IRENA coalition FOR ACTION

STIMULATING INVESTMENT IN COMMUNITY ENERGY:

BROADENING THE OWNERSHIP OF RENEWABLES

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About the Coalition

The IRENA Coalition for Action brings together leading renewable energy players from around the world with the common goal of advancing the uptake of renewable energy. The Coalition facilitates global dialogues between public and private sectors to develop actions to increase the share of renewables in the global energy mix and accelerate the global energy transition.

About this paper

This white paper has been developed jointly by members of the Coalition's Working Group on Community Energy. Building on several case studies, the paper showcases policy measures and financing mechanisms that reflect best practices in community energy and offers recommendations to governments and financial institutions on how to accelerate community energy development.

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ABBREVIATIONS

ASHDINQUI	Asociación Hidroeléctrica de Desarrollo Integral Norte del Quiché
CARES	Community and Renewable Energy Scheme
CCA	Community choice aggregation
DFI	Development finance institution
FIT	feed-in tariff
ICE	Instituto Costarricense de Electricidad
IRENA	International Renewable Energy Agency
KfW	Kreditanstalt für Wiederaufbau
kW	kilowatt
LLC	limited liability company
OLADE	Organización Latinoamericana de Energía
PAYG	pay-as-you-go
USD	United States dollar
VNM	virtual net energy metering

Photo: Hokkaido Green Fund

Launch ceremony for community wind project in Ishikari city, Japan

01 COMMUNITY ENERGY: AN INVESTMENT WITH IMPACT

The COVID-19 pandemic has spurred recovery measures that have the potential to drive a lasting shift in the global energy mix. While some governments have announced more ambitious climate commitments, many others have yet to take decisive action to move towards a green recovery. Renewable energy, with its inherent adaptability and decentralised nature, is well positioned to help build more equitable, inclusive and resilient economies, while fostering increased citizen participation in the energy transition (IRENA, 2020b).

Citizen-driven renewable energy projects – referred to here as "community energy" – can play a considerable role in the post COVID recovery by promoting local social and economic prosperity while helping to meet climate and sustainability objectives.

The International Renewable Energy Agency (IRENA) Coalition for Action has defined community energy as the "economic and operational participation and ownership by citizens or members of a defined community – be it at the village, city or regional level – in a renewable energy project, regardless of the size and scope of the project".[1]

A diverse range of approaches to community energy development is found around the world. Successful approaches leverage the project's direct social and economic benefits (led by the creation of revenues and jobs from renewable energy generation) as well as its broader contribution to local socio-economic development (e.g. through the expansion of access to electricity).

While community energy projects can be found across the electricity, heating and cooling, and transport sectors, this white paper, developed by the Coalition's Community Energy Working Group, reviews measures that stimulate and sustain community energy initiatives in the electricity sector. Although renewable energy investments by citizens and communities have gained traction in many countries, knowledge exchange on a global level has been limited. This paper fills the gap by showcasing policy measures and financing mechanisms that reflect best practices and offering recommendations to governments and financial institutions on how to accelerate community energy development and reap its benefits.

1 The IRENA Coalition for Action (2018) white paper "Community Energy: Broadening the Ownership of Renewables" defines community energy as any combination of at least two of the following elements: (1) local stakeholders own the majority or all of a renewable energy project; (2) voting control rests with a community-based organisation; (3) the majority of social and economic benefits are distributed locally.

A number of public and private investors are increasingly prioritising environmental and social performance in their practices. Nevertheless, the lack of supportive policy frameworks and enabling market environments remains a major barrier for the mobilisation of investments in community energy. Findings reported in this paper demonstrate that public support and non-discriminatory access to the electricity market and grid have key roles to play in community energy development, even in countries where communities already have access to affordable and low-cost financing.

In addition to adopting specific policy targets for community energy, policy makers can unlock further investment by providing a stable, predictable and non-discriminatory policy environment. To raise private capital, innovative alternative financing mechanisms such as crowdfunding have emerged to meet the needs of communities. If insufficient private capital is available, communities often rely on public grants or other support schemes to get started. The financial community can further support investment by facilitating access to debt and equity financing for small- and medium-scale renewable energy projects and helping to create partnerships among community energy investors.

The next chapter explores the substantial benefits of community energy, as well as the barriers that face communities seeking financing for their projects. Chapter 3 surveys policy measures that shape community energy development around the world. Chapter 4 provides an overview of how community energy projects are financed and the role played by public and private actors. Chapter 5 summarises key takeaways on enabling community energy investments. Nine case studies of community energy initiatives from around the world make up the Annex.

Photo: Nordic Folkecenter for Renewable Energy

Community solar thermal district heating project in Snested, Denmark

THE BENEFITS OF COMMUNITY ENERGY AND BARRIERS TO ITS FINANCING

02

Community energy projects can bring substantial benefits to the communities involved, as well as broader benefits to society. Yet much more investment is needed to realise community energy's full potential. By removing the regulatory, financial and institutional barriers that continue to hinder investments, more communities can contribute to the energy transition (IRENA Coalition for Action, 2018).


Photo: Mali-Folkecenter Nyetaa

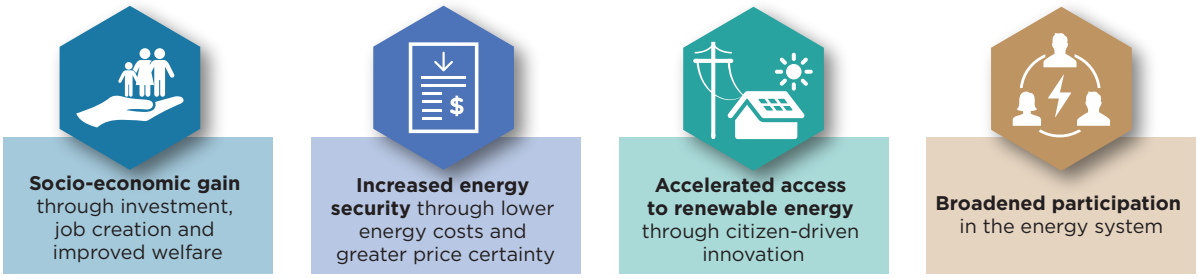
Community solar project in Mali

2.1 Community energy supports an inclusive energy transition

Community energy projects involve citizens and communities as producers, distributors and sellers of electricity – and as consumers. The projects may benefit communities socially, economically, environmentally and institutionally, with many of the benefits filtering through to society at large (see Figure 1). The extent to which communities and society can benefit from community energy may vary depending on local political frameworks, ownership models and other factors.

Community energy adds local socio-economic value through investment, job creation and improved welfare. The transition to a renewables-based energy system can play a key role in the economic recovery from the COVID-19 pandemic (IRENA, 2020b). Community-owned renewable energy projects are of particular importance as they are likely to employ local contractors and re-invest in local enterprises, services and goods and thus support local resilience (Gancheva et al., 2018). Furthermore, successful community energy projects often invest in capacity building and skill development so that local populations can maintain and operate installations, thereby creating jobs along the entire renewable energy value chain (Callaghan and Williams, 2014). In some cases, the financial returns of projects can be re-invested in public facilities such as hospitals, used to retrofit buildings or channelled into other renewable energy and energy efficiency projects (IZES, 2015). Finally, community energy projects help generate welfare gains, such as health benefits through reduced air, water and land pollution and greenhouse gas emissions.

Figure 1: Potential benefits of community energy



Community energy improves energy security through lower energy costs and greater price certainty. Renewable generation, when locally owned and managed, enables communities to increase energy independence from external energy suppliers often still reliant on fossil fuels, reducing their exposure to fluctuating energy prices and saving on costs. Community energy projects may also be able to generate long-term income through the sale of (excess) renewable energy. Shareholders may elect to offer low-cost power to people in disadvantaged areas, thereby reducing energy poverty (Friends of the Earth Europe and REScoop.eu, 2017), or otherwise share savings across the community.

Community energy widens access to renewable energy through citizen-driven innovation. In developing countries, and in some developed ones, many rural and remote communities continue to struggle with access to affordable and reliable energy. Community energy projects have spawned innovative business models and technological solutions that expand access, improve the reliability of service, help build climate resilience, increase possibilities for new productive activities and improve livelihoods (IRENA, 2020c).

Such grassroots innovations can make significant contributions to the broader energy transition by expanding the development and uptake of renewable energy and complementing existing energy access initiatives (Callaghan and Williams, 2014; Ornetzeder and Rohracher, 2012; Rogers et al., 2012).

Community energy broadens participation in the energy system and expands awareness and acceptance of renewable energy. Engaging community members in shared decision-making processes can lead to increased transparency and inclusiveness in the planning, construction and management of installations. By making collective decisions about the use and distribution of investments and generated income, as well as exercising direct control over local financial and energy resources, communities achieve greater autonomy and self-governance. Citizen investment in community energy projects can also foster more positive attitudes towards renewable energy development (Bauwens and Devine-Wright, 2018). All of these forms of participation can increase citizens' sense of ownership and community unity, as well as raise awareness, acceptance and active support for the energy transition (IRENA, 2020c; Renn, 2014).

Photo: Energieagentur Rheinland-Pfalz

Active citizens form the base of the successful energy transition in the Rhein-Hunsrück district of Rhineland-Palatinate, Germany, as represented by the honorary municipal council of Horn

2.2 Barriers to mobilising investment still hinder community energy growth

Community energy development continues to face regulatory, financial and institutional barriers. The nature and extent of the obstacles experienced vary between projects and across countries, but also depend on project size: Smaller projects and organisations are more prone to encounter the challenges listed.

Overall, community energy has unique characteristics that distinguish them from the structures and practices of other renewable energy projects. These characteristics include, but are not limited to, a strong reliance on decentralised organisation, voluntary contributions from community members with limited prior experience in energy development and trust in collective investments (see Figure 2). These differences make establishing financial viability and accessing third-party financing particularly challenging, especially for smaller projects.

Community energy and its benefits are not yet widely understood and accepted. Attracting buy-in from policy makers, financiers and citizens may prove challenging owing to limited awareness, understanding and support of community energy and its associated benefits. Stakeholders may question the reliability of renewables to cover base load at all times or have reservations about new technologies. For various reasons, they may also mistrust or oppose the idea of collaborative business models more generally (Brummer, 2018). These underlying biases against community energy projects may also increase distrust among the general public, whose broad support is needed to leverage investments and other resources from local citizens and outside investors.

Policy frameworks for renewable energy are structured around centralised, large-scale projects. Traditional energy market structures and regulatory frameworks are mostly designed around centralised, large-scale energy generation (IRENA, 2020e). Policy makers often do not have community energy on their agendas, which may lead to the implementation of policies that (unintentionally) discriminate against community energy. For example, small- and medium-sized actors (such as communities) carry disproportionate risks when participating in auctions, discouraging diversity among auction participants and leaving communities behind. Communities are thus left to navigate an unfavourable landscape that creates additional investment uncertainties and subsequent planning challenges (Brummer, 2018).

Community energy projects may have limited access to capital and third-party finance. In many countries, securing financing from traditional sources still presents a challenge for community energy projects, particularly those that require early-stage support (Caramizaru and Uihlein, 2020; Haggett and Aitken, 2015). Community energy projects below a certain size[2] may not attract interest from commercial lenders since they come with high bank transaction costs and offer a limited return on investment.

Figure 2: Potential barriers to mobilising investment in community energy

2 Community energy can take place on both large and small scales. For example, some co-operatives in Europe have invested in gigawatt-scale renewable energy projects.

Moreover, debt and equity financing are typically extended with a view to earning a profit. A community energy project focused on creating socio-economic and environmental value may not generate sufficient profits to attract debt financing from local commercial financial institutions. Communities that cannot meet collateral requirements may also find it hard to secure loans from commercial financial institutions (Ottinger and Bowie, 2015).

The risk profiles of individuals and communities are different from those of private sector companies. In many countries, citizen-driven investment in renewable energy has been absent, as policy frameworks have typically not accounted for the risks that communities face when investing in individual projects. Coupled with the prospect of facing direct personal risks and exposure when investing, community members may be reluctant to invest upfront in community energy projects. Furthermore, many communities new to renewable energy development develop stand-alone projects. Unlike companies with several projects in development, these communities are unable to spread risks across a portfolio of projects. Difficulties in securing funding and reliance on single projects means that these communities also have more trouble covering costs and expenditures incurred in the initial stages of project development (Brummer, 2018). All of these factors ultimately slow down the development of community energy projects.

Community energy projects often rely on the voluntary commitment and engagement of citizens who may lack knowledge, capacity and experience in setting up renewable energy projects. Unlike established private or commercial developers, who are experienced in drafting project proposals and business plans and have existing relationships with banks and institutional investors, in many cases communities have no track record in renewable energy development (Haggett and Aitken, 2015) and encounter difficulties accessing related support structures (Avelino et al., 2014). These factors compound the challenges of securing both early-stage and long-term financing for community energy.

Photo: Mali-Folkecenter / Yvetaa

Participants of the 2nd World Community Power Conference in Bancoumana, Mali

ENABLING ENVIRONMENTS FOR COMMUNITY ENERGY INVESTMENT

03

Overcoming the barriers described in Chapter 2 requires a conducive enabling framework that will allow community energy's untapped potential to benefit citizens and communities. To unlock investments, policy frameworks should be non-discriminatory and provide market access to all types of investors, including communities.

Such frameworks include regulatory measures that promote market entry for community energy projects; financial measures that support their funding; and administrative measures that help communities acquire the skills and knowledge needed to develop a renewable energy project. Enabling frameworks proposed for a given national or subnational jurisdiction should be considered in the context of the jurisdiction's institutional environment and broader socio-economic objectives.

Photo: Nordic Folkecenter for Renewable Energy

Community wind project owned by Thyborøn-Harboøre Vindmøllelaug I/S af 2002, Denmark

3.1 Supportive legislation and government policies are key to community energy growth

As is the case for all renewable energy projects, stable, predictable and non-discriminatory policy frameworks are key to enabling community energy. Apart from mandating the establishment of legal frameworks to promote and facilitate the development of community energy, as in the European Union (see Box 1), governments can encourage community energy development by implementing a range of individual measures or making adjustments to existing policies.

A multitude of renewable energy support schemes exist and have been implemented in different countries. As shown in Table 1, several existing measures for renewable energy can be tailored and designed to encourage community energy development. First and foremost, a policy environment generally conducive to renewable energy is also beneficial for community energy. More specific tools may include setting **sub-targets for community energy** and creating **local ownership quotas** for renewable energy projects.

As per their non-discriminatory design, administrative **feed-in tariffs** set by government (FITs) have been very effective in supporting renewable energy market growth, including smaller community energy projects. **Virtual net energy metering schemes** have also emerged more recently to enable multiple customers to share billing credits produced by off-site projects, thus encouraging the growth of subscription-based community energy projects (IRENA, 2019a).

The transition from FITs to auctions in countries like Denmark, Germany and Japan has proven challenging for community energy projects. Some key features of **auctions** – such as bidding procedures and prequalification requirements that necessitate upfront investments without being guaranteed a contract – disproportionately increase financial risks for community actors (Fell, 2019; IRENA, 2019b; WWEA, 2019). Community actors are consequently likely to limit their participation to bidding processes where their likelihood of being awarded a contract is high (e.g. in auctions where the lowest bid is not the sole or even the primary criterion for award).

Box 1 **Community energy in European Union Renewable Energy Directive and Electricity Directive**

The development of community energy in the European Union (EU) has historically been driven by local and national legislation. Community energy initiatives are now widespread in several countries in western and northern Europe but remain comparatively rare in eastern, central, and southern Europe. As of 2020, there are an estimated 1750 energy communities (including renewable energy communities) in Germany, another 700 in Denmark, 500 in the Netherlands and several hundreds more throughout Europe (Caramizaru and Uihlein, 2020). Additionally, approximately 3500 renewable energy co-operatives operate within the EU (RESCoop MECISE, 2019).

The European Commission's new Clean Energy Package (approved in 2019) mandates EU member states to create an enabling legal framework to promote and facilitate the development of community energy. "Energy communities" are recognised in two EU legislative documents under the formal definitions of "citizen energy communities" (revised Internal Electricity Market Directive [EU] 2019/944) and "renewable energy communities" (revised Renewable Energy Directive [EU] 2018/2001).*

The two directives set out specific criteria to ensure community energy projects can compete in the market based on non-discriminatory and proportional terms. Member states are required to transpose both directives into national frameworks and offset market and regulatory barriers in order to promote and facilitate the advancement of community energy.

*"Energy communities" are not only limited to renewable projects. They "may engage in generation, including from renewable sources, distribution, supply, consumption, aggregation, energy storage, energy efficiency services or charging services for electric vehicles or provide other energy services to its members or shareholders" (Electricity Market Directive [EU] 2019/944).

Some countries have implemented auction design elements aimed at favouring small and new players, creating local jobs, contributing to subnational development, and engaging communities (IRENA, 2019b). Policy design elements such as mandated quotas and preferential rules for community energy projects, legal limits on the involvement of large private investors, and bonus payments for community participation could contribute to the growth of community energy projects. However, the case study of Germany (see Annex) suggests that auctions need to be carefully designed, implemented and evaluated in order to avoid unintended consequences and yield the intended results. Engaging communities successfully in auctions remains broadly challenging and further adjustments to auction designs remain necessary to promote community energy.

Legislation and government policies aimed at community energy should be developed in early and close consultation with citizens and communities to ensure the desired outcome. Streamlined administrative procedures and capacity building opportunities are key for community involvement and implementation of projects. Governments can put in place a variety of measures, such as **one-stop shops**, to break down knowledge barriers by raising citizen awareness of community energy, disseminating best practices, assisting communities with the project development process, and connecting communities with funding sources. Governments can also provide training opportunities to communities to help them develop long-term capacity in renewable energy.

Lastly, governments may opt to offer fiscal and financial incentives to support the financing of community energy projects: Options for direct support include **grants, loans, revolving funds, and tax incentives**. Public funding measures will be further discussed in Chapter 4 on financing community energy projects.

3.2 Policy design can be tailored to community energy

While many countries already have in place ambitious targets and supporting policies for renewable energy, there is ample scope to improve community and citizen participation to ensure an inclusive energy transition.

Through policy design, governments can tailor renewable energy measures to provide better support for community energy investment. As Table 1 highlights, measures supporting community energy can be implemented at various levels of government, ranging from local to regional to national. Many of these measures are already being used to support grid connected community energy projects in developed countries; their application in other areas may require modifications to accommodate local contexts. Finally, governments must work in close co-operation with financial institutions, the private sector, communities that have developed projects and other key stakeholders to design and implement policy measures that remove barriers to investment in community energy projects.

Table 1: Government measures, past and present, that can enable community energy investment

TYPE	MEASURE	DESIGN OPTIONS ENABLING COMMUNITY ENERGY	LIMITATIONS	REPRESENTATVE JURISDICTIONS IN WHICH OPTION HAS BEEN IMPLEMENTED SEE CASE STUDIES IN ANNEX
Regulatory	**Renewable energy targets**	Renewable energy targets that define specific sub-targets for a broad range of types and sizes of renewable energy projects, such as for community energy, provide long-term signals to investors about governments commitment and can therefore increase investors' confidence in community energy investments (IRENA, 2015b).	Renewable energy targets are not effective on their own and need further policy measures to incentivise implementation. They are highly dependent on political commitment (IRENA, IEA and REN21, 2018).	Scotland, UK
Regulatory	**Local ownership quotas**	By requiring project developers to offer a minimum percentage of local ownership shares in a new renewable energy project, governments can ensure citizens have an opportunity to participate in and benefit from projects (IEA-RETD, 2016a).	Quotas need to be well defined and monitored to ensure they achieve desired policy outcomes (IEA-RETD, 2016a).	Denmark
Regulatory	**Virtual net energy metering**	A variant of net energy metering, virtual net energy metering enables multiple customers to share billing credits produced by off-site projects and encourages the growth of subscription-based community energy projects (IRENA, 2019a).	As the penetration of distributed renewable energy resources increases, net metering may create cross-subsidisation between prosumers and those who do not self-consume (IRENA, IEA and REN21, 2018).	United States
Regulatory	**Feed-in tariffs and premiums**	Feed-in tariffs or premiums can easily be designed in a non-discriminatory manner and may also be based on criteria such as project size and technology to encourage certain types of projects, including community energy (IRENA, 2015a).	Feed-in tariffs require active tariff setting and adjustment. In times of rapidly decreasing costs and volatile fossil fuel prices this may require regular monitoring and adjustments (IRENA, IEA and REN21, 2018).	Denmark Germany Japan Scotland, UK
Regulatory	**Auctions**	While auctions have typically been designed to procure electricity at lowest cost, a variety of design elements may be implemented to achieve objectives such as facilitating the inclusion of small and new players and achieving a just and inclusive transition (IRENA, 2019b).	Bidders have to fulfil certain administrative, technical and financial requirements in order to qualify to bid in an auction. Since bidders bear the risk of not being awarded projects, auctions are likely to pose disproportionate barriers for community actors unless they are specifically designed to encourage participation from small and new players (Fell, 2019; WWEA, 2019).	Denmark Germany Japan

TYPE	MEASURE	DESIGN OPTIONS ENABLING COMMUNITY ENERGY	LIMITATIONS	REPRESENTATVE JURISDICTIONS IN WHICH OPTION HAS BEEN IMPLEMENTED SEE CASE STUDIES IN 0 ANNEX
Financial	**Grants**	Grants can help de-risk community energy projects by offsetting expenses for early-stage community energy project development as well as project costs (IRENA, IEA and REN21, 2018).	Grants provided by foreign investors do little to assist local capital markets when local equity investment is small. Grant financing in the form of crowdfunding may be affected by exchange rate fluctuations, unless it is a donation (KfW Entwicklungsbank, 2005).	Victoria, Australia Denmark Department of Quiché, Guatemala Japan Mindanao, Philippines Scotland, UK
Financial	**Loans**	Concessional loans with lower interest rates, longer repayment periods or extended grace periods can improve access to capital and reduce the costs of borrowing for community energy projects (IRENA, IEA and REN21, 2018),	The positive impacts of concessional loans will extend beyond the projects benefitting from the loans only if supplemented by capacity building for local lending institutions (IRENA, 2016).	Guanacaste, Costa Rica
Financial	**Revolving funds**	Revolving funds are a long-term source of credit for community energy projects. The funds funnel all or a portion of loan payments towards sustaining and growing the funds for additional projects (Burke and Stephens, 2017).	Management and monitoring play a crucial role. Because the creditor bears the credit risk, failed projects reduce the amount of the revolving fund (Setyawan, 2014).	Mindanao, Philippines
Financial	**Tax incentives**	Tax relief such as production tax credits, investment tax credits and accelerated depreciation (IRENA, IEA and REN21, 2018) can incentivise investments in community energy projects by offering a higher rate of return to prospective investors (Bauwens, Gotchev and Holstenkamp, 2016).	Community energy projects owned by non-taxable entities (e.g. municipalities, non-profit organisations) are unable to benefit from such incentives (Farrell, 2016).	Scotland, UK United States
Administrative	**One-stop shops**	One-stop shops dedicated to facilitating community energy projects streamline the interface between communities (or individuals) and government. While their main aim is to reduce regulatory and administrative burden, some one-stop shops also provide information and advice including capacity-building (OECD, 2020).	One-stop shops require political commitment if they are to be effective. Time and other resources must be invested towards developing staff capabilities to deliver services effectively (OECD, 2020).	Victoria, Australia Japan Scotland, UK

04 FINANCING COMMUNITY ENERGY PROJECTS

Key to scaling up investment in community energy are contributions from community members themselves and the availability of external financing from public and private sources. Since public resources are limited, the growth of the community energy sector increasingly depends on communities' ability to access private sources of financing. That they can do so under the right circumstances has been borne out by the experiences encapsulated in this section and described more fully in the case studies (see Annex).


Photo: Sahelia Solar

A rural community solar photovoltaic micro-grid in Burkina Faso

4.1 Ownership and financing of community energy are interlinked

The ownership structures and financing of community energy are closely related. The optimal mix of financing for a given project depends not only on the characteristics of the project (e.g. size, technology), but also, and especially, on the ownership model and level of autonomy desired by the community.

Table 2 provides an overview of common ownership models through which community actors collectively invest in and own energy assets. While many community energy projects strive for large shares of community ownership, achieving this depends on the availability of local knowledge and resources – services, labour, land and financial capital. In some models such as co-operatives, ownership comes with a direct level of decision-making. In most co-operatives, individuals are required to contribute to the common capital by investing in membership shares as a condition of membership (International Co-operative Alliance, 2017). In addition to individuals, other stakeholders – such as conventional energy companies (e.g. utilities, retailers etc.), non-profit organisations and local authorities may also participate as community members. In other models where the community does not own the entire project, these other stakeholders may serve as partners. Partners can also contribute in a variety of ways beyond owning a part of the project. For example, municipalities can enter into agreements with community actors to host community energy projects on their infrastructure (e.g. public roofs) (Roberts, Bodman and Rybski, 2014).

Table 2: Legal forms of community ownership

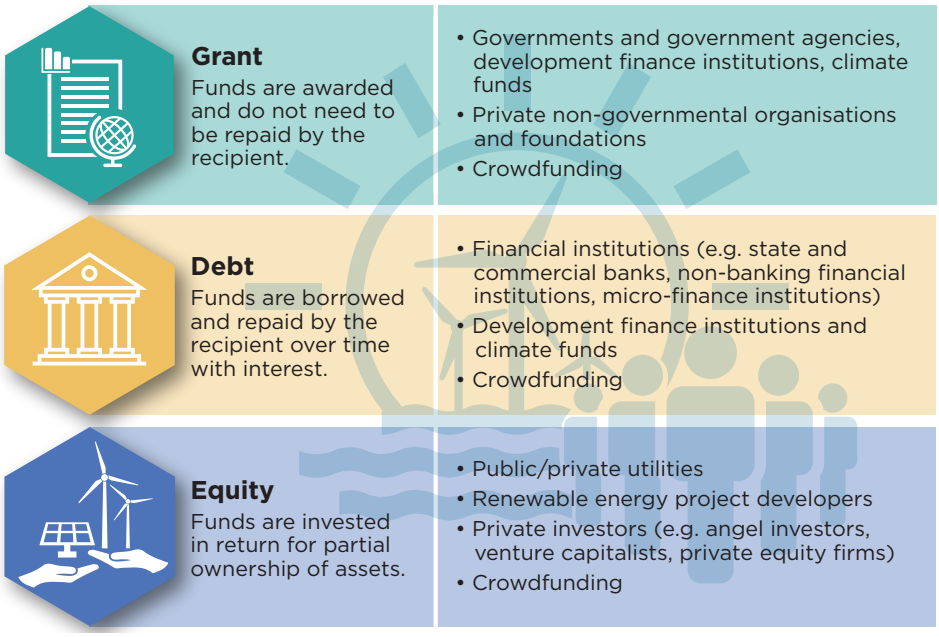
OWNERSHIP MODEL	DESCRIPTION
Co-operative	Co-operatives are jointly owned by their members to achieve common economic, social or cultural goals based on the democratic principle of "one member, one vote". A co-operative may be formed to provide services (consumer co-operatives) or to pool investment capital (investment co-operatives). Maximising return on capital is usually not a key objective.
Non-profit organisation	Non-profit organisations are formed by investments from members, who are responsible for financing the organisation but do not take profits.
Association	Associations are private, non-profit organisations established around a common cause. Decision-making power usually stems from the association's statutes or by-laws and rests with its members. A renewable energy association can take many forms. Examples include enterprise associations and housing associations.
Community trust	Community trusts act as vehicles for broader community benefit, rather than generating profits for investors. Returns from investments are used for specific local purposes and are shared with people who are unable to invest.
Partnership	Partnerships are formed between individuals or legal persons to achieve a common business purpose. A partnership can take the form of a general partnership (where all partners can be held individually liable for the partnership's debts) or a limited partnership (where partners who do not participate in management activities have limited liability for the partnership's debts).
Corporation	Corporations are separate legal entities owned by their shareholders; as such, shareholders benefit from limited liability for the corporation's debts. Shareholders holding more shares have greater voting power. The profits of a corporation are paid out to shareholders as dividends.
Limited liability company	LLCs combine the characteristics of a corporation with those of a partnership. Like shareholders in a corporation, members of an LLC benefit from limited liability for the company's debts. Like partners in a partnership, the profits of an LLC are passed through directly to its members.

Sources: Gancheva et al., 2018; IRENA, 2020d; Roberts, Bodman and Rybski, 2014

Most community ownership models will draw on multiple financing options to cover the costs of their energy projects, including contributions from community members and financing from external public and private sources. Figure 3 presents an overview of external financing options available to a community throughout the project development and construction process. In many cases, smaller projects may be financed entirely through direct investments from community members. In others, a combination of grants and debt financing (loans) may be necessary. Larger projects are more likely to rely on equity investments from external parties. Debt-to-equity ratios for community energy projects vary widely due to factors such as the specific risk profile of a community and the institutional environment within which it operates (Dukan et al., 2019; IEA-RETD, 2016b).

To increase the number of available financing options, multiple community projects can be bundled to reduce transaction costs and investment risk. Community energy projects are often funded through project financing; however, in situations where one community partners with another entity the project may also be supported through corporate or balance sheet financing. Project financing implies that lenders are repaid from the cash flow generated by the project or the value of the project's assets. Under corporate financing, lenders have full recourse to all assets and revenues of the funded entity in the event of default. Financing is secured based on the balance sheet of the entity (Yescombe, 2014).

Figure 3: External financing options for community energy projects



4.2 Public sources of financing can be leveraged for community energy investment

Public sources of financing for community energy include governments, government agencies, development finance institutions (DFIs), other public banks and climate funds.[3]

Public financing has the potential to accelerate community energy, provided it is accompanied by arrangements to involve communities in participatory decision making, efforts to build the technical and financial capacity of communities and local partners, and opportunities for communities to assume ownership should they elect to do so.

DFIs and climate funds are governed by national governments and have specific mandates to support development outcomes; consequently, they have a prominent role to play in directing investments in community energy projects in developing countries. DFIs are increasingly deploying targeted measures to improve access to debt and equity financing for small- and medium-scale renewable energy projects. Such measures include **concessional loans** at below-market interest rates for renewable energy projects and on-lent debt to local commercial financial institutions. For example, the IRENA/Abu Dhabi Fund for Development Project Facility allocated USD 350 million in concessional loans to 32 renewable energy projects with sustainable development benefits, at a tenor of up to 20 years and a five-year grace period (IRENA, 2020a). While these public financing measures are partly applicable to community energy projects, they would need to be tailored further to fully unlock the potential of community energy.

Given the challenges some communities still face accessing capital and third-party financing, in many countries **grants** remain an important financial measure for directing targeted support to community energy projects, bringing viable projects to bankability and profitability. National and regional governments in Australia, Guatemala, Japan and Scotland (see Annex) as well as DFIs have awarded grants to offset the costs of early-stage project development activities as well as project construction costs. An example is the Pacific Renewable Energy Investment Facility, a multi-donor fund providing loans and grants to support renewable energy projects in smaller Pacific island countries. From 2017 to 2019, eight projects approved under the facility were allocated over USD 141 million in financing, including over USD 77 million in grant funding from the Asian Development Bank (ADB, 2020).

Given the limited resources of public funding, it is well recognised that public measures must be used strategically to leverage debt and equity financing (IRENA, 2016). Some countries have put **grants** in place to further encourage commercial lenders to finance community energy projects by mitigating political, policy, credit and currency risks. Governments and DFIs have also implemented **risk-mitigation** measures aimed at mobilising additional private investments in small- and medium-scale renewable energy. Examples include first-loss loans and first-loss guarantees to address potential losses borne by commercial lenders (IRENA, 2016).

Additional community energy investment can also be supported through **revolving funds**. In the Philippine province of Mindanao, the Asian Development Bank has provided financing for community energy projects and a revolving fund to support local economic development. The fund is replenished as loan recipients make repayments, creating the opportunity to issue new loans to other businesses that can make productive use of renewable energy. Revolving funds can therefore become a long-term source of credit for community energy projects and local enterprises (see Annex).

3 For the purposes of this paper, DFIs include global and regional development banks, bilateral development agencies, and national development banks.

In addition to project financing (i.e. grants, debt and equity), community energy may be indirectly supported through investments in energy access and local development programmes.

By linking energy access initiatives with community energy, governments and DFIs can spur additional local socio-economic development and strengthen long-term community growth.

To support energy solutions for poor communities in the "last mile", a range of combinations of public and private funding sources – within a strong local ecosystem and with strengthened local financial institutions – can play a critical role (Rajagopal, 2019). For example, responsAbility Investments launched a USD 200 million fund in early 2020 in partnership with public and private partners, including the European Investment Bank, the International Finance Corporation, the UK Department for International Development and the government of Luxembourg, to support companies providing energy access solutions in emerging markets (responsAbility, 2020). Public programmes for decentralised energy solution providers have great potential to support community energy, provided they are further tailored to create the on-the-ground partnerships needed to give communities access to energy.

4.3 Private financing must step up

Private sources of financing for community energy include renewable energy project developers as well as financial institutions (e.g. commercial banks, non-bank financial institutions, micro-finance institutions) and private investors (e.g. angel investors, venture capitalists, private equity investors). In some countries where community energy is a well-known and established form of investment (e.g. Denmark, Germany), communities have been able to raise financing through private sources. However, communities in many countries – particularly developing countries – still find it difficult to gain access to private financing.

Although public finance has enabled private finance to play a more prominent role in renewable energy projects, direct investments in community energy from the private sector continue to be limited.

One option for communities is to make use of joint-venture models to access financing. In a model where a community energy project partners with a private developer, the developer may raise capital for its share of the project through equity financing based on its track record and the income projections of its portfolio. For example, in a joint venture in the United Kingdom, Falck Renewables and the Fintry Development Trust negotiated an agreement in 2007 whereby Falck loaned capital to the trust for "virtual ownership" of 1 of 15 turbines in a Scottish wind farm. The loan is to be repaid over 15 years through the sale of electricity generated by the turbine (Haggett et al., 2014).

Box 2 Impact investing

Impact investing is an approach that intentionally seeks to generate measurable social and environmental impact alongside financial returns (Global Impact Investing Network, 2020). It comes in a variety of forms and vehicles. Some approaches prioritise impact and generate financial returns at below-market rates, while others emphasise market-rate financial returns for the investor alongside societal benefits. Impact investments are becoming increasingly widespread in both emerging and developed markets, attracting a wide range of public and private investors including individuals, non-governmental organisations and foundations, banks and development finance institutions.

Innovative financial and business models can also help communities reduce their upfront investment requirements, particularly equity. Under a **pay-as-you-go** (PAYG) business model, a private partner leverages its access to equity to finance the community's share of the project. The community can then direct project revenues (or cost savings realised from the project) to make regular payments to the partner over a mutually agreed time frame. Ownership transfers to the community once it has repaid the partner (Muchunku et al., 2017). PAYG schemes have been used to deploy energy solutions to communities. For example, with grant support from the United States African Development Foundation, social enterprise Sosai

Renewable Energies successfully deployed solar mini-grids in two villages in Kaduna State, Nigeria, in 2017. The mini-grids provide electricity to over 800 individuals using a PAYG model (IRENA, 2018).

Box 3 Crowdfunding in sub-Saharan Africa

Crowdfunding has played a role in enhancing the financing opportunities available to small and medium-sized enterprises, including companies deploying renewables-based solutions to widen access to energy. Social enterprise Pawame – a provider of pay-as-you-go solar home systems to households across sub-Saharan Africa – has successfully raised debt financing through crowdfunding platforms such as TRINE (trine.com) and Bettervest (bettervest.com). In 2020, Pawame crowdfunded debt to finance 2 300 solar home systems for households (Solar-Home-Systeme für Kenia – Pawame, 2020).

Alternative finance, developed outside the traditional banking system (i.e. regulated banks and capital markets), provides communities with another potential source of funding. An example of alternative finance is **crowdfunding**, which enables a project or an organisation to raise capital from a large number of individuals or entities (Mollick, 2014). By using predominantly online channels, instruments and systems funding beneficiaries can present proposals to the public and engage with potential funders (see Box 3 on crowdfunding in sub-Saharan Africa).

Crowdfunding models can be distinguished based on the funders' primary motivation for investing and expected return. Non-investment-based crowdfunding approaches (such as donation and rewards-based crowdfunding) have been leveraged to fund single and multiple community energy projects in part or in full. For example, Citizens Own Renewable Energy Network Australia (corenafund.org.au) uses crowdfunded donations to create a revolving fund for community energy projects.

Other approaches replicate the traditional debt and equity financing modalities. Examples include:

- **Peer-to-peer lending platforms that provide investors with a debt instrument.** Abundance Investments (www.abundanceinvestment.com) offers debt-based investments in projects and businesses in the renewable energy, energy efficiency and housing sectors.
- **Equity platforms that allow investors to acquire shares in projects.** Windcentrale (www.windcentrale.nl) is a Netherlands-based organisation that has facilitated co-operative wind turbine purchases through its crowdfunding platform.
- **Hybrid platforms offering a range of investment options,** including debt instruments, shares and bonds. Triodos Bank (www.triodoscrowdfunding.co.uk) operates a crowdfunding platform through which it connects investors with bond and equity offerings from organisations focusing on social and environmental impact.

Crowdfunding can thus facilitate individual investors' access to impact investment opportunities in community energy, and even help governments and other key actors to identify – and direct investments towards – community energy projects that have gained local community support.

05 KEY TAKEAWAYS FOR GOVERNMENTS AND FINANCIAL INSTITUTIONS

When integrated into post-COVID recovery measures, community energy offers vast untapped potential to maximise socio-economic benefits and local value creation, as well as to strengthen the broader resilience of communities and beyond. Drawing from the case studies in this paper (see Annex), the following takeaways may serve as guidance and inspiration for governments, DFIs and other financial institutions on how to design policies and mobilise finance to scale up community energy investments.

Build awareness and develop a shared understanding of community energy. There is a need for broader awareness around the concept of community energy and of the role communities and citizens can play in the energy transition. A common and widely recognised understanding of community energy makes it easier for governments and financial institutions to identify best practices, design policies and mobilise funds that reflect the specificities of community energy actors. As the legal forms for community energy may vary across jurisdictions, a strict definition of community energy may be difficult to establish. However, identifying a set of key characteristics – such as minimum requirements for ownership, decision making and profit sharing – may be used to identify projects that qualify as community energy and are thus eligible for support.

Adopt targets and policy designs that value citizen participation and local socio-economic development. While communities may not always be able to compete on cost with large-scale commercial renewable energy projects, their participation in the energy transition is widely recognised as an important way to ensure inclusiveness and maximise local socio-economic benefits. To fully realise the potential of renewables to achieve broader development goals, governments should establish community energy targets and consult with community energy representatives to ensure that supporting policies (e.g. FITs, auctions, grants, tax incentives) are designed to enable the participation of small and new actors. Further policy frameworks addressing sector coupling or energy efficiency need to be developed to strengthen positive effects on local socio-economic development. More broadly, governments should work towards establishing non-discriminatory regulatory environments which allow all investors – including communities – to invest and access energy markets, including clearly defined policies for access to the electricity grid.

Establish dedicated agencies or one-stop shops to support community energy. Community energy projects are often initiated by committed individuals who have limited expertise and experience in setting up renewable energy projects or navigating complex administrative procedures. In addition to expanding awareness of community energy, a dedicated entity (e.g. public agency or non-governmental organisation) can support communities and citizens by helping streamline administrative procedures, providing templates for project documentation, offering other capacity-building activities and even connecting communities with financing.

The Community and Renewable Energy Scheme (CARES) in Scotland is an example of a one-stop shop for communities and citizens interested in investing in community energy.

Facilitate community access to capital through targeted public finance. Access to debt and equity financing can be particularly difficult for smaller community energy projects, especially at the initial stages of project development. Perceived or actual risks throughout the project development process result in less favourable lending terms at high costs. Governments, DFIs and other public finance institutions can offer support by establishing grants, revolving funds and concessional loans at below-market interest rates, and by on-lending debt to local commercial financial institutions for community energy projects. Public funds can further be used to provide guarantees that de-risk community energy projects, thereby enabling access to commercial loans at a lower cost. Fiscal and financial incentives can also reduce capital costs. Financial instruments should be tailored to the specificities of community energy projects, as well as to national and local contexts, so as to make renewable energy economically viable for even the most vulnerable communities.

Support innovative financing mechanisms and business models for community energy projects and the most vulnerable. Given the limited access to debt financing that many community energy projects have, policy makers and financial institutions can support innovative mechanisms for raising equity financing that take into account the unique characteristics of community energy while preserving project ownership and control. Community assets such as land rights and labour can be converted into equity shares. Regulatory environments that encourage financial institutions to offer green investment options (e.g. debt instruments, shares and bonds) can lower costs for renewable energy projects, including community energy. Additionally, innovative business models and alternative financing mechanisms like crowdfunding can support new partnerships between community and private actors. Flexible payment schemes such as PAYG can help to distribute electricity across communities without overlooking their most vulnerable members. Other innovative finance mechanisms include subscription-based models such as virtual net energy metering (VNM) that allow citizens who lack the means to invest in renewable energy to take part in the energy transition. Such financing mechanisms and business models should also consider how communities will finance ongoing operation and maintenance costs for their projects.

Encourage aggregation of and collaboration between community energy projects. Partnerships between communities through aggregation, or project bundling, can enable smaller community energy projects to gain access to financing schemes typically available only to large-scale projects. The aggregation of projects may reduce investment risks by spreading them across several projects, while also cutting transaction costs. To facilitate the aggregation of community energy projects, policy makers can create enabling frameworks for communities to form partnerships, as showcased by Community Choice Aggregation policies in the United States. Aggregation also strengthens the negotiating power of communities in purchasing equipment and services from commercial suppliers. For example, in Costa Rica, four regional co operatives formed a consortium, Conelectricas, to increase the profitability of their operations.

Integrate community energy in energy access and local development programmes. Community energy projects can play an important role in providing access to affordable and reliable energy for productive applications (e.g. agricultural processing facilities, heat/cold storage facilities, etc.) – particularly for vulnerable communities, which are often located in remote or rural areas. Combined with cross-sectoral policies (e.g. concessional financing for productive equipment and appliances), community energy projects can also contribute to the broader development of local economies. For example, a revolving fund was established in Mindanao, Philippines to support livelihood activities, leveraging electricity produced by community energy projects. Projected revenues from productive uses of energy can be used to pay back investors and reinvested in other community-led activities such as energy efficiency, infrastructure enhancements or additional renewable energy projects.

ANNEX I. CASE STUDIES: ENABLING ENVIRONMENTS FOR COMMUNITY ENERGY INVESTMENT

Victoria, Australia

Photo: Sustainability Victoria/Esther Lloyd

Community Power Hub members attending a site demonstration of earlier prototype solar thermal technology in Victoria, Australia.

KEY FEATURES

- **Government grants for community energy have been administered through various renewable energy programmes.**
- **Regional one-stop shops facilitate community access to skills and knowledge, and connect bankable projects with sources of capital.**

A number of community energy policies have emerged in Australia over the past decade, reflecting interest in community energy at the state and national levels (Parliament of Victoria Economic, Education, Jobs and Skills Committee, 2017). As of 2019, Australia had over 105 community energy groups, approximately 50 of which were based in the state of Victoria (Coalition for Community Energy, 2019).

Victoria's state government implemented a range of programmes to promote community energy under its 2015 Renewable Energy Roadmap (State of Victoria Department of Economic Development, Jobs, Transport and Resources, 2015).[4] To support community energy project development, the Victorian government awards grants through initiatives including its New Energy Jobs Fund, Community Renewables Solar Grants Initiative and Renewable Communities Program. The Renewable Communities Programme has awarded over USD 800 000 in funding to nine community energy projects (Victoria State Government, n.d.).

From 2017 to 2019, the Victorian government also funded and supported a pilot programme to establish three regional community power hubs. Each hub – hosted by a local not-for-profit or social enterprise – assists communities with testing project ideas, turning viable ideas into bankable projects and connecting them with capital (Community Power Hub, 2020). In two years, the hubs have also helped in the financing and commissioning of 15 community energy projects with a combined capacity of over 1.3 MW. In the process, they have generated local socio-economic benefits valued at almost USD 8 million (Sustainability Victoria, 2019).

The Victorian government continues to identify how it can support communities' efforts to tackle climate change. Victoria's 2017 renewable energy auction scheme incorporated design elements requiring proof of community engagement (IRENA, 2019b). While community energy groups have welcomed government support for business case development, feasibility studies and project implementation, they have described grant application processes as onerous (Parliament of Victoria Economic, Education, Jobs and Skills Committee, 2017). As a result, grassroots organisations have emerged throughout Australia to fill in financing gaps for community energy by raising funding via donation-based crowdfunding.[5] In 2017, the Australian government also lowered barriers for small businesses seeking to raise capital by establishing a legislative framework for investment crowdfunding (Australian Securities & Investments Commission, 2019).

4 The road map included a commitment to "encourage household and community development of renewable generation, products and services".

5 For example, see Citizens Own Renewable Energy Network Australia (corenafund.org.au) and the People's Solar (thepeoplessolar.pozible.com).

Denmark

Photo: Nordic Folkecenter for Renewable Energy

Since 2010, a community wind farm comprising three 3MW turbines has operated in Hvide Sande, Denmark

KEY FEATURES

- **From 2009 to 2020, wind energy projects were required to offer an ownership share of at least 20% to local residents and enterprises.**
- **Feed-in premiums guarantee a fixed premium on top of the wholesale market price for electricity.**
- **A guarantee fund offsets the costs of preliminary studies for local co-operatively owned wind energy projects.**

With regulations to support local renewable energy in place as early as the 1970s, Denmark may be considered the birthplace of modern community energy. Denmark's first phase of policy measures included restricting the ownership of wind projects to local actors within close proximity of the project and limiting a single investor's maximum ownership share (Gorroño-Albizu, Sperling and Djørup, 2019), as well as granting tax exemptions for income from wind turbines and implementing fixed FITs (Gancheva et al., 2018). Geographic eligibility for investment was later expanded to the entire country, thereby allowing external private ownership.

In the late 1990s, Denmark initiated a set of policy reforms to liberalize its electricity market. Its FIT scheme was initially phased out in favour of a renewable portfolio standard (RPS), but a few years later the government introduced a feed-in premium. In part because premiums were set at levels too low to attract projects and local ownership requirements were changed, almost no new wind energy projects – including community energy – were developed between 2003 and 2008.

Consequently, wind power capacities flatlined almost completely (IEA-RETD, 2016a). These developments reduced local interest in wind power (WWEA, 2018b).

Because of the negative impacts of these reforms on renewable energy deployment, Denmark began a policy rollback in 2009 and partly reinforced community energy measures. That year's Promotion of Renewable Energy Act mandated wind power developers to offer at least 20% of ownership to residents and enterprises living within a 4.5 kilometre radius (Gancheva et al., 2018). Feed-in premiums were increased, making projects economically viable again. The Danish government also created a guarantee fund that provides grants to local co-operatives to reduce the costs of preliminary studies for wind energy projects (WWEA, 2018b). These changes revived the community energy movement.

By the end of 2016, 52% of installed wind capacity in Denmark was again under community ownership (Gorroño-Albizu, Sperling and Djørup, 2019). However, major hurdles to development remained – namely price volatility (Bauwens, Gotchev and Holstenkamp, 2016), competition from large investors, and local opposition (Roberts, Bodman and Rybski, 2014). More recent policy changes may also impact future community energy development. Since 2018, feed-in premiums for solar and wind projects have been awarded through technology-neutral renewable energy tenders (Energistyrelsen, 2020b), creating additional challenges for communities to be awarded projects. Moreover, the Promotion of Renewable Energy Act was amended in June 2020 to repeal the 20% local ownership requirement (Energistyrelsen, 2020a).

Germany

Founded in 2010 by a group of students, the co-operative Heidelberger Energiegenossenschaft in Germany has built more than 25 solar plants

KEY FEATURES

- **Prior to 2014, feed-in tariffs guaranteed remuneration at a fixed price over 20 years.**
- **Amendments to the German Co-operative Law in 2006 facilitated the establishment of energy co-operatives.**

Citizen-led renewable energy projects are a cornerstone of Germany's early success in the energy transition (Energiewende). In 2018, renewables accounted for 35% of electricity generation in Germany (IRENA, 2020f) – partly attributable to the participation of relatively small actors such as community based enterprises, green start-ups, municipal utilities,[6] farmers and other individuals. Over 50% of Germany's total net electricity generation in the first half of 2020 was estimated to come from renewable energy sources (Fraunhofer Institute for Solar Energy Systems, 2020). Amendments to the German Co-operative Law also supported the rise of community energy in Germany (Debor, 2014). As of 2019, approximately 200 000 individuals were actively involved as members in about 880 energy co-operatives, the vast majority of them active in producing solar photovoltaic power (DGRV, 2020).

Historically, renewable energy policy measures in Germany have not included explicit supports for community energy but have paved the way for community energy projects to become a common form of investment. The Renewable Energy Act (Erneuerbare Energien-Gesetz), which came into force in 2000, is considered the key driving force for Germany's Energiewende. Setting fixed FITs over 20 years and providing grid priority for renewable energy, it allowed for a fast, decentralised expansion of renewable energy based on investments from a wide variety of actors, including individuals and community actors. As a result, newly founded energy co-operatives, a major legal form of community energy initiatives in Germany, peaked at about 170 in 2011.

However, with the nationwide shift from FITs to an auction scheme and revisions of the regulatory framework in 2014 and 2016, Germany has seen a sharp decline in the number of new community energy projects. Although the German government introduced special privileges for such projects into its renewable energy auction scheme, the enacting legislation failed to achieve its intended effect, because the definition of community energy only took into account voting rights in a renewable energy project. Most of the successful projects in the 2017 auction were developer-led projects with nominal community involvement (WWEA, 2018a). In 2018 and 2019, just 14 and 9 new energy co-operatives were formed, respectively.

The policy shift to auctions seems to have played a role in decreasing investments in community energy projects and reducing the initiation of new projects in favour of larger investors (Fell, 2019; WWEA, 2019). Possible reasons for this include the heavier bureaucratic burden and increased financial risks associated with participating in auctions (e.g. due to prequalification requirements), and, more generally, the increasing complexity of permitting processes.

6 Owing to the recent re-municipalisation of energy utilities, more than 150 new municipal utilities (Stadtwerke) were formed between 2005 and 2016 (Berlo, Wagner and Schäfer, 2018), thereby creating a more localised decision-making environment and facilitating the formation and co-ordination of energy communities.

Japan

Minamata Susubaru community solar photovoltaic project in Minamata city, Japan

KEY FEATURES

- **Feed-in tariffs were established in 2012.**
- **From 2011 to 2013, national government grants were available to support communities with local capacity building.**
- **Local governments offer tailor-made support programmes, such as Nagano Prefecture's profit repayment subsidy scheme.**

Community energy in Japan began to emerge in the 2000s through the actions of engaged individuals (Furuya, 2016). The Fukushima nuclear power accident in March 2011, coupled with various steps to open up Japan's electricity market further accelerated interest in community energy.

In 2012, Japan introduced its first FIT scheme with premiums among the highest in the world. Renewable energy projects under the scheme were also granted priority access to the grid. In addition to the FIT scheme, the Ministry of Environment launched, under its Plans for Community-led Renewable Energy Projects, a three-year grant programme aimed at building local capacity for community energy projects (Institute for Sustainable Energy Policies, 2014). From 2011 to 2013, 25 communities received annual grants of USD 95 000 and help in organising local stakeholder meetings, developing business plans and other activities (Furuya, 2016).

Building on the national government's grant initiative, several local governments set up tailor-made programmes to further encourage community energy projects. In 2013, Nagano Prefecture established its Profit Repayment Subsidy for Community Power Planning and Development programme, which invited proposals for FIT-eligible community-based projects to apply for additional financial support. Selected projects were eligible for subsidies covering 50% to 67% of feasibility study costs, or 25% to 30% of installation costs.[7] From 2014 to 2019, 33 projects received a total of USD 2.7 million in funding (Nagano Prefecture, 2020).

Although interest in community energy projects has grown substantially in Japan, generation capacity amounted to just 90 megawatts (MW) as of 2018 (Yamashita, 2018). While several cities and prefectures continue to expand renewable energy and community ownership, the national government has scaled back support schemes such as the FIT. As of 2020, any projects larger than 250 kilowatts (kW) must compete in auctions (Colthorpe, 2020), affecting the further rollout of community energy (Bellini, 2019; Yamashita, 2018).

7 Eligible energy sources and the percentage of costs covered by the subsidy have been adjusted year by year. For example, solar photovoltaic has been removed from the list of eligible energy sources because its cost has dropped significantly.

Scotland, United Kingdom

Udny Community Wind Project in Aberdeenshire, Scotland

KEY FEATURES

- **Explicit targets were set for community energy.**
- **Feed-in tariffs, in place from 2010 to 2019 in the UK, were succeeded in 2020 by the Smart Export Guarantee.**
- **Dedicated financial support schemes (grants, loans) are in place for both early-stage activities and development of projects.**
- **Until 2015, investors in community energy projects were eligible for tax relief offered through the Enterprise Investment Scheme, Seed Enterprise Investment Scheme, and Social Investment Tax Relief.**
- **Community energy enjoyed dedicated advice and support through one-stop-shops.**

Empowering communities by fostering innovative and integrated local energy systems and networks has been identified as one of the key priorities of Scotland's energy strategy (Scottish Government, 2017). As such, Scotland has set an explicit target to reach 1 GW of community and locally owned renewable generation capacity by 2020. This represents an update of Scotland's initial target of 500 MW, which it met and surpassed three years earlier than expected. A target of 2 GW has been set for 2030 (Energy Saving Trust, 2020).

Community energy in Scotland has benefitted from the national FIT scheme introduced by the British government in 2010. To reach its ambitious community energy targets and provide support for community energy development, the Scottish government established the national charity Community Energy Scotland in 2007, followed by the Community and Renewable Energy Scheme (CARES) in 2011. Community Energy Scotland and CARES both provide advice and support to community groups, local authorities and businesses in Scotland interested in investing in locally owned renewable energy projects through all stages of project development. Since 2013, CARES has been delivered by a government-funded consortium, Local Energy Scotland, consisting of the national energy agency, an environmental charity and three social businesses (Community Energy Scotland, n.d.; Local Energy Scotland, 2019a).

CARES offers loan finance, grant-to-loan funding assistance and specialist advice to community groups (Energy Cities, 2019). Its main financial offerings are: 1) grant funding of up to USD 33 000 to fund early-stage activities; and 2) development loans and grants of up to USD 200 000 to fund the development costs of renewable energy projects (Local Energy Scotland, 2019a). CARES also assists projects with funding applications for the Energy Investment Fund, which supports community energy projects that have received planning permission but still face challenges accessing funding. The fund is delivered by the Scottish Investment Bank and offers a lending service that can be tailored to each community project through a case-by-case assessment.

Scotland has higher growth rates of community energy than the rest of the United Kingdom. As of June 2019, Scotland had over 20 000 community and locally owned renewable electricity generation projects accounting for approximately 730 MW of installed capacity[8] (Energy Saving Trust, 2020). Roughly 20% of community energy projects to date have received funding under at least one scheme provided by CARES (Local Energy Scotland, 2019b).

While preferential financial schemes have supported community energy project development in Scotland, enabling frameworks have remained essential to community energy growth. Scotland has seen a significant reduction in new projects due to ongoing shifts in British energy policy since 2015, including the removal of various forms of tax relief for community energy investors and the termination of Britain's FIT scheme. The annual growth rate of community energy electricity and heat generation capacity decreased from 37% in 2015 to 4% in 2018 (Edgar, Ahern and Williams, 2020).

8 Categories of ownership under the "community and locally owned" target include community groups (82MW), farms/ estates (290MW), local authorities (130MW), local Scottish businesses (92MW), housing associations (70MW) and public sector/charities (67MW).

United States

Kaupuni Village, an affordable housing, net-zero community in Oahu, Hawaii, United States

KEY FEATURE

- **Several states in the United States have implemented virtual net energy metering and community choice aggregation policies encouraging community energy.**

Community energy development in the United States has largely been driven by state policies. While federal production and investment tax credits have historically been a key driver of renewable energy development, many community energy projects are owned by entities that do not pay federal income tax and thus are unable to benefit from these incentives (Farrell, 2016). State electricity regulatory schemes vary widely, influencing how community energy projects are implemented across the country. Many different community energy ownership models have emerged, including projects led by utilities, projects owned by special purpose entities, and projects organised and implemented by non-profit organisations (Heeter, Xu and Fekete, 2020).

Virtual net energy metering (VNM) has played a key role in enabling community energy projects in the United States. As of 2020, 20 states and the District of Columbia had legislated community solar programmes or pilot projects, all of which rely on some form of VNM that allows a customer to buy or lease a portion of an off-site renewable energy project and receive bill credits for their share of the electricity generated by the project (Heeter, Xu and Fekete, 2020).[9] As of June 2020, over 2.6 GW of community solar projects had been installed in the country, with approximately half of the total capacity concentrated in the states of Massachusetts (436 MW), Minnesota (663 MW), and New York (243 MW) (NREL, 2020). Growth in Minnesota can be attributed in part to its VNM-based Community Solar Gardens scheme,[10] under which customers are compensated at a value of solar rate representing the direct benefit that projects provide to the utility and its ratepayers. One key factor that has contributed to the scheme's success is that there are no annual caps on how much new solar generation capacity can participate in the scheme (Paulos, 2019).

As of 2020, nine states had also adopted legislation for community choice aggregation. CCA empowers local governments to aggregate customer load and procure electricity on their behalf (Farrell, 2020). Despite customer interest in renewables, however, most CCAs outside California and Illinois have not emphasized local renewable energy (O'Shaughnessy et al., 2019). This is because the aggregator's ability to procure renewables is heavily influenced by other state policies and whether it operates in a regulated or deregulated jurisdiction. For instance, aggregators in California can sign long-term contracts directly with renewable energy developers, while aggregators in deregulated states procure energy through shorter-term contracts with competitive suppliers. The durations of these shorter contracts generally do not provide sufficient financial certainty to allow suppliers to develop local renewable energy projects (O'Shaughnessy et al., 2019).

To date, community energy development in the United States has been concentrated in a few states, suggesting that enabling policies such as VNM and CCA, on their own, are not sufficient to drive community energy growth. In states where community energy has flourished, VNM and CCA are part of broader policy packages supporting renewable energy development. Improved policy alignment at the state and federal levels, combined with non-discriminatory incentives accessible to all renewable energy projects, would accelerate community energy development in the country.

9 One of the main drivers for VNM is to reduce participation barriers for those who cannot take advantage of net metering, which is predominantly associated with solar energy.

10 Minnesota's legislation applies only to the state's largest electric utility. However, municipalities, cooperative utilities and at least one additional investor-owned utility have developed their own community solar programs (Chan et al., 2018).

ANNEX II. CASE STUDIES: FINANCING COMMUNITY ENERGY PROJECTS

Mindanao, Philippines

KEY FEATURE

- **An Asian Development Bank grant was leveraged to expand household access to renewable energy services and establish a revolving fund for local economic development initiatives.**

Rural electrification has been one of the top priorities for the government of the Philippines. While the electricity access rate is as high as 98% in the capital region, remote regions still face significant problems with energy access. On the island of Mindanao, the electrification rate in 2016 stood at 74% (Department of Energy (Philippines), 2017).

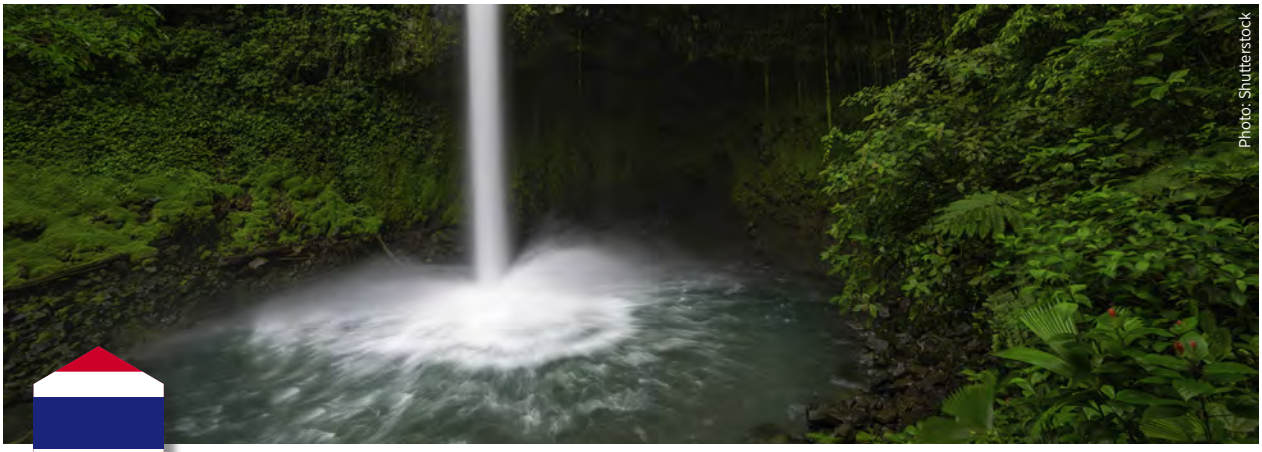
To increase electricity access in rural areas of Mindanao, in 2010 the Asian Development Bank – in collaboration with the National Energy Administration, non-governmental organisations, electric co-operatives and local communities – supported the installation of micro-hydro power generation projects and created a revolving fund to assist households in paying for electrical connections and livelihood development (Ludwig, 2015). A total of USD 2 million in grants under the bank's Clean Energy Financing Partnership Facility was allocated to the initiative (ADB, 2016).

Local community-based organisations were established to manage the power generation projects and administer the revolving fund. They received training on project operation and maintenance as well as financial training from different entities, including local non-governmental organisations. Administration of the revolving fund involves overseeing and processing loan applications from households focusing on agricultural production or micro-enterprise development. In the first cycle of the fund, successful applicants received between USD 1 000 and 6 820 for a duration of about three months. In most cases, loans were paid back in weekly instalments (Ludwig, 2015).

By 2015, two micro-hydro power projects totalling 55 kW of capacity had been installed and operated under net-metering agreements. All household beneficiaries in the first cycle of the revolving fund were able to pay back their loans. Women also played a significant role in the initiative, making up over a quarter of the community members trained to operate the projects. As of 2016, more than 1 500 households gained access to renewable electricity and local economic development has increased through the establishment of small- and medium-sized enterprises powered by the micro-hydro projects (ADB, 2016).

This project illustrates the potential of community energy to contribute to the broader development of local economies when supported by cross-sectoral policies. Similar models could be replicated in other communities that have an unmet demand for electricity in productive applications.

Guanacaste, Costa Rica



KEY FEATURES

- **An electric co-operative was established with a foreign government loan and support from national government institutions.**
- **A consortium of co-operatives minimises investment risks in renewable energy projects.**

In 1965, 229 local members in the northwestern region of Guanacaste in Costa Rica established a rural electricity co-operative with the financial support of the United States' Alliance for Progress programme. At that time, only around half of the national population had access to electricity and achieving 100% electricity access was one of the Costa Rican government's top priorities (Madriz-Vargas et al., 2016; Teske, Morris and Nagrath, 2020).

The Alliance for Progress initially provided a USD 3 000 loan at 1% interest (to be repaid over 30 years with a ten-year grace period) for the establishment of Coopeguanacaste. From the onset, the co-operative received support from state-owned utility, Instituto Costarricense de Electricidad (ICE), and the National Bank of Costa Rica. The co-operative was granted a concession to operate within a certain area, and all electricity generated in that area had to be sold to the national utility before being re-sold to end users.

With the loan, Coopeguanacaste built distribution lines to connect the concession area to the national grid. While technical assistance was provided by ICE at the outset, Coopeguanacaste was able to operate autonomously approximately five years after construction. In addition to electricity distribution, Coopeguanacaste and the other three rural electric co-operatives in Costa Rica established Conelectricas in 1989 for the purpose of developing new renewable energy projects (Madriz-Vargas, Bruce and Watt, 2018). By leveraging their previously generated revenues and bundling their finances, the four co-operatives were able to make investments in power generation.

Using revenues generated through Conelectricas, its distribution network and further diversification (e.g. branching into telecommunications), Coopeguanagaste was able to develop a 17.5 MW mini-hydro power plant in 2008 under a 15-year build, lease and transfer contract.[11] Co-operative members were given technical training on how to operate a renewable energy project (Madriz-Vargas et al., 2016). The success of this initiative led to Coopeguanacaste's decision to develop a second 17.5 MW hydro-power plant in 2018.

By 2015, Coopeguanacaste was managing a concession area of 3 915 square kilometres, covering over 70 000 connections and serving nearly 100 000 end users, including 28 000 households, eco-tourism businesses, and agro-industry. The co-operative also employed some 400 local community members (Madriz-Vargas, Bruce and Watt, 2018).

Although the case of Coopeguanacaste illustrates a successful community-led renewable energy venture, the cooperative faces some challenges due to policy uncertainty surrounding Costa Rica's electricity sector and the fluctuating prices it receives for electricity sold to ICE (Madriz-Vargas, 2018).

11 Under a build, lease and transfer model, a private sponsor builds a facility, transfers ownership to the commissioning entity, leases the facility from the entity and operates it up to the expiry of the lease (Infrastructure Consortium for Africa/Public-Private Infrastructure Advisory Facility, 2009).

Department of Quiché, Guatemala

KEY FEATURE

- **Corporate social responsibility was combined with public financing and community contributions to fund a community energy project.**

Guatemala is rich in renewable energy resources yet depends heavily on hydrocarbons and is a net importer of energy. As of 2018, 95% of the population had access to energy, though some villages, most of them with indigenous populations, remained off-grid (IEA et al., 2020).

As in many other parts of the world, lack of access to affordable debt and equity financing is one of the major challenges to investment in community energy in Guatemala. In an effort to expand electricity access to off-grid location in the country and address the challenge of financing, the Latin American Energy Organisation (OLADE) supported the government by piloting a multi-stakeholder model that combined public sector finance with corporate social responsibility financing from private sector companies and contributions from communities (Kolmsee and Wiemann, 2017). Approximately USD 600 000 in grants and aid was raised, the majority of which came from non-governmental organisations and the public sector (ENERGIA and IUCN, 2015).[12]

As a result, a 90 kW micro-hydro project was built in 2014 to provide electricity to the villages of Batzchocolá, Laguna Batzchocolá and Visiquichum in the Department of Quiché. The project provides electricity to 141 households, 19 micro- and small businesses, and other community services through a total of 170 connections. Project operation, maintenance and management are carried out by the Asociación Hidroeléctrica de Desarrollo Integral Norte del Quiché (ASHDINQUI),[13] a community energy service company formed to administer electricity generation and distribution.

A portion of the funding was also deployed to establish a revolving fund administered by ASHDINQUI to support productive uses of energy produced by the Batzchocolá micro-hydro generation project. Three communities have benefitted from improved living conditions as well as new job and business opportunities. Many community members have been successful in opening new micro- and small businesses that generate enough revenue to cover the project's operational costs. Moreover, as the project's funding came in the form of grants and aid, the communities do not face pressure to provide a return on investment. The project nevertheless faces some challenges. The communities must manage funds to cover operation and maintenance costs, and set up a more sustainable energy plan for the dry season when the project is not in operation.

12 Funding sources for the project are HIVOS (40%), the National Electrification Institute (19%), the Ministry of Energy and Mines/OLADE (15%), Clean Energy Guatemala (ELGUA) (13%), the Municipal Government of Nebaj (9%), TELUS International (3%) and ASHDINQUI (1%) (ENERGIA and IUCN, 2015).

13 ASHDINQUI is made up of an equal number of men and women, including indigenous community members, who participated actively in the project implementation process and in new productive business ventures (ENERGIA and IUCN, 2015).

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