lay with ENERCON • The concept of involvement of regional construction firms was based on the working group's plan
Operational phase	• The 21 commercial ENERCON turbines (as of 2015; some are still under construction) are solely in the hands of ENERCON • 1 citizen turbine is likely to be owned by the citizens* • Employment of one local "wind farm care taker"
Profits/ losses	• Citizens do not receive RoI for the 21 ENERCON turbines • Citizens can receive RoI for one citizen turbine once this is realized* • Land owners receive rent payments • The citizen foundation received part of the profits and invests in charitable projects • Tax revenue to Schlalach is expected after 10 years of operation once the loans of the projects are repaid

* the option for the second citizen turbines will most likely not be realized
Source: own table based on Arbeitsgruppe Windkraft Schlalach (2013)

Example 9: Village Feldheim-Treuenbrietzen, Germany

The village of Feldheim-Treuenbrietzen, close to the community of Schlalach, has decided to go off-grid and supply its own energy (heat and electricity) 100 % renewably and be self-sustainable at all times of the year. The village poses an example of corporate and community cooperation.

The 150 inhabitants of Feldheim cooperated with the local energy company Energiequelle GmbH and established the Feldheim Energie GmbH & Co. KG, which owns the local heat grid and supplies 37 households. The Feldheim Energie GmbH & Co. KG is owned by the city of Treuenbrietzen, Energiequelle and the citizens of Feldheim. The households joined as silent partners and contributed 3,000 Euro each. The heating grid is fed by the local biogas plant resulting in a 10 % reduction of heating costs. The biogas plant is run by the Agrargemeinschaft Feldheim who needed a heating supply system for its pigsties and administrative buildings.

Additionally Feldheim installed a second electricity grid in the small community to be able to detach from the public grid, for which taxes, fees and charges would need to be paid. An off-grid situation/ self-consumption allows exemptions from public taxation thereby creating grid parity for renewables. The 450,000 Euro investment was contributed by Energiequelle GmbH. Electricity users are paying an extra fee to pay off the grid. A 10 MW battery, by its implementation Europe's biggest battery storage system, is supplying a primary energy reserve and can supply the village with extra electricity if needed. Feldheim has an electricity price of 16.6 Ct/kWh (about 30 % below national average). The company Energiequelle GmbH & Co. WP Feldheim 2006 KG owns the grid and supplies electricity to the citizens. The construction of a second grid is a unique case and can be explained out of the administrative situation of privately leased electricity grids in Germany. The example of Feldheim shows that a 100 % renewable energy supply is technically feasible. The energy infrastructure in Feldheim created around 30-50 additional jobs in an otherwise structurally weak region (Forum Neue Energie n.d.).

Website: http://www.neue-energien-forum-feldheim.de/

Model IV: Community-based Model

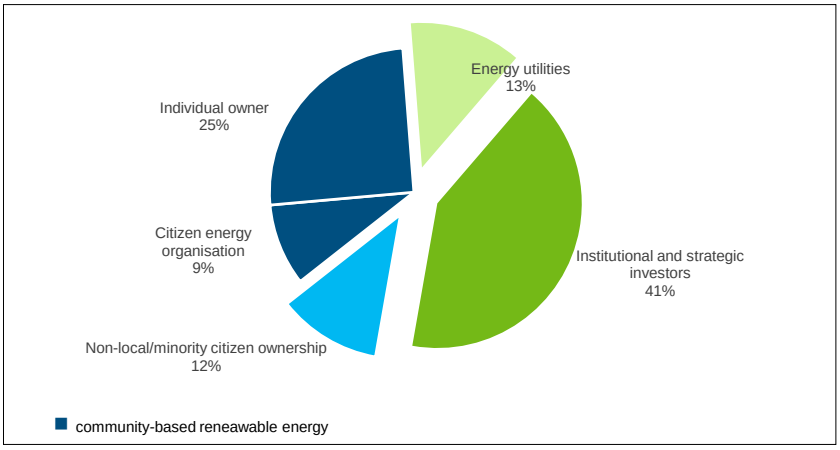
Description

Degenhart & Nestle's definition of citizens' energy in the narrow sense (see p.10) covers model IV of the typologies developed in this study.

In the Community-based Model the local community holds at least 50 % of decision-making power.
A 50:50 cooperation with a commercial or municipal partner is generally referred to as a **joint venture** (DECC 2015). Normally the community is involved at the earliest stage of the project or develops the project autonomously. Community-based renewable energy adds to the *social capital* of a community and has a variety of extra benefits that go far beyond financial contributions, such as experience of *self-efficacy* of the stakeholders, creation of a community spirit, transfer of social participation to other fields, competences dealing with public administration and changing energy policy (Izes 2015).

With respect to the stakeholder position (Figure 3) local actors find themselves on the investment side of the project as well as in the centre as the owner or in some cases even as the operator of the plant. A cooperation with a professional partner is possible particularly for large and typically complex projects like wind farms. This model also includes renewable energy systems owned and operated by individuals. In 2012, 46 % of installed PV capacity in Germany was owned by individuals (trend: research et al. (2013). Other technologies feasible for individual ownership are solar-thermal installations and wood chip/pellet heating systems and in the case of farmers biogas plants. Collaboration among locals is taking place for larger rooftop PV systems particularly on public buildings, wind farms and open-free field PV and biomass plants.
Community-based renewable energy composed about 34 % of installed renewable energy capacities in Germany in 2012 (Figure 14).

Figure 14: Community-based projects in total installed RE-capacity in Germany in 2012



Source: own diagram based on data from trend: research et al. (2013)

Among the most common legal forms in Germany are sole proprietors or civil society partnerships for small projects. Civil society partnerships frequently act together with an association (Hardener Model, p.65). Cooperatives run a variety of projects frequently using GmbH and GmbH & Co. KG as a business vehicle. Renewable energy cooperatives have reached impressive sizes in Germany (e.g. the community-based energy utility Greenpeace Energy e.G. has 1500 members).

Enabling environment for the Community-based Model

The following section is describing the enabling conditions for a Community-based Model that should be in place or that could form barriers if missing.

(1) Project developer: Involved Community Members

Motivation and environmental consciousness: In the German context, one important factor to the initial emergence of community-based renewable energy in Germany was high environmental consciousness and the desire to phase out of nuclear energy as well as to tackle climate change. Both notions were accompanied by an increased mistrust in the established energy sector actors and their refusal to develop viable alternatives. Out of this notion a series of activists became self-educated energy experts. A positive social

image of RE plays an important role for community members/leaders to get involved. Desires to become energy self-sufficient and self-determined are important motivations for community members – compare p.48 for the motivation of community actors.

Drivers of community involvement: Most of the developments in Community-based Models can be traced back to a few number of highly engaged individuals that are the drivers of the projects. Strong project board leadership, expertise and commitment are essential. Example 24 of Odanthurai Gram Panchayat in India (p.50) and Example 5 of the foundation of Zschadraß (p.27) illustrate this importance of leadership.

Social cohesion and clear roles: Example 8 of the working group of Schlalach is an example of social cohesion and teamwork (p.34). From the experience of mini-grids run by community groups in India one can conclude that prior social cohesiveness and experience with group activities as well as clarity on the roles and responsibilities among different stakeholders can be a prerequisite to successful community organisation (GNESD 2014).

Expertise in both renewable energy and the cooperative model, working with and within different levels of government.

Technical knowledge and interest in energy production equipment is widespread, but does not replace the need for skilled technicians. Larger projects that demand frequent or even daily operational care are often run by professional companies. Community-based renewable energy covers the installations of individuals such as solar home systems or biomass plants of farmers, these actors need to make all choices regarding the technology or the installation company themselves. Leasing models for rooftop PV systems have become an alternative for less-technology affine social groups. The PV packages on offer frequently include maintenance contracts and insurances reducing the owners' interaction with their system to a minimum.

(2) Supply chain and support network

In many cases successful projects have formed learning centres and assist new groups in copying existing projects such as in the case of Example 7 *Kilbraur Wind Energy Cooperative* (see p. 34), Example 28 *Bündnis Bürgerenergie e.V.* (see p. 68) and Example 26 *Hardener Model* (p.65). In Germany energy cooperatives require accreditation by the association of cooperatives (see p. 71). This process includes advice and counselling on the set-up and their project. In the United States, special workshops and training offers particularly "Solar Gardeners" to create and improve project leadership.[18]

As any regular RE project developer, communities need affordable supply and maintenance services, legal, tax and insurance services (compare cf. p.16).

(3) Financiers

Community groups as in the case of Open Investment Models need sufficient equity capital and the related trust and interest to invest (compare p.19)

Access to financing: Community groups and individuals have special financing requirements particularly as they frequently engage in only one project and have no record of accomplishment. Community groups with limited expertise are less likely to receive affordable financing if the business model is complicated or risky.
To enable financial access and to support cb-RE investment to cover the high upfront payments the Scottish Government introduced a Community and Renewable Energy loan scheme (CARES) and a Renewable Energy Infrastructure Fund. In the case of Germany, community groups regularly use preferential loans of the KFW and of financial institutions for agriculture like the Landwirtschaftliche Rentenbank (Nestle & Leuphana 2014). Particularly cooperative banking associations, ethical and ecological banks have provided the cooperatives and citizens groups with project advice and financing. The German bank for reconstruction (KfW) provides 100 bn Euro for credit loans for RE production and energy-saving projects (Oteman et al. 2014).

(4) Local community

The *Involved Community Members* who invest in the project are part of the local community, nevertheless the remaining *Wider Community* (see Figure 1, p. 10), particularly those not financially capable or interested in investing in the project, must also be willing to accept the development. Even community-based renewable energy projects require *local acceptance* and communal consensus. Therefore, a community-basis does not replace procedures such as information and discussion meetings and democratic process participation.

(5) Business/market framework

[18] The solar garden projects in the United States have institutionalized the role of a "solar gardener" and developed training workshops to assist newcomer communities. Several educational videos can be found here: http://www.solargardens.org/solar-gardener-training/.

Exemptions and simplifications for energy market access rules: As an owner and frequently also operator of a RE plant individuals and community actors need simplified energy market access rules e.g. an exemption from balancing group management requirements or obligations to register as an energy utility. In Germany for example the administrative processes to register a PV rooftop system takes less than a day and can be dealt with online.

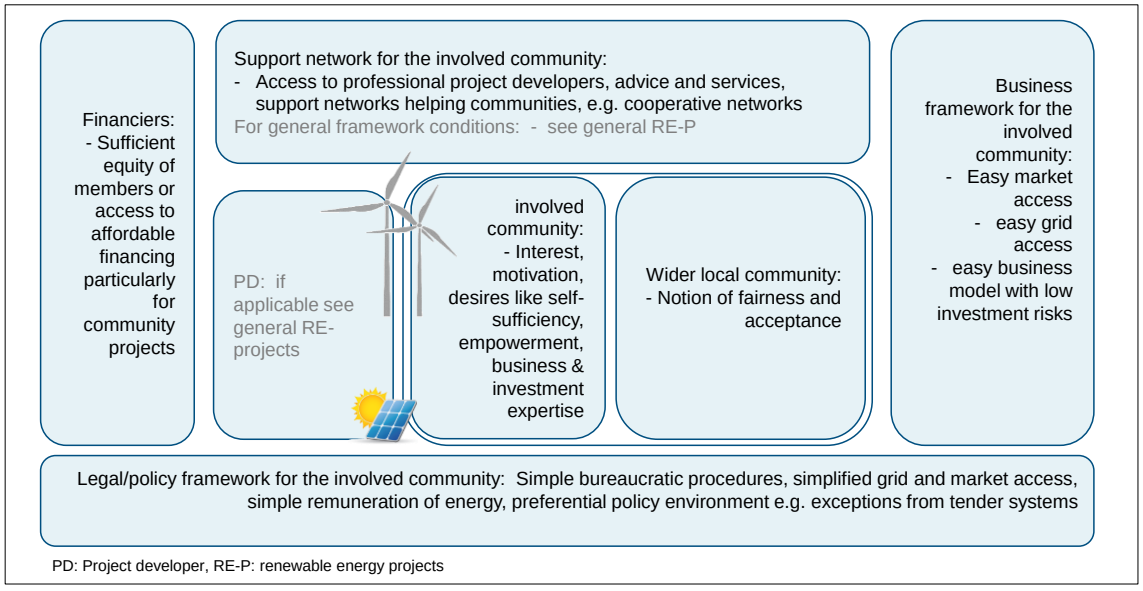
Policy framework regarding the business case: Cb-RE projects can principally use all feasible business models (see the following chapter on business models, p. 46), but higher business risks and complexities affect cb-RE negatively.

Among the most important framework conditions in Germany was the Renewable Energy Act (Erneuerbare Energien Gesetz - EEG). This act guarantees a market premium and for small installations a FiT for a duration of 20 years. Further on, it guarantees access and feed-in priority for RE into the grid. in the past cb-RE projects in Germany relied exclusively on the secured FiT. The decrease of the German feed-in-tariff below the levelized cost of PV electricity has slowed down the establishment of new cooperatives and associations in the field of PV. The remaining capacity expansion is carried out by individual households or businesses in the field of small-scale PV rooftop PV systems (<10 kW) frequently using battery storage for self-consumption (ÜNB 2015). A few community organisations, most of them experienced from previous projects, have entered into direct delivery or even provide complete electricity tariffs for household consumers, as is shown in Example 12 Heidelberger energy cooperative (p.41), Example 18 Association Sonneninitiative (p.45), Example 38 energy utility Naturstrom AG (p.79) or Example 35 Energy utility EWS Schönau (p.75). A general barrier associated with direct delivery of electricity is that long-term contracts with household customers are not legal in Germany. Households renting a flat might move out or the alternative price of electricity (a composition of wholesale market prices and a variety of network charges, taxes and charges) might decrease over the course of the project.

(6) Legal/policy framework for Community-based Models

In the German legal context, the Energiewirtschaftsgesetz (EnWG ~ Energy Industry Law) stipulates that consumers are allowed to choose their power supply company. An energy utility can be any natural or legal person, which supplies energy to others, operates an energy supply grid or has, as an owner the power of disposition for an energy supply grid (§3 Nr. 18EnWG). This allows any (natural/legal) person access to the energy sector as a supplier[19].

Figure 15: Enabling framework conditions for a Community-based Model



Source: own figure

Summary and examples

Table 8 summarizes the main characteristics of the community-based renewable energy model. The following section lists a series of examples of Cb-RE some including *Wider Community Benefits* (Model II).

[19] Suppliers are required to register with the regulatory authority (§5EnWG, §4 StromStG), with the exception of limited supplies within a spatially cohesive area, e.g. a PV roof top system supplying tenants (§3 Nr. 24a, 24b EnWG, § 1a StromStV).

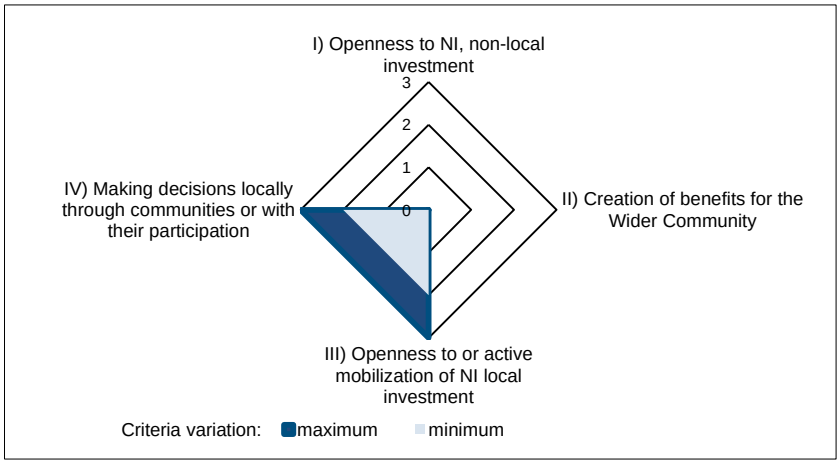
Table 8: Summary of the Community-based Model

Participation model	Community-based Model
Description of the model	The project is owned and managed under majority local ownership
Openness to NI, non-local investment	☆The project can be combined with an Open Investment Model
Benefits	
Benefits of Involved Community Members	Rate of return on investment
Wider Community Benefits	☆ No benefits , the model can be combined with a "compensation model"
Local participation in investment	★★-★ Local participation is explicitly invited and ranks between 50 to 100 %
Community involvement in decision-making	★★-★ Local participation is a key element of the model and ranks between 50 to 100 %
Phase of this involvement	★★★ The *Involved Community Members* participate early on or develop the project autonomously
Local competences required	A minimum of legal, business and technical knowledge is important to manage the project responsibly, professional knowledge can be acquired externally, e.g. by teaming up with a knowledge partner to compensate for a lack of knowledge
Most common legal forms in Germany	e.G., GmbH, GmbH & Co Kg, AG, association, GbR
Suitable business model	Low complexity business models are to be preferred for inexperienced communities, the complexity can be increased over time
Financing scheme	The project will have to be financed at least partially from within the community, the model can be combined with an Open Investment Model with NI investors from outside the community

Source: own table

Figure 16 visualizes a "pure" Community-based Model. The degree of investment collected from local, NI actors varies within this model between 50 % to 100 %. Local participation in decision-making is high or even exclusive. Hand in hand with high decision-making power goes an early involvement or even the autonomous planning of the project by local stakeholders. A Community-based Model can make use of NI, non-local investment (Model I), but as soon as decision-making powers are transferred to more than 50 % outside of the community the project would change to be a mix of a Community Connected and an Open Investment Model. Many projects can change their character over the course of the project lifetime.

Figure 16: Ranking of the community-based renewable energy model in the four criteria



Source: own diagram

Example 10: Bioenergy village Saerbaeck, Germany

Saerbeck is a community in the district of Steinfurt in North Rhine-Westfalia with approx. 7,300 inhabitants. In 2011 17 farmers founded the Saergas GmbH & Co. KG with the Saergas Verwaltungs GmbH as its general partner owning two 500 kW CHP biogas plants. Owner of the biogas plant are the Saergas GmbH & Co. KG and the Maschinenring Steinfurt-Bentheim e.V. The latter being the local farmers' association using machines for agriculture and forestry communally. The EnviTec Biogas AG is the constructor and operator of the plants. Heat from the plant is partly used to dehydrate the digestate of the feedstock. The electricity of the plants is delivered to the grid and receives the FiT (Gemeinde Saerbeck n.d.).

Website: http://www.klimakommune-saerbeck.de/city_info/webaccessibility/index.cfm?region_id=408&waid=317&item_id=845795&oldrecord=82832&oldmodul=5&olddesign=0&oldkeyword=0&oldeps=20&oldaz=all&oldcat=0&fsize=1&contrast=0

Example 11: Community shared solar of the Clean Energy Collective Colorado, United States

The U.S. Department of Energy (DOE) defines "community shared solar" as a solar-electric system that provides power and/or financial benefit to multiple community members (DOE 2012). Community solar arrays, also referred to as solar farms or solar gardens, are usually large-scale ground mounted arrays. Other frequently used sites are for example churches selling the subscriptions to church members. Net metering allows customers to bank this excess electric generation on the grid, usually in the form of kilowatt-hour (kWh) credits during a given period. In virtual net metering an energy utility's customers can own or lease solar panels in the area without having to install panels on their own roof. Since only a fraction of residential roofs can host solar panels either for reasons of physical suitability or because of financial, ownership or other reasons. The DOE states that "as a matter of equity, solar energy programs should be designed in a manner that allows all contributors to participate." (DOE 2012).

The Clean Energy Collective (CEC) provides a member-owned model that enables individuals to own panels in a community shared solar farm. The CEC works closely with local utilities. If an owner moves out of the territory, the owner can resell ownership to another utility customer, back to the CEC at fair market value, or donate the panel to a non-profit. CEC's first project was a 78 kW at Mid Valley Metro Solar Array. CEC leases the site from the Mid Valley Metropolitan District and has a PPA with Holy Cross Energy to purchase the power produced. Holy Cross Energy purchased rights to RECs for US$ 500/kW installed (paid up front).The plant is owned by 18 individuals and businesses in Holy Cross Energy utility territory who could join at a minimum US$ 725 for a single panel after rebates and incentives. Panel owners receive monthly credits for the value of the electricity produced for 50 years. Customers receive the resulting monetary credit on their monthly electric bill. The payback period is 13.1 years (DOE 2012).

Website: http://www.easycleanenergy.com/default.aspx
A list of similar projects and their legal set-up can be found in the DOE Guide to Community Solar:
http://www.nrel.gov/docs/fy11osti/49930.pdf

Example 12: Heidelberger energy cooperative, Germany

Due to a variety of charges and taxes on grid electricity, solar energy in Germany has reached grid parity for household customers (Arepo Consult 2013, 2012). As a reaction to insufficient PV FiT, the cooperative Heidelberger e.G. (HEG) installed a 445-kWp PV rooftop PV system on the roof of a cooperatives apartment building "Neue Heimat", situated in Nußloch, near the German city of Heidelberg. The total generation is around 370.000 kWh / year consumed directly by the tenants via an electricity tariff which includes the residual electricity demand to be supplied from the grid (supplier of the residual electricity is the Naturstrom AG (see p. 78)). Tenants are offered a "package" of 1,000 Euro consisting of an 800 Euro private loan provided to the e.G. and two cooperative shares with a nominal value of 100 Euro each as participation in the e.G. The loans are repaid with the following conditions: 3 % fixed interest rate, payback time of 20 years – the payback period starts from the third year with a yearly instalment of 58,17 Euro inclusive of interest and amortisation. This interest is paid back via the electricity sales revenues. The pay-out over 20 years is expected to be 1,400 Euro. The two cooperative shares entitle the owner to participate in the profit of the Heidelberg Energiegenossenschaft and are repaid upon leaving the cooperative.
A total of 116 of the tenants joined the cooperative and receive a lower electricity tariff of 25.4 Euro Ct/kWh plus a monthly fee of 6.95 Euro.[20] This price is guaranteed for 20 years.
The main stakeholders of this project are the Heidelberg Energy Cooperative (HEG) and the Naturstrom AG utility. The cooperative, apart from managing and supervising the plant, has also accompanied the whole planning and construction phase. Commercial management and technical monitoring are also taken over by HEG. Naturstrom AG is providing the additional electricity, as in the difference from what cannot be supplied via the PV system to meet the demand, from the grid. All the electricity provided by

[20] The electricity is exempt from charges and taxes related to the use of the public grid the households need to pay the full EEG-surplus charge.

Naturstrom AG to the "Neue Heimat" building is guaranteed to be "green". The PV plant has been fully financed via cooperative shares and loans (HEG 2013).

Website: http://www.heidelberger-energiegenossenschaft.de/

Example 13: Middelgrundens Vindmøllelaug I/S, Copenhagen, Denmark

The community-based project "Middelgrundens Vindmøllelaug I/S" shows exemplary how citizens can take ownership and participate in larger offshore wind farm projects. The 20 turbines were established 3.5 km offshore from Copenhagen harbour in end 2000. Each turbine has a capacity of 2 MW. The project was established with half of the ownership held by Dansk Olie og Naturgas A/S, the local power company, which in turn is by the majority owned by the Danish government. The other half is owned by Middelgrundens Vindmøllelaug I/S. Each of the 40,500 shares was sold for around 570 Euro, representing an electricity production of 1,000 kWh per year.

In the beginning, membership and therefore ownership was limited to residents from the municipal area, however, changes in legislation required an opening for a wider participation, and now anyone is eligible to become a partner. As stated by its bylaws, the partnership itself is not able to contract debt, which minimises risk to the membership. Decision-making is democratically based on one-member-one-vote. Overall decision-making is conducted by the Partnership Assembly, which meets once per year. The Partnership Assembly is responsible for deciding on changes to bylaws, election of management and other important decisions (Roberts et al. 2014).

Website: http://www.middelgrunden.dk/

Example 14: Windpark Druiberg GmbH & Co. KG in Dardesheim, Germany

Dardesheim is a small rural village with only 970 inhabitants located in the state of Saxony-Anhalt. Since the early 1990s, it has managed to install 31 turbines just outside the town. These turbines have an installed capacity of 66 MW in total. The project is driven by the desire to stop the net outflow of domestic production from the region, reinvigorate the area economically, and to generate enough power locally to provide for everyone's energy needs – in other words, self-sufficiency. Organised as a GmbH & Co. KG, the profits of the Windpark Druiberg GmbH & Co. KG, flow into the community as a return to local investors from the region. Only local residents are allowed to become partners, and approximately 90 % of the village residents are involved as partners. The partnership hires professional project operators from outside. Finance was based on initial capital invested by shareholders, enabling co-financing through commercial credit. In line with the original intent of its founders, profits have been used to expand renewable capacity, which now includes solar, biomass, an electric vehicle storage system and pumped hydro for storage. Profits are also channelled to a local charitable association Förderverein Stadt Dardesheim e.V. for use in local infrastructure and social projects or cultural events. This flow of income to the association is guaranteed through contractual guarantee within the founding statute of the company (Roberts et al. 2014).

Website: http://www.energiepark-druiberg.de/
See also the movie (German only): Bündnis 90/ Die Grünen (2011). Neue Energie in Bürgerhand. https://www.youtube.com/watch?v=lCSjhPYAXks

Example 15: Employee cooperatives, Germany

Employees of a certain company jointly engage in RE projects. In contrast to "conventional" cooperatives of citizens coming together, staff cooperatives act between the management of the respective company, the workers' council as well as the individual members of the cooperative (HBS 2013).[21]
The Erzeugergemeinschaft für Qualitätsvieh Hümmling e.G. (EZG) is an agricultural cooperative for the marketing and sales of pigs. The cooperative has 40 employees. By 2012 the companies' employees founded the "Belegschaftsgenossenschaft für regenerative Energieerzeugung e.G." dedicated to renewable energy generation. Membership is limited to employees who have worked at the EZG for a minimum of three years. The purpose of the cooperative is to set up a solar PV system on the roof of the hall (196 kWp). Each employee can receive a maximum of 100 shares of 50 Euro each. After six years in the company, they can invest up to 7,500 Euro. 23 of the 40 employees joined the cooperative. The rate of return is about 5 %. For those employees who did not have enough disposable

[21] A series of employee coopertive examples can be found in this publication (in German only): EnEEbler (Mitarbeiter-Engagement für Erneuerbare Energien in Unternehmen) (2014). Belegschaftsgenossenschaften zur Förderung der Energiewende. http://www.eneebler.de/wp-content/uploads/2014/03/Leitfaden_Belegschaftsgenossenschaften_Energiewende.pdf

income to buy a significant number of shares, the company offered them a loan with 2.5 % interest. The PV plant was financed by 40 % by the individual cooperative members and with 60 % by the EZG (EnEEbler 2014).

Website: http://www.ezg-huemmling.de/

Further examples of community-based projects are *Example 32 Ökodorf Sieben Linden* (p.72), *Example 26 BürgerSolar Recklinghausen* (p. 65) and *Example 20* (p. 49) to *Example 24* (p. 50) listed in section *Community-based renewable energy examples in emerging markets*. More complex institutional set-ups are the community-based energy utilities EWS Schönau (*Example 35,* p. 75), the Naturstrom AG (*Example 38,* p. 79) and the energy cooperatives in Costa Rica (*Example 34,* p. 73).

Role of municipalities facilitating community involvement

Local authorities can support community energy in a variety of ways either as a facilitator, as a beneficiary or as an active partner.

Municipalities as facilitator

At a first stage, municipalities can arrange *platforms for interested community members* to come together around the energy topic. Public climate change and energy planning frequently under slogans such as Agenda 2030/2050, "100 % renewable municipality …" or "Bioenergy village …" can bring community members together. The municipality of Ascha in Germany for example facilitated the founding of a purchasing community for solar thermal equipment simply by bringing likeminded individuals together (see p. 65). In the example of Ökologisch Soziale Stiftung Zschadraß (see p. 27 and p.70), the mayor was the leading figure to initiate a community foundation. Municipalities can frequently offer in house legal and business advice and guidance to its community members.

Municipalities as beneficiaries

More practically municipalities can facilitate community renewable energy by *offering energy production sites* such as public roofs, public land or access to biomass feedstock, e.g. from municipal food waste.

Another function is that of *offering investment opportunities* for citizens. Municipalities often lack sufficient capital to invest in energy efficiency or self-consumption models even though the community could save on energy costs. The necessary capital for the investment can be collected from local citizens (Example 19, p.45). In the case of the example of Ökologisch Soziale Stiftung Zschadraß (see Example 5 p. 27 and p.70) municipal energy costs were a key motivation to start the operation of a municipal utility (in this case in the legal form of a foundation) to reduce budget constraints.[22] Other motivations are the creation of local employment particularly in rural areas.

Municipalities can also engage in power purchasing agreements with energy cooperatives e.g. by purchasing the electricity a cooperative produces on a public building's roof (Example 15, p.42).

Municipalities as active partners

Depending on the administrative, legal and political framework, municipalities can become active in the energy sector themselves. Municipal energy utilities frequently jointly invest with citizens in renewable energy projects in the field of PV rooftops systems (Example 16) as well as wind farms (Example 13). Other energy utilities offer rooftop PV systems as a leasing model to their customers.[23] If local authorities have access to sufficient funds they have in the past offered local financial incentive schemes such as the community Ascha that offered support for the installation of solar thermal water heaters in its community (Energie-Atlas Bayern n.d.).

Example 16: Municipalities promoting bulk purchasing: Solarize Portland, United States

Solarize Portland was a solar panel volume-purchasing program from 2009 to 2012. It is an example of a civil society initiative supported by the municipality. Originally created by Southeast Uplift and a neighbourhood leader in the Mt. Tabor Neighbourhood Association, the first iteration of the Solarize Portland project quickly expanded to become a partnership between several SE Portland neighbourhoods and the SE Uplift Neighbourhood Sustainability Program. The interest and excitement around using bulk purchasing to bring down the costs and logistical hurdles of going solar caught on citywide. The City of Portland's Bureau of Planning and Sustainability, Energy Trust of Oregon and Solar Oregon offered strategic and technical assistance to neighbourhood organizations interested in operating a Solarize project. Solarize Portland brought renewable solar energy and the benefits of weatherization to almost 1000 Portland homes.

Website: https://www.portlandoregon.gov/bps/article/405686

[22] See also the movie Bündnis 90/ Die Grünen Neue Energie in Bürgerhand, https://www.youtube.com/watch?v=lCSjhPYAXks
[23] For example the in the case of municipal energy utility Stadtwerke Stuttgart offer PV systems either as a buy or as a leasing option. https://stadtwerke-stuttgart.de/energieerzeugung/solarstrom/solarstrom-fuer-stuttgart/.

Example 17: Joint ownership: Transition Town Totnes and Totnes Council co-owning a PV rooftop PV system, United Kingdom

In the UK the charitable company "Transition Town Totnes", entered into an agreement with the local council to install 74 solar panels on Totnes Civic Hall, which supplies approximately 13,000 kWh of the building's energy needs per year. Solar energy is covering a third of the town halls demand, leading to the Council saving over £5,500/a. Ownership of the installation is split between the council and Transition Town Totnes. The "Transition Town" movements are local volunteer based initiatives in order to support municipalities by the transition into the post-fossil era. In addition they also encourage a return of the economic focus towards a more regional related economy. The "Transition Town Totnes", named after the English town as one of the first initiatives within the movement, widen its aims, besides the minimization of carbon emissions, to a reduction of the costs of living. An important element to the community engagement is the enjoyment in the group activities and working together with neighbours and community members.

Website: http://transitionculture.org/wp-content/uploads/Transition-Town-Totnes-Ashden-report-final4.pdf
Promotional movie of the Transition Streets Group of Transition Town Totnes:
https://www.youtube.com/watch?v=OY9EucqskdQ

Example 18: Municipal PPA: Sonneninitiative e.V. delivers electricity to the city of Frankfurt on the Main, Germany

Since 2013 the association Sonneninitiative e.V. (Solarinitiative) operates an almost 200 kWp PV rooftop system on the public sport arena in Frankfurt am Main. The electricity is directly delivered to the arena. Surplus energy is fed into the grid and receives the FiT. The plant was financed by 20 local citizens from the local Rhein-Main-Area (Solarinitiative 2013).

Website: http://www.sonneninitiative.org/projekte/frankfurt-fraport-arena.html

Example 19: Municipal leasing model: Odenwald e.g. leasing CHP plant, Germany

In the case of the German municipality of Odenwald, lacking sufficient equity capital for a self-consumption energy plant, started a leasing model with a citizens-cooperative, where the cooperative invested in a combined heat power plant (CHP) at the local waste water treatment facility. The plant is fed by waste gas. With the savings from the alternative energy costs, the municipality pays the monthly fees and will eventually own the plant after 15 years.

Website: http://www.energiegenossenschaft-odenwald.de/index.php/energieerzeugung/bhkw

Business models and risks of community involvement in the energy sector

Simply put, a business case exists if the price achievable for the sales of electricity or, in case of self-consumption, if the alternative price of electricity used (either from the grid or from an alternative energy generation, e.g. diesel), is above the cost of electricity produced by the RE facility.

Figure 17 shows the basic categories of business models. If the market framework allows for sufficient income in excess of costs, renewable energy has a business case. Such situations can exist when, a) RE revenues are guaranteed by a cost-covering feed-in tariff or other type of Power Purchase Agreement at a level higher than generation costs. In other situations, b) the cost of electricity production has reached grid parity, than RE is feasible for self-consumption or direct delivery (not via the public grid) to a customer. c) Generation parity is reached when the costs of electricity generated from renewables can compete against other forms. This can be the case in an unreliable grid situation or an off-grid situation, where RE might be cheaper than electricity from a diesel generator. In some countries, most notably Chile, PV electricity can already compete on the wholesale electricity market.

Figure 17 shows an example of the situation of a small-scale rooftop PV system (<10kW) in Germany in 2015 compared to the FiT, the household electricity price and the average spot market price. In the example laid out three basic options for a business model exist:

a) Selling the electricity for the regulated FiT of 13 Euro Ct/kWh,

b) Using the electricity for self-consumption and therefore not buying electricity from an electricity utility.[24]

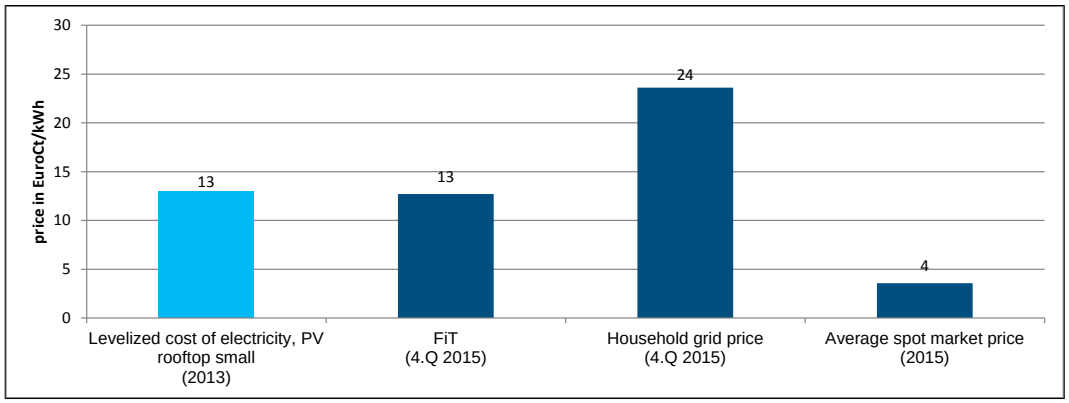
   Including all charges and taxes the alternative grid electricity price would be 24 Euro Ct/kWh.

c) Selling the electricity at the spot market for an average price of 4 Euro Ct/kWh.

d) Combining the options e.g. self-consuming parts of the electricity and selling the remaining part for the FiT.

The business model creating the biggest margin would be to maximise the self-consumption share, this might lead to not utilizing the entire roof-space but rather building a smaller system.

Figure 17: Basic concepts of renewable energy business models example of rooftop PV system in Germany



Source: data based on Fraunhofer (2013), BnetzA (2015) ,online research for household electricity prices 12/2015 and BDEW (2015)

The type of community participation in a renewable energy project is largely independent of the business model but the existence of a business case is generally a prerequisite for anyone to get involved (discarding solely idealistically-motivated behaviour). A business case situation with low financial risks and low administrative burden will be better suited for community involvement than a business case that relies on sales at the spot market, where the permanent observation of the power market and the navigation of different customers is required.

Figure 18 shows a simplified diagram for the increase of business risks associated with certain business models. The easiest model is a long-term *guaranteed feed-in-tariff or power purchase agreement* with a single off-taker, i.e. all electricity can be delivered to an individual buyer such as a state utility or a grid operator who is willing or obligated to purchase all power generated by facility at any point in time. These models allow particularly non-professional groups / individuals to engage in RE power production.

[24] An alternative to self-consumption is frequently „direct delivery" whereby the electricity is used by somebody other than the owner of the PV plant, e.g. the tenants or a neighbouring company, as in many cases this model requires a license as an electricity company and might be connected to paying extra charges and taxes it is not always feasible.

For individual households *self-consumption* or *net metering* is becoming more attractive. On the other hand, if households expect to move, they are not likely to invest in self-consumption on their property as the system is normally neither mobile nor easy to sell further. Virtual net-metering makes self-consumption business models very easy and is an alternative for people without or with inadequate rooftops.

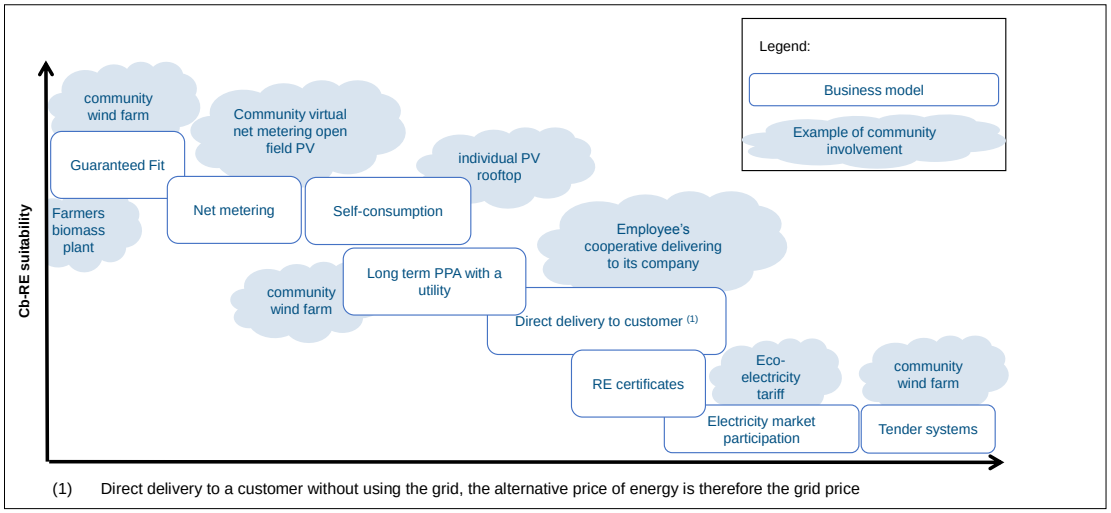
Direct delivery of electricity to final consumers (without using the public grid) involves the risk that the customer cancels the power purchase contract before the amortization period, e.g. because tenants move out, a business stops operating or is no longer willing or able to pay. For these reasons, both direct-delivery and self-consumption models have higher investments risks and require shorter pay-back periods than a twenty year FiT and thus require on average higher RoI or at least higher revenues per kWh.

Business models towards the right of the diagram are more risky, and therefore less suitable to be run by volunteers, private individuals or inexperienced citizen groups. The replacement of FiTs by a *tender system* in Germany recently is widely considered to increase planning and financing risks of RE projects further, raising the pre-investment risks and barriers and is thus considered discouraging for self-organized cb-RE projects (Naturstrom AG annual report 2014; Nestle 2015). In the tender rounds of 2015 for PV free fields in Germany no community actor participated.

Financing a community-based RE project on the *spot market sales* can be an alternative once generation parity is reached, but sales might be too risky, as price projections are difficult even for professional investors.

Nevertheless, there are examples of highly professionalised cb-RE actors like the Heidelberger Energy cooperative[25], Greenpeace Energy[26] or EWS Schönau[27], who engage in direct delivery models and are active in the final consumer market even with household customers. These actors tend to also have a long business history, professional staff and professional partners.

Figure 18: Schematic decrease of suitability for community involvement with increase of business risks

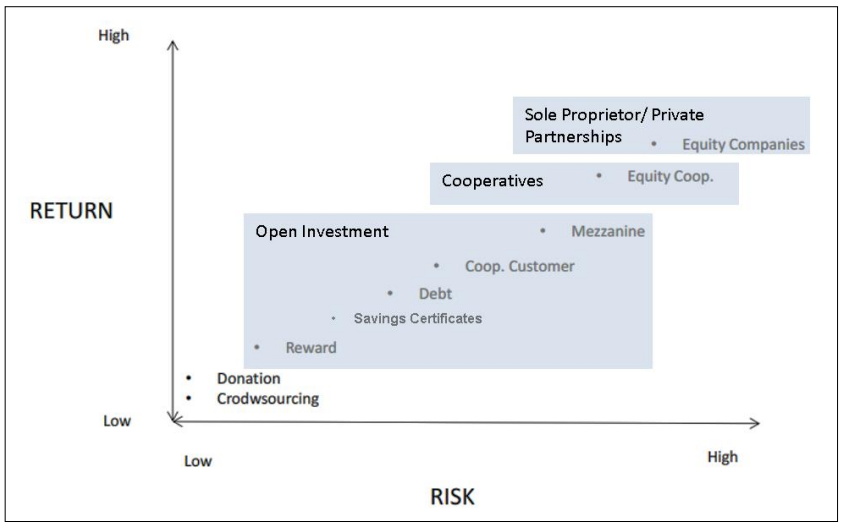


Source: own diagram

With any investment the investor might end up losing capital. The community involvement models I, III and IV that involve investment by private individuals involve the risk of losing all or a share of the money invested but to different degrees since saving certificates for instance have a relatively high security level whilst junior debt has less chances to be repaid in case of bankruptcy. The following graph shows the relationship of risk and return in relation to business models (Figure 18) in relation to the different investment options

25 An overview about their projects can be reviewed here: http://www.heidelberger-energiegenossenschaft.de/ http://www.heidelberger-energiegenossenschaft.de/projekte
26 An overview about their business model and investments can be reviewed here: http://www.greenpeace-energy.de/index.html http://www.greenpeace-energy.de/engagement/kraftwerksbau/konzept.html
27 An overview about their community can be reviewed here: http://www.ews-schoenau.de/mitmachen/mitstreiter.htmlhttp://www.ews-schoenau.de/homepage.html

Figure 19: Levels of risks and returns on individual investments

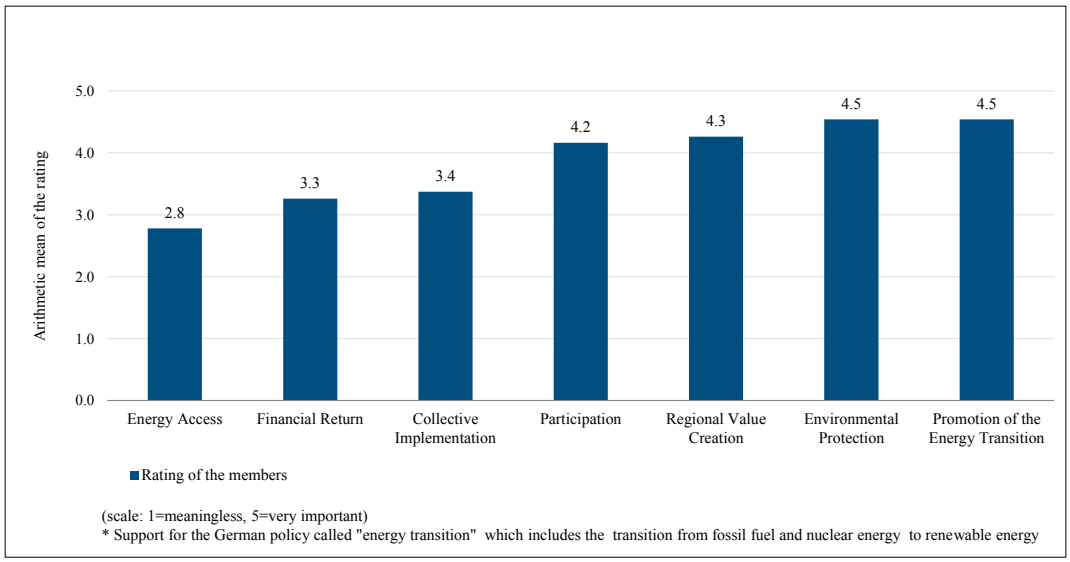


Source: own illustration based on (Citizenergy 2015)

Motivations for community involvement

Participation in RE projects can have financial as well as non-financial drivers. Several empirical studies on German community-based renewable energy analyse the motivation to set-up or invest in cb-RE projects. In accordance with similar studies (e.g. DGRV 2013) Degenhart & Nestle 2014[28] identified several key motivations to invest in RE projects: the environmental benefit, the promotion of the German energy transition policy, regional value creation as well as participation are rated as more important than financial motives, which, however do matter to participants as well, even if not predominantly. The following figures illustrate the data from their survey regarding the arithmetic means of the importance ratings for different motivations.

Figure 20: Rating of the motivations of members of community-based energy projects in Germany in 2014



Source: own illustration, based on data from Degenhart & Nestle, 2014

[28] Degenhart & Nestle (2014) studied the investment motivations of members of community-based energy projects by interviewing 274 members of 61 different cb-RE companies, including cooperatives, GmbH & Co. KGs and GbRs active in the fields of PV, wind and bioenergy. They proposed seven different motivations: financial return, cost-effective electricity access, contribution to local value creation and local economic growth, environmental benefit, promotion of the German Energy Transition, participation in shaping the Energy Transition, collective implementation of projects to be rated on a five point Likert-scale.

3. Community-based renewable energy examples in emerging markets

The examples mentioned in the previous sections were taken from Germany, Denmark, the UK and the US. The following section will present successful examples from middle and low-income countries of the Global South.

These examples show that once policy framework conditions like PPAs, net metering – or cost reductions make renewable energy generation feasible, communities are eager to participate in energy production and benefit from renewable energies.

Example 20: Net Metering - Techo30+ Vitacura, Chile

Fundación Chile along with Swiss Consultors Ernst Basler + Partner is currently working on the development of Local Energy Strategies in the commune of Vitacura (FCh 2015).

The program techo30+ (~30+ roofs), seeks to install solar panels on more than 30 roofs in Vitacura during 2015 and to develop an association of the neighbours by means of an energy cooperative. The 30 rooftop systems use net metering and excess electricity is fed into the grid.

In the first phase of the program, PV systems were installed on three schools to raise awareness for solar energy among students, teachers and parents. In the second phase was a conference to inform the community about relevant aspects of solar energy such as energy security, financing models and net metering. During this conference the first participants in the 30 30-roofs programme with houses or office buildings were identified, followed by and feasibility studies at their sites were conducted. Because of the bulk procurement of the panels, the system price could be reduced by 30 %. The final stage of the program is the establishment of an energy cooperative of the citizens of Vitacura ACESOL (2014).

Website: http://www.fch.cl/proyecto/sustentabilidad/vitacura-3030-2/
Promotional video: http://www.ebpchile.cl/servicios/energia-y-sustentabilidad/aktuell/inauguracion-del-programa-techo-30.html

Example 21: Punta Alta Cooperative wind farm, Argentina

The Cooperative Eléctrica de Punta Alta (Cepa) was founded in 1926 as one of the first energy cooperatives in Latin America. The 2.2 MW Punta Alta wind farm is situated in the province of Buesnos Aires in Argentina. The turbines are operated by the cooperative Eléctrica de Punta Alta and fed into a local distribution grid. The first 400 kW Neg Micon wind turbine was installed in Punta Alta as early as 1995. Three 600 kW turbines followed for an investment of US$ 2.640.000 in 1998 and today that form the wind farm "Centenario" (EduRed nd, Patria Emprendedora nd).

Website: http://www.cepanet.com.ar/energia-eolica.php

Example 22: Grid-connected community-based small hydro by IBEKA, Indonesia

In Indonesia, villages in the Mount Halimun region of West Java are equipped with micro-hydro turbines that were set up by Indonesian organisation IBEKA (Institut Bisnis dan Ekonomi Kerakyatan) and are run and maintained by the community through a cooperative (World Development Movement 2014).

For non-grid connected villages the IBEKA installed turbines for electrification. In communities already grid-connected the electricity is sold via a PPA. In 1999 the first pico hydro plant with 13 kW owned by local farmers was connected to the grid. In the village of Cinta Mekar private investors financed the micro hydro plant and receive the electricity tariff, 20 % of the profits from selling electricity flow into the charitable community cooperative Cinta Mekar Co-op financing education, health care and handing out loans.

Website: http://ibeka.netsains.net/
Promotional video: https://www.youtube.com/watch?v=Xm-PaJNlRp8

Example 23: Net metering in Costa Rica

A five-year net metering pilot program for customers of the state-owned utility Instituto Costarricense de Electricidad was in place in Costa Rica from 2010 until February 2015. The program allowed the use of micro-hydro, wind, sun, and biomass.

The program ended as schedule after reaching the capacity limit of 10 MW (Bloomberg NEF 2015). Net metering legislation for PV to replace the pilot program was passed in 2015. It is planned that by February 2016 Costa Rica's utility regulator Autoridad Reguladora de los Servicios Públicos (ARESEP) will issue the tariffs for the net metering scheme (Photon 2016).

One example of PV use is the Llobet clothing store in Alajuela. In August 2014 the store installed a 55 kW PV rooftop system. The system will cover about 45 % of Llobet energy consumption. The projected return of investment is five years and two months.

Website and promotional video: http://crsolarsolutions.com/portfolio/tienda-llobet/

Another example for net metering in Costa Rica is the Hotel Cocomar in Puntarenas, Costa Rica, which installed a 82.8 kWp solar rooftop system (Enertiva nd). The hotel covers close to 100 % of its consumption with solar energy. Additionally it carried out energy efficiency measures replacing all of its lights with LEDs.

Website: http://www.cocomar.net/about

Example 24: Odanthurai Gram Panchayat, India

The village Odanthurai Gram Panchayat[1] is located 40 kilometres north of Coimbatore in the southern Tamil Nadu state in India. In 2006 the village set up a 350 kW wind turbine to produce its own energy and to avoid inadequate power supply with three hours of daily power cuts. Panchayat President Shanmugam, introduced the idea of a wind energy project under panchayat or rather village ownership. The wind turbine costs were about INR 23 M (about US$ 0.5 M [3]) and the village was able to make a down payment of INR 3.5 M. With the governmental support in form of subsidies, the needed bank load summed to INR 11.5 M. The village's power project became the first one ever undertaken by a local body in India. The wind farm produces 7.5 M units of electricity per year. While the village requires only roughly 60 % of its production, the remaining surplus is sold to the Tamil Nadu Electricity Board, which generates an annual income of INR 19 M. This income is used to repay the bank loan within seven years.

After Odanthurai Panchayat became successful self-powered it invested in a 9 kW biomass plant in order to provide the drinking water pump with off-grid electricity. Since the biomass plant is fed with waste wood from a nearby sawmill pumping costs declined by 70 %.

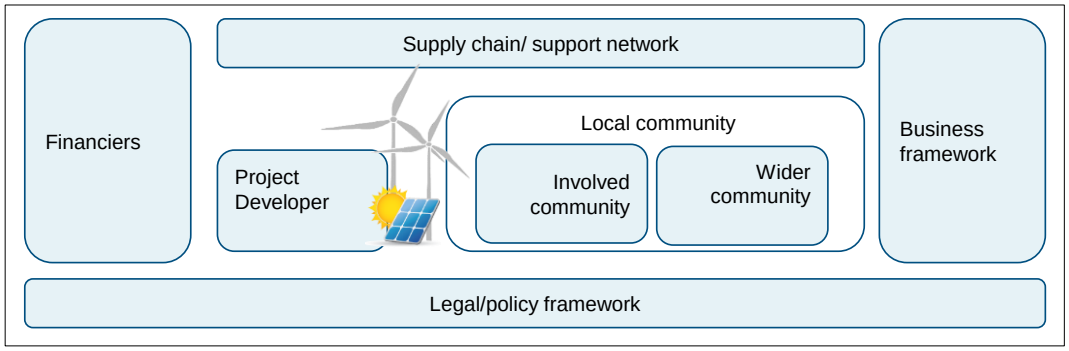
Website: http://www.ecoideaz.com/innovative-green-ideas/inspiring-self-powered-village-odanthurai

[3] Exchange rate in 2006: 1 US$ ~45.22 INR/

4. Application of the enabling framework to other contexts

To assess whether a certain type of model is suitable for a community the analytical framework presented in Figure 21 can be used. This framework has been applied in the previous sections. As a first step it is suggested to describe the situation for a general renewable energy project (compare p.15). In a second step each box should be described having in mind the needs for community involvement models.

Figure 21: Enabling environment framework to assess model suitability



Source: Own illustration

The following list of questions – though not exhaustive – can be helpful to carry out an assessment; whether a model is suitable for a specific community or a country context.

(1) Site location and choice of technology

- Is there sufficient, sustainable energy endowment/ feed-stock now and in the future?
- Have environmental assessments been carried out?
- Have there been the public consultation procedures?

(2) Professional project developer / partners of Involved Community Members

- Are professional project developers interested and motivated to engage in a project?
- Do professional project developers have sufficient expertise?
- Can professionals, e.g. municipal energy utilities, function as partners in the project?

(3) Involved Community Members

- Are citizens motivated and knowledgeable enough to engage in a project? To what degree?
- Do citizens have sufficient equity?
- Can they risk losing their equity?
- Do they trust the business model/ policy framework to invest equity?
- Which financial models can be used to allow community members to participate, e.g. preferential loans from employers, from commercial banks or labour-for-shares swaps?

(4) Supply chain and support network

- Is there access infrastructure to the plant‘s site?
- Are the technology supply chain, maintenance, legal, insurance and advice services available?
- Are RE technologies available (physically, in terms of quality and within reasonable timeframes)?
- Is sufficiently skilled staff available to operate and repair the plant? If trained staff leaves can new staff be trained?

- Will spare parts, maintenance and services be available in the future?
- Are technology and services available at an affordable price? Could bulk procurement help to reduce prices?
- Could support networks e.g. for knowledge sharing replace lack of citizen expertise?

If the supply chain poses a barrier to the project, the supply chain itself might suffer from barriers such as lack of interest, financing, expertise or a business model. Understanding the underlying barriers helps to overcome them.

(5) Financiers

- Is senior debt accessible at affordable rates, e.g. from commercial banks?
- Is junior debt accessible, e.g. from community members involved, crowdfunding etc.?

If affordable financing is not accessible for project developers, the barriers of the financiers themselves need to be analysed. Some of the barriers, e.g. investment licensing, may lie with policy makers.

(6) Wider local community

- Who is the wider local community now and in the future, e.g. due to population increase? (see also section Criterion 2: Creation of Wider Community Benefits (p.11) of this study)
- Is the project environmentally and socially sustainable?
- Is the local community willing to accept the construction of plant?
- How can benefits to the *Wider Community* be maximised?

(7) Business framework

- Is the business model cost-effective? Does the project have a business case, e.g. via net metering, FiT or PPAs?
- Is the project sufficiently low-risk for non-professionals to get involved (reliability of the technology, financial risks, liability issues)?
- Can physical grid access and market access be arranged for by non-professionals?
- Which legal set-up is suitable considering issues of liability, democratic participation, administration and creditworthiness?

If elements of the business framework are problematic, does the problem lie with the supply chain (e.g. the costs are too high) or with the policy framework (e.g. the grid access is not enforced).

(8) Legal/ policy framework

- Is the policy framework stable enough?
- Do administrative rules (grid access, market access, electricity remuneration etc.) enable non-professionals to proceed?
- Does legislative support exist that could be used, e.g. exemption from tender systems?

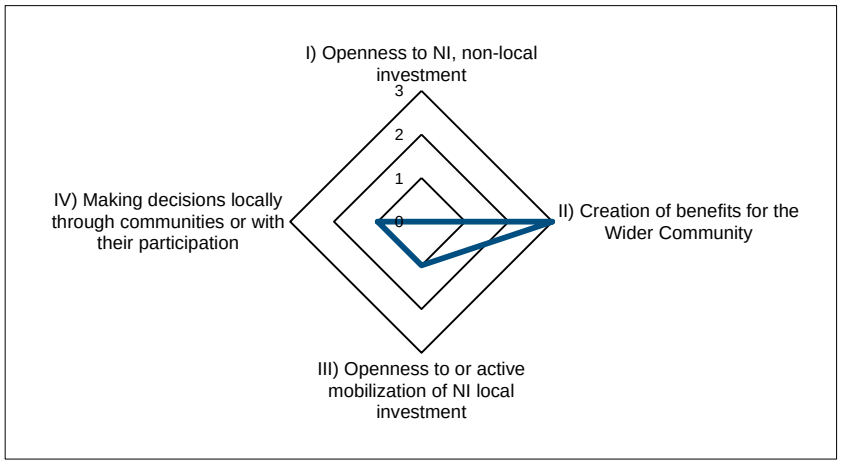
Depending on the strength of the local community – interest, motivation, available equity/ disposable income, bargaining power and the riskiness and complexity of the framework conditions one of the four presented models of community involvement is suitable.

A series of guides and toolkits have been published to assist communities in the formulation of their community vision and in developing their project, among those are:

- Hicks, J., Ison, N., Gilding, J. and Mey, F. (2014) “Community-owned renewable energy: a how to guide”
- Community Power Agency, Sydney: http://cpagency.org.au/wp-content/uploads/2014/06/CPAgency_HowtoGuide2014-web.pdf
- Embark: www.embark.com.au:
- PlanLoCal: www.planlocal.org.uk/pages/renewable-energy
- Community Energy Scotland: www.scotland.gov.uk/Resource/Doc/917/0115761.pdf

To describe and analyse projects we suggest to use the spider-diagram presented in this study as a visualization tool. The four criteria – (1) openness to NI, non-local investment, (2) creation of *Wider Community Benefits*, (3) openness to or active mobilization of NI, local investment and (4) making decisions locally through communities – can be rated according the system presented in Table 1.. Figure 22 shows the application of this rating system for Example 8, the wind farm of Schlalach (p.34). Schlalach is expected to become a split ownership model in which the community owns one turbines of a 22 turbine park by 2016. Since the local community has contributed only a minority of the investment, the ratings for the criteria (2) and (4) remain below the 50 % local ownership margin. For criterion (2) the community receives a multitude of different benefit streams such as (i) local tax payments, (ii) local ecological compensatory measures, (iii) the employment of local construction firms and (iv) a community foundation.

Figure 22: Ranking of the community benefit and split ownership example Wind farm Schlalach in the four dimensions



Source: own table

5. Conclusion

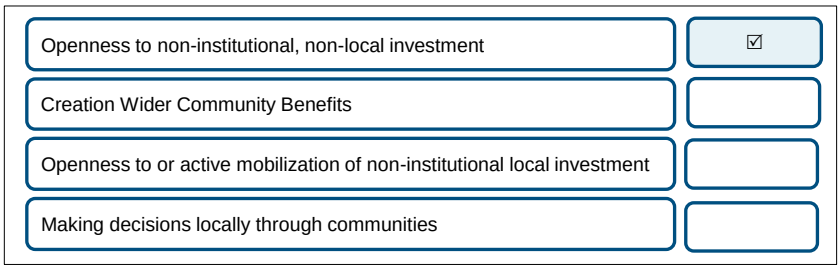
The study at hand analysed different forms of community involvement in renewable energy projects in Germany and around the world. To differentiate the types of community involvement four criteria were formulated (1) openness to community investment, (2) creation of Wider Community Benefits, (3) openness to or active mobilization of non-institutional local investment and (4) making decisions locally through communities. Based on the criteria, four models of community involvement have been identified. The different forms of community involvement serve a variety of purposes among them access to additional affordable financing for investors, social and local acceptance, fairness, the creation of local investment cycles and community *empowerment*.

As can be seen by international comparisons, community involvement has developed quite differently in the individual national contexts, therefore, we have added an analysis of the enabling framework to each model. All models share that the enabling environment needs to be sufficiently nurturing to create "professional" renewable energy projects in the first place, additional conditions are need to allow for community involvement to flourish.

I. The first type of community involvement is the Open Investment Model. To assess whether a project falls under this model the following question can be helpful: To what extent does the project invite investment from non-institutional, non-local investors?

In the Open Investment Model individuals or small businesses can participate financially in a project, e.g. in the form of holding a junior bond or participation right. These individuals normally do not live at the site of the RE project.

Figure 23: Criteria fulfilled by the Open Investment Model



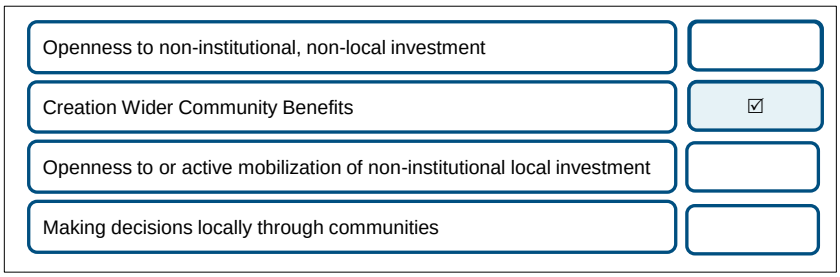
Source: own figure

The purpose of the model is to access additional NI financing from an increasingly affluent middle-class and channel these funds into sustainable development. Profit participation sharing among wider groups of society strengthens the acceptance and support for environmental projects and increases awareness of energy and climate change issues.

The enabling environment of this model is characterized by the availability of disposable income of NIinvestors and the legislative framework e.g. investor protection and investment licensing procedures.

II. The second type of community involvement identified is the Community Compensation Model. To assess whether a project falls under this model the following question can be helpful: How many benefit streams exist for the local community and who in the community benefits from them?
In the Community Compensation Model the wider local community receives some form of benefit from the RE project. Compensation can easily combined with other involvement models.

Figure 24: Criteria fulfilled by the Community Compensation Model



Source: own figure

The purpose of the model is to improve local acceptance of the RE plant and prevent NIMBY attitudes as well as to improve the life of the community.

The enabling environment of a Community Compensation Model is characterized by the bargaining skills of the community, and a supportive legislative framework e.g. legislation on tax payments to be made locally, environmental compensatory measures, or public registers to improve transparency of voluntary payments.

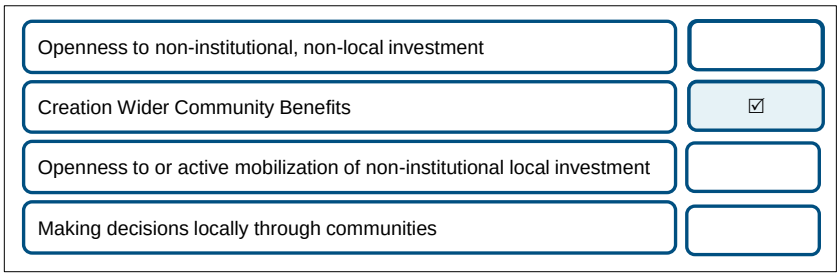
III. The third model defined in this study is called Community Connected Model. To assess whether a project falls under this model the following could be asked: Are locals explicitly offered shares by the project developers? Do local citizens hold less than 50 % of the equity/mezzanine capital?

In Community Connected Models the local community can buy into a RE project or operate parts of it. The local community can:

III a) own shares in the entire project ("Shared Revenue Model") or

III b) own and operate a specific part of the project ("Split Ownership Model").

Figure 25: Criteria fulfilled by the Community Connected Model



Source: own figure

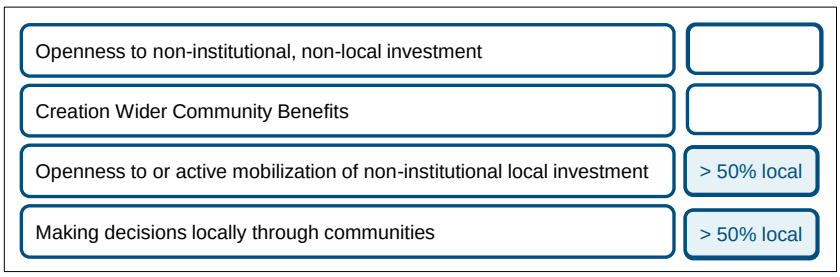
The purpose of the model is to create social fairness and local acceptance for the RE projects. Channelling profits into the community can create local economic cycles and improve the economic situation in the community.

The enabling environment for Community Connected Models is characterized by the bargaining skills of the community if no legal requirements exist to support their claims, the availability of disposable income in the community to buy shares and supportive a legislative framework such as a guaranteed right to invest.

IV. The highest degree of community involvement was defined as the Community-based Model. To assess whether a project falls under this model the following question can be helpful: Do locals hold the majority of decision-making rights in the project?

The Community-based Model refers to RE projects that are financed by natural persons, local businesses or farmers, who – individually or cooperatively – invest equity capital. These (non-institutional) investors hold at least 50 % of the voting rights and are from/based in the region where the project is constructed. A 50:50 cooperation with a commercial or municipal partner is generally referred to as a joint venture.

Figure 26: Criteria fulfilled by the Community-based Model



Source: own figure

The purpose of the model is to empower the community to become active in sustainable development and to live a green lifestyle. Community members shall experience self-efficacy and improve their skills by cooperating with each other, government and businesses. Communal projects can help form social capital in the communities. The returns of the project remain within the community and help to create local investment cycles.

The enabling environment is characterized by the interest and motivation of the community, the availability of disposable income to invest and by a supportive legislative framework e.g. easy market and grid access and simple low-risk business models, net metering or simple access to PPAs and FiT. Tax

Municipalities can act as supporters for community involvement, for example by arranging platforms for interested community members to come together and plan communal project, by offering energy production sites, by offering investment opportunities for citizens e.g. to sell electricity to the municipality, or by the municipal energy utility jointly carrying out a project with citizen groups.

Other supporters identified in this study are citizen groups that spread their model to other communities like the Hardener Model or the Baywind cooperative. A series of foundations, community-founded institutes and lobbying networks such as the Bündnis Bürgerenergie e.V. or the Solar Gardens Community have been set-up to offer advice, knowledge sharing and workshops for communities and project leaders to improve the skills of citizens getting involved or being confronted with energy projects.

Many community-based organisations reach impressive professionalism. After some time they are able to deal with complex business models or have a large enough portfolio to spread investment risks. Most citizen groups though engage in a single project. To allow newcomers or those doing a one-time project to engage in renewable energy business models for community involvement should be low-risk and low in complexity.

Annex I: Legal forms and uses in Germany

Overview of the legal forms in the German context

In Germany, the legal regulations for the energy sector are among others determined in the Energiewirtschaftsgesetz (EnWG ~ Energy Industry Law). The creation of a distinct legal entity to engage in a renewable energy project is not required in the EnWG. Citizens can engage as sole proprietors or as civil law partnership in energy projects. However, they can also enter in more complex legal constructs. Entering into more complicated legal constructs can offer advantages such as liability limitation, lending or contractual rights, and external recognition (Robert et al. 2014).
Community-based renewable energy utilizes legal forms such as incorporated businesses[29], cooperatives, community trusts and foundations, non-profit associations or other jointly-owned enterprises, associations as well as individual ownership. In this section, we will describe the most relevant legal forms for community-based renewable energy projects in Germany, covering the following:

- EinzelunternehmerIn – sole proprietor
- Gesellschaft bürgerlichen Rechts (GbR) – civil law partnership
- Eingetragener Verein (e.V.) – registered association
- Rechtsfähige Stiftung bürgerlichen Rechts– incorporated foundation under civil law [30]
- Eingetragene Genossenschaft (e.G.) – registered cooperative
- Gesellschaft mit beschränkter Haftung (GmbH) – limited liability company
- Gesellschaft mit beschränkter Haftung und Compagnie Kommanditgesellschaft (GmbH & Co. KG)/ German limited partnership with a private limited company as a general partner
- Aktiengesellschaft (AG) – German public company on stocks
- Anstalt öffentlichen Rechts (AöR) – public agency

Where applicable, we will describe the international equivalents of these legal forms.
While there are no official statistics on community stakeholdership in RE projects, the most common form (within the recorded projects) is the energy cooperative (Degenhart & Nestle 2014). In 2015 850 energy cooperatives were registered with the "Deutscher Genossenschafts- und Raiffeisenverband e. V." (~the German Cooperative and Raiffeisen Confederation) (DGRV n.d.). Limited partnerships such as the GmbH & Co. KG are the second most common legal form for cb-RE. The number of GbRs is unknown as this legal form is not subject to public disclosure or to registration in the commercial registry. A rare construct for community stakeholdership is the AG as its main characteristic is the tradability of its shares, which is not necessarily a desired function in community-based projects.

The legal information offered in this chapter should not be used as a source of legal advice and cannot replace legal services to set-up an organisation.

Access to financing of different legal forms

Renewable energy can in principle be financed via corporate finance (e.g. the project is included in the balance sheet structure of a specific company) or via project finance (e.g. through the establishment of a special purpose vehicle/a separate entity for the project so that the financing of the project is 'off-balance sheet'). For cb-RE projects, the latter is most relevant (Degenhart & Nestle 2014). This means that in order to set up a RE project, the citizens need to gather the required capital – equity capital as well as debt capital via financial institutions.

It is uncommon for cb-RE to collect senior debt capital e.g. on the capital markets.[31] Most cb-RE projects in Germany are financed by a large share of equity or mezzanine capital. Especially in renewable energy the capital stems from private persons.

[29] An incorporated business is a legally separate corporate entity, separated from its owners and organized around shares, shareholders and directors. In Germany, incorporated business include the GmbH, the AG as well as forms such as the Gmbh & Co. KG
[30] A foundation as such is not a specific legal form under German Law, there are several foundations, differing in their incorporation and purpose. Within this report, we will focus on incorporated foundations.

Cooperatives tend to start off with very high equity levels. After the establishment they tend to increase debt capital proportionally more strongly than equity (DGRV, 2013).

Private individuals' equity contributions can be complicated from a legal standpoint, as the *acceptance* of large scale private credits might require the organization to hold a banking license (Degenhart & Nestle 2014). These contributions are however possible using mezzanine capital instruments such as junior debt, participation loans, bonds or silent partnerships (Degenhart & Nestle, 2014).[32] Junior debt (Nachrangdarlehen) is subordinate to other debt and is associated with a fixed interest rate while the participation loan (partiarisches Darlehen) includes a profit-dependant rate of return (Energie Innovativ 2012). Whether or not a project can utilize these instruments depends on its legal form. While a proper banking license is not required, generally everyone offering these products needs a license from the Federal Financial Supervisory Authority (BaFin). So far, energy cooperatives have been exempt from the regulations. A silent partnership ("Stille Gesellschaft") is a fully liable contribution to any kind of corporation (GmbH, AG or the limited partnership GmbH & Co. KG) or a civil law partnership. The contributing partner is silent, and the involvement usually does not have to be made public.[33] The silent partner is not involved in management decisions and has no significant control rights beyond insight into the company reports and accounts (Energie Innovativ 2012). The silent partner participates in the profits of the company (similar to any other partner through dividends) but is rarely (unless contractually stipulated) impacted by losses (Energie Innovativ 2012). A silent partnership is especially beneficial in case further capital is needed (a contribution by the silent partner is bureaucratically uncomplicated and the company only has internal liabilities to the silent partner). There are no general documentation requirements, which is why the prevalence of silent partnerships in Germany is unknown.

Levels of participation of different legal forms

The level of involvement of members in decision-making differs significantly for the different legal forms. Table 9 illustrates the participation options possible within the different legal forms.

Table 9: Participation in the different German legal forms

Legal Form	Participation Option	Degree of participation*	Comment
EinzelunternehmerIn – sole proprietor	Project developer/owner	Full control	High involvement but also personal liability, the involvement is at all stages of the project
GbR– civil society partnership	Partner (GesellschafterIn)	Full control	High involvement but also personal liability, the involvement is at all stages of the project, with the exit of one partner the form usually ceases to exist, differing agreements can be made in the statute incl. the repayment of partner contribution.
e.V. – registered association	Member	One vote in majority decision-making	The membership requires an application form as well as the admission by the association. It can be terminated by the member (no approval by the association needed). At the general assembly all members have the right to speak as well as one vote (for full members) – differing agreements for supporting or honorary members can be made
Stiftung – foundation	Donor	One vote in majority decision-making	The foundation is based on endowments and the foundation does not have members, typically as stipulated in the statute, the donors have one vote in the assembly based on a minimum donation.
e.G. – registered cooperative	Member (~Genosse/Genossin)	One vote in majority decision-making	The voting rights in the cooperative are not based on the capital contribution, there is one vote per member, members can join upon approval of the e.G., exit possible without approval, cooperative shares can be terminated (under compliance to the notice period) and right to the repayment of share value
GmbH– limited liability company	Shareholder (~AnteilseignerIn)	Voting based on share ratio	Voting rights are based on the ownership shares in the company, shares can be sold or inherited but not terminated (agreements regarding repayment of company shares can be regulated in the statute)

[31] Senior debt is debt that is prioritized over other unsecured or otherwise junior debt in the repayment, especially in case of insolvency.
[32] The term "silent partner" refers to an individual with limited involvement in a partnership beyond providing capital to the business; the silent partner is seldom involved in daily operations or management meetings.
[33] The involvement of a silent partner in an AG requires publication of this involvement

Legal Form	Participation Option	Degree of participation*	Comment
GmbH & Co. KG- German Limited Partnership with a Private Limited	Partner of the KG	No management rights	As a limited partner in the partnership, the KG is secluded from the management and only has the right to object in case of extraordinary transactions (§164 (1) HGB), shares in the KG can be terminated or transferred
Company as a General Partner	Stockholder (~AktionärIn)	Voting based on share ratio	Voting rights are based on the share ratio in the company, entry and exit via the purchase/sales of shares
AG– German Public Company	Silent partner	No management rights, right to insights into company accounts	The participation of the silent partner is effective in the internal constellation and does not need to be published except for the silent partnership with an AG, entry of a silent partner is uncomplicated without founding procedures
Silent Partnership	Private individuals	No participation rights	No specific involvement of citizens foreseen
AöR – public agency		No participation rights	no specific involvement of citizens foreseen

Source: own compilation

Legal constellations of different legal forms

Frequently cb-RE projects are a joint project of different actors such as private individuals, companies, co-operations and municipal utilities working together. The legal forms differ regarding their suitability to combine different partners. Due to liability issues a GmbH & Co KG will usually be preferred over a GbR. Governmental entities are normally not allowed to join such an arrangement in the first place. Cooperatives on the other hand allow for equal participation of all members which frequently is not in the interest of commercial/ public actors in a project. The GmbH & Co. KG model on the other hand can be advantageous when citizens want to combine shareholders and financiers with different levels of interest or legal characteristics (such as companies, private citizens and municipal actors) in one legal entity (FNR 2014:14). Each of the legal forms has specific characteristics and therefore different advantages and disadvantages.

Choice of a legal form

Depending on the *duration and long-term strategy* of a project influencing factors are whether only one project is planned or whether the entity shall serve for additional future projects. For some activities e.g. a one-time purchasing community it might not be useful at all to put the agreement into a written contract.

The choice of legal form is further on related to questions of *business risk distribution* and *liability*. Users might want to limit personal liability for business models with higher associated risks such as direct delivery models, while with business models such as guaranteed feed-in tariffs risks are lower and liability limitations might be less important. The advantage of legal forms such as AG and the GmbH is that the liability can be limited to the capital contribution (shares). The KG (partner in the GmbH & Co. KG) and the GbR in contrast are 'Personenhandelsgesellschaften' (societies) between two or more natural or legal partners where the liability is not as limited as with the companies limited by shares. In the GmbH & Co. KG normally the GmbH and in the GbR all partners are fully liable.

The models vary with respect to their ability to *access financing* e.g. in respect to the ability to acquire senior debt. Some activities are regulated by the Vermögensanlagengesetz (VermAnlG ~Investment Act) and are therefore not easily carried out.
Depending on the nature of *decision-making* or the degree of participation desired, certain legal forms are more democratically organised while others follow strict capitalist rules.

Regarding the *administration and reporting* requirements, some of the constructs allow for professional management to be hired (e.g. the GmbH & Co KG, GmbH or AG), others are subject to professional assistance (e.G.) while some can be run entirely by volunteers (e.V. or the foundation). In summary the choice of the most appropriate legal form thus depends among others on the following elements:

- Duration of the project/investment and long-term strategy
- Liability issues
- Access to financing:
    - Creditworthiness
    - Requirements regarding investment offers
- Structure:
    - Typical number of participants/citizens involved
    - Participation rights
    - Combination of different legal entities such as individuals and municipal utilities
- Set-up and Administration:
    - Minimum capital requirements at establishment
    - Legal requirements of administrative set-up (regarding governing bodies)
    - Legal requirements regarding reporting and transparency

The differences between the legal forms in Germany are presented in a concise summary table below (Table 10). Separate factsheets for each legal form follow in Table 11-Table 19. These factsheets cannot be used as a source of legal advice and cannot replace legal services to set-up an organisation.

Table 10: Summary of Legal Forms

	Einzel-unternehmerIn	GbR	e.V.	Stiftung [1]	e.G.	GmbH	GmbH & Co. KG	AG	AöR
English Term	Sole proprietor	Civil society partnership	Registered association	Foundation	Registered cooperative	Limited liability company	German limited partnership with a private limited company as a general partner	German public company	Public agency
Liability	personal liability	personal liability	no liability of members	no liability of founders	no liability of members	no liability of shareholders	no liability of shareholders	no liability of shareholders	n/a
Access to financing									
Creditworthiness(1)	low	Low	low	n/a	low	medium	medium	high	high
Requirements regarding investment offers (2)	low	Low	low	low	medium	high	high	high	n/a
Structure									
Typical number of participants	sole proprietor	Low	low	unlimited	unlimited	unlimited	unlimited	unlimited	n/a
Combination of legal entities	n/a	Possible	possible	possible	possible	possible	possible	possible	Not possible
Degree of Participation (3)	High	High	high	low	high	medium	medium	low	Low

[1] The foundation as such is not a specific legal form under German law, within this report we will however focus on the "rechtsfähige Stiftung bürgerlichen Rechts" (=incorporated foundation under civil law) and refer to "foundation"

	Einzel-unternehmerIn	GbR	e.V.	Stiftung [1]	e.G.	GmbH	GmbH & Co. KG	AG	AöR
Set-up and Administration									
Minimum capital requirements at establishment	n/a	n/a	n/a	n/a but often 50,000 Euro	n/a	25,000 Euro	GmbH: 25,000 Euro, KG: regulated in the statute	50,000 Euro	n/a
Legal requirements of reporting and transparency (4)	low	Low	medium	medium	medium	high	high	high	high
Legal requirements of administrative set-up (5)	Low	Low	medium	medium	medium	high	high	high	

EB – executive board, GA: general assembly, KG: Kommanditgesellschaft
(1) Creditworthiness: *low*: low degree of creditworthiness towards commercial banks, *high:* high risk premium (usually high interest rates), *medium:* medium degree of creditworthiness towards commercial banks, high:high degree of creditworthiness, low risk of default/non-repayment and low risk premium (usually low interest rates)
(2) Requirements regarding investment offers: *low:* no applicability of investment offer requirements, *medium:* medium requirements, risks to be applicable for the VermAnlG, *high:* strict requirements regarding investment offers (applicability of the VermAnlG and the obligation to publish a sales prospectus)
(3) Degree of participation: *low:* low degree of involvement in decision-making, *medium:* participation rights via the general assembly depending on shares, *high:* equality of all parties involved
(4) Complexity of reporting and transparency: *low:* no external reporting duties (tax-related reporting disregarded), *medium:* Regulated reporting duties, *high:* regulated reporting duties, obligation to publish a public annual report 1
(5) Administrative set-up requirements: *low:* No specified bodies to be set up, *medium:* general assembly obligatory, *high:* general assembly, supervisory board obligatory

Source: own compilation

[1] The "Publizitätsgesetz" (~transparency and disclosure Act) foresees strict reporting rules for publicly traded companies and those companies exceeding thresholds regarding balance revenues and employees.

Sole proprietor

The majority of installed capacity within cb-RE (46.6 % of 34 MW installed capacity in 2012 (trend:research et al. 2013)) in Germany is owned by sole proprietors. Also in the case of biomass plants a large number is installed by individual farmers. Other appropriate technologies are wood chip heating systems, solar thermal installations, heat pumps, or small wind turbines.

This legal form is most suitable for low-risk business models where the risk of recourse can be limited, e.g. business models based on FiT or self-consumption. The inclusion of further stakeholders leads to the creation of other legal forms, e.g. a GbR.

Table 11: EinzelunternemerIn/ Sole proprietor in Germany

Sole proprietor	
German Term	EinzelunternehmerIn
Related legal forms	Natürliche Person (natural person) [36]
Founding procedure	Economic entity founded by a single natural person, in case the sole proprietor is a merchant according to German Commercial Law, a registration into the commercial registry is required Registration as a business[37]
Capital	No minimum capital requirements for the sole proprietor
Liability	Full liability with organizational and personal assets
Description of risks	All risks related to investing and running a RE facility, e.g. insurance needs in case of damage by/ to the facility, risks relating to payback of loans, need for sufficient liquidity to pay operational costs etc.
Participation of members	Full participation by the sole proprietor
Legal framework	In case the sole proprietor is not registered in the commercial registry (“KleingewerbetreibendeR” (=small enterprise) acc. to § 1 Abs. 2 HGB), a simple profit and loss calculation is required (no publishing obligations), otherwise the sole proprietor is required to follow the same bookkeeping requirements as other legal entities
Pros	Full control Only one owner, no potential conflicts with partners No minimum capital
Cons	Full liability with private assets

Source: own compilation

[36] The sub-forms most relevant to the underlying paper are presented here, while there might be more variations to the legal form
[37] A RE owner who receives income via the FiT, is a trade person and needs to register as such. RE owners can make use of the Kleinunternehmerregelung (regulations for small-scale trade), but in that case a RE tax deduction is not possible.

Civil society partnership

The GbR is important in community-based renewable energy in Germany. A large number of RE investments in the field of small scale communal PV is put into practice as a GbR – so-called "Bürgersolaranlagen" (Saena 2010). This legal form is suitable to engage a small number of participants and requires little administration. A major drawback of the legal form is the unlimited liability of partners, i.e. in case of default, the partners are fully liable with their private assets.

To limit liability the following legal construction is possible: The Haderner model is a legal construct which aims at imitating the GmbH & Co KG benefits of limited liability without its legal complications including founding procedures, as well as reporting and transparency regulations. The model was named after a project initiated in Hadern, a city district of Munich, Bavaria. Since in a GbR each participant is liable, not only to their share contribution but with their complete personal assets, engaging in such a GbR bears significant risks. Within the Haderner Modell, a GbR (civil law partnership) and a registered association (eingetragener Verein - e.V.) engage in a contractual relationship, in which the association is a service provider for constructing and operating the energy project. The association is equipped with technical competence plus an insurance for maloperation (typically a 5 M Euro liability insurance (Saena 2010). If potential claims resulting from default or failure of the system exceed the liability policy, the association, as the system operator, will be liable with its (limited) organizational assets and the GbR members are protected against potential liability claims resulting from the operation (Kuntze n.d.). The GbR is responsible for all business management aspects of the projects, including the assignment of management and selling the power through a –power purchase agreement, but not liable throughout the operation (Kuntze n.d.). The taxation of profits also takes place at the level of the GbR.

Table 12: Gesellschaft bürgerlichen Rechts/Civil society partnership in Germany

Civil society partnership	
German Term	Gesellschaft bürgerlichen Rechts (GbR)
Related legal forms	"Haderner Model" (= GbR + e.V.)
Founding procedure	• The GbR is based on the German Civil Code and is a partnership between two (or more) individuals or enterprises united in the achievement of a joint contract (BGB §§705 ff.). A conversion to a general commercial partnership (OHG) is obligatory if the operations of the GbR are seen to require a commercially business set-up * • Partnership agreement (written is not obligatory), no capital requirements for the establishment, obligatory to register with the local trade office
Bodies	Minimum of two founders: natural or legal persons, all partners represent and manage the organisation jointly, often the management of the organisation is handed over to an individual person via power of attorney (EnergieAgentur NRW, 2014)
Capital	No minimum capital requirements at establishment
Liability	• Direct and unlimited liability of the partners (with business and private assets) • legal combination with an e.V. (="Haderner Modell") details below make it possible to limit the liability,) or the GbR as a silent partner in a GmbH can limit liability risks
Participation of members	• Generally, all partners have equal rights (and obligation) in the management of the organization. It is possible to include special regulations in the partnership agreement (e.g. handing over the management to a specific (external) person, regulating the decision-making procedures etc.)
Legal framework	• All relevant legal regulations are found in the German Civil Law Code (BGB) • Legal regulations can be replaced by the agreements made in the partnership agreement which results in a relatively flexible design • VermAnlG: exemption from the regulations if less than 20 shares are distributed that do not exceed 100,000 Euro (fesa 2012)
International Analogues	Comparable forms in other countries include the General Partnership (UK), organisme à caractère collectif (France), consigliere delegato (Italy), la sociedad (Spain) (WW+KN Krinninger Neubert Steuerberater n.d.)
Pros	• Uncomplicated and affordable founding as well as tax-attractive • No (legal) formalities for the establishment, but written contract recommended • High and equal participation rights of all partners and possibility to design the partnership agreement individually • Appropriate for both long-term as well as short-term partnerships (Saena 2010)

Civil society partnership	
Cons	• Very risky legal form, because in case of default or increased costs within the project, the members are liable with their private assets • Further, in case of many partners, the management of the partnership gets more difficult as each partner has managerial power

(*)If the GbR reaches a certain threshold of annual turnover, capital resources and total number of employees or uses commercial accounting, the company is deemed to be a commercial business and must be entered in the commercial register upon which it automatically becomes a general commercial partnership (Offene Handelsgesellschaft, OHG).

Source: own compilation

Example 25: Informal set-ups: Joint bulk procurement

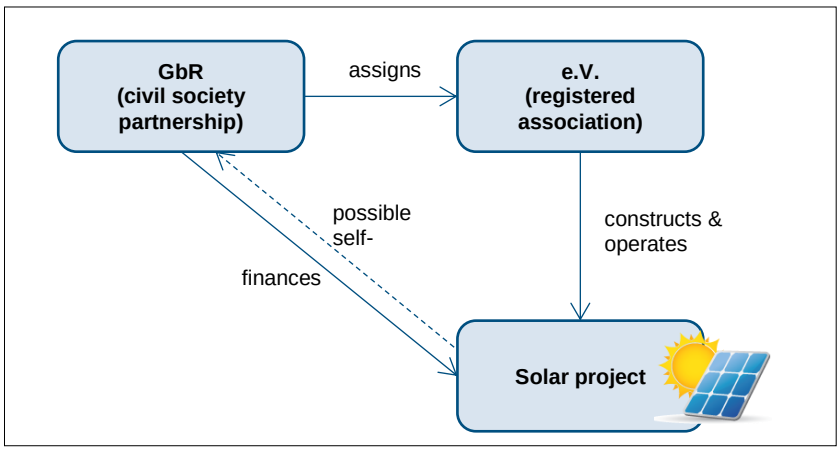
In case of a one-time and short-term cooperation an uncomplicated legal form can be most appropriate. These one-time events might later lead to a formal set-up. A frequent example could be purchasing communities.
In 2000, a buyers group was initiated by the municipality and the working group "Agenda 21" in the city of Ascha (a municipality in the district of Straubing-Bogen in Bavaria). A solar community was formed by 20 households in order to strengthen their collective purchasing power for solar collectors. Due to the larger numbers of solar collectors bought, the group received better conditions for the product and with the local construction firm (bulk prices) (Gemeinde Ascha n.d.).
See also the *Solarize Portland* example on p. 44 for an alternative bulk procurement program or the Cooperative Community Energy California[38] as an example of a formal set-up of bulk procurement as a cooperative.

Example 26: Civil society partnership & Associations (Hardener Model): BürgerSolar Recklinghausen GbR, Germany

The constellation of the Bürgersolar Recklingshausen GbR and the Sola RE e.V. is an example of the Haderner Model (p.64). In 2015 SolaRE has so far installed three PV rooftop PV systems. For each project a separate GbR is set up. The GbRs each raised 230 000 to 250 000 Euro from 69 to 85 citizens of Recklingshausen each (Sola RE e.V. n.d.). The city of Recklinghausen supports the initiative by renting out the rooftops on which the systems are installed. The GbRs outsource the construction and operation of the PV systems to the Sola RE e.V. The FiT is channelled directly to the GbRs. The association is responsible for the supervision of operations and control of the system performance while the GbR is responsible for accounting, profit- and loss calculations, communication with banks, taxation reporting as well as the annual general assembly (Kuntze n.d.).

Website: http://www.sola-re.de/index.php/die-anlagen-im-ueberblick

Figure 27: Schematic illustration of the Haderner Model



Source: own figure, translated and based on Sola RE, 2015

[38] Cooperative Community Energy California website: http://www.ccenergy.com/index.php

Example 27: International examples of limiting liability

In Danish Law *Interessentskab* (I/S), are frequently used for community energy projects most famously for wind turbine cooperatives (*Vindmøllelaug*). In these partnerships each partner has joint and individual liability, meaning that each partner can individually be held liable for the entire debt of the partnership (Roberts et al. 2014). The risks associated with the unlimited liability is mitigated by prohibiting the I/S from contracting debt via stipulating so within the statutes of the I/S.
The establishment of an I/S, as a partnership as opposed to a cooperative, allows individuals of the partnership to be taxed for return on their investments at individual tax rates of each household (Roberts et al. 2014).

Registered association

The legal form of an association can be used for any (legal) purpose except profit-making. In comparison to the foundation, for an association, the members and the membership is priority, while for the foundation, the foundational assets and their use is at the focus (Friedrich et al. 2005). Associations own and operate a multitude of citizen power plants like the Sonneninitiaive e.V.(Sonneninitiaive e.V. n.d.) or set up PV projects including employee-PV systems in the form of constellation of the Hardener Model (see Example 26 p. 65).

Table 13: Eingetragener Verein/Registered association in Germany

Registered association	
German Term	Eingetragener Verein (e.V.)
Related legal forms	• "Haderner Model" (= GbR + e.V.)[39]
Founding procedure	• Minimum of 7 members and a written statute • Registration to the association registry ("Vereinsregister") (without the registration the association is an unregistered group of individuals without a legal function (="nicht rechtsfähiger Verein") - prerequisite for the registration is a joint objective and a set-up for a predetermined duration • an association can only be registered if its non-economic (focus on profit-making/economic activities) (§21 BGB) or has special state awarding (§22 BGB)
Bodies	• Board of the association (Vereinsvorstand) – responsible for the accountability towards the general assembly • Mitgliederversammlung (members' assembly, general assembly)
Capital	• No minimum capital requirement at establishment
Liability	• Liability of the foundation (with its assets) no personal liability of the members • the chairman can be made personally liable in case of breach of duties
Participation of members	• decisions generally taken by the general assembly, • every member has one vote, the majority of votes is relevant • membership fees are not mandatory but can be made applicable, if regulated in the statute of the association
Legal framework	• Relevant legal regulations are found in the German Civil Law Code (§§21-79 BGB)[40]
Pros	• simple founding procedure • the e.V. can, as a corporate body, be charitable (in contrast to the GbR or the sole proprietor, which cannot) – this has significant taxation and accounting reliefs • democratic structure according to the 'one member, one vote' principle unless otherwise stipulated (special rights can be agreed upon according to §35 BGB)
Cons	• An e.V. is not allowed to focus primarily on profit-making/economic business operations if this is seen as the primary purpose of the association (the association is only allowed to engage incidentally and subordinately in economic activity), the legal capacity of the association can be withdrawn [41] • The establishment of an association requires at least 7 members

Source: own compilation

[39] The sub-forms most relevant to the underlying paper are presented here, while there might be more variations to the legal form
[40] The German Transparency and Disclosure Act stipulates that organisations exceeding certain dimensions are subject to the same stringent disclosure regulations as incorporated companies on stocks (§ 1 Abs. 1 PublG).
[41] An association can, with special state awarding, remain a registered, legally capable association even with business operations (primary focus), this state awarding is however, very rare

Example 28: Associations - Bündnis Bürgerenergie e.V., Germany

The Bündnis Bürgerenergie e.V. supports community-based renewable energy and promotes political dialogue to establish a "culture of community-based renewable energy" (BBE n.d.). The association accepts only other associations, networks, cooperatives and companies as voting members. Individuals can contribute only financially, without participation rights.

Website: http://www.buendnis-buergerenergie.de/intro/

Foundations

Foundations in community-based renewable energy are frequently used as a vehicle for social services fed by money from a RE project (e.g. in the Example 8 of Schlalach p. 34).

Table 14: Rechtsfähige Stiftung des bürgerlichen Rechts/Incorporated foundation under civil law

Incorporated foundation under civil law	
German term	Rechtsfähige Stiftung des bürgerlichen Rechts[42]
Related legal forms	• Treuhandstiftung (trust foundation) • Bürgerstiftung[43]
Founding procedure	• Any natural or legal person can set up a foundation • According to §80 Abs. 1 BGB, the founding is subject to the permission from the responsible authority of the country, requiring sufficient foundational endowment, a foundation goal as well as foundation statute
Bodies	• Foundation board (1-3 natural persons responsible for the management of the foundation and its assets as well as awarding of disposable assets to supported projects) with one chairman of the board • Foundational assembly (including all donors) • Foundation council (3-5 natural persons)
Capital	• minimum of 50,000 Euro foundation endowment - exceptions can apply in case the purpose of the foundation requires only minimal endowment
Liability	• the liability of the foundation is similar to the liability of the association: the foundation is liable with its endowment (§89 (1) in combination with §31BGB)
Participation of members	• Specific activities of the foundation can be supported via donations to the foundations (the foundation is responsible for utilizing the funds in a timely manner) and the donor can determine the purpose of the donation (to a specific project/activity), but the participation is limited to this • Further, there is the possibility to make a contribution to the foundation's endowment ("Zustiftung"); this increases the endowment of the foundation and is preserved (gathers interest income) in order to finance the foundation on the long-term • The founders must agree on the foundational focus and activities, the purpose of the foundation can only be changed when the fulfilment has become impossible or dangerous to society (§ 87 BGB), the bodies and conditions of the foundations are usually determined in the statute (including potential committees)
Legal framework	• The legal framework for foundations are stipulated in German Civil Law §§80-88 BGB and according to § 86 also the §§ 26, 27 (3), §§ 28-31a, 42 BGB which are paragraphs about associations.[44] • Further, the "Stiftungsgesetze", which are the Laws on Foundations – these are relevant federal level regulations, i.e. a different law for each of the 16 federal states [45]
Pros	• The donations to a charitable foundations can represent tax-effective deductions • All profit from the operation of a RE system via a charitable foundation are channelled to charitable community purposes (e.g. education and awareness) – the benefits for the community are thus wide-reaching • The capital is tied to the foundation long-term, there is no possibility of divestment

[42] Hereafter simply referred to as „foundation"
[43] The sub-forms most relevant to the underlying paper are presented here, while there might be more variations to the legal form
[44] The German Transparency and Disclosure Act stipulates that organisations exceeding certain dimensions are subject to the same stringent disclosure regulations as incorporated companies on stocks (§ 1 Abs. 1 PublG)
45 The different Foundation Acts can be found here: http://www.stiftungsgesetze.de/

Incorporated foundation under civil law	
Cons	• It is common that the foundation board and other bodies of the foundation are volunteer positions, so that there might be a lack of professionalism due to the lack of full-time HR • dependent on endowment as well as set up for a long-term • founding procedure are rather complex (e.g. compared to an association)

Source: own compilation

Example 29: Foundation Ökologisch-Soziale Stiftung Zschadraß, Germany

In other cases the foundation can also function as a financial contributor to RE projects as in the case of the "Ökologisch-Soziale Stiftung Zschadraß" (see Example 5, p. 27). The participation of the foundation members and the community is fairly low (founders of the foundation have little codetermination rights once their donation is made and the endowment is tied to the foundation for the purposes set in the statute).[46] In the case of Zschadraß the initial donation of foundation capital originated from an affluent individual who had a personal interest in the promotion of renewable energy.

Website: http://www.colditz.de/stiftung/Oekologisch-soziale-Stiftung.html
Promotional video (in German only): Bündnis 90/ Die Grünen (2011) .Neue Energie in Bürgerhand. https://www.youtube.com/watch?v=lCSjhPYAXks

Example 30: Foundations - Community foundation model, Denmark

The Danish community foundation model is established by local associations and businesses. The capital requirement is a minimum of DKK 300,000 (~40,220 Euro[47]). The foundation is its own legal entity – the purpose of revenue use is stipulated by the foundation's owners. It has a special lower tax rate. Grants handed out can be deducted from the foundation's taxable income (Roberts et al. 2014). This model generally resembles that of a trust foundation ("Treuhandstiftung").

Example 31: Foundations - Development trusts, Scotland

Under UK regulations, trusts can be established as a charity, a company limited by guarantee, a community interest company or as an Industrial and Provident Society (IPS). As such the trust does not have owners or shareholders, and the income derived from the investments is reinvested into the community or the organisation. A board of trustees is responsible for overseeing the operations. Constellations could also include a trust setting up an IPS to construct and manage the energy system (Roberts et al. 2014).
One example of such an IPS is the Harlaw Hydro Ltd. (an IPS). The Balerno Village Trust established the IPS in 2012 in Balerno, a suburb of Edinburgh, Scotland for the specific purpose of owning and operating a micro-hydro scheme at the local Harlaw reservoir (www.harlawhydro.org.uk). The capital investment was raised via a share offer raising a total of £403,000 from 250 shareholders (Edinburgh Reporter Website n.d.). Harlaw Hydro aims to produce 65 kW of electricity, to feed this into the national grid and generate revenue via the FiT. This will pay for a return on investment for the shareholders.

Website: www.harlawhydro.org.uk

[46] The statute of the Zschadraß foundation can be found here: http://www.colditz.de/download/377/1/Satzung.html.
[47] Exchange Rate as of 29/10/2015: 0,13

Registered cooperatives

Cooperatives are very important in community-based renewable energy in Germany and they represent a suitable form to promote social and cultural activities of members via a common business beyond profit maximisation. The most common form within the recorded projects identified as cb-RE by Degenhart & Nestle (2014) is the energy cooperative – with a considerable increase until 2013. Recorded numbers range between 622 and 888 in 2013 (Degenhart & Nestle 2014; Klaus Novy Institut 2014). The majority of existing energy cooperatives are solar cooperatives (founded from 2007 onwards). Only in a few cases cooperatives own more than 1-2 wind turbines, for projects of greater scale often times the legal form of GmbH & Co. KG is chosen (Degenhart & Nestle 2014). Wind cooperatives represent a smaller share than for instance in solar, but with longer history and larger installed capacity (Oteman et al. 2014).

Table 15: Eingetragene Genossenschaft/Registered cooperative in Germany

Registered cooperative	
German Term	Eingetragene Genossenschaft (e.G.)
Founding procedure	• Minimum of three members, written statute + business plan *, members can be either natural or legal persons • Accreditation by the association of cooperatives to allow for registration (IFEU 2015)
Bodies	• Genossenschaftsvorstand ("management board"): – 1 member for cooperatives with less than 20 members and a minimum of 2 in case the cooperative has more than 20 members • Aufsichtsrat ("supervisory board"): chosen by the general assembly (min. of three members) and is generally (only) required if there are more than 20 members in the cooperative and in case there is no supervisory board for smaller cooperatives, the general assembly assumes its tasks • Generalversammlung (~general assembly) (GA) • Further; positions within the bodies of the cooperative can only be assumed by cooperative members
Capital	• No legal requirements for a minimum capital (can be stipulated by the cooperative in the statute though) • Company share and minimum capital can be determined by the members, an alternative to the share would be a subordinated loan (similar to equity capital) and the interest paid on the loan (to the member of the cooperative) would not be regarded as profit of the cooperative (exempt of taxes) (IFEU 2015)
Liability	• The cooperative (with its assets) is liable to its creditors in case of insolvency, the reserve liability of members can be regulated in the statute so that no personal liability of shareholders occurs (IFEU, 2015, DGSV, 2014a) • The cooperative is legally recognized with the registration into the cooperative registry, until the registration, the members of the cooperative are fully liable for any liabilities incurred until the moment of registration
Participation of members	• The cooperative is seen as a particularly democratic organization as every member has 1 vote independent of financial contribution to the cooperative • Decision-making in the GA, simple majority of votes (IFEU 2015; DGSV 2014) • Decisions to be made in the GA are among others: the termination, merger, conversion into other legal forms, changes to the statute, increase or splitting of cooperative shares, appointment and dismissal of the board and the supervisory board, decisions regarding the annual accounts, the profit and loss calculations etc. • The inclusion of new members does not have to be registered in a public registry, it simply has to be approved by the e.G.
Legal framework	• The association of cooperatives consults in business, legal and tax-relevant matters and in order for the cooperative to be recognized, it needs to be approved by the association of cooperatives (see founding procedure) • According to the Genossenschaftsgesetz (GenG), the Cooperative Act; a biannual (in case the balance sheet total exceeds 2 M Euro/a) audit of the commercial circumstances as well as compliance of the management is required – this

Registered cooperative	
	audit is not only relevant to comprehensive reporting but also to the support received from the auditing association • The VermAnl, which is the German investment Act stipulating transparency regulations for investments, foresees exceptions for cooperatives, so that they are exempt from the regulations in the act with regards to share offers [VermAnlG §2 (1) & (6)][48]
International analogues	• Industrial and Provident Societies (IPS) is a UK-specific legal form and can be formed in two ways: 1) a community benefit society ('BenCom' – focus is on the benefit for the community as a whole) or 2) a cooperative society (focus is on the benefit of their members) • Cooperative limited company (Andelsselskaber med begraenset ansvar in Denmark)
Description of risks	• A fixed capital is not (legally) required but can be regulated in the statute and is often necessary for well-directed business operations, in case a shareholders wants to exit the cooperatives, this is easily possible and they are entitled to pay out of their share (no price risks compared to shares) • Changes in current regulations (e.g. the investment act) might make it more difficult for e.G. to have access to additional capital
Pros	• Possibility to engage different actors (communes, civil society, companies etc.) with relatively limited (or very differing levels of) financial contribution • No individual liability of partners, thus also attractive for larger projects, • Adding a new member into the cooperative is fairly easy • No minimum capital required • High democratic participation structure • Quality control by the association of cooperatives which supports in the development and audits the cooperative's business plan and statute
Cons	• Less profit-oriented • Need to submit an annual balance sheet • Two-level taxation for cooperative members corporate tax + personal income taxation - however possibility to avoid this by replacing shares with subordinate loans from members (interest on loans is deduced from cooperative profit) • Might have longer decision-making time since all members need to be heard • Payment of dividends is common, but cannot (in comparison to other forms, be determined before hand –only generated profits can be distributed and the use of the annual profit will be decided upon at the GA (BWGV 2012)

* The founding procedure for cooperative was eased considerably, e.g. the minimum required number of founding members was reduced from seven to three. Small cooperatives (of less than 20 members) only need one board member. The annual audit is not required for small cooperatives with a turnover of less than 1 M Euro balance sheet total, and 2 M Euro revenues (Brinkmann & Schulz 2011).

Source: own compilation

Example 32: Cooperatives – Ökodorf Sieben Linden, Germany

Many villages in Germany have committed to sustainability, ecological orientation and societal change. A prominent example within this field is the eco-village Sieben Linden, established in 1997 (with the purchase of the land) in the 140-people-community of Beetzendorf, in Saxony-Anhalt. The objective of the eco-village is "to develop and test answers to pressing challenges such as climate change, economic crisis, unsustainable resource use and social inequality". The whole project is structured as a registered cooperative (Siedlungs-Genossenschaft Ökodorf e.G), with the land as well as the infrastructure belonging to the members (all inhabitants being members). The cooperative is among other things investing in solar energy (Freundeskreis Ökodorf e.V. n.d.).

Website: http://www.siebenlinden.de/

[48] The German Transparency and Disclosure Act stipulates that organisations exceeding certain dimensions are subject to the same stringent disclosure regulations as incorporated companies on stocks (§ 1 Abs. 1 PublG). In that case, administrative requirements of cooperatives increase significantly.

Example 33: Combination of several legal actors in a cooperative, Germany

Cooperatives can also be used to combine different types of actors. The "Neue Energien West e.G." (NEW e.G.) in the Oberpfalz combines two municipal energy utilities, 16 municipalities and a citizens energy cooperative. Together they raised 8.65 M Euro for a 22.3 MW solar project.

Website: http://wordpress.p280938.webspaceconfig.de/

Example 34: International experiences - Cooperatives in Costa Rica

The Costa Rican energy market includes four rural energy cooperatives that produce and distribute power in response to demand from rural areas. The Coopelesca, Coope Alfaro Ruiz, Coope Guanacaste and Coopesantos supply about 150,000 customers (ILO 2013).

Initiated in the mid-to-late 1960s, the Costa Rican rural cooperative program was funded jointly by the U.S. Agency for International Development and the National Bank of Costa Rica, at a cost of a US$ 3.3 loan from USAID, together with an US$ 800,000 contribution from the National Bank of Costa Rica. Each of the four cooperatives was initially set up in an area not serviced by the state utility.

The cooperatives are owned and operated by the energy users and hold periodic public meetings at which leadership decisions are made as well as decisions about electricity pricing. The coops assume responsibility for the administration, maintenance and expansion of the distribution systems under their control. Ultimate authority within the cooperative rests with the General Assembly. Delegates from communities in the service area are elected to the GA every two years, and the GA elects an administrative council to oversee the cooperative's management, providing a measure of defence against gross mismanagement.

Each cooperative charges varying connection fees and tariffs depending on what is required for cost-recovery in that area. The cooperatives are obliged to cover their operating costs, as well as debt repayments and interest. All cooperatives run education programmes as a service to the communities (Climate Parliament 2010).

Limited liability companies

The GmbH is a suitable form for larger projects that require a limitation of liability for its partners, while also allowing for the inclusion of a large number of partners as well as the appointment of third-party management. Many Stadtwerke (~municipal utilities) were organized as GmbHs after the liberalisation of Germany's energy sector in 1998 (Berlo & Wagner 2013). Further, also the majority (67 %) of newly founded Stadtwerke is organized via the legal form GmbH (Berlo & Wagner 2013).
Degenhart & Nestle (2014) estimate that among community-based renewable energy there are 29 GmbH/UG and 307 GmbH/UG & Co.KG operating renewable energy plants in Germany.

Table 16: Gesellschaft mit beschränkter Haftung/Limited liability company in Germany

Limited liability company	
German Term	Gesellschaft mit beschränkter Haftung (GmbH)
Related legal forms	• Unternehmergesellschaft (UG) [49](small corporation with only one shareholder)
Founding procedure	• Minimum of 1 shareholder • Company statute, notarization, registration in the commercial registry • UG is founded similarly to the GmbH
Bodies	• Managing director(s), supervisory board (obligatory if more than 500 employees), general assembly[50]
Capital	• Minimum capital of 25,000, minimum of 25 % capital contribution • Minimum capital requirements were eased significantly in 2008 introducing the UG starting at a capital requirements of 1 Euro (§ 5a GmbHG)
Liability	• The assets of the company are liable for the debt holders, reserve liability can be regulated in the company agreement, the partners (Gesellschafter) are not personally liable • The managing directors of the GmbH in breach of their duties shall be jointly and severally liable for the damage ensuing [51]
Decision-making of	• Company decisions are generally made by the managing director(s), fundamental decisions are made at the meeting of shareholders, voting rights are based on the share in the company
Legal framework	• "Gesetz betreffend die Gesellschaften mit beschränkter Haftung" (GmbHG), the regulations regarding accounting are stipulated in §§ 238 -335 HGB, as well as §§ 42 ff. GmbHG, hereby the GmbH has obligations to prepare an annual report as well as is subject to the legal auditing and publishing obligations stipulated for incorporated companies on stock
International Analogues	• Many countries have comparable legal forms, including the private company limited by shares (UK), société anonyme de responsabilité limitée (France), Società a responsabilità limitata (Italy)
Pros	• The liability of shareholders is limited to their shares • Shares can be sold, transferred, usually the company statute includes regulations regarding right of first refusal for current shareholders (often dependant on their shares held) • No regular GA (to be called for by the managing directors, the supervisory board or potentially liquidators (§ 36 Abs 1 GmbHG))

[49] The sub-forms most relevant to the underlying paper are presented here, while there might be more variations to the legal form
[50] According to GmbHG, the managing director(s), the supervisory board (if existent) as well as a liquidator (in case of a liquidation) can call a general assembly and it is obligatory once a year, as well as when a shareholder (with 10 % of equity capital) calls for one, or when certain KPIs are not achieved
[51] E.g. the breach of duty of diligence to which the managing director is obliged according to §§ 43 Abs. 1 GmbHG can lead to the full and personal liability of the managing director, the managing director has further obligations, such as (but not limited to) the disclosure in case of impending insolvency

Limited liability company	
Cons	• High accounting and bookkeeping requirements • Founding is fairly complex and costly (notarization in several steps)

Source: own compilation

Example 35: GmbH - Elektrizitätswerke Schönau Netze GmbH, Germany

A GmbH in cb-RE can act as a vehicle for operations of a holding company as is the case with the Elektrizitätswerke Schönau Netze GmbH (hereafter: EWS). The GmbH is fully owned by the EWS Netzkauf e.G. – a cooperative founded in 2009 by the association "Eltern für atomfreie Zukunft e.V." (~ association of parents for a nuclear-free future) in the town of Schönau. The cooperative was originally set up by transforming the Netzkauf GbR into an e.G. (EWS e.G. 2014) and has five subsidiary companies (all registered GmbHs). EWS has 150,000 customers Germany-wide (as of 07/2014).

The general assembly of the e.G. appoints the supervisory board, which in turn supervises the guidelines and controls the subsidiary companies. These are appointed with different operational activities: (1) Elektrizitätswerke Schönau Vertriebs GmbH is responsible for the electricity and gas sales. (2) Elektrizitätswerke Schönau Netze GmbH operates the electricity and gas network as well as other grids outside of Schönau. (3) Elektrizitätswerke Schönau Direkt GmbH is responsible for delivery models. (4) Elektrizitätswerke Schönau Energie GmbH is responsible for the construction and operation of electricity generation systems. And (5) Holzenergie Bertreibergesellschaft mbH plans, constructs and operates local heat networks.

The e.G. is responsible for administrative activities for the subsidiaries and provides space as well as material against a fee.
The EWS e.G. has 4,358 members, and made a profit of 2.7 M Euro in 2014 (EWS e.G. 2014). It is suggested (and approved) in the annual report that the profit will be distributed to members at 3,5 % of the contributed shares (amounting to 996,219.00 Euro in total) (EWS e.G. 2014).

Website: http://www.ews-schoenau.de/homepage.html

Example 36: GmbHs - Stadtwerke Celle, Germany

GmbHs are also used as a vehicle by municipal utilities: the Stadtwerke Celle (Municipal Utility Celle) was modified into a GmbH in 1972, the owner of all shares is the city of Celle. Participation of citizens was promoted in February 2015 via an Open Investment Model, when the Stadtwerke Celle opened up the process for subordinated loans for a solar PV system on the rooftops of the railway station. Within two weeks, the GmbH was able to raise 2 M Euro with loan sizes ranging between 1.000 Euro and 20,000 Euro (Stadtwerke Celle 2015). The loan duration of the subordinated loans is 5 years with an interest rate of 1.55 % p.a., for customers of the Stadtwerke, the interest is even 2,25 % p.a.

Website: http://stadtwerke-celle.de/

German limited partnership with a private limited company as a general partner (GmbH & Co. KG)

GmbH & Co. KG play a highly important role in community-based renewable energy in Germany. The majority of RE investments in the field of wind energy is put into practice as a GmbH & Co. KG (BWE 2012). It is a suitable form for larger projects with higher investment volumes that require a limitation of liability. In the area of solar installations as opposed to wind energy, the legal form of GmbH & Co. KG in cb-RE tends to occur less frequently (Degenhart & Nestle 2014).

Table 17: GmbH & Co. KG/German limited partnership with a private limited company as a general partner in Germany

German limited partnership with a private limited company as a general partner	
German term	Gesellschaft mit beschränkter Haftung & Compagnie Kommanditgesellschaft (GmbH & Co. KG)
Founding procedure	• Minimum of two founding shareholders – legal or natural persons • Partnership agreement (notarization) and registration in the commercial registry, the limited-liability company is general partner (full liability) + one limited partner
Bodies	• Management board • Advisory board (supervising the management of operations) • General assembly (tasks include voting on board member appointments)
Capital	The capital requirements for each of the partner organisations is relevant; for the GmbH, there is a minimum of 25,000 Euro initial capital, while the KG has no fixed capital requirements
Liability	• The GmbH is fully liable for the GmbH & Co. KG's debts and liabilities (with its company assets) • The limited partners (KG-Kommanditisten) are limited to their respective share of the partnership capital, there is no personal liability of the shareholders (Germany Trade & Invest n.d.)
Participation of members	The members become engaged through purchasing shares and participate as limited partners with co-management rights as stipulated in the partnership agreement
Decision-making	Voting rights according to the company agreement (usually based on capital contribution)
Legal framework	The relevant acts are the HGB (‘Handelsgesetzbuch’), the BGB (‚Bürgerliches Gesetzbuch‘) as well as the GmbHG (‚Gesetz betreffend die Gesellschaften mit beschränkter Haftung‘)
International Comparison	The GmbH & Co. KG is a special form in German (and Austrian) law, not existing in other countries, but partially comparable with the Limited Liability Company (LLC) in the USA
Pros	• Liability limitations • Can leverage high amounts of quasi-equity • Risk diversification (via merging of two traditional legal structures) and shareholders can participate without very high risks • Simplified management structures • Possible tax advantages: tax exempt amount of the trade tax • Individual customization of the statute possible as well as the employment of an external/non-member as the managing director
Cons	• High accounting and bookkeeping requirements • Founding is complex, while the costs to set up a GmbH are fairly high, the partnership (KG) is easier and more inexpensive to set up → It thus makes sense to spread the cost of setting up a GmbH across multiple projects (with different partnership constellations) • Voting rights are usually dependent on the capital contribution, in case maximum capital contributions are set, this is a limited risk

Source: own compilation among others based on WW+KN Krinninger Neubert Steuerberater n.d.

Example 37: GmbH & Co. KG - Freudenberger Oberland GmbH & Co. KG, Germany

The “Citizens’ Wind Farm” Freudenberger Oberland GmbH & Co. KG, was established in 2009 in Freudenberg, a municipality in the Amberg-Sulzbach district, in Bavaria.

The GmbH & Co. KG consists of the “Bürgerwind Region Freudenberg GmbH” set up by 16 founding partners and citizens of Freudenberg. Investment costs of 7.5 M Euro were financed by 50 % equity capital (ca. 3.75 M Euro in shares of 5,000 Euro /each) and by 50 % debt capital – which was sourced from a commercial bank, Sparkasse Amberg-Sulzbach. Overall, the equity capital consisted of 60 % citizen participation (more than 200 limited partners) as well as two energy supply companies: the Stadtwerke Amberg (20 %) and the Naturstrom AG (20 %). In 2011 the operation of two wind turbines (Enercon E82-E2, 2.3 MW, 138 meters high, price ca. 3.3 M Euro/ turbine) commenced.

The (geographic) allocation of shared ownership was important to the GmbH & Co. KG founders. The shares were not sold via a ‘first come – first serve’ principle, but on geographical criteria. The most favoured group were *local* natural or legal persons with a registered residence in Freudenberg as well as those who expressed interest in shares during the planning phase of the Freudenberger Oberland GmbH & Co. KG (before founding). The second group consisted of *regional* natural or legal persons with a registered residence within the municipality of Amberg-Sulzbach or neighbouring municipalities. And the third group were *all other* natural or legal persons.

Energy utilities hold 40 % of the Freudenberger Oberland GmbH & Co. KG. Since shares can be owned by people from outside the Freudenberg region, the wind farm might can either remain a *Community-based Model* with a majority ownership of local citizens or move to a *Community Connected Model* with the majority of shares owned by energy utilities and natural/ legal persons from outside the area.

Website: http://www.buergerwind-freudenberg.de/

German public companies

The role of an Aktiengesellschaft (AG) (German public company) in community-based renewable energy in Germany is limited. It is a corporate structure set out for large constellations with high numbers of shareholders and high levels of capital. The set-up and management is highly complex and regulated. The legal form of an AG is interesting to utility companies, which, due to changed market conditions and multiple challenges need to restructure and one reaction might be the (partial) privatisation through sales of shares as an AG (Sanders 2008). Due to its complex legal regulations this legal form is meant for large-scale corporations with a large number of members/shareholders or projects of a very large scale, and to a lesser extent interesting to smaller municipalities (and their utilities) (Berlo & Wagner 2013).

Table 18: Aktiengesellschaft/ German public company

German public company	
German term	Aktiengesellschaft (AG)
Related legal forms	Aktiengesellschaften & Co. Kommanditgesellschaft (AG & Co. KG) Europäische Aktiengesellschaft (Societas Europaea, SE)
Founding procedure	• Written statute of the AG (certified by a notary public) and required initial capital • Assignment of the required bodies • Founding report and audit by the management board and supervisory board • Registration in the commercial registry
Bodies	3 decision-making bodies: • General assembly (“Hauptversammlung”) – includes all shareholders • management board (“Vorstand”) • supervisory board (“Aufsichtsrat”)
Capital	• Minimum capital requirements of 50,000 Euro for the SE: 120,000 Euro • Public trading of shares at the stock exchange is not mandatory and usually only undertaken by larger AGs
Liability	Liability limited to the AG’s equity, shareholders liable up to the value of their shares
Participation of members	• The management board takes over company management • The general assembly includes all shareholders and they have voting rights depending on their respective shares.
Legal framework	German Law “Aktiengesetz” (~ Public Companies Act)
International Analogues*	Public Company limited by shares (United Kingdom), Naamloze Vennootschap (Netherlands), Société Anonymee (France), Aktieselskab (Denmark), Società per azioni (Italy) (WW+KN Krinninger Neubert Steuerberater n.d.), in Thailand - limited liability companies can be private companies (subject to the Civil and Commercial Code (the “CCC”)), or public companies (subject to the Public Limited Companies Act, B.E. 2535 (1992)) (Baker & McKenzie 2015)
Pros	• Clear structures (set-up of three predefined bodies as well as the strong role of the supervisory board), transparency requirements and own assets/capital • The splitting of assets into shares allows for the financial participation of a large number of members
Cons	• Complicated founding formalities and costs, significant capital requirements • Voting rights depending on shares owned rather than on democratic principles • The general assembly does not have any direct influence on the management • Often shares can be sold anonymously and usually without informing the AG

* Civil law and tax law regulations in the respective country might differ substantially, they are listed here as they are essentially comparable in their basic arrangements.

Source: own compilation based on Baker & McKenzie (2015), WW+KN, Sander, C. (2008), Berlo & Wager (2013, Aktiengesetz” (~ Public Companies Act)

Example 38: AG - Naturstrom AG, Germany

One example of the use of an AG in cb-RE is the Naturstrom AG which was founded 1998 in Düsseldorf by members of environmental associations including BUND (Friends of the Earth Germany), NABU (Nature And Biodiversity Conservation Union), BWE (German Wind Energy Association) and Eurosolar (European Association for Renewable Energy). It was the first independent green energy provider in Germany and has over 240,000 customers (private households and companies) as of 2015 (Naturstrom AG n.d.). Electricity is produced primarily from water and wind and primarily in Germany. The total number of shareholders is 978 with voting rights that depend on the number of shares owned. The majority of shares are dispersed with a small aggregation (02.09.2015), the single biggest shareholders are eco eco AG (23,8 %), Sustention AG (7,5 %) and THEOLIA Naturenergien GmbH (4 %) (Naturstrom n/a). The largest shareholders of the Naturstrom AG are legal persons (AG and GmbH) which have their own participation models.

The capital of Naturstrom AG is currently 30.5 M Euro and is divided into 2.44 M nominal shares. The shares of Naturstrom are not publicly traded, i.e. it is only possible to purchase shares privately from current owners.[52] Naturstrom AG achieved revenues of 9.5 M Euro in 2014; approx. 10 % increase from the previous year (Naturstrom AG 2015).

Based on the self-perception as a community-based renewable energy organisation in the form of an AG, Naturstrom is one of the founding members of the Bündnis Bürgerenergie e.V. (BBEn) – the association of community-based energy in Germany and as such Naturstrom supports the organisation financially as well as via know-how (Naturstrom AG 2015).

Website: https://www.naturstrom.de/

[52] The purchase of new Naturstrom shares would currently only be possible via a capital increase. A capital increase and issuance of new shares is currently not planned but it is possible to register as a share interested party to receive further information when applicable. The company facilitates such negotiations (possibility to record interest to sell/purchase on their website).

Public agencies

An Anstalt öffentlichen Rechts (AöR) is a public, legal administrative agency. The legal form is less used, but is relevant for municipalities to cooperate and jointly get organized for a certain service and operate an entity similar to a commercial business. For the AöR, the focus of their activities is their users, similar to any public service (utility). AöR play an important role in the German Energy Transition and as partners and facilitators of community-based renewable energy as they allow municipalities more leeway and act comparably more flexible than the GmbH, while sustaining control. At the same time, it is aimed to reduce tensions between competing private companies and municipal agencies (Städte- und Gemeindebund NRW 2001)

Table 19: Anstalt öffentlichen Rechts/Public agency in Germany

Public Agency	
German Term	Anstalt öffentlichen Rechts (AöR)
Related legal forms	bundesunmittelbare (federal), landesunmittelbar (regional) and kommunale (municipal) AöR
Founding procedure	Can be founded by a statute (to be decided in a public session), simply needs to be registered (relevant authority needs to be notified 6 weeks prior to the founding) , there is no approval procedure
Bodies	• Executive board • Administrative board with supervisory functions
Capital	Initial contribution by the member communities – as an organization based on capital, the AöR is also required to do an annual audit/report
Liability	While federal AöRs are generally not eligible for insolvency, this is also usually excluded for regional AöRs while municipal AöRs – having a stronger interaction in economic and competitive landscape, are eligible for insolvency. Hereby the liability is limited until the initial contribution of members (and as can be regulated in the statute, only for the project implemented by the AöR for the respective community)
Participation of members	Citizens in relation to the AöR are users of their services and as such there is little participation in decision-making of the project
Pros	• It offers a good option to set up a legal (separate) and public entity which can operate economically outside of the communal budget • Fast and cost-effective founding procedure (compared to the GmbH or AG) • Only reporting duties are towards the municipal oversight authorities, the founding needs to be noted, but not approved • High flexibility with regards to task assignments
Cons	• To be founded by municipalities • Little (formal) participation rights for citizens

Source: own compilation

Example 39: AöR- Islek Energie AöR, Germany

The Islek Energie AöR, located in Arzfeld, Rhineland-Palatinate, Germany, was founded jointly by 11 municipalities in 2011 as a separate legal entity to take over activities for an economic purpose in public interest. The AöR owns and operates RE systems for renewable energy generation for the demand of the population (Islek Energie AöR Statute (Islek Energie AöR 2011)). The chairman of the executive board is the mayor of Arzfeld and the participating municipalities have participating rights via the administrative board. The initial contribution of the member communities is 500 Euro and the addition of further municipalities is possible anytime. Until 2013, 24 solar rooftop PV systems (total capacity of 440 kWp) with an investment sum of approx. 960.000 Euro have been built (Gierenz 2013).

Website: http://www.vg-arzfeld.de/rathaus/islek_energie.php

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